# SIEMENS

**SIMATIC**

# Products for Totally Integrated Automation

**Catalog ST 70**

**Edition 2017**

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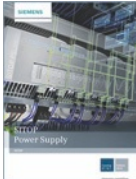**Industrial Communication**                             IK PI
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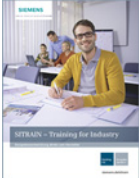
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# Products for Totally Integrated Automation

**SIMATIC**

**Catalog ST 70 · 2017**

Supersedes:
Catalog ST 70 · 2015
Catalog News ST 70 N · 2016

Refer to the Industry Mall for current updates of this catalog:
www.siemens.com/industrymall

The products contained in this catalog can also be found in the Interactive Catalog CA 01.
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**1**

# Introduction

*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

Siemens ST 70 · 2017

## Introduction
LOGO!

### LOGO! logic module

■ **Overview**

***LOGO!:***
***Simply ingenious for small automation tasks***

LOGO! 8 is the compact, easy-to-use and low-cost solution for simple control tasks. It is universally applicable in industry and in functional or residential buildings. Wiring is significantly reduced by internal linking of logic functions – similar to a programmable logic controller. Versions are available for LOGO! with display and integrated operating unit for displaying message texts and variables, or without display and keys.

Simple operation:
• Interconnection of functions by mouse click on the PC or at the press of a button on the device

Minimum time requirements:
• Wiring solely of the inputs and outputs

Reduced costs:
• Many integral functions of switching technology

High level of flexibility:
• Simple modification of functionality at the press of a button
• Versions for different operating voltages
• Modular design, therefore expandable at any time
• Ethernet interface for networking LOGO! basic units for connection to SIMATIC Controllers and SIMATIC Panels or for programming with a PC
• Networking of up to 16 devices
• Use of micro SD cards
• Data logging, user-defined functions (macro blocks), astronomical clock
• Integral web server in all LOGO! 8 devices



New as of Release FS:04:
• Integrated Modbus protocol (TCP/IP as client and server)
• Time synchronization via NTP (as client and server)
• LOGO! Access Tool for data access in RUN
• Extended temperature range -20 to +55 °C

For more information, refer to:

www.siemens.com/logo

| LOGO! 8 | 24CE 24CEo | 24RCE 24RCEo | 12/24 RCE 12/24 RCEo | 230 RCE 230 RCEo |
|---|---|---|---|---|
| Supply voltage | 24 V DC | 24 V AC/DC | 12/24 V DC | 115/230 V AC/DC |
| Inputs | 8 (of which 4 for use in analog mode) | 8 | 8 (of which 4 for use in analog mode) | 8 |
| Outputs | 4, transistor | 4, relay | | |
| Continuous current | 0.3 A | 10 A (with resistive load), 3 A (with inductive load) | | |
| Short-circuit protection | Electric (1 A) | External fuse required | | |
| Integral time switches/ power reserve | Available Power reserve 480 h | | | |
| Ambient temperature | 0 to +55 °C; FS:04 and higher: -20 to +55 °C | | | |
| Radio interference suppression | In accordance with EN 50 011 (limit class B) | | | |
| Degree of protection | IP20 | | | |
| Certification | In accordance with VDE 0631, IEC 1131, FM, Class 1, Div 2, cUlus, C-Tick, CSA, marine approvals | | | |
| Installation | On 35 mm DIN rail or wall mounting | | | |
| Dimensions (W x H x D) | 72 × 90 × 55 mm (4 modular widths) | | | |
| Programming cable | Standard Ethernet | | | |

## Overview

Siemens offers the right controller for a wide range of automation requirements. The SIMATIC range of controllers comprises Basic, Advanced, Distributed and Software Controllers offering impressive scalability and integration of their functions.

Engineering in the Totally Integrated Automation Portal (TIA Portal) enables optimum automation solutions to be found for every application.
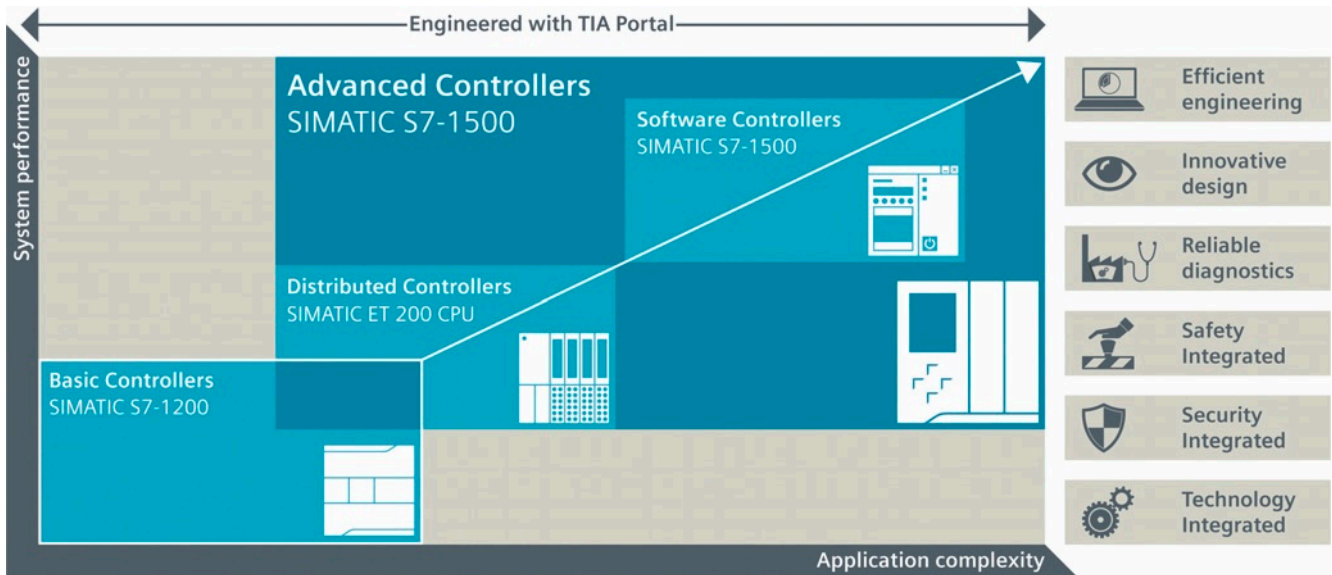


[1] SIMATIC S7-300 will be available at least until 2020 as a mature, tried and proven controller. Afterwards, our 10-year replacement part guarantee goes into effect.

*Modernization with SIMATIC Controllers –*
*Higher productivity, efficiency and availability through retrofit or modernization*

To remain competitive in the long term, machines and plants must be continually adapted to the latest requirements. For this purpose, Siemens offers solutions using SIMATIC technologies tailored to your individual needs.

Benefit from the time-saving simulation of automation while production is in progress, optimized control options by means of I/O adapters and integrated system diagnostics, as well as global support for retrofitting or modernization. Regardless of whether you want to completely modernize your plant or just replace parts of it.

www.siemens.com/tia-migration
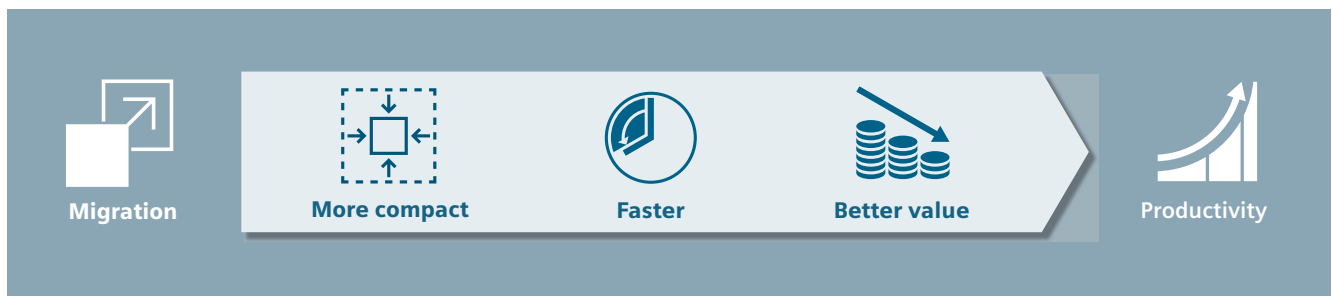
# Introduction

## SIMATIC Basic Controllers

**SIMATIC S7-1200**

**1**

### ■ Overview

***SIMATIC S7-1200:***
***Controllers in compact design for simple automation tasks***

SIMATIC S7-1200 Basic Controllers offer persuasive, comprehensive technological features and integrated I/Os, as well as a compact, space-saving design. They are the intelligent choice for small to medium-sized projects.

The functionality of the SIMATIC S7-1200 controllers is seamlessly extended by the SIMATIC S7-1500 controllers that have been developed for more complex tasks. This means you benefit from uniform processes and the resulting maximum efficiency in engineering, operation, and maintenance, and when migrating systems.

- Scalable and flexible design:
  The SIMATIC S7-1200 hardware is compact and modular, and it enables you to develop automation solutions that exactly meet your requirements. The innovative signal board concept lets you easily add digital and analog I/Os without changing the physical size of the controller.

- Engineering in the TIA Portal:
  SIMATIC S7-1200 is perfectly integrated into the Totally Integrated Automation Portal (TIA Portal) for maximum engineering efficiency. All SIMATIC Controllers and SIMATIC Panels are based on a shared database, a standardized operator concept, and centralized services. You benefit from a significantly reduced engineering overhead.

- Networking:
  The Industrial Ethernet/PROFINET interface integrated into SIMATIC S7-1200 offers seamless communication with distributed I/O, with SIMATIC HMI Panels for visualization and additional controllers for CPU-to-CPU communication. It can also be used with devices from third parties for extended integration possibilities as well as with the TIA Portal engineering framework for configuring and programming.

- Integrated technology:
  Integrated technology features for metering and measuring tasks, closed-loop control and motion control make the SIMATIC S7-1200 a versatile system that is perfectly suited for numerous automation tasks.

- Security Integrated:
  Protection from unauthorized code or process value changes means higher availability during operation. Know-how protection, copy protection and access protection prevent unauthorized third parties from opening and duplicating blocks and keep your algorithms and processes safe. The security features are integrated in the S7-1200 and the TIA Portal.



- Diagnostics:
  SIMATIC S7-1200 offers a diagnostic functionality that is already integrated in the system, without the need for any further programming. A standardized display concept enables error messages to be identically visualized as plain text information in the TIA Portal, on the HMI and in the web server.

- Safety Integrated:
  Safety-related applications are possible up to SIL 3 according to IEC 62061 and PL e according to ISO 13849 with fail-safe S7-1200 CPUs. The integrated PROFIsafe functionality enables connection of additional fail-safe devices, such as frequency converters. The S7-1200 fail-safe CPUs can be used for standard and fail-safe applications in machine and plant automation.

For more information, refer to:

www.siemens.com/s7-1200

| SIMATIC S7-1200 | CPU 1211C | CPU 1212C | CPU 1214C | CPU 1215C | CPU 1217C | CPU 1212FC | CPU 1214FC | CPU 1215FC |
|---|---|---|---|---|---|---|---|---|
| CPU type | DC/DC/DC, DC/DC/RLY, AC/DC/RLY | | | | DC/DC/DC | DC/DC/DC, DC/DC/RLY | | |
| Ethernet interfaces | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 |
| RAM | 50 KB | 75 KB | 100 KB | 125 KB | 150 KB | 100 KB | 125 KB | 150 KB |
| Integrated digital I/O | 6/4 | 8/6 | 14/10 | 14/10 | 14[1]/10 | 6/4 | 8/6 | 14/10 |
| Integrated analog I/O | 2/0 | 2/0 | 2/0 | 2/2 | 2/2 | 2/0 | 2/0 | 2/0 |
| Number of signal modules | – | 2 | 8 | 8 | 8 | 2 | 2 | 8 |
| Number of communication modules | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Width | 90 mm | 90 mm | 110 mm | 130 mm | 150 mm | 90 mm | 90 mm | 110 mm |
| Ambient conditions | -20 °C ...+60 °C (horizontal installation) | | | | | | | |

[1]  In addition, the CPU 1217 has a line driver IO in order to control stepper motor positioners up to a frequency of 1 MHz.

## Overview

*SIMATIC S7-1500:*
*Maximum productivity and efficiency*

Thanks to a large variety of innovative features, the SIMATIC S7-1500 Advanced Controllers set new standards for the highest level of productivity and can be used extremely flexibly in machine building and automation of entire production plants. They are suitable as compact or distributed controllers in series machine building as well as central controllers in the control cabinet for medium and high-end machines, and they meet the high requirements regarding performance, communication, flexibility and technological function.

- Maximum performance:
  For maximum productivity and product quality in your production process, SIMATIC S7-1500 supports you with the fast backplane bus with PROFINET performance and the shortest response times as well as a command processing time in the CPU as little as 1 ns. The PROFINET connection with deterministic time response ensures reproducibility and precision in the µs range.

- Integrated system diagnostics:
  The SIMATIC S7-1500 CPU offers a diagnostic function that is already integrated in the system and can be used without the need for any programming. Thanks to this system diagnostics function integrated in the firmware, faults are detected independent of the program and error messages are uniformly displayed as plain text information in TIA Portal engineering, in the web server, on the CPU display as well as on the connected HMI. With the real-time trace function, you can record up to 1 000 sporadic events, precisely diagnose them and ultimately optimize your automation.

- Functional design and very easy handling:
  Very easy handling and the highest degree of user-friendliness in many interesting details are convincing properties of the SIMATIC S7-1500. This is demonstrated, for example, in the design of a SIMATIC S7-1500 station and in the easy wiring with channel-granular signaling. Without having to rely on engineering, the CPU display supports diagnostics and commissioning through functions such as station and module status, event display, tag status checking and IP address assignment.

- Security Integrated:
  A security concept with authorization levels, authentication, copy and block protection is installed in the SIMATIC S7-1500; it helps you protect your know-how and maintain communication integrity. This concept protects your investment and helps you achieve greater plant availability.



- Safety Integrated:
  SIMATIC S7-1500 controllers enable the highest degree of integration: one controller, one communication system and one engineering design for both standard and fail-safe automation. The multi-channel, fail-safe IO modules can be addressed directly during engineering.
  Any standard CPU is also available as fail-safe CPU.

- Engineering in the TIA Portal:
  TIA Portal is the innovative engineering framework for all automation tasks, with data transfer from the product design, automatic project generation for the SIMATIC S7-1500 and HMI Panels and data transparency during operation to optimize productivity.

- Scalable CPU types:
  Various CPU versions are available in several performance classes: standard and fail-safe CPUs, compact CPUs with integrated inputs and outputs as well as technology functions, technology CPUs with extended motion control functions and the ODK CPU with C/C++ block call from the control program.

For more information, refer to:

www.siemens.com/s7-1500

**Introduction**
SIMATIC Advanced Controllers

**1**

■ **Overview** (continued)

| Standard CPUs | CPU 1511 | CPU 1513 | CPU 1515 | CPU 1516 | CPU 1517 | CPU 1518 | CPU 1518 ODK |
|---|---|---|---|---|---|---|---|
| C/C++ blocks | – | – | – | – | – | – | available |
| DP/PN interfaces/PN ports | 0/1/2 | | 0/2/3 | 1/2/3 | | 1/3/4 | |
| Program memory/data | 150 KB/ 1 MB | 300 KB/ 1.5 MB | 500 KB/ 3 MB | 1 MB/ 5 MB | 2 MB/ 8 MB | 4 MB/ 20 MB | 4 MB/ 20 MB + 20 MB |
| Bit performance | 60 ns | 40 ns | 30 ns | 10 ns | 2 ns | 1 ns | |
| Maximum number of connections | 96 | 128 | 192 | 156 | 320 | 384 | |
| Positioning axes Typical (4 ms)/max. | 5/10 | | 7/30 | | 70/128 | 128/128 | |
| Width | 35 mm | | 70 mm | | 175 mm | | |

| Compact CPUs | CPU 1511C | | CPU 1512C | |
|---|---|---|---|---|
| DP/PN interfaces/PN ports | 0/1/2 | | | |
| Program memory/data | 175 KB/ 1 MB | | 250 KB/ 1 MB | |
| Bit performance | 60 ns | | 40 ns | |
| Inputs/outputs | 16 DI/16 DO/5 AI/2 AO | | 32 DI/32DO/5 AI/2 AO | |
| Maximum number of connections | 96 | | 128 | |
| Positioning axes Typical (4 ms)/max. | 5/10 | | | |
| Width | 35 mm | | | |

| Fail-safe CPUs | CPU 1511F | CPU 1513F | CPU 1515F | CPU 1516F | CPU 1517F | CPU 1518F | CPU 1518F ODK |
|---|---|---|---|---|---|---|---|
| C/C++ blocks | – | – | – | – | – | – | available |
| DP/PN interfaces/PN ports | 0/1/2 | | 0/2/3 | 1/2/3 | | 1/3/4 | |
| Program memory/data | 225 KB/ 1 MB | 450 KB/ 1.5 MB | 750 KB/ 3 MB | 1.5 MB/ 5 MB | 3 MB/ 8 MB | 6 MB/ 20 MB | 6 MB/ 20 MB + 20 MB |
| Bit performance | 60 ns | 40 ns | 30 ns | 10 ns | 2 ns | 1 ns | |
| Maximum number of connections | 96 | 128 | 192 | 156 | 320 | 384 | |
| Positioning axes Typical (4 ms)/max. | 5/10 | | 7/30 | | 70/128 | 128/128 | |
| Width | 35 mm | | 70 mm | | 175 mm | | |

## Overview (continued)

### SIMATIC Technology CPUs

In addition to standard and safety applications, the technology CPUs of the SIMATIC S7-1500 Advanced Controllers combine an expanded range of motion control functions in one controller in the familiar TIA Portal environment.

The benefits of the technology CPUs at a glance:

• Standard, safety and motion control functions in one CPU

• Extended motion control tasks such as gearing or camming

• A high degree of engineering efficiency due to graphic and tabular configuration and optimization of cams

• Adaption and calculation of cams in the user program during operation (e.g. when there is a product change)

The connection via PROFINET also allows easy, integrated diagnostics and detailed error detection, which allows machine downtimes to be kept to a minimum.

Integrated solution

In interaction with SINAMICS servo drive systems (e.g. SINAMICS S110, S120, V90), which are easily integrated via PROFINET, different and multi-faceted motion control tasks can thus be efficiently implemented in the SIMATIC environment with TIA Portal.

www.siemens.com/sinamics

The engineering of SIMATIC and SINAMICS is carried out in the Totally Integrated Automation Portal (TIA Portal). This engineering framework allows the parameterization of technology functions with technology objects. These objects allow a simple view of the Motion Control functions and can be configured and parameterized via user-friendly input masks. This not only simplifies the work of a machine builders, but also the work of their customers, who do not have to acquire specialist knowledge to maintain or re-configure their machines. Instead, they can use their already available PLC know-how.



Technology objects are already integrated for the following basic functions:

• Speed

• Positioning

• Measuring input

• Synchronous operation

• Cam disk

• Cam, cam track

• Flying shears

• Gripper feed

• Pressure mark correction

• Ejector

SIMATIC Technology CPUs are available with different configuration options and can address a maximum of 128 axes.

For more information, refer to:

www.siemens.com/t-cpu

| Technology CPUs | CPU 1511T | CPU 1515T | CPU 1517T/TF |
|---|---|---|---|
| DP/PN interfaces/PN ports | 0/1/2 | 0/2/3 | 1/2/3 |
| Program memory/data | 225 KB/ 1 MB | 750 KB/ 3 MB | 3 MB/ 8 MB |
| Bit performance | 60 ns | 30 ns | 2 ns |
| Maximum number of connections | 96 | 192 | 320 |
| Positioning axes Typical (4 ms)/max. | 5/10 | 7/30 | 128/128 |
| Width | 35 mm | 70 mm | 175 mm |

# Introduction
## SIMATIC Distributed Controllers

**Distributed Controllers – the central modules of the ET 200**

### Overview

The SIMATIC ET 200 CPU Distributed Controllers combine a compact design with versatility. Especially in the mid performance range for machines with distributed intelligence or series machines offering little space, the Distributed Controllers are the perfect solution for standard and fail-safe applications.

Regarding Distributed Controllers, not only the SIMATIC ET 200SP CPUs and the new SIMATIC ET 200SP open controller, but also the tried and tested controllers for SIMATIC ET 200S and ET 200pro systems are available.

Thanks to their compact design, Distributed Controllers are suitable for series machine construction. They can be mounted directly on the machine in small control boxes. In networked plants they are connected to the central control cabinet of a production line via PROFINET.

The relocation of the intelligence from the central control cabinet to Distributed Controllers at the individual stations has a positive effect on the availability of a plant. If a fault should occur at one station, this can be cleared without bringing the entire plant to a standstill.

*SIMATIC ET 200SP –*
*the new generation of distributed I/O*



Interface modules with integrated CPU and PROFINET connections are available for SIMATIC ET 200SP. The functionality of the CPUs corresponds to that of the S7-1500. Various connection technologies can be implemented with the three integrated Ethernet ports. Thanks to the I-device functionality, the connection to a higher-level CPU can be made in just the same way as with a standard interface module. The CPUs support additional functions such as PROFIenergy, isochronous mode, configuration control (option handling) and DP master.

**Standard CPUs**:



- CPU 1510SP-1PN
- CPU 1512SP-1PN

The fail-safe ET 200SP CPUs allow the processing of standard and safety programs. They are certified in accordance with EN 61508 (2nd edition) for functional safety and are suitable for use in safety-relevant applications up to SIL 3 according to IEC 62061 and PL e according to ISO 13849.

**Fail-safe CPUs**:



- CPU 1510SP F-1 PN
- CPU 1512SP F-1 PN

**Overview** (continued)

### SIMATIC ET 200SP Open Controller



The ET 200SP Open Controller combines the functions of a PC-based Software Controller with visualization, Windows applications and central I/Os (inputs/outputs) in a single compact device.

The functionality of the ET 200SP Open Controller corresponds to that of the S7-1500. It can be flexibly expanded with standard ET 200SP modules and optimized for machines wth distributed architecture.

Highlights:

- "All-in-one"
  - Control with central I/Os
  - Visualization and Windows applications
  - PC interfaces for monitor, mouse and keyboard
  - Gigabit Ethernet
- High system availability
  - Software Controllers independent of Windows
  - Windows can be restarted while controller is running
- Compact and modular
  - Small footprint
  - Extensive range of I/O modules
  - Single-row expansion with up to 64 modules
- Ruggedness
  - Continuous operation at up to 60° C ambient temperature without loss of performance
  - Easy to maintain thanks to fanless design
  - High EMC
  - Resistant to vibration and shock loads
- User-friendly design
  - Externally accessible bulk memory, protected against unauthorized access
  - Integral Run/Stop switch for the controller
  - Additional memory capacity through SD card
  - PROFINET on board: replaceable BusAdapter for flexible connection
- Efficient engineering in the TIA Portal
  - No Windows settings necessary for the Software Controller
  - Reusability of S7 programs on other hardware platforms

### SIMATIC ET 200SP Open Controller with Safety Integrated

The SIMATIC ET 200SP Open Controller with fail-safe is a PC-based controller with the design of the ET 200SP I/O system. The pre-installed SIMATIC S7-1500 Software Controller is used for control purposes, here in its fail-safe version with Safety Integrated. The integrated safety function makes the system especially compact and therefore saves space in the control cabinet. The additional safety controller that would otherwise be necessary is not required. Its compact design and modular expandability make it particularly well suited for series machine building.

### *SIMATIC ET 200pro CPU*



The SIMATIC ET 200pro is a particularly small, very rugged and high-performance I/O system with IP65/67 degree of protection. Interface modules are available in both standard and fail-safe versions offering CPU functionality for connection to PROFINET. A comprehensive range of modules rounds off the offering.

The devices are ideal for use in harsh industrial environments, directly at the machine.

The time-saving installation enables highly flexible implementation of automation solutions.

The CPU supports both PROFINET IO (up to 128 IO devices can be connected) and PROFINET CBA, as well as PROFIBUS DP (as master for up to 124 slaves). The open Ethernet communication (TCP/IP, UDP, ISO-on-TCP) permits reliable and high-speed data exchange. The systems can be used at ambient temperatures of -25 to +55 °C and a relative humidity of 5 to 100 %. The SIMATIC ET 200pro Distributed Controllers have been upgraded with new CPUs with the latest SIMATIC S7-1500 technology for standard and fail-safe automation tasks.

For more information, refer to:

www.siemens.com/distributed-controller

**Introduction**
SIMATIC Software Controllers

**1**

**SIMATIC S7-1500 Software Controller**

■ **Overview**

**SIMATIC S7-1500 Software Controller**

PC-based automation is combined with the highest degree of system availability in the SIMATIC S7-1500 Software Controller: The Software Controller runs completely independent of the Windows system, which means it also continues to run during restart or even when Windows fails.

- Flexible control for special-purpose machines with high performance and function requirements:
  - Integrated system functions similar to the SIMATIC S7-1500 Advanced Controllers
  - Integration of user-specific functions via open interfaces (e.g. C/C++/MATLAB)
  - Flexible connection to any interfaces (e.g. IT) and fieldbus systems
- Use with industrial SIMATIC IPCs:
  - Free scalability across the entire IPC range
- Industry and customer-specific requirements are fulfilled:
  - Integration of PC software, for example for image processing
  - All on a single device, easier communication
  - High computing power and integration of complex algorithms into the control program
  - Integration of model-based software development (e.g. MATLAB/Simulink)
- Increased system availability:
  - Fast start-up of controller
  - Reboot of Windows during operation (e.g. updates)
  - The controller continues to run, even if Windows fails
- Engineering efficiency:
  - Complete engineering in the TIA Portal: No Windows settings required on controller
  - Simple integration of high-level languages into the user program
  - Easy implementation from interfaces to PC applications with ODK 1500S
  - Direct integration of Simulink models into the user program with Target 1500S
  - Full compatibility with SIMATIC S7-1500
- Security Integrated:
  - Know-how protection for machine manufacturer
  - Access protection for the end customer

**SIMATIC S7-1500 Software Controller with Safety Integrated**

The integrated safety functionality offers additional benefits in the form of savings in space and costs, because no additional safety controller is required. This has noticeable advantages in terms of engineering efficiency, safety and user-friendliness.

**SIMATIC S7-1500 Software Controller ODK**

SIMATIC ODK 1500S supports the development of Windows and real-time library functions for the SIMATIC S7-1500 Software Controller and enables integration of high-level language code, C++.



Application

Windows library applications:

- Interfacing to databases
- Communication with Windows programs, such as Office applications
- Connection to application-specific visualization software
- Implementation of industry-specific protocol converters such as PV02, IEC 61850, etc.
- Access to the Windows file system, e.g. with specific file formats

Real-time library applications:

- Integration of existing C/C++ algorithms into the control task
- Implementation of closed-loop controllers or algorithms

Function

SIMATIC ODK 1500S combines PLC programming with programming in complex higher-level languages, such as C++, in the simplest possible way.

- Integration of higher-level languages
- Simple integration of Windows applications, e.g. Enterprise software, databases
- Recording of production data
- Integration of PC applications
- Implementation of complex algorithms for real-time applications
- Know-how protection
- Re-use of existing programming codes and recipes

The scope of delivery includes:

- Eclipse
- Templates for Visual Studio

For more information, refer to:

www.siemens.com/software-controller

■ **Overview**

### SIMATIC Field PG M5: The only industrial notebook with all programming interfaces onboard

The SIMATIC Field PG has proved its worth for use in harsh industrial environments – not least because of the rugged enclosure in an attractive industrial design.
Powerful processors and fast work memory offer high performance even for the most demanding engineering tasks with the pre-installed TIA Portal. Users also benefit from wireless technology, the high-luminance display, and a host of well-conceived details. No wish is left unfulfilled for use in the normal office environment, too.

### The latest high-performance programming device notebook design

For mobile applications in industrial plants, the SIMATIC Field PG M5 offers both rugged hardware and pre-installed TIA Portal engineering software for fast and efficient configuring, commissioning, service and maintenance.

The Field PG also offers all the interfaces required for these tasks: For connecting to the automation process, the SIMATIC Field PG is equipped both with a PROFIBUS interface and two high-speed PROFINET interfaces. SIMATIC Memory Cards can be directly programmed via corresponding slots.

The SIMATIC Field PG is so rugged that it withstands not only impacts and vibrations but also electromagnetic radiation from machines in an industrial environment.

The SIMATIC Field PG is available in two versions that are perfectly optimized for engineering with the TIA Portal: Comfort and Advanced

### Area of application

The industrial design predestines the SIMATIC Field PG for use in harsh industrial environments.
Everything is possible: from engineering of the plant in an office environment and testing at the machine level, all the way to service and maintenance in the factory.

- Increased protection from electromagnetic influences for applications in an industrial environment through complete shielding (EMC/EMS tested)
- A rugged, light, magnesium enclosure and rubber-buffered corners provide protection against shocks and vibrations
- Dirt-resistant industrial design with dark colors and keyboard with abrasion-resistant laser inscription
- Lightweight, space-saving power supply and a stable handle enable easy transport when the location of use changes
- Option for connecting external monitors over DVI-I or DisplayPort as well as a USB docking station for normal office environments

### Benefits

- High-end PC hardware for demanding applications in the automation environment
- Ready for immediate use and perfect TIA Portal engineering support through pre-installed, system-tested programming software
- The high-resolution display reduces eye strain and supports ergonomic working
- Complete package comprising hardware and software with an attractive price-performance ratio
- High availability thanks to top quality 'Made in Germany', exclusive development and production in Karlsruhe



### Prepared ready-to-run

- With pre-installed TIA Portal engineering software and previous version, optional STEP 5 with S5 HW support
- Can be ordered with the following types of license: Trial, TIA Portal, or Combo (TIA Portal and previous version)
- With 64-bit Windows operating system from Microsoft
- Trusted Platform Module TPM 2.0 for increased data security
- Remote administration through Intel Active Management Technology (iAMT) and Wake on LAN (WoL)

### Available interfaces

- 3 x USB 3.0 type A interfaces, one of which has a 1.5 A charging function when the device is powered off
- 1 USB 3.0 type C port
- Bluetooth and WLAN (based on the WLAN standard 802.11ac)
- 2 x Gigabit Ethernet, 1 x PROFIBUS DP/MPI
- Slots for SIMATIC Memory Cards
- Optional: S5 online functionality (TTY) and S5 EPROM adapter

### High-performance hardware components

- Intel® Core™ i5/i7 processor for maximum performance (optimal for TIA Portal Engineering)
- Work memory with up to 32 GB DDR4 SDRAM (2400 MHz)
- Lithium ion battery with 8850 mAh
- 15.6"/39.6 cm widescreen full HD display in 16:9 format
- Integrated Intel HD530 graphic supports the current 4k resolution, $4096 \times 2304$ pixels are possible via the display port to give a screen working area that is over 400 percent larger than one with full HD
- Easily replaceable hard disk (1 TB HDD) or solid-state drive (512 GB or 1 TB SSD)

For more information, refer to:

www.siemens.com/simatic-pg

# Introduction
## SIMATIC Industrial PCs

**1**

◼ **Overview**



SIMATIC IPC family

### SIMATIC Industrial PCs

Our reliable and innovative Industrial PCs are the optimal PC hardware platform for PC-based Automation from Siemens.

### Rack PC

Rack PCs are flexible, high-availability Industrial PC systems for powerful yet compact applications using 19" technology.

### Box PC

SIMATIC Box PCs provide mechanical engineers, plant engineers and control cabinet makers with particularly rugged Industrial PC systems for use in powerful yet compact applications.

### Panel PC

SIMATIC Panel PCs are suitable, thanks to their high industrial compatibility, for use in control cabinets, consoles and control panels, as well as directly at the machine. Typical areas of application can be found in both factory and process automation.

### Tablet PC

The SIMATIC Tablet PC brings the performance of Industrial PCs to the tablet format. It is suitable for mobile computing in production, in the office, for service calls, for measuring and testing as well as operator control and monitoring.

### Industrial monitors and thin clients

Flexible operator input concepts can be implemented via Flat Panel monitors or thin clients. These are industry-standard LCD monitors with high-contrast displays that can be located up to 30 m away from the PC, or low-cost, rugged thin clients that offer HMI functionality over the network in larger plants spread over wide areas.

### Ruggedness and industrial compatibility for 24-hour continuous use in an industrial environment

- Compact, space-saving enclosure (Box PC and Panel PC)
- Suitable for installing in space-saving control cabinets, only 500 mm deep (Rack PC)
- All-metal enclosure with a high degree of electromagnetic compatibility for use in industrial areas and in domestic, business and commercial environments and for degrees of protection up to IP65/NEMA 4
- The mounting position of the devices can be varied by means of wall, portrait or control cabinet mounting (Box PC), rail mounting (SIMATIC IPC427D or IPC227D only) and horizontal or vertical mounting position in the 19" cabinet or with the appropriate kit as an industrial tower PC (Rack PC)
- High resistance to shock/vibration thanks to special hard disk mountings, locked connectors, and card retainers
- Maintenance-free due to design without hard disk or fans using SIMATIC CFast Memory Cards or solid-state drive (SIMATIC IPC427D/IPC477D and SIMATIC IPC227D/IPC277D)
- Service-friendly, modular device design for replacement of defective components
- Integral industrial power supplies (according to NAMUR) for safe power supplies protected against system disturbances
- Attractive product design with dirt-repelling fronts and coated surfaces
- Dust protection thanks to a pressurized cooling concept, front-mounted fans and dust filters (Rack PC)

For more information, refer to:

www.siemens.com/simatic-ipc

■ **Overview**

### Efficient engineering for all SIMATIC Controllers

SIMATIC Software is a core component of Totally Integrated Automation and provides the optimum tool for every automation task and every phase of a project. SIMATIC Software enables the potential in the engineering workflow to be fully exploited.

- Fewer interfaces thanks to integrated engineering environment for logic, HMI and motion control.
- Design and implementation times are shortened by structured, process-oriented programming methodology.
- The costs of subsequent projects are reduced because blocks are easy to reuse.
- Efficient process error diagnostics increase plant availability.

### Totally Integrated Automation Portal (TIA Portal)

The engineering framework – Totally Integrated Automation Portal (TIA Portal) – is the basis for all engineering systems for configuring, programming and commissioning programmable controllers. As an integral component of the various engineering systems

- SIMATIC STEP 7 for S7 controllers (PLC)
- SIMATIC WinCC for machine-level operation (HMI)
- SIMATIC Startdrive for SINAMICS drives
- SCOUT for the SIMOTION Motion Control Systems

the engineering framework automatically ensures standardized and consistent system behavior by providing shared services and properties.

### Engineering systems for SIMATIC Controllers – based on TIA Portal

- STEP 7 Basic V14 (incl. WinCC Basic), shared engineering for SIMATIC S7-1200 and SIMATIC HMI Basic Panels.
- STEP 7 Professional V14 (incl. WinCC Basic), the easy-to-use, uniform engineering system for all SIMATIC Controllers and SIMATIC HMI Panels.

### Highlights:

- Powerful language innovations:
  Efficient program editors, integrated symbolic programming
- User-friendly online functionalities:
  Hardware detection, software upload, module expansion during operation, simulation (PLCSim) for S7-1500 and S7-1200, Download in RUN, Undo
- Integrated system diagnosis as a firmware function:
  Uniform display concept for STEP 7, CPU display, web server and HMI without any configuration overhead, up to 4 real-time traces
- Integrated technology:
  Technology objects for motion sequences (rotational speed and relative synchronous operation) and PID control functions with self-optimization
- Multi-level security concept:
  Integrated protection functions for project and plant protection:
  - Know-how protection for program blocks,
  - Copy protection for the program through coupling with hardware,
  - 4-level protection against unauthorized access to CPU, HMI, communication,
  - Manipulation protection by means of lead seals.

New for TIA Portal V14:
- Virtual commissioning:
  PLCSim Advanced with interfaces to simulation software, such as Plant Simulation and Process Simulate, shortens the time-to-market.
- Cloud interfaces:
  Cloud-based engineering offers the highest degree of flexibility: With the new TIA Portal Cloud Connector, users can access the plant controller from their private cloud. No installation on the engineering workstation is required.
- Engineering interface:
  The TIA Portal interacts with other systems through open interfaces. The Teamcenter gateway is a new interface for product data management in Teamcenter, the data collaboration platform for design, planning and engineering.
- Energy management:
  The SIMATIC Energy Suite facilitates easy parameter assignment and evaluation of numerous measuring components. The required control program is generated automatically. To increase transparency for energy savings according to ISO 50001, energy data is easily collected and integrated into the automation solution.
- Multiuser functionality:
  The multiuser function provides several operatives with efficient and simultaneous access to a server project, based on automatic synchronization.

For more information, refer to:

www.siemens.com/simatic-software

# Introduction
## SIMATIC I/O systems

**1**

■ **Overview**

### *The right solution for every application*

With SIMATIC ET 200 a wide range of distributed I/O systems is available – for solutions in the control cabinet or without a control cabinet directly at the machine, as well as for applications in hazardous areas. SIMATIC ET 200 systems for cabinet-free configurations are installed in a rugged, fiber-glass-reinforced plastic enclosure, making them resistant to shock and dirt, as well as watertight. Furthermore, you need fewer additional components, save on cabling, and profit from extremely fast response times.

The modular design makes it possible to scale and expand the ET 200 systems simply and in small stages. Already integrated additional modules reduce costs and at the same time offer a widely diverse range of possible applications. You can choose from a wide range of possible combinations: digital and analog inputs/outputs, intelligent modules with CPU functionality, safety engineering, motor starters, pneumatic systems, frequency converters, and diverse technology modules.

Communication over PROFINET and PROFIBUS, uniform engineering, transparent diagnostics options as well as optimum interfacing to SIMATIC Controllers and HMI devices prove the unique integration of Totally Integrated Automation.

In addition to the fieldbus systems, the point-to-point connection I/O-Link is also available for intelligent connection of sensors and actuators.

For more information, refer to:

www.siemens.com/et200

### In a control cabinet (IP20)

**ET 200SP**
A new generation of scalable I/O

**ET 200MP**
Multi-channel and multifunctional S7-1500 I/O system

**ET 200M**
Modular design with S7-300 modules

**ET 200iSP**
Intrinsically safe version for hazardous area
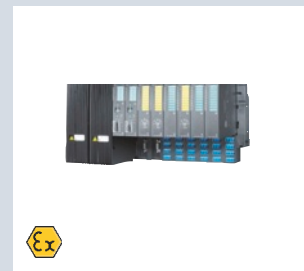
### Without control cabinet (IP65/67)

**ET 200AL**
Digital und analog I/O is extremely easy to install
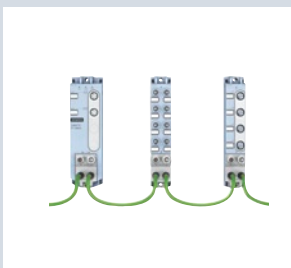
**ET 200pro**
Modular design and multifunctional
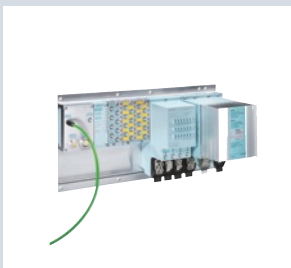
**ET 200eco PN**
Low-cost, space-saving block I/O

■ **Overview**
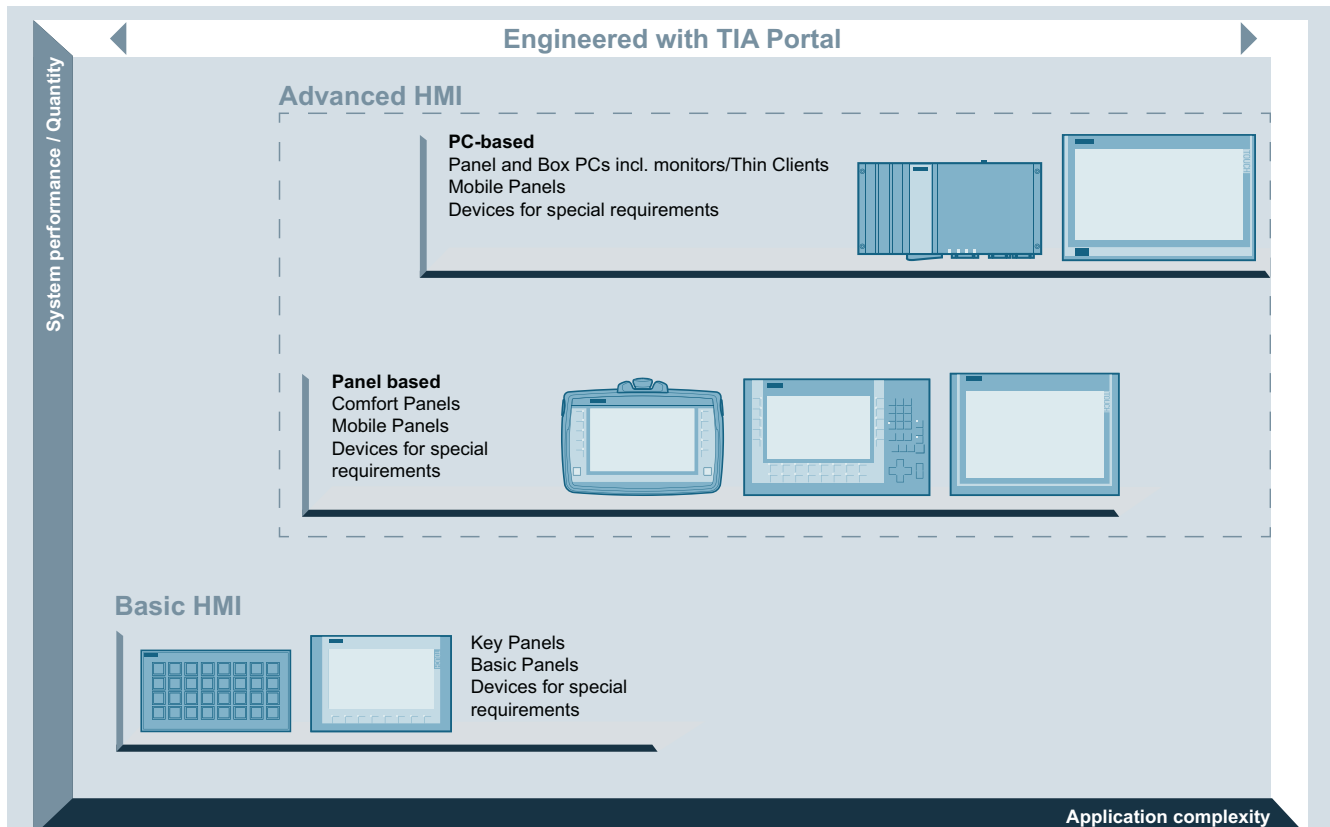


SIMATIC Panels Overview

### SIMATIC HMI Panels –
### HMI devices for efficient machine-level interaction

A complete range of powerful and innovative HMI devices is available for implementing efficient, machine-level HMI solutions in the most diverse applications and industries. One unique and highly efficient feature is the integrated configuring via SIMATIC WinCC in the TIA Portal, with which users can achieve significant savings with regard to engineering time, costs and effort.

http://www.siemens.com/hmi-panels

Basic HMI

• Panel-based:
  HMI devices with excellent price-performance ratio for simple visualization tasks.
  http://www.siemens.com/basic-hmi

Advanced HMI

• Panel-based:
  Powerful HMI devices for demanding visualization tasks with a high level of convenience.
  http://www.siemens.com/advanced-hmi-panel

• PC-based:
  High-performance HMI devices for data-intensive and complex visualization tasks.
  http://www.siemens.com/advanced-hmi-pc

### Rugged and compact for use at machine level

With IP66/NEMA 4 degree of protection at the front, high EMC and extreme vibration resistance, the SIMATIC HMI Operator Panels are ideally suited for use at machine level in harsh industrial environments. Thanks to their compact design with a shallow mounting depth, the stationary HMI devices can be fitted anywhere, even where only restricted space is available. For distributed configurations, there are also devices available with all-round IP65/NEMA 4 protection.

The extremely rugged and shock-proof enclosure with IP65 degree of protection makes the Mobile Panels especially suitable for industrial applications. Their low weight and ergonomic design means that they are user-friendly and easy to operate.

### One configuration software for everything

SIMATIC WinCC (TIA Portal) is a tool for the uniform configuration of all SIMATIC HMI Panels as well as PC-based systems. Graded variants are available for every task. The software permits simple and efficient configuration. Programming experience is not required.

Once created, configurations can be reused within the family. Key Panels only need to be configured, not programmed.

**Introduction**

SIMATIC Operator Panels

**1**

■ **Overview** (continued)

### Component of Totally Integrated Automation

Siemens provides the complete modular system of matched components for automation solutions from one source and — with Totally Integrated Automation — one of the most globally successful automation concepts. SIMATIC WinCC (TIA Portal) is an integral component of this world. It offers crucial advantages. Thanks to the triple uniformity in configuration/programming, data management and communication, automation solution engineering costs are significantly reduced.

### Open for a wide variety of automation systems

Despite being consistently incorporated into the SIMATIC world, the panels are nevertheless open for connection to PLCs from many different vendors. The standard delivery includes a comprehensive range of user-friendly drivers.

### Innovative operator control and monitoring

The SIMATIC HMI Panels facilitate innovative operator control and monitoring combined with ruggedness, stability and simplicity. On the Comfort Panels in particular, standard hardware and software interfaces, e.g. the Multimedia Card/SD Card, USB, Ethernet, PROFINET, PROFIBUS DP and Visual Basic scripts, provide greater flexibility and openness as well as access to the office world.

### Worldwide application

The SIMATIC HMI Panels are ideally equipped for global use. Online language switching permits selection of up to 32 languages during operation simply by pressing a button. The wide variety of languages available also includes, for example, Asian logographic languages (Chinese, Taiwanese, Korean, Japanese) and Russian. The configuration interface of WinCC (TIA Portal) including the online help and the complete documentation is also multilingual. Up to 32 languages can be used in one project. And all this is complemented by global service and support from Siemens.

# LOGO! logic modules

**2**

*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# LOGO! logic modules

Introduction

## LOGO! logic module

### ■ Overview



***LOGO! logic module:***

- The compact, easy-to-use and low-cost solution for simple control tasks
- Compact, easy to operate, universally applicable without accessories
- "All in one": Integrated display and operator panel
- 36 different functions can be connected at the press of a button or by means of PC software; up to 130 times over
- LOGO! 8: 38/43 different functions can be linked at the press of a button or using PC software; up to 200/400 times
- Functions are easily changed at the press of a button. No more time-consuming rewiring

***SIPLUS LOGO!:***

- The controller for use in the toughest environmental conditions
- With extended temperature range from -40/-25 °C to +70 °C
- Suitable for exposure to media (harmful gas atmosphere)
- Condensation permissible
- With the proven PLC technology of LOGO!
- Easy to handle, program, maintain, and service
- Ideal for use in automotive engineering, environmental engineering, mining, chemical plants, material handling, food industry, etc.

Accessories:

- The front panel mounting set also allows simple and reliable installation of the logic modules in front panels; IP65 protection is thus possible.
- In order to ensure dependable operation of SIPLUS devices supplied by the battery in conjunction with combustion engines, it is necessary to put in a SIPLUS upmiter upstream device between the battery and the SIPLUS LOGO!.

For more information, please go to:

http://www.siemens.com/siplus-extreme

### ■ General technical data of the SIPLUS LOGO!

| | |
|---|---|
| Ambient temperature range | -40/-25 ... +70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |

**Ambient conditions**

| | |
|---|---|
| Extended range of environmental conditions | |
| • with reference to ambient temperature, air pressure and altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0° C |
| Relative humidity | |
| • with condensation, max. | 100 %; RH incl. bedewing/frost (no commissioning in bedewed state) |
| Resistance | |
| • to biologically active substances/ compliance with EN 60721-3-3 | Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to chemically active substances/ compliance with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to mechanically active substances, compliance with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation. |

## Overview



- The space-saving basic variants
- Interface for the connection of expansion modules, up to 24 digital inputs, 20 digital outputs, 8 analog inputs and 8 analog outputs can be addressed
- All basic units with integrated web server
- Enclosure width 72 mm (4 U)
- All basic units with Ethernet interface for communication with LOGO! 8, LOGO! TDE, SIMATIC Controllers, SIMATIC Panels and PCs
- Use of standard micro CF cards

## Technical specifications

| Article number | 6ED1052-1CC01-0BA8 | 6ED1052-1MD00-0BA8 | 6ED1052-1HB00-0BA8 | 6ED1052-1FB00-0BA8 |
|---|---|---|---|---|
| | LOGO! 24CE, 8DI(4AI)/4DO, 400 BLOCKS | LOGO!12/24RCE, 8DI(4AI)/4DO, 400 BLOCKS | LOGO! 24RCE, 8DI/4DO, 400 BLOCKS | LOGO!230RCE, 8DI/4DO, 400 BLOCKS |
| **Display** | | | | |
| with display | Yes | Yes | Yes | Yes |
| **Installation type/mounting** | | | | |
| Mounting | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide |
| **Supply voltage** | | | | |
| Rated value (DC) | | | | |
| • 12 V DC | | Yes | | |
| • 24 V DC | Yes | Yes | Yes | |
| • 115 V DC | | | | Yes |
| • 230 V DC | | | | Yes |
| permissible range, lower limit (DC) | 20.4 V | 10.8 V | 20.4 V | 100 V |
| permissible range, upper limit (DC) | 28.8 V | 28.8 V | 28.8 V | 253 V |
| Rated value (AC) | | | | |
| • 24 V AC | | | Yes | |
| • 115 V AC | | | | Yes |
| • 230 V AC | | | | Yes |
| **Time of day** | | | | |
| **Time switching clocks** | | | | |
| • Number | 190 | 190 | 190 | 8 |
| • Power reserve | 480 h | 480 h | 480 h | 480 h |
| **Digital inputs** | | | | |
| Number of digital inputs | 8; Of which 4 can be used in analog mode (0 to 10 V) | 8; Of which 4 can be used in analog mode (0 to 10 V) | 8 | 8 |
| **Digital outputs** | | | | |
| Number of digital outputs | 4; Transistor | 4; Relays | 4; Relays | 4; Relays |
| Short-circuit protection | Yes; electrical (1 A) | No; external fusing necessary | No; external fusing necessary | No; external fusing necessary |
| **Output current** | | | | |
| • for signal "1" permissible range for 0 to 55 °C, max. | 0.3 A | 10 A | | |
| **Relay outputs** | | | | |
| **Switching capacity of contacts** | | | | |
| - with inductive load, max. | | 3 A | 3 A | 3 A |
| - with resistive load, max. | | 10 A | 10 A | 10 A |

# LOGO! logic modules
## LOGO! modular

**LOGO! modular basic variants**

**2**

## ■ Technical specifications (continued)

| Article number | 6ED1052-1CC01-0BA8 | 6ED1052-1MD00-0BA8 | 6ED1052-1HB00-0BA8 | 6ED1052-1FB00-0BA8 |
|---|---|---|---|---|
| | LOGO! 24CE, 8DI(4AI)/4DO, 400 BLOCKS | LOGO!12/24RCE, 8DI(4AI)/4DO, 400 BLOCKS | LOGO! 24RCE, 8DI/4DO, 400 BLOCKS | LOGO!230RCE, 8DI/4DO, 400 BLOCKS |
| **EMC** | | | | |
| **Emission of radio interference acc. to EN 55 011** | | | | |
| • Limit class B, for use in residential areas | Yes; Radio interference suppression according to EN55011, Limit Value Class B | Yes | Yes | Yes |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP20 | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes | Yes |
| UL approval | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes |
| developed in accordance with IEC 61131 | Yes | Yes | Yes | Yes |
| according to VDE 0631 | Yes | Yes | Yes | Yes |
| **Marine approval** | | | | |
| • Marine approval | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C | 55 °C |
| **Dimensions** | | | | |
| Width | 71.5 mm | 71.5 mm | 71.5 mm | 71.5 mm |
| Height | 90 mm | 90 mm | 90 mm | 90 mm |
| Depth | 60 mm | 60 mm | 60 mm | 60 mm |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **LOGO! 8 logic module** | | **LOGO! 24RCE** | 6ED1052-1HB00-0BA8 |
| **LOGO! 24CE** | 6ED1052-1CC01-0BA8 | Supply voltage 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch Ethernet interface; 400 function blocks can be interlinked, modular expansion capability | |
| Supply voltage 24 V DC, 8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A, integrated time switch Ethernet interface: 400 function blocks can be interlinked, modular expansion capability | | **LOGO! 230RCE** | 6ED1052-1FB00-0BA8 |
| **LOGO! 12/24RCE** | 6ED1052-1MD00-0BA8 | Supply voltage 115...230 V AC/DC, 8 digital inputs 115...230 V AC/DC, 4 relay outputs 10 A, integral time switch Ethernet interface; 400 function blocks can be interlinked, modular expansion capability | |
| Supply voltage 12...24 V DC, 8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V) 4 relay outputs 10 A, integral time switch Ethernet interface; 400 function blocks can be interlinked, modular expansion capability | | | |

## Ordering data

| Accessories | Article No. |
|---|---|
| **LOGO! 8 text display HMI** | **6ED1055-4MH00-0BA1** |
| 6-line text display, can be connected to all LOGO! 8 basic and pure variants, with 2 Ethernet interfaces; including installation accessories. Requires additional 12 V DC or 24 V AC/DC power supply | |
| **LOGO!Soft Comfort V8** | **6ED1058-0BA08-0YA1** |
| For programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | |
| **LOGO! 8 Starter Kits** | |
| In TANOS Box, with LOGO! 8, LOGO! Soft Comfort V8, WinCC Basic V13, Ethernet cable, | |
| **LOGO! 8 12/24 V Starter Kit** | **6ED1057-3BA00-0AA8** |
| With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A | |

| | Article No. |
|---|---|
| **LOGO! 8 230V Starter Kit** | **6ED1057-3BA02-0AA8** |
| With LOGO! 230RCE | |
| **LOGO! 8 TDE Starter Kit** | **6ED1057-3BA10-0AA8** |
| With LOGO! 12/24RCEO, LOGO! Power 24 V, 1.3 A, LOGO! TDE | |
| **LOGO! 8 KP300 Basic Starter Kit** | **6AV2132-0HA00-0AA1** |
| With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KP300 Basic mono PN | |
| **LOGO! 8 KTP400 Basic Starter Kit** | **6AV2132-0KA00-0AA1** |
| With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KTP400 Basic | |
| **LOGO! 8 KTP700 Basic Starter Kit** | **6AV2132-3GB00-0AA1** |
| With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KTP700 Basic | |
| **Front panel mounting set** | |
| Width 4 U | **6AG1057-1AA00-0AA0** |
| Width 4 U, with keys | **6AG1057-1AA00-0AA3** |
| Width 8 U | **6AG1057-1AA00-0AA1** |
| Width 8 U, with keys | **6AG1057-1AA00-0AA2** |

2

# LOGO! logic modules
LOGO! modular

## LOGO! modular pure variants

**2**

### Overview



- Basic variants optimized for costs
- Interface for the connection of expansion modules, up to 24 digital inputs, 20 digital outputs, 8 analog inputs and 8 analog outputs can be addressed
- With connection option for LOGO! TDE text display
- All basic units with integrated web server
- Enclosure width 72 mm (4 U)
- All basic units with Ethernet interface for communication with LOGO! 8, LOGO! TDE, SIMATIC Controllers, SIMATIC Panels and PCs
- Use of standard micro CF cards

### Technical specifications

| Article number | 6ED1052-2CC01-0BA8 | 6ED1052-2MD00-0BA8 | 6ED1052-2HB00-0BA8 | 6ED1052-2FB00-0BA8 |
|---|---|---|---|---|
| | LOGO! 24CEO, 8DI(4AI)/4DO, 400 BLOCKS | LOGO!12/24RCEO, 8DI(4AI)/4DO, 400 BLOCKS | LOGO! 24RCEO, 8DI/4DO, 400 BLOCKS | LOGO!230RCEO, 8DI/4DO, 400 BLOCKS |
| **Installation type/mounting** | | | | |
| Mounting | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide |
| **Supply voltage** | | | | |
| Rated value (DC) | | | | |
| • 12 V DC | | Yes | | |
| • 24 V DC | Yes | Yes | Yes | |
| • 115 V DC | | | | Yes |
| • 230 V DC | | | | Yes |
| permissible range, lower limit (DC) | 20.4 V | 10.8 V | 20.4 V | 100 V |
| permissible range, upper limit (DC) | 28.8 V | 28.8 V | 28.8 V | 253 V |
| Rated value (AC) | | | | |
| • 24 V AC | | | Yes | |
| • 115 V AC | | | | Yes |
| • 230 V AC | | | | Yes |
| **Time of day** | | | | |
| **Time switching clocks** | | | | |
| • Number | 190 | 190 | 190 | 8 |
| • Power reserve | 480 h | 480 h | 480 h | 480 h |
| **Digital inputs** | | | | |
| Number of digital inputs | 8; Of which 4 can be used in analog mode (0 to 10 V) | 8; Of which 4 can be used in analog mode (0 to 10 V) | 8 | 8 |
| **Digital outputs** | | | | |
| Number of digital outputs | 4; Transistor | 4; Relays | 4; Relays | 4; Relays |
| Short-circuit protection | Yes; electrical (1 A) | No; external fusing necessary | No; external fusing necessary | No; external fusing necessary |
| **Output current** | | | | |
| • for signal "1" permissible range for 0 to 55 °C, max. | 0.3 A | 10 A | | |
| **Relay outputs** | | | | |
| **Switching capacity of contacts** | | | | |
| - with inductive load, max. | | 3 A | 3 A | 3 A |
| - with resistive load, max. | | 10 A | 10 A | 10 A |

**2**

## ■ Technical specifications (continued)

| Article number | 6ED1052-2CC01-0BA8 | 6ED1052-2MD00-0BA8 | 6ED1052-2HB00-0BA8 | 6ED1052-2FB00-0BA8 |
|---|---|---|---|---|
| | LOGO! 24CEO, 8DI(4AI)/4DO, 400 BLOCKS | LOGO!12/24RCEO, 8DI(4AI)/4DO, 400 BLOCKS | LOGO! 24RCEO, 8DI/4DO, 400 BLOCKS | LOGO!230RCEO, 8DI/4DO, 400 BLOCKS |
| **EMC** | | | | |
| **Emission of radio interference acc. to EN 55 011** | | | | |
| • Limit class B, for use in residential areas | Yes; Radio interference suppression according to EN55011, Limit Value Class B | Yes | Yes | Yes |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP20 | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes | Yes |
| UL approval | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes |
| developed in accordance with IEC 61131 | Yes | Yes | Yes | Yes |
| according to VDE 0631 | Yes | Yes | Yes | Yes |
| **Marine approval** | | | | |
| • Marine approval | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C | 55 °C |
| **Dimensions** | | | | |
| Width | 71.5 mm | 71.5 mm | 71.5 mm | 71.5 mm |
| Height | 90 mm | 90 mm | 90 mm | 90 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm |

## ■ Ordering data

| | Article No. |
|---|---|
| **LOGO! 8 logic module** | |
| **LOGO! 24CEo logic module** | **6ED1052-2CC01-0BA8** |
| Supply voltage 24 V DC, 8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A, integral time switch Ethernet interface; without display and keyboard; 400 function blocks can be interlinked, modular expansion capability | |
| **LOGO! 12/24RCEo logic module** | **6ED1052-2MD00-0BA8** |
| Supply voltage 12...24 V DC, 8 digital inputs 12...24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | |

| | Article No. |
|---|---|
| **LOGO! 24RCEo logic module** | **6ED1052-2HB00-0BA8** |
| Supply voltage 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | |
| **LOGO! 230RCEo logic module** | **6ED1052-2FB00-0BA8** |
| Supply voltage 115...230 V AC/DC, 8 digital inputs 115...230 V AC/DC, 4 relay outputs 10 A, integral time switch; Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | |

# LOGO! logic modules
LOGO! modular

## LOGO! modular pure variants

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | **LOGO! 8 12/24 V Starter Kit** | 6ED1057-3BA00-0AA8 |
| **LOGO! TDE text display** | 6ED1055-4MH00-0BA1 | With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A | |
| 6-line text display, can be connected to all LOGO! 8 basic and pure variants, with 2 Ethernet interfaces; including installation accessories. | | **LOGO! 8 230V Starter Kit** | 6ED1057-3BA02-0AA8 |
| | | With LOGO! 230RCE | |
| Requires additional 12 V DC or 24 V AC/DC power supply | | **LOGO! 8 TDE Starter Kit** | 6ED1057-3BA10-0AA8 |
| **LOGO!Soft Comfort V8** | 6ED1058-0BA08-0YA1 | With LOGO! 12/24RCEO, LOGO! Power 24 V, 1.3 A, LOGO! TDE | |
| For programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | | **LOGO! 8 KP300 Basic Starter Kit** | 6AV2132-0HA00-0AA1 |
| | | With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KP300 Basic mono PN | |
| **LOGO! 8 Starter Kits** | | **LOGO! 8 KTP400 Basic Starter Kit** | 6AV2132-0KA00-0AA1 |
| In TANOS Box, with LOGO! 8, LOGO! Soft Comfort V8, WinCC Basic V13, Ethernet cable, | | With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KTP400 Basic | |
| | | **LOGO! 8 KTP700 Basic Starter Kit** | 6AV2132-3GB00-0AA1 |
| | | With LOGO! 12/24RCE, LOGO! Power 24 V 1.3 A, KTP700 Basic | |

## Overview



- Expansion modules for connection to LOGO! modular
- With digital inputs and outputs, analog inputs, or analog outputs

## Technical specifications

| Article number | 6ED1055-1CB00-0BA2 | 6ED1055-1HB00-0BA2 | 6ED1055-1MB00-0BA2 | 6ED1055-1FB00-0BA2 |
|---|---|---|---|---|
| | LOGO! DM8 24 EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 24R EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 12/24R, EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 230R, EXPANSION MODULE, 2MW, 4DI/4DQ |
| **Installation type/mounting** | | | | |
| Mounting | on 35 mm DIN rail, 2 spacing units wide | on 35 mm DIN rail, 2 spacing units wide | on 35 mm DIN rail, 2 spacing units wide | on 35 mm DIN rail, 2 spacing units wide |
| **Supply voltage** | | | | |
| Rated value (DC) | | | | |
| • 12 V DC | | | Yes | |
| • 24 V DC | Yes | Yes | Yes | |
| • 115 V DC | | | | Yes |
| • 230 V DC | | | | Yes |
| permissible range, lower limit (DC) | 20.4 V | 20.4 V | 10.8 V | 100 V |
| permissible range, upper limit (DC) | 28.8 V | 28.8 V | 28.8 V | 253 V |
| Rated value (AC) | | | | |
| • 24 V AC | | Yes | | |
| • 115 V AC | | | | Yes |
| • 230 V AC | | | | Yes |
| **Line frequency** | | | | |
| • permissible range, lower limit | | 47 Hz | | 47 Hz |
| • permissible range, upper limit | | 63 Hz | | 63 Hz |
| **Digital inputs** | | | | |
| Number of digital inputs | 4 | 4 | 4 | 4 |
| **Input voltage** | | | | |
| • Type of input voltage | DC | AC/DC | DC | AC/DC |
| • for signal "0" | < 5 V DC | < 5 V AC/DC | < 5 V DC | < 40 V AC, < 30 V DC |
| • for signal "1" | > 12 V DC | > 12 V AC/DC | > 8.5 V | > 79 V AC, > 79 V DC |
| **Input current** | | | | |
| • for signal "0", max. (permissible quiescent current) | 0.88 mA | 1.1 mA | 0.88 mA | 0.06 mA; 0.05 mA with AC, 0.06 mA with DC |
| • for signal "1", typ. | 2.1 mA | 2.63 mA | 1.5 mA | 0.13 mA |
| **Input delay (for rated value of input voltage)** | | | | |
| **for standard inputs** | | | | |
| - at "0" to "1", max. | 1.5 ms | 1.5 ms | 1.5 ms | 40 ms |
| - at "1" to "0", max. | 1.5 ms | 15 ms | 1.5 ms | 75 ms |

# LOGO! logic modules
LOGO! modular

## LOGO! modular expansion modules

### Technical specifications (continued)

| Article number | 6ED1055-1CB00-0BA2 | 6ED1055-1HB00-0BA2 | 6ED1055-1MB00-0BA2 | 6ED1055-1FB00-0BA2 |
|---|---|---|---|---|
| | LOGO! DM8 24 EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 24R EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 12/24R, EXPANSION MODULE, 2MW, 4DI/4DQ | LOGO! DM8 230R, EXPANSION MODULE, 2MW, 4DI/4DQ |
| **Digital outputs** | | | | |
| Number of digital outputs | 4 | 4; Relays | 4; Relays | 4; Relays |
| Short-circuit protection | Yes | No | No | No |
| Controlling a digital input | | Yes | Yes | Yes |
| **Switching capacity of the outputs** | | | | |
| • on lamp load, max. | | 1 000 W | 1 000 W | 1 000 W; 500 W at 115V AC |
| **Parallel switching of two outputs** | | | | |
| • for uprating | No | No | No | No |
| **Switching frequency** | | | | |
| • with resistive load, max. | 10 Hz | 2 Hz | 2 Hz | 2 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • mechanical, max. | | 10 Hz | 10 Hz | 10 Hz |
| **Relay outputs** | | | | |
| **Switching capacity of contacts** | | | | |
| - with inductive load, max. | | 3 A | 3 A | 3 A |
| - with resistive load, max. | | 5 A | 5 A | 5 A |
| **EMC** | | | | |
| **Emission of radio interference acc. to EN 55 011** | | | | |
| • Limit class B, for use in residential areas | Yes | Yes | Yes | Yes |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP20 | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes | Yes |
| UL approval | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes |
| developed in accordance with IEC 61131 | Yes | Yes | Yes | Yes |
| according to VDE 0631 | Yes | Yes | | Yes |
| **Marine approval** | | | | |
| • Marine approval | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C | 55 °C |
| **Dimensions** | | | | |
| Width | 35.5 mm | 35.5 mm | 35.5 mm | 35.5 mm |
| Height | 90 mm | 90 mm | 90 mm | 90 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm |

### Technical specifications (continued)

| Article number | 6ED1055-1CB10-0BA2 | 6ED1055-1NB10-0BA2 | 6ED1055-1FB10-0BA2 |
|---|---|---|---|
| | LOGO! DM16 24, EXP. MODULE, 4MW, 8DI/8DQ | LOGO! DM16 24R, EXP. MODULE, 4MW, 8DI/8DQ | LOGO! DM16 230R, EXP. MODULE, 4MW, 8DI/8DQ |
| **Installation type/mounting** | | | |
| Mounting | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide | on 35 mm DIN rail, 4 spacing units wide |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | |
| • 115 V DC | | | Yes |
| • 230 V DC | | | Yes |
| permissible range, lower limit (DC) | 20.4 V | 20.4 V | 100 V |
| permissible range, upper limit (DC) | 28.8 V | 28.8 V | 253 V |
| Rated value (AC) | | | |
| • 24 V AC | | No | |
| • 115 V AC | | | Yes |
| • 230 V AC | | | Yes |
| **Line frequency** | | | |
| • permissible range, lower limit | | | 47 Hz |
| • permissible range, upper limit | | | 63 Hz |
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 8 | 8 |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | AC/DC |
| • for signal "0" | < 5 V DC | < 5 V DC | < 40 V AC, < 30 V DC |
| • for signal "1" | > 12 V DC | > 12 V DC | > 79 V AC, > 79 V DC |
| **Input current** | | | |
| • for signal "0", max. (permissible quiescent current) | 0.85 mA | 0.85 mA | 0.06 mA; 0.05 mA with AC, 0.06 mA with DC |
| • for signal "1", typ. | 3.5 mA | 2 mA | 0.13 mA |
| **Input delay (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - at "0" to "1", max. | 1.5 ms | 1.5 ms | 40 ms |
| - at "1" to "0", max. | 1.5 ms | 1.5 ms | 75 ms |
| **Digital outputs** | | | |
| Number of digital outputs | 8 | 8; Relays | 8; Relays |
| Short-circuit protection | Yes | No | No |
| Controlling a digital input | Yes | Yes | Yes |
| **Switching capacity of the outputs** | | | |
| • on lamp load, max. | | 1 000 W | 1 000 W; 500 W at 115V AC |
| **Parallel switching of two outputs** | | | |
| • for uprating | No | No | No |
| **Switching frequency** | | | |
| • with resistive load, max. | 10 Hz | 2 Hz | 2 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • mechanical, max. | | 10 Hz | 10 Hz |
| **Relay outputs** | | | |
| **Switching capacity of contacts** | | | |
| - with inductive load, max. | | 3 A | 3 A |
| - with resistive load, max. | | 5 A | 5 A |

# LOGO! logic modules
LOGO! modular

## Technical specifications (continued)

| Article number | 6ED1055-1CB10-0BA2 | 6ED1055-1NB10-0BA2 | 6ED1055-1FB10-0BA2 |
|---|---|---|---|
| | LOGO! DM16 24, EXP. MODULE, 4MW, 8DI/8DQ | LOGO! DM16 24R, EXP. MODULE, 4MW, 8DI/8DQ | LOGO! DM16 230R, EXP. MODULE, 4MW, 8DI/8DQ |
| **EMC** | | | |
| **Emission of radio interference acc. to EN 55 011** | | | |
| • Limit class B, for use in residential areas | Yes | Yes | Yes |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP20 | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | |
| CE mark | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes |
| UL approval | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes |
| developed in accordance with IEC 61131 | Yes | Yes | Yes |
| according to VDE 0631 | Yes | Yes | Yes |
| **Marine approval** | | | |
| • Marine approval | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C |
| **Dimensions** | | | |
| Width | 71.5 mm | 71.5 mm | 71.5 mm |
| Height | 90 mm | 90 mm | 90 mm |
| Depth | 58 mm | 58 mm | 58 mm |

| Article number | 6ED1055-1MA00-0BA2 | 6ED1055-1MD00-0BA2 |
|---|---|---|
| | LOGO! AM2 EXPANSION MODULE, 12/24V, 2AI | LOGO! AM2 RDT, 2AI, -50..+200DECR/C |
| **Installation type/mounting** | | |
| Mounting | on 35 mm DIN rail, 2 spacing units wide | on 35 mm DIN rail, 2 spacing units wide |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 12 V DC | Yes; 10.8 V DC to 28.8 V DC | Yes; 10.8 V DC to 28.8 V DC |
| • 24 V DC | Yes; 10.8 V DC to 28.8 V DC | Yes; 10.8 V DC to 28.8 V DC |
| **Analog inputs** | | |
| Number of analog inputs | 2 | 2; 2 or 3 wire connection |
| **Input ranges** | | |
| • Voltage | Yes | No |
| • Current | Yes | No |
| • Resistance thermometer | No | Yes; For PT100/PT1000 sensors |
| **Input ranges (rated values), voltages** | | |
| • 0 to +10 V | Yes | No |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes; 0 mA or 4 mA to 20 mA | No |
| **Input ranges (rated values), resistance thermometer** | | |
| • Pt 100 | No | Yes |
| **EMC** | | |
| **Emission of radio interference acc. to EN 55 011** | | |
| • Limit class B, for use in residential areas | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |

## Technical specifications (continued)

| Article number | 6ED1055-1MA00-0BA2 | 6ED1055-1MD00-0BA2 |
|---|---|---|
| | LOGO! AM2 EXPANSION MODULE, 12/24V, 2AI | LOGO! AM2 RDT, 2AI, -50..+200DECR/C |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| CSA approval | Yes | Yes |
| UL approval | Yes | Yes |
| FM approval | Yes | Yes |
| developed in accordance with IEC 61131 | Yes | Yes |
| according to VDE 0631 | Yes | |
| **Marine approval** | | |
| • Marine approval | Yes | Yes |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C |
| **Dimensions** | | |
| Width | 35.5 mm | 35.5 mm |
| Height | 90 mm | 90 mm |
| Depth | 58 mm | 58 mm |

| Article number | 6ED1055-1MM00-0BA2 |
|---|---|
| | LOGO! AM2 AQ, 2AQ, 0-10V, 0/4-20MA |
| **Installation type/mounting** | |
| Mounting | on 35 mm DIN rail, 2 spacing units wide |
| **Supply voltage** | |
| Rated value (DC) | |
| • 12 V DC | No |
| • 24 V DC | Yes |
| **Analog outputs** | |
| Number of analog outputs | 2 |
| **Output ranges, voltage** | |
| • 0 to 10 V | Yes |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **EMC** | |
| **Emission of radio interference acc. to EN 55 011** | |
| • Limit class B, for use in residential areas | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |

| Article number | 6ED1055-1MM00-0BA2 |
|---|---|
| | LOGO! AM2 AQ, 2AQ, 0-10V, 0/4-20MA |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| UL approval | Yes |
| FM approval | Yes |
| developed in accordance with IEC 61131 | Yes |
| according to VDE 0631 | Yes |
| **Marine approval** | |
| • Marine approval | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 55 °C |
| **Dimensions** | |
| Width | 35.5 mm |
| Height | 90 mm |
| Depth | 58 mm |

# LOGO! logic modules
LOGO! modular

## LOGO! modular expansion modules

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **LOGO! 8 expansion modules** | | **Accessories for LOGO! 8** | |
| **LOGO! DM8 24**<br>Supply voltage 24 V DC,<br>4 digital inputs 24 V DC,<br>4 digital outputs 24 V DC, 0.3 A | 6ED1055-1CB00-0BA2 | **LOGO!Soft Comfort V8**<br>For programming on the PC in<br>LAD/FBD; executes on Windows 8,<br>7, XP, Linux and Mac OSX; on DVD | 6ED1058-0BA08-0YA1 |
| **LOGO! DM16 24**<br>Supply voltage 24 V DC,<br>8 digital inputs 24 V DC,<br>8 digital outputs 24 V DC, 0.3 A | 6ED1055-1CB10-0BA2 | | |
| **LOGO! DM8 12/24R**<br>Supply voltage 12...24 V DC,<br>4 digital inputs 12...24 V DC,<br>4 relay outputs 5 A | 6ED1055-1MB00-0BA2 | | |
| **LOGO! DM8 24R**<br>Supply voltage 24 V AC/DC,<br>4 digital inputs 24 V AC/DC,<br>4 relay outputs 5 A | 6ED1055-1HB00-0BA2 | | |
| **LOGO! DM16 24R**<br>Supply voltage 24 V DC,<br>8 digital inputs 24 V DC,<br>8 relay outputs 5 A | 6ED1055-1NB10-0BA2 | | |
| **LOGO! DM8 230R**<br>Supply voltage 115...230 V AC/DC,<br>4 digital inputs 115...230 V AC/DC,<br>4 relay outputs 5 A | 6ED1055-1FB00-0BA2 | | |
| **LOGO! DM16 230R**<br>Supply voltage 115...230 V AC/DC,<br>8 digital inputs 115...230 V AC/DC,<br>8 relay outputs 5 A | 6ED1055-1FB10-0BA2 | | |
| **LOGO! AM2**<br>Supply voltage 12...24 V DC,<br>2 analog inputs 0 to 10 V or<br>0 to 20 mA, resolution 10 bits | 6ED1055-1MA00-0BA2 | | |
| **LOGO! AM2 PT 100**<br>Supply voltage 12...24 V DC,<br>2 analog inputs Pt100,<br>temperature range -50 °C to 200 °C | 6ED1055-1MD00-0BA2 | | |
| **LOGO! AM2 AQ**<br>Supply voltage 24 V DC,<br>2 analog outputs 0 to 10 V,<br>0/4 to 20 mA | 6ED1055-1MM00-0BA2 | | |

## Overview



- The space-saving basic variants
- Interface for connecting expansion modules, up to 24 digital inputs, 20 (16) digital outputs, 8 analog inputs and 8 (2) analog outputs can be addressed
- With connection option for LOGO! TD text display (can be connected to all LOGO! 0BA6 and 0BA7 basic variants); LOGO! TDE can be connected to LOGO! 8 or higher

New for LOGO! 8
- All basic units with integrated web server
- Same enclosure width as LOGO! 0BA6 (4 U)
- All basic units with Ethernet interface for communication with LOGO!, SIMATIC Controllers, SIMATIC Panel and PC
- Use of standard micro CF cards

LOGO! 0BA7 versions:
- Ethernet interface for communication with SIMATIC Controllers, SIMATIC Panel and PC
- Networking of max. 8 LOGO! devices
- Use of standard SD card or SIMATIC Memory Card

Note:

SIPLUS LOGO! 6/7 versions are not compatible with SIPLUS LOGO! 8.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1052-1CC01-7BA8** | **6AG1052-1MD00-7BA8** | **6AG1052-1HB00-7BA8** | **6AG1052-1FB00-7BA8** |
|---|---|---|---|---|
| Based on | **6ES7052-1CC01-0BA8** | **6ES7052-1MD00-0BA8** | **6ES7052-1HB00-0BA8** | **6ES7052-1FB00-0BA8** |
| | SIPLUS LOGO! 24CE | SIPLUS LOGO! 12/24RCE | SIPLUS LOGO! 24RCE | SIPLUS LOGO! 230RCE |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -10 °C; = Tmin; Startup @ 0 °C | -10 °C; = Tmin; Startup @ 0 °C | -10 °C; = Tmin; Startup @ 0 °C | -10 °C; = Tmin; Startup @ 0 °C |
| • max. | 60 °C; Tmax; Tmax > +55 °C max. load 0.2 A per output | 60 °C; Tmax; Tmax > +55 °C max. load 1 A per relay or max. load 3 A per relay and half the number of DIs (no adjacent points) | 60 °C; Tmax; Tmax > +55 °C max. load 1 A per relay or max. load 3 A per relay and half the number of DIs (no adjacent points) | 60 °C; Tmax; Tmax > +55 °C max. load 1 A per relay |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | | | |
| • At cold restart, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |

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# LOGO! logic modules
LOGO! modular

## ■ Technical specifications (continued)

| Article number | 6AG1052-1CC01-7BA8 | 6AG1052-1MD00-7BA8 | 6AG1052-1HB00-7BA8 | 6AG1052-1FB00-7BA8 |
|---|---|---|---|---|
| Based on | 6ES7052-1CC01-0BA8 | 6ES7052-1MD00-0BA8 | 6ES7052-1HB00-0BA8 | 6ES7052-1FB00-0BA8 |
| | SIPLUS LOGO! 24CE | SIPLUS LOGO! 12/24RCE | SIPLUS LOGO! 24RCE | SIPLUS LOGO! 230RCE |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1052-1MD00-2BA7 | 6AG1052-1FB00-2BA7 |
|---|---|---|
| Based on | 6ES7052-1MD00-0BA7 | 6ES7052-1FB00-0BA7 |
| | SIPLUS LOGO!12/24RCE | SIPLUS LOGO! 230RCE |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax | 70 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

**■ Technical specifications** (continued)

| Article number | **6AG1052-1CC01-2BA6** | **6AG1052-1MD00-2BA6** | **6AG1052-1HB00-2BA6** | **6AG1052-1FB00-2BA6** |
|---|---|---|---|---|
| Based on | **6ES7052-1CC01-0BA6** | **6ES7052-1MD00-0BA6** | **6ES7052-1HB00-0BA6** | **6ES7052-1FB00-0BA6** |
| | SIPLUS LOGO! 24C | SIPLUS LOGO! 12/24RC | SIPLUS LOGO! 24RC | SIPLUS LOGO! 230RC |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# LOGO! logic modules
LOGO! modular

## SIPLUS LOGO! modular basic variants

| Odering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS LOGO! 8 logic module** | | **SIPLUS LOGO! 6 logic module** | |
| **SIPLUS LOGO! 24CE**<br><br>Supply voltage 24 V DC,<br>8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V),<br>4 digital outputs 24 V DC, 0.3 A, integrated time switch<br>Ethernet interface;<br>400 function blocks can be interlinked, modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1CC01-7BA8** | **SIPLUS LOGO! 24**<br><br>Supply voltage 24 V DC,<br>8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V),<br>4 digital outputs 24 V DC, 0.3 A, integrated time switch;<br>200 function blocks can be interlinked,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1CC01-2BA6** |
| **SIPLUS LOGO! 12/24RCE**<br><br>Supply voltage 12...24 V DC,<br>8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V),<br>4 relay outputs 10 A,<br>integral time switch,<br>Ethernet interface;<br>400 function blocks can be interlinked, modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1MD00-7BA8** | **SIPLUS LOGO! 12/24RC**<br><br>12/24 V DC power supply,<br>8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V)<br>4 relay outputs 10 A,<br>integral time switch;<br>200 function blocks can be interlinked,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1MD00-2BA6** |
| **SIPLUS LOGO! 24RCE**<br><br>Supply voltage 24 V AC/DC,<br>8 digital inputs 24 V AC/DC,<br>4 relay outputs 10 A,<br>integral time switch,<br>Ethernet interface;<br>400 function blocks can be interlinked, modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1HB00-7BA8** | **SIPLUS LOGO! 24RC**<br><br>Supply voltage 24 V AC/DC,<br>8 digital inputs 24 V AC/DC,<br>4 relay outputs 10 A,<br>integral time switch;<br>200 function blocks can be interlinked,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1HB00-2BA6** |
| **SIPLUS LOGO! 230RCE**<br><br>Supply voltage 115...230 V AC/DC,<br>8 digital inputs 115...230 V AC/DC,<br>4 relay outputs 10 A,<br>integral time switch,<br>Ethernet interface;<br>400 function blocks can be interlinked, modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1FB00-7BA8** | **SIPLUS LOGO! 230RC**<br><br>Control supply voltage 115/230 V AC/DC,<br>8 digital inputs 115/230 V AC/DC,<br>4 relay outputs 10 A,<br>integrated time switch;<br>200 function blocks can be interlinked,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1FB00-2BA6** |
| **SIPLUS LOGO! 7 logic module** | | **SIPLUS LOGO! 6, 7, 8 accessories** | |
| **SIPLUS LOGO! 12/24RCE**<br><br>Supply voltage 12/24 V DC,<br>8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V),<br>4 relay outputs 10 A,<br>integral time switch;<br>400 function blocks can be interlinked,<br>Ethernet interface,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1MD00-2BA7** | **LOGO!Soft Comfort V8**<br><br>For programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | **6ED1058-0BA08-0YA1** |
| | | **Front panel mounting set** | |
| | | Width 4 U | **6AG1057-1AA00-0AA0** |
| | | Width 8 U | **6AG1057-1AA00-0AA1** |
| | | Width 8 U, with keys | **6AG1057-1AA00-0AA2** |
| | | **SIPLUS LOGO! 6, 7 accessories** | |
| **SIPLUS LOGO! 230RCE**<br><br>Supply voltage 115/230 V AC/DC,<br>8 digital inputs 115/230 V AC/DC,<br>4 relay outputs 10 A,<br>integral time switch;<br>400 function blocks can be interlinked,<br>Ethernet interface,<br>modular expansion capability<br><br>Extended temperature range and exposure to media | **6AG1052-1FB00-2BA7** | **SIPLUS LOGO! TD text display**<br><br>(Extended temperature range -10 ... +60 °C and exposure to media)<br><br>4-line text display, can be connected to all LOGO! basic and pure variants as of -0BA6, including connecting cable | **6AG1055-4MH00-2BA0** |

## Overview



- Basic variants optimized for costs
- Interface for connecting expansion modules, up to 24 digital inputs, 16 (20) digital outputs, 8 analog inputs and 2 (8) analog outputs can be addressed
- With connection option for LOGO! TD text display (can be connected to all LOGO! 0BA6 basic variants)

New for SIPLUS LOGO! 8

- All basic units with integrated web server
- Same enclosure width as LOGO! 0BA6 (4 U)
- All basic units with Ethernet interface for communication with LOGO!, SIMATIC Controllers, SIMATIC Panel and PC
- Use of standard micro CF cards

***Note:***

SIPLUS LOGO! 6 versions are not compatible with SIPLUS LOGO! 8.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | **6AG1052-2CC01-7BA8** | **6AG1052-2MD00-7BA8** | **6AG1052-2HB00-7BA8** | **6AG1052-2FB00-7BA8** |
|---|---|---|---|---|
| Based on | **6ED1052-2CC01-0BA8** | **6ED1052-2MD00-0BA8** | **6ED1052-2HB00-0BA8** | **6ED1052-2FB00-0BA8** |
| | SIPLUS LOGO! 24CEO | SIPLUS LOGO! 12/24RCEO | SIPLUS LOGO! 24RCEO (AC) | SIPLUS LOGO! 230RCEO |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; Tmax; Tmax > +55 °C max. load 0.2 A per output | 70 °C; Tmax; Tmax > +55 °C max. load 1 A per relay or max. load 3 A per relay and half the number of DIs (no adjacent points) | 70 °C; Tmax; Tmax > +55 °C max. load 1 A per relay or max. load 3 A per relay and half the number of DIs (no adjacent points) | 70 °C; Tmax; Tmax > +55 °C max. load 1 A per relay |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | | | |
| • At cold restart, min. | 0 °C | 0 °C | 0 °C | 0 °C |

# LOGO! logic modules
LOGO! modular

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## Technical specifications (continued)

| Article number | **6AG1052-2CC01-7BA8** | **6AG1052-2MD00-7BA8** | **6AG1052-2HB00-7BA8** | **6AG1052-2FB00-7BA8** |
|---|---|---|---|---|
| Based on | **6ED1052-2CC01-0BA8** | **6ED1052-2MD00-0BA8** | **6ED1052-2HB00-0BA8** | **6ED1052-2FB00-0BA8** |
| | SIPLUS LOGO! 24CEO | SIPLUS LOGO! 12/24RCEO | SIPLUS LOGO! 24RCEO (AC) | SIPLUS LOGO! 230RCEO |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1052-2CC01-2BA6** | **6AG1052-2MD00-2BA6** | **6AG1052-2HB00-2BA6** | **6AG1052-2FB00-2BA6** |
|---|---|---|---|---|
| Based on | **6ED1052-2CC01-0BA6** | **6ED1052-2MD00-0BA6** | **6ED1052-2HB00-0BA6** | **6ED1052-2FB00-0BA6** |
| | SIPLUS LOGO! 24Co | SIPLUS LOGO! 12/24RCo | SIPLUS LOGO! 24RCo | SIPLUS LOGO! 230RCo |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# LOGO! logic modules
## LOGO! modular

**SIPLUS LOGO! modular pure variants**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS LOGO! 8 logic module** | | **SIPLUS LOGO! 230RCo** | |
| **SIPLUS LOGO! 24CEo** | | Supply voltage 115/230 V AC/DC, 8 digital inputs 115/230 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability | |
| Supply voltage 24 V DC, 8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A, integral time switch Ethernet interface; without display and keyboard; 400 function blocks can be interlinked, modular expansion capability | | Extended temperature range and exposure to media | **6AG1052-2FB00-2BA6** |
| Extended temperature range and exposure to media | **6AG1052-2CC01-7BA8** | **SIPLUS LOGO! 24RCo** | |
| **SIPLUS LOGO! 230RCEo** | | Supply voltage 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability | |
| Supply voltage 115...230 V AC/DC, 8 digital inputs 115...230 V AC/DC, 4 relay outputs 10 A, integral time switch, Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | | Extended temperature range and exposure to media | **6AG1052-2HB00-2BA6** |
| Extended temperature range and exposure to media | **6AG1052-2FB00-7BA8** | **SIPLUS LOGO! 12/24RCo** | |
| **SIPLUS LOGO! 24RCEo** | | Supply voltage 12/24 V DC, 8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability | |
| Supply voltage 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch, Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | | Extended temperature range and exposure to media | **6AG1052-2MD00-2BA6** |
| Extended temperature range and exposure to media | **6AG1052-2HB00-7BA8** | **SIPLUS LOGO! 6, 8 accessories** | |
| **SIPLUS LOGO! 12/24RCEo** | | **LOGO!Soft Comfort V8** | **6ED1058-0BA08-0YA1** |
| Supply voltage 12...24 V DC, 8 digital inputs 12...24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch Ethernet interface; without display or keyboard; 400 function blocks can be interlinked, modular expansion capability | | For programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | |
| | | **Front panel mounting set** | |
| | | Width 4 U | **6AG1057-1AA00-0AA0** |
| | | Width 8 U | **6AG1057-1AA00-0AA1** |
| Extended temperature range and exposure to media | **6AG1052-2MD00-7BA8** | Width 8 U, with keys | **6AG1057-1AA00-0AA2** |
| **SIPLUS LOGO! 6 logic module** | | **SIPLUS LOGO! 6 accessories** | |
| **SIPLUS LOGO! 24o** | | **SIPLUS LOGO! TD text display** | **6AG1055-4MH00-2BA0** |
| Supply voltage 24 V DC, 8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A, integrated time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability | | (Extended temperature range -10 ... +60 °C and exposure to media) | |
| | | 4-line text display, can be connected to all LOGO! basic and pure variants as of -0BA6, including connecting cable | |
| Extended temperature range and exposure to media | **6AG1052-2CC01-2BA6** | | |

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# LOGO! logic modules
LOGO! modular

## SIPLUS LOGO! modular expansion modules

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### ■ Overview



- Expansion modules for connection to LOGO! modular
- With digital inputs and outputs, analog inputs, or analog outputs

Note:

SIPLUS LOGO! 6 versions are not compatible with SIPLUS LOGO! 8.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | 6AG1055-1CB00-7BA2 | 6AG1055-1HB00-7BA2 | 6AG1055-1MB00-7BA2 |
|---|---|---|---|
| Based on | 6ED1055-1CB00-0BA2 | 6ED1055-1HB00-0BA2 | 6ED1055-1MB00-0BA2 |
| | SIPLUS LOGO! DM8 24 V8 | SIPLUS LOGO! DM8 24R V8 | SIPLUS LOGO! DM8 12/24R V8 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; Tmax; Tmax > +55 °C max. load 0.2 A per output | 70 °C; = Tmax; Tmax > +55 °C max. load 3 A per relay or max. total current 10 A | 70 °C; = Tmax; Tmax > +55 °C max. load 3 A per relay or max. total current 10 A |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | | |
| • At cold restart, min. | -25 °C | -25 °C | -25 °C |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications (continued)

| Article number | **6AG1055-1FB00-7BA2** | **6AG1055-1NB10-7BA2** |
|---|---|---|
| Based on | **6ED1055-1FB00-0BA2** | **6ED1055-1NB10-0BA2** |
| | SIPLUS LOGO! DM8 230R V8 | SIPLUS LOGO! DM16 24R V8 |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax; Tmax > +55 °C max. load 3 A per relay or max. total current 10 A | 70 °C; = Tmax; Tmax > +55 °C max. load 3 A per relay |
| **Ambient temperature during storage/transportation** | | |
| • min. | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C |
| **Extended ambient conditions** | | |
| • At cold restart, min. | -25 °C | -25 °C |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1055-1MA00-7BA2** |
|---|---|
| Based on | **6ED1055-1MA00-0BA2** |
| | SIPLUS LOGO! AM2 V8 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |

| Article number | **6AG1055-1MA00-7BA2** |
|---|---|
| Based on | **6ED1055-1MA00-0BA2** |
| | SIPLUS LOGO! AM2 V8 |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# LOGO! logic modules
LOGO! modular

**SIPLUS LOGO! modular expansion modules**

■ **Technical specifications** (continued)

| Article number | **6AG1055-1MM00-7BA2** |
|---|---|
| Based on | **6ED1055-1MM00-0BA2** |
| | SIPLUS LOGO! AM2 AQ V8 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |

| Article number | **6AG1055-1MM00-7BA2** |
|---|---|
| Based on | **6ED1055-1MM00-0BA2** |
| | SIPLUS LOGO! AM2 AQ V8 |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1055-1CB00-2BY0** | **6AG1055-1PB00-2BY0** | **6AG1055-1HB00-2BY0** | **6AG1055-1MB00-2BY1** |
|---|---|---|---|---|
| Based on | **6ED1055-1CB00-0BA0** | **6ED1055-1CB00-0BA0** | **6ED1055-1HB00-0BA0** | **6ED1055-1MB00-0BA1** |
| | SIPLUS LOGO! DM8 24 | SIPLUS LOGO! DM8 12/24 | SIPLUS LOGO! DM8 24R | SIPLUS LOGO! DM8 12/24R |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications (continued)

| Article number | **6AG1055-1FB00-2BY1** | **6AG1055-1NB10-2BA0** |
|---|---|---|
| Based on | **6ED1055-1FB00-0BA1** | **6ED1055-1NB10-0BA0** |
| | SIPLUS LOGO! DM8 230R | SIPLUS LOGO! DM16 24R EXP. MODULE |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -40 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use | 70 °C; = Tmax; 55 °C @ UL/cUL use |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1055-1MA00-2BY0** | Article number | **6AG1055-1MM00-2BY1** |
|---|---|---|---|
| Based on | **6ED1055-1MA00-0BA0** | Based on | **6ED1055-1MM00-0BA1** |
| | SIPLUS LOGO! AM2 | | SIPLUS_LOGO!_AM2_AQ |
| **Ambient conditions** | | **Ambient conditions** | |
| **Ambient temperature during operation** | | **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin | • min. | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use | • max. | 70 °C; = Tmax; 55 °C @ UL/cUL use |
| **Extended ambient conditions** | | **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# LOGO! logic modules
LOGO! modular

## SIPLUS LOGO! modular expansion modules

■ **Odering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS LOGO! 8 expansion modules** | | **SIPLUS LOGO! DM8 24R** | |
| **SIPLUS LOGO! DM8 24** | | Supply voltage 24 V AC/DC, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A | |
| Supply voltage 24 V DC, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A | | Extended temperature range and exposure to media | **6AG1055-1HB00-2BY0** |
| Extended temperature range and exposure to media | **6AG1055-1CB00-7BA2** | **SIPLUS LOGO! AM2** | |
| **SIPLUS LOGO! DM8 230R** | | Supply voltage 12/24 V DC, 2 analog inputs 0 ... 10 V or 0 ... 20 mA, 10-bit resolution | |
| Supply voltage 115...230 V AC/DC, 4 digital inputs 115...230 V AC/DC, 4 relay outputs 5 A | | Extended temperature range and exposure to media | **6AG1055-1MA00-2BY0** |
| Extended temperature range and exposure to media | **6AG1055-1FB00-7BA2** | **SIPLUS LOGO! DM8 12/24R** | |
| **SIPLUS LOGO! DM8 24R** | | Supply voltage 12/24 V DC, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A | |
| Supply voltage 24 V AC/DC, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A | | Extended temperature range and exposure to media | **6AG1055-1MB00-2BY1** |
| Extended temperature range and exposure to media | **6AG1055-1HB00-7BA2** | **SIPLUS LOGO! AM2 AQ** | |
| **SIPLUS LOGO! AM2** | | Supply voltage 24 V DC, 2 analog inputs 0 ... 10 V, 0/4 ... 20 mA, 10-bit resolution | |
| Supply voltage 12...24 V DC, 2 analog inputs 0 to 10 V or 0 to 20 mA, resolution 10 bit | | Extended temperature range and exposure to media | **6AG1055-1MM00-2BY1** |
| Extended temperature range and exposure to media | **6AG1055-1MA00-7BA2** | **SIPLUS LOGO! DM16 24R** | |
| **SIPLUS LOGO! DM8 12/24R** | | Supply voltage 24 V DC, 8 digital outputs 24 V DC, 8 relay outputs 5 A | |
| Supply voltage 12...24 V DC, 4 digital inputs 12...24 V DC, 4 relay outputs 5 A | | Extended temperature range and exposure to media | **6AG1055-1NB10-2BA0** |
| Extended temperature range and exposure to media | **6AG1055-1MB00-7BA2** | **SIPLUS LOGO! DM8 12/24** | |
| **SIPLUS LOGO! AM2 AQ** | | Supply voltage 12/24 V DC, 4 digital inputs 12/24 V DC, 4 digital outputs 24 V DC, 0.3 A | |
| Supply voltage 24 V DC, 2 analog outputs 0 to 10 V, 0/4 to 20 mA | | Extended temperature range and exposure to media | **6AG1055-1PB00-2BY0** |
| Extended temperature range and exposure to media | **6AG1055-1MM00-7BA2** | **SIPLUS LOGO! 6, 8 accessories** | |
| **SIPLUS LOGO! DM16 24R** | | **LOGO!Soft Comfort V8** | **6ED1058-0BA08-0YA1** |
| Supply voltage 24 V DC, 8 digital inputs 24 V DC, 8 relay outputs 5 A | | For programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | |
| Extended temperature range and exposure to media | **6AG1055-1NB10-7BA2** | **Front panel mounting set** | |
| **SIPLUS LOGO! 6 expansion modules** | | Width 4 U | **6AG1057-1AA00-0AA0** |
| **SIPLUS LOGO! DM8 24** | | Width 8 U | **6AG1057-1AA00-0AA1** |
| Supply voltage 24 V DC, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A | | Width 8 U, with keys | **6AG1057-1AA00-0AA2** |
| Extended temperature range and exposure to media | **6AG1055-1CB00-2BY0** | **SIPLUS LOGO! 6 accessories** | |
| **SIPLUS LOGO! DM8 230R** | | **SIPLUS LOGO! TD text display** | **6AG1055-4MH00-2BA0** |
| Supply voltage 115/230 V AC/DC, 4 digital inputs 115/230 V AC/DC, 4 relay outputs 5 A | | (Extended temperature range -10 ... +60 °C and exposure to media) | |
| Extended temperature range and exposure to media | **6AG1055-1FB00-2BY1** | 4-line text display, can be connected to all LOGO! basic and pure variants as of -0BA6, including connecting cable | |

## Overview



- Communication modules for connecting LOGO! Modular to different bus systems.

Note on compatibility:

| Communication module | Can be used with: |
|---|---|
| LOGO! CM EIB/KNX communication module | LOGO! to ...0BA7 |
| LOGO! CMK2000 communication module | LOGO! ...0BA8 |
| LOGO! CSM 12/24 | LOGO! ...0BA7/...0BA8 |
| LOGO! CSM 230 | LOGO! ...0BA7 |
| LOGO! CMR2020 | LOGO! ...0BA8 |
| LOGO! CMR2040 | LOGO! ...0BA8 |
| AS-Interface connection for LOGO! | LOGO! to ...0BA7 |

# LOGO! logic modules
## LOGO! modular communication modules

### LOGO! CMK2000 communication modules

**2**

#### ■ Overview



- Expansion module for LOGO! 8 basic variants
- For integrating LOGO! 8 in KNX installations
- With 24 digital inputs, 20 digital outputs as well as 8 analog inputs and outputs for processing process signals via KNX.

#### ■ Technical specifications

| Article number | 6BK1700-0BA20-0AA0 |
| --- | --- |
| | LOGO! CMK2000 |
| **General information** | |
| Firmware version | |
| • FW update possible | Yes |
| **Installation type/mounting** | |
| Mounting | on 35 mm DIN rail, 4 spacing units wide |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| • 12 V DC | No |
| • 24 V DC | Yes |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 28.8 V |
| Rated value (AC) | |
| • 24 V AC | No |
| **Input current** | |
| Current consumption, max. | 0.04 A |
| **Power loss** | |
| Power loss, max. | 1.1 W |
| **Memory** | |
| Flash | Yes |
| **Time of day** | |
| **Clock synchronization** | |
| • supported | Yes |
| **Interfaces** | |
| Number of industrial Ethernet interfaces | 1; Ethernet, 1 port, RJ45 |
| Number of other interfaces | 1; EIB/KNX |
| Transmission rate, max. | 100 Mbit/s over Ethernet, 9 600 bit/s over KNX |
| **Protocols** | |
| EIB/KNX | Yes |

| Article number | 6BK1700-0BA20-0AA0 |
| --- | --- |
| | LOGO! CMK2000 |
| **Communication functions** | |
| **Web server** | |
| • supported | Yes |
| **Interrupts/diagnostics/status information** | |
| **Diagnostics indication LED** | |
| • RUN/STOP LED | Yes |
| **EMC** | |
| **Emission of radio interference acc. to EN 55 011** | |
| • Limit class B, for use in residential areas | Yes; In accordance with EN 61000-6-3 |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| UL approval | Yes |
| cULus | Yes |
| FM approval | No |
| RCM (formerly C-TICK) | No |
| KC approval | Yes |
| EAC (formerly Gost-R) | Yes |
| according to VDE 0631 | No |
| **Marine approval** | |
| • Marine approval | No |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 55 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Relative humidity** | |
| • Operation, max. | 95 % |
| **Connection method** | |
| Design of plug-in connection | KNX terminal 0.6 mm² - 1.0 mm² |
| Power supply | 2 screw-type terminals: L+, M 0.5 mm² - 2.5 mm² Screw-type terminal: FE 0.5 mm² ... 6.0 mm² |
| **Dimensions** | |
| Width | 71.5 mm; 4 WU |
| Height | 90 mm |
| Depth | 58.5 mm |
| **Weights** | |
| Weight, approx. | 0.14 kg |

#### ■ Ordering data

| | Article No. |
| --- | --- |
| **LOGO! CMK2000 communication module** | **6BK1700-0BA20-0AA0** |
| For integrating LOGO! 8 in the KNX building system bus, max. 50 communication objects can be configured; RJ45 port for Ethernet; supply voltage 24 V DC/40 mA | |

## ■ Overview

The module is used to connect a LOGO! and up to three other nodes to an Industrial Ethernet network with 10/100 Mbit/s in an electrical linear, tree or star topology.

The essential features of the LOGO! CSM are:

- Unmanaged 4-port switch, of which one port is on the front for easy diagnostics access
- Two versions for the voltage ranges 12/24 V DC or 230 V AC/DC
- Problem-free connection using four RJ45 standard connectors
- Space-saving, optimized for connection to LOGO!
- Low-cost solution for implementing small, local Ethernet networks
- Stand-alone use for networking any Ethernet devices

## ■ Technical specifications

| Order number | 6GK7177-1FA10-0AA0 | 6GK7177-1MA20-0AA0 |
|---|---|---|
| Product type designation | LOGO! CSM 230 | LOGO! CSM 12/24 |
| **Transmission rate** | | |
| Transfer rate | 10 Mbit/s, 100 Mbit/s | 10 Mbit/s, 100 Mbit/s |
| **Interfaces for communication integrated** | | |
| Number of electrical connections | | |
| • for network components or terminal equipment | 4 | 4 |
| Number of 100 Mbit/s SC ports | | |
| • for multimode | 0 | 0 |
| Number of 1000 Mbit/s LC ports | | |
| • for multimode | 0 | 0 |
| • for single mode (LD) | 0 | 0 |
| **Interfaces others** | | |
| Number of electrical connections | | |
| • for power supply | 1 | 1 |
| Type of electrical connection | | |
| • for power supply | 3-pole terminal block | 3-pole terminal block |
| **Supply voltage, current consumption, power loss** | | |
| Type of voltage of the supply voltage | 115...240 V AC/DC | 12/24 V DC |
| Supply voltage | | |
| • external | 230 V | 24 V |
| • external | 100 ... 240 V | 10.2 ... 30.2 V |
| Product component fusing at power supply input | Yes | Yes |
| Consumed current maximum | 0.02 A | 0.15 A |
| Power loss [W] | | |
| • at DC at 24 V | | 1.5 W |
| • at AC at 230 V | 1.8 W | |
| **Permitted ambient conditions** | | |
| Ambient temperature | | |
| • during operation | 0 ... 55 °C | 0 ... 55 °C |
| • during storage | -40 ... +70 °C | -40 ... +70 °C |
| • during transport | -40 ... +70 °C | -40 ... +70 °C |
| Relative humidity | | |
| • at 25 °C without condensation during operation maximum | 90 % | 90 % |
| Protection class IP | IP20 | IP20 |

# LOGO! logic modules
## LOGO! modular communication modules

**LOGO ! CSM unmanaged**

### Technical specifications (continued)

| Order number | 6GK7177-1FA10-0AA0 | 6GK7177-1MA20-0AA0 |
|---|---|---|
| Product type designation | LOGO! CSM 230 | LOGO! CSM 12/24 |
| **Design, dimensions and weight** | | |
| Design | LOGO! module | LOGO! module |
| Width | 72 mm | 71.5 mm |
| Height | 90 mm | 90 mm |
| Depth | 55 mm | 58.2 mm |
| Net weight | 0.155 kg | 0.15 kg |
| Mounting type | | |
| • 35 mm DIN rail mounting | Yes | Yes |
| • wall mounting | Yes | Yes |
| • S7-300 rail mounting | No | No |
| • S7-1500 rail mounting | No | No |
| **Product functions management, configuration** | | |
| Product function | | |
| • multiport mirroring | No | No |
| • switch-managed | No | No |
| **Standards, specifications, approvals** | | |
| Standard | | |
| • for hazardous zone | no | ATEX: EN 60079-0 : 2009,EN 60079-15 :2010 (Directive 94/9/EC), IECEx: IEC 60079-0 :2011, IEC 60079-15 :2010 |
| • for safety from CSA and UL | UL60079-0, UL60079-15, CSA C22.2 | UL 508, CSA C22.2 No. 142 |
| • for hazardous zone from CSA and UL | | Haz-Loc  ANSI/ISA 12.12.01: CL. I, Div2, Group A,B,C,D T4, CL I, Zone 2, Group IIC, T4, Ta=55°C |
| Certificate of suitability CE marking | Yes | Yes |
| Certificate of suitability | | |
| • C-Tick | Yes | Yes |
| • KC approval | No | No |
| Marine classification association | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | No | No |
| • Bureau Veritas (BV) | No | No |
| • Det Norske Veritas (DNV) | No | No |
| • Germanische Lloyd (GL) | No | No |
| • Lloyds Register of Shipping (LRS) | No | No |
| • Nippon Kaiji Kyokai (NK) | No | No |
| • Polski Rejestr Statkow (PRS) | No | No |

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **LOGO! CSM compact switch modules** | | **Accessories** | |
| | | **IE TP Cord RJ45/RJ45** | |
| Unmanaged switch for connection of one LOGO! and up to three further nodes on Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; LED diagnostics, LOGO! module | | TP cable 4 x 2 with 2 RJ45 plugs | |
| | | • 0.5 m | 6XV1870-3QE50 |
| | | • 1 m | 6XV1870-3QH10 |
| | | • 2 m | 6XV1870-3QH20 |
| • **LOGO! CSM 12/24** external 12 V DC or 24 V DC power supply, for LOGO! ... 0BA7/... 0BA8 | 6GK7177-1MA20-0AA0 | • 6 m | 6XV1870-3QH60 |
| | | • 10 m | 6XV1870-3QN10 |
| • **LOGO! CSM 230** external 115 ... 240 V AC power supply, for LOGO! ... 0BA7 | 6GK7177-1FA10-0AA0 | **IE FC outlet RJ45** | 6GK1901-1FC00-0AA0 |
| | | For connection of Industrial Ethernet FC cables and TP Cords; graded prices from 10 and 50 units | |

## Overview



LOGO! CMR in combination with the LOGO! logic module is a cost-efficient communication system suitable for monitoring and controlling distributed plants and systems via text message or email.

LOGO! CMR can send text messages or emails to predefined mobile network numbers as well as receive text messages from predefined mobile network numbers.

Sending a text message/email can be initiated by events in the LOGO! basic module as well as by the two digital alarm inputs of the LOGO! CMR. The values in the LOGO! logic module can be directly influenced by receiving a text message.

The LOGO! CMR offers comfortable Web Based Management commissioning and diagnostics via local and/or remote access.

The two digital outputs can also be switched remotely by incoming text messages/emails.

LOGO! CMR determines the current position of the module based on the GPS signal received by the GPS antenna. In addition, the LOGO! 8 logic module can be time-synchronized by means of the time included in the GPS signal. Determination of time by means of an NTP server or from the data of the mobile network provider offers more options for synchronization of the LOGO! BM with the current time of day.

**Product version:**
• LOGO! CMR2020 for use in GSM/GPRS mobile wireless networks
• LOGO! CMR2040 for use in in LTE mobile wireless networks

Warning! The country-specific mobile network approvals must be observed:

DE: http://www.siemens.de/mobilfunkzulassungen

EN: http://www.siemens.com/mobilenetwork-approvals

## Technical specifications

| Order number | 6GK7142-7BX00-0AX0 | 6GK7142-7EX00-0AX0 |
|---|---|---|
| Product type designation | LOGO! CMR2020 | LOGO! CMR2040 |
| **Transmission rate** | | |
| Transfer rate | | |
| • at the 1st interface | 10 ... 100 Mbit/s | 10 ... 100 Mbit/s |
| • for GPRS transmission | | |
| - with downlink maximum | 80 kbit/s | 85.6 kbit/s |
| - with uplink maximum | 40 kbit/s | 85.6 kbit/s |
| • for LTE transmission | | |
| - with downlink maximum | | 100 Mbit/s |
| - with uplink maximum | | 50 Mbit/s |
| **Interfaces** | | |
| Number of interfaces acc. to Industrial Ethernet | 1 | 1 |
| Number of electrical connections | | |
| • at the 1st interface acc. to Industrial Ethernet | 1 | 1 |
| • for external antenna(s) | 2 | 2 |
| • for power supply | 1 | 1 |
| Number of slots | | |
| • for SIM cards | 1 | 1 |
| • for memory cards | 1 | 1 |
| Type of electrical connection | | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port | RJ45 port |
| • for external antenna(s) | SMA socket (50 ohms) | SMA socket (50 ohms) |
| • for power supply | 3-pole terminal block | 3-pole terminal block |
| Type of antenna | | |
| • at port 1 connectable | GPS Antenna | GPS Antenna |
| • at port 2 connectable | Mobile radio antenna (GPRS/GSM) | Mobile radio antenna (GPRS/GSM, UMTS, LTE) |
| Wire length of antenna cable maximum | 15 m | 15 m |

# LOGO! logic modules
LOGO! modular communication modules

## LOGO! CMR (wireless communication)

### Technical specifications (continued)

| Order number | 6GK7142-7BX00-0AX0 | 6GK7142-7EX00-0AX0 |
|---|---|---|
| Product type designation | LOGO! CMR2020 | LOGO! CMR2040 |
| Slot version | | |
| • for SIM card | Standard | Standard |
| • of the memory card | microSD | microSD |
| Storage capacity of the memory card maximum | 32 Gibyte | 32 Gibyte |
| Performance class of the memory card minimum necessary | Class 6 | Class 6 |
| Type of file system Type of file system | FAT32 | FAT32 |
| **Signal-Inputs/outputs** | | |
| Number of electrical connections for digital input signals | 2 | 2 |
| Type of electrical connection for digital input signals | 3 pole terminal block | 3 pole terminal block |
| Digital input version | not potential seperated | not potential seperated |
| Input voltage at digital input | | |
| • with signal <0> at DC | 0 ... 5 V | 0 ... 5 V |
| • for signal <1> at DC | 8.5 ... 24 V | 8.5 ... 24 V |
| Input current at digital input for signal <1> maximum | 5.5 mA | 5.5 mA |
| Number of electrical connections for digital output signals | 2 | 2 |
| Type of electrical connection for digital output signals | 3 pole terminal block | 3 pole terminal block |
| Digital output version | transistor, not potential seperated | transistor, not potential seperated |
| Output voltage at digital output | | |
| • for signal <1> | 12 ... 24 V; Value of the actual supply voltage | 12 ... 24 V; Value of the actual supply voltage |
| • for signal <0> | 0 ... 5 V | 0 ... 5 V |
| Output current at digital output for signal <1> maximum | 0.3 A | 0.3 A |
| **Wireless technology** | | |
| Type of mobile wireless service | | |
| • is supported SMS | Yes | Yes |
| • is supported GPRS | Yes | Yes |
| • Note | GPRS (Multislot Class 10, Mobile Station Class B) | LTE |
| Type of mobile network is supported | | |
| • GSM | Yes | Yes |
| • UMTS | No | Yes |
| • LTE | No | Yes |
| Operating frequency | | |
| • for GSM transmission 850 MHz | Yes | No |
| • for GSM transmission 900 MHz | Yes | Yes |
| • for GSM transmission 1800 MHz | Yes | Yes |
| • for GSM transmission 1900 MHz | Yes | No |
| • with UMTS transmission 850 MHz | No | Yes |
| • with UMTS transmission 900 MHz | No | Yes |
| • with UMTS transmission 2100 MHz | No | Yes |
| • for LTE transmission 800 MHz | No | Yes |
| • for LTE transmission 1800 MHz | No | Yes |
| • for LTE transmission 2600 MHz | No | Yes |

## Technical specifications (continued)

| Order number | **6GK7142-7BX00-0AX0** | **6GK7142-7EX00-0AX0** |
|---|---|---|
| Product type designation | LOGO! CMR2020 | LOGO! CMR2040 |
| **Supply voltage, current consumption, power loss** | | |
| Type of voltage of the supply voltage | DC | DC |
| Supply voltage external | 12 ... 24 V | 12 ... 24 V |
| Supply voltage external at DC Rated value | 12 ... 24 V | 12 ... 24 V |
| Supply voltage for GPS antenna maximum | 3.8 V; at 5 mA: 3,575 V / at 10 mA: 3,35 V / at 15 mA: 3,125 V | 3.8 V; at 5 mA: 3,575 V / at 10 mA: 3,35 V / at 15 mA: 3,125 V |
| Relative positive tolerance at DC at 24 V | 20 % | 20 % |
| Relative negative tolerance at DC at 12 V | 10 % | 10 % |
| Consumed current | | |
| • from external supply voltage at DC at 12 V maximum | 0.25 A | 0.25 A |
| • from external supply voltage at DC at 24 V maximum | 0.125 A | 0.125 A |
| Output current for GPS antenna maximum | 15 mA | 15 mA |
| Power loss [W] | 3 W | 3 W |
| **Permitted ambient conditions** | | |
| Ambient temperature | | |
| • during operation | -20 ... +70 °C | -20 ... +70 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C |
| • during transport | -40 ... +85 °C | -40 ... +85 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % | 95 % |
| Protection class IP | IP20 | IP20 |
| **Design, dimensions and weight** | | |
| Module format | Compact module, for rail mounting | Compact module, for rail mounting |
| Width | 71.5 mm | 71.5 mm |
| Height | 90 mm | 90 mm |
| Depth | 58.2 mm | 58.2 mm |
| Net weight | 0.16 kg | 0.16 kg |
| Mounting type | | |
| • 35 mm DIN rail mounting | Yes | Yes |
| • wall mounting | Yes | Yes |
| **Product properties, functions, components general** | | |
| Product function | | |
| • DynDNS client | Yes | Yes |
| • no-ip.com client | Yes | Yes |
| **Performance data** | | |
| Number of possible connections to the LOGO! logic module | 1 | 1 |
| Number of user groups definable maximum | 10 | 10 |
| Number of signals for monitoring or device control definable maximum | 32 | 32 |
| Number of events for monitoring definable maximum | 32 | 32 |
| number of actions definable maximum | 32 | 32 |
| Number of relations definable maximum | 32 | 32 |
| Number of alias-SMS-command definable maximum | 20 | 20 |
| Number of constants definable maximum | 32 | 32 |

# LOGO! logic modules
LOGO! modular communication modules

## LOGO! CMR (wireless communication)

### Technical specifications (continued)

| Order number | 6GK7142-7BX00-0AX0 | 6GK7142-7EX00-0AX0 |
|---|---|---|
| Product type designation | LOGO! CMR2020 | LOGO! CMR2040 |
| **Performance data IT functions** | | |
| Number of possible connections | | |
| • as server by means of HTTP maximum | 2 | 2 |
| • as server by HTTPS maximum | 2 | 2 |
| • as e-mail client maximum | 1 | 1 |
| Number of free texts for e-mails definable by user | 20; maximum of 160 characters per user defined text | 20; maximum of 160 characters per user defined text |
| **Performance data Teleservice** | | |
| Product function | | |
| • Remote firmware update | Yes | Yes |
| Configuration software | | |
| • required | No, configuration by using the integrated webserver | No, configuration by using the integrated webserver |
| **Product functions Diagnosis** | | |
| Product function Web-based diagnostics | Yes | Yes |
| **Product functions Security** | | |
| Suitability for operation Virtual Private Network | Yes | Yes |
| Type of authentication with Virtual Private Network PSK | Yes | Yes |
| Number of possible connections with VPN connection | 1 | 1 |
| Product function | | |
| • password protection for Web applications | Yes | Yes |
| • password protection for VPN | Yes | Yes |
| • encrypted data transmission | Yes | Yes |
| • switch-off of non-required services | Yes | Yes |
| • log file for unauthorized access | Yes | Yes |
| **Product functions Time** | | |
| Product function pass on time synchronization | Yes | Yes |
| Accuracy of the hardware real-time clock per day maximum | 7.5 s | 7.5 s |
| time synchronization | | |
| • from NTP-server | Yes | Yes |
| • from GPS-signal | Yes | Yes |
| • from mobile network provider | Yes | Yes |
| • PC | Yes | Yes |
| **Product functions Position recognition** | | |
| Product function position detection with GPS | Yes | Yes |

■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|

**Communication Module Radio LOGO! CMR**

Communication modules for connection of LOGO! 0BA8 to GSM/GPRS or LTE network; 1x RJ45 port for Industrial Ethernet connection; 2x digital input; 2x digital output; read/write access to LOGO! tags; possible to send/receive text messages; GPS position detection; time-of-day synchronization/forwarding with real time clock; configuration and diagnostics per web interface; Note country approvals: www.siemens.com/mobilenetwork-approvals

| | Article No. |
|---|---|
| **LOGO! CMR2020** | 6GK7142-7BX00-0AX0 |
| For connecting LOGO! 0BA8 to a GSM/GPRS network | |
| **LOGO! CMR2040** | 6GK7142-7EX00-0AX0 |
| For connecting LOGO! 0BA8 to an LTE network | |
| **Accessories** | |
| **Mobile radio antennas** | |
| **ANT794-4MR** For indoor and outdoor use; 5 m connecting cable permanently connected to antenna; SMA connector; incl. installation bracket, screws, wall plugs | 6NH9860-1AA00 |
| **ANT896-4MA** Rod antenna for direct mounting on device; SMA male connector | 6GK5896-4MA00-0AA3 |
| **ANT896-4ME** Cylinder-shaped antenna for remote installation, e.g. on a control cabinet; N-Connect female connector | 6GK5896-4ME00-0AA0 |
| **GPS antenna** | |
| **ANT895-6ML** GPS/Glonass antenna for remote installation indoor and outdoor, magnet or screw mounting, 30 cm cable with N-Connect female connector | 6GK5895-6ML00-0AA0 |
| **Antenna adapter cable** | |
| N-Connect/SMA male/male flexible connection cable, pre-assembled, connection cable; suitable for 0 ... 6 GHz, IP68 | |
| • 0.3 m | 6XV1875-5LE30 |
| • 1 m | 6XV1875-5LH10 |
| • 2 m | 6XV1875-5LH20 |
| • 5 m | 6XV1875-5LH50 |

| | Article No. |
|---|---|
| **IWLAN RCoax/ antenna N-Connect male/male flexible connection cable** | |
| Flexible connecting cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with N-Connect connections; pre-assembled with two N-Connect male connections; suitable from 0 ... 6 GHz, IP68 | |
| • 1 m | 6XV1875-5AH10 |
| • 2 m | 6XV1875-5AH20 |
| • 5 m | 6XV1875-5AH50 |
| • 10 m | 6XV1875-5AN10 |
| **Cabinet feed-through** | |
| IWLAN RCOAX N-Connect/ N-Connect female/female panel feed-through; control cabinet feed-through for wall thickness max. 4.5 mm; 2.4 GHz and 5 GHz, suitable for 0 ... 6 GHz, IP67 | 6GK5798-2PP00-2AA6 |
| **Lightning protector LP798-2N** | |
| Lightning protector with N/N female/ female connection for ANT 790 antennas, IP67 (-40 to +85 °C), frequency range: 0 … 6 GHz | 6GK5798-2LP00-2AA6 |
| **Patch cable** | |
| **IE TP Cord RJ45/RJ45** | |
| TP cable 4 x 2 with 2 RJ45 plugs | |
| • 0.5 m | 6XV1870-3QE50 |
| • 1 m | 6XV1870-3QH10 |
| • 2 m | 6XV1870-3QH20 |
| • 6 m | 6XV1870-3QH60 |
| • 10 m | 6XV1870-3QN10 |
| **IE FC outlet RJ45** | 6GK1901-1FC00-0AA0 |
| For connection of Industrial Ethernet FC cables and TP Cords; graduated prices for 10 and 50 units or more | |
| **LOGO! CSM12/24** | 6GK7177-1MA20-0AA0 |
| Compact switch module for connecting a LOGO! (...0BA7/...0BA8) and up to 3 further nodes to Industrial Ethernet; Power supply 12/24 V DC | |
| **LOGO! CSM230** | 6GK7177-1FA10 -0AA0 |
| Compact switch module for connecting a LOGO! (...0BA7) and up to 3 further nodes to Industrial Ethernet; Power supply 115 ... 240 V AC/DC | |

**2**

# LOGO! logic modules
LOGO!Power

## Introduction

### ■ Overview



***The flat power supply unit for distribution boards***

Small. Clever. LOGO!Power

Thanks to it stepped profile design, the LOGO!Power product family in the LOGO! 8 design is ideally suited for installation in miniature distribution boards. The stabilized power supplies with a wide range input of 100 … 240 V AC (85 … 264 V) and 110 ... 300 V DC are available in two performance classes with an output voltage of 5 V and 15 V, in three performance classes with 12 V and in four performance classes with 24 V. The 12 V and 24 V versions are ideal for supplying LOGO! controllers with the corresponding voltage input. The high level of efficiency across the entire load range as well as the low no-load losses result in lower overall energy consumption. Greater convenience when commissioning and servicing thanks to the integrated current monitor. The extended temperature range from -25 °C to +70 °C enables a host of additional applications.

To further increase 24 V availability, the 24 V LOGO!Power power supply units can be combined with **DC UPS**, **redundancy** and **selectivity modules**.

LOGO!Power is the ideal choice when components need to be supplied with DC voltage. It can provide currents up to 4 A. This mini power pack can be used regardless of industry, e.g. in building technology applications for light and heating controllers or for access control systems. LOGO!Power is also well-suited for use in industrial automation, such as in packaging machine, machine tool, conveyor belt or sorting system applications.



### ■ Main product highlights

- **Low width**
  with minimum of 18 mm to maximum of 72 mm, thus requiring very little space in the control cabinet
- **High energy efficiency**
  with efficiency levels of up to 90% over the entire power range and ERP-compliant no-load losses of < 0.3 W
- **Global use**
  thanks to extended operating temperature range from -25 °C to +70 °C and international certifications
- **Load monitoring**
  thanks to real-time measurement of output current without disconnecting the cable, i.e. without interrupting the DC supply (new)
- **Flexible mounting**
  with standard rail or wall mounting in different installation positions
- **Wide portfolio**
  with 11 devices with 5 V, 12 V, 15 V and 24 V DC up to 100 watts (new: 12 V/0.9 A and 24 V/0.6 A)
- **Flexible deployment**
  on all standard 1-phase supply networks thanks to wide range input of 100-240 V AC without switchover and operation on DC networks with 110-300 V DC
- **Reliable**
  thanks to problem-free connection of loads with high inrush currents thanks to power reserve when starting up as well as constant current in the event of overload

## Overview

Thanks to it stepped profile design, the LOGO!Power product family is ideally suited for installation in miniature distribution boards. The stabilized power supplies with a wide range input of 100 … 240 V AC (85 … 264 V) and 110 ... 300 V DC are available with an output voltage of 5 V in two performance classes. The high level of efficiency across the entire load range as well as the low no-load losses result in lower overall energy consumption. Greater convenience when commissioning and servicing thanks to the integrated current monitor. The extended temperature range from -25 °C to +70 °C enables a host of additional applications.

### Main product highlights

- 5 V DC/ 3.0 A and 6.3 A
- Narrow unit with 36 mm or 54 mm width and overall depth of 53 mm in LOGO! design
- Flexible mounting: standard rail or wall mounting in a range of installation positions
- Higher energy efficiency: high efficiency levels over the entire load range as well as no-load power losses of < 0.3 W
- Integrated current monitor: actual output current measurement directly at the power supply unit
- Global use: operating temperature range from -25 °C to +70 °C as well as international certifications such as UL, CSA, FM or ATEX

## Technical specifications

| Article number | **6EP3310-6SB00-0AY0** | 6EP3311-6SB00-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 5 V/3 A | 5 V/6.3 A |
| **Input** | | |
| Input | 1-phase AC or DC | 1-phase AC or DC |
| Rated voltage value $V_{in\ rated}$ | 100 ... 240 V | 100 ... 240 V |
| Voltage range AC | 85 ... 264 V | 85 ... 264 V |
| Input voltage | | |
| • at DC | 110 ... 300 V | 110 ... 300 V |
| Wide-range input | Yes | Yes |
| Mains buffering at $I_{out\ rated}$, min. | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V |
| Rated line frequency 1 | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | 60 Hz |
| Rated line range | 47 ... 63 Hz | 47 ... 63 Hz |
| Input current | | |
| • at rated input voltage 120 V | 0.36 A | 0.71 A |
| • at rated input voltage 230 V | 0.22 A | 0.37 A |
| Switch-on current limiting (+25 °C), max. | 26 A | 50 A |
| I²t, max. | 0.8 A²·s | 3 A²·s |
| Built-in incoming fuse | internal | internal |

# LOGO! logic modules
LOGO!Power

**1-phase, 5 V DC**

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■ **Technical specifications** (continued)

| Article number | 6EP3310-6SB00-0AY0 | 6EP3311-6SB00-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 5 V/3 A | 5 V/6.3 A |
| **Output** | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 5 V | 5 V |
| Total tolerance, static ± | 3 % | 3 % |
| Static mains compensation, approx. | 0.1 % | 0.1 % |
| Static load balancing, approx. | 0.1 % | 0.1 % |
| Residual ripple peak-peak, max. | 100 mV | 100 mV |
| Residual ripple peak-peak, typ. | 30 mV | 30 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 100 mV | 100 mV |
| Spikes peak-peak, typ. (bandwidth: 20 MHz) | 50 mV | 50 mV |
| Adjustment range | 4.6 ... 5.4 V | 4.6 ... 5.4 V |
| Product function Output voltage adjustable | Yes | Yes |
| Output voltage setting | via potentiometer | via potentiometer |
| Status display | Green LED for output voltage OK | Green LED for output voltage OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 0.5 s | 0.5 s |
| Voltage rise, typ. | 100 ms | 100 ms |
| Rated current value $I_{out\ rated}$ | 3 A | 6.3 A |
| Current range | 0 ... 3 A | 0 ... 6.3 A |
| • Note | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K |
| Supplied active power typical | 15 W | 31.5 W |
| Parallel switching for enhanced performance | Yes | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 | 2 |
| **Efficiency** | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 76 % | 80 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 5 W | 8 W |
| Power loss [W] during no-load operation maximum | 0.3 W | 0.3 W |
| **Closed-loop control** | | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max. | 0.2 % | 0.2 % |
| Dynamic load smoothing ($I_{out}$: 10/90/10 %), $U_{out}$ ± typ. | 5 % | 7 % |
| Load step setting time 10 to 90%, typ. | 1 ms | 1 ms |
| Load step setting time 90 to 10%, typ. | 1 ms | 1 ms |
| **Protection and monitoring** | | |
| Output overvoltage protection | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 |
| Current limitation, typ. | 3.8 A | 8.2 A |
| Property of the output Short-circuit proof | Yes | Yes |
| Short-circuit protection | Constant current characteristic | Constant current characteristic |
| Enduring short circuit current RMS value | | |
| • maximum | 3.8 A | 8.2 A |
| Overload/short-circuit indicator | - | - |

**2**

## Technical specifications (continued)

| Article number | 6EP3310-6SB00-0AY0 | 6EP3311-6SB00-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 5 V/3 A | 5 V/6.3 A |
| **Safety** | | |
| Primary/secondary isolation | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 |
| Protection class | Class II (without protective conductor) | Class II (without protective conductor) |
| CE mark | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273 |
| Explosion protection | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes | Yes |
| Marine approval | GL, ABS | GL, ABS |
| Degree of protection (EN 60529) | IP20 | IP20 |
| **EMC** | | |
| Emitted interference | EN 55022 Class B | EN 55022 Class B |
| Supply harmonics limitation | not applicable | not applicable |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | |
| Ambient temperature | | |
| • during operation | -25 ... +70 °C | -25 ... +70 °C |
| - Note | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K3, no condensation |
| **Mechanics** | | |
| Connection technology | screw-type terminals | screw-type terminals |
| Connections | | |
| • Supply input | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded |
| • Output | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - | - |
| Width of the enclosure | 36 mm | 54 mm |
| Height of the enclosure | 90 mm | 90 mm |
| Depth of the enclosure | 53 mm | 53 mm |
| Required spacing | | |
| • top | 20 mm | 20 mm |
| • bottom | 20 mm | 20 mm |
| • left | 0 mm | 0 mm |
| • right | 0 mm | 0 mm |
| Weight, approx. | 0.12 kg | 0.2 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x7.5/15 | Snaps onto DIN rail EN 60715 35x7.5/15 |
| MTBF at 40 °C | 2 931 709 h | 2 654 280 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **LOGO!Power 1-phase, 5 V DC/3 A** | | **LOGO!Power 1-phase, 5 V DC/6.3 A** | |
| Stabilized power supply Input: 100 … 240 V DC (110 ... 300 V AC) Output: 5 V DC/3 A | **6EP3310-6SB00-0AY0** | Stabilized power supply Input: 100 … 240 V AC (110 ... 300 V DC) Output: 5 V DC/6.3 A | **6EP3311-6SB00-0AY0** |

# LOGO! logic modules
LOGO!Power

**1-phase, 12 V DC**

## ◾ Overview



Thanks to it stepped profile design, the LOGO!Power product family is ideally suited for installation in miniature distribution boards. The stabilized power supplies with a wide range input of 100 … 240 V AC (85 … 264 V) and 110 ... 300 V DC are available with an output voltage of 12 V in three performance classes.

The 12 V versions are ideal for supplying LOGO! controllers with the corresponding voltage input. The high level of efficiency across the entire load range as well as the low no-load losses result in lower overall energy consumption. Greater convenience when commissioning and servicing thanks to integrated current monitor (for devices at least 36 mm wide) The extended temperature range from -25 °C to +70 °C enables a host of additional applications.

### *Main product highlights*

- 12 V DC / 0.9 A, 1.9 A and 4.5 A
- Narrow unit with width of 18 mm, 36 mm or 54 mm and overall depth of 53 mm in LOGO! design
- Flexible mounting: standard rail or wall mounting in a range of installation positions
- Higher energy efficiency: high efficiency levels over the entire load range as well as no-load power losses of < 0.3 W
- Integrated current monitor: actual output current measurement directly at the power supply unit (for devices at least 36 mm wide)
- Global use: operating temperature range from -25 °C to +70 °C as well as international certifications such as UL, CSA, FM or ATEX

## ◾ Technical specifications

| Article number | 6EP3320-6SB00-0AY0 | 6EP3321-6SB00-0AY0 | 6EP3322-6SB00-0AY0 |
|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 12 V/0.9 A | 12 V/1.9 A | 12 V/4.5 A |
| **Input** | | | |
| Input | 1-phase AC or DC | 1-phase AC or DC | 1-phase AC or DC |
| Rated voltage value $V_{in\ rated}$ | 100 ... 240 V | 100 ... 240 V | 100 ... 240 V |
| Voltage range AC | 85 ... 264 V | 85 ... 264 V | 85 ... 264 V |
| Input voltage | | | |
| • at DC | 110 ... 300 V | 110 ... 300 V | 110 ... 300 V |
| Wide-range input | Yes | Yes | Yes |
| Mains buffering at $I_{out\ rated}$, min. | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V |
| Rated line frequency 1 | 50 Hz | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | 60 Hz | 60 Hz |
| Rated line range | 47 ... 63 Hz | 47 ... 63 Hz | 47 ... 63 Hz |
| Input current | | | |
| • at rated input voltage 120 V | 0.3 A | 0.53 A | 1.13 A |
| • at rated input voltage 230 V | 0.2 A | 0.3 A | 0.61 A |
| Switch-on current limiting (+25 °C), max. | 20 A | 25 A | 50 A |
| I²t, max. | 0.8 A²·s | 0.8 A²·s | 3 A²·s |
| Built-in incoming fuse | internal | internal | internal |

## Technical specifications (continued)

| Article number | 6EP3320-6SB00-0AY0 | 6EP3321-6SB00-0AY0 | 6EP3322-6SB00-0AY0 |
|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 12 V/0.9 A | 12 V/1.9 A | 12 V/4.5 A |
| **Output** | | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 12 V | 12 V | 12 V |
| Total tolerance, static ± | 3 % | 3 % | 3 % |
| Static mains compensation, approx. | 0.1 % | 0.1 % | 0.1 % |
| Static load balancing, approx. | 0.1 % | 0.1 % | 0.1 % |
| Residual ripple peak-peak, max. | 200 mV | 200 mV | 200 mV |
| Residual ripple peak-peak, typ. | 30 mV | 30 mV | 30 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 300 mV | 300 mV | 300 mV |
| Spikes peak-peak, typ. (bandwidth: 20 MHz) | 50 mV | 50 mV | 50 mV |
| Adjustment range | | 10.5 ... 16.1 V | 10.5 ... 16.1 V |
| Product function Output voltage adjustable | No | Yes | Yes |
| Output voltage setting | | via potentiometer | via potentiometer |
| Status display | Green LED for output voltage OK | Green LED for output voltage OK | Green LED for output voltage OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 0.5 s | 0.5 s | 0.5 s |
| Voltage rise, typ. | 100 ms | 100 ms | 100 ms |
| Rated current value $I_{out\ rated}$ | 0.9 A | 1.9 A | 4.5 A |
| Current range | 0 ... 0.9 A | 0 ... 1.9 A | 0 ... 4.5 A |
| • Note | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K |
| Supplied active power typical | 10.8 W | 22.8 W | 54 W |
| Parallel switching for enhanced performance | No | Yes | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 | 2 | 2 |
| **Efficiency** | | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 78 % | 81 % | 87.1 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 3 W | 5 W | 8 W |
| Power loss [W] during no-load operation maximum | 0.3 W | 0.3 W | 0.3 W |
| **Closed-loop control** | | | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max. | 0.2 % | 0.2 % | 0.2 % |
| Dynamic load smoothing ($I_{out}$: 10/90/10 %), $U_{out}$ ± typ. | 3 % | 2 % | 4 % |
| Load step setting time 10 to 90%, typ. | 1 ms | 1 ms | 1 ms |
| Load step setting time 90 to 10%, typ. | 1 ms | 1 ms | 1 ms |
| **Protection and monitoring** | | | |
| Output overvoltage protection | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 |
| Current limitation, typ. | 1.3 A | 2.5 A | 5 A |
| Property of the output Short-circuit proof | Yes | Yes | Yes |
| Short-circuit protection | Constant current characteristic | Constant current characteristic | Constant current characteristic |
| Enduring short circuit current RMS value | | | |
| • maximum | 1.3 A | 2.5 A | 5 A |
| Overload/short-circuit indicator | - | - | - |

# LOGO! logic modules
LOGO!Power

**1-phase, 12 V DC**

■ **Technical specifications** (continued)

| Article number | **6EP3320-6SB00-0AY0** | **6EP3321-6SB00-0AY0** | **6EP3322-6SB00-0AY0** |
|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 12 V/0.9 A | 12 V/1.9 A | 12 V/4.5 A |
| **Safety** | | | |
| Primary/secondary isolation | Yes | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 |
| Protection class | Class II (without protective conductor) | Class II (without protective conductor) | Class II (without protective conductor) |
| CE mark | Yes | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273 |
| Explosion protection | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes | Yes | Yes |
| Marine approval | GL and ABS in process | GL and ABS in process | GL and ABS in process |
| Degree of protection (EN 60529) | IP20 | IP20 | IP20 |
| **EMC** | | | |
| Emitted interference | EN 55022 Class B | EN 55022 Class B | EN 55022 Class B |
| Supply harmonics limitation | not applicable | not applicable | not applicable |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | | |
| Ambient temperature | | | |
| • during operation | -25 ... +70 °C | -25 ... +70 °C | -25 ... +70 °C |
|   - Note | with natural convection | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K3, no condensation | Climate class 3K3, no condensation |
| **Mechanics** | | | |
| Connection technology | screw-type terminals | screw-type terminals | screw-type terminals |
| Connections | | | |
| • Supply input | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded |
| • Output | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - | - | - |
| Width of the enclosure | 18 mm | 36 mm | 54 mm |
| Height of the enclosure | 90 mm | 90 mm | 90 mm |
| Depth of the enclosure | 53 mm | 53 mm | 53 mm |
| Required spacing | | | |
| • top | 20 mm | 20 mm | 20 mm |
| • bottom | 20 mm | 20 mm | 20 mm |
| • left | 0 mm | 0 mm | 0 mm |
| • right | 0 mm | 0 mm | 0 mm |
| Weight, approx. | 0.07 kg | 0.12 kg | 0.2 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions |
| MTBF at 40 °C | 3 793 080 h | 2 938 542 h | 2 566 680 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **LOGO!Power 1-phase, 12 V DC/0.9 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 12 V DC/0.9 A | **6EP3320-6SB00-0AY0** | **LOGO!Power 1-phase, 12 V DC/4.5 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 12 V DC/4.5 A | **6EP3322-6SB00-0AY0** |
| **LOGO!Power 1-phase, 12 V DC/1.9 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 12 V DC/1.9 A | **6EP3321-6SB00-0AY0** | | |

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# LOGO! logic modules
LOGO!Power

**1-phase, 15 V DC**

## Overview



Thanks to it stepped profile design, the LOGO!Power product family is ideally suited for installation in miniature distribution boards. The stabilized power supplies with a wide range input of 100 … 240 V AC (85 … 264 V) and 110 ... 300 V DC are available with an output voltage of 15 V in two performance classes. The high level of efficiency across the entire load range as well as the low no-load losses result in lower overall energy consumption. Greater convenience when commissioning and servicing thanks to the integrated current monitor. The extended temperature range from -25 °C to +70 °C enables a host of additional applications.

### *Main product highlights*

- 15 V DC/ 1.9 A and 4.0 A
- Narrow unit with 36 mm or 54 mm width and depth of 53 mm in LOGO! design
- Flexible mounting: standard rail or wall mounting in a range of installation positions
- Higher energy efficiency: high efficiency levels over the entire load range as well as no-load power losses of < 0.3 W
- Integrated current monitor: actual output current measurement directly at the power supply unit
- Global use: operating temperature range from -25 °C to +70 °C as well as international certifications such as UL, CSA, FM or ATEX

## Technical specifications

| Article number | 6EP3321-6SB10-0AY0 | 6EP3322-6SB10-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 15 V/1.9 A | 15 V/4 A |
| **Input** | | |
| Input | 1-phase AC or DC | 1-phase AC or DC |
| Rated voltage value $V_{in\ rated}$ | 100 ... 240 V | 100 ... 240 V |
| Voltage range AC | 85 ... 264 V | 85 ... 264 V |
| Input voltage | | |
| • at DC | 110 ... 300 V | 110 ... 300 V |
| Wide-range input | Yes | Yes |
| Mains buffering at $I_{out\ rated}$, min. | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V |
| Rated line frequency 1 | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | 60 Hz |
| Rated line range | 47 ... 63 Hz | 47 ... 63 Hz |
| Input current | | |
| • at rated input voltage 120 V | 0.63 A | 1.24 A |
| • at rated input voltage 230 V | 0.33 A | 0.68 A |
| Switch-on current limiting (+25 °C), max. | 25 A | 55 A |
| $I^2t$, max. | 0.8 A²·s | 3 A²·s |
| Built-in incoming fuse | internal | internal |

■ **Technical specifications** (continued)

| Article number | 6EP3321-6SB10-0AY0 | 6EP3322-6SB10-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 15 V/1.9 A | 15 V/4 A |
| **Output** | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 15 V | 15 V |
| Total tolerance, static ± | 3 % | 3 % |
| Static mains compensation, approx. | 0.1 % | 0.1 % |
| Static load balancing, approx. | 0.1 % | 0.1 % |
| Residual ripple peak-peak, max. | 200 mV | 200 mV |
| Residual ripple peak-peak, typ. | 30 mV | 30 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 300 mV | 300 mV |
| Spikes peak-peak, typ. (bandwidth: 20 MHz) | 50 mV | 50 mV |
| Adjustment range | 10.5 ... 16.1 V | 10.5 ... 16.1 V |
| Product function Output voltage adjustable | Yes | Yes |
| Output voltage setting | via potentiometer | via potentiometer |
| Status display | Green LED for output voltage OK | Green LED for output voltage OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 0.5 s | 0.5 s |
| Voltage rise, typ. | 100 ms | 100 ms |
| Rated current value $I_{out\ rated}$ | 1.9 A | 4 A |
| Current range | 0 ... 1.9 A | 0 ... 4 A |
| • Note | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K |
| Supplied active power typical | 28.5 W | 60 W |
| Parallel switching for enhanced performance | Yes | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 | 2 |
| **Efficiency** | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 83 % | 88.4 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 6 W | 8 W |
| Power loss [W] during no-load operation maximum | 0.3 W | 0.3 W |
| **Closed-loop control** | | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max. | 0.2 % | 0.2 % |
| Dynamic load smoothing ($I_{out}$: 10/90/10 %), $U_{out}$ ± typ. | 2 % | 3 % |
| Load step setting time 10 to 90%, typ. | 1 ms | 1 ms |
| Load step setting time 90 to 10%, typ. | 1 ms | 1 ms |
| **Protection and monitoring** | | |
| Output overvoltage protection | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 |
| Current limitation, typ. | 2.5 A | 5 A |
| Property of the output Short-circuit proof | Yes | Yes |
| Short-circuit protection | Constant current characteristic | Constant current characteristic |
| Enduring short circuit current RMS value | | |
| • maximum | 2.5 A | 5 A |
| Overload/short-circuit indicator | - | - |

# LOGO! logic modules
LOGO!Power

**1-phase, 15 V DC**

## Technical specifications (continued)

| Article number | 6EP3321-6SB10-0AY0 | 6EP3322-6SB10-0AY0 |
|---|---|---|
| Product | LOGO!Power | LOGO!Power |
| Power supply, type | 15 V/1.9 A | 15 V/4 A |
| **Safety** | | |
| Primary/secondary isolation | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 |
| Protection class | Class II (without protective conductor) | Class II (without protective conductor) |
| CE mark | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) |
| Explosion protection | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes | Yes |
| Marine approval | GL, ABS, BV, DNV, LRS | GL, ABS, BV, DNV, LRS |
| Degree of protection (EN 60529) | IP20 | IP20 |
| **EMC** | | |
| Emitted interference | EN 55022 Class B | EN 55022 Class B |
| Supply harmonics limitation | not applicable | not applicable |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | |
| Ambient temperature | | |
| • during operation | -25 ... +70 °C | -25 ... +70 °C |
|   - Note | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K3, no condensation |
| **Mechanics** | | |
| Connection technology | screw-type terminals | screw-type terminals |
| Connections | | |
| • Supply input | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded |
| • Output | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - | - |
| Width of the enclosure | 36 mm | 54 mm |
| Height of the enclosure | 90 mm | 90 mm |
| Depth of the enclosure | 53 mm | 53 mm |
| Required spacing | | |
| • top | 20 mm | 20 mm |
| • bottom | 20 mm | 20 mm |
| • left | 0 mm | 0 mm |
| • right | 0 mm | 0 mm |
| Weight, approx. | 0.12 kg | 0.2 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x7.5/15 | Snaps onto DIN rail EN 60715 35x7.5/15 |
| MTBF at 40 °C | 2 938 542 h | 2 566 680 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

## Odering data

| | Article No. | | Article No. |
|---|---|---|---|
| **LOGO!Power 1-phase, 15 V DC/1.9 A** | | **LOGO!Power 1-phase, 15 V DC/4 A** | |
| Stabilized power supply Input: 100 … 240 V AC (110 ... 300 V DC) Output: 15 V DC/1.9 A | **6EP3321-6SB10-0AY0** | Stabilized power supply Input: 100 … 240 V AC (110 ... 300 V DC) Output: 15 V DC/4 A | **6EP3322-6SB10-0AY0** |

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## ■ Overview



Thanks to it stepped profile design, the LOGO!Power product family is ideally suited for installation in miniature distribution boards. The stabilized power supplies with a wide range input of 100 … 240 V AC (85 … 264 V) and 110 ... 300 V DC are available with an output voltage of 24 V in four performance classes. The 24 V versions are ideal for supplying LOGO! controllers with the corresponding voltage input. The high level of efficiency across the entire load range as well as the low no-load losses result in lower overall energy consumption. Greater convenience when

commissioning and servicing thanks to integrated current monitor (for devices at least 36 mm wide) The extended temperature range from -25 °C to +70 °C enables a host of additional applications.

To further increase the 24 V availability, the LOGO!Power power supplies can be combined with **DC UPS**, **redundancy** and **selectivity modules**.

### Main product highlights

- 24 V DC / 0.6 A, 1.3 A, 2.5 A and 4.0 A
- Narrow unit with width of 18 mm, 36 mm, 54 mm or 72 mm and overall depth of 53 mm in LOGO! design
- Flexible mounting: standard rail or wall mounting in a range of installation positions
- Higher energy efficiency: high efficiency levels over the entire load range as well as no-load power losses of < 0.3 W
- Integrated current monitor: actual output current measurement directly at the power supply unit (for devices at least 36 mm wide)
- Global use: operating temperature range from -25 °C to +70 °C as well as international certifications such as UL, CSA, FM or ATEX

## ■ Technical specifications

| Article number | 6EP3330-6SB00-0AY0 | 6EP3331-6SB00-0AY0 | 6EP3332-6SB00-0AY0 | 6EP3333-6SB00-0AY0 |
|---|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 24 V/0.6 A | 24 V/1.3 A | 24 V/2.5 A | 24 V/4 A |
| **Input** | | | | |
| Input | 1-phase AC or DC | 1-phase AC or DC | 1-phase AC or DC | 1-phase AC or DC |
| Rated voltage value $V_{in\ rated}$ | 100 ... 240 V | 100 ... 240 V | 100 ... 240 V | 100 ... 240 V |
| Voltage range AC | 85 ... 264 V | 85 ... 264 V | 85 ... 264 V | 85 ... 264 V |
| Input voltage | | | | |
| • at DC | 110 ... 300 V | 110 ... 300 V | 110 ... 300 V | 110 ... 300 V |
| Wide-range input | Yes | Yes | Yes | Yes |
| Mains buffering at $I_{out\ rated}$, min. | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V | 40 ms; at $V_{in}$ = 187 V |
| Rated line frequency 1 | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| Rated line range | 47 ... 63 Hz | 47 ... 63 Hz | 47 ... 63 Hz | 47 ... 63 Hz |
| Input current | | | | |
| • at rated input voltage 120 V | 0.3 A | 0.7 A | 1.22 A | 1.95 A |
| • at rated input voltage 230 V | 0.2 A | 0.35 A | 0.66 A | 0.97 A |
| Switch-on current limiting (+25 °C), max. | 20 A | 25 A | 52 A | 31 A |
| I²t, max. | 0.8 A²·s | 0.8 A²·s | 3 A²·s | 2.5 A²·s |
| Built-in incoming fuse | internal | internal | internal | internal |

# LOGO! logic modules
LOGO!Power

**1-phase, 24 V DC**

## ■ Technical specifications (continued)

| Article number | 6EP3330-6SB00-0AY0 | 6EP3331-6SB00-0AY0 | 6EP3332-6SB00-0AY0 | 6EP3333-6SB00-0AY0 |
|---|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 24 V/0.6 A | 24 V/1.3 A | 24 V/2.5 A | 24 V/4 A |
| **Output** | | | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 24 V | 24 V | 24 V | 24 V |
| Total tolerance, static ± | 3 % | 3 % | 3 % | 3 % |
| Static mains compensation, approx. | 0.1 % | 0.1 % | 0.1 % | 0.1 % |
| Static load balancing, approx. | 0.1 % | 0.1 % | 0.1 % | 0.1 % |
| Residual ripple peak-peak, max. | 200 mV | 200 mV | 200 mV | 200 mV |
| Residual ripple peak-peak, typ. | 30 mV | 30 mV | 30 mV | 30 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 300 mV | 300 mV | 300 mV | 300 mV |
| Spikes peak-peak, typ. (bandwidth: 20 MHz) | 50 mV | 50 mV | 50 mV | 50 mV |
| Adjustment range | | 22.2 ... 26.4 V | 22.2 ... 26.4 V | 22.2 ... 26.4 V |
| Product function Output voltage adjustable | No | Yes | Yes | Yes |
| Output voltage setting | | via potentiometer | via potentiometer | via potentiometer |
| Status display | Green LED for output voltage OK | Green LED for output voltage OK | Green LED for output voltage OK | Green LED for output voltage OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 0.5 s | 0.5 s | 0.5 s | 0.5 s |
| Voltage rise, typ. | 100 ms | 100 ms | 100 ms | 100 ms |
| Rated current value $I_{out\ rated}$ | 0.6 A | 1.3 A | 2.5 A | 4 A |
| Current range | 0 ... 0.6 A | 0 ... 1.3 A | 0 ... 2.5 A | 0 ... 4 A |
| • Note | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K | +55 ... +70 °C: Derating 2%/K |
| Supplied active power typical | 14.4 W | 31.2 W | 60 W | 96 W |
| Parallel switching for enhanced performance | No | Yes | Yes | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 | 2 | 2 | 2 |
| **Efficiency** | | | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 81 % | 86 % | 90 % | 89 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 3 W | 5 W | 7 W | 12 W |
| Power loss [W] during no-load operation maximum | 0.3 W | 0.3 W | 0.3 W | 0.3 W |
| **Closed-loop control** | | | | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max. | 0.2 % | 0.2 % | 0.2 % | 0.2 % |
| Dynamic load smoothing ($I_{out}$: 10/90/10 %), $U_{out}$ ± typ. | 2 % | 1 % | 2 % | 2 % |
| Load step setting time 10 to 90%, typ. | 1 ms | 1 ms | 1 ms | 1 ms |
| Load step setting time 90 to 10%, typ. | 1 ms | 1 ms | 1 ms | 1 ms |
| **Protection and monitoring** | | | | |
| Output overvoltage protection | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 | Yes, according to EN 60950-1 |
| Current limitation, typ. | 0.8 A | 1.7 A | 3.2 A | 5 A |
| Property of the output Short-circuit proof | Yes | Yes | Yes | Yes |
| Short-circuit protection | Constant current characteristic | Constant current characteristic | Constant current characteristic | Constant current characteristic |
| Enduring short circuit current RMS value | | | | |
| • maximum | 0.8 A | 1.7 A | 3.2 A | 5 A |
| Overload/short-circuit indicator | - | - | - | - |

## ■ Technical specifications (continued)

| Article number | **6EP3330-6SB00-0AY0** | **6EP3331-6SB00-0AY0** | **6EP3332-6SB00-0AY0** | **6EP3333-6SB00-0AY0** |
|---|---|---|---|---|
| Product | LOGO!Power | LOGO!Power | LOGO!Power | LOGO!Power |
| Power supply, type | 24 V/0.6 A | 24 V/1.3 A | 24 V/2.5 A | 24 V/4 A |
| **Safety** | | | | |
| Primary/secondary isolation | Yes | Yes | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 |
| Protection class | Class II (without protective conductor) | Class II (without protective conductor) | Class II (without protective conductor) | Class II (without protective conductor) |
| CE mark | Yes | Yes | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273, NEC class 2 (acc. to UL 1310) | cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273 |
| Explosion protection | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 | ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes | Yes | Yes | Yes |
| Marine approval | available soon | available soon | available soon | available soon |
| Degree of protection (EN 60529) | IP20 | IP20 | IP20 | IP20 |
| **EMC** | | | | |
| Emitted interference | EN 55022 Class B | EN 55022 Class B | EN 55022 Class B | EN 55022 Class B |
| Supply harmonics limitation | not applicable | not applicable | not applicable | EN 61000-3-2 |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | | | |
| Ambient temperature | | | | |
| • during operation | -25 ... +70 °C | -25 ... +70 °C | -25 ... +70 °C | -25 ... +70 °C |
|   - Note | with natural convection | with natural convection | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K3, no condensation | Climate class 3K3, no condensation | Climate class 3K3, no condensation |
| **Mechanics** | | | | |
| Connection technology | screw-type terminals | screw-type terminals | screw-type terminals | screw-type terminals |
| Connections | | | | |
| • Supply input | L, N: 1 screw terminal each for 0.5 ... 2.5 mm2 single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm2 single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm2 single-core/finely stranded | L, N: 1 screw terminal each for 0.5 ... 2.5 mm2 single-core/finely stranded |
| • Output | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² | +, -: 2 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - | - | - | - |
| Width of the enclosure | 18 mm | 36 mm | 54 mm | 72 mm |
| Height of the enclosure | 90 mm | 90 mm | 90 mm | 90 mm |
| Depth of the enclosure | 53 mm | 53 mm | 53 mm | 53 mm |
| Required spacing | | | | |
| • top | 20 mm | 20 mm | 20 mm | 20 mm |
| • bottom | 20 mm | 20 mm | 20 mm | 20 mm |
| • left | 0 mm | 0 mm | 0 mm | 0 mm |
| • right | 0 mm | 0 mm | 0 mm | 0 mm |
| Weight, approx. | 0.07 kg | 0.12 kg | 0.2 kg | 0.29 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes | Yes | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions | Snaps onto DIN rail EN 60715 35x15, various direct mounting positions |
| MTBF at 40 °C | 4 415 040 h | 3 094 996 h | 2 864 520 h | 2 391 480 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

# LOGO! logic modules
LOGO!Power

## 1-phase, 24 V DC

**2**

■ **Ordering data** | **Article No.** | | **Article No.**

| | | | |
|---|---|---|---|
| **LOGO!Power 1-phase, 24 V DC/0.6 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 24 V DC/0.6 A | **6EP3330-6SB00-0AY0** | **LOGO!Power 1-phase, 24 V DC/2.5 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 24 V DC/2.5 A | **6EP3332-6SB00-0AY0** |
| **LOGO!Power 1-phase, 24 V DC/1.3 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 24 V DC/1.3 A | **6EP3331-6SB00-0AY0** | **LOGO!Power 1-phase, 24 V DC/4 A**<br><br>Stabilized power supply<br>Input: 100 … 240 V AC<br>(110 ... 300 V DC)<br>Output: 24 V DC/4 A | **6EP3333-6SB00-0AY0** |

## Overview

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Technical specifications

| Article number | **6AG1331-1SH03-7AA0** | **6AG1332-1SH43-7AA0** | **6AG1332-1SH52-7AA0** |
|---|---|---|---|
| Based on | **6EP1331-1SH03** | **6EP1332-1SH43** | **6EP1332-1SH52** |
| Product | SIPLUS LOGO!Power | SIPLUS LOGO!Power | SIPLUS LOGO!Power |
| Power supply, type | 24 V/1.3 A | 24 V/2.5 A | 24 V/4 A |
| **Operating data** | | | |
| Ambient temperature | | | |
| • during operation | -40 ... +70 °C | -40 ... +70 °C | -40 ... +70 °C |
| - Note | with natural convection | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| Ambient condition relating to ambient temperature - air pressure - installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m); Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m); Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m); Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m); Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m); Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m); Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| Relative humidity with condensation maximum | 100 %; Relative humidity, incl. condensation/frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation/frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation/frost permitted (no commissioning under condensation conditions) |
| Resistance to biologically active substances conformity acc. to EN 60721-3-3 | Yes; Conformity with EN 60721-3-3, Class 3B2 mold, fungus and dry rot spores (with the excepion of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3B2 mold, fungus and dry rot spores (with the excepion of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3B2 mold, fungus and dry rot spores (with the excepion of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| Resistance to chemically active substances conformity acc. to EN 60721-3-3 | Yes; Conformity with EN 60721-3-3, Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| Resistance to mechanically active substances conformity acc. to EN 60721-3-3 | Yes; Conformity with EN 60721-3-3, Class 3S4 incl. Sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3S4 incl. Sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Conformity with EN 60721-3-3, Class 3S4 incl. Sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS LOGO!Power 24 V 1.3 A** | | **SIPLUS LOGO!Power 24 V 4 A** | |
| Input 100 ... 240 V AC Output 24 V DC, 1.3 A | | Input 100 ... 240 V AC Output 24 V DC, 4 A | |
| Extended temperature range and exposure to media | **6AG1331-1SH03-7AA0** | Extended temperature range and exposure to media | **6AG1332-1SH52-7AA0** |
| **SIPLUS LOGO!Power 24 V 2.5 A** | | | |
| Input 100 ... 240 V AC Output 24 V DC, 2.5 A | | | |
| Extended temperature range and exposure to media | **6AG1332-1SH43-7AA0** | | |

# LOGO! logic modules
LOGO!Contact

## LOGO!Contact

### ■ Overview
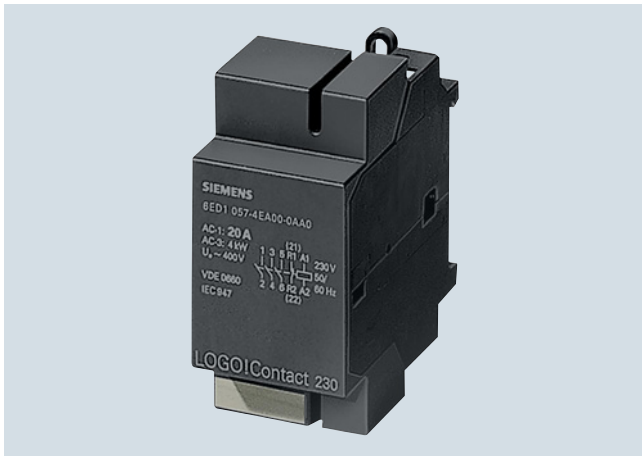


- Switching module for the direct switching of resistive loads and motors

### ■ Technical specifications

| Article number | 6ED1057-4CA00-0AA0 | 6ED1057-4EA00-0AA0 |
|---|---|---|
| | LOGO! CONTACT MOD., DC 24V, 3NO/1NC | LOGO! CONTACT MOD., AC 230V,3NO/1NC |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C | -25 °C |
| • max. | 55 °C | 55 °C |
| **Weights** | | |
| Weight, approx. | 160 g | 160 g |

### ■ Ordering data

| | Article No. |
|---|---|
| **LOGO!Contact** | |
| Switching module for direct switching of resistive loads up to 20 A and motors up to 4 kW | |
| Switching voltage 24 V | **6ED1057-4CA00-0AA0** |
| Switching voltage 230 V | **6ED1057-4EA00-0AA0** |

**2**

## Overview



- The user-friendly software for generating switching programs on the PC for single-user mode and network mode
- Generation of switching programs in a function block diagram (FBD) or ladder logic (LAD)
- Furthermore, testing, simulation, online testing and archiving of the switching programs
- Professional documentation due to manifold comment and print functions

### Minimum system requirements

Windows XP (32-bit), 7 (32/64-bit) or 8 (32/64-bit)

- PC Pentium IV.
- 150 MB free disk capacity.
- 256 MB RAM.
- SVGA graphics card with minimum resolution 800 x 600 (256 colors).
- DVD-ROM

Mac OS X

- Mac OS X 10.4

Linux

- Tested with SUSE Linux 11.3 SP2, kernel 3.0.76
- Runs on all Linux distributions on which Java 2 runs.
- Please refer to your relevant Linux distribution for the necessary hardware requirements.

## Ordering data

| | Article No. |
|---|---|
| **LOGO!Soft Comfort V8** | **6ED1058-0BA08-0YA1** |
| for programming on the PC in LAD/FBD; executes on Windows 8, 7, XP, Linux and Mac OSX; on DVD | |

# LOGO! logic modules
SIPLUS Add-Ons

**LOGO! mounting kits**

## ■ Overview



LOGO! and SIPLUS LOGO! are designed for quick and easy mounting on standard rails. With the mounting kit, these devices can also be easily and safely installed in front panels.  If the supplied washer and seals are used, the devices are reliably protected against harsh environmental conditions up to the IP65 degree of protection.

## ■ Ordering data

| | Article No. |
| --- | --- |
| **Front panel mounting kit** | |
| Width 4 U | **6AG1057-1AA00-0AA0** |
| Width 4 U, with keys | **6AG1057-1AA00-0AA3** |
| Width 8 U | **6AG1057-1AA00-0AA1** |
| Width 8 U, with keys | **6AG1057-1AA00-0AA2** |

*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

Siemens ST 70 · 2017

# SIMATIC S7-1200 Basic Controllers

Introduction

## ■ Overview

- Compact controllers for the low to mid-performance ranges
- Large-scale integration, space-saving, powerful
- With exceptional real-time performance and powerful communication options:
  - Controller with integrated PROFINET IO interface for communication between SIMATIC controllers, HMI, programming device or other automation components
- All CPUs can be used in stand-alone mode, in networks and within distributed structures
- Extremely simple installation, programming and operation
- Integrated web server with standard and user-specific web pages
- Data logging functionality for archiving of data at runtime from the user program
- Powerful, integrated technology functions such as counting, measuring, closed-loop control, and motion control
- Integrated digital and analog inputs/outputs
- Flexible expansion facilities
  - Signal boards for direct use in a controller
  - Signal modules for expansion of controllers with input/output channels; including an Energy Meter module for recording and preparing energy data
  - Accessories, e.g. power supply, switch module or SIMATIC Memory Card

■ **Technical specifications**

| General technical specifications SIMATIC S7-1200 | |
|---|---|
| Degree of protection | IP20 acc. to IEC 529 |
| Ambient temperature | |
| • Operation (95% humidity) | |
|   - Horizontal installation | -20 ... +60 °C |
|   - Vertical installation | -20 ... +50 °C |
| • Transportation and storage | -40 ... +70 °C |
|   - With 95% humidity | 25 ... 55 °C |
| Insulation | |
| • 5/24 V DC circuits | 500 V AC test voltage |
| • 115/230 V AC circuits to ground | 1500 V AC test voltage |
| • 115/230 V AC circuits to 115/230 V AC circuits | 1500 V AC test voltage |
| • 230 V AC circuits to 5/24 V DC circuits | 1500 V AC test voltage |
| • 115 V AC circuits to 5/24 V DC circuits | 1500 V AC test voltage |
| Electromagnetic compatibility | Requirements of the EMC directive |
| • Noise immunity acc. to EN 50082-2 | Test acc. to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160 |
| • Emitted interference acc. to EN 50081-1 and EN 50081-2 | Test according to EN 55011, Class A, Group 1 |
| Mechanical strength | |
| • Vibrations, test acc. to / tested with | IEC 68, Part 2-6: 10 ... 57 Hz; constant amplitude 0.3 mm; 58 ... 150 Hz; constant acceleration 1 g (mounted on DIN rail) or 2 g (mounted in switchboard); mode of vibration: frequency sweeps with a sweep rate of 1 octave/minute; duration of vibration: 10 frequency sweeps per axis in each direction of the three mutually perpendicular axes |
| • Shocks, test acc. to / tested with | IEC 68, Part 2-27/half-sine: magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes |

| General technical specifications SIPLUS S7-1200 | |
|---|---|
| Ambient temperature range | -40/-25/-20 ... +55/+60/+70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical specifications | The technical specifications of the standard product apply except for the ambient conditions. |
| **Ambient conditions** | |
| Extended range of environmental conditions | |
| • with reference to ambient temperature, air pressure and altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0° C |
| Relative humidity | |
| • with condensation, max. | 100%; RH incl. bedewing/frost (no commissioning in bedewed state) |
| Resistance | |
| • to biologically active substances/ compliance with EN 60721-3-3 | Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to chemically active substances/ compliance with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to mechanically active substances, compliance with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation. |

3

# SIMATIC S7-1200 Basic Controllers
Central processing units
Standard CPUs

## CPU 1211C

### ▮ Overview



- Controller for intro to S7
- Expandable by:
  - 1 signal board (SB), battery board (BB) or communication board (CB)
  - Max. 3 communication modules (CM)

### ▮ Technical specifications

| Article number | 6ES7211-1BE40-0XB0 | 6ES7211-1AE40-0XB0 | 6ES7211-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1211C, AC/DC/RELAY, 6DI/4DO/2AI | CPU 1211C, DC/DC/DC, 6DI/4DO/2AI | CPU 1211C, DC/DC/RELAY, 6DI/4DO/2AI |
| **General information** | | | |
| Product type designation | CPU 1211C AC/DC/Relay | CPU 1211C DC/DC/DC | CPU 1211C DC/DC/Relay |
| **Engineering with** | | | |
| • Programming package | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | | Yes | Yes |
| Rated value (AC) | | | |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| **Encoder supply** | | | |
| **24 V encoder supply** | | | |
| • 24 V | 20.4 to 28.8V | L+ minus 4 V DC min. | L+ minus 4 V DC min. |
| **Power loss** | | | |
| Power loss, typ. | 10 W | 8 W | 8 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 50 kbyte | 50 kbyte | 50 kbyte |
| **Load memory** | | | |
| • integrated | 1 Mbyte | 1 Mbyte | 1 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card |
| **Backup** | | | |
| • without battery | Yes | Yes | Yes |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction |
| for word operations, typ. | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area |
| **Process image** | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |

■ **Technical specifications** (continued)

| Article number | 6ES7211-1BE40-0XB0 | 6ES7211-1AE40-0XB0 | 6ES7211-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1211C, AC/DC/RELAY, 6DI/4DO/2AI | CPU 1211C, DC/DC/DC, 6DI/4DO/2AI | CPU 1211C, DC/DC/RELAY, 6DI/4DO/2AI |
| **Digital inputs** | | | |
| Number of digital inputs | 6; Integrated | 6; Integrated | 6; Integrated |
| • of which inputs usable for technological functions | 3; HSC (High Speed Counting) | 3; HSC (High Speed Counting) | 3; HSC (High Speed Counting) |
| **Digital outputs** | | | |
| Number of digital outputs | 4; Relays | 4 | 4; Relays |
| • of which high-speed outputs | | 4; 100 kHz Pulse Train Output | |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| **Input ranges** | | | |
| • Voltage | Yes | Yes | Yes |
| **Analog outputs** | | | |
| Number of analog outputs | 0 | 0 | 0 |
| **1. Interface** | | | |
| Interface type | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | No | No | No |
| **Communication functions** | | | |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **Open IE communication** | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| • UDP | Yes | Yes | Yes |
| **Web server** | | | |
| • supported | Yes | Yes | Yes |
| **Number of connections** | | | |
| • overall | 16; dynamically | 16; dynamically | 16; dynamically |
| **Integrated Functions** | | | |
| Number of counters | 3 | 6 | 3 |
| Counting frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| Number of position-controlled positioning axes, max. | 8 | 8 | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 | 4; With integrated outputs | Up to 4 with SB 1222 |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 4 | |
| Limit frequency (pulse) | | 100 kHz | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Pollutant concentrations** | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |

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# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1211C**

## ■ Technical specifications (continued)

| Article number | 6ES7211-1BE40-0XB0 | 6ES7211-1AE40-0XB0 | 6ES7211-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1211C, AC/DC/RELAY, 6DI/4DO/2AI | CPU 1211C, DC/DC/DC, 6DI/4DO/2AI | CPU 1211C, DC/DC/RELAY, 6DI/4DO/2AI |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
|   - LAD | Yes | Yes | Yes |
|   - FBD | Yes | Yes | Yes |
|   - SCL | Yes | Yes | Yes |
| **Dimensions** | | | |
|  Width | 90 mm | 90 mm | 90 mm |
|  Height | 100 mm | 100 mm | 100 mm |
|  Depth | 75 mm | 75 mm | 75 mm |
| **Weights** | | | |
|  Weight, approx. | 420 g | 370 g | 380 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1211C** | | **SB 1221 signal board** | |
| **Compact CPU, AC/DC/relay**; Integrated program/data memory 50 KB, load memory 1 MB; Wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | **6ES7211-1BE40-0XB0** | 4 inputs, 5 V DC, 200 kHz | **6ES7221-3AD30-0XB0** |
| | | 4 inputs, 24 V DC, 200 kHz | **6ES7221-3BD30-0XB0** |
| | | **SB 1222 signal board** | |
| | | 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6ES7222-1AD30-0XB0** |
| | | 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6ES7222-1BD30-0XB0** |
| | | **SB 1223 signal board** | |
| | | 2 inputs, 24 V DC, IEC type 1 current sinking; 2 x 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | **6ES7223-0BD30-0XB0** |
| **Compact CPU, DC/DC/DC**; Integrated program/data memory 50 KB, load memory 1 MB; Power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; Expandable by up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7211-1AE40-0XB0** | 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6ES7223-3AD30-0XB0** |
| | | 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6ES7223-3BD30-0XB0** |
| | | **SB 1231 signal board** | **6ES7231-4HA30-0XB0** |
| | | 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | |
| | | **SB 1231 thermocouple signal board** | **6ES7231-5QA30-0XB0** |
| | | 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| | | **RTD signal board SB 1231** | **6ES7231-5PA30-0XB0** |
| | | 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| **Compact CPU, DC/DC/relay**; Integrated program/data memory 50 KB, load memory 1 MB; Power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | **6ES7211-1HE40-0XB0** | **SB 1232 signal board** | **6ES7232-4HA30-0XB0** |
| | | 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |
| | | **CB 1241 RS 485 communication board** | **6ES7241-1CH30-1XB0** |
| | | For point-to-point connection, with 1 RS 485 interface | |

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| Ordering data | Article No. | | Article No. | |
|---|---|---|---|---|
| **Battery board BB1297** | **6ES7297-0AX30-0XA0** | **STEP 7 Professional / Basic V14 SP1** | | |
| For long-term backup of real-time clock, can be plugged into the signal board slot; battery (CR1025) is not included | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | | |
| **Digital input simulator SIM 1274 simulator module (optional)** | | Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), | | |
| 8 input switches, for CPU 1211C / CPU 1212C | **6ES7274-1XF30-0XA0** | Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, | | |
| **Analog input simulator SIM 1274 simulator module (optional)** | | Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, | | |
| 2 potentiometers | **6ES7274-1XA30-0XA0** | Windows Server 2008 R2 StdE (full installation), | | |
| **SIMATIC Memory Card (optional)** | | Windows Server 2012 StdE (full installation), | | |
| 4 MB | **6ES7954-8LC02-0AA0** | Windows Server 2016 Standard (full installation); | | |
| 12 MB | **6ES7954-8LE02-0AA0** | STEP 7 Basic V14 SP1 in addition: Windows 7 Home Premium SP1 | | |
| 24 MB | **6ES7954-8LF02-0AA0** | (64-bit), Windows 8.1 (64-bit), | | |
| 256 MB | **6ES7954-8LL02-0AA0** | Windows 10 Home Version 1607 | | |
| 2 GB | **6ES7954-8LP02-0AA0** | Type of delivery: German, English, Chinese, Italian, French, Spanish | | |
| 32 GB | **6ES7954-8LT03-0AA0** | | | |
| **Terminal block (spare part)** | | STEP 7 Professional V14 SP1, floating license | **6ES7822-1AA04-0YA5** | |
| For CPU 1211C AC/DC/relay | | | | |
| • For DI, with 14 screws, tin-coated, coded; 4 units | **6ES7292-1AP40-0XA0** | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | **6ES7822-1AE04-0YA5** | |
| • For DO, with 8 screws, tin-coated, coded; 4 units | **6ES7292-1AH40-0XA0** | Email address required for delivery | | |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** | STEP 7 Basic V14 SP1, floating license | **6ES7822-0AA04-0YA5** | |
| For CPU 1211C DC/DC/DC | | | | |
| • For DI, with 14 screws, tin-coated; 4 units | **6ES7292-1AP30-0XA0** | STEP 7 Basic V14 SP1, floating license, software download incl. license key[1] | **6ES7822-0AE04-0YA5** | |
| • For DO, with 8 screws, tin-coated; 4 units | **6ES7292-1AH30-0XA0** | Email address required for delivery | | |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** | | | |
| For CPU 1211C DC/DC/relay | | | | |
| • For DI, with 14 screws, tin-coated; 4 units | **6ES7292-1AP30-0XA0** | | | |
| • For DO, with 8 screws, tin-coated, coded; 4 units | **6ES7292-1AH40-0XA0** | | | |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** | | | |
| **RJ45 cable grip** | | | | |
| 4 units per pack | | | | |
| Single port | **6ES7290-3AA30-0XA0** | | | |
| **Front flap set (spare part)** | | | | |
| For CPU 1211C/1212C | **6ES7291-1AA30-0XA0** | | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

### ■ Overview

- Controller for intro to S7 with basic expansion options
- Expandable by:
  - 1 signal board (SB), battery board (BB) or communication board (CB)
  - 2 signal modules (SM)
  - Max. 3 communication modules (CM)

### ■ Technical specifications

| Article number | 6ES7212-1BE40-0XB0 | 6ES7212-1AE40-0XB0 | 6ES7212-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1212C, AC/DC/RELAY, 8DI/6DO/2AI | CPU 1212C ,DC/DC/DC, 8DI/6DO/2AI | CPU 1212C, DC/DC/RELAY, 8DI/6DO/2AI |
| **General information** | | | |
| Product type designation | CPU 1212C AC/DC/Relay | CPU 1212C DC/DC/DC | CPU 1212C DC/DC/Relay |
| **Engineering with** | | | |
| • Programming package | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | | Yes | Yes |
| Rated value (AC) | | | |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| **Encoder supply** | | | |
| **24 V encoder supply** | | | |
| • 24 V | 20.4 to 28.8V | L+ minus 4 V DC min. | L+ minus 4 V DC min. |
| **Power loss** | | | |
| Power loss, typ. | 11 W | 9 W | 9 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 75 kbyte | 75 kbyte | 75 kbyte |
| **Load memory** | | | |
| • integrated | 2 Mbyte | 2 Mbyte | 2 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card |
| **Backup** | | | |
| • without battery | Yes | Yes | Yes |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction |
| for word operations, typ. | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area |
| **Process image** | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |

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■ **Technical specifications** (continued)

| Article number | 6ES7212-1BE40-0XB0 | 6ES7212-1AE40-0XB0 | 6ES7212-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1212C, AC/DC/RELAY, 8DI/6DO/2AI | CPU 1212C ,DC/DC/DC, 8DI/6DO/2AI | CPU 1212C, DC/DC/RELAY, 8DI/6DO/2AI |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |
| **Digital inputs** | | | |
| Number of digital inputs | 8; Integrated | 8; Integrated | 8; Integrated |
| • of which inputs usable for technological functions | 4; HSC (High Speed Counting) | 4; HSC (High Speed Counting) | 4; HSC (High Speed Counting) |
| **Digital outputs** | | | |
| Number of digital outputs | 6; Relays | 6 | 6; Relays |
| • of which high-speed outputs | | 4; 100 kHz Pulse Train Output | |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| **Input ranges** | | | |
| • Voltage | Yes | Yes | Yes |
| **Analog outputs** | | | |
| Number of analog outputs | 0 | 0 | 0 |
| **1. Interface** | | | |
| Interface type | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | No | No | No |
| **Communication functions** | | | |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **Open IE communication** | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| • UDP | Yes | Yes | Yes |
| **Web server** | | | |
| • supported | Yes | Yes | Yes |
| **Number of connections** | | | |
| • overall | 16; dynamically | 16; dynamically | 16; dynamically |
| **Integrated Functions** | | | |
| Number of counters | 4 | 4 | 4 |
| Counting frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| Number of position-controlled positioning axes, max. | 8 | 8 | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 | 4; With integrated outputs | Up to 4 with SB 1222 |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 4 | |
| Limit frequency (pulse) | | 100 kHz | |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1212C**

■ **Technical specifications** (continued)

| Article number | 6ES7212-1BE40-0XB0 | 6ES7212-1AE40-0XB0 | 6ES7212-1HE40-0XB0 |
|---|---|---|---|
| | CPU 1212C, AC/DC/RELAY, 8DI/6DO/2AI | CPU 1212C ,DC/DC/DC, 8DI/6DO/2AI | CPU 1212C, DC/DC/RELAY, 8DI/6DO/2AI |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical |
| **Pollutant concentrations** | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| **Dimensions** | | | |
| Width | 90 mm | 90 mm | 90 mm |
| Height | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm |
| **Weights** | | | |
| Weight, approx. | 425 g | 370 g | 385 g |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1212C** | | **Compact CPU, DC/DC/relay**; integrated program/data memory 75 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz | **6ES7212-1HE40-0XB0** |
| **Compact CPU, AC/DC/relay**; Integrated program/data memory 75 KB, load memory 2 MB; Wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules, 2 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | **6ES7212-1BE40-0XB0** | | |
| | | **SB 1221 signal board** | |
| | | 4 inputs, 5 V DC, 200 kHz | **6ES7221-3AD30-0XB0** |
| | | 4 inputs, 24 V DC, 200 kHz | **6ES7221-3BD30-0XB0** |
| **Compact CPU, DC/DC/DC**; Integrated program/data memory 75 KB, load memory 2 MB; Power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; Expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7212-1AE40-0XB0** | **SB 1222 signal board** | |
| | | 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6ES7222-1AD30-0XB0** |
| | | 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6ES7222-1BD30-0XB0** |
| | | **SB 1223 signal board** | |
| | | 2 inputs, 24 V DC, IEC type 1 current sinking; 2 x 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | **6ES7223-0BD30-0XB0** |
| | | 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6ES7223-3AD30-0XB0** |
| | | 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6ES7223-3BD30-0XB0** |
| | | **SB 1231 signal board** | **6ES7231-4HA30-0XB0** |
| | | 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | |

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## Ordering data

| Ordering data | Article No. |
|---|---|
| **SB 1231 thermocouple signal board** | **6ES7231-5QA30-0XB0** |
| 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| **RTD signal board SB 1231** | **6ES7231-5PA30-0XB0** |
| 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| **SB 1232 signal board** | **6ES7232-4HA30-0XB0** |
| 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |
| **CB 1241 RS 485 communication board** | **6ES7241-1CH30-1XB0** |
| For point-to-point connection, with 1 RS 485 interface | |
| **BB1297 battery board** | **6ES7297-0AX30-0XA0** |
| For long-term backup of real-time clock, can be plugged into the signal board slot; battery (CR1025) is not included | |
| **Digital input simulator SIM 1274 simulator module (optional)** | |
| 8 input switches, for CPU 1211C / CPU 1212C | **6ES7274-1XF30-0XA0** |
| **Analog input simulator SIM 1274 simulator module (optional)** | |
| 2 potentiometers | **6ES7274-1XA30-0XA0** |
| **SIMATIC Memory Card (optional)** | |
| 4 MB | **6ES7954-8LC02-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** |
| 24 MB | **6ES7954-8LF02-0AA0** |
| 256 MB | **6ES7954-8LL02-0AA0** |
| 2 GB | **6ES7954-8LP02-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | |
| **Starter box CPU 1212C AC/DC/relay** | **6ES7212-1BD34-4YB0** |
| Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simulator, STEP 7 BASIC CD, manual CD, info material, in Systainer | |
| **Terminal block (spare part)** | |
| For CPU 1212C AC/DC/relay | |
| • For DI, with 14 screws, tin-coated; coded; 4 units | **6ES7292-1AP40-0XA0** |
| • For DO, with 8 screws, tin-coated; coded; 4 units | **6ES7292-1AH40-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |

| Ordering data | Article No. |
|---|---|
| **Terminal block (spare part)** (cont.) | |
| For CPU 1212C DC/DC/DC | |
| • For DI, with 14 screws, tin-coated; 4 units | **6ES7292-1AP30-0XA0** |
| • For DO, with 8 screws, tin-coated; 4 units | **6ES7292-1AH30-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |
| For CPU 1212C DC/DC/relay | |
| • For DI, with 14 screws, tin-coated; 4 units | **6ES7292-1AP30-0XA0** |
| • For DO, with 8 screws, tin-coated, coded; 4 units | **6ES7292-1AH40-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |
| **RJ45 cable grip** | |
| 4 units per pack | |
| Single port | **6ES7290-3AA30-0XA0** |
| **Front flap set (spare part)** | |
| For CPU 1211C/1212C | **6ES7291-1AA30-0XA0** |
| **STEP 7 Professional / Basic V14 SP1** | |
| Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| STEP 7 Basic V14 SP1 in addition: Windows 7 Home Premium SP1 (64-bit), Windows 8.1 (64-bit), Windows 10 Home Version 1607 | |
| Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| STEP 7 Professional V14 SP1, floating license | **6ES7822-1AA04-0YA5** |
| STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] Email address required for delivery | **6ES7822-1AE04-0YA5** |
| STEP 7 Basic V14 SP1, floating license | **6ES7822-0AA04-0YA5** |
| STEP 7 Basic V14 SP1, floating license, software download incl. license key [1] Email address required for delivery | **6ES7822-0AE04-0YA5** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1214C**

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### ■ Overview

- Controller for intro to S7 with flexible expansion options
- Expandable by:
  - 1 signal board (SB), battery board (BB) or communication board (CB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

### ■ Technical specifications

| Article number | 6ES7214-1BG40-0XB0 | 6ES7214-1AG40-0XB0 | 6ES7214-1HG40-0XB0 |
|---|---|---|---|
| | CPU 1214C, AC/DC/RELAY, 14DI/10DO/2AI | CPU 1214C, DC/DC/DC, 14DI/10DO/2AI | CPU 1214C, DC/DC/RELAY, 14DI/10DO/2AI |
| **General information** | | | |
| Product type designation | CPU 1214C AC/DC/Relay | CPU 1214C DC/DC/DC | CPU 1214C DC/DC/Relay |
| **Engineering with** | | | |
| • Programming package | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | | Yes | Yes |
| Rated value (AC) | | | |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| **Encoder supply** | | | |
| **24 V encoder supply** | | | |
| • 24 V | 20.4 to 28.8V | L+ minus 4 V DC min. | L+ minus 4 V DC min. |
| **Power loss** | | | |
| Power loss, typ. | 14 W | 12 W | 12 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 100 kbyte | 100 kbyte | 100 kbyte |
| **Load memory** | | | |
| • integrated | 4 Mbyte | 4 Mbyte | 4 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card |
| **Backup** | | | |
| • without battery | Yes | Yes | Yes |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction |
| for word operations, typ. | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area |
| **Process image** | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |

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■ **Technical specifications** (continued)

| Article number | 6ES7214-1BG40-0XB0 | 6ES7214-1AG40-0XB0 | 6ES7214-1HG40-0XB0 |
|---|---|---|---|
| | CPU 1214C, AC/DC/RELAY, 14DI/10DO/2AI | CPU 1214C, DC/DC/DC, 14DI/10DO/2AI | CPU 1214C, DC/DC/RELAY, 14DI/10DO/2AI |
| **Digital inputs** | | | |
| Number of digital inputs | 14; Integrated | 14; Integrated | 14; Integrated |
| • of which inputs usable for technological functions | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) |
| **Digital outputs** | | | |
| Number of digital outputs | 10; Relays | 10 | 10; Relays |
| • of which high-speed outputs | | 4; 100 kHz Pulse Train Output | |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| **Input ranges** | | | |
| • Voltage | Yes | Yes | Yes |
| **Analog outputs** | | | |
| Number of analog outputs | 0 | 0 | 0 |
| **1. Interface** | | | |
| Interface type | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | No | No | No |
| **Communication functions** | | | |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **Open IE communication** | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| • UDP | Yes | Yes | Yes |
| **Web server** | | | |
| • supported | Yes | Yes | Yes |
| **Number of connections** | | | |
| • overall | 16; dynamically | 16; dynamically | 16; dynamically |
| **Integrated Functions** | | | |
| Number of counters | 6 | 6 | 6 |
| Counting frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| Number of position-controlled positioning axes, max. | 8 | 8 | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 | 4; With integrated outputs | Up to 4 with SB 1222 |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 4 | |
| Limit frequency (pulse) | | 100 kHz | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical |
| **Pollutant concentrations** | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**3**

| CPU 1214C | | | |

## ■ Technical specifications  (continued)

| Article number | 6ES7214-1BG40-0XB0 | 6ES7214-1AG40-0XB0 | 6ES7214-1HG40-0XB0 |
|---|---|---|---|
| | CPU 1214C, AC/DC/RELAY, 14DI/10DO/2AI | CPU 1214C, DC/DC/DC, 14DI/10DO/2AI | CPU 1214C, DC/DC/RELAY, 14DI/10DO/2AI |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| **Dimensions** | | | |
| Width | 110 mm | 110 mm | 110 mm |
| Height | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm |
| **Weights** | | | |
| Weight, approx. | 455 g | 415 g | 435 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1214C** | | **SB 1221 signal board** | |
| **Compact CPU, AC/DC/relay**; Integrated program/data memory 100 KB, load memory 2 MB; Wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | **6ES7214-1BG40-0XB0** | 4 inputs, 5 V DC, 200 kHz | **6ES7221-3AD30-0XB0** |
| | | 4 inputs, 24 V DC, 200 kHz | **6ES7221-3BD30-0XB0** |
| | | **SB 1222 signal board** | |
| | | 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6ES7222-1AD30-0XB0** |
| | | 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6ES7222-1BD30-0XB0** |
| | | **SB 1223 signal board** | |
| | | 2 inputs, 24 V DC, IEC type 1 current sinking; 2 x 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | **6ES7223-0BD30-0XB0** |
| | | 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6ES7223-3AD30-0XB0** |
| **Compact CPU, DC/DC/DC**; Integrated program/data memory 100 KB, load memory 2 MB; Power supply 24 V DC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7214-1AG40-0XB0** | 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6ES7223-3BD30-0XB0** |
| | | **SB 1231 signal board** | **6ES7231-4HA30-0XB0** |
| | | 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | |
| | | **SB 1231 thermocouple signal board** | **6ES7231-5QA30-0XB0** |
| | | 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| | | **RTD signal board SB 1231** | **6ES7231-5PA30-0XB0** |
| | | 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| **Compact CPU, DC/DC/relay**; Integrated program/data memory 100 KB, load memory 2 MB; Power supply 24 V DC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | **6ES7214-1HG40-0XB0** | **SB 1232 signal board** | **6ES7232-4HA30-0XB0** |
| | | 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |
| | | **CB 1241 RS 485 communication board** | **6ES7241-1CH30-1XB0** |
| | | For point-to-point connection, with 1 RS 485 interface | |

## Ordering data

| | Article No. |
|---|---|
| **Battery board BB1297** | **6ES7297-0AX30-0XA0** |
| For long-term backup of real-time clock, can be plugged into the signal board slot; battery (CR1025) is not included | |
| **Digital input simulator SIM 1274 simulator module (optional)** | |
| 14 input switches, for CPU 1214C/1215C | **6ES7274-1XH30-0XA0** |
| **Analog input simulator SIM 1274 simulator module (optional)** | |
| 2 potentiometers | **6ES7274-1XA30-0XA0** |
| **SIMATIC Memory Card (optional)** | |
| 4 MB | **6ES7954-8LC02-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** |
| 24 MB | **6ES7954-8LF02-0AA0** |
| 256 MB | **6ES7954-8LL02-0AA0** |
| 2 GB | **6ES7954-8LP02-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | |
| **Terminal block (spare part)** | |
| For CPU 1214C AC/DC/relay | |
| • For DI, with 20 screws, tin-coated, coded; 4 units | **6ES7292-1AV40-0XA0** |
| • For DO, with 12 screws, tin-coated, coded; 4 units | **6ES7292-1AM40-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |
| For CPU 1214C DC/DC/DC | |
| • For DI, with 20 screws, tin-coated; 4 units | **6ES7292-1AV30-0XA0** |
| • For DO, with 12 screws, tin-coated; 4 units | **6ES7292-1AM30-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |
| For CPU 1214C DC/DC/relay | |
| • For DI, with 20 screws, tin-coated; 4 units | **6ES7292-1AV30-0XA0** |
| • For DO, with 12 screws, tin-coated, coded; 4 units | **6ES7292-1AM40-0XA0** |
| • For AI, with 3 screws, gold-plated; 4 units | **6ES7292-1BC30-0XA0** |

| | Article No. |
|---|---|
| **RJ45 cable grip** | |
| 4 items per pack | |
| Single port | **6ES7290-3AA30-0XA0** |
| **Front flap set (spare part)** | |
| For CPU 1214C | **6ES7291-1AB30-0XA0** |
| **STEP 7 Professional / Basic V14 SP1** | |
| Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); STEP 7 Basic V14 SP1 in addition: Windows 7 Home Premium SP1 (64-bit), Windows 8.1 (64-bit), Windows 10 Home Version 1607 | |
| Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| STEP 7 Professional V14 SP1, floating license | **6ES7822-1AA04-0YA5** |
| STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | **6ES7822-1AE04-0YA5** |
| Email address required for delivery | |
| STEP 7 Basic V14 SP1, floating license | **6ES7822-0AA04-0YA5** |
| STEP 7 Basic V14 SP1, floating license, software download incl. license key[1] | **6ES7822-0AE04-0YA5** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1215C**

## ◼ Overview



- Powerful controller with enhanced networking option
- Expandable by:
  - 1 signal board (SB), battery board (BB) or communication board (CB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

## ◼ Technical specifications

| Article number | **6ES7215-1BG40-0XB0** | **6ES7215-1AG40-0XB0** | **6ES7215-1HG40-0XB0** |
|---|---|---|---|
| | CPU 1215C, AC/DC/RLY, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/RLY, 14DI/10DO/2AI/2AO |
| **General information** | | | |
| Product type designation | CPU 1215C AC/DC/Relay | CPU 1215C DC/DC/DC | CPU 1215C DC/DC/Relay |
| **Engineering with** | | | |
| • Programming package | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | | Yes | Yes |
| Rated value (AC) | | | |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| **Encoder supply** | | | |
| **24 V encoder supply** | | | |
| • 24 V | 20.4 to 28.8V | L+ minus 4 V DC min. | L+ minus 4 V DC min. |
| **Power loss** | | | |
| Power loss, typ. | 14 W | 12 W | 12 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 125 kbyte | 125 kbyte | 125 kbyte |
| **Load memory** | | | |
| • integrated | 4 Mbyte | 4 Mbyte | 4 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card |
| **Backup** | | | |
| • without battery | Yes | Yes | Yes |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction |
| for word operations, typ. | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area |
| **Process image** | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |

■ **Technical specifications** (continued)

| Article number | **6ES7215-1BG40-0XB0** | **6ES7215-1AG40-0XB0** | **6ES7215-1HG40-0XB0** |
|---|---|---|---|
| | CPU 1215C, AC/DC/RLY, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/RLY, 14DI/10DO/2AI/2AO |
| **Digital inputs** | | | |
| Number of digital inputs | 14; Integrated | 14; Integrated | 14; Integrated |
| • of which inputs usable for technological functions | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) |
| **Digital outputs** | | | |
| Number of digital outputs | 10; Relays | 10 | 10; Relays |
| • of which high-speed outputs | | 4; 100 kHz Pulse Train Output | |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| **Input ranges** | | | |
| • Voltage | Yes | Yes | Yes |
| **Analog outputs** | | | |
| Number of analog outputs | 2 | 2 | 2 |
| **Output ranges, current** | | | |
| • 0 to 20 mA | Yes | Yes | Yes |
| **1. Interface** | | | |
| Interface type | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | Yes; as MRP client | Yes; as MRP client | Yes; as MRP client |
| **Communication functions** | | | |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **Open IE communication** | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| • UDP | Yes | Yes | Yes |
| **Web server** | | | |
| • supported | Yes | Yes | Yes |
| **Number of connections** | | | |
| • overall | 16; dynamically | 16; dynamically | 16; dynamically |
| **Integrated Functions** | | | |
| Number of counters | 6 | 6 | 6 |
| Counting frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| Number of position-controlled positioning axes, max. | 8 | 8 | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 | 4; With integrated outputs | Up to 4 with SB 1222 |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 4 | |
| Limit frequency (pulse) | | 100 kHz | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical |
| **Pollutant concentrations** | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1215C**

■ **Technical specifications** (continued)

| Article number | 6ES7215-1BG40-0XB0 | 6ES7215-1AG40-0XB0 | 6ES7215-1HG40-0XB0 |
|---|---|---|---|
| | CPU 1215C, AC/DC/RLY, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215C, DC/DC/RLY, 14DI/10DO/2AI/2AO |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
|   - LAD | Yes | Yes | Yes |
|   - FBD | Yes | Yes | Yes |
|   - SCL | Yes | Yes | Yes |
| **Dimensions** | | | |
|  Width | 130 mm | 130 mm | 130 mm |
|  Height | 100 mm | 100 mm | 100 mm |
|  Depth | 75 mm | 75 mm | 75 mm |
| **Weights** | | | |
|  Weight, approx. | 550 g | 500 g | 585 g |

■ **Ordering data**     **Article No.**                        **Article No.**

| CPU 1215C | Article No. | | Article No. |
|---|---|---|---|
| **Compact CPU, AC/DC/relay**; Integrated program/data memory 125 KB, load memory 4 MB; Wide-range power supply 85 ... 264 V AC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs, 2 analog outputs; Expandable by up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | 6ES7215-1BG40-0XB0 | **SB 1221 signal board** | |
| | | 4 inputs, 5 V DC, 200 kHz | 6ES7221-3AD30-0XB0 |
| | | 4 inputs, 24 V DC, 200 kHz | 6ES7221-3BD30-0XB0 |
| | | **SB 1222 signal board** | |
| | | 4 outputs, 5 V DC, 0.1 A, 200 kHz | 6ES7222-1AD30-0XB0 |
| | | 4 outputs, 24 V DC, 0.1 A, 200 kHz | 6ES7222-1BD30-0XB0 |
| | | **SB 1223 signal board** | |
| | | 2 inputs, 24 V DC, IEC type 1 current sinking; 2 x 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | 6ES7223-0BD30-0XB0 |
| | | 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | 6ES7223-3AD30-0XB0 |
| **Compact CPU, DC/DC/DC**; Integrated program/data memory 125 KB, load memory 4 MB; Power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs, 2 analog outputs; Expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6ES7215-1AG40-0XB0 | 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | 6ES7223-3BD30-0XB0 |
| | | **SB 1231 signal board** | 6ES7231-4HA30-0XB0 |
| | | 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | |
| | | **SB 1231 thermocouple signal board** | 6ES7231-5QA30-0XB0 |
| | | 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| | | **RTD signal board SB 1231** | 6ES7231-5PA30-0XB0 |
| | | 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| | | **SB 1232 signal board** | 6ES7232-4HA30-0XB0 |
| | | 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |
| **Compact CPU, DC/DC/relay**; Integrated program/data memory 125 KB, load memory 4 MB; Power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs, 2 analog outputs; Expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | 6ES7215-1HG40-0XB0 | **CB 1241 RS 485 communication board** | 6ES7241-1CH30-1XB0 |
| | | For point-to-point connection, with 1 RS 485 interface | |
| | | **BB 1297 battery board** | 6ES7297-0AX30-0XA0 |
| | | For long-term backup of real-time clock; can be plugged into the signal board slot; battery (CR 1025) is not included | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input simulator SIM 1274 simulator module (optional)** | | **Front flap set (spare part)** | |
| | | For CPU 1215C | 6ES7291-1AC30-0XA0 |
| 14 input switches, for CPU 1214C/1215C | 6ES7274-1XH30-0XA0 | **RJ45 cable grip** | |
| | | 4 items per pack | |
| **Analog input simulator SIM 1274 simulator module (optional)** | | Dual port | 6ES7290-3AB30-0XA0 |
| 2 potentiometers | 6ES7274-1XA30-0XA0 | **STEP 7 Professional / Basic V14 SP1** | |
| **SIMATIC Memory Card (optional)** | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| 4 MB | 6ES7954-8LC02-0AA0 | Requirement: | |
| 12 MB | 6ES7954-8LE02-0AA0 | Windows 7 Professional SP1 (64-bit), | |
| 24 MB | 6ES7954-8LF02-0AA0 | Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), | |
| 256 MB | 6ES7954-8LL02-0AA0 | Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), | |
| 2 GB | 6ES7954-8LP02-0AA0 | Windows 10 Professional Version 1607, | |
| 32 GB | 6ES7954-8LT03-0AA0 | Windows 10 Enterprise Version 1607, | |
| **Extension cable for two-tier configuration** | 6ES7290-6AA30-0XA0 | Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), | |
| For connecting digital/analog signal modules; length 2 m | | Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| **Terminal block (spare part)** | | STEP 7 Basic V14 SP1 in addition: Windows 7 Home Premium SP1 (64-bit), | |
| For CPU 1215C AC/DC/relay | | Windows 8.1 (64-bit), Windows 10 Home Version 1607 | |
| • For DI, with 20 screws, tin-coated, coded; 4 units | 6ES7292-1AV40-0XA0 | Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| • For DO, with 12 screws, tin-coated, coded; 4 units | 6ES7292-1AM40-0XA0 | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| • For analog units, with 6 screws, gold-plated; 4 units | 6ES7292-1BF30-0XB0 | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| For CPU 1215C DC/DC/DC | | Email address required for delivery | |
| • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 | STEP 7 Basic V14 SP1, floating license | 6ES7822-0AA04-0YA5 |
| • For DO, with 12 screws, tin-coated; 4 units | 6ES7292-1AM30-0XA0 | STEP 7 Basic V14 SP1, floating license, software download incl. license key [1] | 6ES7822-0AE04-0YA5 |
| • For analog units, with 6 screws, gold-plated; 4 units | 6ES7292-1BF30-0XB0 | Email address required for delivery | |
| For CPU 1215C DC/DC/relay | | | |
| • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 | | |
| • For DO, with 12 screws, tin-coated, coded; 4 units | 6ES7292-1AM40-0XA0 | | |
| • For analog units, with 6 screws, gold-plated; 4 units | 6ES7292-1BF30-0XB0 | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

**3**

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1217C**

■ **Overview**



- Powerful controller for extremely fast signal processing
- Expandable by:
  - 1 signal board (SB), battery board (BB) or communication board (CB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

■ **Technical specifications**

| Article number | **6ES7217-1AG40-0XB0** |
|---|---|
| | CPU 1217C, DC/DC/DC, 14DI/10DQ/2AI/2AQ |
| **General information** | |
| Product type designation | CPU 1217C DC/DC/DC |
| **Engineering with** | |
| • Programming package | STEP 7 V14 or higher |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Encoder supply** | |
| **24 V encoder supply** | |
| • 24 V | L+ minus 4 V DC min. |
| **Power loss** | |
| Power loss, typ. | 12 W |
| **Memory** | |
| **Work memory** | |
| • integrated | 150 kbyte |
| **Load memory** | |
| • integrated | 4 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card |
| **Backup** | |
| • without battery | Yes |
| **CPU processing times** | |
| for bit operations, typ. | 0.085 μs; / instruction |
| for word operations, typ. | 1.7 μs; / instruction |
| for floating point arithmetic, typ. | 2.3 μs; / Operation |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 8 kbyte; Size of bit memory address area |
| **Process image** | |
| • Inputs, adjustable | 1 kbyte |
| • Outputs, adjustable | 1 kbyte |

| Article number | **6ES7217-1AG40-0XB0** |
|---|---|
| | CPU 1217C, DC/DC/DC, 14DI/10DQ/2AI/2AQ |
| **Time of day** | |
| **Clock** | |
| • Hardware clock (real-time) | Yes |
| **Digital inputs** | |
| Number of digital inputs | 14; Integrated |
| • of which inputs usable for technological functions | 6; HSC (High Speed Counting) |
| **Digital outputs** | |
| Number of digital outputs | 10 |
| • of which high-speed outputs | 4; 100 kHz Pulse Train Output |
| **Analog inputs** | |
| Number of analog inputs | 2 |
| **Input ranges** | |
| • Voltage | Yes |
| **Analog outputs** | |
| Number of analog outputs | 2 |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| **1. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes; as MRP client |

**3**

## ■ Technical specifications (continued)

| Article number | **6ES7217-1AG40-0XB0** |
|---|---|
| | CPU 1217C, DC/DC/DC, 14DI/10DQ/2AI/2AQ |
| **Communication functions** | |
| **S7 communication** | |
| • supported | Yes |
| **Open IE communication** | |
| • TCP/IP | Yes |
| • ISO-on-TCP (RFC1006) | Yes |
| • UDP | Yes |
| **Web server** | |
| • supported | Yes |
| **Number of connections** | |
| • overall | 16; dynamically |
| **Integrated Functions** | |
| Number of counters | 6 |
| Counting frequency (counter) max. | 1 MHz |
| Frequency meter | Yes |
| controlled positioning | Yes |
| Number of position-controlled positioning axes, max. | 8 |
| Number of positioning axes via pulse-direction interface | 4; With integrated outputs |
| PID controller | Yes |
| Number of alarm inputs | 4 |
| Number of pulse outputs | 4 |
| Limit frequency (pulse) | 1 MHz |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - SCL | Yes |
| **Dimensions** | |
| Width | 150 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 530 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **CPU 1217C** | |
| **Compact CPU, DC/DC/DC**; Integrated program/data memory 150 KB, load memory 4 MB; Power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs (10 digital 24 V DC inputs, 4 digital 1.5 V DC differential inputs), 10 digital outputs (6 digital 24 V DC outputs, 4 digital 1.5 V DC differential outputs), 2 analog inputs, 2 analog outputs; Expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 1 MHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7217-1AG40-0XB0** |
| **SB 1221 signal board** | |
| 4 inputs, 5 V DC, 200 kHz | **6ES7221-3AD30-0XB0** |
| 4 inputs, 24 V DC, 200 kHz | **6ES7221-3BD30-0XB0** |
| **SB 1222 signal board** | |
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6ES7222-1AD30-0XB0** |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6ES7222-1BD30-0XB0** |
| **SB 1223 signal board** | |
| 2 inputs, 24 V DC, IEC type 1 current sinking; 2 x 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | **6ES7223-0BD30-0XB0** |
| 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6ES7223-3AD30-0XB0** |
| 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6ES7223-3BD30-0XB0** |
| **SB 1231 signal board** | **6ES7231-4HA30-0XB0** |
| 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | |
| **SB 1231 thermocouple signal board** | **6ES7231-5QA30-0XB0** |
| 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| **RTD signal board SB 1231** | **6ES7231-5PA30-0XB0** |
| 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| **SB 1232 signal board** | **6ES7232-4HA30-0XB0** |
| 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Standard CPUs

**CPU 1217C**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **CB 1241 RS 485 communication board** | **6ES7241-1CH30-1XB0** | **RJ45 cable grip** | |
| For point-to-point connection, with 1 RS 485 interface | | 4 items per pack | |
| | | Dual port | **6ES7290-3AB30-0XA0** |
| **BB 1297 battery board** | **6ES7297-0AX30-0XA0** | **STEP 7 Professional / Basic V14 SP1** | |
| For long-term backup of real-time clock; can be plugged into the signal board slot; battery (CR 1025) is not included | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| **Digital input simulator SIM 1274 simulator module (optional)** | | Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); STEP 7 Basic V14 SP1 in addition: Windows 7 Home Premium SP1 (64-bit), Windows 8.1 (64-bit), Windows 10 Home Version 1607 | |
| 14 input switches, for CPU 1217C | **6ES7274-1XK30-0XA0** | | |
| **Analog input simulator SIM 1274 simulator module (optional)** | | | |
| 2 potentiometers | **6ES7274-1XA30-0XA0** | | |
| **SIMATIC Memory Card (optional)** | | | |
| 4 MB | **6ES7954-8LC02-0AA0** | | |
| 12 MB | **6ES7954-8LE02-0AA0** | | |
| 24 MB | **6ES7954-8LF02-0AA0** | | |
| 256 MB | **6ES7954-8LL02-0AA0** | | |
| 2 GB | **6ES7954-8LP02-0AA0** | | |
| 32 GB | **6ES7954-8LT03-0AA0** | | |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** | Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| For connecting digital/analog signal modules; length 2 m | | STEP 7 Professional V14 SP1, floating license | **6ES7822-1AA04-0YA5** |
| **Terminal block (spare part)** | | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | **6ES7822-1AE04-0YA5** |
| For CPU 1217C | | Email address required for delivery | |
| • For DI, with 10 screws, tin-coated; 4 units | **6ES7292-1AK30-0XA0** | STEP 7 Basic V14 SP1, floating license | **6ES7822-0AA04-0YA5** |
| • For DI, with 10 screws, tin-coated; 4 units | **6ES7292-1AR30-0XA0** | STEP 7 Basic V14 SP1, floating license, software download incl. license key[1] | **6ES7822-0AE04-0YA5** |
| • For DO, with 18 screws, tin-coated; 4 units | **6ES7292-1AT30-0XA0** | Email address required for delivery | |
| • For analog units, with 6 screws, gold-plated; 4 units | **6ES7292-1BF30-0XB0** | | |
| **Front flap set (spare part)** | | | |
| For CPU 1217C | **6ES7291-1AD30-0XA0** | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## Overview



- The clever compact solution
- With 10 integrated I/Os
- Expandable with:
  - 1 signal board (SB) or communication board (CB); not possible with: 6AG1211-1AE31-2XB0, 6AG1211-1BE31-2XB0, 6AG1211-1HE31-2XB0
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1211-1AE31-4XB0** | **6AG1211-1AE31-2XB0** |
|---|---|---|
| Based on | **6ES7211-1AE31-0XB0** | **6ES7211-1AE31-0XB0** |
| | SIPLUS S7-1200 CPU1211 DC/DC/DC | SIPLUS S7-1200 CPU1211 DC/DC/DC |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax | 70 °C; = Tmax; > +60 °C Number of simultaneously controllable inputs and outputs max. 50%; no signal board can be used |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0 °C | -25 °C |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1211C**

■ **Technical specifications** (continued)

| Article number | **6AG1211-1BE31-4XB0** | **6AG1211-1BE31-2XB0** |
|---|---|---|
| Based on | **6ES7211-1BE31-0XB0** | **6ES7211-1BE31-0XB0** |
| | SIPLUS S7-1200 CPU1211 AC/DC/RLY | SIPLUS S7-1200 CPU1211 AC/DC/RLY |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax | 70 °C; = Tmax; > +60 °C Number of simultaneously controllable inputs and outputs max. 50%; no signal board can be used |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0 °C | -25 °C |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1211-1HE31-4XB0** | **6AG1211-1HE31-2XB0** |
|---|---|---|
| Based on | **6ES7211-1HE31-0XB0** | **6ES7211-1HE31-0XB0** |
| | SIPLUS S7-1200 CPU1211 DC/DC/RLY | SIPLUS S7-1200 CPU1211 DC/DC/RLY |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax | 70 °C; = Tmax; > +60 °C Number of simultaneously controllable inputs and outputs max. 50%; no signal board can be used |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0 °C | -25 °C |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**SIPLUS CPU 1211C compact CPU, AC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program and data memory of 25 KB,
load memory of 1 MB;
wide-range alternating voltage supply 85 ... 264 V AC;
Boolean execution times of 0.1 ms per operation;
6 digital inputs, 4 digital outputs (relay), 2 analog inputs;
expandable with up to
3 communication modules and
1 signal board/communication board;
digital inputs usable as HSC with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1211-1BE31-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1211-1BE31-2XB0**

**SIPLUS CPU 1211C compact CPU, DC/DC/DC**

(Extended temperature range and exposure to media)

Integrated program and data memory of 25 KB,
load memory of 1 MB;
power supply 24 V DC;
Boolean execution times of 0.1 ms per operation;
6 digital inputs, 4 digital outputs, 2 analog inputs;
expandable with up to
3 communication modules and
1 signal board/communication board;
digital inputs usable as HSC with 100 kHz, 24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1211-1AE31-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1211-1AE31-2XB0**

**SIPLUS CPU 1211C compact CPU, DC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program and data memory of 25 KB,
load memory of 1 MB;
power supply 24 V DC;
Boolean execution times of 0.1 ms per operation;
6 digital inputs, 4 digital outputs (relay), 2 analog inputs;
expandable with up to
3 communication modules and
1 signal board/communication board;
digital inputs usable as HSC with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1211-1HE31-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1211-1HE31-2XB0**

**Accessories**

**SIPLUS SB 1221 digital input signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1211-1....-**2**XB0)

| | |
|---|---|
| 4 inputs, 5 V DC, 200 kHz, sourcing | **6AG1221-3AD30-5XB0** |
| 4 inputs, 24 V DC, 200 kHz, sourcing | **6AG1221-3BD30-5XB0** |

**SIPLUS SB 1222 digital output signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1211-1....-**2**XB0)

| | |
|---|---|
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6AG1222-1AD30-5XB0** |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6AG1222-1BD30-5XB0** |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1211C**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|

**SIPLUS SB 1223 digital input/ output signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1211-1....-**2**XB0)

2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs 24 V DC, 0.5 A, 5 W; can be used as HSC at up to 30 kHz

- Suitable for areas with extreme medial exposure (conformal coating)     **6AG1223-0BD30-4XB0**

- Ambient temperature -25 ... +55 °C     **6AG1223-0BD30-5XB0**

2 inputs, 5 V DC, 200 kHz
2 outputs 5 V DC, 0.1 A, 200 kHz     **6AG1223-3AD30-5XB0**

2 inputs, 24 V DC, 200 kHz
2 outputs 24 V DC, 0.1 A, 200 kHz     **6AG1223-3BD30-5XB0**

**SIPLUS SB 1232 analog output signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1211-1....-**2**XB0)

Ambient temperature range -25 ... +55 °C

1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits     **6AG1232-4HA30-5XB0**

Ambient temperature range 0 ... +55 °C

1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits     **6AG1232-4HA30-4XB0**

**SIPLUS CB 1241 RS 485 communication board**

(Extended temperature range and exposure to media; cannot be used with 6AG1211-1....-**2**XB0)

For point-to-point connection, with 1 RS 485 interface     **6AG1241-1CH30-5XB1**

**Additional accessories**     See SIMATIC S7-1200 CPU 1211C, page 3/6

## Overview



- The superior compact solution
- With 14 integral input/outputs
- Expandable by:
  - 1 signal board (SB) or communication board (CB);
    not possible with: 6AG1212-1AE31-2XB0,
    6AG1212-1BE31-2XB0, 6AG1212-1HE31-2XB0
  - 2 signal modules (SM)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1212-1AE40-4XB0 | 6AG1212-1AE40-2XB0 |
|---|---|---|
| Based on | 6ES7212-1AE40-0XB0 | 6ES7212-1AE40-0XB0 |
| | SIPLUS S7-1200 CPU 1212C DC/DC/DC | SIPLUS S7-1200 CPU 1212C DC/DC/DC |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 4, digital outputs 3, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 3, digital outputs 2, analog inputs 0 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1212C**

## ■ Technical specifications (continued)

**3**

| Article number | 6AG1212-1BE40-4XB0 | 6AG1212-1BE40-2XB0 |
|---|---|---|
| Based on | 6ES7212-1BE40-0XB0 | 6ES7212-1BE40-0XB0 |
| | SIPLUS S7-1200 CPU 1212C AC/DC/RLY | SIPLUS S7-1200 CPU 1212C AC/DC/RLY |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 4, digital outputs 3, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 3, digital outputs 2, analog inputs 0 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1212-1HE40-4XB0 | 6AG1212-1HE40-2XB0 |
|---|---|---|
| Based on | 6ES7212-1HE40-0XB0 | 6ES7212-1HE40-0XB0 |
| | SIPLUS S7-1200 CPU 1212C DC/DC/RLY | SIPLUS S7-1200 CPU 1212C DC/DC/RLY |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 4, digital outputs 3, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 3, digital outputs 2, analog inputs 0 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

**3**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**SIPLUS CPU 1212C
compact CPU, AC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program/data memory 75 KB, load memory 1 MB;
Wide-range power supply 85 ... 264 V AC;
Boolean execution times 0.1 µs per operation;
8 digital inputs,
6 digital outputs (relays),
2 analog inputs;
Expandable by up to
3 communication modules,
2 signal modules and 1 signal board/communication board;
Digital inputs can be used as HSC at 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C **6AG1212-1BE40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C **6AG1212-1BE40-2XB0**

**SIPLUS CPU 1212C
compact CPU, DC/DC/DC**

(Extended temperature range and exposure to media)

Integrated program/data memory 75 KB, load memory 1 MB;
Power supply 24 V DC;
Boolean execution times 0.1 µs per operation;
8 digital inputs,
6 digital outputs,
2 analog inputs;
Expandable by up to
3 communication modules,
2 signal modules, and 1 signal board/communication board;
Digital inputs can be used as HSC at 100 kHz,
24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C **6AG1212-1AE40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C **6AG1212-1AE40-2XB0**

**SIPLUS CPU 1212C
compact CPU, DC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program/data memory 75 KB, load memory 1 MB;
Power supply 24 V DC;
Boolean execution times 0.1 µs per operation;
8 digital inputs,
6 digital outputs (relays),
2 analog inputs;
Expandable by up to
3 communication modules,
2 signal modules, and 1 signal board/communication board;
Digital inputs can be used as HSC at 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C **6AG1212-1HE40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C **6AG1212-1HE40-2XB0**

**Accessories**

**SIPLUS SB 1221 digital input signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1212-1....-**2**XB0)

| | |
|---|---|
| 4 inputs, 5 V DC, 200 kHz, sourcing | **6AG1221-3AD30-5XB0** |
| 4 inputs, 24 V DC, 200 kHz, sourcing | **6AG1221-3BD30-5XB0** |

**SIPLUS SB 1222 digital output signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1212-1....-**2**XB0)

| | |
|---|---|
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6AG1222-1AD30-5XB0** |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6AG1222-1BD30-5XB0** |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1212C**

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input/output SIPLUS signal board SB 1223** | | **SIPLUS SB 1232 analog output signal board** | |
| (Extended temperature range and exposure to media; cannot be used with 6AG1212-1....-**2**XB0) | | (Extended temperature range and exposure to media; cannot be used with 6AG1212-1....-**2**XB0) | |
| 2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs 24 V DC, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | | Ambient temperature range <u>-25 ... +55 °C</u> | |
| • Suitable for areas with extreme medial exposure (conformal coating) | **6AG1223-0BD30-4XB0** | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-5XB0** |
| • Ambient temperature -25 ... +55 °C | **6AG1223-0BD30-5XB0** | Ambient temperature range <u>0 ... +55 °C</u> | |
| 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6AG1223-3AD30-5XB0** | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-4XB0** |
| 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6AG1223-3BD30-5XB0** | **SIPLUS CB 1241 RS 485 communication board** | |
| | | (Extended temperature range and exposure to media; cannot be used with 6AG1212-1....-**2**XB0) | |
| | | For point-to-point connection, with 1 RS 485 interface | **6AG1241-1CH30-5XB1** |
| | | **Additional accessories** | See SIMATIC S7-1200 CPU 1212C, page 3/10 |

**3**

3

## Overview



- The compact high-performance CPU
- With 24 integrated I/Os
- Expandable with:
  - 1 signal board (SB) or communication board (CB); not possible with: 6AG1214-1AG40-2XB0, 6AG1214-1BG40-2XB0, 6AG1214-1HG40-2XB0
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1214-1AG40-4XB0** | **6AG1214-1AG40-5XB0** | **6AG1214-1AG40-2XB0** |
|---|---|---|---|
| Based on | **6ES7214-1AG40-0XB0** | **6ES7214-1AG40-0XB0** | **6ES7214-1AG40-0XB0** |
| | SIPLUS S7-1200 CPU 1214C DC/DC/DC | SIPLUS S7-1200 CPU 1214C DC/DC/DC | SIPLUS S7-1200 CPU 1214C DC/DC/DC |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1214C**

## ▌ Technical specifications (continued)

| Article number | 6AG1214-1BG40-4XB0 | 6AG1214-1BG40-5XB0 | 6AG1214-1BG40-2XB0 |
|---|---|---|---|
| Based on | 6ES7214-1BG40-0XB0 | 6ES7214-1BG40-0XB0 | 6ES7214-1BG40-0XB0 |
| | SIPLUS S7-1200 CPU 1214C AC/DC/RLY | SIPLUS S7-1200 CPU 1214C AC/DC/RLY | SIPLUS S7-1200 CPU 1214C AC/DC/RLY |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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■ **Technical specifications** (continued)

| Article number | **6AG1214-1HG40-4XB0** | **6AG1214-1HG40-5XB0** | **6AG1214-1HG40-2XB0** |
|---|---|---|---|
| Based on | **6ES7214-1HG40-0XB0** | **6ES7214-1HG40-0XB0** | **6ES7214-1HG40-0XB0** |
| | SIPLUS S7-1200 CPU 1214C DC/DC/RLY | SIPLUS S7-1200 CPU 1214C DC/DC/RLY | SIPLUS S7-1200 CPU 1214C DC/DC/RLY |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1214C**

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CPU 1214C**<br>**compact CPU, AC/DC/relay** | | **SIPLUS CPU 1214C**<br>**compact CPU, DC/DC/relay** | |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| Integrated program/data memory 100 KB, load memory 2 MB; Wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | | Integrated program/data memory 100 KB, load memory 2 MB; Power supply 24 V DC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; Expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C | 6AG1214-1BG40-4XB0 | • For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C | 6AG1214-1HG40-4XB0 |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C | 6AG1214-1BG40-5XB0 | • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C | 6AG1214-1HG40-5XB0 |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C | 6AG1214-1BG40-2XB0 | • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C | 6AG1214-1HG40-2XB0 |
| **SIPLUS CPU 1214C**<br>**compact CPU, DC/DC/DC** | | **Accessories** | |
| (Extended temperature range and exposure to media) | | **SIPLUS SB 1221 digital input signal board** | |
| Integrated program/data memory 100 KB, load memory 2 MB; Power supply 24 V DC; Boolean execution times 0.1 μs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | | (Extended temperature range and exposure to media; cannot be used with 6AG1214-1....-**2**XB0) | |
| | | 4 inputs, 5 V DC, 200 kHz, sourcing | 6AG1221-3AD30-5XB0 |
| | | 4 inputs, 24 V DC, 200 kHz, sourcing | 6AG1221-3BD30-5XB0 |
| | | **SIPLUS SB 1222 digital output signal board** | |
| | | (Extended temperature range and exposure to media; cannot be used with 6AG1214-1....-**2**XB0) | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C | 6AG1214-1AG40-4XB0 | 4 outputs, 5 V DC, 0.1 A, 200 kHz | 6AG1222-1AD30-5XB0 |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C | 6AG1214-1AG40-5XB0 | 4 outputs, 24 V DC, 0.1 A, 200 kHz | 6AG1222-1BD30-5XB0 |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C | 6AG1214-1AG40-2XB0 | | |

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■ **Ordering data** | Article No. | | Article No.
---|---|---|---

| **SIPLUS SB 1223<br>digital input/output signal board** | | **SIPLUS SB 1232<br>analog output signal board** | |
|---|---|---|---|
| (Extended temperature range and exposure to media; cannot be used with 6AG1214-1....-**2**XB0) | | (Extended temperature range and exposure to media; cannot be used with 6AG1214-1....-**2**XB0) | |
| 2 inputs, 24 V DC,<br>IEC type 1 current sinking;<br>2 transistor outputs 24 V DC,<br>0.5 A, 5 W; can be used as HSC at up to 30 kHz | | <u>Ambient temperature range<br>-25 ... +55 °C</u> | |
| • Suitable for areas with extreme medial exposure<br>(conformal coating) | **6AG1223-0BD30-4XB0** | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-5XB0** |
| • Ambient temperature<br>-25 ... +55 °C | **6AG1223-0BD30-5XB0** | <u>Ambient temperature range<br>0 ... +55 °C</u> | |
| 2 inputs, 5 V DC, 200 kHz<br>2 outputs 5 V DC, 0.1 A, 200 kHz | **6AG1223-3AD30-5XB0** | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-4XB0** |
| 2 inputs, 24 V DC, 200 kHz<br>2 outputs 24 V DC, 0.1 A, 200 kHz | **6AG1223-3BD30-5XB0** | **SIPLUS CB 1241 RS 485<br>communication board** | |
| | | (Extended temperature range and exposure to media; cannot be used with 6AG1214-1....-**2**XB0) | |
| | | For point-to-point connection,<br>with 1 RS 485 interface | **6AG1241-1CH30-5XB1** |
| | | **Additional accessories** | See SIMATIC S7-1200<br>CPU 1214C, page 3/14 |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

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## ■ Overview

- The compact high-performance CPU
- With 24 integrated I/Os
- Expandable with:
  - 1 signal board (SB) or communication board (CB);
    not possible with: 6AG1215-1AG40-2XB0,
    6AG1215-1BG40-2XB0, 6AG1215-1HG40-2XB0
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | **6AG1215-1AG40-4XB0** | **6AG1215-1AG40-5XB0** | **6AG1215-1AG40-2XB0** |
|---|---|---|---|
| Based on | **6ES7215-1AG40-0XB0** | **6ES7215-1AG40-0XB0** | **6ES7215-1AG40-0XB0** |
| | SIPLUS S7-1200 CPU 1215C DC/DC/DC | SIPLUS S7-1200 CPU 1215C DC/DC/DC | SIPLUS S7-1200 CPU 1215C DC/DC/DC |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1, analog outputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

■ **Technical specifications** (continued)

| Article number | 6AG1215-1BG40-4XB0 | 6AG1215-1BG40-5XB0 | 6AG1215-1BG40-2XB0 |
|---|---|---|---|
| Based on | 6ES7215-1BG40-0XB0 | 6ES7215-1BG40-0XB0 | 6ES7215-1BG40-0XB0 |
| | SIPLUS S7-1200 CPU 1215C AC/DC/RLY | SIPLUS S7-1200 CPU 1215C AC/DC/RLY | SIPLUS S7-1200 CPU 1215C AC/DC/RLY |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1, analog outputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-1200 Basic Controllers
## Central processing units
## SIPLUS standard CPUs

**SIPLUS CPU 1215C**

■ **Technical specifications** (continued)

| Article number | 6AG1215-1HG40-4XB0 | 6AG1215-1HG40-5XB0 | 6AG1215-1HG40-2XB0 |
|---|---|---|---|
| Based on | 6ES7215-1HG40-0XB0 | 6ES7215-1HG40-0XB0 | 6ES7215-1HG40-0XB0 |
| | SIPLUS S7-1200 CPU 1215C DC/DC/RLY | SIPLUS S7-1200 CPU 1215C DC/DC/RLY | SIPLUS S7-1200 CPU 1215C DC/DC/RLY |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position | 70 °C; = Tmax; Tmax > +55 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 2, analog outputs 2 (no adjacent points) with horizontal mounting position; Tmax > +60 °C number of simultaneously switched-on digital inputs 7, digital outputs 5, analog inputs 1, analog outputs 1 (no adjacent points) with horizontal mounting position |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**SIPLUS CPU 1215C
compact CPU, AC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program and data memory 125 KB,
load memory 4 MB;
wide-range power supply
85 ... 264 V AC;
Boolean execution times 0.085 µs per operation;
14 digital inputs,
10 digital outputs (relay),
2 analog inputs,
2 analog outputs;
expandable by up to
3 communication modules,
8 signal modules and 1 signal board/communication board;
digital inputs usable as HSC with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1215-1BG40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C — **6AG1215-1BG40-5XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1215-1BG40-2XB0**

**SIPLUS CPU 1215C
compact CPU, DC/DC/DC**

(Extended temperature range and exposure to media)

Integrated program and data memory 125 KB,
load memory 4 MB;
power supply 24 V DC;
Boolean execution times 0.085 µs per operation;
14 digital inputs,
10 digital outputs,
2 analog inputs,
2 analog outputs;
expandable by up to
3 communication modules,
8 signal modules and 1 signal board/communication board;
digital inputs usable as HSC with 100 kHz;
24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1215-1AG40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C — **6AG1215-1AG40-5XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1215-1AG40-2XB0**

**SIPLUS CPU 1215C
compact CPU, DC/DC/relay**

(Extended temperature range and exposure to media)

Integrated program and data memory 125 KB,
load memory 4 MB;
power supply 24 V DC;
Boolean execution times 0.085 µs per operation;
14 digital inputs,
10 digital outputs (relay),
2 analog inputs,
2 analog outputs;
expandable by up to
3 communication modules,
8 signal modules and 1 signal board/communication board;
digital inputs usable as HSC with 100 kHz

- For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C — **6AG1215-1HG40-4XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +60 °C — **6AG1215-1HG40-5XB0**

- For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C — **6AG1215-1HG40-2XB0**

**Accessories**

**SIPLUS SB 1221 digital input signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1215-1....-**2**XB0)

| | Article No. |
|---|---|
| 4 inputs, 5 V DC, 200 kHz, sourcing | **6AG1221-3AD30-5XB0** |
| 4 inputs, 24 V DC, 200 kHz, sourcing | **6AG1221-3BD30-5XB0** |

**SIPLUS SB 1222 digital output signal board**

(Extended temperature range and exposure to media; cannot be used with 6AG1215-1....-**2**XB0)

| | Article No. |
|---|---|
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6AG1222-1AD30-5XB0** |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6AG1222-1BD30-5XB0** |

# SIMATIC S7-1200 Basic Controllers
Central processing units
SIPLUS standard CPUs

**SIPLUS CPU 1215C**

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input/output SIPLUS signal board SB 1223** | | **SIPLUS SB 1232 analog output signal board** | |
| (Extended temperature range and exposure to media; cannot be used with 6AG1215-1....-**2**XB0) | | (Extended temperature range and exposure to media; cannot be used with 6AG1215-1....-**2**XB0) | |
| 2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs 24 V DC, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | | Ambient temperature range -25 ... +55 °C | |
| | | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-5XB0** |
| • Suitable for areas with extreme medial exposure (conformal coating) | **6AG1223-0BD30-4XB0** | Ambient temperature range 0 ... +55 °C | |
| • Ambient temperature -25 ... +55 °C | **6AG1223-0BD30-5XB0** | 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-4XB0** |
| 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | **6AG1223-3AD30-5XB0** | **SIPLUS CB 1241 RS 485 communication board** | |
| 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | **6AG1223-3BD30-5XB0** | (Extended temperature range and exposure to media; cannot be used with 6AG1215-1....-**2**XB0) | |
| | | For point-to-point connection, with 1 RS 485 interface | **6AG1241-1CH30-5XB1** |
| | | **Additional accessories** | See SIMATIC S7-1200 CPU 1215C. page 3/18 |

## Overview



The fail-safe SIMATIC S7-1200 Controllers are based on the S7-1200 standard CPUs and offer additional safety-related functions.

They can be used for safety-oriented tasks according to IEC 61508 up to SIL 3 and ISO 13849-1 up to PL e.

Safety-related programs are created in the TIA Portal. The STEP 7 Safety engineering tool offers commands, operations and blocks for safety-related programs in the LAD and FBD languages. To this end, there is a library with pre-configured, TÜV-approved blocks for safety-related functions.

- Standard controller with integrated safety functions:
  - Standardized and convenient diagnostic functions for standard and safety
  - Uniform symbols, data consistency, ...
- Modular system with scalable range of CPUs and expandable I/O quantity structure:
  - One engineering for standard and fail-safe automation
  - Use of the standard I/O modules together with the fail-safe I/O modules in the central system
  - Integrated standard PROFINET functionalities for PROFINET controllers and PROFINET iDevice services
  - Connection of distributed standard I/O via field bus such as PROFINET or PROFIBUS
  - F-library certified by the German Technical Inspectorate (TÜV) for all common safety functions
  - Free programming of the safety logic using FBD and LAD
  - Standard-compliant printout of the F-program
- One integrated engineering for both standard and safety from S7-1200 to S7-300/400/1500 and WinAC RTX F:
  - STEP 7 Safety Basic for easy engineering of the CPU 1200 FC
  - STEP 7 Safety Advanced for the entire fail-safe SIMATIC S7 portfolio
- Integrated system diagnosis of the CPUs, for standard and safety:
  - Consistent plain text display of system diagnostic information in the TIA Portal, HMI and web server
  - Messages are updated even if the CPU is in STOP state
  - System diagnostics integrated in the CPU firmware. Configuration by user not required
  - The diagnostics is automatically updated on configuration changes.
- 2 fail-safe compact controllers with graded performances in the versions DC/DC/DC and DC/DC/relay

| Characteristics | CPU 1212 FC | CPU 1214 FC | CPU 1215 FC |
|---|---|---|---|
| Variants | DC/DC/DC, DC/DC/relay | DC/DC/DC, DC/DC/relay | DC/DC/DC, DC/DC/relay |
| Main memory, integrated | 100 KB | 125 KB | 150 KB |
| Load memory, integrated | 2 MB | 4 MB | 4 MB |
| Memory card | SIMATIC Memory Card (optional) | SIMATIC Memory Card (optional) | SIMATIC Memory Card (optional) |
| Standard digital inputs/outputs, integrated | 8/6 | 14/10 | 14/10 |
| Standard analog inputs, integrated | 2 | 2 | 2 |
| Standard analog outputs, integrated | - | - | 2 |
| Process image | 1024 bytes for inputs, 1024 bytes for outputs | 1024 bytes for inputs, 1024 bytes for outputs | 1024 bytes for inputs, 1024 bytes for outputs |
| Expansion by signal board | Max. 1 | Max. 1 | Max. 1 |
| Expansion by signal modules | Max. 2 | Max. 8 | Max. 8 |
| Expansion by communication modules | Max. 3 | Max. 3 | Max. 3 |

# SIMATIC S7-1200 Basic Controllers
Central processing units
Fail-safe CPUs

## CPU 1212 FC, CPU 1214 FC, CPU 1215 FC

### ■ Technical specifications

| Article number | 6ES7212-1AF40-0XB0 | 6ES7212-1HF40-0XB0 | 6ES7214-1AF40-0XB0 | 6ES7214-1HF40-0XB0 | 6ES7215-1AF40-0XB0 | 6ES7215-1HF40-0XB0 |
|---|---|---|---|---|---|---|
| | CPU 1212FC , DC/DC/DC, 8DI/6DO/2AI | CPU 1212FC, DC/DC/RELAY, 8DI/6DO/2AI | CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI | CPU 1214 FC, DC/DC/RELAY, 14DI/10DO/2AI | CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215 FC, DC/DC/RLY,14DI/10DO/2AI/2AO |
| **General information** | | | | | | |
| Product type designation | CPU 1212FC DC/DC/DC | CPU 1212FC DC/DC/relay | CPU 1214FC DC/DC | CPU 1214FC DC/DC/Relay | CPU 1215FC DC/DC/DC | CPU 1215C DC/DC/Relay |
| **Engineering with** | | | | | | |
| • Programming package | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher | STEP 7 V14 or higher |
| **Supply voltage** | | | | | | |
| Rated value (DC) | | | | | | |
| • 24 V DC | Yes | Yes | Yes | Yes | Yes | Yes |
| **Encoder supply** | | | | | | |
| **24 V encoder supply** | | | | | | |
| • 24 V | Permissible range: 20.4V to 28.8V | Permissible range: 20.4V to 28.8V | L+ minus 4 V DC min. | L+ minus 4 V DC min. | L+ minus 4 V DC min. | L+ minus 4 V DC min. |
| **Power loss** | | | | | | |
| Power loss, typ. | 9 W | 9 W | 12 W | 12 W | 12 W | 12 W |
| **Memory** | | | | | | |
| **Work memory** | | | | | | |
| • integrated | 100 kbyte | 100 kbyte | 125 kbyte | 125 kbyte | 150 kbyte | 150 kbyte |
| **Load memory** | | | | | | |
| • integrated | 2 Mbyte | 2 Mbyte | 4 Mbyte | 4 Mbyte | 4 Mbyte | 4 Mbyte |
| • Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card | with SIMATIC memory card |
| **Backup** | | | | | | |
| • without battery | Yes | Yes | Yes | Yes | Yes | Yes |
| **CPU processing times** | | | | | | |
| for bit operations, typ. | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction | 0.085 µs; / instruction |
| for word operations, typ. | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.5 µs; / instruction | 2.5 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction | 2.3 µs; / instruction |
| **Data areas and their retentivity** | | | | | | |
| **Flag** | | | | | | |
| • Number, max. | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area | 8 kbyte; Size of bit memory address area |
| **Address area** | | | | | | |
| **I/O address area** | | | | | | |
| • Inputs | 1 024 byte | 1 024 byte | 1 024 byte | | | |
| • Outputs | 1 024 byte | 1 024 byte | 1 024 byte | | | |
| **Process image** | | | | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte | 1 kbyte |
| **Time of day** | | | | | | |
| **Clock** | | | | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes | | Yes | Yes |
| **Digital inputs** | | | | | | |
| Number of digital inputs | 8; Integrated | 8; Integrated | 14 | | 14; Integrated | 14; Integrated |
| • of which inputs usable for technological functions | 4; HSC (High Speed Counting) | 4; HSC (High Speed Counting) | 6; HSC (High Speed Counting) | | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) |
| **Digital outputs** | | | | | | |
| Number of digital outputs | 6 | 6 | 10 | | 10; Relays | 10; Relays |
| • of which high-speed outputs | 4; 100 kHz Pulse Train Output | | 4; 100 kHz Pulse Train Output | | | |
| **Analog inputs** | | | | | | |
| Number of analog inputs | 2 | 2 | 2 | 2 | 2 | 2 |
| **Input ranges** | | | | | | |
| • Voltage | Yes | Yes | Yes | Yes | Yes | Yes |
| **Analog outputs** | | | | | | |
| Number of analog outputs | | 0 | 0 | 0 | 2 | 2 |
| **Output ranges, current** | | | | | | |
| • 0 to 20 mA | | | | Yes | Yes | Yes |

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## Technical specifications (continued)

| Article number | 6ES7212-1AF40-0XB0 | 6ES7212-1HF40-0XB0 | 6ES7214-1AF40-0XB0 | 6ES7214-1HF40-0XB0 | 6ES7215-1AF40-0XB0 | 6ES7215-1HF40-0XB0 |
|---|---|---|---|---|---|---|
| | CPU 1212FC , DC/DC/DC, 8DI/6DO/2AI | CPU 1212FC, DC/DC/RELAY, 8DI/6DO/2AI | CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI | CPU 1214 FC, DC/DC/RELAY, 14DI/10DO/2AI | CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215 FC, DC/DC/RLY,14DI/10DO/2AI/2AO |
| **1. Interface** | | | | | | |
| Interface type | PROFINET | PROFINET | PROFINET | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet | Ethernet | Ethernet | Ethernet |
| **Functionality** | | | | | | |
| • PROFINET IO Controller | Yes | Yes | Yes | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes | Yes | Yes | Yes |
| • Media redundancy | | | Yes; as MRP client | Yes; as MRP client | Yes; as MRP client | Yes; as MRP client |
| **Communication functions** | | | | | | |
| **S7 communication** | | | | | | |
| • supported | Yes | Yes | Yes | Yes | Yes | Yes |
| **Open IE communication** | | | | | | |
| • TCP/IP | Yes | Yes | Yes | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes | Yes | Yes | Yes |
| • UDP | Yes | Yes | Yes | Yes | Yes | Yes |
| **Web server** | | | | | | |
| • supported | Yes | Yes | Yes | Yes | Yes | Yes |
| **Number of connections** | | | | | | |
| • overall | | | 16; dynamically | 16; dynamically | 16; dynamically | 16; dynamically |
| **Integrated Functions** | | | | | | |
| Number of counters | 4 | 4 | 6 | 6 | 6 | 6 |
| Counting frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of position-controlled positioning axes, max. | 8 | 8 | 8 | 8 | 8 | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 | Up to 4 with SB 1222 | Up to 4 with SB 1222 | Up to 4 with SB 1222 | Up to 4 with SB 1222 | Up to 4 with SB 1222 |
| PID controller | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of alarm inputs | 4 | | 4 | 4 | 4 | 4 |
| Number of pulse outputs | 4 | 4 | | | | |
| Limit frequency (pulse) | 100 kHz | | | | | |
| **Ambient conditions** | | | | | | |
| **Ambient temperature during operation** | | | | | | |
| • min. | -20 °C | -20 °C | -20 °C | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated inputs or outputs 7 or 5 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 14 or 10 at 55 °C horizontal or 45 °C vertical |
| **Pollutant concentrations** | | | | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |

# SIMATIC S7-1200 Basic Controllers
## Central processing units
## Fail-safe CPUs

■ **Technical specifications** (continued)

| Article number | 6ES7212-1AF40-0XB0 | 6ES7212-1HF40-0XB0 | 6ES7214-1AF40-0XB0 | 6ES7214-1HF40-0XB0 | 6ES7215-1AF40-0XB0 | 6ES7215-1HF40-0XB0 |
|---|---|---|---|---|---|---|
| | CPU 1212FC, DC/DC/DC, 8DI/6DO/2AI | CPU 1212FC, DC/DC/RELAY, 8DI/6DO/2AI | CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI | CPU 1214 FC, DC/DC/RELAY, 14DI/10DO/2AI | CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO | CPU 1215 FC, DC/DC/RLY,14DI/10DO/2AI/2AO |
| **Configuration** | | | | | | |
| **Programming** | | | | | | |
| **Programming language** | | | | | | |
| - LAD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - SCL | Yes | Yes | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | | | |
| Width | 90 mm | 90 mm | 110 mm | 110 mm | 130 mm | 130 mm |
| Height | 100 mm | 100 mm | 100 mm | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm | 75 mm | 75 mm | 75 mm |
| **Weights** | | | | | | |
| Weight, approx. | 370 g | 385 g | 435 g | 435 g | 585 g | 585 g |

■ **Ordering data**      Article No.            Article No.

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1212 FC** | | **CPU 1214 FC** | |
| **Fail-safe compact CPU, DC/DC/DC**; integrated program/data memory 100 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6ES7212-1AF40-0XB0 | **Fail-safe compact CPU, DC/DC/DC**; integrated program/data memory 125 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6ES7214-1AF40-0XB0 |
| **Fail-safe compact CPU, DC/DC/relay**; integrated program/data memory 125 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz | 6ES7212-1HF40-0XB0 | **Fail-safe compact CPU, DC/DC/relay**; integrated program/data memory 125 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz | 6ES7214-1HF40-0XB0 |

## ▮ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1215 FC** | | **Terminal block (spare part)** (cont.) | |
| **Fail-safe compact CPU, DC/DC/DC**; integrated program/data memory 150 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; 2 analog outputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6ES7215-1AF40-0XB0 | For CPU 1214FC, DC/DC/relay | |
| | | • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 |
| | | • For DO, with 12 screws, tin-coated, coded; 4 units | 6ES7292-1AM40-0XA0 |
| | | • For AI, with 3 screws, gold-plated; 4 units | 6ES7292-1BC30-0XA0 |
| | | For CPU 1215FC, DC/DC/DC | |
| | | • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 |
| | | • For DO, with 12 screws, tin-coated; 4 units | 6ES7292-1AM30-0XA0 |
| | | • For AI, with 6 screws, gold-plated; 4 units | 6ES7292-1BF30-0XA0 |
| | | For CPU 1215FC, DC/DC/relay | |
| | | • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 |
| | | • For DO, with 12 screws, tin-coated, coded; 4 units | 6ES7292-1AM40-0XA0 |
| **Fail-safe compact CPU, DC/DC/relay**; integrated program/data memory 150 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; 2 analog outputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz | 6ES7215-1HF40-0XB0 | • For AI, with 6 screws, gold-plated; 4 units | 6ES7292-1BF30-0XA0 |
| | | **Front flap set (spare part)** | |
| | | For CPU 1214 FC | 6ES7291-1AB30-0XA0 |
| | | For CPU 1215 FC | 6ES7291-1AC30-0XA0 |
| | | **RJ45 cable grip** | |
| | | 4 items per pack | |
| | | Single port | 6ES7290-3AA30-0XA0 |
| | | Dual port | 6ES7290-3AB30-0XA0 |
| **Accessories** | | **STEP 7 Safety Advanced V14 SP1** | |
| **SIMATIC S7-1200 Fail-Safe Starter Kit** | 6ES7212-1HF41-4YB0 | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Consisting of: CPU 1212FC DC/DC relay, F digital input SM 1226 16 x 24 V DC, F digital output SM 1226 4 x 24 V DC, input simulator, STEP 7 Basic and STEP 7 Safety Basic on CD, manual on CD, info material; in Systainer | | | |
| **Simulator (optional)** | 6ES7274-1XH30-0XA0 | Floating license for 1 user, software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| 14 incoming circuit breakers | | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| **SIMATIC Memory Card (optional)** | | **STEP 7 Safety Basic V14 SP1** | |
| 4 MB | 6ES7954-8LC02-0AA0 | Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC Requirement: STEP 7 Basic V14 SP1 and higher | |
| 12 MB | 6ES7954-8LE02-0AA0 | | |
| 24 MB | 6ES7954-8LF02-0AA0 | | |
| 256 MB | 6ES7954-8LL02-0AA0 | | |
| 2 GB | 6ES7954-8LP02-0AA0 | | |
| 32 GB | 6ES7954-8LT03-0AA0 | | |
| **Extension cable for two-tier configuration** | 6ES7290-6AA30-0XA0 | Floating license for 1 user; software and documentation on DVD, license key on USB flash drive | 6ES7833-1FB14-0YA5 |
| For connecting digital/analog signal modules; length 2 m | | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FB14-0YH5 |
| **Terminal block (spare part)** | | | |
| For CPU 1214FC, DC/DC/DC | | | |
| • For DI, with 20 screws, tin-coated; 4 units | 6ES7292-1AV30-0XA0 | | |
| • For DO, with 12 screws, tin-coated; 4 units | 6ES7292-1AM30-0XA0 | | |
| • For AI, with 3 screws, gold-plated; 4 units | 6ES7292-1BC30-0XA0 | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

**3**

# SIMATIC S7-1200 Basic Controllers
Central processing units

## SIPLUS fail-safe CPUs

### ■ Overview



The fail-safe SIPLUS S7-1200 Controllers are based on the S7-1200 standard CPUs and offer additional safety-related functions.

They can be used for safety-oriented tasks according to IEC 61508 up to SIL 3 and ISO 13849-1 up to PL e.

Safety-related programs are created in the TIA Portal. The STEP 7 Safety engineering tool offers commands, operations and blocks for safety-related programs in the LAD and FBD languages. To this end, there is a library with pre-configured, TÜV-approved blocks for safety-related functions.

- Standard controller with integrated safety functions:
  - Standardized and convenient diagnostic functions for standard and safety
  - Uniform symbols, data consistency, ...
- Modular system with scalable range of CPUs and expandable I/O quantity structure:
  - One engineering for standard and fail-safe automation
  - Use of the standard I/O modules together with the fail-safe I/O modules in the central system
  - Integrated standard PROFINET functionalities for PROFINET controllers and PROFINET iDevice services
  - Connection of distributed standard I/O via field bus such as PROFINET or PROFIBUS
  - F-library certified by the German Technical Inspectorate (TÜV) for all common safety functions
  - Free programming of the safety logic using FBD and LAD
  - Standard-compliant printout of the F-program
- One integrated engineering for both standard and safety from S7-1200 to S7-300/400/1500 and WinAC RTX F:
  - STEP 7 Safety Basic for easy engineering of the CPU 1200 FC
  - STEP 7 Safety Advanced for the entire fail-safe SIMATIC S7 portfolio
- Integrated system diagnosis of the CPUs, for standard and safety:
  - Consistent plain text display of system diagnostic information in the TIA Portal, HMI and web server
  - Messages are updated even if the CPU is in STOP state
  - System diagnostics integrated in the CPU firmware. Configuration by user not required
  - The diagnostics is automatically updated on configuration changes.
- 2 fail-safe compact controllers with graded performances in the versions DC/DC/DC and DC/DC/relay

| Characteristics | SIPLUS CPU 1214 FC |
|---|---|
| Variants | DC/DC/DC, DC/DC/relay |
| Main memory, integrated | 125 KB |
| Load memory, integrated | 4 MB |
| Memory card | SIMATIC memory card (optional) |
| Standard digital inputs/outputs, integrated | 14/10 |
| Standard analog inputs, integrated | 2 |
| Standard analog outputs, integrated | - |
| Process image | 1024 bytes for inputs, 1024 bytes for outputs |
| Expansion by signal board | Max. 1 |
| Expansion by signal modules | Max. 8 |
| Expansion by communication modules | Max. 3 |

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1214-1AF40-5XB0 | 6AG1214-1HF40-5XB0 |
|---|---|---|
| Based on | 6ES7214-1AF40-0XB0 | 6ES7214-1HF40-0XB0 |
| | SIPLUS S7-1200 CPU 1214FC DC/DC/DC | SIPLUS S7-1200 CPU 1214FC DC/DC/RLY |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 55 °C; = Tmax | 55 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Pollutant concentrations** | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1214 FC**<br><br>(Extended temperature range and environmental stress)<br><br>**Fail-safe compact CPU, DC/DC/DC**;<br>integrated program/data memory 125 KB, load memory 4 MB;<br>power supply 24 V DC;<br>Boolean execution times 0.085 µs per operation;<br>14 digital inputs,<br>10 digital outputs,<br>2 analog inputs;<br>expandable by up to<br>3 communication modules,<br>8 signal modules, and 1 signal board/communication board;<br>digital inputs can be used as HSC at 100 kHz,<br>24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6AG1214-1AF40-5XB0 | **Fail-safe compact CPU, DC/DC/relay**;<br>integrated program/data memory 125 KB, load memory 4 MB;<br>power supply 24 V DC;<br>Boolean execution times 0.085 µs per operation;<br>14 digital inputs,<br>10 digital outputs (relays),<br>2 analog inputs;<br>expandable by up to<br>3 communication modules,<br>8 signal modules, and 1 signal board/communication board;<br>digital inputs can be used as HSC at 100 kHz | 6AG1214-1HF40-5XB0 |
| | | **Accessories** | See SIMATIC CPU 1214 FC, page 3/45 |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SM 1221 digital input modules

### ▮ Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional inputs

### ▮ Technical specifications

| Article number | 6ES7221-1BF32-0XB0 | 6ES7221-1BH32-0XB0 |
|---|---|---|
| | DIGITAL INPUT SM 1221, 8DI, 24V DC | DIGITAL INPUT SM 1221, 16DI, 24V DC |
| **General information** | | |
| Product type designation | SM 1221 DI 8x24 VDC | SM 1221 DI 16x24 VDC |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Input current** | | |
| from backplane bus 5 V DC, max. | 105 mA | 130 mA |
| **Digital inputs** | | |
| • from load voltage L+ (without load), max. | 4 mA; per channel | 4 mA; per channel |
| **Output voltage** | | |
| **Power supply to the transmitters** | | |
| • present | Yes | Yes |
| **Power loss** | | |
| Power loss, typ. | 1.5 W | 2.5 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 16 |
| • in groups of | 2 | 4 |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | Yes |
| **Number of simultaneously controllable inputs** | | |
| **all mounting positions** | | |
| - up to 40 °C, max. | 8 | 16 |
| **horizontal installation** | | |
| - up to 40 °C, max. | 8 | 16 |
| - up to 50 °C, max. | 8 | 16 |
| **vertical installation** | | |
| - up to 40 °C, max. | 8 | 16 |

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## Technical specifications (continued)

| Article number | **6ES7221-1BF32-0XB0** | **6ES7221-1BH32-0XB0** |
|---|---|---|
| | DIGITAL INPUT SM 1221, 8DI, 24V DC | DIGITAL INPUT SM 1221, 16DI, 24V DC |
| **Input voltage** | | |
| • Type of input voltage | DC | DC |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | 5 V DC at 1 mA | 5 V DC at 1 mA |
| • for signal "1" | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 1 mA | 1 mA |
| • for signal "1", min. | 2.5 mA | 2.5 mA |
| • for signal "1", typ. | 4 mA | 4 mA |
| **Input delay (for rated value of input voltage)** | | |
| **for standard inputs** | | |
|   - parameterizable | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four |
| **for interrupt inputs** | | |
|   - parameterizable | Yes | Yes |
| **Cable length** | | |
| • shielded, max. | 500 m | 500 m |
| • unshielded, max. | 300 m | 300 m |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostics indication LED** | | |
| • for status of the inputs | Yes | Yes |
| **Potential separation** | | |
| **Potential separation digital inputs** | | |
| • between the channels, in groups of | 2 | 4 |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| CSA approval | Yes | Yes |
| cULus | Yes | Yes |
| FM approval | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes |
| **Marine approval** | | |
| • Marine approval | | Yes |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Connection method** | | |
| required front connector | Yes | Yes |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 45 mm | 45 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 170 g | 210 g |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SM 1221 digital input modules

### Ordering data

| | Article No. |
|---|---|
| **SM 1221 digital input signal module** | |
| 8 inputs, 24 V DC, isolated, current sourcing/sinking | **6ES7221-1BF32-0XB0** |
| 16 inputs, 24 V DC, isolated, current sourcing/sinking | **6ES7221-1BH32-0XB0** |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | |

| | Article No. |
|---|---|
| **Terminal block (spare part)** | |
| For 6ES7221-1BF32-0XB0, 6ES7221-1BH32-0XB0 | |
| With 7 screws, zinc-plated; 4 pcs. | **6ES7292-1AG30-0XA0** |
| **Front flap set (spare part)** | |
| For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |

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## Overview



- Digital inputs as a supplement to the integral I/O of SIMATIC S7-1200 CPUs
- Can be plugged directly into the CPU

## Technical specifications

| Article number | 6ES7221-3AD30-0XB0 | 6ES7221-3BD30-0XB0 |
|---|---|---|
| | SIGNAL BOARD SB 1221, 4 DI 5VDC 200KHZ | SIGNAL BOARD SB 1221, 4 DI 24VDC 200KHZ |
| **General information** | | |
| Product type designation | SB 1221 4xDI 5VDC 200kHz | SB 1221 4xDI 24VDC 200kHz |
| **Input current** | | |
| from backplane bus 5 V DC, typ. | 40 mA | 40 mA |
| **Power loss** | | |
| Power loss, typ. | 1 W | 1 W |
| **Digital inputs** | | |
| Number of digital inputs | 4; Current-sourcing | 4; Current-sourcing |
| • in groups of | 4 | 4 |
| **Input voltage** | | |
| • Type of input voltage | DC | DC |
| • Rated value (DC) | 5 V | 24 V |
| • for signal "0" | (L+ minus 1.0 V DC) ... L+ (2.2 ... 0 mA) | (L+ minus 5.0 V DC) ... L+ (1.4 ... 0 mA) |
| • for signal "1" | 0 V ... (L+ minus 2.0 V DC (20 ... 5.1 mA)) | 0 V ... (L+ minus 10 V DC (10 ... 2.9 mA)) |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 2.2 mA | 1.4 mA |
| • for signal "1", min. | 5.1 mA | 2.9 mA |
| • for signal "1", typ. | | 7 mA |
| **Input delay**<br>**(for rated value of input voltage)** | | |
| **for standard inputs** | | |
| - parameterizable | Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 µs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms | Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 µs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms |
| **for interrupt inputs** | | |
| - parameterizable | Yes | Yes |
| **for counter/technological functions** | | |
| - parameterizable | Yes | Yes |
| **Cable length** | | |
| • shielded, max. | 50 m; shielded, twisted pair | 50 m; shielded, twisted pair |
| **Diagnostics indication LED** | | |
| • for status of the inputs | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SB 1221 digital input modules

### ■ Technical specifications (continued)

| Article number | 6ES7221-3AD30-0XB0 | 6ES7221-3BD30-0XB0 |
|---|---|---|
| | SIGNAL BOARD SB 1221, 4 DI 5VDC 200KHZ | SIGNAL BOARD SB 1221, 4 DI 24VDC 200KHZ |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting with 2 simultaneously activated, non-adjacent inputs; otherwise up to 55 °C with horizontal mounting or 45 °C with vertical mounting |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 38 mm | 38 mm |
| Height | 62 mm | 62 mm |
| Depth | 21 mm | 21 mm |
| **Weights** | | |
| Weight, approx. | 35 g | 35 g |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SB 1221 signal board digital input modules** | | **Terminal block (spare part)** | |
| | | For signal board | |
| 4 inputs, 5 V DC, 200 kHz, sourcing | **6ES7221-3AD30-0XB0** | With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |
| 4 inputs, 24 V DC, 200 kHz, sourcing | **6ES7221-3BD30-0XB0** | | |

## Overview



- Digital outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional outputs

## Technical specifications

| Article number | 6ES7222-1BF32-0XB0 | 6ES7222-1BH32-0XB0 | 6ES7222-1HF32-0XB0 | 6ES7222-1HH32-0XB0 | 6ES7222-1XF32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL OUTPUT SM1222, 8 DO, 24V DC | DIGITAL OUTPUT SM1222, 16 DO, 24V DC | DIGITAL OUTPUT SM 1222, 8 DO, RELAY | DIGITAL OUTPUT SM1222, 16 DO, RELAY | DIGITAL OUTPUT SM 1222, 8 DO, CHANGEOVER |
| **General information** | | | | | |
| Product type designation | SM 1222 DQ 8x24VDC | SM 1222 DQ 16x24VDC | SM 1222 DQ 8xRelay | SM 1222 DQ 16xRelay | SM 1222 DQ 8x relay changeover contact |
| **Input current** | | | | | |
| from backplane bus 5 V DC, max. | 120 mA | 140 mA | 120 mA | 135 mA | 140 mA |
| **Digital outputs** | | | | | |
| • from load voltage L+, max. | | | 11 mA/relay coil | 11 mA/relay coil | 16.7 mA/relay coil |
| **Power loss** | | | | | |
| Power loss, typ. | 1.5 W | 2.5 W | 4.5 W | 8.5 W | 5 W |
| **Digital outputs** | | | | | |
| Number of digital outputs | 8 | 16 | 8 | 16 | 8 |
| • in groups of | 1 | 1 | 2 | 1 | 1 |
| Short-circuit protection | No; to be provided externally | No; to be provided externally | No; to be provided externally | No; to be provided externally | No; to be provided externally |
| Limitation of inductive shutdown voltage to | typ. (L+) -48 V | typ. (L+) -48 V | | | |
| **Switching capacity of the outputs** | | | | | |
| • with resistive load, max. | 0.5 A | 0.5 A | 2 A | 2 A | 2 A |
| • on lamp load, max. | 5 W | 5 W | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC |
| **Output voltage** | | | | | |
| • Rated value (DC) | 24 V | 24 V | 5 V DC to 30 V DC | 5 V DC to 30 V DC | 5 V DC to 30 V DC |
| • Rated value (AC) | | | 5 V AC to 250 V AC | 5 V AC to 250 V AC | 5 V AC to 250 V AC |
| • for signal "0", max. | 0.1 V; with 10 kOhm load | 0.1 V; with 10 kOhm load | | | |
| • for signal "1", min. | 20 V DC | 20 V DC | | | |
| **Output current** | | | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | | | |
| • for signal "1" permissible range, max. | | | 2 A | 2 A | 2 A |
| • for signal "0" residual current, max. | 10 µA | 10 µA | | | |
| **Output delay with resistive load** | | | | | |
| • "0" to "1", max. | 50 µs | 50 µs | 10 ms | 10 ms | 10 ms |
| • "1" to "0", max. | 200 µs | 200 µs | 10 ms | 10 ms | 10 ms |
| **Total current of the outputs (per group)** | | | | | |
| **horizontal installation** | | | | | |
| - up to 50 °C, max. | 4 A; Current per mass | 8 A; Current per mass | 10 A; Current per mass | 10 A; Current per mass | 2 A; Current per mass |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

**SM 1222 digital output modules**

## Technical specifications (continued)

| Article number | 6ES7222-1BF32-0XB0 | 6ES7222-1BH32-0XB0 | 6ES7222-1HF32-0XB0 | 6ES7222-1HH32-0XB0 | 6ES7222-1XF32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL OUTPUT SM1222, 8 DO, 24V DC | DIGITAL OUTPUT SM1222, 16 DO, 24V DC | DIGITAL OUTPUT SM 1222, 8 DO, RELAY | DIGITAL OUTPUT SM1222, 16 DO, RELAY | DIGITAL OUTPUT SM 1222, 8 DO, CHANGEOVER |
| **Relay outputs** | | | | | |
| • Number of relay outputs | | | 8 | 16 | 8 |
| • Rated supply voltage of relay coil L+ (DC) | | | 24 V | 24 V | 24 V |
| • Number of operating cycles, max. | | | mechanically 10 million, at rated load voltage 100 000 | mechanically 10 million, at rated load voltage 100 000 | mechanically 10 million, at rated load voltage 100 000 |
| **Switching capacity of contacts** | | | | | |
| - with inductive load, max. | 0.5 A | 0.5 A | 2 A | 2 A | 2 A |
| - on lamp load, max. | 5 W | 5 W | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC |
| - with resistive load, max. | 0.5 A | 0.5 A | 2 A | 2 A | 2 A |
| **Cable length** | | | | | |
| • shielded, max. | 500 m | 500 m | 500 m | 500 m | 500 m |
| • unshielded, max. | 150 m | 150 m | 150 m | 150 m | 150 m |
| **Interrupts/diagnostics/ status information** | | | | | |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • for status of the outputs | Yes | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | | |
| **Potential separation digital outputs** | | | | | |
| • between the channels | | | Relays | Relays | Relays |
| • between the channels, in groups of | 1 | 1 | 2 | 4 | 1 |
| • between the channels and backplane bus | 500 V AC | 500 V AC | 1500 V AC for 1 minute | 1500 V AC for 1 minute | 1500 V AC for 1 minute |
| **Permissible potential difference** | | | | | |
| between different circuits | | | 750 V AC for 1 minute | 750 V AC for 1 minute | 750 V AC for 1 minute |
| **Degree and class of protection** | | | | | |
| Degree of protection acc. to EN 60529 | | | | | |
| • IP20 | Yes | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | | |
| CE mark | Yes | Yes | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes | Yes | Yes | Yes |
| **Marine approval** | | | | | |
| • Marine approval | Yes | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | | |
| **Free fall** | | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C | 60 °C | 60 °C; Number of simultaneously activated outputs: 8 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 16 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated outputs: 4 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 at 55 °C horizontal or 45 °C vertical |

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## Technical specifications (continued)

| Article number | 6ES7222-1BF32-0XB0 | 6ES7222-1BH32-0XB0 | 6ES7222-1HF32-0XB0 | 6ES7222-1HH32-0XB0 | 6ES7222-1XF32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL OUTPUT SM1222, 8 DO, 24V DC | DIGITAL OUTPUT SM1222, 16 DO, 24V DC | DIGITAL OUTPUT SM 1222, 8 DO, RELAY | DIGITAL OUTPUT SM1222, 16 DO, RELAY | DIGITAL OUTPUT SM 1222, 8 DO, CHANGEOVER |
| **Connection method** | | | | | |
| required front connector | Yes | Yes | Yes | Yes | Yes |
| **Mechanics/material** | | | | | |
| Enclosure material (front) | | | | | |
| • Plastic | Yes | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | | |
| Width | 45 mm | 45 mm | 45 mm | 45 mm | 70 mm |
| Height | 100 mm | 100 mm | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm | 75 mm | 75 mm |
| **Weights** | | | | | |
| Weight, approx. | 180 g | 220 g | 190 g | 260 g | 310 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 1222 digital output signal module** | | **Terminal block (spare part)** | |
| 8 outputs, 24 V DC; 0.5 A, 5 W, isolated | **6ES7222-1BF32-0XB0** | For 6ES7222-1BF32-0XB0, 6ES7222-1BH32-0XB0 • With 7 screws, zinc-plated; 4 pcs. | **6ES7292-1AG30-0XA0** |
| 16 outputs, 24 V DC; 0.5 A, 5 W, isolated | **6ES7222-1BH32-0XB0** | For 6ES7222-1HF32-0XB0 • With 7 screws, tin-coated, left coded; 4 units | **6ES7292-1AG40-0XA1** |
| 8 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC | **6ES7222-1HF32-0XB0** | For 6ES7222-1HH32-0XB0 • With 7 screws, tin-coated, right coded; 4 units | **6ES7292-1AG40-0XA0** |
| 8 relay outputs, change-over contact, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC | **6ES7222-1XF32-0XB0** | For 6ES7222-1XF32-0XB0 • With 11 screws, tin-coated; 4 units | **6ES7292-1AL30-0XA0** |
| 16 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC | **6ES7222-1HH32-0XB0** | **Front flap set (spare part)** | |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** | For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |
| | | For modules with a width of 70 mm | **6ES7291-1BB30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SB 1222 digital output modules

### ■ Overview



- Digital outputs as a supplement to the integral I/O of SIMATIC S7-1200 CPUs
- Can be plugged directly into the CPU

### ■ Technical specifications

| Article number | 6ES7222-1AD30-0XB0 | 6ES7222-1BD30-0XB0 |
|---|---|---|
| | SIGNAL BOARD SB1222, 4 DQ 5VDC 200KHZ | SIGNAL BOARD SB1222, 4 DQ 24VDC 200KHZ |
| **General information** | | |
| Product type designation | SB 1222 4xDQ 5VDC 200kHz | SB 1222 4xDQ 24VDC 200kHz |
| **Input current** | | |
| from backplane bus 5 V DC, typ. | 35 mA | 35 mA |
| **Power loss** | | |
| Power loss, typ. | 0.5 W | 0.5 W |
| **Digital outputs** | | |
| Number of digital outputs | 4; MOSFET, solid-state (current-sinking/current-sourcing) | 4; MOSFET, solid-state (current-sinking/current-sourcing) |
| • in groups of | 4 | 4 |
| Short-circuit protection | No | No |
| **Switching capacity of the outputs** | | |
| • with resistive load, max. | 0.1 A | 0.1 A |
| **Load resistance range** | | |
| • upper limit | 7 Ω | 11 Ω |
| **Output voltage** | | |
| • Rated value (DC) | 5 V | 24 V |
| • for signal "0", max. | 0.2 V | 1 V; with 10 kOhm load |
| • for signal "1", min. | L+ minus 0.7 V DC | L+ (-1.5 V) |
| • for signal "1", max. | 6 V | |
| **Output current** | | |
| • for signal "1" rated value | 0.1 A | 0.1 A |
| • for signal "1" permissible range, max. | 0.1 A | |
| **Cable length** | | |
| • shielded, max. | 50 m | 50 m |
| **Diagnostics indication LED** | | |
| • for status of the outputs | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |

■ **Technical specifications**  (continued)

| Article number | 6ES7222-1AD30-0XB0 | 6ES7222-1BD30-0XB0 |
|---|---|---|
|  | SIGNAL BOARD SB1222, 4 DQ 5VDC 200KHZ | SIGNAL BOARD SB1222, 4 DQ 24VDC 200KHZ |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting with 2 simultaneously activated, non-adjacent inputs; otherwise up to 55 °C with horizontal mounting or 45 °C with vertical mounting | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 38 mm | 38 mm |
| Height | 62 mm | 62 mm |
| Depth | 21 mm | 21 mm |
| **Weights** | | |
| Weight, approx. | 35 g | 35 g |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SB 1222 signal board digital output modules** | | **Terminal block (spare part)** | |
| | | For signal board | |
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6ES7222-1AD30-0XB0** | With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6ES7222-1BD30-0XB0** | | |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Digital modules

### SM 1223 digital input/output modules

## ◾ Overview

- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional inputs and outputs

## ◾ Technical specifications

| Article number | 6ES7223-1BH32-0XB0 | 6ES7223-1BL32-0XB0 | 6ES7223-1PH32-0XB0 | 6ES7223-1PL32-0XB0 | 6ES7223-1QH32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL I/O SM 1223, 8 DI / 8 DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI/8DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI AC/ 8DO RLY |
| **General information** | | | | | |
| Product type designation | SM 1223 DI 8x24 VDC, DQ 8x24 VDC | SM 1223 DI 16x24 VDC, DQ 16x24 VDC | SM 1223 DI 8x24 VDC, DQ 8xRelay | SM 1223 DI 16x24 VDC, DQ 16xRelay | 120/230 V AC SM223 DIx8/DQx8 RLY |
| **Supply voltage** | | | | | |
| Rated value (DC) | | | | | |
| • 24 V DC | Yes | Yes | Yes | Yes | Yes |
| **Input current** | | | | | |
| from backplane bus 5 V DC, max. | 145 mA | 185 mA | 145 mA | 180 mA | 120 mA |
| **Digital inputs** | | | | | |
| • from load voltage L+ (without load), max. | 4 mA; per channel | 4 mA; per channel | 4 mA/input 11 mA/ relay | 4 mA/input 11 mA/ relay | |
| **Output voltage** | | | | | |
| **Power supply to the transmitters** | | | | | |
| • present | Yes | Yes | Yes | Yes | Yes |
| **Power loss** | | | | | |
| Power loss, typ. | 2.5 W | 4.5 W | 5.5 W | 10 W | 7.5 W |
| **Digital inputs** | | | | | |
| Number of digital inputs | 8 | 16 | 8 | 16 | 8 |
| • in groups of | 2 | 2 | 2 | 2 | 4 |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | Yes | Yes | Yes | Yes |
| **Number of simultaneously controllable inputs** | | | | | |
| **all mounting positions** | | | | | |
| - up to 40 °C, max. | 8 | 16 | 8 | 16 | 8 |
| **horizontal installation** | | | | | |
| - up to 40 °C, max. | 8 | 16 | 8 | 16 | 8 |
| - up to 50 °C, max. | 8 | 16 | 8 | 16 | 8 |
| **vertical installation** | | | | | |
| - up to 40 °C, max. | 8 | 16 | 8 | 16 | 8 |
| **Input voltage** | | | | | |
| • Type of input voltage | DC | DC | DC | DC | AC |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | |
| • Rated value (AC) | | | | | 120/230V AC |
| • for signal "0" | 5 V DC at 1 mA | 5 V DC at 1 mA | 5 V DC at 1 mA | 5 V DC at 1 mA | 20 V AC at 1 mA |
| • for signal "1" | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 79 V AC at 2.5 mA |
| **Input current** | | | | | |
| • for signal "0", max. (permissible quiescent current) | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA |
| • for signal "1", min. | 2.5 mA | 2.5 mA | 2.5 mA | 2.5 mA | 2.5 mA |
| • for signal "1", typ. | 4 mA | 4 mA | 4 mA | 4 mA | 9 mA |

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## ■ Technical specifications (continued)

| Article number | 6ES7223-1BH32-0XB0 | 6ES7223-1BL32-0XB0 | 6ES7223-1PH32-0XB0 | 6ES7223-1PL32-0XB0 | 6ES7223-1QH32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL I/O SM 1223, 8 DI / 8 DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI/8DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI AC/ 8DO RLY |
| **Input delay (for rated value of input voltage)** | | | | | |
| **for standard inputs** | | | | | |
| - parameterizable | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four |
| **for interrupt inputs** | | | | | |
| - parameterizable | Yes | Yes | Yes | Yes | Yes |
| **Cable length** | | | | | |
| • shielded, max. | 500 m | 500 m | 500 m | 500 m | 500 m |
| • unshielded, max. | 300 m | 300 m | 300 m | 300 m | 300 m |
| **Digital outputs** | | | | | |
| Number of digital outputs | 8 | 16 | 8 | 16 | 8 |
| • in groups of | 1 | 1 | 2 | 4 | 4 |
| Short-circuit protection | No; to be provided externally | No; to be provided externally | No; to be provided externally | No; to be provided externally | No; to be provided externally |
| Limitation of inductive shutdown voltage to | L+ (-48 V) | L+ (-48 V) | | | |
| **Switching capacity of the outputs** | | | | | |
| • with resistive load, max. | 0.5 A | 0.5 A | 2 A | 2 A | 2 A |
| • on lamp load, max. | 5 W | 5 W | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC |
| **Output voltage** | | | | | |
| • Rated value (DC) | 24 V | 24 V | 5 V DC to 30 V DC | 5 V DC to 30 V DC | 5 V DC to 30 V DC |
| • Rated value (AC) | | | 5 V AC to 250 V AC | 5 V AC to 250 V AC | 5 V AC to 250 V AC |
| • for signal "0", max. | 0.1 V; with 10 kOhm load | 0.1 V; with 10 kOhm load | | | |
| • for signal "1", min. | 20 V DC | 20 V DC | | | |
| **Output current** | | | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | | | |
| • for signal "1" permissible range, max. | 0.5 A | 0.5 A | 2 A | 2 A | 2 A |
| • for signal "0" residual current, max. | 10 µA | 10 µA | | | |
| **Output delay with resistive load** | | | | | |
| • "0" to "1", max. | 50 µs | 50 µs | 10 ms | 10 ms | 10 ms |
| • "1" to "0", max. | 200 µs | 200 µs | 10 ms | 10 ms | 10 ms |
| **Total current of the outputs (per group)** | | | | | |
| **horizontal installation** | | | | | |
| - up to 50 °C, max. | 4 A; Current per mass | 8 A; Current per mass | 10 A; Current per mass | 8 A; Current per mass | 8 A; Current per mass |
| **Relay outputs** | | | | | |
| • Number of relay outputs | | | 8 | 16 | 8 |
| • Rated supply voltage of relay coil L+ (DC) | | | 24 V | 24 V | 24 V |
| • Number of operating cycles, max. | | | mechanically 10 million, at rated load voltage 100 000 | mechanically 10 million, at rated load voltage 100 000 | mechanically 10 million, at rated load voltage 100 000 |
| **Switching capacity of contacts** | | | | | |
| - with inductive load, max. | | 0.5 A | 2 A | 2 A | 2 A |
| - on lamp load, max. | | 5 W | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC | 30 W with DC, 200 W with AC |
| - with resistive load, max. | | 0.5 A | 2 A | 2 A | 2 A |
| **Cable length** | | | | | |
| • shielded, max. | 500 m | 500 m | 500 m | 500 m | 500 m |
| • unshielded, max. | 150 m | 150 m | 150 m | 150 m | 150 m |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SM 1223 digital input/output modules

### Technical specifications (continued)

| Article number | 6ES7223-1BH32-0XB0 | 6ES7223-1BL32-0XB0 | 6ES7223-1PH32-0XB0 | 6ES7223-1PL32-0XB0 | 6ES7223-1QH32-0XB0 |
|---|---|---|---|---|---|
| | DIGITAL I/O SM 1223, 8 DI / 8 DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI/8DO | DIGITAL I/O SM 1223, 16DI/16DO | DIGITAL I/O SM 1223, 8DI AC/ 8DO RLY |
| **Interrupts/diagnostics/status information** | | | | | |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • for status of the inputs | Yes | Yes | Yes | Yes | Yes |
| • for status of the outputs | Yes | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | | |
| **Potential separation digital inputs** | | | | | |
| • between the channels, in groups of | 2 | 2 | 2 | 2 | 2 |
| **Potential separation digital outputs** | | | | | |
| • between the channels | | | Relays | Relays | Relays |
| • between the channels, in groups of | 1 | 1 | 2 | 4 | 2 |
| • between the channels and backplane bus | 500 V AC | 500 V AC | 1500 V AC for 1 minute | 1500 V AC for 1 minute | 1500 V AC for 1 minute |
| **Permissible potential difference** | | | | | |
| between different circuits | | | 750 V AC for 1 minute | 750 V AC for 1 minute | 750 V AC for 1 minute |
| **Degree and class of protection** | | | | | |
| Degree of protection acc. to EN 60529 | | | | | |
| • IP20 | Yes | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | | |
| CE mark | Yes | Yes | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes | Yes | Yes | Yes |
| **Marine approval** | | | | | |
| • Marine approval | Yes | | Yes | Yes | Yes |
| **Ambient conditions** | | | | | |
| **Free fall** | | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C | 60 °C | 60 °C; Number of simultaneously activated outputs: 8 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 16 at 55 °C horizontal or 45 °C vertical | 60 °C; Number of simultaneously activated outputs: 4 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 at 55 °C horizontal or 45 °C vertical |
| **Connection method** | | | | | |
| required front connector | Yes | Yes | Yes | Yes | Yes |
| **Mechanics/material** | | | | | |
| Enclosure material (front) | | | | | |
| • Plastic | Yes | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | | |
| Width | 45 mm | 70 mm | 45 mm | 70 mm | 45 mm |
| Height | 100 mm | 100 mm | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm | 75 mm | 75 mm |
| **Weights** | | | | | |
| Weight, approx. | 210 g | 310 g | 230 g | 350 g | 230 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 1223 digital input/output signal module** | | **Terminal block (spare part)** | |
| | | For 6ES7223-1BH32-0XB0 | |
| 8 inputs, 24 V DC, IEC type 1 current sinking; 8 24 V DC transistor outputs, 0.5 A, 5 W | **6ES7223-1BH32-0XB0** | • With 7 screws, tin-coated; 4 units | **6ES7292-1AG30-0XA0** |
| | | For 6ES7223-1BL32-0XB0 | |
| | | • With 11 screws, tin-coated; 4 units | **6ES7292-1AL30-0XA0** |
| 16 inputs, 24 V DC, IEC type 1 current sinking; 16 24 V DC transistor outputs, 0.5 A, 5 W | **6ES7223-1BL32-0XB0** | For 6ES7223-1PH32-0XB0 | |
| | | • With 7 screws, zinc-plated; 4 pcs. | **6ES7292-1AG30-0XA0** |
| | | • With 7 screws, tin-coated, right coded; 4 units | **6ES7292-1AG40-0XA0** |
| 8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC | **6ES7223-1PH32-0XB0** | For 6ES7223-1PL32-0XB0 | |
| | | • With 11 screws, tin-coated; 4 units | **6ES7292-1AL30-0XA0** |
| | | • With 11 screws, tin-coated, coded; 4 units | **6ES7292-1AL40-0XA0** |
| 16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC | **6ES7223-1PL32-0XB0** | For 6ES7223-1PL32-0XB0 | |
| | | • With 7 screws, tin-coated, right coded; 4 units | **6ES7292-1AG40-0XA0** |
| 8 inputs, 120/230 V AC; 8 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC | **6ES7223-1QH32-0XB0** | **Front flap set (spare part)** | |
| | | For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** | For modules with a width of 70 mm | **6ES7291-1BB30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | | | |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SB 1223 digital input/output modules

### ◼ Overview



- Digital inputs and outputs as supplement to the integral I/O of the SIMATIC S7-1200 CPUs
- Can be plugged direct into the CPU

### ◼ Technical specifications

| Article number | 6ES7223-0BD30-0XB0 | 6ES7223-3AD30-0XB0 | 6ES7223-3BD30-0XB0 |
|---|---|---|---|
| | SIGNAL BOARD SB1223, 2 DI/2 DO | SIGNAL BOARD SB 1223, 2DI/2DQ 5V 200KHZ | SIGNAL BOARD SB 1223, 2DI/2DQ 24V 200KHZ |
| **General information** | | | |
| Product type designation | SB 1223 DI2x24 VDC, DQ 2x24 VDC | SB 1223 2xDI / 2xDQ 5VDC 200kHz | SB 1223 2xDI / 2xDQ 24VDC 200kHz |
| **Input current** | | | |
| from backplane bus 5 V DC, typ. | 50 mA | 35 mA | 35 mA |
| **Output voltage** | | | |
| **Power supply to the transmitters** | | | |
| • Supply current, max. | 4 mA; per channel | | |
| **Power loss** | | | |
| Power loss, typ. | 1 W | 0.5 W | 0.5 W |
| **Digital inputs** | | | |
| Number of digital inputs | 2; Current-sinking | 2; Current-sourcing | 2; Current-sourcing |
| • in groups of | 1 | 2 | 2 |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | | |
| **Number of simultaneously controllable inputs** | | | |
| **all mounting positions** | | | |
| - up to 40 °C, max. | 2 | | 2 |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | DC |
| • Rated value (DC) | 24 V | 5 V | 24 V |
| • for signal "0" | 0 to 5 V | (L+ minus 1.0 V DC) ... L+ | (L+ minus 5.0 V DC) ... L+ |
| • for signal "1" | +15 to +30V | 0 V ... (L+ minus 2.0 V DC) | 0 V ... (L+ minus 10 V DC) |
| **Input current** | | | |
| • for signal "0", max. (permissible quiescent current) | 1 mA | 2.2 mA | 1.4 mA |
| • for signal "1", min. | | 5.1 mA | 2.9 mA |
| • for signal "1", typ. | 0.5 A | | 7 mA |

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## Technical specifications (continued)

| Article number | 6ES7223-0BD30-0XB0 | 6ES7223-3AD30-0XB0 | 6ES7223-3BD30-0XB0 |
|---|---|---|---|
| | SIGNAL BOARD SB1223, 2 DI/2 DO | SIGNAL BOARD SB 1223, 2DI/2DQ 5V 200KHZ | SIGNAL BOARD SB 1223, 2DI/2DQ 24V 200KHZ |
| **Input delay (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - parameterizable | Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four | Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 μs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms | Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 μs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms |
| - at "0" to "1", max. | 2 μs | | |
| - at "1" to "0", max. | 10 μs | | |
| **for interrupt inputs** | | | |
| - parameterizable | Yes | Yes | Yes |
| **for counter/technological functions** | | | |
| - parameterizable | Yes | Yes | Yes |
| **Cable length** | | | |
| • shielded, max. | 500 m | 50 m; shielded, twisted pair | 50 m; shielded, twisted pair |
| • unshielded, max. | 300 m | | |
| **Digital outputs** | | | |
| Number of digital outputs | 2; MOSFET, solid-state (current-sinking/current-sourcing) | 2; MOSFET, solid-state (current-sinking/current-sourcing) | 2; MOSFET, solid-state (current-sinking/current-sourcing) |
| • in groups of | 1 | 2 | 2 |
| Short-circuit protection | No | No | No |
| **Switching capacity of the outputs** | | | |
| • with resistive load, max. | 0.5 A | 0.1 A | 0.1 A |
| • on lamp load, max. | 5 W | | |
| **Load resistance range** | | | |
| • upper limit | 0.6 Ω | 7 Ω | |
| **Output voltage** | | | |
| • Rated value (DC) | 24 V | 5 V | 24 V |
| • for signal "0", max. | 0.1 V; with 10 kOhm load | 0.2 V | 1 V |
| • for signal "1", min. | 20 V | L+ minus 0.7 V DC | L+ (-1.5 V) |
| • for signal "1", max. | | 6 V | |
| **Output current** | | | |
| • for signal "1" rated value | 0.5 A | 0.1 A | 0.1 A |
| • for signal "1" permissible range, max. | | 0.1 A | |
| • for signal "0" residual current, max. | 10 μA | | |
| **Cable length** | | | |
| • shielded, max. | 500 m | 50 m | 50 m |
| • unshielded, max. | 150 m | | |
| **Interrupts/diagnostics/ status information** | | | |
| Alarms | Yes | | |
| Diagnostic functions | Yes | | |
| **Diagnostics indication LED** | | | |
| • for status of the inputs | Yes | Yes | Yes |
| • for status of the outputs | Yes | Yes | Yes |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP20 | Yes | Yes | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Digital modules

## SB 1223 digital input/output modules

### ■ Technical specifications (continued)

| Article number | 6ES7223-0BD30-0XB0 | 6ES7223-3AD30-0XB0 | 6ES7223-3BD30-0XB0 |
|---|---|---|---|
| | SIGNAL BOARD SB1223, 2 DI/2 DO | SIGNAL BOARD SB 1223, 2DI/2DQ 5V 200KHZ | SIGNAL BOARD SB 1223, 2DI/2DQ 24V 200KHZ |
| **Ambient conditions** | | | |
| **Free fall** | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting |
| • min. | 0 °C | -20 °C | -20 °C |
| • max. | 55 °C | 60 °C | 60 °C |
| **Mechanics/material** | | | |
| Enclosure material (front) | | | |
| • Plastic | Yes | Yes | Yes |
| **Dimensions** | | | |
| Width | 38 mm | 38 mm | 38 mm |
| Height | 62 mm | 62 mm | 62 mm |
| Depth | 21 mm | 21 mm | 21 mm |
| **Weights** | | | |
| Weight, approx. | 40 g | 35 g | 35 g |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SB 1223 digital input/output signal board** | | **Terminal block (spare part)** | |
| 2 inputs, 24 V DC, IEC type 1 current sinking; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | 6ES7223-0BD30-0XB0 | For signal board With 6 screws, gold-plated; 4 pcs. | 6ES7292-1BF30-0XA0 |
| 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz | 6ES7223-3AD30-0XB0 | | |
| 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz | 6ES7223-3BD30-0XB0 | | |

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## Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1221-1BF32-2XB0** | **6AG1221-1BF32-4XB0** | **6AG1221-1BH32-2XB0** | **6AG1221-1BH32-4XB0** |
|---|---|---|---|---|
| Based on | **6ES7221-1BF32-0XB0** | **6ES7221-1BF32-0XB0** | **6ES7221-1BH32-0XB0** | **6ES7221-1BH32-0XB0** |
| | SIPLUS S7-1200 SM 1221 8DI | SIPLUS S7-1200 SM 1221 8DI | SIPLUS S7-1200 SM 1221 16DI | SIPLUS S7-1200 SM 1221 16DI |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated inputs 4 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated inputs 8 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 1221 digital input modules

**3**

| ■ **Ordering data** | Article No. | | Article No. |
|---|---|---|---|
| **Digital input SIPLUS signal module SM 1221** | | **Accessories** | See SIMATIC S7-1200 digital input SM 1221, page 3/50 |
| (Extended temperature range and exposure to media) | | | |
| 8 inputs, 24 V DC, isolated, current sourcing/sinking | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1221-1BF32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1221-1BF32-2XB0** | | |
| 16 inputs, 24 V DC, isolated, current sourcing/sinking | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1221-1BH32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1221-1BH32-2XB0** | | |

## Overview



- Digital inputs as a supplement to the integral I/O of SIMATIC S7-1200 CPUs
- Can be plugged directly into the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

**3**

## Technical specifications

| Article number | 6AG1221-3AD30-5XB0 | 6AG1221-3BD30-5XB0 |
|---|---|---|
| Based on | **6ES7221-3AD30-0XB0** | **6ES7221-3BD30-0XB0** |
| | SIPLUS S7-1200 SB 1221 4DI 5VDC | SIPLUS S7-1200 SB 1221 4DI 24VDC |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax; Tmax > 55 °C number of simultaneously activated inputs 2 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax; Tmax > 55 °C number of simultaneously activated inputs 2 (no adjacent points) for horizontal mounting position |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SB 1221 digital input signal board** | | **Accessories** | See SIMATIC S7-1200 digital input SB 1221, page 3/52 |
| (Extended temperature range and exposure to media) | | | |
| 4 inputs, 5 V DC, 200 kHz, sourcing | **6AG1221-3AD30-5XB0** | | |
| 4 inputs, 24 V DC, 200 kHz, sourcing | **6AG1221-3BD30-5XB0** | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 1222 digital output modules

### ■ Overview

- Digital outputs as a supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

**Note:**

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Technical specifications

| Article number | 6AG1222-1BF32-2XB0 | 6AG1222-1BF32-4XB0 | 6AG1222-1BH32-2XB0 | 6AG1222-1BH32-4XB0 |
|---|---|---|---|---|
| Based on | 6ES7222-1BF32-0XB0 | 6ES7222-1BF32-0XB0 | 6ES7222-1BH32-0XB0 | 6ES7222-1BH32-0XB0 |
| | SIPLUS S7-1200 SM 1222 8DQ | SIPLUS S7-1200 SM 1222 8DQ | SIPLUS S7-1200 SM 1222 16DQ | SIPLUS S7-1200 SM 1222 16DQ |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 4 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 8 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications (continued)

| Article number | **6AG1222-1HF32-2XB0** | **6AG1222-1HF32-4XB0** | **6AG1222-1HH32-2XB0** | **6AG1222-1HH32-4XB0** |
|---|---|---|---|---|
| Based on | **6ES7222-1HF32-0XB0** | **6ES7222-1HF32-0XB0** | **6ES7222-1HH32-0XB0** | **6ES7222-1HH32-0XB0** |
| | SIPLUS S7-1200 SM 1222 8DQ RLY | SIPLUS S7-1200 SM 1222 8DQ RLY | SIPLUS S7-1200 SM 1222 16DQ RLY | SIPLUS S7-1200 SM 1222 16DQ RLY |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 4 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 8 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); from 2 000 m max. 132 V AC | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C | | | |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

**3**

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 1222 digital output modules

**3**

| ◼ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **Digital output SIPLUS signal module SM 1222** | | **Accessories** | See SIMATIC S7-1200 digital output SM 1222, page 3/55 |
| (Extended temperature range and exposure to media) | | | |
| 8 outputs, 24 V DC; 0.5 A, 5 W, isolated | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1222-1BF32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1222-1BF32-2XB0** | | |
| 16 outputs, 24 V DC; 0.5 A, 5 W, isolated | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1222-1BH32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1222-1BH32-2XB0** | | |
| 8 outputs, 5 ... 30 V DC/5 ... 250 V AC, relay 2 A, 30 W DC/200 W AC | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1222-1HF32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1222-1HF32-2XB0** | | |
| 16 outputs, 5 ... 30 V DC/5 ... 250 V AC, relay 2 A, 30 W DC/200 W AC | | | |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1222-1HH32-4XB0** | | |
| • -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1222-1HH32-2XB0** | | |

## Overview

- Digital outputs as a supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the respective task
- For subsequent expansion of the system with additional outputs
- Can be plugged directly into the CPU
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | 6AG1222-1AD30-5XB0 | 6AG1222-1BD30-5XB0 |
|---|---|---|
| Based on | 6ES7222-1AD30-0XB0 | 6ES7222-1BD30-0XB0 |
| | SIPLUS S7-1200 SB 1222 4DQ 5VDC | SIPLUS S7-1200 SB 1222 4DQ 24VDC |
| **Ambient temperature during operation** | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax; Tmax > 55 °C number of simultaneously activated outputs 2 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax; Tmax > 55 °C number of simultaneously activated outputs 2 (no adjacent points) for horizontal mounting position |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SB 1222 digital output signal board** | | **Accessories** | See SIMATIC S7-1200 digital output module SB 1222, page 3/57 |
| (Extended temperature range and exposure to media) | | | |
| 4 outputs, 5 V DC, 0.1 A, 200 kHz | **6AG1222-1AD30-5XB0** | | |
| 4 outputs, 24 V DC, 0.1 A, 200 kHz | **6AG1222-1BD30-5XB0** | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 1223 digital input/output modules

■ **Overview**



- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

■ **Technical specifications**

| Article number | **6AG1223-1BH32-2XB0** | **6AG1223-1BH32-4XB0** | **6AG1223-1PH32-2XB0** | **6AG1223-1PH32-4XB0** |
|---|---|---|---|---|
| Based on | **6ES7223-1BH32-0XB0** | **6ES7223-1BH32-0XB0** | **6ES7223-1PH32-0XB0** | **6ES7223-1PH32-0XB0** |
| | SIPLUS S7-1200 SM 1223 8DI/8DQ | SIPLUS S7-1200 SM 1223 8DI/8DQ | SIPLUS S7-1200 SM 1223 8DI/8DQ RLY | SIPLUS S7-1200 SM 1223 8DI/8DQ RLY |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 4, inputs 4 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 4, inputs 4 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C | | | |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications (continued)

| Article number | **6AG1223-1PL32-2XB0** | **6AG1223-1PL32-4XB0** | **6AG1223-1BL32-2XB0** | **6AG1223-1BL32-4XB0** |
|---|---|---|---|---|
| Based on | **6ES7223-1PL32-0XB0** | **6ES7223-1PL32-0XB0** | **6ES7223-1BL32-0XB0** | **6ES7223-1BL32-0XB0** |
| | SIPLUS S7-1200 SM 1223 16DI/16DQ RLY | SIPLUS S7-1200 SM 1223 16DI/16DQ RLY | SIPLUS S7-1200 SM 1223 16DI/16DQ | SIPLUS S7-1200 SM 1223 16DI/16DQ |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 8, inputs 8 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously activated outputs 8, inputs 8 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 1223 digital input/output modules

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input/output**<br>**SIPLUS signal module SM 1223** | | 8 inputs, 24 V DC,<br>IEC type 1 current sinking<br>8 relay outputs,<br>5 ... 30 V DC / 5 ... 250 V AC, 2 A,<br>30 W DC / 200 W AC | |
| (Extended temperature range and exposure to media) | | • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1223-1PH32-4XB0** |
| 8 inputs, 24 V DC,<br>IEC type 1 current sinking<br>8 transistor outputs,<br>24 V DC, 0.5 A, 5 W | | • -25 ... +70 °C,<br>from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1223-1PH32-2XB0** |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1223-1BH32-4XB0** | 16 inputs, 24 V DC,<br>IEC type 1 current sinking<br>16 relay outputs,<br>5 ... 30 V DC / 5 ... 250 V AC, 2 A,<br>30 W DC / 200 W AC | |
| • -25 ... +70 °C,<br>from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1223-1BH32-2XB0** | • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1223-1PL32-4XB0** |
| 16 inputs, 24 V DC,<br>IEC type 1 current sinking<br>16 transistor outputs,<br>24 V DC, 0.5 A, 5 W | | • -25 ... +70 °C,<br>from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1223-1PL32-2XB0** |
| • Suitable for areas with extraordinary medial exposure (conformal coating) | **6AG1223-1BL32-4XB0** | **Accessories** | See SIMATIC S7-1200 digital input/output SM 1223, page 3/61 |
| • -25 ... +70 °C,<br>from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | **6AG1223-1BL32-2XB0** | | |

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## Overview

- Digital inputs and outputs as supplement to the integral I/O of the SIPLUS S7-1200-CPUs
- Can be plugged directly into the CPU (cannot be used for +70 °C version)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1223-0BD30-4XB0** | **6AG1223-0BD30-5XB0** | **6AG1223-3AD30-5XB0** | **6AG1223-3BD30-5XB0** |
|---|---|---|---|---|
| Based on | **6ES7223-0BD30-0XB0** | **6ES7223-0BD30-0XB0** | **6ES7223-3AD30-0XB0** | **6ES7223-3BD30-0XB0** |
| | SIPLUS S7-1200 SB 1223 2DI/2DQ 24VDC | SIPLUS S7-1200 SB 1223 2DI/2DQ 24VDC | SIPLUS S7-1200 SB 1223 2DI/2DQ 5VDC | SIPLUS S7-1200 SB 1223 2DI/2DQ, 24VDC |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 55 °C; = Tmax | 60 °C; = Tmax | 60 °C; = Tmax | 60 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SB 1223 digital input/output modules

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| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|

**Digital input/output
SIPLUS signal board SB 1223**

(Extended temperature range and
exposure to media)

2 inputs, 24 V DC,
IEC type 1 current sinking;
2 transistor outputs
24 V DC, 0.5 A, 5 W;
can be used as HSC at up to
30 kHz
- Suitable for areas with extreme
  medial exposure
  (conformal coating)          **6AG1223-0BD30-4XB0**
- Ambient temperature
  -25 ... +55 °C               **6AG1223-0BD30-5XB0**

2 inputs, 5 V DC, 200 kHz      **6AG1223-3AD30-5XB0**
2 outputs 5 V DC, 0.1 A, 200 kHz

2 inputs, 24 V DC, 200 kHz     **6AG1223-3BD30-5XB0**
2 outputs 24 V DC, 0.1 A, 200 kHz

**Accessories**

See SIMATIC S7-1200
digital input/output SB 1223,
page 3/64

## Overview

- Analog inputs for SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog sensors without additional amplifiers
- For solving even more complex automation tasks

## Technical specifications

| Article number | 6ES7231-4HD32-0XB0 | 6ES7231-4HF32-0XB0 | 6ES7231-5ND32-0XB0 |
|---|---|---|---|
| | ANALOG INPUT SM 1231, 4AI | ANALOG INPUT SM 1231, 8AI | ANALOG INPUT SM 1231, 4AI 16BIT |
| **General information** | | | |
| Product type designation | SM 1231 AI 4x13 bit | SM 1231 AI 8 x 13 bit | SM 1231 AI 4 x 16 bit |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | Yes |
| **Input current** | | | |
| Current consumption, typ. | 45 mA | 45 mA | 65 mA |
| from backplane bus 5 V DC, typ. | 80 mA | 90 mA | 80 mA |
| **Power loss** | | | |
| Power loss, typ. | 1.5 W | 1.5 W | 1.8 W |
| **Analog inputs** | | | |
| Number of analog inputs | 4; Current or voltage differential inputs | 8; Current or voltage differential inputs | 4; Current or voltage differential inputs |
| permissible input voltage for current input (destruction limit), max. | ±35 V | ±35 V | ±15 V |
| permissible input voltage for voltage input (destruction limit), max. | 35 V | 35 V | ±35 V |
| permissible input current for voltage input (destruction limit), max. | 40 mA | 40 mA | 40 mA; limited by input resistance 1 MOhm |
| permissible input current for current input (destruction limit), max. | 40 mA | 40 mA | 40 mA |
| Cycle time (all channels) max. | 625 µs | 625 µs | 100 µs |
| **Input ranges** | | | |
| • Voltage | Yes; ±10V, ±5V, ±2.5V | Yes; ±10V, ±5V, ±2.5V | Yes; ±10V, ±5V, ±2.5V or ±1.25V |
| • Current | Yes; 4 to 20 mA, 0 to 20 mA | Yes; 4 to 20 mA, 0 to 20 mA | Yes; 4 to 20 mA, 0 to 20 mA |
| • Thermocouple | No | No | No |
| • Resistance thermometer | No | No | No |
| • Resistance | No | Yes | No |
| **Input ranges (rated values), voltages** | | | |
| • -1.25 V to +1.25 V | | | Yes |
| • -10 V to +10 V | Yes | Yes | Yes |
| • -2.5 V to +2.5 V | Yes | Yes | Yes |
| • -5 V to +5 V | Yes | Yes | Yes |
| **Input ranges (rated values), currents** | | | |
| • 0 to 20 mA | Yes | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes |
| **Thermocouple (TC)** | | | |
| **Temperature compensation** | | | |
| - parameterizable | | No | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

**SM 1231 analog input modules**

## ■ Technical specifications (continued)

| Article number | 6ES7231-4HD32-0XB0 | 6ES7231-4HF32-0XB0 | 6ES7231-5ND32-0XB0 |
|---|---|---|---|
| | ANALOG INPUT SM 1231, 4AI | ANALOG INPUT SM 1231, 8AI | ANALOG INPUT SM 1231, 4AI 16BIT |
| **Analog value generation for the inputs** | | | |
| **Integration and conversion time/ resolution per channel** | | | |
| • Resolution with overrange (bit including sign), max. | 12 bit; + sign | 12 bit; + sign | 15 bit; + sign |
| • Integration time, parameterizable | Yes | Yes | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz |
| **Smoothing of measured values** | | | |
| • parameterizable | Yes | Yes | Yes |
| • Step: None | Yes | Yes | Yes |
| • Step: low | Yes | Yes | Yes |
| • Step: Medium | Yes | Yes | Yes |
| • Step: High | Yes | Yes | Yes |
| **Errors/accuracies** | | | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range | 25 °C ±0.1% / ±0.3% total measurement range |
| **Basic error limit (operational limit at 25 °C)** | | | |
| • Voltage, relative to input range, (+/-) | 0.1% | 0.1% | 0.1% |
| • Current, relative to input range, (+/-) | 0.1% | 0.1% | 0.1% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | | | |
| • Common mode voltage, max. | 12 V | 12 V | 12 V |
| **Interrupts/diagnostics/ status information** | | | |
| Alarms | Yes | Yes | Yes |
| Diagnostic functions | Yes | Yes | Yes |
| **Alarms** | | | |
| • Diagnostic alarm | Yes | Yes | Yes |
| **Diagnostic messages** | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes |
| • Wire-break | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | |
| • for status of the inputs | Yes | Yes | Yes |
| • for maintenance | Yes | Yes | Yes |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP20 | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | |
| CE mark | Yes | Yes | Yes |
| CSA approval | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes | Yes |
| **Marine approval** | | | |
| • Marine approval | Yes | Yes | Yes |

## Technical specifications (continued)

| Article number | 6ES7231-4HD32-0XB0 | 6ES7231-4HF32-0XB0 | 6ES7231-5ND32-0XB0 |
|---|---|---|---|
| | ANALOG INPUT SM 1231, 4AI | ANALOG INPUT SM 1231, 8AI | ANALOG INPUT SM 1231, 4AI 16BIT |
| **Ambient conditions** | | | |
| **Free fall** | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Pollutant concentrations** | | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | | | |
| required front connector | Yes | Yes | Yes |
| **Mechanics/material** | | | |
| Enclosure material (front) | | | |
| • Plastic | Yes | Yes | Yes |
| **Dimensions** | | | |
| Width | 45 mm | 45 mm | 45 mm |
| Height | 100 mm | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm | 75 mm |
| **Weights** | | | |
| Weight, approx. | 180 g | 180 g | 180 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 1231 analog input signal module** | | **Extension cable for two-tier configuration** | 6ES7290-6AA30-0XA0 |
| 4 analog inputs, ±10V, ±5V, ±2.5V, or 0 ... 20 mA, 16 bits | 6ES7231-5ND32-0XB0 | For connecting digital/analog signal modules; length 2 m | |
| 4 analog inputs, ±10V, ±5V, ±2.5V, or 0 ... 20 mA,12 bits + sign | 6ES7231-4HD32-0XB0 | **Terminal block (spare part)** | |
| 8 analog inputs, ±10V, ±5V, ±2.5V, or 0 ... 20 mA,12 bits + sign | 6ES7231-4HF32-0XB0 | For 6ES7231-5ND32-0XB0, 6ES7231-4HD32-0XB0, 6ES7231-4HF32-0XB0 • With 7 screws, gold-plated; 4 pcs. | 6ES7292-1BG30-0XA0 |
| | | **Front flap set (spare part)** | |
| | | For modules with a width of 45 mm | 6ES7291-1BA30-0XA0 |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SB 1231 analog input modules

### ■ Overview

- Analog input module for the SIMATIC S7-1200
- With extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- For the solution of more complex automation tasks as well
- Can be plugged directly into the CPU

**3**

### ■ Technical specifications

| Article number | 6ES7231-4HA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231, 1 AI |
| **General information** | |
| Product type designation | SB1231 AI 1x12 BIT |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from backplane bus 5 V DC, typ. | 55 mA |
| **Power loss** | |
| Power loss, typ. | 0.4 W |
| **Analog inputs** | |
| Number of analog inputs | 1; Current or voltage differential inputs |
| permissible input voltage for current input (destruction limit), max. | ±35 V |
| permissible input voltage for voltage input (destruction limit), max. | 35 V |
| permissible input current for voltage input (destruction limit), max. | 40 mA |
| permissible input current for current input (destruction limit), max. | 40 mA |
| Cycle time (all channels) max. | 156.25 μs; 400 Hz suppression |
| **Input ranges** | |
| • Voltage | Yes; ±10V, ±5V, ±2.5V |
| • Current | Yes; 0 to 20 mA |
| • Thermocouple | No |
| • Resistance thermometer | No |
| • Resistance | No |
| **Input ranges (rated values), voltages** | |
| • -10 V to +10 V | Yes |
| • -2.5 V to +2.5 V | Yes |
| • -5 V to +5 V | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| **Analog outputs** | |
| Number of analog outputs | 0 |

| Article number | 6ES7231-4HA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231, 1 AI |
| **Analog value generation for the inputs** | |
| Measurement principle | integrating |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 11 bit; + sign |
| • Integration time, parameterizable | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 40 dB, DC to 60 Hz |
| **Smoothing of measured values** | |
| • parameterizable | Yes |
| • Step: None | Yes |
| • Step: low | Yes |
| • Step: Medium | Yes |
| • Step: High | Yes |
| **Errors/accuracies** | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.3%, to 55 °C ±0.6% total measurement range |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Wire-break | No |
| **Diagnostics indication LED** | |
| • for status of the inputs | Yes |
| • for maintenance | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |

■ **Technical specifications** (continued)

| Article number | 6ES7231-4HA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231, 1 AI |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C |
| • max. | 60 °C |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | |
| required front connector | Yes |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 35 g |

■ **Ordering data**      **Article No.**

| | |
|---|---|
| **SB 1231 signal board analog input module** | |
| 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6ES7231-4HA30-0XB0** |
| **Terminal block (spare part)** | |
| For signal board | |
| With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

**SM 1232 analog output modules**

## ◾ Overview



- Analog outputs for SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog actuators without additional amplifiers
- For solving even more complex automation tasks

## ◾ Technical specifications

| Article number | 6ES7232-4HB32-0XB0 | 6ES7232-4HD32-0XB0 |
|---|---|---|
| | ANALOG OUTPUT SM 1232, 2AO | ANALOG OUTPUT SM 1232, 4AO |
| **General information** | | |
| Product type designation | SM 1232 AQ 2x14 bit | SM 1232 AQ 4 x 14bit |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Input current** | | |
| Current consumption, typ. | 45 mA | 45 mA |
| from backplane bus 5 V DC, typ. | 80 mA | 80 mA |
| **Power loss** | | |
| Power loss, typ. | 1.5 W | 1.5 W |
| **Analog outputs** | | |
| Number of analog outputs | 2; Current or voltage | 4; Current or voltage |
| **Output ranges, voltage** | | |
| • -10 V to +10 V | Yes | Yes |
| **Output ranges, current** | | |
| • 0 to 20 mA | Yes | Yes |
| **Load impedance (in rated range of output)** | | |
| • with voltage outputs, min. | 1 000 Ω | 1 000 Ω |
| • with current outputs, max. | 600 Ω | 600 Ω |
| **Analog value generation for the outputs** | | |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution (incl. overrange) | Voltage: 14 bits; Current : 13 bits | Voltage: 14 bits; Current : 13 bits |
| **Errors/accuracies** | | |
| Temperature error (relative to output range), (+/-) | 25 °C ±0.3%, to 55 °C ±0.6% total measurement range | 25 °C ±0.3%, to 55 °C ±0.6% total measurement range |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to output range, (+/-) | 0.3% | 0.3% |
| • Current, relative to output range, (+/-) | 0.3% | 0.3% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | | |
| • Common mode voltage, max. | 12 V | 12 V |

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## Technical specifications (continued)

| Article number | 6ES7232-4HB32-0XB0 | 6ES7232-4HD32-0XB0 |
|---|---|---|
| | ANALOG OUTPUT SM 1232, 2AO | ANALOG OUTPUT SM 1232, 4AO |
| **Interrupts/diagnostics/ status information** | | |
| Alarms | Yes | Yes |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | Yes | Yes |
| • Wire-break | Yes | Yes |
| • Short-circuit | Yes | Yes |
| **Diagnostics indication LED** | | |
| • for status of the outputs | Yes | Yes |
| • for maintenance | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| CSA approval | Yes | Yes |
| FM approval | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Pollutant concentrations** | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | | |
| required front connector | Yes | Yes |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 45 mm | 45 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 180 g | 180 g |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SM 1232 analog output modules

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 1232 analog output signal module** | | **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| 2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | **6ES7232-4HB32-0XB0** | For connecting digital/analog signal modules; length 2 m | |
| 4 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | **6ES7232-4HD32-0XB0** | **Front flap set (spare part)** | |
| **Terminal block (spare part)** | | For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |
| For 6ES7232-4HB32-0XB0, 6ES7232-4HD32-0XB0 | | | |
| With 7 screws, gold-plated; 4 units | **6ES7292-1BG30-0XA0** | | |

## Overview



- Analog output for the SIMATIC S7-1200
- Can be plugged direct into the CPU

## Technical specifications

| Article number | 6ES7232-4HA30-0XB0 |
| --- | --- |
| | SIGNAL BOARD SB 1232, 1 AO |
| **General information** | |
| Product type designation | SB 1232 1x AO |
| **Input current** | |
| from backplane bus 5 V DC, typ. | 15 mA |
| **Output voltage** | |
| **Power supply to the transmitters** | |
| • Supply current, max. | 25 mA |
| **Power loss** | |
| Power loss, typ. | 1.5 W |
| **Analog inputs** | |
| Number of analog inputs | 0 |
| **Analog outputs** | |
| Number of analog outputs | 1 |
| Cycle time (all channels) max. | Voltage: 300 µS (R), 750 µS (1 uF) Current: 600 ms (1 mH); 2 ms (10 mH) |
| **Output ranges, voltage** | |
| • -10 V to +10 V | Yes |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| **Load impedance (in rated range of output)** | |
| • with voltage outputs, min. | 1 000 Ω |
| • with current outputs, max. | 600 Ω |
| **Cable length** | |
| • shielded, max. | 10 m; shielded, twisted pair |

| Article number | 6ES7232-4HA30-0XB0 |
| --- | --- |
| | SIGNAL BOARD SB 1232, 1 AO |
| **Errors/accuracies** | |
| Temperature error (relative to output range), (+/-) | 25 °C ±0.5%, to 55 °C ±1% |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • for status of the outputs | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SB 1232 analog output modules

### ■ Technical specifications (continued)

| Article number | 6ES7232-4HA30-0XB0 |
| --- | --- |
| | SIGNAL BOARD SB 1232, 1 AO |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | 0 °C to 55 °C horizontal installation, 0 °C to 45 °C vertical installation |
| • min. | 0 °C |
| • max. | 55 °C |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 40 g |

### ■ Ordering data

| | Article No. |
| --- | --- |
| **SB 1232 analog output signal board** | |
| 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6ES7232-4HA30-0XB0** |
| **Terminal block (spare part)** | |
| For signal board | |
| With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |

## Overview



- Analog inputs and outputs for the SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- For solving even more complex automation tasks

## Technical specifications

| Article number | 6ES7234-4HE32-0XB0 |
|---|---|
| | ANALOG I/O SM 1234, 4AI/2AO |
| **General information** | |
| Product type designation | SM 1234 A I4x13 bit AQ 2x14 bit |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| Current consumption, typ. | 60 mA |
| from backplane bus 5 V DC, typ. | 80 mA |
| **Power loss** | |
| Power loss, typ. | 2 W |
| **Analog inputs** | |
| Number of analog inputs | 4; Current or voltage differential inputs |
| permissible input voltage for current input (destruction limit), max. | ±35 V |
| permissible input voltage for voltage input (destruction limit), max. | 35 V |
| permissible input current for voltage input (destruction limit), max. | 40 mA |
| permissible input current for current input (destruction limit), max. | 40 mA |
| Cycle time (all channels) max. | 625 µs |
| **Input ranges** | |
| • Voltage | Yes; ±10V, ±5V, ±2.5V |
| • Current | Yes; 4 to 20 mA, 0 to 20 mA |
| **Input ranges (rated values), voltages** | |
| • -10 V to +10 V | Yes |
| • -2.5 V to +2.5 V | Yes |
| • -5 V to +5 V | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |

| Article number | 6ES7234-4HE32-0XB0 |
|---|---|
| | ANALOG I/O SM 1234, 4AI/2AO |
| **Analog outputs** | |
| Number of analog outputs | 2; Current or voltage |
| **Output ranges, voltage** | |
| • -10 V to +10 V | Yes |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Load impedance (in rated range of output)** | |
| • with voltage outputs, min. | 1 000 Ω |
| • with current outputs, max. | 600 Ω |
| **Analog value generation for the inputs** | |
| Measurement principle | Differential |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 12 bit; + sign |
| • Integration time, parameterizable | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz |
| **Smoothing of measured values** | |
| • parameterizable | Yes |
| • Step: None | Yes |
| • Step: low | Yes |
| • Step: Medium | Yes |
| • Step: High | Yes |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution (incl. overrange) | Voltage: 14 bits; Current : 13 bits |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Analog modules

**SM 1234 analog input/output modules**

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### ■ Technical specifications  (continued)

| Article number | 6ES7234-4HE32-0XB0 |
|---|---|
| | ANALOG I/O SM 1234, 4AI/2AO |
| **Errors/accuracies** | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range |
| Temperature error (relative to output range), (+/-) | 25 °C ±0.3%, to 55 °C ±0.6% total measurement range |
| **Basic error limit (operational limit at 25 °C)** | |
| • Voltage, relative to input range, (+/-) | 0.1% |
| • Current, relative to input range, (+/-) | 0.1% |
| • Voltage, relative to output range, (+/-) | 0.3% |
| • Current, relative to output range, (+/-) | 0.3% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | |
| • Common mode voltage, max. | 12 V |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • for status of the inputs | Yes |
| • for status of the outputs | Yes |
| • for maintenance | Yes |
| **Potential separation analog outputs** | |
| • between the channels and the power supply of the electronics | No |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |

| Article number | 6ES7234-4HE32-0XB0 |
|---|---|
| | ANALOG I/O SM 1234, 4AI/2AO |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| **Marine approval** | |
| • Marine approval | Yes |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C |
| • max. | 60 °C |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | |
| required front connector | Yes |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 45 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 220 g |

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### ■ Ordering data

| | Article No. |
|---|---|
| **SM 1234 analog input/output signal module** | |
| 4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bits + sign; 2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | **6ES7234-4HE32-0XB0** |
| **Terminal block (spare part)** | |
| For 6ES7234-4HE32-0XB0 | |
| With 7 screws, gold-plated; 4 pcs. | **6ES7292-1BG30-0XA0** |

| | Article No. |
|---|---|
| **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| For connecting digital/analog signal modules; length 2 m | |
| **Front flap set (spare part)** | |
| For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |

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## Overview

- For the convenient recording of temperatures with great accuracy
- 7 common thermocouple types can be used
- Also for the measurement of analog signals with a low level (±80 mV)
- Can easily be retrofitted to existing plant

## Technical specifications

| Article number | **6ES7231-5QD32-0XB0** | **6ES7231-5QF32-0XB0** |
|---|---|---|
| | S7-1200, ANALOG INPUT SM 1231 TC, 4 AI | S7-1200, ANALOG INPUT SM 1231 TC, 8 AI |
| **General information** | | |
| Product type designation | SM 1231 TC 4x16 bit | SM 1231 TC 8x16bit |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Input current** | | |
| Current consumption, typ. | 40 mA | 40 mA |
| from backplane bus 5 V DC, typ. | 80 mA | 80 mA |
| **Power loss** | | |
| Power loss, typ. | 1.5 W | 1.5 W |
| **Analog inputs** | | |
| Number of analog inputs | 4; Thermocouples | 8; Thermocouples |
| permissible input voltage for current input (destruction limit), max. | ±35 V | ±35 V |
| permissible input voltage for voltage input (destruction limit), max. | +-35 V | +-35 V |
| Technical unit for temperature measurement adjustable | Degrees Celsius/degrees Fahrenheit | Degrees Celsius/degrees Fahrenheit |
| **Input ranges** | | |
| • Voltage | Yes | Yes |
| • Current | No | No |
| • Thermocouple | Yes; J, K, T, E, R, S, N, C, TXK/XK(L); voltage range: +/-80 mV | Yes; J, K, T, E, R & S, B, N, C, TXK/XK(L); voltage range: ±80 mV |
| • Resistance thermometer | No | No |
| • Resistance | No | No |
| **Input ranges (rated values), voltages** | | |
| • -80 mV to +80 mV | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | |
| • Type B | Yes | Yes |
| • Type C | Yes | Yes |
| • Type E | Yes | Yes |
| • Type J | Yes | Yes |
| • Type K | Yes | Yes |
| • Type N | Yes | Yes |
| • Type R | Yes | Yes |
| • Type S | Yes | Yes |
| • Type T | Yes | Yes |
| • Type TXK/TXK(L) to GOST | Yes | Yes |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
| - parameterizable | No | No |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SM 1231 thermocouple modules

### ■ Technical specifications (continued)

| Article number | 6ES7231-5QD32-0XB0 | 6ES7231-5QF32-0XB0 |
|---|---|---|
| | S7-1200, ANALOG INPUT SM 1231 TC, 4 AI | S7-1200, ANALOG INPUT SM 1231 TC, 8 AI |
| **Analog value generation for the inputs** | | |
| Measurement principle | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 15 bit; + sign | 15 bit; + sign |
| • Integration time, parameterizable | No | No |
| • Interference voltage suppression for interference frequency f1 in Hz | 85 dB at 50 / 60 / 400 Hz | 85 dB at 50 / 60 / 400 Hz |
| **Smoothing of measured values** | | |
| • parameterizable | Yes | Yes |
| **Errors/accuracies** | | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.5% | 0.5% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | | |
| • Common mode interference, min. | 120 dB | 120 dB |
| **Interrupts/diagnostics/ status information** | | |
| Alarms | Yes | Yes |
| Diagnostic functions | Yes; Can be read out | Yes; Can be read out |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | Yes | Yes |
| • Wire-break | Yes | Yes |
| **Diagnostics indication LED** | | |
| • for status of the inputs | Yes | Yes |
| • for maintenance | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| CSA approval | Yes | Yes |
| FM approval | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Pollutant concentrations** | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |

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## Technical specifications (continued)

| Article number | 6ES7231-5QD32-0XB0 | 6ES7231-5QF32-0XB0 |
| --- | --- | --- |
| | S7-1200, ANALOG INPUT SM 1231 TC, 4 AI | S7-1200, ANALOG INPUT SM 1231 TC, 8 AI |
| **Connection method** | | |
| required front connector | Yes | Yes |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 45 mm | 45 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 180 g | 220 g |

## Ordering data

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **SM 1231 thermocouple module** | | **Accessories** | |
| 4 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, S, T, R, E, N | **6ES7231-5QD32-0XB0** | **Terminal block (spare part)** | |
| | | For 6ES7231-5QD32-0XB0, 6ES7231-5QF32-0XB0 | |
| | | With 7 screws, gold-plated; 4 units | **6ES7292-1BG30-0XA0** |
| 8 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L) | **6ES7231-5QF32-0XB0** | **Extension cable for two-tier configuration** | **6ES7290-6AA30-0XA0** |
| | | For connecting digital/analog signal modules; length 2 m | |
| | | **Front flap set (spare part)** | |
| | | For modules with a width of 45 mm | **6ES7291-1BA30-0XA0** |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SB 1231 thermocouple signal boards

### ■ Overview

- For the convenient recording of temperatures with great accuracy
- 1 input with 16-bit resolution
- Common thermocouple types can be used
- Also for the measurement of analog signals with a low level (±80 mV)
- Can easily be retrofitted to existing plant
- Can be plugged directly into the CPU

### ■ Technical specifications

| Article number | 6ES7231-5QA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 TC, 1 AI |
| **General information** | |
| Product type designation | SB1231 AI 1xTC |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| Current consumption, typ. | 5 mA |
| from backplane bus 5 V DC, typ. | 20 mA |
| **Power loss** | |
| Power loss, typ. | 0.5 W |
| **Analog inputs** | |
| Number of analog inputs | 1; Thermocouples |
| permissible input voltage for current input (destruction limit), max. | ±35 V |
| permissible input voltage for voltage input (destruction limit), max. | +-35 V |
| Technical unit for temperature measurement adjustable | Degrees Celsius/degrees Fahrenheit |
| **Input ranges** | |
| • Voltage | Yes |
| • Current | No |
| • Thermocouple | Yes; J, K; voltage range ±80 mV |
| • Resistance thermometer | No |
| • Resistance | No |
| **Input ranges (rated values), voltages** | |
| • -80 mV to +80 mV | Yes |
| **Input ranges (rated values), thermocouples** | |
| • Type J | Yes |
| • Type K | Yes |
| **Thermocouple (TC)** | |
| **Temperature compensation** | |
| - parameterizable | No |
| **Analog outputs** | |
| Number of analog outputs | 0 |

| Article number | 6ES7231-5QA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 TC, 1 AI |
| **Analog value generation for the inputs** | |
| Measurement principle | integrating |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 15 bit; + sign |
| • Integration time, parameterizable | No |
| • Interference voltage suppression for interference frequency f1 in Hz | 85 dB at 10 / 50 / 60 / 400 Hz |
| **Smoothing of measured values** | |
| • parameterizable | Yes |
| **Errors/accuracies** | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.5% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | |
| • Common mode interference, min. | 120 dB |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes; Can be read out |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Wire-break | Yes |
| **Diagnostics indication LED** | |
| • for status of the inputs | Yes |
| • for maintenance | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |

## Technical specifications (continued)

| Article number | 6ES7231-5QA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 TC, 1 AI |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C |
| • max. | 60 °C |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | |
| required front connector | Yes |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 35 g |

## Ordering data

| | Article No. |
|---|---|
| **SB 1231 thermocouple signal board** | **6ES7231-5QA30-0XB0** |
| 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K | |
| **Accessories** | |
| **Terminal block (spare part)** | |
| For signal board | |
| With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SM 1231 RTD signal modules

### ◾ Overview

- For the convenient recording of temperatures with great accuracy
- 4 inputs
- Most popular resistance temperature detectors can be used
- Can easily be retrofitted to existing installation

### ◾ Technical specifications

| Article number | 6ES7231-5PD32-0XB0 | 6ES7231-5PF32-0XB0 |
|---|---|---|
| | S7-1200, ANALOG INPUT SM 1231 RTD, 4 AI | S7-1200, ANALOG INPUT SM 1231 RTD, 8 AI |
| **General information** | | |
| Product type designation | SM 1231 RTD 4x16bit | SM 1231 RTD 8x16bit |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Input current** | | |
| Current consumption, typ. | 40 mA | 40 mA |
| from backplane bus 5 V DC, typ. | 80 mA | 80 mA |
| **Power loss** | | |
| Power loss, typ. | 1.5 W | 1.5 W |
| **Analog inputs** | | |
| Number of analog inputs | 4; Resistance thermometer | 8; Resistance thermometer |
| permissible input voltage for current input (destruction limit), max. | ±35 V | ±35 V |
| Technical unit for temperature measurement adjustable | Degrees Celsius/degrees Fahrenheit | Degrees Celsius/degrees Fahrenheit |
| **Input ranges** | | |
| • Voltage | No | No |
| • Current | No | No |
| • Thermocouple | No | No |
| • Resistance thermometer | Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu100, LG-Ni1000 | Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu100, LG-Ni1000 |
| • Resistance | Yes; 150 Ω, 300 Ω, 600 Ω | Yes; 150 Ω, 300 Ω, 600 Ω |
| **Input ranges (rated values), resistance thermometer** | | |
| • Cu 10 | Yes | Yes |
| • Ni 100 | Yes | Yes |
| • Ni 1000 | Yes | Yes |
| • LG-Ni 1000 | Yes | Yes |
| • Ni 120 | Yes | Yes |
| • Ni 200 | Yes | Yes |
| • Ni 500 | Yes | Yes |
| • Pt 100 | Yes | Yes |
| • Pt 1000 | Yes | Yes |
| • Pt 200 | Yes | Yes |
| • Pt 500 | Yes | Yes |
| **Input ranges (rated values), resistors** | | |
| • 0 to 150 ohms | Yes | Yes |
| • 0 to 300 ohms | Yes | Yes |
| • 0 to 600 ohms | Yes | Yes |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
| - parameterizable | No | No |

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## Technical specifications (continued)

| Article number | 6ES7231-5PD32-0XB0 | 6ES7231-5PF32-0XB0 |
|---|---|---|
| | S7-1200, ANALOG INPUT SM 1231 RTD, 4 AI | S7-1200, ANALOG INPUT SM 1231 RTD, 8 AI |
| **Analog value generation for the inputs** | | |
| Measurement principle | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 15 bit; + sign | 15 bit; + sign |
| • Integration time, parameterizable | No | No |
| • Interference voltage suppression for interference frequency f1 in Hz | 85 dB at 50 / 60 / 400 Hz | 85 dB at 50 / 60 / 400 Hz |
| **Errors/accuracies** | | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.05% | 0.05% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | | |
| • Common mode interference, min. | 120 dB | 120 dB |
| **Interrupts/diagnostics/ status information** | | |
| Alarms | Yes | Yes |
| Diagnostic functions | Yes; Can be read out | Yes; Can be read out |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | Yes | Yes |
| • Wire-break | Yes | Yes |
| **Diagnostics indication LED** | | |
| • for status of the inputs | Yes | Yes |
| • for maintenance | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| CSA approval | Yes | Yes |
| FM approval | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C | -20 °C |
| • max. | 60 °C | 60 °C |
| **Pollutant concentrations** | | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | | |
| required front connector | Yes | Yes |
| **Mechanics/material** | | |
| Enclosure material (front) | | |
| • Plastic | Yes | Yes |
| **Dimensions** | | |
| Width | 45 mm | 70 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 220 g | 220 g |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SM 1231 RTD signal modules

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### Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SM 1231 RTD signal module** | | | **Accessories** | |
| 4 inputs for resistance temperature detectors Pt10/50/100/200/500/ 1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bits + sign | 6ES7231-5PD32-0XB0 | | **Terminal block (spare part)** | |
| | | | For 6ES7231-5PD32-0XB0 • With 7 screws, gold-plated; 4 units | 6ES7292-1BG30-0XA0 |
| 8 inputs for resistance temperature detectors Pt10/50/100/200/500/ 1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bits + sign | 6ES7231-5PF32-0XB0 | | For 6ES7231-5PF32-0XB0 • With 11 screws, gold-plated; 4 units | 6ES7292-1BL30-0XA0 |
| | | | **Extension cable for two-tier configuration** | 6ES7290-6AA30-0XA0 |
| | | | For connecting digital/analog signal modules; length 2 m | |
| | | | **Front flap set (spare part)** | |
| | | | For modules with a width of 45 mm | 6ES7291-1BA30-0XA0 |
| | | | For modules with a width of 70 mm | 6ES7291-1BB30-0XA0 |

## Overview

- For the convenient recording of temperatures with great accuracy
- 1 input with 16-bit resolution
- Common resistance-type temperature detectors can be used
- Can easily be retrofitted to existing plant
- Can be plugged directly into the CPU

## Technical specifications

| Article number | 6ES7231-5PA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 RTD |
| **General information** | |
| Product type designation | SB1231 AI 1xRTD |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| Current consumption, typ. | 5 mA |
| from backplane bus 5 V DC, typ. | 20 mA |
| **Power loss** | |
| Power loss, typ. | 0.5 W |
| **Analog inputs** | |
| Number of analog inputs | 1; Resistance thermometer |
| permissible input voltage for current input (destruction limit), max. | ±35 V |
| Technical unit for temperature measurement adjustable | Degrees Celsius/degrees Fahrenheit |
| **Input ranges** | |
| • Voltage | Yes |
| • Current | No |
| • Thermocouple | No |
| • Resistance thermometer | Yes; Platinum (Pt) |
| • Resistance | Yes; 150 Ω, 300 Ω, 600 Ω |
| **Input ranges (rated values), resistance thermometer** | |
| • Pt 100 | Yes |
| • Pt 1000 | Yes |
| • Pt 200 | Yes |
| • Pt 500 | Yes |
| **Input ranges (rated values), resistors** | |
| • 0 to 150 ohms | Yes |
| • 0 to 300 ohms | Yes |
| • 0 to 600 ohms | Yes |
| **Thermocouple (TC)** | |
| **Temperature compensation** | |
| - parameterizable | No |
| **Analog outputs** | |
| Number of analog outputs | 0 |

| Article number | 6ES7231-5PA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 RTD |
| **Analog value generation for the inputs** | |
| Measurement principle | integrating |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 15 bit; + sign |
| • Integration time, parameterizable | No |
| • Interference voltage suppression for interference frequency f1 in Hz | 85 dB at 10 / 50 / 60 / 400 Hz |
| **Errors/accuracies** | |
| Temperature error (relative to input range), (+/-) | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.05% |
| **Interference voltage suppression for f = n x (f1 +/- 1%), f1 = interference frequency** | |
| • Common mode interference, min. | 120 dB |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes; Can be read out |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Wire-break | Yes |
| **Diagnostics indication LED** | |
| • for status of the inputs | Yes |
| • for maintenance | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SB 1231 RTD signal boards

### Technical specifications (continued)

| Article number | 6ES7231-5PA30-0XB0 |
|---|---|
| | SIGNAL BOARD SB 1231 RTD |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| • min. | -20 °C |
| • max. | 60 °C |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **Connection method** | |
| required front connector | Yes |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 35 g |

### Ordering data

| | Article No. |
|---|---|
| **RTD signal board SB 1231** | **6ES7231-5PA30-0XB0** |
| 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign | |
| **Accessories** | |
| **Terminal block (spare part)** | |
| For signal board | |
| With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |

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## Overview

- Energy management based on SIMATIC S7-1200
- Data acquisition of electrical characteristics in 1 and 3-phase networks up to 480 V AC
- Direct connection of voltage inputs
- Current measurement performed by 1 A and 5 A current transformers
- Can be used in TN and TT networks
- Data backup of measurement data in the event of a power failure

## Technical specifications

| Article number | **6ES7238-5XA32-0XB0** |
|---|---|
| | SM 1238 Energy Meter 480V AC |
| **General information** | |
| Product type designation | SM 1238 AI Energy Meter 480 VAC |
| **Product function** | |
| • Voltage measurement | Yes |
| • Voltage measurement with voltage transformers | Yes |
| • Current measurement | Yes |
| • Phase current measurement without current transformers | No |
| • Phase current measurement with current transformers | Yes |
| • Energy measurement | Yes |
| • Frequency measurement | Yes |
| • Power measurement | Yes |
| • Active power measurement | Yes |
| • Reactive power measurement | Yes |
| • I&M data | Yes; I&M 0 |
| • Isochronous mode | No |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 |
| **Operating mode** | |
| • cyclic measurement | Yes |
| • acyclic measurement | Yes |
| • Acyclic measured value access | Yes |
| • Fixed measured value sets | Yes |
| • Freely definable measured value sets | Yes |
| **CiR – Configuration in RUN** | |
| Reparameterization possible in RUN | Yes |
| Calibration possible in RUN | Yes |
| **Installation type/mounting** | |
| Mounting position | Horizontal, vertical |
| **Supply voltage** | |
| Design of the power supply | Supply via voltage measurement channel L1 |
| Type of supply voltage | AC 100 - 277 V |
| permissible range, lower limit (AC) | 90 V |
| permissible range, upper limit (AC) | 293 V |
| **Line frequency** | |
| • permissible range, lower limit | 47 Hz |
| • permissible range, upper limit | 63 Hz |

| Article number | **6ES7238-5XA32-0XB0** |
|---|---|
| | SM 1238 Energy Meter 480V AC |
| **Power loss** | |
| Power loss, typ. | 0.6 W |
| **Address area** | |
| **Address space per module** | |
| • Address space per module, max. | 124 byte; 112 byte input / 12 byte output |
| **Analog inputs** | |
| Cycle time (all channels), typ. | 50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data) |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Limit value alarm | Yes |
| • Hardware interrupt | No |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; red Fn LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Integrated Functions** | |
| **Measuring functions** | |
| • Measuring procedure for voltage measurement | TRMS |
| • Measuring procedure for current measurement | TRMS |
| • Type of measured value acquisition | seamless |
| • Curve shape of voltage | Sinusoidal or distorted |
| • Buffering of measured variables | Yes |
| • Parameter length | 74 byte |
| • Bandwidth of measured value acquisition | 2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz |
| **Operating mode for measured value acquisition** | |
| - automatic detection of line frequency | No; Parameterizable |
| **Measuring range** | |
| - Frequency measurement, min. | 45 Hz |
| - Frequency measurement, max. | 65 Hz |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Analog modules

## SM 1238 Energy Meter 480 V AC analog input modules

### ■ Technical specifications (continued)

| Article number | 6ES7238-5XA32-0XB0 |
|---|---|
| | SM 1238 Energy Meter 480V AC |
| **Measuring inputs for voltage** | |
| - Measurable line voltage between phase and neutral conductor | 277 V |
| - Measurable line voltage between the line conductors | 480 V |
| - Measurable line voltage between phase and neutral conductor, min. | 90 V |
| - Measurable line voltage between phase and neutral conductor, max. | 293 V |
| - Measurable line voltage between the line conductors, min. | 155 V |
| - Measurable line voltage between the line conductors, max. | 508 V |
| - Measurement category for voltage measurement in accordance with IEC 61010-2-030 | CAT II; CAT III in case of guaranteed protection level of 1.5 kV |
| - Internal resistance line conductor and neutral conductor | 3.4 MΩ |
| - Power consumption per phase | 20 mW |
| - Impulse voltage resistance 1,2/50µs | 1 kV |
| **Measuring inputs for current** | |
| - measurable relative current (AC), min. | 1%; Relative to the secondary rated current 5 A |
| - measurable relative current (AC), max. | 100%; Relative to the secondary rated current 5 A |
| - Continuous current with AC, maximum permissible | 5 A |
| - Apparent power consumption per phase for measuring range 5 A | 0.6 V·A |
| - Rated value short-time withstand current restricted to 1 s | 100 A |
| - Input resistance measuring range 0 to 5 A | 25 mΩ; At the terminal |
| - Zero point suppression | Parameterizable: 2 - 250 mA, default 50 mA |
| - Surge strength | 10 A; for 1 minute |

| Article number | 6ES7238-5XA32-0XB0 |
|---|---|
| | SM 1238 Energy Meter 480V AC |
| **Accuracy class according to IEC 61557-12** | |
| - Measured variable voltage | 0,2 |
| - Measured variable current | 0,2 |
| - Measured variable apparent power | 0.5 |
| - Measured variable active power | 0.5 |
| - Measured variable reactive power | 1 |
| - Measured variable power factor | 0.5 |
| - Measured variable active energy | 0.5 |
| - Measured variable reactive energy | 1 |
| - Measured variable neutral current | 0.5; calculated |
| - Measured variable phase angle | ±1 °; not covered by IEC 61557-12 |
| - Measured variable frequency | 0.05 |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes; 3 700V AC (type test) CAT III |
| **Isolation** | |
| Isolation tested with | 2 300V AC for 1 min. (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -20 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -20 °C |
| • vertical installation, max. | 50 °C |
| **Dimensions** | |
| Width | 45 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight (without packaging) | 165 g |
| **Data for selecting a current transformer** | |
| • Burden power current transformer x/1A, min. | As a function of cable length and cross section, see device manual |
| • Burden power current transformer x/5A, min. | As a function of cable length and cross section, see device manual |

### ■ Ordering data

| | Article No. |
|---|---|
| **SM 1238 Energy Meter 480 V AC analog input** | |
| Energy measurement module for data acquisition in 1 and 3-phase networks (TN, TT) up to 480 V AC; current range: 1 A, 5 A; recording of voltage, current, phase angles, power ratings, energy values, frequencies; with channel diagnostics | 6ES7238-5XA32-0XB0 |
| **Extension cable for two-tier configuration** | 6ES7290-6AA30-0XA0 |
| For connecting digital/analog signal modules; length 2 m | |

| | Article No. |
|---|---|
| **Terminal block (spare part)** | |
| For voltage input (top), 7-pole, tinned, coded in middle | 6ES7292-1AG40-0XA2 |
| For current input (bottom), 7-pole, tinned | 6ES7292-1AG30-0XA0 |
| **Front flap set (spare part)** | |
| For modules with a width of 45 mm | 6ES7291-1BA30-0XA0 |

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## Overview



- Analog inputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1231-4HD32-4XB0** |
|---|---|
| Based on | **6ES7231-4HD32-0XB0** |
| | SIPLUS S7-1200 SM 1231 4AI 13Bit |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 60 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |

| Article number | **6AG1231-4HD32-4XB0** |
|---|---|
| Based on | **6ES7231-4HD32-0XB0** |
| | SIPLUS S7-1200 SM 1231 4AI 13Bit |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Analog input SIPLUS signal module SM 1231** | | **Accessories** | See SIMATIC S7-1200 analog input SM 1231, page 3/79 |
| (Extended temperature range and exposure to media) | | | |
| Ambient temperature range 0 ... +55 °C | | | |
| 4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA; 12 bits + sign | **6AG1231-4HD32-4XB0** | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS analog modules

**SIPLUS SM 1232 analog output modules**

## ■ Overview

- Analog outputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the outputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | **6AG1232-4HB32-4XB0** |
|---|---|
| Based on | **6ES7232-4HB32-0XB0** |
| | SIPLUS S7-1200 SM 1232 2AQ 13Bit |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 60 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |

| Article number | **6AG1232-4HB32-4XB0** |
|---|---|
| Based on | **6ES7232-4HB32-0XB0** |
| | SIPLUS S7-1200 SM 1232 2AQ 13Bit |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Analog output SIPLUS signal module SM 1232**<br><br>(Extended temperature range and exposure to media)<br><br>Ambient temperature range -20 ... +60 °C<br><br>2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | **6AG1232-4HB32-4XB0** | **Accessories** | See SIMATIC S7-1200 analog output SM 1232, page 3/84 |

## ■ Overview

- Analog output for SIPLUS S7-1200
- Can be plugged directly into the CPU
  (cannot be used for +70 °C version)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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## ■ Technical specifications

| Article number | 6AG1232-4HA30-4XB0 | 6AG1232-4HA30-5XB0 |
|---|---|---|
| Based on | 6ES7232-4HA30-0XB0 | 6ES7232-4HA30-0XB0 |
| | SIPLUS S7-1200 SB 1232 1AQ | SIPLUS S7-1200 SB 1232 1AQ |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • min. | 0 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 55 °C; = Tmax | 55 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS analog modules

## SIPLUS SB 1232 analog output modules

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SB 1232 analog output signal board** | | **Accessories** | See SIMATIC S7-1200 analog output SB 1232, page 3/86 |
| (Extended temperature range and exposure to media) | | | |
| Ambient temperature range <u>-25 ... +55 °C</u> | | | |
| 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-5XB0** | | |
| Ambient temperature range <u>0 ... +55 °C</u> | | | |
| 1 analog output, ±10 V with 12 bits or 0 ... 20 mA with 11 bits | **6AG1232-4HA30-4XB0** | | |

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## ■ Overview

- Analog inputs and outputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the inputs and outputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | 6AG1234-4HE32-2XB0 | 6AG1234-4HE32-4XB0 |
|---|---|---|
| Based on | 6ES7234-4HE32-0XB0 | 6ES7234-4HE32-0XB0 |
| | SIPLUS S7-1200 SM 1234 4AI/2AQ 13Bit | SIPLUS S7-1200 SM 1234 4AI/2AQ 13Bit |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 70 °C; = Tmax; Tmax > +60 °C number of simultaneously used outputs 1, inputs 2 (no adjacent points) for horizontal mounting position | 60 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS analog modules

## SIPLUS SM 1234 analog input/output modules

| Ordering data | Article No. | | | Article No. |
|---|---|---|---|---|
| **Analog input/output SIPLUS signal module SM 1234** | | **Accessories** | | See SIMATIC S7-1200 analog input/output SM 1234, page 3/88 |
| (Extended temperature range and exposure to media) | | | | |
| Ambient temperature range -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50% | | | | |
| 4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bits + sign; 2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | 6AG1234-4HE32-2XB0 | | | |
| Ambient temperature range 0 ... +55 °C | | | | |
| 4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bits + sign; 2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits | 6AG1234-4HE32-4XB0 | | | |

## Overview

- For the convenient recording of temperatures with great accuracy
- 7 common thermocouple types can be used
- Also for the measurement of analog signals with a low level (±80 mV)
- Can easily be retrofitted to existing plant

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

**3**

## Technical specifications

| Article number | **6AG1231-5QF32-4XB0** | **6AG1231-5QD32-4XB0** |
|---|---|---|
| Based on | **6ES7231-5QF32-0XB0** | **6ES7231-5QD32-0XB0** |
| | SIPLUS S7-1200 SM 1231 8AI TC 16Bit | SIPLUS S7-1200 SM 1231 4AI TC 16Bit |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -20 °C; = Tmin; Startup @ 0 °C |
| • max. | 60 °C; = Tmax | 60 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 1231 thermocouple module** | | **Accessories** | See SIMATIC S7-1200 thermocouple module SM 1231, page 3/91 |
| (Extended temperature range and exposure to media) | | | |
| Ambient temperature range -40 ... +70 °C | | | |
| 8 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L) | **6AG1231-5QF32-4XB0** | | |
| 4 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L) | **6AG1231-5QD32-4XB0** | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS analog modules

## SIPLUS RTD SM 1231 signal modules

### ■ Overview

- For the convenient recording of temperatures with great accuracy
- 4 inputs
- Most popular resistance temperature detectors can be used
- Can easily be retrofitted to existing plant

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | 6AG1231-5PD32-4XB0 | 6AG1231-5PD32-2XB0 | 6AG1231-5PF32-4XB0 | 6AG1231-5PF32-2XB0 |
|---|---|---|---|---|
| Based on | 6ES7231-5PD32-0XB0 | 6ES7231-5PD32-0XB0 | 6ES7231-5PF32-0XB0 | 6ES7231-5PF32-0XB0 |
| | SIPLUS S7-1200 SM 1231 4AI RTD 16Bit | SIPLUS S7-1200 SM 1231 4AI RTD 16Bit | SIPLUS S7-1200 SM 1231 8AI RTD 16Bit | SIPLUS S7-1200 SM 1231 8AI RTD 16Bit |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = Tmax | 70 °C; = Tmax | 60 °C; = Tmax | 70 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIPLUS RTD signal module SM 1231** | | | **Accessories** | See SIMATIC S7-1200 RTD signal module SM 1231, page 3/93 |
| (Extended temperature range and exposure to media) | | | | |
| 4 inputs for resistance temperature detectors Pt10/50/100/200/500/ 1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bits + sign | | | | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C | **6AG1231-5PD32-4XB0** | | | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C | **6AG1231-5PD32-2XB0** | | | |
| 8 inputs for resistance temperature detectors Pt10/50/100/200/500/ 1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bits + sign | | | | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +60 °C | **6AG1231-5PF32-4XB0** | | | |
| • For areas with extreme medial exposure (conformal coating); ambient temperature -40 ... +70 °C | **6AG1231-5PF32-2XB0** | | | |

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# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Special modules

**SM 1278 4xIO-Link Master**

## ■ Overview



- Module for connecting up to 4 IO-Link devices according to IO Link Specification V1.1. The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.2 and higher.

## ■ Technical specifications

| Article number | **6ES7278-4BD32-0XB0** |
|---|---|
| | S7-1200, SM1278, 4 X IO-LINK MASTER |
| **General information** | |
| Product type designation | SM 1278, IO-Link Master |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Power loss** | |
| Power loss, typ. | 1 W |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| **Connection method** | |
| required front connector | Yes |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 45 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 150 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **SM 1278 signal module 4xIO-Link master** | **6ES7278-4BD32-0XB0** |
| For the connection of up to 4 IO-Link devices according to IO Link Specification V1.1 | |
| **Terminal block (spare part)** | |
| With 7 screws, tin-coated; 4 units | **6ES7292-1AG30-0XA0** |

## Overview



SIPLUS CMS1200 SM 1281 Condition Monitoring forms part of SIMATIC S7-1200 and is used for the:

- Monitoring of motors, generators, pumps, fans, or other mechanical components
- Recording and analysis of vibrations
- Expansion capability of up to 7 modules

## Technical specifications

| Article number | **6AT8007-1AA10-0AA0** |
|---|---|
| | SM1281_Condition_Monitoring |
| **General information** | |
| Product brand name | SIPLUS |
| Product category | Condition Monitoring IEPE |
| Product designation | CMS1200 SM 1281 Condition Monitoring |
| Product description | S7-1200 module for the monitoring of vibrations on mechanical components based on parameters and frequency-selective analysis functions |
| Physical measuring principle | Vibration acceleration |
| Measurement range vibration frequency, min. | 0.1 Hz |
| Measurement range vibration frequency, max. | 10 000 Hz |
| **Installation type/mounting** | |
| Mounting type | Rail or wall mounting |
| Mounting position | Horizontal, vertical |
| Recommended mounting position | Horizontal |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | |
| • 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption, typ. | 200 mA |
| Current consumption, max. | 250 mA |
| from backplane bus 5 V DC, typ. | 80 mA |
| from backplane bus 5 V DC, max. | 85 mA |
| **Memory** | |
| Total memory capacity | 1 Gbyte |
| **Hardware configuration** | |
| Design of hardware configuration | Modular, up to 7 modules per CPU |

| Article number | **6AT8007-1AA10-0AA0** |
|---|---|
| | SM1281_Condition_Monitoring |
| **Speed input** | |
| Number of speed inputs | 1 |
| **Protocols** | |
| • 24 V DC digital | Yes |
| **Sensor input** | |
| Number of IEPE sensor inputs | 4 |
| Sampling frequency, max. | 46 875 Hz |
| **Interfaces** | |
| Type of data transmission | Exporting of raw data as WAV file for further analyses (e.g. using CMS X-Tools) can be downloaded via browser |
| Ethernet interface | Yes |
| **Protocols** | |
| Bus communication | Yes |
| **Web server** | |
| • HTTP | Yes |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostics indication LED** | |
| • Status indicator digital input (green) | No |
| • for status of the inputs | Yes |
| • for maintenance | Yes |
| **Integrated Functions** | |
| **Monitoring functions** | |
| • Monitoring of the sensor inputs | Yes; Cable break and short-circuit |
| • Vibration characteristic monitoring via RMS value of the vibration speed | Yes |
| • Vibration characteristic monitoring via RMS value of the vibration acceleration | Yes |
| • Frequency-selective monitoring via vibration speed spectrum | Yes |
| • Frequency-selective monitoring via vibration acceleration spectrum | Yes |
| • Frequency-selective monitoring via envelope curve analysis | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Special modules

**SIPLUS CMS1200 SM 1281 Condition Monitoring**

## ■ Technical specifications  (continued)

| Article number | 6AT8007-1AA10-0AA0 |
|---|---|
| | SM1281_Condition_Monitoring |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| Certificate of suitability | CE |
| CE mark | Yes |
| UL approval | Yes |
| EAC (formerly Gost-R) | Yes |
| China RoHS compliance | Yes |
| Device tag according to DIN EN 81346-2 | P |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -20 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -20 °C |
| • vertical installation, max. | 45 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Operation, min. | 795 hPa |
| • Operation, max. | 1 080 hPa |
| • Storage/transport, min. | 660 hPa |
| • Storage/transport, max. | 1 080 hPa |
| **Relative humidity** | |
| • Operation without condensation, min. | 5% |
| • Operation without condensation, max. | 95% |
| **Software** | |
| Browser software required | Web browser Mozilla Firefox (ESR31) or Microsoft Internet Explorer (10/11) |
| **Connection method** | |
| required front connector | Yes |
| Design of electrical connection | Screw connection |
| **Mechanics/material** | |
| Material of housing | Plastic: polycarbonate, abbreviation: PC- GF 10 FR |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 112 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight | 260 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS CMS1200 SM 1281 Condition Monitoring** | **6AT8007-1AA10-0AA0** |
| Module for SIMATIC S7-1200 for monitoring vibrations in mechanical components based on characteristic values and frequency-selective analysis functions. | |

## Overview

- Simulator module for program testing during commissioning and ongoing operation
- Simulation of 8 or 14 inputs

## Technical specifications

| Article number | 6ES7274-1XF30-0XA0 | 6ES7274-1XH30-0XA0 |
|---|---|---|
| | S7-1200 SIMULATOR MODULE SIM1274, 8 INP | S7-1200 SIMULATOR MODULE SIM1274, 14 INP |
| **General information** | | |
| Product type designation | SIM 1274 8Ch DI Simulator | SIM 1274 14Ch DI Simulator |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 14 |
| **Digital outputs** | | |
| Number of digital outputs | 0 | 0 |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Dimensions** | | |
| Width | 43 mm | 67 mm |
| Height | 35 mm | 35 mm |
| Depth | 23 mm | 23 mm |

## Ordering data

| | Article No. |
|---|---|
| **Digital input simulator SIM 1274 simulator module** | |
| With 8 input switches, for CPU 1211C/1212C | **6ES7274-1XF30-0XA0** |
| With 14 input switches, for CPU 1214C/1215C | **6ES7274-1XH30-0XA0** |
| With 14 input switches, for CPU 1217C | **6ES7274-1XK30-0XA0** |
| **Analog input simulator SIM 1274 simulator module** | |
| 2 potentiometers | **6ES7274-1XA30-0XA0** |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Special modules

## Battery Board BB 1297

### ■ Overview

- Battery board for extending the power reserve for the S7-1200 real-time clock

### ■ Technical specifications

| Article number | 6ES7297-0AX30-0XA0 |
|---|---|
| | BATTERY BOARD BB 1297 F. CPU 12XX |
| **General information** | |
| Product type designation | BB 1297 battery board |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • for maintenance | Yes; The maintenance LED (MAINT) of the PLC signals that the battery needs to be replaced. |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| **Marine approval** | |
| • Marine approval | Yes |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 60 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Operation, min. | 795 hPa |
| • Operation, max. | 1 080 hPa |
| • Storage/transport, min. | 660 hPa |
| • Storage/transport, max. | 1 080 hPa |
| **Relative humidity** | |
| • permissible range (without condensation) at 25 °C | 95% |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 40 g |

### ■ Ordering data

| | Article No. |
|---|---|
| **BB 1297 battery board** | **6ES7297-0AX30-0XA0** |
| For long-term backup of real-time clock; can be plugged into the signal board slot of an S7-1200 CPU in FW version 3.0 or higher; battery (CR 1025) is not included | |
| **Terminal block (spare part)** | |
| For signal board | |
| With 6 screws, gold-plated; 4 units | **6ES7292-1BF30-0XA0** |

## Overview



SIWAREX WP231 is a versatile, legal for trade weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-1200 automation system. It can also be operated without a SIMATIC CPU.

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## Technical specifications

| SIWAREX WP231 | |
|---|---|
| **Integration in automation systems** | |
| S7-1200 | SIMATIC S7-1200 system bus |
| Operator panel and/or automation systems from other vendors | Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU) |
| **Communication interfaces** | • SIMATIC S7-1200 backplane bus<br>• RS 485 (Modbus RTU, Siebert remote display)<br>• Ethernet (SIWATOOL V7, Modbus TCP/IP)<br>• Analog output 0/4 - 20 mA<br>• 4 x digital outputs, 24 V DC floating, short-circuit proof<br>• 4 x digital outputs, 24 V DC, floating |
| **Commissioning options** | • Using SIWATOOL V7<br>• Using function block in SIMATIC S7-1200 CPU / Touch Panel<br>• Using Modbus TCP/IP<br>• Using Modbus RTU |
| **Measuring accuracy** | |
| EU type approval as non-automatic weighing instrument, trade class III | 3000 d ≥ 0.5 µV/e |
| Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution | up to ±4 million parts |
| Measuring frequency | 100 / 120 Hz |
| **Digital filter** | Variable adjustable low-pass and average filter |
| **Typical applications** | • Non-automatic weighing instruments<br>• Force measurements<br>• Fill-level monitoring<br>• Belt tension monitors |
| **Weighing functions** | |
| Weight values | • Gross<br>• Net<br>• Tare |
| Limit values | • 2 x min/max<br>• Empty |
| Zeroing | Per command |
| Tare | Per command |
| Tare specification | Per command |
| **Load cells** | Full-bridge strain gauges in 4-wire or 6-wire system |

| SIWAREX WP231 | |
|---|---|
| **Load cell powering** | |
| Supply voltage (regulated via feedback) | 4.85 V DC |
| Permissible load resistance<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 40 Ω<br>< 4 100 Ω |
| With SIWAREX IS Ex interface<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 50 Ω<br>< 4 100 Ω |
| **Load cell characteristic** | 1 … 4 mV/V |
| **Permissible range of the measurement signal (with 4 mV/V sensors)** | -21.3 ... +21.3 mV |
| **Max. distance of load cells** | 500 m (229.66 ft) |
| **Connection to load cells in Ex zone 1** | Optionally via SIWAREX IS Ex interface (compatibility of the load cells must be checked) |
| **Approvals/certificates** | • ATEX Zone 2<br>• UL<br>• EAC<br>• KCC<br>• RCM<br>• OIML R76<br>• Design approval 2009/23/EC (NAWI) |
| **Calibration approval** | EU type approval OIML R76 |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 200 mA |
| Max. power consumption SIMATIC Bus | 3 mA |
| **IP degree of protection according to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements**<br>$T_{min\ (IND)} ... T_{max\ (IND)}$<br>**(operating temperature)**<br>• Vertical installation<br>• Horizontal installation | <br><br><br>-10 ... +40 °C (14 ... 104 °F)<br>-10 ... +55 °C (14 ... 131 °F) |
| **EMC requirements** | according to EN 45501 |
| **Dimensions** | 70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in) |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Special modules

## SIWAREX WP231

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| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX WP231 weighing module** | **7MH4960-2AA01** | **Ethernet cable patch cord 2 m (7 ft)** | **6XV1850-2GH20** |
| Single-channel, legal-for-trade, for NAWI non-automatic weighing instruments (e.g. platform or hopper scales) with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port. | | For connecting SIWAREX WP231 to a PC (SIWATOOL), SIMATIC CPU, panel, etc. | |
| **SIWAREX S7-1200 device manual** | | **Remote display (optional)** | |
| Available in a range of languages | | The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. | |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | Suitable remote display: | |
| **SIWAREX WP231 "Ready for Use"** | | S102 | |
| Complete software package for non-automatic weighing instrument (for S7-1200 and a directly connected operator panel). | | Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de | |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | Detailed information is available from the manufacturer. | |
| **SIWAREX WP231 "Ready for Use - legal-for-trade"** | | **Accessories** | |
| Software package for legal for trade non-automatic weighing instruments for S7-1200. | | **SIWAREX JB junction box, aluminum housing** | **7MH4710-1BA** |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | For connecting up to 4 load cells in parallel, and for connecting several junction boxes | |
| **Software SecureDisplay** | | **SIWAREX JB junction box, stainless steel housing** | **7MH4710-1EA** |
| Software for a legal trade display on Windows CE-based Panel. SIMATIC Basic and Key Panels are excluded. | | For connecting up to 4 load cells in parallel. | |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | **SIWAREX JB junction box, stainless steel housing (ATEX)** | **7MH4710-1EA01** |
| **Configuration package SIWAREX WP231 for TIA Portal** | **7MH4960-2AK01** | For connecting up to 4 load cells in parallel. (For zone allocation, see manual or type examination certificate). | |
| • "Ready for use" software for operating a scale with SIWAREX WP231 and a touch panel (in a variety of languages) | | **Ex interface SIWAREX IS** | |
| • SIWATOOL V7.0 | | For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. | |
| • Device manuals (PDF files in a variety of languages) | | • Short-circuit current < 199 mA DC | **7MH4710-5BA** |
| **Calibration set for SIWAREX WP2xx** | **7MH4960-0AY10** | • Short-circuit current < 137 mA DC | **7MH4710-5CA** |
| For verification of up to 3 scales comprising: | | | |
| • 3 x inscription foil for labeling | | | |
| • 1 x protection foil | | | |
| • Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP | | | |

## Ordering data

| | Article No. |
|---|---|
| **Cable (optional)** | |
| **Cable Li2Y 1 x 2 x 0.75 ST +<br>2 x (2 x 0.34 ST) – CY** | |
| For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. | |
| External diameter:<br>approx. 10.8 mm (0.43 in) | |
| Permissible ambient temperature<br>-40 ... +80 °C (-40 ... +176 °F). | |
| Sold by the meter. | |
| • Sheath color: orange | **7MH4702-8AG** |
| • For potentially explosive atmospheres. Sheath color: blue | **7MH4702-8AF** |

| | Article No. |
|---|---|
| **Ground terminal for connecting the load cell cable shield to the grounded DIN rail** | **6ES5728-8MA11** |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Special modules

## SIWAREX WP241

### ■ Overview



SIWAREX WP241

SIWAREX WP241 is a flexible weighing module for belt scales. The compact module is easy to install in the SIMATIC S7-1200 automation system. It can also be operated as a stand-alone module, i.e. without a SIMATIC CPU.

### ■ Technical specifications

| SIWAREX WP241 | |
|---|---|
| **Integration in automation systems** | |
| S7-1200 | SIMATIC S7-1200 system bus |
| Operator panel and/or automation systems from other vendors | Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU) |
| **Communication interfaces** | • SIMATIC S7-1200 backplane bus<br>• RS 485 (Modbus RTU)<br>• Ethernet (SIWATOOL V7, Modbus TCP/IP)<br>• Analog output 0/4 - 20 mA<br>• 4 x digital outputs, 24 V DC floating, short-circuit proof<br>• 4 x digital outputs, 24 V DC, floating |
| **Commissioning options** | • Using SIWATOOL V7<br>• Using function block in SIMATIC S7-1200 CPU / Touch Panel<br>• Using Modbus TCP/IP<br>• Using Modbus RTU |
| **Measuring accuracy** | |
| Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution | up to ±4 million parts |
| Measuring frequency | 100 / 120 Hz |
| **Digital filter** | Separate, variable adjustable low-pass and average filter for loading and speed |
| Filter for conveyor load | Low-pass filter (limit frequency 0.05 ... 50 Hz) |
| Filter for belt speed | Low-pass filter (limit frequency 0.05 ... 50 Hz) |
| **Weighing functions** | |
| Readout data | • Weight<br>• Belt load<br>• Material flow rate<br>• Accumulated total<br>• Main total<br>• Free totals 1 … 4<br>• Belt speed |
| Limits (min/max) | • Belt load<br>• Material flow rate<br>• Belt speed |

| SIWAREX WP241 | |
|---|---|
| **Load cells** | Full-bridge strain gauges in 4-wire or 6-wire system |
| **Load cell excitation** | |
| Supply voltage (regulated via feedback) | 4.85 V DC |
| Permissible load resistance<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 40 Ω<br>< 4100 Ω |
| With SIWAREX IS Ex interface<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 50 Ω<br>< 4100 Ω |
| **Load cell characteristic** | 1 … 4 mV/V |
| **Permissible measurement signal range** | -21.3 ... +21.3 mV |
| **Max. distance of load cells** | 500 m (229.66 ft) |
| **Connection to load cells in Ex zone 1** | Optionally via SIWAREX IS Ex interface (compatibility of the load cells must be checked) |
| **Approvals/certificates** | • ATEX Zone 2<br>• UL<br>• EAC<br>• KCC<br>• RCM |
| Calibration approvals | • EU-type examination certificate 2014/31/EU (NAWI) acc. to OIML R76<br>• EU-type examination certificates 2014/32/EU (MID) acc. to OIML R61 and OIML R51 |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 200 mA |
| Max. power consumption SIMATIC Bus | 3 mA |
| **IP degree of protection to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** $T_{min \, (IND)}$ ... $T_{max \, (IND)}$ (operating temperature)<br>• Vertical installation<br>• Horizontal installation | <br><br>-10 ... +40 °C (14 ... 104 °F)<br>-10 ... +55 °C (14 ... 131 °F) |
| **EMC requirements** | according to EN 45501 |
| **Dimensions** | 70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in) |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX WP241 weighing module** | **7MH4960-4AA01** | **Accessories** | |
| Single-channel, for conveyor scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port. | | **SIWAREX JB junction box, aluminum housing** | **7MH4710-1BA** |
| **SIWAREX S7-1200 device manual** | | For connecting up to 4 load cells in parallel, and for connecting several junction boxes | |
| Available in a range of languages | | **SIWAREX JB junction box, stainless steel housing** | **7MH4710-1EA** |
| Free-of-charge download from the Internet at: http://www.siemens.com/weighing-technology | | For connecting up to 4 load cells in parallel. | |
| **SIWAREX WP241 "Ready for Use"** | | **SIWAREX JB junction box, stainless steel housing (ATEX)** | **7MH4710-1EA01** |
| Complete software package for belt scales (for S7-1200 and a directly connected operator panel) Free download on the Internet at: http://www.siemens.com/weighing-technology | | For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate). | |
| **SIWAREX WP241 configuration package for TIA Portal** | **7MH4960-4AK01** | **Ex interface SIWAREX IS** | |
| • "Ready for Use" software for operating a scale with SIWAREX WP241 and a touch panel (in a variety of languages) <br> • SIWATOOL V7.0 <br> • Device manuals (PDF files in a variety of languages) | | For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. <br> • Short-circuit current < 199 mA DC <br> • Short-circuit current < 137 mA DC | **7MH4710-5BA** <br><br><br><br><br><br> **7MH4710-5CA** |
| **Ethernet cable patch cord 2 m (7 ft)** | **6XV1850-2GH20** | **Cable (optional)** | |
| For connecting SIWAREX WP241 to a PC (SIWATOOL), SIMATIC CPU, panel, etc. | | **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY** | |
| | | For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.  For permanent installation. Occasional bending is possible. | |
| | | External diameter:  approx. 10.8 mm (0.43 inch) | |
| | | Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). | |
| | | Sold by the meter. <br> • Sheath color: orange <br> • For potentially explosive atmospheres. Sheath color: blue | <br> **7MH4702-8AG** <br> **7MH4702-8AF** |
| | | **Ground terminal for connecting the load cell cable shield to the grounded DIN rail** | **6ES5728-8MA11** |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Special modules

## SIWAREX WP251

### Overview



SIWAREX WP251 electronic weighing module

SIWAREX WP251 is a flexible weighing module for dosing and filling processes. The compact module can be installed seamlessly in the SIMATIC S7-1200 automation system. It can also be used without a SIMATIC CPU in stand-alone mode.

### Technical specifications

| SIWAREX WP251 | |
|---|---|
| Weighing modes | • Non-automatic scales (filling + removal) (in accordance with OIML R-76)<br>• Automatic scales for single weighing (filling + removal) (in accordance with OIML R-51)<br>• Automatic scales for batching (in accordance with OIML R-61) |
| **Integration in automation systems** | |
| S7-1200 | SIMATIC S7-1200 system bus |
| Operator panel and/or automation systems from other vendors | Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU) |
| Ports | • 1 x SIMATIC S7-1200 system bus<br>• 1 x Ethernet (SIWATOOL and Modbus TCP/IP)<br>• 1 x RS 485 (Modbus RTU or remote display)<br>• 1 x analog output (0/4 ... 20 mA)<br>• 4 x digital inputs (24 V DC, floating)<br>• 4 x digital outputs (24 V DC, floating, short-circuit proof) |
| Functions | • 3 limits<br>• Tare<br>• Tare specification<br>• Set to zero<br>• Zero adjustment<br>• Statistics<br>• Automatic correction of the shut-off points<br>• Internal protocol memory for 550 000 entries<br>• Trace function for signal analysis<br>• Internal restore point<br>• Stand-alone mode or SIMATIC S7-1200 integrated |

| SIWAREX WP251 | |
|---|---|
| Parameter assignment | • Full access using function block in SIMATIC S7-1200<br>• Full access using Modbus TCP/IP<br>• Full access using Modbus RTU |
| **Remote display** | |
| Connection | via RS 485 |
| Setting the scales | PC software SIWATOOL (Ethernet), S7-1200 function block and touch panel or directly connected operator panel (Modbus) |
| **Measuring accuracy** | |
| Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution | Up to ±4 million parts |
| **Number of measurements/second** | 100 or 120 (selectable) |
| Filter | • Low-pass filter 0.1 ... 50 Hz<br>• Average value filter |
| Load cells | Full-bridge strain gauges in 4-wire or 6-wire system |
| **Load cell powering** | |
| Supply voltage (regulated via feedback) | 4.85 V DC |
| Permissible load resistance<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 40 Ω<br>< 4 100 Ω |
| With SIWAREX IS Ex interface<br>• $R_{Lmin}$<br>• $R_{Lmax}$ | <br>> 50 Ω<br>< 4 100 Ω |
| **Load cell characteristic** | 1 … 4 mV/V |
| **Permissible range of the measurement signal (with 4 mV/V sensors)** | -21.3 ... +21.3 mV |
| **Max. distance of load cells** | 500 m (229.66 ft) |
| Connection to load cells in Ex zone 1 | Optionally via SIWAREX IS Ex interface |
| Certificates | • ATEX Zone 2<br>• UL<br>• KCC<br>• EAC<br>• RCM |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 200 mA |
| Max. power consumption SIMATIC Bus | 3 mA |
| **IP degree of protection according to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements T$_{min(IND)}$ ... T$_{max(IND)}$ (operating temperature)**<br>• Vertical installation<br>• Horizontal installation | <br><br>-10 ... +40 °C (14 ... 104 °F)<br>-10 ... +55 °C (14 ... 131 °F) |
| **EMC requirements** | according to EN 45501 |
| **Dimensions** | 70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in) |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX WP251 weighing module** | **7MH4960-6AA01** | **Accessories** | |
| Single-channel, legal-for-trade, for automatic dosing and batching scales (GFI, ACI, NAWI) with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port. | | **SIWAREX JB junction box, aluminum housing** | **7MH4710-1BA** |
| | | For connecting up to 4 load cells in parallel, and for connecting several junction boxes | |
| **SIWAREX WP251 device manual** | | **SIWAREX JB junction box, stainless steel housing** | **7MH4710-1EA** |
| Available in a range of languages | | For connecting up to 4 load cells in parallel | |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | **SIWAREX JB junction box, stainless steel housing (ATEX)** | **7MH4710-1EA01** |
| **SIWAREX WP251 "Ready for Use"** | | For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate). | |
| Free download from the Internet at: http://www.siemens.com/weighing-technology | | **Ex interface SIWAREX IS** | |
| **Configuration package SIWAREX WP251 on CD-ROM for TIA Portal V12** | **7MH4960-6AK01** | For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. | |
| • "Ready for use" software for operating a scale with SIWAREX WP251 and a touch panel (in a variety of languages)<br>• SIWATOOL V7.0 | | • Short-circuit current < 199 mA DC | **7MH4710-5BA** |
| • Device manuals (PDF files in a variety of languages) | | • Short-circuit current < 137 mA DC | **7MH4710-5CA** |
| **Calibration set for SIWAREX WP2xx** | **7MH4960-0AY10** | **Cable (optional)** | |
| For verification of up to 3 scales comprising:<br>• 3 x inscription foil for labeling | | **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY** | |
| • 1 x protection foil | | For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. | |
| • 10 x EU verification marks (black M on green background)<br>• Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP | | External diameter: approx. 10.8 mm (0.43 in) | |
| **Ethernet cable patch cord 2 m (7 ft)** | **6XV1850-2GH20** | Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). | |
| For connecting SIWAREX WP251 to a PC (SIWATOOL), SIMATIC CPU, panel, etc. | | Sold by the meter.<br>• Sheath color: orange | **7MH4702-8AG** |
| **Remote display (optional)** | | • For potentially explosive atmospheres. Sheath color: blue | **7MH4702-8AF** |
| The digital remote displays can be connected directly to the SIWAREX WP251 via the RS 485 interface. | | **Ground terminal for connecting the load cell cable shield to the grounded DIN rail** | **6ES5728-8MA11** |
| Suitable remote display: S102 | | | |
| Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 | | | |
| Internet: http://www.siebert.de | | | |
| Detailed information is available from the manufacturer. | | | |

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# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CM 1241 communication modules

### ■ Overview

- For quick, high-performance serial data exchange via point-to-point connection
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU, 3964(R)
- Additional protocols can also be loaded
- Simple parameterization with STEP 7 Basic

### ■ Technical specifications

| Article number | 6ES7241-1CH32-0XB0 | 6ES7241-1AH32-0XB0 |
|---|---|---|
| | COMMUNICATION MODULE CM 1241, RS 422/485 | COMMUNICATION MODULE CM 1241, RS 232 |
| **General information** | | |
| Product type designation | CM 1241 RS 422/485 | CM 1241 RS 232 |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Input current** | | |
| Current consumption, max. | 220 mA; From backplane bus 5 V DC | 200 mA; From backplane bus 5 V DC |
| **Power loss** | | |
| Power loss, typ. | 1.1 W | 1.1 W |
| **Interfaces** | | |
| Number of interfaces | 1 | 1 |
| Interface physics, RS 232C (V.24) | | Yes |
| Interface (physical) RS 422/485 (X.27) | Yes | |
| **Point-to-point** | | |
| • Cable length, max. | 1 000 m | 10 m |
| **Integrated protocol driver** | | |
| - Freeport | Yes | Yes |
| - ASCII | Yes; Available as library function | Yes; Available as library function |
| - Modbus | Yes | Yes |
| - Modbus RTU master | Yes | Yes |
| - MODBUS RTU slave | Yes | Yes |
| - USS | Yes; Available as library function | |
| **Protocols** | | |
| **Integrated protocols** | | |
| **Freeport** | | |
| - Telegram length, max. | 1 kbyte | 1 kbyte |
| - Bits per character | 7 or 8 | 7 or 8 |
| - Number of stop bits | 1 (Standard), 2 | 1 (Standard), 2 |
| - Parity | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) |
| **3964 (R)** | | |
| - Telegram length, max. | 1 kbyte | 1 kbyte |
| - Bits per character | 7 or 8 | 7 or 8 |
| - Number of stop bits | 1 (Standard), 2 | 1 (Standard), 2 |
| - Parity | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) |

**3**

■ **Technical specifications**  (continued)

| Article number | 6ES7241-1CH32-0XB0 | 6ES7241-1AH32-0XB0 |
|---|---|---|
| | COMMUNICATION MODULE CM 1241, RS 422/485 | COMMUNICATION MODULE CM 1241, RS 232 |
| **Modbus RTU master** | | |
| - Address area | 1 through 49 999 (Standard Modbus addressing) | 1 through 49 999 (Standard Modbus addressing) |
| - Number of slaves, max. | 247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration | 247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration |
| **MODBUS RTU slave** | | |
| - Address area | 1 through 49 999 (Standard Modbus addressing) | 1 through 49 999 (Standard Modbus addressing) |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostic functions | Yes | Yes |
| **Diagnostics indication LED** | | |
| • for status of the outputs | Yes | Yes |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| cULus | Yes | Yes |
| FM approval | Yes | Yes |
| RCM (formerly C-TICK) | Yes | Yes |
| KC approval | Yes | Yes |
| **Ambient conditions** | | |
| **Free fall** | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| **Dimensions** | | |
| Width | 30 mm | 30 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 155 g | 150 g |

■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **CM 1241 communication module** | | | **Accessories** | |
| Communication module for point-to-point connection, with one RS 422/485 interface | **6ES7241-1CH32-0XB0** | | **Front flap set (spare part)** | |
| | | | For communication modules | **6ES7291-1CC30-0XA0** |
| Communication module for point-to-point connection, with one RS 232 interface | **6ES7241-1AH32-0XB0** | | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CB 1241 RS 485 communication boards

■ **Overview**

- For fast, high-performance serial data exchange via point-to-point connection
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can be loaded later
- Simple parameterization with STEP 7 Basic
- Can be plugged directly into the CPU

■ **Technical specifications**

| Article number | **6ES7241-1CH30-1XB0** |
| --- | --- |
| | COMMUNICATION BOARD CB 1241, RS 485 |
| **General information** | |
| Product type designation | CB 1241 RS 485 |
| **Input current** | |
| from backplane bus 5 V DC, typ. | 50 mA |
| **Power loss** | |
| Power loss, typ. | 1.5 W |
| **Interfaces** | |
| **Point-to-point** | |
| • Cable length, max. | 1 000 m |
| **Integrated protocol driver** | |
| - Freeport | Yes |
| - ASCII | Yes; Available as library function |
| - Modbus | Yes |
| - Modbus RTU master | Yes |
| - MODBUS RTU slave | Yes |
| - USS | Yes; Available as library function |
| **Protocols** | |
| **Integrated protocols** | |
| **Freeport** | |
| - Telegram length, max. | 1 kbyte |
| - Bits per character | 7 or 8 |
| - Number of stop bits | 1 (Standard), 2 |
| - Parity | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) |
| **3964 (R)** | |
| - Telegram length, max. | 1 kbyte |
| - Bits per character | 7 or 8 |
| - Number of stop bits | 1 (Standard), 2 |
| - Parity | No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0) |
| **Modbus RTU master** | |
| - Address area | 1 through 49 999 (Standard Modbus addressing) |
| - Number of slaves, max. | 247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration |
| **MODBUS RTU slave** | |
| - Address area | 1 through 49 999 (Standard Modbus addressing) |

| Article number | **6ES7241-1CH30-1XB0** |
| --- | --- |
| | COMMUNICATION BOARD CB 1241, RS 485 |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| cULus | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • permissible temperature range | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 38 mm |
| Height | 62 mm |
| Depth | 21 mm |
| **Weights** | |
| Weight, approx. | 40 g |

■ **Ordering data**

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **CB 1241 RS 485 communication board** | **6ES7241-1CH30-1XB0** | **Accessories** | |
| | | **Terminal block (spare part)** | |
| For point-to-point connection, with 1 RS 485 interface | | For signal board | |
| | | With 6 screws, gold-plated; 4 pcs. | **6ES7292-1BF30-0XA0** |

3

## Overview



| DP-M | DP-S | FMS | PG/OP | S7 |
|------|------|-----|-------|-----|
|      | ●    |     |       |     |

The CM 1242-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP slave and has the following characteristics:

- PROFIBUS DPV1 slave in accordance with IEC 61158
- Module replacement without PG supported
- Power is supplied via the backplane bus so that no extra cabling is required
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The CM 1242-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

## Technical specifications

| Article number | **6GK7242-5DX30-0XE0** |
|---|---|
| Product type designation | CM 1242-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| • for power supply | 0 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS 485) |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.15 A |
| Power loss [W] | 0.75 W |

| Article number | **6GK7242-5DX30-0XE0** |
|---|---|
| Product type designation | CM 1242-5 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 45 °C |
| • for horizontally arranged busbars during operation | 0 ... 55 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.115 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • S7-300 rail mounting | No |
| • wall mounting | Yes |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

■ **Technical specifications** (continued)

| Article number | **6GK7242-5DX30-0XE0** |
|---|---|
| Product type designation | CM 1242-5 |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |
| **Performance data PROFIBUS DP** | |
| Service as DP slave | |
| • DPV0 | Yes |
| • DPV1 | Yes |
| Amount of data | |
| • of the address area of the inputs as DP slave total | 240 byte |
| • of the address area of the outputs as DP slave total | 240 byte |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | No |
| Configuration software | |
| • required | STEP 7 Basic/Professional V11 (TIA Portal) or higher |

■ **Ordering data** | **Article No.**

| | |
|---|---|
| **CM 1242-5 communication module** | |
| Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DP slave module | **6GK7242-5DX30-0XE0** |
| **Accessories** | |
| **PROFIBUS FastConnect connection plug RS 485** | |
| With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s | |
| • Without PG interface | **6ES7972-0BA52-0XA0** |
| • With PG interface | **6ES7972-0BB52-0XA0** |
| **PROFIBUS FC Standard Cable** | |
| 2-core bus cable, shielded, special design for fast mounting, sold by the meter; delivery unit: max. 1000 m, minimum order 20 m | **6XV1830-0EH10** |
| **PROFIBUS FastConnect Stripping Tool** | |
| Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable | **6GK1905-6AA00** |
| **PROFIBUS bus terminal 12M** | |
| Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable | **6GK1500-0AA10** |

Note:

You can find order information for software in the Catalog IK PI or in the Industry Mall.

## ■ Overview
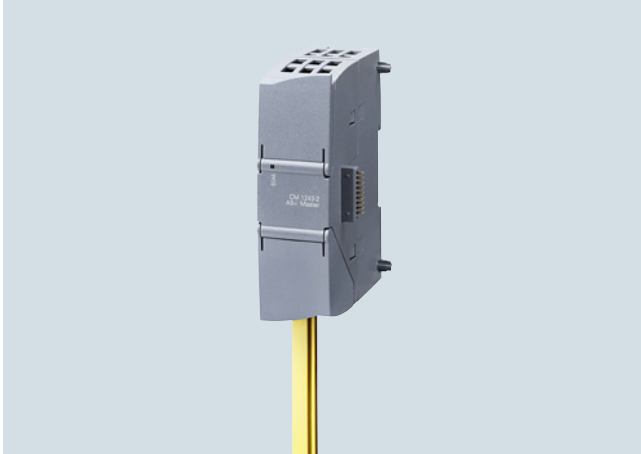


CM 1243-2 communication module for S7-1200

The CM 1243-2 communication module is the AS-Interface master for the SIMATIC S7-1200 and has the following features:

- As many as 62 AS-Interface slaves can be connected
- Integrated analog value transmission
- Supports all AS-Interface master functions in accordance with the AS-Interface specification V3.0
- Indication of the operating state on the front of the device displayed via LED
- Display of operating mode, AS-Interface voltage faults, configuration faults and peripheral faults via LED behind the front panel
- Compact enclosure in the design of the SIMATIC S7-1200
- Suitable for AS-i Power24V: In combination with the optional DCM 1271 data decoupling module, a standard 24 V power supply unit can be used
- Configuration and diagnostics via the TIA portal

### *Design*

The CM 1243-2 communication module is positioned to the left of the S7-1200 CPU and linked to the S7-1200 via lateral contacts.

It has:

- Terminals for two AS-i cables (internally jumpered) via two screw terminals each
- One terminal for connection to the functional ground
- LEDs for indication of the operating state and fault statuses of the connected slaves

The screw terminals (included in scope of supply) can be removed to facilitate installation.

### *Function*

The CM 1243-2 supports all specified functions of the AS-Interface Specification V3.0.

The values of the digital AS-i slaves can be activated via the process image of the S7-1200. During configuration of the slaves in the TIA Portal, the values of the analog AS-i slaves can also be accessed directly in the process image.

It is also possible to exchange all data of the AS-i master and the connected AS-i slaves with the S7-1200 via the data record interface.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM 1243-2 in the TIA Portal.

The optional DCM 1271 data decoupling module (see "Accessories" and Catalog IC 10) has an integrated detection unit for detecting ground faults on the AS-Interface cable. The integrated overload protection also disconnects the AS-Interface cable if the drive current required exceeds 4 A.

Notes on safety

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

For more information on the topic of Industrial Security, see http://www.siemens.com/industrialsecurity.

### *Configuration*

To configure CM 1243-2, you require STEP 7 V11 + SP2 or higher.

For STEP 7 V11 + SP2 or higher, the additional Hardware Support Package for CM 1243-2 is required. This is available from the Industry Online Support Portal. See https://support.industry.siemens.com/cs/ww/en/view/54164095.

The software enables user-friendly configuration and diagnostics of the AS-i master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration at the "touch of a button" via the control panel integrated in the TIA portal/STEP7.

When operated on a S7-1200 CPU with firmware version V4.0 or higher, the firmware version V1.1 (or higher) is required for the CM 1243-2.

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CM 1243-2**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **CM 1243-2 communication module**<br>• AS-Interface master for SIMATIC S7-1200<br>• Corresponds to AS-Interface Specification V3.0<br>• With screw terminals, removable terminals (included in the scope of supply)<br>• Dimensions (W × H × D / mm): 30 × 100 × 75 | 3RK7243-2AA30-0XB0 | **AS-interface addressing unit V3.0**<br>• For AS-Interface modules and sensors and sensors and actuators with integrated AS-Interface according to AS-i Specification V3.0<br>• For setting the AS-i address of standard slaves, and slaves with extended addressing mode (A/B slaves)<br>• With input/output test function and many other commissioning functions<br>• Battery operation with four type AA batteries (IEC LR6, NEDA 15)<br>• Degree of protection IP40<br>• Dimensions (W × H × D / mm): 84 × 195 × 35<br>• Scope of supply:<br> - Addressing unit with 4 batteries<br> - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m | 3RK1904-2AB02 |
| **Accessories** | | | |
| **DCM 1271 data decoupling module**<br>• With screw terminals, removable terminals (included in the scope of supply)<br>• Dimensions (W × H × D / mm): 30 × 100 × 75 | 3RK7271-1AA30-0AA0 | | |
| **Screw terminals (replacement)**<br>• 5-pole<br> for AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling unit<br>• With screw terminals<br><br>• 3-pole<br> for AS-i DCM 1271 data decoupling unit for connecting the power supply unit<br>• With screw terminals | 3RK1901-3MA00<br><br><br><br>3RK1901-3MB00 | **More information**<br><br>For manuals, see https://support.industry.siemens.com/cs/ww/en/ps/15750/man. | |

## Overview

The CM 1243-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP master and has the following characteristics:

- PROFIBUS DPV1 master in accordance with IEC 61158
- Support of up to 16 PROFIBUS DP slaves
- Communication with other S7 controllers based on S7 communication
- Allows the connection of programming devices and operator panels with a PROFIBUS interface to the S7-1200
- Module replacement without PG supported
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The CM 1243-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

| DP-M | DP-S | FMS | PG/OP | S7 |
|------|------|-----|-------|-----|
| ● | | | ● | ● |

## Technical specifications

| Article number | **6GK7243-5DX30-0XE0** |
|---|---|
| Product type designation | CM 1243-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS 485) |
| • for power supply | 3-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20% |
| Relative negative tolerance at DC at 24 V | 20% |
| Consumed current | |
| • from external supply voltage at DC at 24 V typical | 0.1 A |
| Power loss [W] | 2.4 W |

| Article number | **6GK7243-5DX30-0XE0** |
|---|---|
| Product type designation | CM 1243-5 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 45 °C |
| • for horizontally arranged busbars during operation | 0 ... 55 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.134 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • S7-300 rail mounting | No |
| • wall mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CM 1243-5**

■ **Technical specifications** (continued)

| | |
|---|---|
| Article number | **6GK7243-5DX30-0XE0** |
| Product type designation | CM 1243-5 |
| **Performance data PROFIBUS DP** | |
| Service as DP master | |
| • DPV1 | Yes |
| Number of DP slaves on DP master usable | 16 |
| Amount of data | |
| • of the address area of the inputs as DP master total | 512 byte |
| • of the address area of the outputs as DP master total | 512 byte |
| • of the address area of the inputs per DP slave | 244 byte |
| • of the address area of the outputs per DP slave | 244 byte |
| • of the address area of the diagnostic data per DP slave | 240 byte |
| Service as DP slave | |
| • DPV0 | No |
| • DPV1 | No |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 8 |
| • with PG connections maximum | 1 |
| • with PG/OP connections maximum | 3 |
| • Note | max. 4 connections to other S7 stations |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | |
| • without DP maximum | 8 |
| • with DP maximum | 8 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | No |
| Configuration software | |
| • required | STEP 7 Basic/Professional V11 (TIA Portal) or higher |

■ **Ordering data**                                    **Article No.**

| | |
|---|---|
| **CM 1243-5 communication module** | |
| Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 master | **6GK7243-5DX30-0XE0** |
| **Accessories** | |
| **PROFIBUS FastConnect connection plug RS 485** | |
| With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s | |
| • Without PG interface | **6ES7972-0BA52-0XA0** |
| • With PG interface | **6ES7972-0BB52-0XA0** |
| **PROFIBUS FC Standard Cable** | |
| 2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter | **6XV1830-0EH10** |
| **PROFIBUS FastConnect Stripping Tool** | |
| Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable | **6GK1905-6AA00** |
| **PROFIBUS bus terminal 12M** | |
| Bus terminal for connection of PROFIBUS nodes up to 12 Mbps with connecting cable | **6GK1500-0AA10** |

Note:

You can find order information for software in the Catalog IK PI or in the Industry Mall.

## Overview



- Unmanaged switch for connecting a SIMATIC S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Multiplication of Ethernet interfaces on a SIMATIC S7-1200 for additional connection of up to three programming devices, operator controls, and further Ethernet nodes
- Simple, space-saving mounting on the SIMATIC S7-1200 mounting rail
- Low-cost solution for implementing small, local Ethernet networks
- Connection without any problems using RJ45 plugs
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

## Technical specifications

| Article number | **6GK7277-1AA10-0AA0** |
|---|---|
| Product type designation | CSM 1277 |
| **Transmission rate** | |
| Transfer rate | 10 Mbit/s, 100 Mbit/s |
| **Interfaces for communication integrated** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 4 |
| Number of 100 Mbit/s SC ports | |
| • for multimode | 0 |
| Number of 1000 Mbit/s LC ports | |
| • for multimode | 0 |
| • for single mode (LD) | 0 |
| **Interfaces others** | |
| Number of electrical connections | |
| • for power supply | 1 |
| Type of electrical connection | |
| • for power supply | 3-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | |
| • external | 24 V |
| • external | 19.2 ... 28.8 V |
| Product component fusing at power supply input | Yes |
| Fuse protection type at input for supply voltage | 0.5 A / 60 V |
| Consumed current maximum | 0.07 A |
| Power loss [W] | |
| • at DC at 24 V | 1.6 W |

| Article number | **6GK7277-1AA10-0AA0** |
|---|---|
| Product type designation | CSM 1277 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity | |
| • at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Design | SIMATIC S7-1200 device design |
| Width | 45 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.15 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |
| • S7-300 rail mounting | No |
| • S7-1500 rail mounting | No |
| **Product functions management, configuration** | |
| Product function | |
| • multiport mirroring | No |
| • switch-managed | No |
| **Product functions Redundancy** | |
| Product function | |
| • Parallel Redundancy Protocol (PRP)/ operation in the PRP-network | Yes |
| • Parallel Redundancy Protocol (PRP)/ Redundant Network Access (RNA) | No |

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# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CSM 1277 unmanaged**

■ **Technical specifications**  (continued)

| | |
|---|---|
| Article number | **6GK7277-1AA10-0AA0** |
| Product type designation | CSM 1277 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta |
| • for hazardous zone | EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T4, KEMA 08 ATEX 0003 X |
| • for safety from CSA and UL | UL 508, CSA C22.2 No. 142 |
| • for emitted interference | EN 61000-6-4 (Class A) |
| • for interference immunity | EN 61000-6-2 |
| Certificate of suitability CE marking | Yes |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • C-Tick | Yes |
| • KC approval | No |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes |
| • Bureau Veritas (BV) | Yes |
| • Det Norske Veritas (DNV) | Yes |
| • Germanische Lloyd (GL) | No |
| • Lloyds Register of Shipping (LRS) | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes |
| • Polski Rejestr Statkow (PRS) | No |
| • Royal Institution of Naval Architects (RINA) | No |
| MTBF at 40 °C | 273 y |

■ **Ordering data** | **Article No.**

| | |
|---|---|
| **CSM 1277 compact switch module** | |
| Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM | **6GK7277-1AA10-0AA0** |
| **Accessories** | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | **6XV1840-3AH10** |
| 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **IE FC RJ45 Plug 180 2 x 2** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |
| **IE FC outlet RJ45** | **6GK1901-1FC00-0AA0** |
| For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more | |
| **IE TP Cord RJ45/RJ45** | |
| • TP cord pre-assembled with 2 RJ45 connectors; length: 0.5 m | **6XV1850-2GE50** |
| • TP cable 4 x 2 with 2 RJ45 connectors; length: 0.5 m | **6XV1870-3QE50** |

**3**

## Overview

The CP 1243-1 communications processor is used for connecting a SIMATIC S7-1200 to the TeleControl Server Basic control center software via Ethernet, and for safe communication via IP-based networks.

The CP has the following features:

- Ethernet-based connection to TeleControl Server Basic, e.g. via Internet
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Data buffering of up to 64,000 values ensures a secure database even with temporary connection failures
- Secure communication via VPN connections based on IPSec
- Access protection via Stateful Inspection Firewall
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

## Technical specifications

| Article number | 6GK7243-1BX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • for power supply | 0 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.25 A |
| Power loss [W] | 1.25 W |

| Article number | 6GK7243-1BX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 110 mm |
| Depth | 75 mm |
| Net weight | 0.122 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CP 1243-1

### ■ Technical specifications (continued)

| Article number | **6GK7243-1BX30-0XE0** |
|---|---|
| Product type designation | CP 1243-1 |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • Note | like CPU |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | No |
| • substation | Yes |
| • TIM control center | No |
| Control center connection | to be used with Telecontrol Server Basic |
| • by means of a permanent connection | supported |
| • Note | Connection to SCADA system via Telecontrol Server Basic |
| Protocol is supported | |
| • DNP3 | No |
| • IEC 60870-5 | No |
| Product function data buffering if connection is aborted | Yes; 64,000 values |
| Number of data points per station maximum | 200 |
| **Performance data Teleservice** | |
| Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes |
| Product function | |
| • program download with SIMATIC STEP 7 | Yes |
| • Remote firmware update | Yes |
| Configuration software | |
| • required | STEP 7 Basic/Professional V13 Update 2 + HSP (TIA Portal) or higher |

| Article number | **6GK7243-1BX30-0XE0** |
|---|---|
| Product type designation | CP 1243-1 |
| **Product functions Security** | |
| Firewall version | stateful inspection |
| Product function with VPN connection | IPSec |
| Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168 |
| Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates |
| Type of hashing algorithms with VPN connection | MD5, SHA-1 |
| Number of possible connections with VPN connection | 8 |
| Product function | |
| • password protection for Web applications | No |
| • password protection for teleservice access | No |
| • encrypted data transmission | Yes |
| • ACL - IP-based | No |
| • ACL - IP-based for PLC/routing | No |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | No |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| time synchronization | |
| • from control center | Yes |

## ◼ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Communications processor CP 1243-1** | | **Compact switch module CSM 1277** | |
| Communications processor for connection of SIMATIC S7-1200 to TeleControl Server Basic or for secure connection via IP-based networks | **6GK7243-1BX30-0XE0** | Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-1200 module including electronic device manual on CD-ROM | **6GK7277-1AA10-0AA0** |
| **Accessories** | | | |
| **TeleControl Server Basic V3.0** | | **IE FC RJ45 plugs** | |
| Software for 8 to 5000 stations; single license for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 Windows Server 2008 R2 Standard 64-bit Service Pack 1 | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| | | **IE FC RJ45 Plug 180** | |
| | | 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| | | • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| | | • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| | | • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |
| • **TeleControl Server Basic 8 V3** Connection management for 8 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AA0** | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | |
| • **TeleControl Server Basic 32 V3** Connection management for 32 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AF0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE F RJ45 plug; PROFINET-compatible; with UL approval; <u>sold by the meter</u> max. length 1000 m, minimum order quantity 20 m | **6XV1840-2AH10** |
| • **TeleControl Server Basic 64 V3** Connection management for 64 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AB0** | **IE FC Stripping Tool** | |
| • **TeleControl Server Basic 256 V3** Connection management for 256 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AC0** | Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables | **6GK1901-1GA00** |
| • **TeleControl Server Basic 1000 V3** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AD0** | **STEP 7 Basic Engineering Software (TIA Portal)** | See catalog section 11 |
| • **TeleControl Server Basic 5000 V3** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AE0** | | |
| • **TeleControl Server Basic UPGR V3** Upgrade package from Version V2.x to V3 for all license sizes | **6NH9910-0AA21-0GA0** | | |

**3**

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

**CP 1242-7 V2 GPRS**

## ◾ Overview



The CP 1242-7 GPRS V2 communications processor is used to connect a SIMATIC S7-1200 to the globally available GSM/GPRS mobile radio network and has the following characteristics:

- Worldwide wireless exchange of data between S7-1200 controllers and/or between S7-1200 controllers and control centers with an Internet connection
- Communication based on the GPRS (**G**eneral **P**acket **R**adio **S**ervice) mobile wireless service with data transmission speeds of up to 86 Kbit/s in the downlink and 43 Kbit/s in the uplink
- GPRS mode with fixed IP addresses and dynamic IP addresses with standard mobile phone contract
- Time synchronization on the basis of NTP (**N**etwork **T**ime **P**rotocol)
- Sending and receiving of text messages
- LED signaling for fast diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

In conjunction with the TeleControl Server Basic software, the CP 1242-7 forms a telecontrol system with additional properties:

- Connection of up to 5000 telecontrol stations to the control center via an OPC interface
- Data buffering in the substations in the event of connection failures
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Teleservice access with STEP 7 to the substations via the Internet

The CP 1242-7 V2 is a new product version of the CP 1242-7. The concept for process data transmission has been expanded with a simple data point configuration, which enables substantially easier commissioning without high programming overhead and minimizes susceptibility to errors during the projects implementation phase. CP 1242-7 has also been equipped with new functions, such as access to the internal Web server of the S7-1200. This opens up numerous new application areas.

## ◾ Technical specifications

| Article number | 6GK7242-7KX31-0XE0 | | Article number | 6GK7242-7KX31-0XE0 |
|---|---|---|---|---|
| Product type designation | CP 1242-7 V2 | | Product type designation | CP 1242-7 V2 |
| **Transmission rate** | | | **Wireless technology** | |
| Transfer rate | | | Type of mobile wireless service | |
| • for GPRS transmission | | | • is supported SMS | Yes |
| - with downlink maximum | 86 kbit/s | | • is supported GPRS | Yes |
| - with uplink maximum | 43 kbit/s | | • Note | GPRS (Multislot Class 10) |
| **Interfaces** | | | Type of mobile network is supported | |
| Number of interfaces acc. to Industrial Ethernet | 0 | | • GSM | Yes |
| Number of electrical connections | | | • UMTS | No |
| • for external antenna(s) | 1 | | • LTE | No |
| • for power supply | 1 | | Operating frequency | |
| Number of slots | | | • 850 MHz | Yes |
| • for SIM cards | 1 | | • 900 MHz | Yes |
| Type of electrical connection | | | • 1800 MHz | Yes |
| • for external antenna(s) | SMA socket (50 ohms) | | • 1900 MHz | Yes |
| • for power supply | 3-pole terminal block | | Transmit power | |
| Slot version | | | • at operating frequency 900 MHz | 2 W |
| • for SIM card | Standard | | • at operating frequency 1800 MHz | 1 W |
| | | | • at operating frequency 1900 MHz | 1 W |

■ **Technical specifications** (continued)

| Article number | **6GK7242-7KX31-0XE0** |
|---|---|
| Product type designation | CP 1242-7 V2 |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20% |
| Relative negative tolerance at DC at 24 V | 20% |
| Consumed current | |
| • from external supply voltage at DC at 24 V typical | 0.1 A |
| • from external supply voltage at DC at 24 V maximum | 0.22 A |
| Power loss [W] | 2.4 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.133 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • S7-300 rail mounting | No |
| • wall mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |
| **Performance data** | |
| Number of users/telephone numbers definable maximum | 10 |

| Article number | **6GK7242-7KX31-0XE0** |
|---|---|
| Product type designation | CP 1242-7 V2 |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | like CPU |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as e-mail client maximum | 1 |
| **Performance data telecontrol** | |
| Control center connection | Telecontrol Server Basic |
| • by means of a permanent connection | supported |
| • by means of demand-oriented connection | supported |
| • Note | Connection to SCADA system using OPC interface |
| Protocol is supported | |
| • DNP3 | No |
| • IEC 60870-5 | No |
| Product function data buffering if connection is aborted | Yes; 64,000 values |
| **Performance data Teleservice** | |
| Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes |
| Product function | |
| • program download with SIMATIC STEP 7 | Yes |
| • Remote firmware update | Yes |
| Configuration software | |
| • required | STEP 7 Basic/Professional V13 SP1 or higher |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions Security** | |
| Product function | |
| • password protection for teleservice access | Yes |
| • encrypted data transmission | Yes |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| time synchronization | |
| • from control center | Yes |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CP 1242-7 V2 GPRS**

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| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Communications processor CP 1242-7 V2[1]** | | **ANT794-4MR antenna** | **6NH9860-1AA00** |
| Communications processor CP 1242-7 GPRS V2 for connecting SIMATIC S7-1200 to TeleControl Server Basic via GSM/GPRS mobile radio network | **6GK7242-7KX31-0XE0** | Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; weather-resistant for indoor and outdoor use; 5 m connecting cable with fixed connection to antenna; SMA connector; including mounting bracket, screws, wall plugs | |
| **Accessories** | | | |
| **TeleControl Server Basic V3.0** | | **ANT794-3M antenna** | **6NH9870-1AA00** |
| Software for 8 to 5000 stations; single license for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 Windows Server 2008 R2 Standard 64-bit Service Pack 1 | | Flat panel antenna for GSM (2G) networks, for triband with 900/1800/1900 MHz; weather-resistant for indoor/ outdoor use, 1.2 m connecting cable with fixed connection to antenna; SMA connector, incl. assembly adhesive tape | |
| | | **STEP 7 Basic Engineering Software V13 SP1 (TIA Portal)** | See catalog section 11 |
| • **TeleControl Server Basic 8 V3** Connection management for 8 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AA0** | | |
| • **TeleControl Server Basic 32 V3** Connection management for 32 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AF0** | | |
| • **TeleControl Server Basic 64 V3** Connection management for 64 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AB0** | | |
| • **TeleControl Server Basic 256 V3** Connection management for 256 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AC0** | | |
| • **TeleControl Server Basic 1000 V3** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AD0** | | |
| • **TeleControl Server Basic 5000 V3** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AE0** | | |
| • **TeleControl Server Basic UPGR V3** Upgrade package from Version V2.x to V3 for all license sizes | **6NH9910-0AA21-0GA0** | | |

[1] Note national approvals under
http://www.siemens.com/mobilenetwork-approvals

## Overview



CP 1243-7 LTE is used to connect the S7-1200 to a mobile wireless network of the 4th Generation LTE (Long Term Evolution). The increased data rates compared to GPRS and widespread introduction of LTE open up new areas of application. The CP1243-7 is characterized by the following properties:

- 1 connection to LTE (4G) mobile wireless network (various versions for EU and North America)
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Operation with fixed IP addresses and dynamic IP addresses with standard cellular phone contract
- Time synchronization based on NTP (Network Time Protocol)
- On-demand connection buildup via voice call or text message
- Sending and receiving of text messages
- TeleService access with STEP 7 to substations via mobile wireless networks
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Temperature range in operation: -20 °C to +70 °C
- Installation on standard mounting rails
- Diagnostics LEDs (overall status and details)
- Integrated security functions (VPN and firewall)
- Access to the CPU Web server
- Fast commissioning due to simplified configuration with STEP 7
- Data buffering of up to 64,000 values ensures a secure database even with temporary connection failures

## Technical specifications

| Article number | 6GK7243-7KX30-0XE0 | 6GK7243-7SX30-0XE0 |
|---|---|---|
| Product type designation | CP 1243-7 LTE EU | CP 1243-7 LTE US |
| **Transmission rate** | | |
| Transfer rate | | |
| • for LTE transmission | | |
| - with downlink maximum | 42 Mbit/s | 42 Mbit/s |
| - with uplink maximum | 5.76 Mbit/s | 5.76 Mbit/s |
| **Interfaces** | | |
| Number of interfaces acc. to Industrial Ethernet | 0 | 0 |
| Number of electrical connections | | |
| • for external antenna(s) | 1 | 1 |
| • for power supply | 1 | 1 |
| Number of slots | | |
| • for SIM cards | 1 | 1 |
| Type of electrical connection | | |
| • for external antenna(s) | SMA socket (50 ohms) | SMA socket (50 ohms) |
| • for power supply | 3-pole terminal block | 3-pole terminal block |
| Slot version | | |
| • for SIM card | Standard | Standard |

| Article number | 6GK7243-7KX30-0XE0 | 6GK7243-7SX30-0XE0 |
|---|---|---|
| Product type designation | CP 1243-7 LTE EU | CP 1243-7 LTE US |
| **Wireless technology** | | |
| Type of mobile wireless service | | |
| • is supported SMS | Yes | Yes |
| • is supported GPRS | Yes | Yes |
| • Note | GPRS (Multislot Class 10) | GPRS (Multislot Class 10) |
| Type of mobile network is supported | | |
| • GSM | Yes | Yes |
| • UMTS | Yes | Yes |
| • LTE | Yes | Yes |
| Operating frequency | | |
| • 850 MHz | | Yes |
| • 1900 MHz | | Yes |
| Operating frequency | | |
| • for GSM transmission 900 MHz | Yes | |
| • for GSM transmission 1800 MHz | Yes | |
| • with UMTS transmission 900 MHz | Yes | |
| • with UMTS transmission 2100 MHz | Yes | |
| • for LTE transmission 700 MHz | | Yes |
| • for LTE transmission 800 MHz | Yes | |
| • for LTE transmission 1700 MHz | | Yes |
| • for LTE transmission 1800 MHz | Yes | |
| • for LTE transmission 2600 MHz | Yes | |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CP 1243-7 LTE**

■ **Technical specifications** (continued)

| Article number | 6GK7243-7KX30-0XE0 | 6GK7243-7SX30-0XE0 |
|---|---|---|
| Product type designation | CP 1243-7 LTE EU | CP 1243-7 LTE US |
| **Supply voltage, current consumption, power loss** | | |
| Type of voltage of the supply voltage | DC | DC |
| Supply voltage external | 24 V | 24 V |
| Supply voltage external at DC Rated value | 24 V | 24 V |
| Relative positive tolerance at DC at 24 V | 20% | 20% |
| Relative negative tolerance at DC at 24 V | 20% | 20% |
| Consumed current | | |
| • from external supply voltage at DC at 24 V typical | 0.1 A | 0.1 A |
| • from external supply voltage at DC at 24 V maximum | 0.22 A | 0.22 A |
| **Permitted ambient conditions** | | |
| Ambient temperature | | |
| • for vertical installation during operation | -20 ... +60 °C | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C | -20 ... +70 °C |
| • during storage | -40 ... +70 °C | -40 ... +70 °C |
| • during transport | -40 ... +70 °C | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% | 95% |
| Protection class IP | IP20 | IP20 |
| **Design, dimensions and weight** | | |
| Module format | Compact module S7-1200 single width | Compact module S7-1200 single width |
| Width | 30 mm | 30 mm |
| Height | 100 mm | 100 mm |
| Depth | 75 mm | 75 mm |
| Net weight | 0.133 kg | 0.133 kg |
| Mounting type | | |
| • 35 mm DIN rail mounting | Yes | Yes |
| • S7-300 rail mounting | No | No |
| • wall mounting | Yes | Yes |
| **Product properties, functions, components general** | | |
| Number of units | | |
| • per CPU maximum | 3 | 3 |
| **Performance data** | | |
| Number of users/telephone numbers definable maximum | 10 | 10 |
| **Performance data open communication** | | |
| Number of possible connections for open communication | | |
| • by means of T blocks maximum | like CPU | like CPU |
| **Performance data IT functions** | | |
| Number of possible connections | | |
| • as e-mail client maximum | 1 | 1 |

| Article number | 6GK7243-7KX30-0XE0 | 6GK7243-7SX30-0XE0 |
|---|---|---|
| Product type designation | CP 1243-7 LTE EU | CP 1243-7 LTE US |
| **Performance data telecontrol** | | |
| Suitability for use | | |
| • substation | Yes | Yes |
| Control center connection | Telecontrol Server Basic | Telecontrol Server Basic |
| • by means of a permanent connection | supported | supported |
| • by means of demand-oriented connection | supported | supported |
| • Note | Connection to SCADA system using OPC interface | Connection to SCADA system using OPC interface |
| Protocol is supported | | |
| • DNP3 | No | No |
| • IEC 60870-5 | No | No |
| Product function data buffering if connection is aborted | Yes; 64,000 values | Yes; 64,000 values |
| **Performance data Teleservice** | | |
| Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes | Yes |
| Product function | | |
| • program download with SIMATIC STEP 7 | Yes | Yes |
| • Remote firmware update | Yes | Yes |
| Configuration software | | |
| • required | STEP 7 Basic/Professional V13 SP1 or higher | STEP 7 Basic/Professional V13 SP1 + HSP or higher |
| **Product functions Diagnosis** | | |
| Product function Web-based diagnostics | Yes | Yes |
| **Product functions Security** | | |
| Firewall version | stateful inspection | stateful inspection |
| Product function with VPN connection | IPSec | IPSec |
| Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168, DES-56 | AES-256, AES-192, AES-128, 3DES-168, DES-56 |
| Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates | Preshared key (PSK), X.509v3 certificates |
| Type of hashing algorithms with VPN connection | MD5, SHA-1 | MD5, SHA-1 |
| Number of possible connections with VPN connection | 1 | 1 |
| Product function | | |
| • password protection for teleservice access | Yes | Yes |
| • encrypted data transmission | Yes | Yes |
| **Product functions Time** | | |
| Protocol is supported | | |
| • NTP | Yes | Yes |
| time synchronization | | |
| • from control center | Yes | Yes |

**3**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Communications processor CP 1243-7 LTE** | | **ANT794-4MR antenna** | **6NH9860-1AA00** |
| Communications processor for connecting SIMATIC S7-1200 to the TeleControl Server Basic via the LTE mobile wireless network | | Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; weather-resistant for indoor and outdoor use; 5 m cable with fixed connection to antenna; SMA connector; including mounting bracket, screws, wall plugs | |
| • **CP 1243-7 LTE EU** Frequencies in European band: 700, 1700 MHz | **6GK7243-7KX30-0XE0** | | |
| • **CP 1243-7 LTE US** Frequencies in North American band: 800, 1800, 2600 MHz | **6GK7243-7SX30-0XE0** | **STEP 7 Basic Engineering Software (TIA Portal)** | See catalog section 11 |
| **Accessories** | | | |
| **TeleControl Server Basic V3.0** | | | |
| Software for 8 to 5000 stations; single license for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 Windows Server 2008 R2 Standard 64-bit Service Pack 1 | | | |
| • **TeleControl Server Basic 8 V3** Connection management for 8 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AA0** | | |
| • **TeleControl Server Basic 32 V3** Connection management for 32 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AF0** | | |
| • **TeleControl Server Basic 64 V3** Connection management for 64 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AB0** | | |
| • **TeleControl Server Basic 256 V3** Connection management for 256 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AC0** | | |
| • **TeleControl Server Basic 1000 V3** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AD0** | | |
| • **TeleControl Server Basic 5000 V3** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AE0** | | |
| • **TeleControl Server Basic UPGR V3** Upgrade package from Version V2.x to V3 for all license sizes | **6NH9910-0AA21-0GA0** | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CP 1243-8 IRC

### ■ Overview



The CP 1243-8 IRC communications processor (Industrial Remote Communication) is used for connecting a SIMATIC S7-1200 in the TeleControl Professional system via the SINAUT ST7 telecontrol protocol to higher-level ST7 stations or to an ST7 control center.

The CP has the following features:

- SINAUT ST7 telecontrol protocol supported
- Two WAN connections for selecting the communication paths:
  - Ethernet-based connection: RJ45 port on the module for connecting external routers, e.g. SCALANCE M
  - Additional connection configurable via plug-in TS modules

- Both WAN interfaces can also be operated simultaneously: Route redundancy
- Data transfer optimized for telecontrol systems on the basis of SINAUT ST7
- Automatic transmission of alarms per email or SMS
- Time synchronization based on NTP (Network Time Protocol) or via the SINAUT system
- Data buffering of up to 16,000 data messages prevents data loss in the event of temporary connection failures
- Secure communication via VPN connections based on IPSec
- Access protection via Stateful Inspection Firewall
- Fast and simple diagnostics via clear LED indicators, STEP 7 and web browser
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail

The integrated Ethernet interface and the option of using the TS modules provide flexible connection options for the CP. The following TS modules are available:

- TS module RS 232
- TS module MODEM
- TS module ISDN and
- TS module GSM.

### ■ Technical specifications

| Article number | 6GK7243-8RX30-0XE0 |
|---|---|
| Product type designation | CP 1243-8 IRC |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| • at the 2nd interface | 0.3 ... 115.2 kbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| • at interface 2 for external data transmission | Interface to the TS Module |
| • for power supply | 3-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage external | 24 V |
| Supply voltage external | 19.2 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 19.2 ... 28.8 V |

| Article number | 6GK7243-8RX30-0XE0 |
|---|---|
| Product type designation | CP 1243-8 IRC |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.25 A |
| • from external supply voltage at DC at 24 V typical | 0.1 A |
| Power loss [W] Note | 1.25 W from S7-1200 backplane without TS module. 2.4 W from 24 V DC external with TS module |
| Power loss [W] | 2.4 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C |
| • during storage | -40 ... -70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |

■ **Technical specifications** (continued)

| Article number | **6GK7243-8RX30-0XE0** |
|---|---|
| Product type designation | CP 1243-8 IRC |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 110 mm |
| Depth | 75 mm |
| Net weight | 0.122 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • S7-300 rail mounting | No |
| • wall mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 1 |
| • Note | One CP pluggable on left side of CPU, one TS Module pluggable left side of CP. |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | like CPU |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • with PG connections maximum | 2 |
| • with OP connections maximum | 1 |
| • Note | Configured S7-Connection for ST7-Communication |
| Service | |
| • SINAUT ST7 via S7 communication | Yes |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as e-mail client maximum | 1 |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | No |
| • substation | Yes |
| • TIM control center | No |
| • Note | Ethernet and TS Module can be operated in parallel |
| Control center connection | control center with ST7 function |
| • by means of a permanent connection | supported |
| Protocol is supported | |
| • SINAUT ST7 protocol | Yes |
| Product function data buffering if connection is aborted | Yes; 16,000 data messages |
| Number of data points per station maximum | 200 |
| Transmission format | |
| • for SINAUT ST7 protocol with multi-master polling 10-bit | Yes |
| • for SINAUT ST7 protocol with polling or spontaneous 10-bit or 11-bit | Yes |
| Operating mode for scanning of data transmission | |
| • with dedicated line/radio link with SINAUT ST7 protocol | Polling |
| • with dial-up network with SINAUT ST7 protocol | spontaneous |
| Hamming distance | |
| • for SINAUT ST7 protocol | 4 |

| Article number | **6GK7243-8RX30-0XE0** |
|---|---|
| Product type designation | CP 1243-8 IRC |
| **Performance data Teleservice** | |
| Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes |
| Product function | |
| • program download with SIMATIC STEP 7 | Yes |
| • Remote firmware update | Yes |
| Protocol is supported | |
| • SNMP v3 | Yes |
| • DCP | Yes |
| Configuration software | |
| • required | SINAUT ES V5.5 and STEP7 V13 SP1 or higher |
| • for PG configuring required SINAUT ST7 configuration software for PG | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions Security** | |
| Firewall version | stateful inspection |
| Suitability for operation Virtual Private Network | Yes |
| Product function with VPN connection | IPSec |
| Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168, DES-56 |
| Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates |
| Type of hashing algorithms with VPN connection | MD5, SHA-1 |
| Number of possible connections with VPN connection | 8 |
| Product function | |
| • password protection for teleservice access | No |
| • encrypted data transmission | Yes |
| • MSC client via GPRS modem with MSC capability | Yes |
| Protocol | |
| • is supported MSC protocol | Yes |
| • with Virtual Private Network MSC is supported | TCP/IP |
| Key length for MSC with Virtual Private Network | 128 bit |
| Number of possible connections | |
| • as MSC client with VPN connection | 1 |
| • as MSC server with VPN connection | 0 |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| time synchronization | |
| • from NTP-server | Yes |
| • from control center | Yes |
| **Accessories** | |
| accessories | TS Module RS 232 or TS Module MODEM or TS Module ISDN or TS Module GSM pluggable |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CP 1243-8 IRC

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **CP 1243-8 IRC communications processor**<br><br>Communications processor for connecting a SIMATIC S7-1200 in the TeleControl Professional system via the SINAUT ST7 telecontrol protocol to higher-level ST7 stations or to an ST7 control center. | **6GK7243-8RX30-0XE0** | **SINAUT Engineering Software V5.5**<br>**Upgrade from V5.0, V5.1, V5.2, V5.3 or V5.4**<br><br>For upgrading functional expansions; on CD ROM / DVD | **6NH7997-0CA55-0GA0** |
| **Accessories** | | **TeleService module**<br><br>Connection to TS Adapter IE Basic/Advanced or CP 1243-8 IRC. Power supply via TS Adapter IE Basic/Advanced or CP 1243-8 IRC. | |
| **STEP 7 Professional 2010 SR4/V14, Floating Combo License;**<br><br>on DVD | **6ES7810-5CC11-0YA5** | **TS module RS 232** | **6ES7972-0MS00-0XA0** |
| **SINAUT Engineering Software V5.5**<br><br>On CD-ROM, comprising:<br>• SINAUT ST7/DNP3 configuration and diagnostic software for STEP 7 V5.5 incl. SP4;<br>• SINAUT TD7 block library<br><br>• Electronic manual in German and English | **6NH7997-0CA55-0AA0** | **TS module modem** | **6ES7972-0MM00-0XA0** |
| | | **TS module ISDN** | **6ES7972-0MD00-0XA0** |
| | | **TS module GSM**<br><br>GSM/GPRS modem for SIMATIC Teleservice [1] | **6GK7972-0MG00-0XA0** |

[1] Note national approvals under
http://www.siemens.com/mobilenetwork-approvals

**3**

## Overview

The CP 1243-1 DNP3 communications processor is used to connect a SIMATIC S7-1200 to a control center system via the DNP3 protocol and has the following characteristics:

- Support for the established DNP3 telecontrol protocol for standardized linking of the SIMATIC S7-1200 to WinCC, PCS 7, or other commercially available control center systems
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7
- Data buffering of up to 64,000 values ensures a secure database even with temporary connection failures

## Technical specifications

| Article number | 6GK7243-1JX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 DNP3 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • for power supply | 0 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.25 A |
| Power loss [W] | 1.25 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |

| Article number | 6GK7243-1JX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 DNP3 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 110 mm |
| Depth | 75 mm |
| Net weight | 0.122 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • Note | like CPU |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as e-mail client maximum | 1 |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Communication

**CP 1243-1 DNP3**

■ **Technical specifications** (continued)

| Article number | 6GK7243-1JX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 DNP3 |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | No |
| • substation | Yes |
| • TIM control center | No |
| Control center connection | control center with DNP3 function |
| • by means of a permanent connection | supported |
| • Note | Connection to SCADA system using DNP3 services |
| Protocol is supported | |
| • DNP3 | Yes |
| • IEC 60870-5 | No |
| Product function data buffering if connection is aborted | Yes; 64,000 values |
| Number of data points per station maximum | 200 |

| Article number | 6GK7243-1JX30-0XE0 |
|---|---|
| Product type designation | CP 1243-1 DNP3 |
| **Performance data Teleservice** | |
| Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes |
| Product function | |
| • program download with SIMATIC STEP 7 | Yes |
| • Remote firmware update | Yes |
| Configuration software | |
| • required | STEP 7 Basic/Professional V12 SP1 (TIA Portal) or higher |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | No |
| time synchronization | |
| • from control center | Yes |

■ **Ordering data**      **Article No.**      **Article No.**

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 1243-1 DNP3 communications processor**<br><br>Communications processor for connecting SIMATIC S7-1200 to a control center via the DNP3 protocol | 6GK7243-1JX30-0XE0 | **IE FC RJ45 Plug 180**<br><br>180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface<br>• 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | <br><br><br><br>6GK1901-1BB10-2AA0<br>6GK1901-1BB10-2AB0<br>6GK1901-1BB10-2AE0 |
| **Accessories** | | **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br><br>4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE F RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order quantity 20 m | 6XV1840-2AH10 |
| **Compact switch module CSM 1277**<br><br>Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics LEDs, S7-1200 module including electronic manual on CD-ROM | 6GK7277-1AA10-0AA0 | | |
| **IE FC RJ45 plugs**<br><br>RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | **IE FC Stripping Tool**<br><br>Preadjusted tool for fast stripping of Industrial Ethernet FC cables | 6GK1901-1GA00 |
| | | **Engineering Software STEP7 Basic (TIA Portal)** | See catalog section 11 |

## Overview

The CP 1243-1 IEC communications processor is used to connect a SIMATIC S7-1200 to a control center system via the IEC 60870 protocol and has the following characteristics:

- Support for the established communication standard in accordance with IEC 60870-5-104 for standardized linking of the SIMATIC S7-1200 to WinCC, PCS 7, or other commercially available control center systems
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7
- Data buffering of up to 64,000 values ensures a secure database even with temporary connection failures

## Technical specifications

| Article number | **6GK7243-1PX30-0XE0** |
|---|---|
| Product type designation | CP 1243-1 IEC |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • for power supply | 0 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.25 A |
| Power loss [W] | 1.25 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | -20 ... +60 °C |
| • for horizontally arranged busbars during operation | -20 ... +70 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95% |
| Protection class IP | IP20 |

| Article number | **6GK7243-1PX30-0XE0** |
|---|---|
| Product type designation | CP 1243-1 IEC |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1200 single width |
| Width | 30 mm |
| Height | 110 mm |
| Depth | 75 mm |
| Net weight | 0.122 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 3 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • Note | like CPU |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as e-mail client maximum | 1 |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## CP 1243-1 IEC

### ■ Technical specifications  (continued)

| Article number | 6GK7243-1PX30-0XE0 | Article number | 6GK7243-1PX30-0XE0 |
|---|---|---|---|
| Product type designation | CP 1243-1 IEC | Product type designation | CP 1243-1 IEC |
| **Performance data telecontrol** | | **Performance data Teleservice** | |
| Suitability for use | | Diagnostics function online diagnostics with SIMATIC STEP 7 | Yes |
| • Node station | No | Product function | |
| • substation | Yes | • program download with SIMATIC STEP 7 | Yes |
| • TIM control center | No | • Remote firmware update | Yes |
| Control center connection | control center with IEC 60870-5 function | Configuration software | |
| • by means of a permanent connection | supported | • required | STEP 7 Basic/Professional V13 (TIA Portal) or higher |
| • Note | Connection to SCADA system using IEC 60870-5 | **Product functions Time** | |
| | | Protocol is supported | |
| Protocol is supported | | • NTP | No |
| • DNP3 | No | time synchronization | |
| • IEC 60870-5 | Yes | • from control center | Yes |
| Product function data buffering if connection is aborted | Yes; 64,000 values | | |
| Number of data points per station maximum | 200 | | |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 1243-1 IEC communications processor** | | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | |
| Communications processor for connecting SIMATIC S7-1200 to a control center via the IEC 60870-5-104 protocol | **6GK7243-1PX30-0XE0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE F RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order quantity 20 m | **6XV1840-2AH10** |
| **Accessories** | | | |
| **CSM 1277 compact switch module** | | **IE FC Stripping Tool** | |
| Unmanaged switch for connecting one SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, diagnostics LEDs, S7-1200 module including electronic manual on CD-ROM | **6GK7277-1AA10-0AA0** | Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | **6GK1901-1GA00** |
| | | **STEP 7 Basic Engineering Software (TIA Portal)** | See catalog section 11 |
| **IE FC RJ45 plugs** | | | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** | | |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** | | |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** | | |

## Overview



The SIMATIC RF120C is a communication module for connecting the SIMATIC identification systems directly to the SIMATIC S7-1200. The readers of all RFID systems as well as the MV400 optical readers can be operated on the SIMATIC RF120C.

Integration into the TIA Portal and the uniform plug-in connection systems permit fast and simple commissioning.

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## Technical specifications

| Article number | 6GT2002-0LA00 |
|---|---|
| Product type designation | RF120C communication module |
| Suitability for operation | SIMATIC S7-1200 together with RF200/300/600, MV400, MOBY D/U |
| **Transmission rate** | |
| Transfer rate at the point-to-point connection serial maximum | 115.2 kbit/s |
| **Interfaces** | |
| Design of the interface for point-to-point connection | RS 422 |
| Number of readers connectable | 1 |
| Type of electrical connection | |
| • of the backplane bus | S7-1200 backplane bus |
| • for supply voltage | Screw terminals |
| Design of the interface to the reader for communication | D-sub, 9-pin, socket |
| **Mechanical data** | |
| Material | Xantar MX 1094 |
| Color | Ti-grey 24L01 |
| Tightening torque of the screw for securing the equipment maximum | 0.45 N·m |
| **Supply voltage, current consumption, power loss** | |
| Supply voltage | |
| • at DC Rated value | 24 V |
| • at DC | 20 ... 30 V |
| Consumed current at DC at 24 V | |
| • without connected devices typical | 0.03 A |
| • with connected devices maximum | 1 A |

| Article number | 6GT2002-0LA00 |
|---|---|
| Product type designation | RF120C communication module |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 55 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Protection class IP | IP20 |
| Shock resistance | According to IEC 61131-2 |
| Shock acceleration | 300 m/s² |
| Vibrational acceleration | 100 m/s² |
| **Design, dimensions and weight** | |
| Width | 30 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.15 kg |
| Mounting type | S7-1200 rack |
| Cable length for RS 422 interface maximum | 1 000 m |
| **Product properties, functions, components general** | |
| Display version | 4 LEDs for reader connection, 1 LED for device status |
| Product function transponder file handler can be addressed | No |
| Protocol is supported | |
| • S7 communication | Yes |
| Type of parameterization | HSP |
| Type of programming | Library with functions |
| Type of computer-mediated communication | acyclic communication |
| **Standards, specifications, approvals** | |
| Certificate of suitability | CE, FCC, cULus, KCC, C-Tick, FM, Ex: II 3G Ex nAA IIC T4 Gc |
| MTBF | 196 y |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Communication

## SIMATIC RF120C

**3**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC RF120C communication module** | 6GT2002-0LA00 | **Accessories for extended use** | |
| Integrated in the S7-1200 controller for connection of a reader | | **Extension cable for all readers** | |
| | | PUR material, CMG approval, suitable for cable carriers | |
| **Accessories for all readers** | | 2 m, straight connector | 6GT2891-4FH20 |
| **Reader cable for SIMATIC RF200 / RF300 / RF600 / MV400** | | 5 m, straight connector | 6GT2891-4FH50 |
| PUR material, CMG approval, suitable for cable carriers, straight reader connector | | 10 m, straight connector | 6GT2891-4FN10 |
| | | 20 m, straight connector | 6GT2891-4FN20 |
| 2 m | 6GT2091-4LH20 | 50 m, straight connector | 6GT2891-4FN50 |
| 5 m | 6GT2091-4LH50 | 2 m, plug angled at reader | 6GT2891-4JH20 |
| 10 m | 6GT2091-4LN10 | 5 m, plug angled at reader | 6GT2891-4JH50 |
| | | 10 m, plug angled at reader | 6GT2891-4JN10 |
| | | **Reader adapter cable for MOBY D** Material PUR, CMG approval, suitable for cable carriers, 2 m. A cable of the type 6GT2091-4L... is also required. | 6GT2691-4FH20 |
| | | **DVD "RFID Systems Software & Documentation"** | 6GT2080-2AA20 |

## Overview

- For fast, high-performance serial data exchange via point-to-point coupling
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can also be loaded
- Simple parameterization with STEP 7 Basic

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1241-1AH32-4XB0 | 6AG1241-1AH32-2XB0 | 6AG1241-1CH32-4XB0 | 6AG1241-1CH32-2XB0 |
|---|---|---|---|---|
| Based on | 6ES7241-1AH32-0XB0 | 6ES7241-1AH32-0XB0 | 6ES7241-1CH32-0XB0 | 6ES7241-1CH32-0XB0 |
| | SIPLUS S7-1200 CM 1241 RS 232 | SIPLUS S7-1200 CM1241 RS 232 | SIPLUS S7-1200 CM 1241 RS 422/485 | SIPLUS S7-1200 CM 1241 RS 422/485 |
| **Ambient conditions** | | | | |
| **Free fall** | | | | |
| • Fall height, max. | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | | | | |
| • min. | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C | -20 °C; = Tmin; Startup @ 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C | 70 °C; = Tmax | 60 °C; = Tmax | 70 °C; Tmax > 60 °C, derating: Max. one module may be configured; this module must be the last module on the CM bus; minimum clearance on the left side of at least 45 mm |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS communication

**SIPLUS CM 1241 communication modules**

## ◾ Technical specifications  (continued)

| Article number | **6AG1241-1AH32-4XB0** | **6AG1241-1AH32-2XB0** | **6AG1241-1CH32-4XB0** | **6AG1241-1CH32-2XB0** |
|---|---|---|---|---|
| Based on | **6ES7241-1AH32-0XB0** | **6ES7241-1AH32-0XB0** | **6ES7241-1CH32-0XB0** | **6ES7241-1CH32-0XB0** |
| | SIPLUS S7-1200 CM 1241 RS 232 | SIPLUS S7-1200 CM1241 RS 232 | SIPLUS S7-1200 CM 1241 RS 422/485 | SIPLUS S7-1200 CM 1241 RS 422/485 |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ◾ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIPLUS CM 1241 communication module** | | | **Accessories** | See SIMATIC S7-1200 CM 1241 communication modules, page 3/123 |
| (Extended temperature range and exposure to media) | | | | |
| Ambient temperature -40 ... +70° C | | | | |
| Communication module for point-to-point connection, with one RS 232 interface | **6AG1241-1AH32-2XB0** | | | |
| Communication module for point-to-point connection, with one RS 485 interface | **6AG1241-1CH32-2XB0** | | | |
| Suitable for areas with extreme medial exposure (conformal coating) | | | | |
| Communication module for point-to-point connection, with one RS 232 interface | **6AG1241-1AH32-4XB0** | | | |
| Communication module for point-to-point connection, with one RS 485 interface | **6AG1241-1CH32-4XB0** | | | |

## ■ Overview

- For fast, high-performance serial data exchange via point-to-point connection
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can be loaded later
- Simple parameterization with STEP 7 Basic
- Can be plugged directly into the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | **6AG1241-1CH30-5XB1** |
|---|---|
| Based on | **6ES7241-1CH30-1XB0** |
| | SIPLUS S7-1200 CB 1241 RS 485 |
| **General information** | |
| Product type designation | CB 1241 RS 485 |
| **Input current** | |
| from backplane bus 5 V DC, typ. | 50 mA |
| **Power loss** | |
| Power loss, typ. | 1.5 W |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • for status of the outputs | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 55 °C |

| Article number | **6AG1241-1CH30-5XB1** |
|---|---|
| Based on | **6ES7241-1CH30-1XB0** |
| | SIPLUS S7-1200 CB 1241 RS 485 |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Pollutant concentrations** | |
| - SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60 % condensation-free |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CB 1241 RS 485 communication board** | **6AG1241-1CH30-5XB1** | **Accessories** | See SIMATIC CB 1241 RS 485 communication board, page 3/124 |
| For point-to-point connection, with 1 RS 485 interface | | | |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS communication

**SIPLUS CM 1242-5 communication modules**

3

## Overview



| DP-M | DP-S | FMS | PG/OP | S7 |
|---|---|---|---|---|
|  | ● |  |  |  |

The SIPLUS CM 1242-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP slave and has the following characteristics:

- PROFIBUS DPV1 slave in accordance with IEC 61158
- Module replacement without PG supported
- Power is supplied via the backplane bus so that no extra cabling is required
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The CM 1242-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS S7-1200 CM 1242-5 | |
|---|---|
| **Article number** | **6AG1 242-5DX30-2XE0** |
| **Article number based on** | **6GK7 242-5DX30-0XE0** |
| Ambient temperature range | -25 ... +55 °C |
| Ambient conditions | Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere). |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permitted. No commissioning in bedewed state. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range |
| | 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K |
| | 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K |

Technical documentation on SIPLUS can be found here:
http://www.siemens.de/siplus-extreme

| Ordering data | Article No. |
|---|---|
| **SIPLUS communication module CM 1242-5** (Extended temperature range and exposure to media) Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 slave | **6AG1242-5DX30-2XE0** |
| **Accessories** | See SIMATIC S7-1200 CM 1242-5 communication module, page 3/126 |

**SIPLUS CM 1243-5 communication modules**

## Overview



| DP-M | DP-S | FMS | PG/OP | S7 |
|------|------|-----|-------|-----|
| ● | | | ● | ● |

The CM 1243-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP master and has the following characteristics:

- PROFIBUS DPV1 master in accordance with IEC 61158
- Support of up to 16 PROFIBUS DP slaves
- Communication with other S7 controllers based on S7 communication
- Allows the connection of programming devices and operator panels with a PROFIBUS interface to the S7-1200
- Module replacement without PG supported
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The CM 1243-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS S7-1200 CM 1243-5 | |
|---|---|
| **Article number** | **6AG1 243-5DX30-2XE0** |
| **Article number based on** | **6GK7 243-5DX30-0XE0** |
| Ambient temperature range | -25 ... +70 °C |
| Ambient conditions | Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere). |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permitted. No commissioning in bedewed state. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range |
| | 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K |
| | 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K |

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

| Ordering data | Article No. |
|---|---|
| **SIPLUS CM 1243-5 communication module** (Extended temperature range and exposure to media) Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 master | **6AG1243-5DX30-2XE0** |
| **Accessories** | See SIMATIC S7-1200 CM 1243-5 communication module, page 3/130 |

**3**

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS communication

## SIPLUS NET CSM 1277

### ■ Overview

- Unmanaged switch for connection of SIPLUS S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Multiplication of Ethernet interfaces on a SIPLUS S7-1200 for additional connection of up to three programming devices, operator controls, and further Ethernet nodes
- Simple, space-saving mounting on the SIPLUS S7-1200 rail
- Low-cost solution for implementing small, local Ethernet networks
- Problem-free connection using RJ45 plugs
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS NET CSM 1277 | |
|---|---|
| **Article number** | **6AG1 277-1AA10-4AA0** |
| **Article number based on** | **6GK7 277-1AA10-0AA0** |
| Ambient temperature range | 0 … +60 °C |

### ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS NET CSM 1277 compact switch module** | |
| (Extended temperature range and exposure to media) | |
| Unmanaged switch for connection of SIPLUS S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-1200 module including electronic Manual on CD-ROM | **6AG1 277-1AA10-4AA0** |
| **Accessories** | See CSM 1277 unmanaged, page 3/132 |

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## Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- Operable exclusively in the central system

## Technical specifications

| Article number | **6ES7226-6BA32-0XB0** |
|---|---|
| | DIGITAL INPUT SM 1226, F-DI 16X 24VDC |
| **General information** | |
| Product type designation | SM 1226 F-DI 16x24VDC |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from backplane bus 5 V DC, max. | 155 mA; Current consumption (SM Bus, 5 V DC): 155 mA |
| **Digital inputs** | |
| • from load voltage L+ (without load), max. | 130 mA; 130 mA + 6 mA / input used + any Vs1/Vs2 current used |
| **Power loss** | |
| Power loss, typ. | 7 W |
| **Digital inputs** | |
| Number of digital inputs | 16; 16 (1oo1) or 8 (1oo2); Note: You can individually assign each pair of inputs "a.x" and "b.x" as a single (1oo2)-channel or as 2 separate (1oo1)-channels |
| **horizontal installation** | |
| - up to 50 °C, max. | 16; 16 inputs at 55 °C horizontal |
| **vertical installation** | |
| - up to 40 °C, max. | 16; 16 inputs at 45 °C vertical |
| **Input voltage** | |
| • Type of input voltage | DC |
| • for signal "0" | -30 V DC to +5 V DC |
| • for signal "1" | 15 V DC to 30 V DC |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 0.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; 0.8 / 1.6 / 3.2 / 6.4 / 12.8 ms |

| Article number | **6ES7226-6BA32-0XB0** |
|---|---|
| | DIGITAL INPUT SM 1226, F-DI 16X 24VDC |
| **Cable length** | |
| • shielded, max. | 200 m; Unshielded with input filter time of 1.6 ms to 12.6 ms (With an input delay of 0.8 ms, shielded cables must be used for the digital inputs and the sensor supply) |
| • unshielded, max. | 200 m; Shielded with input filter time of 0.8 ms to 12.6 s (With an input delay of 0.8 ms, shielded cables must be used for the digital inputs and the sensor supply) |
| **Diagnostics indication LED** | |
| • for status of the inputs | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| cULus | Yes |
| FM approval | Yes |
| **Highest safety class achievable in safety mode** | |
| • SIL acc. to IEC 61508 | SIL 2 (single-channel), SIL 3 (two-channel) |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 55 °C |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 250 g |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Fail-safe digital modules

**SM 1226 fail-safe digital input modules**

**3**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SM 1226 fail-safe digital input signal module**<br><br>16 inputs, 24 V DC<br>(SIL 2/category 3/PL d) or<br>8 inputs 24 V DC<br>(SIL 3/category 3 or<br>category 4/PL e)<br>or a combination of both | **6ES7 226-6BA32-0XB0** | **STEP 7 Safety Basic V14 SP1**<br><br>Task:<br>Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC<br>Requirement:<br>STEP 7 Basic V14 SP1 and higher | |
| **Accessories** | | Floating license for 1 user; software and documentation on DVD; license key on USB flash drive | **6ES7833-1FB14-0YA5** |
| **Terminal block (spare part)** | | | |
| With 11 screws, tin-coated; 4 units | **6ES7292-1AL30-0XA0** | Floating license for 1 user; software, documentation and license key for download[1];<br>email address required for delivery | **6ES7833-1FB14-0YH5** |
| **Front flap set (spare part)** | | | |
| For modules with a width of 70 mm | **6ES7291-1BB30-0XA0** | | |
| **STEP 7 Safety Advanced V14 SP1**<br><br>Task:<br>Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O<br>Requirement:<br>STEP 7 Professional V14 SP1 | | | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** | | |
| Floating license for 1 user, software, documentation and license key for download[1];<br>email address required for delivery | **6ES7833-1FA14-0YH5** | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## ■ Overview



- Digital outputs as a supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- Operable exclusively in the central system

## ■ Technical specifications

| Article number | **6ES7226-6DA32-0XB0** |
|---|---|
| | DIGITAL OUTPUT SM 1226, F-DQ 4X 24VDC |
| **General information** | |
| Product type designation | SM 1226 F-DQ 4 x 24 V DC |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from backplane bus 5 V DC, max. | 125 mA |
| **Digital outputs** | |
| • from load voltage L+, max. | 170 mA |
| **Power loss** | |
| Power loss, typ. | 8 W |
| **Digital outputs** | |
| Number of digital outputs | 4 |
| • in groups of | 1 |
| Short-circuit protection | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 30 Hz |
| • on lamp load, max. | 10 Hz |
| **Output voltage** | |
| • Rated value (DC) | 24 V |
| **Output current** | |
| • for signal "1" rated value | 2 A |
| • for signal "1" permissible range, max. | 10 mA to 2.4 A |
| • for signal "0" residual current, max. | P-switch: 0.5 mA, maximum; M-switch: 0.5 mA, maximum |
| **Cable length** | |
| • shielded, max. | 200 m |
| • unshielded, max. | 200 m |
| **Diagnostics indication LED** | |
| • for status of the outputs | Yes |

| Article number | **6ES7226-6DA32-0XB0** |
|---|---|
| | DIGITAL OUTPUT SM 1226, F-DQ 4X 24VDC |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| cULus | Yes |
| FM approval | Yes |
| **Highest safety class achievable in safety mode** | |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 55 °C |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 270 g |

# SIMATIC S7-1200 Basic Controllers
## I/O modules
## Fail-safe digital modules

**SM 1226 fail-safe digital output modules**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SM 1226 fail-safe digital output signal module**<br><br>4 outputs; 24 V DC,<br>current sourcing/sinking | **6ES7226-6DA32-0XB0** | **STEP 7 Safety Basic V14 SP1**<br><br>Task:<br>Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC<br>Requirement:<br>STEP 7 Basic V14 SP1 and higher | |
| **Accessories** | | Floating license for 1 user; software and documentation on DVD; license key on USB flash drive | **6ES7833-1FB14-0YA5** |
| **Terminal block (spare part)** | | | |
| With 11 screws, tin-coated; 4 units | **6ES7292-1AL30-0XA0** | Floating license for 1 user; software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FB14-0YH5** |
| **Front flap set (spare part)** | | | |
| For modules with a width of 70 mm | **6ES7291-1BB30-0XA0** | | |
| **STEP 7 Safety Advanced V14 SP1**<br><br>Task:<br>Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O<br>Requirement:<br>STEP 7 Professional V14 SP1 | | | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** | | |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## Overview

- Relay outputs as a supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- Operable exclusively in the central system

## Technical specifications

| Article number | 6ES7226-6RA32-0XB0 |
|---|---|
| | DIGITAL OUTPUT SM 1226, F-DQ 2X RELAY |
| **General information** | |
| Product type designation | SM 1226 F-DQ 2 x Relay |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from backplane bus 5 V DC, max. | 120 mA |
| **Digital outputs** | |
| • from load voltage L+, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 10 W |
| **Digital outputs** | |
| Number of digital outputs | 2 |
| Short-circuit protection | No |
| **Output voltage** | |
| • Rated value (DC) | 5 V DC to 30 V DC |
| • Rated value (AC) | 5 V AC to 250 V AC |
| **Output current** | |
| • for signal "1" permissible range, max. | 5 A maximum per circuit and 10 A maximum of all circuits per module |
| **Relay outputs** | |
| • Number of relay outputs | 2; 2 circuits per output |
| **Switching capacity of contacts** | |
| - with inductive load, max. | 0.1 Hz, accordance with IEC 60947-5-1, DC-13; 2 Hz, accordance with IEC 60947-5-1, AC-15 |
| - with resistive load, max. | 2 Hz |
| **Cable length** | |
| • shielded, max. | 200 m |
| • unshielded, max. | 200 m |
| **Diagnostics indication LED** | |
| • for status of the outputs | Yes |

| Article number | 6ES7226-6RA32-0XB0 |
|---|---|
| | DIGITAL OUTPUT SM 1226, F-DQ 2X RELAY |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| cULus | Yes |
| FM approval | Yes |
| **Highest safety class achievable in safety mode** | |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 55 °C |
| **Mechanics/material** | |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 300 g |

# SIMATIC S7-1200 Basic Controllers
I/O modules
Fail-safe digital modules

## SM 1226 fail-safe relay output modules

### Ordering data

| | Article No. |
|---|---|
| **SM 1226 fail-safe relay output signal module** | **6ES7226-6RA32-0XB0** |
| 2 relay outputs | |
| **Accessories** | |
| **Terminal block (spare part)** | |
| With 11 screws, tin-coated, coded; 4 units | **6ES7292-1AL40-0XA0** |
| **Front flap set (spare part)** | |
| For modules with a width of 70 mm | **6ES7291-1BB30-0XA0** |
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |

| | Article No. |
|---|---|
| **STEP 7 Safety Basic V14 SP1** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC Requirement: STEP 7 Basic V14 SP1 and higher | |
| Floating license for 1 user; software and documentation on DVD; license key on USB flash drive | **6ES7833-1FB14-0YA5** |
| Floating license for 1 user; software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FB14-0YH5** |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- Operable exclusively in the central system

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1226-6BA32-5XB0** |
| Based on | **6ES7226-6BA32-0XB0** |
| | SIPLUS S7-1200 SM 1226 F-DI 16x24VDC |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 55 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS SM 1226 fail-safe digital input signal module** | **6AG1226-6BA32-5XB0** |
| (Extended temperature range and environmental stress) | |
| 16 inputs, 24 V DC (SIL 2/category 3/PL d) or 8 inputs 24 V DC (SIL 3/category 3 or category 4/PL e) or a combination of both | |
| **Accessories** | See SIMATIC SM 1226 fail-safe digital input signal module, page 3/158 |

# SIMATIC S7-1200 Basic Controllers
I/O modules
SIPLUS Fail-safe

## SIPLUS SM 1226 fail-safe digital output modules

**3**

### Overview



- Digital outputs as a supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- Operable exclusively in the central system

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

### Technical specifications

| Article number | **6AG1226-6DA32-5XB0** |
|---|---|
| Based on | **6ES7226-6DA32-0XB0** |
| | SIPLUS S7-1200 SM 1226 F-DQ 4x24VDC |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 55 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

### Ordering data

| | Article No. |
|---|---|
| **SIPLUS SM 1226 fail-safe digital output module**<br>4 outputs; 24 V DC, current sourcing/sinking | **6AG1226-6DA32-5XB0** |
| **Accessories** | See SIMATIC SM 1226 fail-safe digital output signal module, page 3/160 |

**3**

## Overview



- Relay outputs as a supplement to the integral I/O of the CPUs
- Integrated into the overall automation for the implementation of safety-related requirements
- With integrated safety functions
- Communication with fail-safe CPUs via PROFIsafe mechanisms
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- Operable exclusively in the central system

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1226-6RA32-5XB0** |
| Based on | **6ES7226-6RA32-0XB0** |
| | SIPLUS S7-1200 SM 1226 F-DQ 2xRelay |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 55 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS SM 1226 fail-safe relay output signal module**<br>2 relay outputs | **6AG1226-6RA32-5XB0** |
| **Accessories** | See SIMATIC SM 1226 fail-safe relay output signal module, page 3/162 |

# SIMATIC S7-1200 Basic Controllers
Power supplies

## Single phase, 24 V DC (for S7-1200)

■ **Overview**

In terms of design and functionality, the SIMATIC PM 1207 single-phase load power supply (PM = power module) with automatic range selection of the input voltage is an optimal match to the SIMATIC S7-1200 PLC. It provides the supply to CPUs with 24 V input as well as to signal modules, and to 24 V loads connected to the modules. Comprehensive certifications, such as UL, ATEX and GL facilitate universal use.

■ **Technical specifications**

| Article number | 6EP1332-1SH71 |
| --- | --- |
| Product | S7-1200 PM1207 |
| Power supply, type | 24 V/2.5 A |
| **Input** | |
| Input | 1-phase AC |
| Supply voltage | |
| • 1 at AC Rated value | 120 V |
| • 2 at AC Rated value | 230 V |
| • Note | Automatic range selection |
| Input voltage | |
| • 1 at AC | 85 ... 132 V |
| • 2 at AC | 176 ... 264 V |
| Wide-range input | No |
| Overvoltage resistance | $2.3 \times V_{\text{in rated}}$, 1.3 ms |
| Mains buffering at $I_{\text{out rated}}$, min. | 20 ms; at $V_{\text{in}}$ = 93/187 V |
| Rated line frequency 1 | 50 Hz |
| Rated line frequency 2 | 60 Hz |
| Rated line range | 47 ... 63 Hz |
| Input current | |
| • at rated input voltage 120 V | 1.2 A |
| • at rated input voltage 230 V | 0.67 A |
| Switch-on current limiting (+25 °C), max. | 13 A |
| Duration of inrush current limiting at 25 °C | |
| • maximum | 3 ms |
| $I^2t$, max. | 0.5 A²·s |
| Built-in incoming fuse | T 3,15 A/250 V (not accessible) |
| Protection in the mains power input (IEC 898) | Recommended miniature circuit breaker: 16 A characteristic B or 10 A characteristic C |

| Article number | 6EP1332-1SH71 |
| --- | --- |
| Product | S7-1200 PM1207 |
| Power supply, type | 24 V/2.5 A |
| **Output** | |
| Output | Controlled, isolated DC voltage |
| Rated voltage $V_{\text{out}}$ DC | 24 V |
| Total tolerance, static ± | 3% |
| Static mains compensation, approx. | 0.1% |
| Static load balancing, approx. | 0.2% |
| Residual ripple peak-peak, max. | 150 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 240 mV |
| Product function Output voltage adjustable | No |
| Output voltage setting | - |
| Status display | Green LED for 24 V OK |
| On/off behavior | No overshoot of $V_{\text{out}}$ (soft start) |
| Startup delay, max. | 6 s; 2 s at 230 V, 6 s at 120 V |
| Voltage rise, typ. | 10 ms |
| Rated current value $I_{\text{out rated}}$ | 2.5 A |
| Current range | 0 ... 2.5 A |
| Supplied active power typical | 60 W |
| Short-term overload current | |
| • on short-circuiting during the start-up typical | 6 A |
| • at short-circuit during operation typical | 6 A |
| Duration of overloading capability for excess current | |
| • on short-circuiting during the start-up | 100 ms |
| • at short-circuit during operation | 100 ms |
| Parallel switching for enhanced performance | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 |

■ **Technical specifications**  (continued)

| Article number | **6EP1332-1SH71** |
|---|---|
| Product | S7-1200 PM1207 |
| Power supply, type | 24 V/2.5 A |
| **Efficiency** | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 83% |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 12 W |
| **Closed-loop control** | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15%), max. | 0.3% |
| Dynamic load smoothing (Iout: 50/100/50%), $U_{out}$ ± typ. | 3% |
| Load step setting time 50 to 100%, typ. | 5 ms |
| Load step setting time 100 to 50%, typ. | 5 ms |
| Setting time maximum | 5 ms |
| **Protection and monitoring** | |
| Output overvoltage protection | < 33 V |
| Current limitation, typ. | 2.65 A |
| Property of the output Short-circuit proof | Yes |
| Short-circuit protection | Constant current characteristic |
| Enduring short circuit current RMS value | |
| • typical | 2.7 A |
| Overload/short-circuit indicator | - |
| **Safety** | |
| Primary/secondary isolation | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 |
| Protection class | Class I |
| Leakage current | |
| • maximum | 3.5 mA |
| CE mark | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950-1, CSA C22.2 No. 60950-1) File E151273 |
| Explosion protection | ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455 |
| FM approval | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes |
| Marine approval | GL, ABS, BV, DNV, LRS, NK |
| Degree of protection (EN 60529) | IP20 |

| Article number | **6EP1332-1SH71** |
|---|---|
| Product | S7-1200 PM1207 |
| Power supply, type | 24 V/2.5 A |
| **EMC** | |
| Emitted interference | EN 55022 Class B |
| Supply harmonics limitation | not applicable |
| Noise immunity | EN 61000-6-2 |
| **Operating data** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
|   - Note | with natural convection |
| • during transport | -40 ... +85 °C |
| • during storage | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation |
| **Mechanics** | |
| Connection technology | screw-type terminals |
| Connections | |
| • Supply input | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² |
| • Output | L+, M: 2 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - |
| Width of the enclosure | 70 mm |
| Height of the enclosure | 100 mm |
| Depth of the enclosure | 75 mm |
| Required spacing | |
| • top | 20 mm |
| • bottom | 20 mm |
| • left | 0 mm |
| • right | 0 mm |
| Weight, approx. | 0.3 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x7.5/15, wall mounting |
| MTBF at 40 °C | 1 492 537 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

■ **Ordering data**

| | Article No. |
|---|---|
| **SIMATIC S7-1200 PM 1207** | **6EP1332-1SH71** |
| Input: 120/230 V AC Output: 24 V DC/2.5 A | |

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# SIMATIC S7-1200 Basic Controllers
SIPLUS power supplies

## Single phase, 24 V DC (for SIPLUS S7-1200)

### ◾ Overview



- Stabilized power supply for SIPLUS S7-1200
- In the S7-1200 design
- Input 120/230 V AC, output 24 V DC, 2.5 A
  (derating: 1.5 A above 60 °C)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS power supply PM 1207 | | |
|---|---|---|
| **Article number** | **6AG1332-1SH71-4AA0** | **6AG1332-1SH71-7AA0** |
| **Article number based on** | **6EP1332-1SH71** | |
| Ambient temperature range | 0 ... +60° C | -25 ... +70° C |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical specifications | The technical data of the standard product applies except for the ambient conditions. | |
| **Ambient conditions** | | |
| Relative humidity | 100%, condensation/frost permitted. No commissioning in bedewed state. | |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m) derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m) derating 20 K | |

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

## ■ Technical specifications

| | SIPLUS PM 1207 |
|---|---|
| Article number | **6AG1332-1SH71-7AA0** |
| | **6AG1332-1SH71-4AA0** |
| Article number based on | **6EP1332-1SH71** |
| Input voltage, nominal value | 120/230 V AC (auto-switching) |
| • Range | 85…132 V / 176...264 V AC |
| Mains buffering | > 20 ms (at 93/187 V) |
| Line frequency, nominal | 50/60 Hz |
| • Range | 47 … 63 Hz |
| Input current, nominal value | 1.2/0.67 A |
| • Inrush current (25 °C) | <13 A |
| • Recommended circuit-breaker | 16 A Charact. B, 10 A Charact. C |
| Output voltage, nominal value | 24 V DC |
| • Tolerance | ±3% |
| • Residual ripple | < 150 mVpp |
| • Adjustment | No |
| Output current, nominal value | 2.5 A (derating: 1.5 A from 60 °C) |
| Efficiency at nominal values, approx. | 83% |
| Parallel operation | Yes, 2 units |
| Electronic short-circuit protection | Yes, automatic restart |
| Radio interference suppression (EN 55022) | Class B |
| Operating display | Green LED for "24 V o.k." |
| Supply-harmonics limitation (EN 61000-3-2) | Not applicable |
| Degree of protection (EN 60529) | IP20 |
| Protection class | Class 1 |
| Electric isolation | SELV acc. to EN 60950 and EN 50178 |
| Ambient temperature | 0 … +60 °C |
| | -25 ... 70 °C |
| Transport and storage temperature | -25 … +85 °C |
| Installation | Standard rail EN 60715 35x7.5/15 |
| Dimensions (W x H x D) in mm | 70 x 100 x 75 |
| Weight, approx. | 0.3 kg |
| Certifications | CE |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS S7-1200 PM 1207 power supply** | |
| (Extended temperature range and exposure to media) | |
| Input 120/230 V AC, output 24 V DC, 2.5 A; derating from + 55 °C to + 70 °C to 1.2 A output current | |
| Ambient temperature -25 ... +70 °C | **6AG1332-1SH71-7AA0** |
| Ambient temperature 0 ... +60 °C | **6AG1332-1SH71-4AA0** |

**3**

# SIMATIC S7-1200 Basic Controllers
## Operator control and monitoring
## Basic HMI – Basic Panels

**Standard devices 2nd Generation**

■ **Overview**



SIMATIC HMI Basic Panels 2nd Generation

### Basic Panels 2nd Generation

SIMATIC HMI Basic Panels 2nd Generation with their fully developed HMI basic functions are the ideal entry level series for simple HMI applications.

The device family offers panels with 4", 7", 9" and 12" widescreen displays, as well as combined key and touch operation.

The innovative high-resolution widescreen displays with 64 000 colors are also suitable for upright installation, and they can be dimmed down to 100%. The innovative operator interface with improved usability opens up a diverse range of options thanks to new controls and graphics. The new USB interface enables the connection of keyboard, mouse or barcode scanner, and supports the simple archiving of data on a USB flash drive as well as the manual backup and restoring of the complete panel.

The integrated Ethernet or RS 485/422 interface (version-specific) enables simple connection to the controller.

■ **Ordering data**

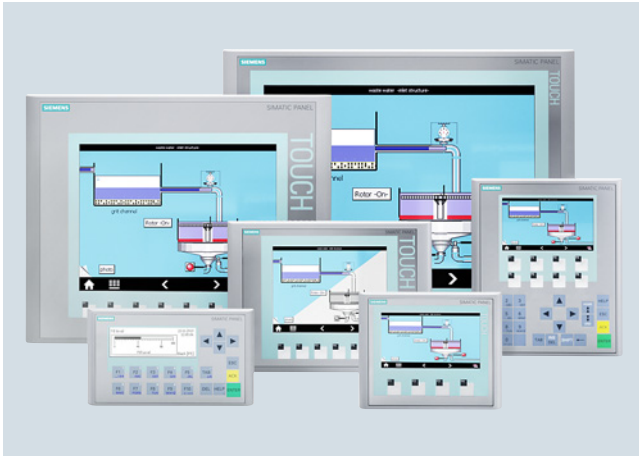| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC HMI Basic Panels (2nd Generation)** | | **Starter kits** | |
| **Key and Touch devices** | | **Starter kit SIMATIC S7-1200 + KP300 Basic mono PN** | 6AV6651-7HA01-3AA4 |
| **SIMATIC HMI KTP400 Basic** Key/touch-screen operation; 4" TFT widescreen display, 65 536 colors, PROFINET interface | 6AV2123-2DB03-0AX0 | **Starter Kit SIMATIC S7-1200 + KTP400 Basic** | 6AV6651-7KA01-3AA4 |
| **SIMATIC HMI KTP700 Basic** Key/touch-screen operation; 7" TFT widescreen display, 65 536 colors, PROFINET interface | 6AV2123-2GB03-0AX0 | **Starter Kit SIMATIC S7-1200 + KTP700 Basic** Starter kits with an S7-1200 consist of: • The respective SIMATIC HMI Basic Panel SIMATIC HMI KP300 Basic mono PN SIMATIC HMI KTP400 Basic SIMATIC HMI KTP700 Basic • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 Simulator Module SIM 12 • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m | 6AV6651-7DA01-3AA4 |
| **SIMATIC HMI KTP700 Basic DP** Key/touch-screen operation; 7" TFT widescreen display, 65 536 colors, PROFIBUS interface | 6AV2123-2GA03-0AX0 | | |
| **SIMATIC HMI KTP900 Basic** Key/touch-screen operation; 9" TFT widescreen display, 65 536 colors, PROFINET interface | 6AV2123-2JB03-0AX0 | | |
| **SIMATIC HMI KTP1200 Basic** Key/touch-screen operation; 12" TFT widescreen display, 65 536 colors, PROFINET interface | 6AV2123-2MB03-0AX0 | **Starter kit LOGO! + KP300 Basic mono PN** | 6AV2132-0HA00-0AA1 |
| **SIMATIC HMI KTP1200 Basic DP** Key/touch-screen operation; 12" TFT widescreen display, 65 536 colors, PROFIBUS interface | 6AV2123-2MA03-0AX0 | **Starter kit LOGO! + KTP400 Basic** | 6AV2132-0KA00-0AA1 |
| | | **Starter kit LOGO! + KTP700 Basic** Starter kits with a LOGO! consist of: • The respective SIMATIC HMI Basic Panel SIMATIC HMI KP300 Basic mono PN SIMATIC HMI KTP400 Basic SIMATIC HMI KTP700 Basic • LOGO! 12/24 RCE • LOGO! POWER 24 V 1.3 A • LOGO! SOFT COMFORT V7 • WINCC BASIC (TIA Portal) • Ethernet CAT5 cable, 2 m | 6AV2132-3GB00-0AA1 |
| | | **Documentation** | |
| | | You can find the manual for the Basic Panels on the Internet at: | http://support.automation. siemens.com |
| | | **Accessories** | See catalog ST 80 / ST PC or Industry Mall |

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## Overview



### Basic Panels 1st Generation

- Ideal entry-level series from 3" to 15" for operating and monitoring compact machines and systems
- Clear process representation thanks to use of pixel-graphics displays
- Intuitive operation using Touch and tactile function keys
- Equipped with all the necessary basic functions such as alarm logging, recipe management, plots, vector graphics, and language switching
- Simple connection to the controller via integral Ethernet interface or separate version with RS 485/422
- Faster commissioning thanks to integrated diagnostics viewer and IP setting for SIMATIC S7-1200 and S7-1500 PLCs

## Ordering data

| | Article No. |
|---|---|
| **SIMATIC HMI Basic Panels (1st Generation)** | |
| **Key and Touch devices** | |
| **SIMATIC HMI KTP400 Basic mono PN** | **6AV6647-0AA11-3AX0** |
| Key/touch-screen operation; 4" STN display; 4 gray levels; PROFINET interface | |
| **SIMATIC HMI KTP400 Basic color PN** | **6AV6647-0AK11-3AX0** |
| Key/touch-screen operation; 4" widescreen TFT display, 256 colors, PROFINET interface | |
| **SIMATIC HMI KTP600 Basic mono PN** | **6AV6647-0AB11-3AX0** |
| Key/touch-screen operation; 6" STN display, 4 gray levels, PROFINET interface | |
| **SIMATIC HMI KTP600 Basic color DP** | **6AV6647-0AC11-3AX0** |
| Key/touch-screen operation; 6" TFT display, 256 colors, MPI/PROFIBUS DP interface | |
| **SIMATIC HMI KTP600 Basic color PN** | **6AV6647-0AD11-3AX0** |
| Key/touch-screen operation; 6" TFT display, 256 colors, PROFINET interface | |
| **SIMATIC HMI KTP1000 Basic color DP** | **6AV6647-0AE11-3AX0** |
| Key/touch-screen operation; 10" TFT display, 256 colors, MPI/PROFIBUS DP interface | |
| **SIMATIC HMI KTP1000 Basic color PN** | **6AV6647-0AF11-3AX0** |
| Key/touch-screen operation; 10" TFT display, 256 colors, PROFINET interface | |

| | Article No. |
|---|---|
| **Key devices** | |
| **SIMATIC HMI KP300 Basic mono PN** | **6AV6647-0AH11-3AX0** |
| Key operation; 3" FSTN LCD display, black and white, PROFINET interface | |
| **SIMATIC HMI KP400 Basic color PN** | **6AV6647-0AJ11-3AX0** |
| Key operation; 4" widescreen TFT display, 256 colors, PROFINET interface | |
| **Touch devices** | |
| **SIMATIC HMI TP1500 Basic color PN** | **6AV6647-0AG11-3AX0** |
| Touch-screen operation; 15" TFT display, 256 colors, PROFINET interface | |
| **Documentation** | |
| You can find the manual for the Basic Panels on the Internet at: | http://support.automation. siemens.com |
| **Accessories** | See catalog ST 80 / ST PC or Industry Mall |

# SIMATIC S7-1200 Basic Controllers
Operator control and monitoring
Comfort Panels

**Standard devices**

## ◼ Overview



Comfort Panel family, KP, TP, KTP

### SIMATIC HMI Comfort Panels - Standard devices

- Excellent HMI functionality for demanding applications
- Widescreen TFT displays with 4", 7", 9", 12", 15", 19" and 22" diagonals (all 16 million colors) with up to 40% more visualization area as compared to the predecessor devices
- Integrated high-end functionality with archives, scripts, PDF/Word/Excel viewer, Internet Explorer, Media Player and Web Server
- Dimmable displays from 0 to 100% via PROFIenergy, via the HMI project or via a controller
- Modern industrial design, cast aluminum fronts for 7" upwards
- Upright installation for all touch devices
- Optimal selection option: seven touch and five key versions are available
- Data security in the event of a power failure for the device and for the SIMATIC HMI Memory Card
- Innovative service and commissioning concept through second SD card (automatic backup)
- Maximum performance with short screen refresh times
- Suitable for extremely harsh industrial environments thanks to extended approvals such as ATEX 2/22 and marine approvals
- Wide range of communication options: PROFIBUS and PROFINET onboard; 2 x PROFINET with integrated switch for 7" models or larger; plus 1 x PROFINET with Gigabit support for 15" models or larger
- All versions can be used as an OPC UA client or as an OPC DA server
- Key-operated devices with LED in every function key and new text input mechanism, similar to the keypads of mobile phones
- All keys have a service life of 2 million operations
- Configuring with the WinCC engineering software of the TIA Portal

Note:

A 7" and 15" Comfort Outdoor version will be available soon. For further information, please go to:

http://www.siemens.com/hmi

## ■ Ordering data

| SIMATIC HMI Comfort Panels | Article No. |
|---|---|
| **Key and touch devices** | |
| **SIMATIC HMI KTP400 Comfort** Key/touch-screen operation; 4" widescreen display | 6AV2124-2DC01-0AX0 |
| **Touch devices** | |
| **SIMATIC HMI TP700 Comfort** Touch-screen operation; 7" widescreen display | 6AV2124-0GC01-0AX0 |
| **SIMATIC HMI TP900 Comfort** Touch-screen operation; 9" widescreen display | 6AV2124-0JC01-0AX0 |
| **SIMATIC HMI TP1200 Comfort** Touch-screen operation; 12" widescreen display | 6AV2124-0MC01-0AX0 |
| **SIMATIC HMI TP1500 Comfort** Touch-screen operation; 15" widescreen display | 6AV2124-0QC02-0AX0 |
| **SIMATIC HMI TP1900 Comfort** Touch-screen operation; 19" widescreen display | 6AV2124-0UC02-0AX0 |
| **SIMATIC HMI TP2200 Comfort** Touch-screen operation; 22" widescreen display | 6AV2124-0XC02-0AX0 |
| **Key devices** | |
| **SIMATIC HMI KP400 Comfort** Key operation; 4" widescreen display | 6AV2124-1DC01-0AX0 |
| **SIMATIC HMI KP700 Comfort** Key operation; 7" widescreen display | 6AV2124-1GC01-0AX0 |
| **SIMATIC HMI KP900 Comfort** Key operation; 9" widescreen display | 6AV2124-1JC01-0AX0 |
| **SIMATIC HMI KP1200 Comfort** Key operation; 12" widescreen display | 6AV2124-1MC01-0AX0 |
| **SIMATIC HMI KP1500 Comfort** Key operation; 15" widescreen display | 6AV2124-1QC02-0AX0 |

| | Article No. |
|---|---|
| **Starter kits for SIMATIC HMI Comfort Panels** Consisting of: the respective SIMATIC HMI Comfort Panel, SIMATIC WinCC Comfort, Ethernet cable, 2 m SIMATIC HMI memory card 2 GB 10 protective films for touch screen devices | |
| **Starter kit for SIMATIC HMI KTP400 Comfort, Key and Touch** | 6AV2181-4DB20-0AX0 |
| **Starter kit for SIMATIC HMI TP700 Comfort, Touch** | 6AV2181-4GB00-0AX0 |
| **Starter kit for SIMATIC HMI TP900 Comfort, Touch** | 6AV2181-4JB00-0AX0 |
| **Starter kit for SIMATIC HMI TP1200 Comfort, Touch** | 6AV2181-4MB00-0AX0 |
| **Starter kit for SIMATIC HMI TP1500 Comfort, Touch** | 6AV2181-4QB00-0AX0 |
| **Starter kit for SIMATIC HMI TP1900 Comfort, Touch** | 6AV2181-4UB00-0AX0 |
| **Starter kit for SIMATIC HMI TP2200 Comfort, Touch** | 6AV2181-4XB00-0AX0 |
| **Starter kit for SIMATIC HMI KP400 Comfort, Key** | 6AV2181-4DB10-0AX0 |
| **Starter kit for SIMATIC HMI KP700 Comfort, Key** | 6AV2181-4GB10-0AX0 |
| **Starter kit for SIMATIC HMI KP900 Comfort, Key** | 6AV2181-4JB10-0AX0 |
| **Starter kit for SIMATIC HMI KP1200 Comfort, Key** | 6AV2181-4MB10-0AX0 |
| **Starter kit for SIMATIC HMI KP1500 Comfort, Key** | 6AV2181-4QB10-0AX0 |
| **Accessories** | See catalog ST 80 / ST PC or Industry Mall |

# SIMATIC S7-1200 Basic Controllers
SIPLUS operator control and monitoring

## SIPLUS Basic Panels (2nd Generation)

### ■ Overview

With their fully developed HMI basic functions, 2<sup>nd</sup> generation SIPLUS Basic Panels are the ideal entry level series for simple HMI applications.

The device family offers panels with 4", 7", 9" and 12" displays, as well as combined key and touch operation.

The innovative high-resolution widescreen displays with 64 000 colors are also suitable for upright installation, and they can be dimmed down to 100%. The innovative operator interface with improved usability opens up a diverse range of options thanks to new controls and graphics. The new USB interface enables the connection of keyboard, mouse or barcode scanner, and supports the simple archiving of data on a USB stick.

The integrated Ethernet or RS 485/422 interface (version-specific) enables simple connection to the controller.

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

### ■ Technical specifications

| Article number | 6AG1123-2DB03-2AX0 | 6AG1123-2GB03-2AX0 | 6AG1123-2GA03-2AX0 |
|---|---|---|---|
| Based on | 6AV2123-2DB03-0AX0 | 6AV2123-2GB03-0AX0 | 6AV2123-2GA03-0AX0 |
| | SIPLUS HMI KTP400 BASIC | SIPLUS HMI KTP700 BASIC | SIPLUS HMI KTP700 BASIC DP |
| **Ambient conditions** | | | |
| Suited for indoor use | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No |
| **Ambient temperature during operation** | | | |
| • Operation (vertical installation) | | | |
| - For vertical installation, min. | -20 °C | -20 °C | -20 °C; = Tmin |
| - For vertical installation, max. | 50 °C | 50 °C | 50 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning when condensation present), vertical mounting position |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications (continued)

| Article number | 6AG1123-2JB03-2AX0 | 6AG1123-2MB03-2AX0 | 6AG1123-2MA03-2AX0 |
|---|---|---|---|
| Based on | 6AV2123-2JB03-0AX0 | 6AV2123-2MB03-0AX0 | 6AV2123-2MA03-0AX0 |
| | SIPLUS HMI KTP900 BASIC | SIPLUS HMI KTP1200 BASIC | SIPLUS HMI KTP1200 BASIC DP |
| **Ambient conditions** | | | |
| Suited for indoor use | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No |
| **Ambient temperature during operation** | | | |
| • Operation (vertical installation) | | | |
|   - For vertical installation, min. | -20 °C | -10 °C; = Tmin | -10 °C; = Tmin |
|   - For vertical installation, max. | 50 °C | 50 °C | 50 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
|   - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100%; RH incl. condensation/frost (no commissioning when condensation present), vertical mounting position |
| **Resistance** | | | |
|   - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
|   - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
|   - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HMI Basic Panels, Key and Touch** | | **SIPLUS HMI KTP900 Basic** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +50 °C | 6AG1123-2JB03-2AX0 |
| **SIPLUS HMI KTP400 Basic** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +50 °C | 6AG1123-2DB03-2AX0 | | |
| | | **SIPLUS HMI KTP1200 Basic** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -10 ... +50 °C | 6AG1123-2MB03-2AX0 |
| **SIPLUS HMI KTP700 Basic** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +50 °C | 6AG1123-2GB03-2AX0 | | |
| | | **SIPLUS HMI KTP1200 Basic DP** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -10 ... +50 °C | 6AG1123-2MA03-2AX0 |
| **SIPLUS HMI KTP700 Basic DP** <br><br> For areas with extreme medial exposure (conformal coating); ambient temperature -20 ... +50 °C | 6AG1123-2GA03-2AX0 | | |
| | | **Accessories** | See catalog ST 80 / ST PC or Industry Mall |

# SIMATIC S7-1200 Basic Controllers
## SIPLUS operator control and monitoring

### SIPLUS Basic Panels (1st Generation)

■ **Overview**

- Ideal entry-level series of 3.8 inches to 15 inches for operating and monitoring compact machines and systems
- Clear process representation through the use of full-graphic displays
- Intuitive operation via touch and tactile function keys
- Equipped with all the necessary basic functions such as reporting, recipe management, curve representation, vector graphics, and language selection
- Easy connection to the controller via integrated Ethernet interface or a separate version with RS 485/422

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

■ **Technical specifications**

| Article number | 6AG1647-0AH11-2AX0 | 6AG1647-0AA11-2AX0 | 6AG1647-0AD11-2AX0 |
|---|---|---|---|
| Based on | 6AV6647-0AH11-3AX0 | 6AV6647-0AA11-3AX0 | 6AV6647-0AD11-3AX0 |
| | SIPLUS HMI KP300 BASIC MONO PN 3,6" | SIPLUS KTP400 BASIC MONO PN 3,8" | SIPLUS KTP600 BASIC COLOR PN |
| **Ambient conditions** | | | |
| Suited for indoor use | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No |
| **Ambient temperature during operation** | | | |
| • Operation (vertical installation) | | | |
| - For vertical installation, min. | -25 °C | -10 °C | -25 °C |
| - For vertical installation, max. | 60 °C | 60 °C | 60 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ▉ Technical specifications (continued)

| Article number | 6AG1647-0AE11-4AX0<br>6AV6647-0AE11-3AX0<br>SIPLUS KTP1000 BASIC COLOR DP 10,4" | 6AG1647-0AF11-4AX0<br>6AV6647-0AF11-3AX0<br>SIPLUS KTP1000 BASIC COLOR PN 10,4" | 6AG1647-0AG11-4AX0<br>6AV6647-0AG11-3AX0<br>SIPLUS TP1500 BASIC COLOR PN 15" |
|---|---|---|---|
| **Ambient conditions** | | | |
| Suited for indoor use | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No |
| **Ambient temperature during operation** | | | |
| • Operation (vertical installation) | 0 to +50 °C | 0 to +50 °C | 0 to +50 °C |
| - For vertical installation, min. | 0 °C | 0 °C | 0 °C |
| - For vertical installation, max. | 50 °C | 50 °C | 50 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ▉ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HMI KP300 Basic mono PN**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature -25 ... +60 °C | 6AG1647-0AH11-2AX0 | **SIPLUS HMI KTP1000 Basic color DP**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature 0 ... +50 °C | 6AG1647-0AE11-4AX0 |
| **SIPLUS HMI KTP400 Basic mono PN**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature -10 ... +60 °C | 6AG1647-0AA11-2AX0 | **SIPLUS HMI KTP1000 Basic color PN**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature 0 ... +50 °C | 6AG1647-0AF11-4AX0 |
| **SIPLUS HMI KTP600 Basic color PN**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature -25 ... +60 °C | 6AG1647-0AD11-2AX0 | **SIPLUS HMI TP1500 Basic color PN**<br><br>For areas with extreme medial exposure (conformal coating); ambient temperature 0 ... +50 °C | 6AG1647-0AG11-4AX0 |
| | | **Accessories** | See catalog ST 80 / ST PC or Industry Mall |

# SIMATIC S7-1200 Basic Controllers
SIPLUS operator control and monitoring

## SIPLUS Comfort Panels

### ■ Overview



- Excellent HMI functionality for demanding applications
- Widescreen TFT displays with 4", 7", 9", 12", 15", 19" and 22" diagonals (all 16 million colors) with up to 40% more visualization area as compared to the predecessor devices
- Integrated high-end functionality with archives, scripts, PDF/Word/Excel viewer, Internet Explorer, Media Player
- Dimmable displays from 0 to 100% via PROFIenergy, via the HMI project or via a controller
- Modern industrial design, cast aluminum fronts for 7" upwards
- Upright installation for all touch devices
- Optimal selection option: seven touch and five key versions are available
- Data security in the event of a power failure for the device and for the SIMATIC HMI Memory Card
- Innovative service and commissioning concept through second SD card (automatic backup)

- Easy project transfer via standard cable (standard Ethernet cable, standard USB cable)
- Maximum performance with short screen refresh times
- Suitable for extremely harsh industrial environments thanks to extended approvals such as ATEX 2/22
- Wide range of communication options: PROFIBUS and PROFINET onboard; 2x PROFINET with integrated switch for 7" models or larger; plus 1 additional PROFINET with Gigabit support for 15" models or larger
- All variants can be used as an OPC UA client or as an OPC DA server
- Key-operated devices with LED in every function key and new text input mechanism, similar to the keypads of mobile phones
- Key-operated devices with stamped keys for optimum tactile feedback
- All keys have a service life of 2 million operations
- Configuring with the WinCC engineering software of the TIA Portal

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

■ **Technical specifications**

| Article number | **6AG1124-2DC01-4AX0** | **6AG1124-0GC01-4AX0** | **6AG1124-0JC01-4AX0** | **6AG1124-0MC01-4AX0** |
|---|---|---|---|---|
| Based on | **6AV2124-2DC01-0AX0** | **6AV2124-0GC01-0AX0** | **6AV2124-0JC01-0AX0** | **6AV2124-0MC01-0AX0** |
| | SIPLUS HMI KTP400 COMFORT | SIPLUS HMI TP700 COMFORT | SIPLUS HMI TP900 COMFORT | SIPLUS HMI TP1200 COMFORT |
| **Ambient conditions** | | | | |
| Suited for indoor use | Yes | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No | No |
| **Ambient temperature during operation** | | | | |
| • Operation (vertical installation) | | | | |
|   - For vertical installation, min. | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin |
|   - For vertical installation, max. | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
|   - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
|   - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
|   - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
|   - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

**3**

# SIMATIC S7-1200 Basic Controllers
## SIPLUS operator control and monitoring

**SIPLUS Comfort Panels**

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### ▮ Technical specifications (continued)

| Article number | 6AG1124-1DC01-4AX0 | 6AG1124-1GC01-4AX0 | 6AG1124-1JC01-4AX0 | 6AG1124-1MC01-4AX0 | 6AG1124-1QC02-4AX0 |
|---|---|---|---|---|---|
| Based on | 6AV2124-1DC01-0AX0 | 6AV2124-1GC01-0AX0 | 6AV2124-1JC01-0AX0 | 6AV2124-1MC01-0AX0 | 6AV2124-1QC02-0AX0 |
| | SIPLUS HMI KP400 COMFORT | SIPLUS HMI KP700 COMFORT | SIPLUS HMI KP900 COMFORT | SIPLUS HMI KP1200 COMFORT | SIPLUS HMI KP1500 COMFORT |
| **Ambient conditions** | | | | | |
| Suited for indoor use | Yes | Yes | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No | No | No |
| **Ambient temperature during operation** | | | | | |
| • Operation (vertical installation) | | | | | |
| - For vertical installation, min. | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin |
| - For vertical installation, max. | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax |
| **Extended ambient conditions** | | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Technical specifications  (continued)

| Article number | **6AG1124-0QC02-4AX0** | **6AG1124-0UC02-4AX0** | **6AG1124-0XC02-4AX0** |
|---|---|---|---|
| Based on | **6AV2124-0QC02-0AX0** | **6AV2124-0UC02-0AX0** | **6AV2124-0XC02-0AX0** |
| | SIPLUS HMI TP1500 COMFORT | SIPLUS HMI TP1900 COMFORT | SIPLUS HMI TP2200 COMFORT |
| **Ambient conditions** | | | |
| Suited for indoor use | Yes | Yes | Yes |
| Suited for outdoor use | No | No | No |
| **Ambient temperature during operation** | | | |
| • Operation (vertical installation) | | | |
| - For vertical installation, min. | 0 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin |
| - For vertical installation, max. | 50 °C; = Tmax | 45 °C; = Tmax | 45 °C; = Tmax |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) | 100%; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HMI Comfort Panels, Keys and Touch** | | **SIPLUS HMI Comfort Panels, Keys** | |
| **SIPLUS HMI KP400 Comfort** | **6AG1124-2DC01-4AX0** | **SIPLUS HMI KP400 Comfort** | **6AG1124-1DC01-4AX0** |
| **SIPLUS HMI Comfort Panels, Touch** | | **SIPLUS HMI KP700 Comfort** | **6AG1124-1GC01-4AX0** |
| **SIPLUS HMI TP700 Comfort** | **6AG1124-0GC01-4AX0** | **SIPLUS HMI KP900 Comfort** | **6AG1124-1JC01-4AX0** |
| **SIPLUS HMI TP900 Comfort** | **6AG1124-0JC01-4AX0** | **SIPLUS HMI KP1200 Comfort** | **6AG1124-1MC01-4AX0** |
| **SIPLUS HMI TP1200 Comfort** | **6AG1124-0MC01-4AX0** | **SIPLUS HMI KP1500 Comfort** | **6AG1124-1QC02-4AX0** |
| **SIPLUS HMI TP1500 Comfort** | **6AG1124-0QC02-4AX0** | **Accessories** | See catalog ST 80 / ST PC or Industry Mall |
| **SIPLUS HMI TP1900 Comfort** | **6AG1124-0UC02-4AX0** | | |
| **SIPLUS HMI TP2200 Comfort** | **6AG1124-0XC02-4AX0** | | |

# SIMATIC S7-1200 Basic Controllers
## Add-on products from third-party manufacturers

### SIMATIC S7-1200 CM CANopen

■ **Overview**



***Note***

The CM CANopen module is an HMS product and can only be obtained through HMS.

The following description contains information on supplementary products that are manufactured and marketed, not by Siemens, but by third-parties outside the Siemens group ("external companies"). These external companies organize the manufacture, sale and delivery of their products independently. Their own terms and conditions of business and delivery apply.

Responsibility for these supplementary products and for the associated information presented here rests exclusively with the respective external company. Unless compulsory by law, Siemens assumes no liability and makes no guarantee for supplemental products of external companies. Please refer also to the note on "Exemption from liability/Use of hyperlinks" (see "More information").

***Overview***

An interface module is available for operating the S7-1200 on CANopen. It can be used together with system and IO components of the S7-1200 automation system.

CiA and CANopen are registered Community Trademarks of CAN in Automation e.V.

■ **Application**

CANopen is a widely used industrial bus system and can be used for a variety of different applications. The module allows simple and cost-effective connection of CANopen applications to SIMATIC.

- Control of hydraulic valves/axes in vehicles
- Control of motors in packaging machines or conveyors
- Capturing of angular encoder positions in wind turbines
- Capturing of control devices on machines, e.g. joysticks
- Capturing the measured data of path encoders, inclinometers or angular encoders, e.g. for tower cranes and gantry cranes

The CM CANopen module has the following properties:

- Interface module for CANopen (master/slave) for SIMATIC S7-1200
- Connection of up to 16 CANopen slave stations in the master mode
- 256 bytes of input data and 256 bytes of output data per module
- Connection of up to 3 modules per CPU
- 3 LEDs for module, network and I/O status diagnostics
- Possible integration of the module into the hardware catalog of the TIA Portal configuration suite
- Supports Transparent CAN 2.0A for processing customer-specific protocols
- CANopen implementation according to communication profiles CiA 301 Rev. 4.2 and CiA 302 Rev. 4.1 (master)

■ **More information**

The CANopen bus can be configured via any commercially available CANopen configuration tool. The HMS company also supplies suitable "CM CANopen Configuration Studio" software with the product. The configuration is saved directly on the module by means of a USB connection. Routing via PROFIBUS/PROFINET is not possible.

Preprogrammed function blocks are available for easier PLC programming in the TIA Portal.

For further information, please contact HMS directly:

http://www.hms-networks.com/can-for-s7-1200

***Ordering and Support***

Please note that ordering and support for the module are exclusively carried out via HMS. Please contact HMS directly should you have any questions concerning this module. The relevant contact details can be found on the Internet at

http://www.hms-networks.com/can-for-s7-1200

***Exemption from liability/Use of hyperlinks***

Siemens has prepared this description with great care. It is not possible, however, for Siemens to verify that the data supplied by external companies is complete, correct or up to date. The possibility that individual items of information might be incorrect, incomplete, or not up-to-date cannot therefore be ruled out. Unless compulsory by law, Siemens accepts no liability for the usability of the data or of the product for the user per se.

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*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# SIMATIC S7-1500 Advanced Controllers
Introduction

## SIMATIC S7-1500/S7-1500F, SIPLUS S7-1500

■ **Overview**

- Modular, scalable, and universally usable system in IP20 level of protection
- The system solution for a variety of automation applications in discrete automation
- Highest performance with excellent usability
- Configurable exclusively in the Totally Integrated Automation Portal with STEP 7 Professional V12 or higher

### *Performance*

- Increase in performance through
  - Faster command execution
  - Language extensions
  - New data types
  - Faster backplane bus
  - Optimized code generation
- Powerful communication:
  - PROFINET IO (2-port switch) as standard interface; from CPU 1515-2 PN, one or more additional integrated PROFINET interfaces, e.g. for network separation, for connecting further PROFINET devices or for high-speed communication as an I-device
  - OPC UA Data Access Server as runtime option for the easy connection of SIMATIC S7-1500 in third-party devices/systems
  - Expandable with communication modules for bus systems and point-to-point connection

### *Integrated technology*

- Motion control integrated without additional modules:
  - Standardized blocks (PLCopen) for connection of analog and PROFIdrive-capable drives
  - The motion control functionality supports speed-controlled axes, positioning axes, relative synchronous operation (synchronizing without specification of the synchronized position), as well as external encoders, cams and probes.
  - Extended motion control functions such as absolute synchronous operation (synchronizing with specification of the synchronized position) and camming are also integrated in the technology CPUs.
- Comprehensive trace functions for all CPU tags for real-time diagnostics and sporadic error detection; for effective commissioning and quick optimization of drives and controls
- Comprehensive control functionalities: e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Additional functions through available technology modules: e.g. high-speed counting, position detection, or measurement functions for signals up to 1 MHz

### *Safety Integrated*

Protection of personnel and machinery – within the framework of an integrated complete system

- Fail-safe SIMATIC S7-1500(T)F Controllers for processing standard and safety programs on the same controller. Generation of the fail-safe and standard user program is carried out in the TIA Portal with the same editors; this enables fail-safe data to be evaluated like standard data in the standard user program, for example. Due to this integration the system benefits and the comprehensive functionality of SIMATIC are also available for fail-safe applications.

### *Security Integrated*

- Password-based know-how protection against unauthorized reading and modification of program blocks
- Copy protection for greater protection against unauthorized copying of program blocks:
  With copy protection, individual blocks on the SIMATIC Memory Card can be tied to its serial number so that the block can only be run if the configured memory card is inserted into the CPU.
- Rights concept with four different authorization levels:
  Different access rights can be assigned to various user groups. The new protection level 4 makes it possible to also restrict communication to HMI devices.
- Improved manipulation protection:
  Changed or unauthorized transfers of engineering data are detected by the controller.
- For use of an Ethernet CP (CP 1543-1):
  - Additional access protection by means of a firewall
  - Establishment of secure VPN connections

### *Design and handling*

- CPUs with display for plain text information (display simulator tool on the Internet):
  - Information about article numbers, firmware version, and the serial number of all connected modules can be displayed
  - Setting the IP address of the CPU and additional network settings possible directly on site, without programming device on the display
  - Display of occurring error messages directly as plain text message, meaning reduction in downtime
- Uniform front connectors for all modules and integrated potential bridges for flexible potential group formation simplify stock keeping and reduce wiring costs
- Integrated DIN rail in the S7-1500 DIN rail:
  quick and easy installation of additional components such as miniature circuit breakers, relays, etc.
- Central expansion with signal modules:
  for flexible adaptation to any application
- System cabling for digital signal modules:
  for fast and clearly arranged connecting to sensors and actuators in the field and simple wiring inside the control cabinet
- Power supply:
  - Load power supply modules (PMs) for supplying the module with 24 V
  - Power supply modules to supply power to the internal module electronics via the backplane bus
- Distributed expansion:
  - Use of up to 30 signal modules, communication modules, and technology modules via the PROFINET interface module IM 155-5 for the ET 200MP I/O system
  - No difference in terms of handling and system functions in central and distributed operation

## Overview (continued)

### Integrated system diagnostics

- Integrated system diagnostics for CPUs, activated by default:
  - Consistent plain text display of system diagnostic information in the display, TIA Portal, HMI, and web server, even for drive messages. Messages are updated even if the CPU is in STOP state.
  - System diagnostics integrated in the CPU firmware. Configuration by user not required. The diagnostics is automatically updated on configuration changes.

### Support of SIMATIC ProDiag S7-1500

- ProDiag is a concept for the easy creation of machine and plant diagnostics. It increases availability and supports with fault analysis and elimination on-site.

### Datalog (archives) and recipes

- SIMATIC Memory Card:
  - Plug-in load memory
  - Permits firmware updates
  - Storage option for STEP 7 projects (including comments and symbols), additional documentation, or csv files (for recipes and archives)
  - Easy access to plant-relevant operating data and configuration data with Office tools via the SD card reader (two-way data exchange from and to the controller)
- Integrated web server:
  - Easy access to plant-relevant operating data and configuration data via a web browser

### Approvals

The SIMATIC S7-1500 complies with the following national and international standards:

- cULus approval
- cULus HazLoc approval
- FM approval
- ATEX approval (only for 24 V; not for 230 V)
- CE
- RCM (formerly C-Tick)
- KCC
- IECEx (24 V only; not for 230 V)
- EN 61000-6-4
- EN 60068-2-1/ -2/ -6/ -14/ -27/ -30/ -32
- EN 61131-2

You can find the marine approvals available for the S7-1500 on the Internet (SIMATIC Customer Support):
http://www.siemens.com/automation/support

## Technical specifications

| General technical specifications SIMATIC S7-1500 | |
|---|---|
| Degree of protection | IP20 acc. to IEC 60 529 |
| Ambient temperature | |
| • Horizontal installation | 0...60 °C (display: at an operating temperature of typ. 50 °C, the display is switched off.) |
| • Vertical installation | 0... 40 °C (display: at an operating temperature of typ. 40 °C, the display is switched off.) |
| Relative humidity | 5%...95%, no condensation |
| Atmospheric pressure | From 1080 to 795 hPa (corresponds to an altitude of -1000 to +2000 m) |
| Insulation | |
| • < 50 V | 707 V DC test voltage (type test) |
| • < 150 V | 2200 V DC test voltage |
| • < 250 V | 2500 V DC test voltage |
| Electromagnetic compatibility | Requirements of the EMC directive; interference immunity according to IEC 61000-6-2 |
| • Pulse-shaped disturbance variables | Test according to: Electrostatic discharge according to IEC 61000-4-2, burst pulses according to IEC 61000-4-4, energy single pulse (surge) according to IEC 61000-4-5, |
| • Sinusoidal disturbance variables | Test according to: HF irradiation according to IEC 61000-4-3, HF decoupling according to IEC 61000-4-6 |
| | Requirements of the EMC directive; interference emission according to EN 61000-6-4 |
| • Emission of radio frequency interference | Interference emission according to 61000-6-4 |
| | Interference emission of electromagnetic fields according to EN 61000-6-4 |

| General technical specifications SIMATIC S7-1500 | |
|---|---|
| Mechanical stress | |
| • Vibrations | Testing according to EN 60068-2-6 Tested with: 5 Hz ≤ f ≤ 8.4 Hz, constant amplitude 7 mm; 9 Hz ≤ f ≤ 150 Hz, constant acceleration 2 g; duration of vibration: 10 frequency passes per axis in each direction of the 3 mutually perpendicular axes |
| • Shock | Testing according to EN 60068-2-27 Tested with: Half-wave: strength of shock 15 g peak value, 11 ms duration; shock direction: 3 shocks each in ± direction in each of the 3 mutually vertical axes |

# SIMATIC S7-1500 Advanced Controllers
## Introduction

### SIMATIC S7-1500/S7-1500F, SIPLUS S7-1500

**Technical specifications** (continued)

| General technical data of SIPLUS S7-1500 | |
| --- | --- |
| Ambient temperature range | -40/-25/-20 ... +55/60/70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical specifications | The technical data of the standard product applies except for the ambient conditions. |

| General technical data of SIPLUS S7-1500 | |
| --- | --- |
| **Ambient conditions** | |
| Extended range of environmental conditions | |
| • with reference to ambient temperature, air pressure and altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | 0° C |
| Relative humidity | |
| • with condensation, max. | 100 %; RH incl. bedewing/frost (no commissioning in bedewed state) |
| Resistance | |
| • to biologically active substances/ compliance with EN 60721-3-3 | Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to chemically active substances/ compliance with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to mechanically active substances, compliance with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation. |

4

### Overview CPU 1511-1 PN

- Entry-level CPU in the S7-1500 Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

### Overview CPU 1513-1 PN

- The CPU for applications with medium requirements for program/data storage in the S7-1500 Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Standard CPUs**

### Overview CPU 1515-2 PN



- The CPU for applications with medium to high requirements for program/data storage in the S7-1500 Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, precise position gearing between axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

### Overview CPU 1516-3 PN/DP



- The CPU with a large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

**4**

## Overview CPU 1517-3 PN/DP



- The CPU with a very large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

## Overview CPU 1518-4 PN/DP



- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Two additional PROFINET interfaces with separate IP address; for network separation. The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Standard CPUs

### ■ Overview CPU 1518-4 PN/DP ODK

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ in the CPU 1518-4 PN/DP ODK.
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller

- Two additional PROFINET interfaces with separate IP addresses for network separation The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

### ■ Technical specifications

| Article number | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7515-2AM01-0AB0 |
|---|---|---|---|
| | CPU 1511-1PN, 150KB PROGRAM, 1MB DATA | CPU 1513-1 PN, 300KB PROG., 1,5MB DATA | CPU 1515-2 PN, 500KB PROG., 3MB DATA |
| **General information** | | | |
| Product type designation | CPU 1511-1 PN | CPU 1513-1 PN | CPU 1515-2 PN |
| **Engineering with** | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 | V14 |
| **Display** | | | |
| Screen diagonal [cm] | 3.45 cm | 3.45 cm | 6.1 cm |
| **Supply voltage** | | | |
| Type of supply voltage | 24 V DC | 24 V DC | 24 V DC |
| **Power loss** | | | |
| Power loss, typ. | 5.7 W | 5.7 W | 6.3 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated (for program) | 150 kbyte | 300 kbyte | 500 kbyte |
| • integrated (for data) | 1 Mbyte | 1.5 Mbyte | 3 Mbyte |
| **Load memory** | | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | | |
| for bit operations, typ. | 60 ns | 40 ns | 30 ns |
| for word operations, typ. | 72 ns | 48 ns | 36 ns |
| for fixed point arithmetic, typ. | 96 ns | 64 ns | 48 ns |
| for floating point arithmetic, typ. | 384 ns | 256 ns | 192 ns |
| **Counters, timers and their retentivity** | | | |
| **S7 counter** | | | |
| • Number | 2 048 | 2 048 | 2 048 |
| **IEC counter** | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | | |
| • Number | 2 048 | 2 048 | 2 048 |
| **IEC timer** | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |

■ **Technical specifications** (continued)

| Article number | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7515-2AM01-0AB0 |
|---|---|---|---|
| | CPU 1511-1PN, 150KB PROGRAM, 1MB DATA | CPU 1513-1 PN, 300KB PROG., 1,5MB DATA | CPU 1515-2 PN, 500KB PROG., 3MB DATA |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 16 kbyte | 16 kbyte | 16 kbyte |
| **Address area** | | | |
| **I/O address area** | | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | | |
| **Clock** | | | |
| • Type | Hardware clock | Hardware clock | Hardware clock |
| **1. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 | Yes; X1 |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes | Yes |
| **PROFINET IO Controller** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | Yes | Yes | Yes |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128 | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 128 | 256 |
| - of which in line, max. | 128 | 128 | 256 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |

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# SIMATIC S7-1500 Advanced Controllers
## Central processing units

### Standard CPUs

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■ **Technical specifications** (continued)

| Article number | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7515-2AM01-0AB0 |
|---|---|---|---|
| | CPU 1511-1PN, 150KB PROGRAM, 1MB DATA | CPU 1513-1 PN, 300KB PROG., 1,5MB DATA | CPU 1515-2 PN, 500KB PROG., 3MB DATA |
| **Update time for IRT** | | | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | No | No | No |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes |
| - MRP | Yes | Yes | Yes |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes |
| - Shared device | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 |
| **2. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | | | 1 |
| • integrated switch | | | No |
| • RJ 45 (Ethernet) | | | Yes; X2 |
| **Functionality** | | | |
| • PROFINET IO Controller | | | Yes |
| • PROFINET IO Device | | | Yes |
| • SIMATIC communication | | | Yes |
| • Open IE communication | | | Yes |
| • Web server | | | Yes |
| • Media redundancy | | | No |

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■ **Technical specifications** (continued)

| Article number | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7515-2AM01-0AB0 |
|---|---|---|---|
| | CPU 1511-1PN, 150KB PROGRAM, 1MB DATA | CPU 1513-1 PN, 300KB PROG., 1,5MB DATA | CPU 1515-2 PN, 500KB PROG., 3MB DATA |
| **PROFINET IO Controller** | | | |
| **Services** | | | |
| - PG/OP communication | | | Yes |
| - S7 routing | | | Yes |
| - Isochronous mode | | | No |
| - Open IE communication | | | Yes |
| - IRT | | | No |
| - MRP | | | No |
| - PROFIenergy | | | Yes |
| - Prioritized startup | | | No |
| - Number of connectable IO Devices, max. | | | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | | | 32 |
| - of which in line, max. | | | 32 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | | | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | | | 8 |
| - Updating times | | | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | | | |
| - for send cycle of 1 ms | | | 1 ms to 512 ms |
| **PROFINET IO Device** | | | |
| **Services** | | | |
| - PG/OP communication | | | Yes |
| - S7 routing | | | Yes |
| - Isochronous mode | | | No |
| - Open IE communication | | | Yes |
| - IRT | | | No |
| - MRP | | | No |
| - MRPD | | | No |
| - PROFIenergy | | | Yes |
| - Prioritized startup | | | No |
| - Shared device | | | Yes |
| - Number of IO Controllers with shared device, max. | | | 4 |
| **Protocols** | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes |
| PROFIsafe | No | No | No |
| PROFIBUS | No | No | No |
| **Number of connections** | | | |
| ● Number of connections, max. | 96; via integrated interfaces of the CPU and connected CPs / CMs | 128; via integrated interfaces of the CPU and connected CPs / CMs | 192; via integrated interfaces of the CPU and connected CPs / CMs |
| **PROFINET IO Controller** | | | |
| **Services** | | | |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | |
| - Of which IO devices with IRT, max. | 64 | 64 | |
| - Number of connectable IO Devices for RT, max. | 128 | 128 | |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 625 µs | Yes; With minimum OB 6x cycle of 500 µs | Yes; With minimum OB 6x cycle of 500 µs |

# SIMATIC S7-1500 Advanced Controllers
Central processing units

**Standard CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7515-2AM01-0AB0 |
|---|---|---|---|
| | CPU 1511-1PN, 150KB PROGRAM, 1MB DATA | CPU 1513-1 PN, 300KB PROG., 1,5MB DATA | CPU 1515-2 PN, 500KB PROG., 3MB DATA |
| **Supported technology objects** | | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 800 | 800 | 2 400 |
| • Required Motion Control resources | | | |
|   - per speed-controlled axis | 40 | 40 | 40 |
|   - per positioning axis | 80 | 80 | 80 |
|   - per synchronous axis | 160 | 160 | 160 |
|   - per external encoder | 80 | 80 | 80 |
|   - per output cam | 20 | 20 | 20 |
|   - per cam track | 160 | 160 | 160 |
|   - per probe | 40 | 40 | 40 |
| Controller | | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | | |
| • High-speed counter | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
|   - LAD | Yes | Yes | Yes |
|   - FBD | Yes | Yes | Yes |
|   - STL | Yes | Yes | Yes |
|   - SCL | Yes | Yes | Yes |
|   - GRAPH | Yes | Yes | Yes |
| **Know-how protection** | | | |
| • User program protection/password protection | Yes | Yes | Yes |
| • Copy protection | Yes | Yes | Yes |
| • Block protection | Yes | Yes | Yes |
| **Access protection** | | | |
| • Password for display | Yes | Yes | Yes |
| • Protection level: Write protection | Yes | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes | Yes |
| **Dimensions** | | | |
| Width | 35 mm | 35 mm | 70 mm |
| Height | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm |
| **Weights** | | | |
| Weight, approx. | 430 g | 430 g | 830 g |

■ **Technical specifications** (continued)

| Article number | 6ES7516-3AN01-0AB0 | 6ES7517-3AP00-0AB0 | 6ES7518-4AP00-0AB0 | 6ES7518-4AP00-3AB0 |
|---|---|---|---|---|
| | CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA | CPU 1517-3 PN/DP, 2MB PROG./8MB DATA | CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA | CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA |
| **General information** | | | | |
| Product type designation | CPU 1516-3 PN/DP | CPU 1517-3 PN/DP | CPU 1518-4 PN/DP | CPU 1518-4 PN/DP ODK |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 | V14 | V14 |
| **Display** | | | | |
| Screen diagonal [cm] | 6.1 cm | 6.1 cm | 6.1 cm | 6.1 cm |
| **Supply voltage** | | | | |
| Type of supply voltage | 24 V DC | 24 V DC | 24 V DC | 24 V DC |
| **Power loss** | | | | |
| Power loss, typ. | 7 W | 24 W | 24 W | 24 W |
| **Memory** | | | | |
| **Work memory** | | | | |
| • integrated (for program) | 1 Mbyte | 2 Mbyte | 4 Mbyte | 4 Mbyte |
| • integrated (for data) | 5 Mbyte | 8 Mbyte | 20 Mbyte | 20 Mbyte |
| • Integrated (for ODK application) | | | | 20 Mbyte |
| **Load memory** | | | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | | | |
| for bit operations, typ. | 10 ns | 2 ns | 1 ns | 1 ns |
| for word operations, typ. | 12 ns | 3 ns | 2 ns | 2 ns |
| for fixed point arithmetic, typ. | 16 ns | 3 ns | 2 ns | 2 ns |
| for floating point arithmetic, typ. | 64 ns | 12 ns | 6 ns | 6 ns |
| **Counters, timers and their retentivity** | | | | |
| **S7 counter** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC counter** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC timer** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **Data areas and their retentivity** | | | | |
| **Flag** | | | | |
| • Number, max. | 16 kbyte | 16 kbyte | 16 kbyte | 16 kbyte |
| **Address area** | | | | |
| **I/O address area** | | | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | | | |
| **Clock** | | | | |
| • Type | Hardware clock | Hardware clock | Hardware clock | Hardware clock |
| **1. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | 2 | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 | Yes; X1 | Yes; X1 |
| **Functionality** | | | | |
| • PROFINET IO Controller | Yes | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Standard CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7516-3AN01-0AB0 | 6ES7517-3AP00-0AB0 | 6ES7518-4AP00-0AB0 | 6ES7518-4AP00-3AB0 |
|---|---|---|---|---|
| | CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA | CPU 1517-3 PN/DP, 2MB PROG./8MB DATA | CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA | CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | Yes | Yes | Yes | Yes |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 256 | 512 | 512 | 512 |
| - of which in line, max. | 256 | 512 | 512 | 512 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | | | |
| - for send cycle of 125 µs | | | 125 µs | 125 µs |
| - for send cycle of 187.5 µs | | | 187.5 µs | 187.5 µs |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms | 250 µs to 4 ms | 250 µs to 4 ms |
| - for send cycle of 500 µs | 500 µs to 8 ms | 500 µs to 8 ms | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms |

## Technical specifications (continued)

| Article number | 6ES7516-3AN01-0AB0 | 6ES7517-3AP00-0AB0 | 6ES7518-4AP00-0AB0 | 6ES7518-4AP00-3AB0 |
|---|---|---|---|---|
| | CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA | CPU 1517-3 PN/DP, 2MB PROG./8MB DATA | CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA | CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
|   - PG/OP communication | Yes | Yes | Yes | Yes |
|   - S7 routing | Yes | Yes | Yes | Yes |
|   - Isochronous mode | No | No | No | No |
|   - Open IE communication | Yes | Yes | Yes | Yes |
|   - IRT | Yes | Yes | Yes | Yes |
|   - MRP | Yes | Yes | Yes | Yes |
|   - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
|   - PROFIenergy | Yes | Yes | Yes | Yes |
|   - Shared device | Yes | Yes | Yes | Yes |
|   - Number of IO Controllers with shared device, max. | 4 | 4 | 4 | 4 |
| **2. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | 1 | 1 | 1 | 1 |
| • integrated switch | No | No | No | No |
| • RJ 45 (Ethernet) | Yes; X2 | Yes; X2 | Yes; X2 | Yes; X2 |
| **Functionality** | | | | |
| • PROFINET IO Controller | Yes | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes | Yes |
| • Media redundancy | No | No | No | No |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
|   - PG/OP communication | Yes | Yes | Yes | Yes |
|   - S7 routing | Yes | Yes | Yes | Yes |
|   - Isochronous mode | No | No | No | No |
|   - Open IE communication | Yes | Yes | Yes | Yes |
|   - IRT | No | No | No | No |
|   - MRP | No | No | No | No |
|   - PROFIenergy | Yes | Yes | Yes | Yes |
|   - Prioritized startup | No | No | No | No |
|   - Number of connectable IO Devices, max. | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
|   - Number of connectable IO Devices for RT, max. | 32 | 128 | 128 | 128 |
|   - of which in line, max. | 32 | 128 | 128 | 128 |
|   - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
|   - Number of IO Devices per tool, max. | 8 | 8 | | |
|   - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | | | | |
|   - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Standard CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7516-3AN01-0AB0 | 6ES7517-3AP00-0AB0 | 6ES7518-4AP00-0AB0 | 6ES7518-4AP00-3AB0 |
|---|---|---|---|---|
| | CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA | CPU 1517-3 PN/DP, 2MB PROG./8MB DATA | CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA | CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | No | No | No | No |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | No | No | No | No |
| - MRP | No | No | No | No |
| - MRPD | No | No | No | No |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Prioritized startup | No | No | No | No |
| - Shared device | Yes | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 | 4 |
| **3. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | 1 | 1 | 1 | 1 |
| • integrated switch | | | No | No |
| • RJ 45 (Ethernet) | | | Yes; X3 | Yes; X3 |
| • RS 485 | Yes; X3 | Yes; X3 | | |
| **Functionality** | | | | |
| • PROFINET IO Controller | | | No | No |
| • PROFINET IO Device | | | No | No |
| • PROFIBUS DP master | Yes | Yes | | |
| • PROFIBUS DP slave | No | No | | |
| • SIMATIC communication | Yes | Yes | Yes | Yes |
| • Open IE communication | | | Yes | Yes |
| • Web server | | | Yes | Yes |
| **4. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | | | 1 | 1 |
| • RS 485 | | | Yes; X4 | Yes; X4 |
| **Functionality** | | | | |
| • PROFIBUS DP master | | | Yes | Yes |
| • PROFIBUS DP slave | | | No | No |
| • SIMATIC communication | | | Yes | Yes |
| **Protocols** | | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes | Yes |
| PROFIsafe | No | No | No | No |
| PROFIBUS | Yes | Yes | Yes | Yes |
| **Number of connections** | | | | |
| • Number of connections, max. | 256; via integrated interfaces of the CPU and connected CPs / CMs | 320; via integrated interfaces of the CPU and connected CPs / CMs | 384; via integrated interfaces of the CPU and connected CPs / CMs | 384; via integrated interfaces of the CPU and connected CPs / CMs |
| **PROFIBUS DP master** | | | | |
| **Services** | | | | |
| - Number of DP slaves | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 375 µs | Yes; With minimum OB 6x cycle of 250 µs | Yes; With minimum OB 6x cycle of 125 µs | Yes; With minimum OB 6x cycle of 125 µs |
| **Supported technology objects** | | | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 2 400 | 10 240 | 10 240 | 10 240 |

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## ◼ Technical specifications (continued)

| Article number | 6ES7516-3AN01-0AB0 | 6ES7517-3AP00-0AB0 | 6ES7518-4AP00-0AB0 | 6ES7518-4AP00-3AB0 |
|---|---|---|---|---|
| | CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA | CPU 1517-3 PN/DP, 2MB PROG./8MB DATA | CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA | CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA |
| **Supported technology objects (continued)** | | | | |
| • Required Motion Control resources | | | | |
| - per speed-controlled axis | 40 | 40 | 40 | 40 |
| - per positioning axis | 80 | 80 | 80 | 80 |
| - per synchronous axis | 160 | 160 | 160 | 160 |
| - per external encoder | 80 | 80 | 80 | 80 |
| - per output cam | 20 | 20 | 20 | 20 |
| - per cam track | 160 | 160 | 160 | 160 |
| - per probe | 40 | 40 | 40 | 40 |
| Controller | | | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | | | |
| • High-speed counter | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | | | |
| **Programming** | | | | |
| **Programming language** | | | | |
| - LAD | Yes | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes |
| • Copy protection | Yes | Yes | Yes | Yes |
| • Block protection | Yes | Yes | Yes | Yes |
| **Access protection** | | | | |
| • Password for display | Yes | Yes | Yes | Yes |
| • Protection level: Write protection | Yes | Yes | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes | Yes | Yes |
| **Open Development interfaces** | | | | |
| • Size of ODK SO file, max. | | | | 5.8 Mbyte |
| **Dimensions** | | | | |
| Width | 70 mm | 175 mm | 175 mm | 175 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 845 g | 1 978 g | 1 988 g | 1 988 g |

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Standard CPUs

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| Ordering data | Article No. |
|---|---|
| **CPU 1511-1 PN** | **6ES7511-1AK01-0AB0** |
| Work memory 150 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **CPU 1513-1 PN** | **6ES7513-1AL01-0AB0** |
| Work memory 300 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **CPU 1515-2 PN** | **6ES7515-2AM01-0AB0** |
| Work memory 500 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required | |
| **CPU 1516-3 PN/DP** | **6ES7516-3AN01-0AB0** |
| Work memory 1 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1517-3 PN/DP** | **6ES7517-3AP00-0AB0** |
| Work memory 2 MB for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1518-4 PN/DP** | **6ES7518-4AP00-0AB0** |
| Work memory 4 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1518-4 PN/DP ODK** | **6ES7518-4AP00-3AB0** |
| Work memory 4 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **SIMATIC Memory Card** | |
| 4 MB | **6ES7954-8LC02-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** |
| 24 MB | **6ES7954-8LF02-0AA0** |
| 256 MB | **6ES7954-8LL02-0AA0** |
| 2 GB | **6ES7954-8LP02-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** |
| **SIMATIC S7-1500 DIN rail** | |
| Fixed lengths, with grounding elements | |
| • 160 mm | **6ES7590-1AB60-0AA0** |
| • 245 mm | **6ES7590-1AC40-0AA0** |
| • 482 mm | **6ES7590-1AE80-0AA0** |
| • 530 mm | **6ES7590-1AF30-0AA0** |
| • 830 mm | **6ES7590-1AJ30-0AA0** |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| • 2000 mm | **6ES7590-1BC00-0AA0** |

| Ordering data | Article No. |
|---|---|
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| 20 units | |
| **Power supply** | |
| For supplying the backplane bus of the S7-1500 | |
| 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** |
| 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** |
| **Power connector** | **6ES7590-8AA00-0AA0** |
| With coding element for power supply module; spare part, 10 units | |
| **Load power supply** | |
| 24 V DC/3 A | **6EP1332-4BA00** |
| 24 V DC/8 A | **6EP1333-4BA00** |
| **Power supply connector** | |
| Spare part; for connecting the 24 V DC supply voltage | |
| • With push-in terminals | **6ES7193-4JB00-0AA0** |
| **PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet** | |
| With insulation displacement, max. transmission rate 12 Mbps | |
| Without PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BA70-0XA0** |
| With PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BB70-0XA0** |
| **PROFIBUS FC Standard Cable GP** | **6XV1830-0EH10** |
| Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Robust Cable** | **6XV1830-0JH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Flexible Cable** | **6XV1831-2K** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Trailing Cable** | |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| Sheath color: Petrol | **6XV1830-3EH10** |
| Sheath color: Violet | **6XV1831-2L** |
| **PROFIBUS FC Food Cable** | **6XV1830-0GH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **PROFIBUS FC Ground Cable** | 6XV1830-3FH10 | **Front cover for PROFIBUS DP interface** | 6ES7591-8AA00-0AA0 |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | For CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part | |
| **PROFIBUS FC FRNC Cable GP** | 6XV1830-0LH10 | **SIMATIC S7-1500 Starter Kit** | 6ES7511-1CK00-4YB5 |
| 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation | |
| **PROFIBUS FastConnect Stripping Tool** | 6GK1905-6AA00 | **STEP 7 Professional V14 SP1** | |
| Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| **IE FC RJ45 plugs** | | Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | | |
| **IE FC RJ45 Plug 180** | | | |
| 180° cable outlet | | Type of delivery: English, German, Chinese, Italian, French, Spanish | |
| 1 unit | 6GK1901-1BB10-2AA0 | | |
| 10 units | 6GK1901-1BB10-2AB0 | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| 50 units | 6GK1901-1BB10-2AE0 | | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Email address required for delivery | |
| | | **SIMATIC ODK 1500S V2.0** | |
| | | Open Development Kit for support in developing Windows and real-time library functions | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | Package with data storage medium | 6ES7806-2CD02-0YA0 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Download incl. license key [1] | 6ES7806-2CD02-0YG0 |
| | | Email address required for delivery | |
| | | **SIMATIC Target 1500S for Simulink V1.0** | 6ES7823-1BE00-0YA5 |
| | | Download incl. license key [1] | |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | Email address required for delivery | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | | |
| **Display** | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| For CPU 1511-1 PN and CPU 1513-1 PN; spare part | 6ES7591-1AA01-0AA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part | 6ES7591-1BA01-0AA0 | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**SIPLUS Standard CPUs**

### Overview SIPLUS CPU 1511-1 PN

- Entry-level CPU in the S7-1500 Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- SIMATIC Memory Card required for operation of the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### Overview SIPLUS CPU 1513-1 PN

- The CPU for applications with medium/high requirements for program and data storage in the S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O

- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- SIMATIC Memory Card required for operation of the CPU

Please note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### Overview SIPLUS CPU 1516-3 PN/DP

- The CPU with large program and data memory in the S7-1500 Controller product range for applications with high program scope requirements.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- SIMATIC Memory Card required for operation of the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Overview SIPLUS CPU 1518-4 PN/DP



- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O

- PROFINET IO IRT interface with 2-port switch
- Two additional PROFINET interfaces with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages

SIMATIC Memory Card required for operating the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information has been added.

## Technical specifications

| Article number | 6AG1511-1AK01-2AB0 | 6AG1511-1AK01-7AB0 | 6AG1513-1AL01-2AB0 | 6AG1513-1AL01-7AB0 |
|---|---|---|---|---|
| Based on | 6ES7511-1AK01-0AB0 | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7513-1AL01-0AB0 |
| | SIPLUS S7-1500 CPU 1511-1 PN | SIPLUS S7-1500 CPU 1511-1 PN | SIPLUS S7-1500 CPU 1513-1 PN | SIPLUS S7-1500 CPU 1513-1 PN |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

■ **Technical specifications** (continued)

| Article number | 6AG1511-1AK01-2AB0 | 6AG1511-1AK01-7AB0 | 6AG1513-1AL01-2AB0 | 6AG1513-1AL01-7AB0 |
|---|---|---|---|---|
| Based on | 6ES7511-1AK01-0AB0 | 6ES7511-1AK01-0AB0 | 6ES7513-1AL01-0AB0 | 6ES7513-1AL01-0AB0 |
| | SIPLUS S7-1500 CPU 1511-1 PN | SIPLUS S7-1500 CPU 1511-1 PN | SIPLUS S7-1500 CPU 1513-1 PN | SIPLUS S7-1500 CPU 1513-1 PN |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1516-3AN01-2AB0 | 6AG1516-3AN01-7AB0 | 6AG1518-4AP00-4AB0 |
|---|---|---|---|
| Based on | 6ES7516-3AN01-0AB0 | 6ES7516-3AN01-0AB0 | 6ES7518-4AP00-0AB0 |
| | SIPLUS S7-1500 CPU 1516-3 PN/DP | SIPLUS S7-1500 CPU 1516-3 PN/DP | SIPLUS S7-1500 CPU 1518-4 PN/DP |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -20 °C | -40 °C; = Tmin; Startup @ -20 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Available soon |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! | Available soon |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Available soon |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS CPU 1511-1 PN** | |
| (Extended temperature range and exposure to media) | |
| Work memory 150 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| Temperature range -40 ... +60 °C (startup -20 °C) | **6AG1511-1AK01-2AB0** |
| Temperature range -40 ... +70 °C (startup -20 °C) | **6AG1511-1AK01-7AB0** |
| **SIPLUS CPU 1513-1 PN** | |
| (Extended temperature range and exposure to media) | |
| Work memory 300 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| Temperature range -40 ... +60 °C (startup -20 °C) | **6AG1513-1AL01-2AB0** |
| Temperature range -40 ... +70 °C (startup -20 °C) | **6AG1513-1AL01-7AB0** |
| **SIPLUS CPU 1516-3 PN/DP** | |
| (Extended temperature range and exposure to media) | |
| Work memory 1 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| Temperature range -40 ... +60 °C (startup -20 °C) | **6AG1516-3AN01-2AB0** |
| Temperature range -40 ... +70 °C (startup -20 °C) | **6AG1516-3AN01-7AB0** |
| **SIPLUS CPU 1518-4 PN/DP** | **6AG1518-4AP00-4AB0** |
| (Exposure to media) | |
| Work memory 3 MB for program, 10 MB for data, PROFINET IO IRT interface, 2 PROFINET/PROFIBUS interfaces; SIMATIC Memory Card required | |

| | Article No. |
|---|---|
| **Accessories** | |
| **System power supply** | |
| (Extended temperature range and exposure to media) | |
| 24 V DC input voltage, power 25 W | **6AG1505-0KA00-7AB0** |
| 24/48/60 V DC input voltage, power 60 W | **6AG1505-0RA00-7AB0** |
| 120/230 V AC input voltage, power 60 W | **6AG1507-0RA00-7AB0** |
| **Load power supply** | |
| (Extended temperature range and exposure to media) | |
| 24 V DC/3A | **6AG1332-4BA00-7AA0** |
| 24 V DC/8A | **6AG1333-4BA00-7AA0** |
| **Display** | |
| (Extended temperature range and exposure to media) | |
| For SIPLUS CPU 1511-1 PN and CPU 1513-1 PN; spare part | **6AG1591-1AA01-2AA0** |
| For SIPLUS CPU 1516-3 PN/DP and SIPLUS CPU 1518-4 PN/DP; spare part | **6AG1591-1BA01-2AA0** |
| **Further accessories** | See SIMATIC S7-1500, standard CPUs, page 4/18 |

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# SIMATIC S7-1500 Advanced Controllers
Central processing units

**Compact CPUs**

### Overview CPU 1511C-1 PN



- The compact CPU with integral digital and analog inputs and outputs in the S7-1500 Controller product range
- With integrated technological functions, e.g. high-speed counter (HSC), frequency measurement, period duration measurement or stepper motor control, pulse duration modulation, frequency output
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

### Overview CPU 1512C-1 PN



- The compact CPU with integral digital and analog inputs and outputs in the S7-1500 Controller product range
- With integrated technological functions, e.g. high-speed counter (HSC), frequency measurement, period duration measurement or stepper motor control, pulse duration modulation, frequency output
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

■ **Technical specifications**

| Article number | 6ES7511-1CK00-0AB0 | 6ES7512-1CK00-0AB0 |
|---|---|---|
| | CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA | CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA |
| **General information** | | |
| Product type designation | CPU 1511C-1 PN | CPU 1512C-1 PN |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 |
| **Display** | | |
| Screen diagonal [cm] | 3.45 cm | 3.45 cm |
| **Supply voltage** | | |
| Type of supply voltage | 24 V DC | 24 V DC |
| **Input current** | | |
| **Digital inputs** | | |
| • from load voltage L+ (without load), max. | 20 mA; per group | 20 mA; per group |
| **Digital outputs** | | |
| • from load voltage L+, max. | 30 mA; Per group, without load | 30 mA; Per group, without load |
| **Power loss** | | |
| Power loss, typ. | 11.8 W | 15.2 W |
| **Memory** | | |
| **Work memory** | | |
| • integrated (for program) | 175 kbyte | 250 kbyte |
| • integrated (for data) | 1 Mbyte | 1 Mbyte |
| **Load memory** | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | |
| for bit operations, typ. | 60 ns | 48 ns |
| for word operations, typ. | 72 ns | 58 ns |
| for fixed point arithmetic, typ. | 96 ns | 77 ns |
| for floating point arithmetic, typ. | 384 ns | 307 ns |
| **Counters, timers and their retentivity** | | |
| **S7 counter** | | |
| • Number | 2 048 | 2 048 |
| **IEC counter** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | |
| • Number | 2 048 | 2 048 |
| **IEC timer** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **Data areas and their retentivity** | | |
| **Flag** | | |
| • Number, max. | 16 kbyte | 16 kbyte |
| **Address area** | | |
| **I/O address area** | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | |
| **Clock** | | |
| • Type | Hardware clock | Hardware clock |
| **Digital inputs** | | |
| integrated channels (DI) | 16 | 32 |
| **Digital outputs** | | |
| integrated channels (DO) | 16 | 32 |
| Short-circuit protection | Yes; electronic/thermal | Yes; electronic/thermal |
| **Analog outputs** | | |
| integrated channels (AO) | 2 | 2 |
| **1. Interface** | | |
| **Interface types** | | |
| • Number of ports | 2 | 2 |
| • integrated switch | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 |

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# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Compact CPUs**

### Technical specifications (continued)

| Article number | 6ES7511-1CK00-0AB0 | 6ES7512-1CK00-0AB0 |
|---|---|---|
| | CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA | CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA |
| **Functionality** | | |
| • PROFINET IO Controller | Yes | Yes |
| • PROFINET IO Device | Yes | Yes |
| • SIMATIC communication | Yes | Yes |
| • Open IE communication | Yes | Yes |
| • Web server | Yes | Yes |
| • Media redundancy | Yes | Yes |
| **PROFINET IO Controller** | | |
| **Services** | | |
| - PG/OP communication | Yes | Yes |
| - S7 routing | Yes | Yes |
| - Isochronous mode | Yes | Yes |
| - Open IE communication | Yes | Yes |
| - IRT | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 128 |
| - of which in line, max. | 128 | 128 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | |
| **Services** | | |
| - PG/OP communication | Yes | Yes |
| - S7 routing | Yes | Yes |
| - Isochronous mode | No | No |
| - Open IE communication | Yes | Yes |
| - IRT | Yes | Yes |
| - MRP | Yes | Yes |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes |
| - Shared device | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 |

## Technical specifications (continued)

| Article number | 6ES7511-1CK00-0AB0 | 6ES7512-1CK00-0AB0 |
|---|---|---|
| | CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA | CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA |
| **Protocols** | | |
| **Number of connections** | | |
| • Number of connections, max. | 96; via integrated interfaces of the CPU and connected CPs / CMs | 128; via integrated interfaces of the CPU and connected CPs / CMs |
| **PROFINET IO Controller** | | |
| **Services** | | |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 128 |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 625 µs | Yes; With minimum OB 6x cycle of 625 µs |
| **Supported technology objects** | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 800 | 800 |
| • Required Motion Control resources | | |
| - per speed-controlled axis | 40 | 40 |
| - per positioning axis | 80 | 80 |
| - per synchronous axis | 160 | 160 |
| - per external encoder | 80 | 80 |
| - per output cam | 20 | 20 |
| - per cam track | 160 | 160 |
| - per probe | 40 | 40 |
| Controller | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | |
| • High-speed counter | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Note derating data for onboard I/O in the manual. Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Note derating data for onboard I/O in the manual. Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Note derating data for onboard I/O in the manual. Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Note derating data for onboard I/O in the manual. Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | |
| **Programming** | | |
| **Programming language** | | |
| - LAD | Yes | Yes |
| - FBD | Yes | Yes |
| - STL | Yes | Yes |
| - SCL | Yes | Yes |
| - GRAPH | Yes | Yes |
| **Know-how protection** | | |
| • User program protection/password protection | Yes | Yes |
| • Copy protection | Yes | Yes |
| • Block protection | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Compact CPUs

### ▪ Technical specifications  (continued)

| Article number | 6ES7511-1CK00-0AB0 | 6ES7512-1CK00-0AB0 |
|---|---|---|
| | CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA | CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA |
| **Access protection** | | |
| • Password for display | Yes | Yes |
| • Protection level: Write protection | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes |
| **Dimensions** | | |
| Width | 85 mm | 110 mm |
| Height | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm |
| **Weights** | | |
| Weight, approx. | 1 050 g | 1 360 g |

### ▪ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1511C-1 PN** | **6ES7511-1CK00-0AB0** | **SIMATIC S7-1500 DIN rail** | |
| Work memory 175 KB for program, 1 MB for data, 16 digital inputs, 16 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IO IRT interface; SIMATIC Memory Card required | | Fixed lengths, with grounding elements | |
| | | • 160 mm | **6ES7590-1AB60-0AA0** |
| | | • 245 mm | **6ES7590-1AC40-0AA0** |
| | | • 482 mm | **6ES7590-1AE80-0AA0** |
| | | • 530 mm | **6ES7590-1AF30-0AA0** |
| | | • 830 mm | **6ES7590-1AJ30-0AA0** |
| **CPU 1512C-1 PN** | **6ES7512-1CK00-0AB0** | For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| Work memory 250 KB for program, 1 MB for data, 32 digital inputs, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IO IRT interface; SIMATIC Memory Card required | | • 2000 mm | **6ES7590-1BC00-0AA0** |
| | | **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| **Accessories** | | 20 units | |
| **SIMATIC Memory Card** | | **Power supply** | |
| 4 MB | **6ES7954-8LC02-0AA0** | For supplying the backplane bus of the S7-1500 | |
| 12 MB | **6ES7954-8LE02-0AA0** | 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** |
| 24 MB | **6ES7954-8LF02-0AA0** | 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** |
| 256 MB | **6ES7954-8LL02-0AA0** | 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** |
| 2 GB | **6ES7954-8LP02-0AA0** | 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** |
| 32 GB | **6ES7954-8LT03-0AA0** | **Power connector** | **6ES7590-8AA00-0AA0** |
| **Front connector** | | With coding element for power supply module; spare part, 10 units | |
| For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part | **6ES7592-1BM00-0XA0** | **Load power supply** | |
| | | 24 V DC/3A | **6EP1332-4BA00** |
| | | 24 V DC/8A | **6EP1333-4BA00** |
| **Shielding set I/O** | | **Power supply connector** | |
| For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module). | **6ES7590-5CA10-0XA0** | Spare part; for connecting the 24 V DC supply voltage | |
| | | • with push-in terminals | **6ES7193-4JB00-0AA0** |
| **Shield terminal** | **6ES7590-5BA00-0AA0** | | |
| 10 units; spare part | | | |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 plugs** | | **STEP 7 Professional V14 SP1** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| **IE FC RJ45 Plug 180** | | Requirement: Windows 7 Professional SP 1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| 180° cable outlet | | | |
| 1 unit | 6GK1901-1BB10-2AA0 | | |
| 10 units | 6GK1901-1BB10-2AB0 | | |
| 50 units | 6GK1901-1BB10-2AE0 | | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Type of delivery: English, German, Chinese, Italian, French, Spanish | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| | | Email address required for delivery | |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Display** | 6ES7591-1AA01-0AA0 | | |
| For CPU 1511(F), CPU 1511C, CPU 1512C, CPU 1513(F); spare part | | | |
| **SIMATIC S7-1500 Starter Kit** | 6ES7511-1CK00-4YB5 | | |
| Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation | | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

### ■ Overview CPU 1511F-1 PN

- Entry-level CPU in the S7-1500F Controller product range
- Suitable for standard and fail-safe applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configuration
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU

### ■ Overview CPU 1513F-1 PN

- The CPU for standard and fail-safe applications with medium/high requirements for program/data storage in the S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configuration
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU

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■ **Overview CPU 1515F-2 PN**



- The CPU for applications with medium to high requirements for program/data storage in the S7-1500 Controller product range
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

■ **Overview CPU 1516F-3 PN/DP**



- The CPU with a large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Fail-safe CPUs

### Overview CPU 1517F-3 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, positionally precise gearing between axes
- Integrated web server with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

### Overview CPU 1518F-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with highest requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

## Overview CPU 1518F-4 PN/DP ODK

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ in the CPU 1518-4 PN/DP ODK.
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller

- Two additional PROFINET interfaces with separate IP addresses for network separation. The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

## Technical specifications

| Article number | **6ES7511-1FK01-0AB0** | **6ES7513-1FL01-0AB0** | **6ES7515-2FM01-0AB0** | **6ES7516-3FN01-0AB0** |
|---|---|---|---|---|
| | CPU 1511F-1PN, 225KB PROG, 1MB DATA | CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA | CPU 1515F-2 PN, 750KB PROG.,3MB DATA | CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA |
| **General information** | | | | |
| Product type designation | CPU 1511F-1 PN | CPU 1513F-1 PN | CPU 1515F-2 PN | CPU 1516F-3 PN/DP |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 | V14 | V14 |
| **Display** | | | | |
| Screen diagonal [cm] | 3.45 cm | 3.45 cm | 6.1 cm | 6.1 cm |
| **Supply voltage** | | | | |
| Type of supply voltage | 24 V DC | 24 V DC | 24 V DC | 24 V DC |
| **Power loss** | | | | |
| Power loss, typ. | 5.7 W | 5.7 W | 6.3 W | 7 W |
| **Memory** | | | | |
| **Work memory** | | | | |
| • integrated (for program) | 225 kbyte | 450 kbyte | 750 kbyte | 1.5 Mbyte |
| • integrated (for data) | 1 Mbyte | 1.5 Mbyte | 3 Mbyte | 5 Mbyte |
| **Load memory** | | | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | | | |
| for bit operations, typ. | 60 ns | 40 ns | 30 ns | 10 ns |
| for word operations, typ. | 72 ns | 48 ns | 36 ns | 12 ns |
| for fixed point arithmetic, typ. | 96 ns | 64 ns | 48 ns | 16 ns |
| for floating point arithmetic, typ. | 384 ns | 256 ns | 192 ns | 64 ns |
| **Counters, timers and their retentivity** | | | | |
| **S7 counter** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC counter** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC timer** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7511-1FK01-0AB0 | 6ES7513-1FL01-0AB0 | 6ES7515-2FM01-0AB0 | 6ES7516-3FN01-0AB0 |
|---|---|---|---|---|
| | CPU 1511F-1PN, 225KB PROG, 1MB DATA | CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA | CPU 1515F-2 PN, 750KB PROG.,3MB DATA | CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA |
| **Data areas and their retentivity** | | | | |
| **Flag** | | | | |
| • Number, max. | 16 kbyte | 16 kbyte | 16 kbyte | 16 kbyte |
| **Address area** | | | | |
| **I/O address area** | | | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | | | |
| **Clock** | | | | |
| • Type | Hardware clock | Hardware clock | Hardware clock | Hardware clock |
| **1. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | 2 | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 | Yes; X1 | Yes; X1 |
| **Functionality** | | | | |
| • PROFINET IO Controller | Yes | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes | Yes | Yes |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | Yes | Yes | Yes | Yes |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128 | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 128 | 256 | 256 |
| - of which in line, max. | 128 | 128 | 256 | 256 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |

## ▪ Technical specifications (continued)

| Article number | 6ES7511-1FK01-0AB0 | 6ES7513-1FL01-0AB0 | 6ES7515-2FM01-0AB0 | 6ES7516-3FN01-0AB0 |
|---|---|---|---|---|
| | CPU 1511F-1PN, 225KB PROG, 1MB DATA | CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA | CPU 1515F-2 PN, 750KB PROG.,3MB DATA | CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA |
| **Update time for IRT** | | | | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 500 µs to 8 ms | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | No | No | No | No |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes | Yes |
| - MRP | Yes | Yes | Yes | Yes |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Shared device | Yes | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 | 4 |
| **2. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | | | 1 | 1 |
| • integrated switch | | | No | No |
| • RJ 45 (Ethernet) | | | Yes; X2 | Yes; X2 |
| **Functionality** | | | | |
| • PROFINET IO Controller | | | Yes | Yes |
| • PROFINET IO Device | | | Yes | Yes |
| • SIMATIC communication | | | Yes | Yes |
| • Open IE communication | | | Yes | Yes |
| • Web server | | | Yes | Yes |
| • Media redundancy | | | No | No |

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# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7511-1FK01-0AB0<br>CPU 1511F-1PN,<br>225KB PROG, 1MB DATA | 6ES7513-1FL01-0AB0<br>CPU 1513F-1 PN,<br>450KB PROG, 1.5MB DATA | 6ES7515-2FM01-0AB0<br>CPU 1515F-2 PN,<br>750KB PROG.,3MB DATA | 6ES7516-3FN01-0AB0<br>CPU 1516F-3 PN/DP,<br>1.5MB PROG., 5MB DATA |
|---|---|---|---|---|
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - PG/OP communication | | | Yes | Yes |
| - S7 routing | | | Yes | Yes |
| - Isochronous mode | | | No | No |
| - Open IE communication | | | Yes | Yes |
| - IRT | | | No | No |
| - MRP | | | No | No |
| - PROFIenergy | | | Yes | Yes |
| - Prioritized startup | | | No | No |
| - Number of connectable IO Devices, max. | | | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | | | 32 | 32 |
| - of which in line, max. | | | 32 | 32 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | | | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | | | 8 | 8 |
| - Updating times | | | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | | | | |
| - for send cycle of 1 ms | | | 1 ms to 512 ms | 1 ms to 512 ms |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
| - PG/OP communication | | | Yes | Yes |
| - S7 routing | | | Yes | Yes |
| - Isochronous mode | | | No | No |
| - Open IE communication | | | Yes | Yes |
| - IRT | | | No | No |
| - MRP | | | No | No |
| - MRPD | | | No | No |
| - PROFIenergy | | | Yes | Yes |
| - Prioritized startup | | | No | No |
| - Shared device | | | Yes | Yes |
| - Number of IO Controllers with shared device, max. | | | 4 | 4 |
| **3. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | | | | 1 |
| • RS 485 | | | | Yes; X3 |
| **Functionality** | | | | |
| • PROFIBUS DP master | | | | Yes |
| • PROFIBUS DP slave | | | | No |
| • SIMATIC communication | | | | Yes |
| **Protocols** | | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes | Yes |
| PROFIsafe | Yes | Yes | Yes | Yes |
| PROFIBUS | No | No | No | Yes |
| **Number of connections** | | | | |
| • Number of connections, max. | 96; via integrated interfaces of the CPU and connected CPs / CMs | 128; via integrated interfaces of the CPU and connected CPs / CMs | 192; via integrated interfaces of the CPU and connected CPs / CMs | 256; via integrated interfaces of the CPU and connected CPs / CMs |

## ■ Technical specifications (continued)

| Article number | 6ES7511-1FK01-0AB0 | 6ES7513-1FL01-0AB0 | 6ES7515-2FM01-0AB0 | 6ES7516-3FN01-0AB0 |
|---|---|---|---|---|
| | CPU 1511F-1PN, 225KB PROG, 1MB DATA | CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA | CPU 1515F-2 PN, 750KB PROG.,3MB DATA | CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | | |
| - Of which IO devices with IRT, max. | 64 | 64 | | |
| - Number of connectable IO Devices for RT, max. | 128 | 128 | | |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 625 µs | Yes; With minimum OB 6x cycle of 500 µs | Yes; With minimum OB 6x cycle of 500 µs | Yes; With minimum OB 6x cycle of 375 µs |
| **Supported technology objects** | | | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 800 | | 2 400 | 2 400 |
| • Required Motion Control resources | | | | |
| - per speed-controlled axis | 40 | | 40 | 40 |
| - per positioning axis | 80 | | 80 | 80 |
| - per synchronous axis | 160 | | 160 | 160 |
| - per external encoder | 80 | | 80 | 80 |
| - per output cam | 20 | | 20 | 20 |
| - per cam track | 160 | | 160 | 160 |
| - per probe | 40 | | 40 | 40 |
| • Speed-controlled axis | | | | |
| - Number of speed-controlled axes, max. | | 6; Requirement: There must be no other motion technology objects created | | |
| • Positioning axis | | | | |
| - Number of positioning axes, max. | | 6; Requirement: There must be no other motion technology objects created | | |
| • Synchronized axes (relative gear synchronization) | | | | |
| - Number of axes, max. | | 3; Requirement: There must be no other motion technology objects created | | |
| • External encoders | | | | |
| - Number of external encoders, max. | | 6; Requirement: There must be no other motion technology objects created | | |
| Controller | | | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | | | |
| • High-speed counter | Yes | Yes | Yes | Yes |
| **Highest safety class achievable in safety mode** | | | | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | | | | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 | < 2.00E-05 | < 2.00E-05 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 | < 1.00E-09 | < 1.00E-09 | < 1.00E-09 1/h |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

■ **Technical specifications** (continued)

| Article number | **6ES7511-1FK01-0AB0** CPU 1511F-1PN, 225KB PROG, 1MB DATA | **6ES7513-1FL01-0AB0** CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA | **6ES7515-2FM01-0AB0** CPU 1515F-2 PN, 750KB PROG.,3MB DATA | **6ES7516-3FN01-0AB0** CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA |
|---|---|---|---|---|
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | | | |
| **Programming** | | | | |
| **Programming language** | | | | |
| - LAD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - STL | Yes | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes |
| • Copy protection | Yes | Yes | Yes | Yes |
| • Block protection | Yes | Yes | Yes | Yes |
| **Access protection** | | | | |
| • Password for display | Yes | Yes | Yes | Yes |
| • Protection level: Write protection | Yes | Yes; Specific write protection both for Standard and for Failsafe | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | |
| Width | 35 mm | 35 mm | 70 mm | 70 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 430 g | 430 g | 830 g | 845 g |

| Article number | **6ES7517-3FP00-0AB0** CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | **6ES7518-4FP00-0AB0** CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | **6ES7518-4FP00-3AB0** CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
|---|---|---|---|
| **General information** | | | |
| Product type designation | CPU 1517F-3PN/DP | CPU 1518F-4PN/DP | CPU 1518F-4 PN/DP ODK |
| **Engineering with** | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 | V14 |
| **Display** | | | |
| Screen diagonal [cm] | 6.1 cm | 6.1 cm | 6.1 cm |
| **Supply voltage** | | | |
| Type of supply voltage | 24 V DC | 24 V DC | 24 V DC |
| **Power loss** | | | |
| Power loss, typ. | 24 W | 24 W | 24 W |

■ **Technical specifications** (continued)

| Article number | 6ES7517-3FP00-0AB0 | 6ES7518-4FP00-0AB0 | 6ES7518-4FP00-3AB0 |
|---|---|---|---|
| | CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated (for program) | 3 Mbyte | 6 Mbyte | 6 Mbyte |
| • integrated (for data) | 8 Mbyte | 20 Mbyte | 20 Mbyte |
| • Integrated (for ODK application) | | | 20 Mbyte |
| **Load memory** | | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | | |
| for bit operations, typ. | 2 ns | 1 ns | 1 ns |
| for word operations, typ. | 3 ns | 2 ns | 2 ns |
| for fixed point arithmetic, typ. | 3 ns | 2 ns | 2 ns |
| for floating point arithmetic, typ. | 12 ns | 6 ns | 6 ns |
| **Counters, timers and their retentivity** | | | |
| **S7 counter** | | | |
| • Number | 2 048 | 2 048 | 2 048 |
| **IEC counter** | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | | |
| • Number | 2 048 | 2 048 | 2 048 |
| **IEC timer** | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 16 kbyte | 16 kbyte | 16 kbyte |
| **Address area** | | | |
| **I/O address area** | | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | | |
| **Clock** | | | |
| • Type | Hardware clock | Hardware clock | Hardware clock |
| **1. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 | Yes; X1 |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes | Yes |

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# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Fail-safe CPUs

### ■ Technical specifications (continued)

| Article number | 6ES7517-3FP00-0AB0 | 6ES7518-4FP00-0AB0 | 6ES7518-4FP00-3AB0 |
|---|---|---|---|
| | CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
| **PROFINET IO Controller** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | Yes | Yes | Yes |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 512 | 512 | 512 |
| - of which in line, max. | 512 | 512 | 512 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | | |
| - for send cycle of 125 µs | | 125 µs | 125 µs |
| - for send cycle of 187.5 µs | | 187.5 µs | 187.5 µs |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms | 250 µs to 4 ms |
| - for send cycle of 500 µs | 500 µs to 8 ms | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | No | No | No |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes |
| - MRP | Yes | Yes | Yes |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes |
| - Shared device | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 |

## ■ Technical specifications (continued)

| Article number | 6ES7517-3FP00-0AB0 | 6ES7518-4FP00-0AB0 | 6ES7518-4FP00-3AB0 |
|---|---|---|---|
| | CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
| **2. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | 1 | 1 | 1 |
| • integrated switch | No | No | No |
| • RJ 45 (Ethernet) | Yes; X2 | Yes; X2 | Yes; X2 |
| **Functionality** | | | |
| • PROFINET IO Controller | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes |
| • Media redundancy | No | No | No |
| **PROFINET IO Controller** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | No | No | No |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | No | No | No |
| - MRP | No | No | No |
| - PROFIenergy | Yes | Yes | Yes |
| - Prioritized startup | No | No | No |
| - Number of connectable IO Devices, max. | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | 128 | 128 | 32 |
| - of which in line, max. | 128 | 128 | 128 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | | |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | | | |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| **PROFINET IO Device** | | | |
| **Services** | | | |
| - PG/OP communication | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes |
| - Isochronous mode | No | No | No |
| - Open IE communication | Yes | Yes | Yes |
| - IRT | No | No | No |
| - MRP | No | No | No |
| - MRPD | No | No | No |
| - PROFIenergy | Yes | Yes | Yes |
| - Prioritized startup | No | No | No |
| - Shared device | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 |
| **3. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | 1 | 1 | 1 |
| • integrated switch | | No | No |
| • RJ 45 (Ethernet) | | Yes; X3 | Yes; X3 |
| • RS 485 | Yes; X3 | | |

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# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Technical specifications (continued)

| Article number | 6ES7517-3FP00-0AB0 | 6ES7518-4FP00-0AB0 | 6ES7518-4FP00-3AB0 |
|---|---|---|---|
| | CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
| **Functionality** | | | |
| • PROFINET IO Controller | | No | No |
| • PROFINET IO Device | | No | No |
| • PROFIBUS DP master | Yes | | |
| • PROFIBUS DP slave | No | | |
| • SIMATIC communication | Yes | Yes | Yes |
| • Open IE communication | | Yes | Yes |
| • Web server | | Yes | Yes |
| **4. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | | 1 | 1 |
| • RS 485 | | Yes; X4 | Yes; X4 |
| **Functionality** | | | |
| • PROFIBUS DP master | | Yes | Yes |
| • PROFIBUS DP slave | | No | No |
| • SIMATIC communication | | Yes | Yes |
| **Protocols** | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes |
| PROFIsafe | Yes | Yes | Yes |
| PROFIBUS | Yes | Yes | Yes |
| **Number of connections** | | | |
| • Number of connections, max. | 320; via integrated interfaces of the CPU and connected CPs / CMs | 384; via integrated interfaces of the CPU and connected CPs / CMs | 384; via integrated interfaces of the CPU and connected CPs / CMs |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 250 µs | Yes; With minimum OB 6x cycle of 125 µs | Yes; With minimum OB 6x cycle of 125 µs |
| **Supported technology objects** | | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 10 240 | 10 240 | 10 240 |
| • Required Motion Control resources | | | |
| - per speed-controlled axis | 40 | 40 | 40 |
| - per positioning axis | 80 | 80 | 80 |
| - per synchronous axis | 160 | 160 | 160 |
| - per external encoder | 80 | 80 | 80 |
| - per output cam | 20 | 20 | 20 |
| - per cam track | 160 | 160 | 160 |
| - per probe | 40 | 40 | 40 |
| Controller | | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | | |
| • High-speed counter | Yes | Yes | Yes |
| **Highest safety class achievable in safety mode** | | | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | | | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 | < 2.00E-05 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 | < 1.00E-09 | < 1.00E-09 |

■ **Technical specifications** (continued)

| Article number | 6ES7517-3FP00-0AB0 | 6ES7518-4FP00-0AB0 | 6ES7518-4FP00-3AB0 |
|---|---|---|---|
| | CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA | CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA | CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe | Yes; incl. failsafe | Yes; incl. failsafe |
| - STL | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes |
| **Know-how protection** | | | |
| • User program protection/password protection | Yes | Yes | Yes |
| • Copy protection | Yes | Yes | Yes |
| • Block protection | Yes | Yes | Yes |
| **Access protection** | | | |
| • Password for display | Yes | Yes | Yes |
| • Protection level: Write protection | Yes | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes | Yes |
| **Open Development interfaces** | | | |
| • Size of ODK SO file, max. | | | 6 Mbyte |
| **Dimensions** | | | |
| Width | 175 mm | 175 mm | 175 mm |
| Height | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm |
| **Weights** | | | |
| Weight, approx. | 1 978 g | 1 988 g | 1 988 g |

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# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

| Ordering data | Article No. |
|---|---|
| **CPU 1511F-1 PN** | **6ES7511-1FK01-0AB0** |
| Fail-safe CPU, work memory 230 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **CPU 1513F-1 PN** | **6ES7513-1FL01-0AB0** |
| Fail-safe CPU, work memory 450 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **CPU 1515F-2 PN** | **6ES7515-2FM01-0AB0** |
| Fail-safe CPU, work memory 750 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required | |
| **CPU 1516F-3 PN/DP** | **6ES7516-3FN01-0AB0** |
| Fail-safe CPU, work memory 1.5 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1517F-3 PN/DP** | **6ES7517-3FP00-0AB0** |
| Fail-safe CPU, work memory 3 MB for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1518F-4 PN/DP** | **6ES7518-4FP00-0AB0** |
| Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1518F-4 PN/DP ODK** | **6ES7518-4FP00-3AB0** |
| Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **SIMATIC Memory Card** | |
| 4 MB | **6ES7954-8LC02-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** |
| 24 MB | **6ES7954-8LF02-0AA0** |
| 256 MB | **6ES7954-8LL02-0AA0** |
| 2 GB | **6ES7954-8LP02-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** |

| | Article No. |
|---|---|
| **SIMATIC S7-1500 DIN rail** | |
| Fixed lengths, with grounding elements | |
| • 160 mm | **6ES7590-1AB60-0AA0** |
| • 245 mm | **6ES7590-1AC40-0AA0** |
| • 482 mm | **6ES7590-1AE80-0AA0** |
| • 530 mm | **6ES7590-1AF30-0AA0** |
| • 830 mm | **6ES7590-1AJ30-0AA0** |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| • 2000 mm | **6ES7590-1BC00-0AA0** |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| 20 units | |
| **Power supply** | |
| For supplying the backplane bus of the S7-1500 | |
| 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** |
| 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** |
| **Power connector** | **6ES7590-8AA00-0AA0** |
| With coding element for power supply module; spare part, 10 units | |
| **Load power supply** | |
| 24 V DC/3A | **6EP1332-4BA00** |
| 24 V DC/8A | **6EP1333-4BA00** |
| **Power supply connector** | |
| Spare part; for connecting the 24 V DC supply voltage | |
| • with push-in terminals | **6ES7193-4JB00-0AA0** |
| **PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet** | |
| With insulation displacement, max. transmission rate 12 Mbps | |
| Without PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BA70-0XA0** |
| With PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BB70-0XA0** |
| **PROFIBUS FC Standard Cable GP** | **6XV1830-0EH10** |
| Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Robust Cable** | **6XV1830-0JH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Flexible Cable** | **6XV1831-2K** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |

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| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **PROFIBUS FC Trailing Cable** | | **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| Sheath color: Petrol | 6XV1830-3EH10 | | |
| Sheath color: Violet | 6XV1831-2L | | |
| **PROFIBUS FC Food Cable** | 6XV1830-0GH10 | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | |
| **PROFIBUS FC Ground Cable** | 6XV1830-3FH10 | **Display** | |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | For CPU 1511(F)-1 PN and CPU 1513(F)-1 PN; spare part | 6ES7591-1AA01-0AA0 |
| | | For CPU 1515(F)-2 PN, CPU 1516(F)-3 PN/DP, CPU 1517(F)-3 PN/DP, CPU 1518(F)-4 PN/DP and CPU 1518(F)-4 PN/DP ODK; spare part | 6ES7591-1BA01-0AA0 |
| **PROFIBUS FC FRNC Cable GP** | 6XV1830-0LH10 | | |
| 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | **Front cover for PROFIBUS DP interface** | 6ES7591-8AA00-0AA0 |
| | | For CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part | |
| **PROFIBUS FastConnect Stripping Tool** | 6GK1905-6AA00 | **SIMATIC S7-1500 Starter Kit** | 6ES7511-1CK00-4YB5 |
| Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables | | Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation | |
| **IE FC RJ45 plugs** | | | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | **STEP 7 Safety Advanced V14 SP1** | |
| | | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | |
| **IE FC RJ45 Plug 180** | | | |
| 180° cable outlet | | Requirement: STEP 7 Professional V14 SP1 | |
| 1 unit | 6GK1901-1BB10-2AA0 | | |
| 10 units | 6GK1901-1BB10-2AB0 | Floating license for 1 user, software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| 50 units | 6GK1901-1BB10-2AE0 | | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Fail-safe CPUs

| Ordering data | Article No. |
|---|---|
| **STEP 7 Professional V14 SP1** | |

Target system:
SIMATIC S7-1200, S7-1500,
S7-300, S7-400, WinAC
Requirement:
Windows 7 Professional SP1
(64-bit),
Windows 7 Enterprise SP1 (64-bit),
Windows 7 Ultimate SP1 (64-bit),
Windows 8.1 Professional (64-bit),
Windows 8.1 Enterprise (64-bit),
Windows 10 Professional
Version 1607,
Windows 10 Enterprise
Version 1607,
Windows 10 Enterprise 2016 LTSB,
Windows 10 Enterprise 2015 LTSB,
Windows Server 2008 R2 StdE
(full installation),
Windows Server 2012 StdE
(full installation),
Windows Server 2016 Standard
(full installation);
Type of delivery:
English, German, Chinese, Italian,
French, Spanish

| | |
|---|---|
| STEP 7 Professional V14 SP1, floating license | **6ES7822-1AA04-0YA5** |
| STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | **6ES7822-1AE04-0YA5** |

Email address required for delivery

| | Article No. |
|---|---|
| **SIMATIC ODK 1500S V2.0** | |
| Open Development Kit for support in developing Windows and real-time library functions | |
| Package with data storage medium | **6ES7806-2CD02-0YA0** |
| Download incl. license key [1] | **6ES7806-2CD02-0YG0** |
| Email address required for delivery | |
| **SIMATIC Target 1500S for Simulink V1.0** | **6ES7823-1BE00-0YA5** |
| Download incl. license key [1] | |
| Email address required for delivery | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1500 Advanced Controllers
## Central processing units
### SIPLUS fail-safe CPUs

**■ Overview SIPLUS CPU 1511F-1 PN**



- Entry-level CPU in the SIPLUS S7-1500F Controller product range
- Suitable for standard and fail-safe applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

**■ Overview SIPLUS CPU 1513F-1 PN**



- The CPU for standard and fail-safe applications with medium/high requirements for program/data storage in the SIPLUS S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

### Overview SIPLUS CPU 1516F-3 PN/DP



- The CPU with a large program and data memory in the SIPLUS S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

### Overview SIPLUS CPU 1518-4 PN/DP



- The CPU with a very large program and data memory in the SIPLUS S7-1500 Controller product range for fail-safe applications with highest requirements regarding program scope, performance and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1511-1FK01-2AB0** | **6AG1513-1FL01-2AB0** | **6AG1516-3FN01-2AB0** | **6AG1518-4FP00-4AB0** |
|---|---|---|---|---|
| Based on | **6ES7511-1FK01-0AB0** | **6ES7513-1FL01-0AB0** | **6ES7516-3FN01-0AB0** | **6ES7518-4FP00-0AB0** |
| | SIPLUS S7-1500 CPU 1511F-1 PN | SIPLUS S7-1500 CPU 1513F-1 PN | SIPLUS S7-1500 CPU-1516F-3 PN/DP | SIPLUS S7-1500 CPU 1518F-4 PN/DP |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | -25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**SIPLUS fail-safe CPUs**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1511F-1 PN** | **6AG1511-1FK01-2AB0** | **Accessories** | |
| (Extended temperature range and exposure to media) | | **Power supply** | |
| Fail-safe CPU, work memory 225 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | | (Extended temperature range and exposure to media) | |
| | | For supplying the backplane bus of the S7-1500 | |
| **SIPLUS CPU 1513F-1 PN** | **6AG1513-1FL01-2AB0** | 24 V DC input voltage, power 25 W | **6AG1505-0KA00-7AB0** |
| (Extended temperature range and exposure to media) | | 24/48/60 V DC input voltage, power 60 W | **6AG1505-0RA00-7AB0** |
| Fail-safe CPU, work memory 450 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | | 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** |
| | | 120/230 VAC input voltage, power 60 W | **6AG1507-0RA00-7AB0** |
| **SIPLUS CPU 1516F-3 PN/DP** | **6AG1516-3FN01-2AB0** | **Load power supply** | |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| Fail-safe CPU, work memory 1.5 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | | 24 V DC/3A | **6AG1332-4BA00-7AA0** |
| | | 24 V DC/8A | **6AG1333-4BA00-7AA0** |
| **CPU 1518F-4 PN/DP** | **6AG1518-4FP00-4AB0** | **Display** | |
| (Exposure to media) | | (Extended temperature range and exposure to media) | |
| Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required | | For SIPLUS CPU 1511F-1 PN and CPU 1513F-1 PN; spare part | **6AG1591-1AA01-2AA0** |
| | | For SIPLUS CPU 1516F-3 PN/DP and CPU 1518-4F PN/DP; spare part | **6AG1591-1BA01-2AA0** |
| | | **Other accessories** | See SIMATIC S7-1500, fail-safe CPUs, page 4/44 |

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■ **Overview CPU 1511T-1 PN**



- Entry-level CPU in the S7-1500T Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operating the CPU.

■ **Overview CPU 1515T-2 PN**



- The CPU for applications with medium to high requirements for program/data storage in the S7-1500T Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Technology CPUs**

### Overview CPU 1517T-3 PN/DP



- The CPU with a very large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

### Overview CPU 1517TF-3 PN/DP



- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

## Technical specifications

| Article number | 6ES7511-1TK01-0AB0 | 6ES7515-2TM01-0AB0 | 6ES7517-3TP00-0AB0 | 6ES7517-3UP00-0AB0 |
|---|---|---|---|---|
| | CPU 1511T-1PN, 225KB prog., 1MB data | CPU 1515T-2 PN, 750KB prog., 3MB data | CPU 1517T-3 PN/DP, 3MB prog., 8MB data | CPU 1517TF-3 PN/DP, 3MB prog., 8MB data |
| **General information** | | | | |
| Product type designation | CPU 1511T-1 PN | CPU 1515T-2 PN | CPU 1517T-3 PN/DP | CPU 1517TF-3 PN/DP |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 | V14 | V14 |
| **Display** | | | | |
| Screen diagonal [cm] | 3.45 cm | 6.1 cm | 6.1 cm | 6.1 cm |
| **Supply voltage** | | | | |
| Type of supply voltage | 24 V DC | 24 V DC | 24 V DC | 24 V DC |
| **Power loss** | | | | |
| Power loss, typ. | 5.7 W | 6.3 W | 24 W | 24 W |
| **Memory** | | | | |
| **Work memory** | | | | |
| • integrated (for program) | 225 kbyte | 750 kbyte | 3 Mbyte | 3 Mbyte |
| • integrated (for data) | 1 Mbyte | 3 Mbyte | 8 Mbyte | 8 Mbyte |
| **Load memory** | | | | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte | 32 Gbyte | 32 Gbyte | 32 Gbyte |
| **CPU processing times** | | | | |
| for bit operations, typ. | 60 ns | 30 ns | 2 ns | 2 ns |
| for word operations, typ. | 72 ns | 36 ns | 3 ns | 3 ns |
| for fixed point arithmetic, typ. | 96 ns | 48 ns | 3 ns | 3 ns |
| for floating point arithmetic, typ. | 384 ns | 192 ns | 12 ns | 12 ns |
| **Counters, timers and their retentivity** | | | | |
| **S7 counter** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC counter** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | | | |
| • Number | 2 048 | 2 048 | 2 048 | 2 048 |
| **IEC timer** | | | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **Data areas and their retentivity** | | | | |
| **Flag** | | | | |
| • Number, max. | 16 kbyte | 16 kbyte | 16 kbyte | 16 kbyte |
| **Address area** | | | | |
| **I/O address area** | | | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Time of day** | | | | |
| **Clock** | | | | |
| • Type | Hardware clock | Hardware clock | Hardware clock | Hardware clock |
| **1. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | 2 | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; X1 | Yes; X1 | Yes; X1 | Yes; X1 |
| **Functionality** | | | | |
| • PROFINET IO Controller | Yes | Yes | Yes | Yes |
| • PROFINET IO Device | Yes | Yes | Yes | Yes |
| • SIMATIC communication | Yes | Yes | Yes | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes |
| • Web server | Yes | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
## Central processing units

**Technology CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7511-1TK01-0AB0 | 6ES7515-2TM01-0AB0 | 6ES7517-3TP00-0AB0 | 6ES7517-3UP00-0AB0 |
|---|---|---|---|---|
| | CPU 1511T-1PN, 225KB prog., 1MB data | CPU 1515T-2 PN, 750KB prog., 3MB data | CPU 1517T-3 PN/DP, 3MB prog., 8MB data | CPU 1517TF-3 PN/DP, 3MB prog., 8MB data |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | Yes | Yes | Yes | Yes |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 | 64 | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 256 | 512 | 512 |
| - of which in line, max. | 128 | 256 | 512 | 512 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 | 8 | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | | | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive | 500 µs to 8 ms | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
| - PG/OP communication | Yes | Yes | Yes | Yes |
| - S7 routing | Yes | Yes | Yes | Yes |
| - Isochronous mode | No | No | No | No |
| - Open IE communication | Yes | Yes | Yes | Yes |
| - IRT | Yes | Yes | Yes | Yes |
| - MRP | Yes | Yes | Yes | Yes |

## ■ **Technical specifications** (continued)

| Article number | 6ES7511-1TK01-0AB0 | 6ES7515-2TM01-0AB0 | 6ES7517-3TP00-0AB0 | 6ES7517-3UP00-0AB0 |
|---|---|---|---|---|
| | CPU 1511T-1PN, 225KB prog., 1MB data | CPU 1515T-2 PN, 750KB prog., 3MB data | CPU 1517T-3 PN/DP, 3MB prog., 8MB data | CPU 1517TF-3 PN/DP, 3MB prog., 8MB data |
| **Services** (continued) | | | | |
| - MRPD | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT | Yes; Requirement: IRT |
| - PROFIenergy | Yes | Yes | Yes | Yes |
| - Shared device | Yes | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 | 4 | 4 |
| **2. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | | 1 | 1 | 1 |
| • integrated switch | | No | No | No |
| • RJ 45 (Ethernet) | | Yes; X2 | Yes; X2 | Yes; X2 |
| **Functionality** | | | | |
| • PROFINET IO Controller | | Yes | Yes | Yes |
| • PROFINET IO Device | | Yes | Yes | Yes |
| • SIMATIC communication | | Yes | Yes | Yes |
| • Open IE communication | | Yes | Yes | Yes |
| • Web server | | Yes | Yes | Yes |
| • Media redundancy | | No | No | No |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - PG/OP communication | | Yes | Yes | Yes |
| - S7 routing | | Yes | Yes | Yes |
| - Isochronous mode | | No | No | No |
| - Open IE communication | | Yes | Yes | Yes |
| - IRT | | No | No | No |
| - MRP | | No | No | No |
| - PROFIenergy | | Yes | Yes | Yes |
| - Prioritized startup | | No | No | No |
| - Number of connectable IO Devices, max. | | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | | 32 | 128 | 32 |
| - of which in line, max. | | 32 | 128 | 128 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | | 8; in total across all interfaces | 8; in total across all interfaces | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | | 8 | 8 | 8 |
| - Updating times | | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | | | | |
| - for send cycle of 1 ms | | 1 ms to 512 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| **PROFINET IO Device** | | | | |
| **Services** | | | | |
| - PG/OP communication | | Yes | Yes | Yes |
| - S7 routing | | Yes | Yes | Yes |
| - Isochronous mode | | No | No | No |
| - Open IE communication | | Yes | Yes | Yes |
| - IRT | | No | No | No |
| - MRP | | No | No | No |
| - MRPD | | No | No | No |
| - PROFIenergy | | Yes | Yes | Yes |
| - Prioritized startup | | No | No | No |
| - Shared device | | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | | 4 | 4 | 4 |

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Technology CPUs

**Technical specifications** (continued)

| Article number | 6ES7511-1TK01-0AB0 | 6ES7515-2TM01-0AB0 | 6ES7517-3TP00-0AB0 | 6ES7517-3UP00-0AB0 |
|---|---|---|---|---|
| | CPU 1511T-1PN, 225KB prog., 1MB data | CPU 1515T-2 PN, 750KB prog., 3MB data | CPU 1517T-3 PN/DP, 3MB prog., 8MB data | CPU 1517TF-3 PN/DP, 3MB prog., 8MB data |
| **3. Interface** | | | | |
| **Interface types** | | | | |
| • Number of ports | | | 1 | 1 |
| • RS 485 | | | Yes | Yes |
| **Functionality** | | | | |
| • PROFIBUS DP master | | | Yes | Yes |
| • PROFIBUS DP slave | | | No | No |
| • SIMATIC communication | | | Yes | Yes |
| **Protocols** | | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes | Yes |
| PROFIsafe | No | No | No | Yes |
| PROFIBUS | No | No | Yes | Yes |
| **Number of connections** | | | | |
| • Number of connections, max. | 96; via integrated interfaces of the CPU and connected CPs / CMs | 192; via integrated interfaces of the CPU and connected CPs / CMs | 320; via integrated interfaces of the CPU and connected CPs / CMs | 320; via integrated interfaces of the CPU and connected CPs / CMs |
| **PROFINET IO Controller** | | | | |
| **Services** | | | | |
| - Number of connectable IO Devices, max. | 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | | | |
| - Of which IO devices with IRT, max. | 64 | | | |
| - Number of connectable IO Devices for RT, max. | 128 | | | |
| **PROFIBUS DP master** | | | | |
| **Services** | | | | |
| - Number of DP slaves | | | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; With minimum OB 6x cycle of 625 µs | Yes; With minimum OB 6x cycle of 500 µs | Yes; With minimum OB 6x cycle of 250 µs | Yes; With minimum OB 6x cycle of 250 µs |
| **Supported technology objects** | | | | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 800 | 2 400 | 10 240 | 10 240 |
| • Required Motion Control resources | | | | |
| - per speed-controlled axis | 40 | 40 | 40 | 40 |
| - per positioning axis | 80 | 80 | 80 | 80 |
| - per synchronous axis | 160 | 160 | 160 | 160 |
| - per external encoder | 80 | 80 | 80 | 80 |
| - per output cam | 20 | 20 | 20 | 20 |
| - per cam track | 160 | 160 | 160 | 160 |
| - per probe | 40 | 40 | 40 | 40 |
| Controller | | | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | | | |
| • High-speed counter | Yes | Yes | Yes | Yes |

■ **Technical specifications** (continued)

| Article number | 6ES7511-1TK01-0AB0 | 6ES7515-2TM01-0AB0 | 6ES7517-3TP00-0AB0 | 6ES7517-3UP00-0AB0 |
|---|---|---|---|---|
| | CPU 1511T-1PN, 225KB prog., 1MB data | CPU 1515T-2 PN, 750KB prog., 3MB data | CPU 1517T-3 PN/DP, 3MB prog., 8MB data | CPU 1517TF-3 PN/DP, 3MB prog., 8MB data |
| **Highest safety class achievable in safety mode** | | | | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | | | | |
| - Low demand mode: PFDavg in accordance with SIL3 | | | | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | | | | < 1.00E-09 1/h |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off | 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| **Configuration** | | | | |
| **Programming** | | | | |
| **Programming language** | | | | |
| - LAD | Yes | Yes | Yes | Yes; incl. failsafe |
| - FBD | Yes | Yes | Yes | Yes; incl. failsafe |
| - STL | Yes | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes |
| • Copy protection | Yes | Yes | Yes | Yes |
| • Block protection | Yes | Yes | Yes | Yes |
| **Access protection** | | | | |
| • Password for display | Yes | Yes | Yes | Yes |
| • Protection level: Write protection | Yes | Yes | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | |
| Width | 35 mm | 70 mm | 175 mm | 175 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 430 g | 830 g | 1 978 g | 1 978 g |

# SIMATIC S7-1500 Advanced Controllers
Central processing units

## Technology CPUs

### Ordering data

| Description | Article No. |
|---|---|
| **CPU 1511T-1 PN** | **6ES7511-1TK01-0AB0** |
| Work memory 225 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **CPU 1515T-2 PN** | **6ES7515-2TM01-0AB0** |
| Work memory 750 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required | |
| **CPU 1517T-3 PN/DP** | **6ES7517-3TP00-0AB0** |
| 3 MB work memory for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **CPU 1517T-3 PN/DP** | **6ES7517-3UP00-0AB0** |
| 3 MB work memory for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **SIMATIC Memory Card** | |
| 4 MB | **6ES7954-8LC02-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** |
| 24 MB | **6ES7954-8LF02-0AA0** |
| 256 MB | **6ES7954-8LL02-0AA0** |
| 2 GB | **6ES7954-8LP02-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** |
| **SIMATIC S7-1500 DIN rail** | |
| Fixed lengths, with grounding elements | |
| • 160 mm | **6ES7590-1AB60-0AA0** |
| • 245 mm | **6ES7590-1AC40-0AA0** |
| • 482 mm | **6ES7590-1AE80-0AA0** |
| • 530 mm | **6ES7590-1AF30-0AA0** |
| • 830 mm | **6ES7590-1AJ30-0AA0** |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| • 2000 mm | **6ES7590-1BC00-0AA0** |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| 20 units | |
| **Power supply** | |
| For supplying the backplane bus of the S7-1500 | |
| 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** |
| 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** |
| 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** |
| **Power connector** | **6ES7590-8AA00-0AA0** |
| With coding element for power supply module; spare part, 10 units | |

| Description | Article No. |
|---|---|
| **Load power supply** | |
| 24 V DC/3A | **6EP1332-4BA00** |
| 24 V DC/8A | **6EP1333-4BA00** |
| **Power supply connector** | |
| Spare part; for connecting the 24 V DC supply voltage | |
| • with push-in terminals | **6ES7193-4JB00-0AA0** |
| **PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet** | |
| With insulation displacement, max. transmission rate 12 Mbps | |
| Without PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BA70-0XA0** |
| With PG interface, grounding via control cabinet contact surface; 1 unit | **6ES7972-0BB70-0XA0** |
| **PROFIBUS FC Standard Cable GP** | **6XV1830-0EH10** |
| Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Robust Cable** | **6XV1830-0JH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Flexible Cable** | **6XV1831-2K** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Trailing Cable** | |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| Sheath color: Petrol | **6XV1830-3EH10** |
| Sheath color: Violet | **6XV1831-2L** |
| **PROFIBUS FC Food Cable** | **6XV1830-0GH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC Ground Cable** | **6XV1830-3FH10** |
| 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FC FRNC Cable GP** | **6XV1830-0LH10** |
| 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| **PROFIBUS FastConnect Stripping Tool** | **6GK1905-6AA00** |
| Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables | |

| ■ **Ordering data** | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 plugs** | | **STEP 7 Professional V14 SP1** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| **IE FC RJ45 Plug 180** | | Requirement: Windows 7 Professional SP1 (64-bit), | |
| 180° cable outlet | | Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), | |
| 1 unit | 6GK1901-1BB10-2AA0 | Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), | |
| 10 units | 6GK1901-1BB10-2AB0 | Windows 10 Professional Version 1607, | |
| 50 units | 6GK1901-1BB10-2AE0 | Windows 10 Enterprise Version 1607, | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | Type of delivery: English, German, Chinese, Italian, French, Spanish | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| | | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| | | Email address required for delivery | |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | **STEP 7 Safety Advanced V14 SP1** | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | Floating license for 1 user, software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| **Display** | | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| For CPU 1511T-1 PN; spare part | 6ES7591-1AA01-0AA0 | | |
| For CPU 1515T-2 PN, CPU 1517T-3 PN/DP and CPU 1517TF-3 PN/DP; spare part | 6ES7591-1BA01-0AA0 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Front cover for PROFIBUS DP interface** | 6ES7591-8AA00-0AA0 | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| For CPU 1517T-3 PN/DP and CPU 1517TF-3 PN/DP; spare part | | | |
| **SIMATIC S7-1500 Starter Kit** | 6ES7511-1CK00-4YB5 | | |
| Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Digital modules

## Overview

- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- 35 mm wide modules with parameters and diagnostic functions
- 25 mm wide modules for use in tight spaces: particularly economical, without parameters or diagnostic functions

## Technical specifications

| Article number | 6ES7521-1BH00-0AB0 | 6ES7521-1BL00-0AB0 | 6ES7521-1BH50-0AA0 | 6ES7521-1FH00-0AA0 | 6ES7521-7EH00-0AB0 |
|---|---|---|---|---|---|
| | S7-1500, DI 16X24VDC HF | S7-1500, DI 32X24VDC HF | S7-1500, DI 16X24VDC SRC BA | S7-1500, DI 16X230VAC BA | S7-1500, DI 16 X 24...125V UC HF |
| **General information** | | | | | |
| Product type designation | DI 16x24VDC HF | DI 32x24VDC HF | DI 16x24VDC SRC BA | DI 16x230VAC BA | DI 16x24 ... 125VUC HF |
| **Product function** | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V13 SP1 / - | V13 SP1 / - | V12 / V12 | V12 / V12 | V13 SP1 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - |
| **Operating mode** | | | | | |
| • DI | Yes | Yes | Yes | Yes | Yes |
| • Counter | Yes | Yes | No | No | No |
| • Oversampling | No | | | | No |
| • MSI | Yes | Yes | Yes | Yes | Yes |
| **Supply voltage** | | | | | |
| Type of supply voltage | DC | DC | DC | | |
| Rated value (DC) | 24 V | 24 V | | | |
| Reverse polarity protection | Yes | Yes | | | |
| **Digital inputs** | | | | | |
| Number of digital inputs | 16 | 32 | 16 | 16 | 16 |
| Digital inputs, parameterizable | Yes | Yes | No | No | Yes |
| Source/sink input | P-reading | P-reading | m-reading | P-reading | Yes |
| Input characteristic curve in accordance with IEC 61131, type 1 | | | | Yes | |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes | Yes | | Yes; at 24 V DC |
| **Digital input functions, parameterizable** | | | | | |
| • Gate start/stop | Yes | Yes | | | |
| • Freely usable digital input | Yes | Yes | | | |
| • Counter | | | | | |
| - Number, max. | 2 | 2 | | | |
| - Counting frequency, max. | 1 kHz | 1 kHz | | | |
| - Counting width | 32 bit | 32 bit | | | |
| - Counting direction up/down | Up | Up | | | |

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## Technical specifications (continued)

| Article number | 6ES7521-1BH00-0AB0 | 6ES7521-1BL00-0AB0 | 6ES7521-1BH50-0AA0 | 6ES7521-1FH00-0AA0 | 6ES7521-7EH00-0AB0 |
|---|---|---|---|---|---|
| | S7-1500, DI 16X24VDC HF | S7-1500, DI 32X24VDC HF | S7-1500, DI 16X24VDC SRC BA | S7-1500, DI 16X230VAC BA | S7-1500, DI 16 X 24...125V UC HF |
| **Input voltage** | | | | | |
| • Type of input voltage | DC | DC | DC | AC | AC/DC |
| • Rated value (DC) | 24 V | 24 V | 24 V | | 24 V; 48 V; 125 V |
| • Rated value (AC) | | | | 230 V; 120/230V AC, 50/60 Hz | 24 V; 48 V, 125 V (50 - 60 Hz) |
| • for signal "0" | -30 to +5V | -30 to +5V | -5 to +30V | 0V AC to 40V AC | -5 ... +5 V |
| • for signal "1" | +11 to +30V | +11 to +30V | -11 to -30V | 79V AC to 264V AC | +11 V DC to +146 V DC |
| **Input current** | | | | | |
| • for signal "1", typ. | 2.5 mA | 2.5 mA | 4.5 mA | 11 mA; At 230 V AC and 5.5 mA at 120 V AC | 3 mA; at 24 V DC |
| **Input delay (for rated value of input voltage)** | | | | | |
| **for standard inputs** | | | | | |
| - parameterizable | Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms | Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms | No | No | Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms parameterizable with DC, 20 ms fixed with AC |
| **for interrupt inputs** | | | | | |
| - parameterizable | Yes | Yes | No | No | Yes |
| **for counter/technological functions** | | | | | |
| - parameterizable | Yes | Yes | No | No | No |
| **Cable length** | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m |
| **Encoder** | | | | | |
| **Connectable encoders** | | | | | |
| • 2-wire sensor | Yes | Yes | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA | 2 mA | 1.5 mA |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes | Yes | No | No | No |
| Filtering and processing time (TCI), min. | 80 µs; At 50 µs filter time | 80 µs; At 50 µs filter time | | | |
| Bus cycle time (TDP), min. | 250 µs | 250 µs | | | |
| **Interrupts/diagnostics/status information** | | | | | |
| Diagnostics function | Yes | Yes | No | No | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | No | No | Yes |
| • Hardware interrupt | Yes | Yes | No | No | Yes |
| **Diagnostic messages** | | | | | |
| • Monitoring the supply voltage | Yes | Yes | No | No | No |
| • Wire-break | Yes; to I < 350 µA | Yes; to I < 350 µA | No | No | Yes; To I < 550 µA |
| • Short-circuit | No | No | No | No | No |
| **Diagnostics indication LED** | | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED | No | No | No |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | Yes; Red LED | No | No | Yes; Red LED |
| • for module diagnostics | Yes; Red LED | Yes; Red LED | No | Yes; Red LED | Yes; Red LED |
| **Potential separation** | | | | | |
| **Potential separation channels** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 3 100 V DC | 2 000 V DC |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Digital modules

**SM 521 digital input modules**

### ◾ Technical specifications (continued)

| Article number | 6ES7521-1BH00-0AB0 | 6ES7521-1BL00-0AB0 | 6ES7521-1BH50-0AB0 | 6ES7521-1FH00-0AA0 | 6ES7521-7EH00-0AB0 |
|---|---|---|---|---|---|
| | S7-1500, DI 16X24VDC HF | S7-1500, DI 32X24VDC HF | S7-1500, DI 16X24VDC SRC BA | S7-1500, DI 16X230VAC BA | S7-1500, DI 16 X 24...125V UC HF |
| **Standards, approvals, certificates** | | | | | |
| Suitable for safety functions | No | No | No | No | No |
| **Ambient conditions** | | | | | |
| **Ambient temperature during operation** | | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C | 40 °C | 40 °C |
| **Decentralized operation** | | | | | |
| Prioritized startup | Yes | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | | |
| Width | 35 mm | 35 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | | |
| Weight, approx. | 240 g | 260 g | 230 g | 300 g | 240 g |

| Article number | 6ES7521-1BH10-0AA0 | 6ES7521-1BL10-0AA0 |
|---|---|---|
| | S7-1500, DI 16X24VDC BA | S7-1500, DI 32X24VDC BA |
| **General information** | | |
| Product type designation | DI 16 x 24 V DC BA | DI 32x24VDC BA |
| **Product function** | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - |
| **Operating mode** | | |
| • DI | Yes | Yes |
| • Counter | No | No |
| • MSI | Yes | Yes |
| **Supply voltage** | | |
| Type of supply voltage | DC | DC |
| Rated value (DC) | 24 V | 24 V |
| **Digital inputs** | | |
| Number of digital inputs | 16 | 32 |
| Digital inputs, parameterizable | No | No |
| Source/sink input | P-reading | P-reading |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes |
| **Input voltage** | | |
| • Type of input voltage | DC | DC |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | -30 to +5V | -30 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V |
| **Input current** | | |
| • for signal "1", typ. | 2.7 mA | 2.7 mA |
| **Input delay (for rated value of input voltage)** | | |
| **for standard inputs** | | |
| - parameterizable | No | No |
| **for interrupt inputs** | | |
| - parameterizable | No | No |
| **for counter/technological functions** | | |
| - parameterizable | No | No |

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■ **Technical specifications** (continued)

| Article number | **6ES7521-1BH10-0AA0** | **6ES7521-1BL10-0AA0** |
|---|---|---|
| | S7-1500, DI 16X24VDC BA | S7-1500, DI 32X24VDC BA |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m |
| **Encoder** | | |
| **Connectable encoders** | | |
| • 2-wire sensor | Yes | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | No | No |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostics function | No | No |
| **Alarms** | | |
| • Diagnostic alarm | No | No |
| • Hardware interrupt | No | No |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | No | No |
| • Wire-break | No | No |
| • Short-circuit | No | No |
| **Diagnostics indication LED** | | |
| • RUN LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | No | No |
| • Channel status display | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No |
| • for module diagnostics | No | No |
| **Potential separation** | | |
| **Potential separation channels** | | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | |
| Suitable for safety functions | No | No |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C |
| **Decentralized operation** | | |
| Prioritized startup | Yes | Yes |
| **Dimensions** | | |
| Width | 25 mm | 25 mm |
| Height | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm |
| **Weights** | | |
| Weight, approx. | 230 g | 260 g |
| **Other** | | |
| Note: | Supplied incl. 40-pole push-in front connectors | Supplied incl. 40-pole push-in front connectors |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Digital modules

## SM 521 digital input modules

### Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SM 521 digital input modules** | | | **DIN A4 labeling sheets** | |
| _Module width 35 mm_ | | | For 35 mm modules;<br>10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-2AX00-0AA0 |
| 16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts | 6ES7521-1BH00-0AB0 | | | |
| 32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts | 6ES7521-1BL00-0AB0 | | For 25 mm modules;<br>10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-1AX00-0AA0 |
| 16 inputs, 24 V DC, isolated, input delay 3.2 ms | 6ES7521-1BH50-0AA0 | | **U connector** | 6ES7590-0AA00-0AA0 |
| 16 inputs, 230 V AC, isolated, input delay 20 ms | 6ES7521-1FH00-0AA0 | | 5 units; spare part | |
| 16 inputs, 24 ... 125 V UC, input delay 0.05 ... 20 ms, parameterizable diagnostics and hardware interrupts | 6ES7521-7EH00-0AB0 | | **Universal front door for I/O modules** | |
| _Module width 25 mm;_<br>_front connector (push-in) included in delivery package_ | | | For 35 mm modules;<br>5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-7AA0 |
| 16 inputs, 24 V DC, isolated | 6ES7521-1BH10-0AA0 | | For 25 mm modules;<br>5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-0AA0 |
| 32 inputs, 24 V DC, isolated | 6ES7521-1BL10-0AA0 | | | |
| **Accessories** | | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Front connectors** | | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | | | | |
| • Screw terminals | 6ES7592-1AM00-0XB0 | | | |
| • Push-in | 6ES7592-1BM00-0XB0 | | | |
| For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part | 6ES7592-1BM00-0XA0 | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Potential bridges for front connectors** | 6ES7592-3AA00-0AA0 | | Current "Manual Collection" DVD and the three subsequent updates | |
| For 35 mm modules;<br>20 pieces; spare part | | | | |

## Overview

- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- 35 mm wide modules with parameters and diagnostic functions
- 25 mm wide modules for use in tight spaces: particularly economical, without parameters or diagnostic functions

## Technical specifications

| Article number | 6ES7522-1BH01-0AB0 | 6ES7522-1BL01-0AB0 | 6ES7522-1BF00-0AB0 | 6ES7522-5EH00-0AB0 |
|---|---|---|---|---|
| | S7-1500, DQ 16X24V DC/ 0.5A HF | S7-1500, DQ 32X24VDC/ 0.5A HF | S7-1500, DQ 8X24VDC/2A HF | S7-1500, DQ 16X24...48VUC/125VDC/ 0.5A ST |
| **General information** | | | | |
| Product type designation | DQ 16x24VDC/0.5A HF | DQ 32x24VDC/0.5A HF | DQ 8x24VDC/2A HF | DQ 16x24 ... 48VUC/ 125VDC/0.5A ST |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 / - | V13 SP1 / - | V13 SP1 / - | V13 SP1 / - |
| • STEP 7 configurable/integrated as of version | | | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - |
| **Operating mode** | | | | |
| • DQ | Yes | Yes | Yes | Yes |
| • DQ with energy-saving function | No | No | Yes; with an application | No |
| • PWM | No | No | Yes | No |
| • Oversampling | No | No | No | No |
| • MSO | Yes | Yes | Yes | Yes |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | DC | |
| Rated value (DC) | 24 V | 24 V | 24 V | |
| Reverse polarity protection | Yes; through internal protection with 7 A per group | Yes; through internal protection with 7 A per group | Yes; through internal protection with 10 A per group | |
| **Digital outputs** | | | | |
| Type of digital output | Transistor | Transistor | Transistor | Transistor |
| Number of digital outputs | 16 | 32 | 8 | 16 |
| Current-sinking | | | | Yes |
| Current-sourcing | Yes | Yes | Yes | Yes |
| Digital outputs, parameterizable | Yes | Yes | Yes | Yes |
| Short-circuit protection | Yes; Clocked electronically | Yes; Clocked electronically | Yes | |
| Limitation of inductive shutdown voltage to | L+ (-53 V) | L+ (-53 V) | -17 V | 200 V (suppressor diode) |
| Controlling a digital input | Yes | Yes | Yes | Yes |
| **Digital output functions, parameterizable** | | | | |
| • Freely usable digital output | | | Yes | |
| • PWM output | | | Yes | |
| - Number, max. | | | 2 | |
| - Cycle duration, parameterizable | | | Yes; 2 ... 100 ms continuous | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Digital modules

## SM 522 digital output modules

### Technical specifications (continued)

| Article number | 6ES7522-1BH01-0AB0 | 6ES7522-1BL01-0AB0 | 6ES7522-1BF00-0AB0 | 6ES7522-5EH00-0AB0 |
|---|---|---|---|---|
| | S7-1500, DQ 16X24V DC/0.5A HF | S7-1500, DQ 32X24VDC/0.5A HF | S7-1500, DQ 8X24VDC/2A HF | S7-1500, DQ 16X24...48VUC/125VDC/0.5A ST |
| **Switching capacity of the outputs** | | | | |
| • with resistive load, max. | 0.5 A | 0.5 A | | 0.5 A |
| • on lamp load, max. | 5 W | 5 W | 10 W | 40 W; At 125 V DC, 10 W at 48 V UC, 5 W at 24 V UC |
| **Load resistance range** | | | | |
| • lower limit | 48 Ω | 48 Ω | 12 Ω | |
| • upper limit | 12 kΩ | 12 kΩ | 4 kΩ | |
| **Output voltage** | | | | |
| • Type of output voltage | DC | DC | DC | UC |
| • for signal "1", min. | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-1.0 V) |
| **Output current** | | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | 2 A | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA | 0.5 mA | |
| **Output delay with resistive load** | | | | |
| • "0" to "1", typ. | | | 80 μs | |
| • "0" to "1", max. | 100 μs | 100 μs | 100 μs | 5 ms |
| • "1" to "0", typ. | | | 300 μs | |
| • "1" to "0", max. | 500 μs | 500 μs | 500 μs | 5 ms |
| **Parallel switching of two outputs** | | | | |
| • for logic links | Yes | Yes | Yes | Yes |
| • for uprating | No | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes | Yes |
| **Switching frequency** | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz; With PWM operation: 500 Hz | 25 Hz |
| • with inductive load, max. | 0.5 Hz; According to IEC 60947-5-1, DC-13 | 0.5 Hz; According to IEC 60947-5-1, DC-13 | 0.5 Hz; According to IEC 60947-5-1, DC-13; max. 500 Hz with PWM operation only with external circuit; see additional description in the manual | 0.5 Hz |
| • on lamp load, max. | 10 Hz | 10 Hz | 10 Hz | 10 Hz |
| **Total current of the outputs** | | | | |
| • Current per channel, max. | 0.5 A; see additional description in the manual | 0.5 A; see additional description in the manual | 2 A; see additional description in the manual | 0.5 A |
| • Current per group, max. | 4 A; see additional description in the manual | 4 A; see additional description in the manual | 8 A; see additional description in the manual | 0.5 A |
| • Current per module, max. | 8 A; see additional description in the manual | 16 A; see additional description in the manual | 16 A; see additional description in the manual | 8 A |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes | Yes | No | No |
| Execution and activation time (TCO), min. | 70 μs | 70 μs | | |
| Bus cycle time (TDP), min. | 250 μs | 250 μs | | |
| **Interrupts/diagnostics/status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | No |
| Substitute values connectable | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | No |
| **Diagnostic messages** | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | No |
| • Wire-break | Yes | Yes | No | No |
| • Short-circuit | Yes | Yes | Yes | No |
| • Group error | Yes | Yes | Yes | |

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## ◼ Technical specifications (continued)

| Article number | **6ES7522-1BH01-0AB0**<br>S7-1500, DQ 16X24V DC/0.5A HF | **6ES7522-1BL01-0AB0**<br>S7-1500, DQ 32X24VDC/0.5A HF | **6ES7522-1BF00-0AB0**<br>S7-1500, DQ 8X24VDC/2A HF | **6ES7522-5EH00-0AB0**<br>S7-1500, DQ 16X24...48VUC/125VDC/0.5A ST |
|---|---|---|---|---|
| **Diagnostics indication LED** | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED | Yes; Green LED | No |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | No |
| • for module diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 2 000 V DC |
| **Standards, approvals, certificates** | | | | |
| Suitable for safety functions | No | No | No | No |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | | | 0 °C |
| • horizontal installation, max. | 60 °C | | | 60 °C |
| • vertical installation, min. | 0 °C | | | 0 °C |
| • vertical installation, max. | 60 °C | | | 40 °C |
| **Decentralized operation** | | | | |
| Prioritized startup | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | |
| Width | 35 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 230 g | 280 g | 240 g | 230 g |

| Article number | **6ES7522-5HF00-0AB0**<br>S7-1500, DQ 8X230VAC/5A ST (RELAY) | **6ES7522-5HH00-0AB0**<br>S7-1500, DQ 16X230VAC/2A ST (RELAY) | **6ES7522-5FF00-0AB0**<br>S7-1500, DQ 8X230VAC/2A ST (TRIAC) | **6ES7522-5FH00-0AB0**<br>S7-1500, DQ 16X230VAC/1A ST (TRIAC) |
|---|---|---|---|---|
| **General information** | | | | |
| Product type designation | DQ 8x230 V AC/5 A ST (relay) | DQ 16x230VAC/2A ST (relay) | DQ 8x230 V AC/2A ST (triac) | DQ 16x230VAC/1A ST (Triac) |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V12 / V12 | V13 SP1 / - | V12 / V12 | V13 SP1 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/GSD revision | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - |
| **Operating mode** | | | | |
| • DQ | Yes | Yes | Yes | Yes |
| • DQ with energy-saving function | No | No | No | No |
| • PWM | No | No | No | No |
| • Oversampling | No | No | No | No |
| • MSO | Yes | Yes | Yes | Yes |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | | |
| Rated value (DC) | 24 V | 24 V | | |
| Reverse polarity protection | Yes | Yes | | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Digital modules

## SM 522 digital output modules

### ■ Technical specifications (continued)

| Article number | 6ES7522-5HF00-0AB0 | 6ES7522-5HH00-0AB0 | 6ES7522-5FF00-0AB0 | 6ES7522-5FH00-0AB0 |
|---|---|---|---|---|
| | S7-1500, DQ 8X230VAC/5A ST (RELAY) | S7-1500, DQ 16X230VAC/2A ST (RELAY) | S7-1500, DQ 8X230VAC/2A ST (TRIAC) | S7-1500, DQ 16X230VAC/1A ST (TRIAC) |
| **Digital outputs** | | | | |
| Type of digital output | Relays | Relays | Triac | Triac |
| Number of digital outputs | 8 | 16 | 8 | 16 |
| Current-sinking | Yes | Yes | | Yes |
| Current-sourcing | Yes | Yes | Yes | Yes |
| Digital outputs, parameterizable | Yes | Yes | Yes | Yes |
| Short-circuit protection | No | No | No | No |
| Controlling a digital input | possible | Yes | | |
| **Switching capacity of the outputs** | | | | |
| • with resistive load, max. | | | 2 A | 1 A |
| • on lamp load, max. | 1 500 W; 10 000 operating cycles | 50 W (230 V AC), 5 W (24 V DC) | 50 W | 50 W |
| • Low energy/fluorescent lamps with electronic control gear | 10x 58 W (25 000 operating cycles) | | | |
| • Fluorescent tubes, conventionally compensated | 1x 58 W (25 000 operating cycles) | | | |
| • Fluorescent tubes, uncompensated | 10x 58 W (25 000 operating cycles) | | | |
| **Output voltage** | | | | |
| • Type of output voltage | | | AC | AC |
| • for signal "1", min. | | | L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current | L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current |
| **Output current** | | | | |
| • for signal "1" rated value | 5 A | 2 A | 2 A | 1 A |
| • for signal "0" residual current, max. | 0 A | 0 A | 2 mA | 2 mA |
| **Output delay with resistive load** | | | | |
| • "0" to "1", max. | | | 1 AC cycle | 1 AC cycle |
| • "1" to "0", max. | | | 1 AC cycle | 1 AC cycle |
| **Parallel switching of two outputs** | | | | |
| • for logic links | Yes | Yes | No | No |
| • for uprating | No | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes | Yes |
| **Switching frequency** | | | | |
| • with resistive load, max. | 2 Hz | 1 Hz | 10 Hz | 10 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 2 Hz | 1 Hz | 1 Hz | 1 Hz |
| **Total current of the outputs** | | | | |
| • Current per channel, max. | 8 A; see additional description in the manual | 2 A; see additional description in the manual | 2 A; see additional description in the manual | 1 A; see additional description in the manual |
| • Current per group, max. | 8 A; see additional description in the manual | 2 A; see additional description in the manual | 2 A; see additional description in the manual | 2 A; see additional description in the manual |
| • Current per module, max. | 64 A; see additional description in the manual | 32 A; see additional description in the manual | 10 A; see additional description in the manual | 10 A; see additional description in the manual |
| **Relay outputs** | | | | |
| • Number of relay outputs | 8 | 16 | | |
| • Rated supply voltage of relay coil L+ (DC) | 24 V | 24 V | | |
| • Current consumption of relays (coil current of all relays), typ. | 80 mA | 150 mA | | |
| • external protection for relay outputs | With miniature circuit breaker with characteristic B for: cos φ 1.0: 600 A cos φ 0.5 ... 0.7: 900 A with 8 A Diazed fuse: 1000 A | Miniature circuit breaker B10 / B16 | | |

■ **Technical specifications** (continued)

| Article number | 6ES7522-5HF00-0AB0 | 6ES7522-5HH00-0AB0 | 6ES7522-5FF00-0AB0 | 6ES7522-5FH00-0AB0 |
|---|---|---|---|---|
| | S7-1500, DQ 8X230VAC/5A ST (RELAY) | S7-1500, DQ 16X230VAC/2A ST (RELAY) | S7-1500, DQ 8X230VAC/2A ST (TRIAC) | S7-1500, DQ 16X230VAC/1A ST (TRIAC) |
| **Relay outputs (continued)** | | | | |
| • Contact connection (internal) | No | No | | |
| • Size of motor starters according to NEMA, max. | 5 | 5 | | |
| • Number of operating cycles, max. | 4 000 000; see additional description in the manual | see additional description in the manual | | |
| • Relay approved acc. to UL 508 | Yes; 250 V AC/5 A g.p.; 120 V AC TV-4 tungsten; A300, R300 | No | | |
| **Switching capacity of contacts** | | | | |
| - with inductive load, max. | see additional description in the manual | 2 A; see additional description in the manual | | |
| - with resistive load, max. | see additional description in the manual | 2 A; see additional description in the manual | | |
| **Triac outputs** | | | | |
| • Size of motor starters according to NEMA, max. | | | 5 | 4 |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | No |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | No | No |
| Substitute values connectable | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | No | No |
| **Diagnostic messages** | | | | |
| • Monitoring the supply voltage | Yes | Yes | No | No |
| • Wire-break | No | No | No | No |
| • Short-circuit | No | No | No | No |
| **Diagnostics indication LED** | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED | No | No |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No | No | No |
| • for module diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | Between channels: 3 100 V DC; between channels backplane bus: 3 100 V DC; between L+ and backplane bus: 707 V DC (type test) | Between channels: 3 100 V DC; between channels backplane bus: 3 100 V DC; between L+ and backplane bus: 707 V DC (type test) | 3 100 V DC | 3 100 V DC |
| **Standards, approvals, certificates** | | | | |
| Suitable for safety functions | No | No | No | No |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C | 60 °C |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Digital modules

## SM 522 digital output modules

### ■ Technical specifications (continued)

| Article number | 6ES7522-5HF00-0AB0 | 6ES7522-5HH00-0AB0 | 6ES7522-5FF00-0AB0 | 6ES7522-5FH00-0AB0 |
|---|---|---|---|---|
| | S7-1500, DQ 8X230VAC/5A ST (RELAY) | S7-1500, DQ 16X230VAC/2A ST (RELAY) | S7-1500, DQ 8X230VAC/2A ST (TRIAC) | S7-1500, DQ 16X230VAC/1A ST (TRIAC) |
| **Decentralized operation** | | | | |
| Prioritized startup | Yes | Yes | Yes | Yes |
| **Dimensions** | | | | |
| Width | 35 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 350 g | 350 g | 290 g | 310 g |

| Article number | 6ES7522-1BH10-0AA0 | 6ES7522-1BL10-0AA0 |
|---|---|---|
| | S7-1500, DQ 16X24VDC/0.5A BA | S7-1500, DQ 32X24VDC/0.5A BA |
| **General information** | | |
| Product type designation | DQ 16x24VDC/0.5A BA | DQ 32x24VDC/0.5A BA |
| **Product function** | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - |
| **Operating mode** | | |
| • DQ | Yes | Yes |
| • DQ with energy-saving function | No | No |
| • PWM | No | No |
| • Oversampling | No | No |
| • MSO | Yes | Yes |
| **Supply voltage** | | |
| Type of supply voltage | DC | DC |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes; through internal protection with 7 A per group | Yes; through internal protection with 7 A per group |
| **Digital outputs** | | |
| Type of digital output | Transistor | Transistor |
| Number of digital outputs | 16 | 32 |
| Current-sourcing | Yes | Yes |
| Digital outputs, parameterizable | No | No |
| Short-circuit protection | Yes | Yes |
| Limitation of inductive shutdown voltage to | L+ (-53 V) | L+ (-53 V) |
| Controlling a digital input | Yes | Yes |
| **Switching capacity of the outputs** | | |
| • with resistive load, max. | 0.5 A | 0.5 A |
| • on lamp load, max. | 5 W | 5 W |
| **Load resistance range** | | |
| • lower limit | 48 Ω | 48 Ω |
| • upper limit | 12 kΩ | 12 kΩ |
| **Output voltage** | | |
| • Type of output voltage | DC | DC |
| • for signal "1", min. | L+ (-0.8 V) | L+ (-0.8 V) |

■ **Technical specifications** (continued)

| Article number | 6ES7522-1BH10-0AA0 | 6ES7522-1BL10-0AA0 |
|---|---|---|
| | S7-1500, DQ 16X24VDC/0.5A BA | S7-1500, DQ 32X24VDC/0.5A BA |
| **Output current** | | |
| • for signal "1" rated value | 0.5 A | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA |
| **Output delay with resistive load** | | |
| • "0" to "1", max. | 100 µs | 100 µs |
| • "1" to "0", max. | 500 µs | 500 µs |
| **Parallel switching of two outputs** | | |
| • for logic links | Yes | Yes |
| • for uprating | No | No |
| • for redundant control of a load | Yes | Yes |
| **Switching frequency** | | |
| • with resistive load, max. | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz; According to IEC 60947-5-1, DC-13 | 0.5 Hz; According to IEC 60947-5-1, DC-13 |
| • on lamp load, max. | 10 Hz | 10 Hz |
| **Total current of the outputs** | | |
| • Current per channel, max. | 0.5 A; see additional description in the manual | 0.5 A; see additional description in the manual |
| • Current per group, max. | 4 A; see additional description in the manual | 4 A; see additional description in the manual |
| • Current per module, max. | 8 A; see additional description in the manual | 16 A; see additional description in the manual |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | No | No |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostics function | No | No |
| Substitute values connectable | No | No |
| **Alarms** | | |
| • Diagnostic alarm | No | No |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | No | No |
| • Wire-break | No | No |
| • Short-circuit | No | No |
| • Group error | No | No |
| **Diagnostics indication LED** | | |
| • RUN LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED |
| • Channel status display | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No |
| • for module diagnostics | No | No |
| **Potential separation** | | |
| **Potential separation channels** | | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | |
| Suitable for safety functions | No | No |
| **Decentralized operation** | | |
| Prioritized startup | Yes | Yes |

**4**

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Digital modules

**SM 522 digital output modules**

**4**

## ▍ Technical specifications (continued)

| Article number | 6ES7522-1BH10-0AA0 | 6ES7522-1BL10-0AA0 |
|---|---|---|
| | S7-1500, DQ 16X24VDC/0.5A BA | S7-1500, DQ 32X24VDC/0.5A BA |
| **Dimensions** | | |
| Width | 25 mm | 25 mm |
| Height | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm |
| **Weights** | | |
| Weight, approx. | 230 g | 280 g |
| **Other** | | |
| Note: | Supplied incl. 40-pole push-in front connectors | Supplied incl. 40-pole push-in front connectors |

## ▍ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 522 digital output modules** | | **DIN A4 labeling sheets** | |
| Module width 35 mm | | For 35 mm modules;<br>10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-2AX00-0AA0 |
| 8 outputs, 24 V DC;<br>2 A, isolated | 6ES7522-1BF00-0AB0 | | |
| 16 outputs, 24 V DC;<br>0.5 A, isolated | 6ES7522-1BH01-0AB0 | For 25 mm modules;<br>10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-1AX00-0AA0 |
| 32 outputs, 24 V DC;<br>0.5 A, isolated | 6ES7522-1BL01-0AB0 | | |
| 8 relay outputs, 230 V AC, 5 A | 6ES7522-5HF00-0AB0 | **U connector** | 6ES7590-0AA00-0AA0 |
| 16 relay outputs, 230 V AC, 2 A | 6ES7522-5HH00-0AB0 | 5 units; spare part | |
| 8 outputs (triac), 230 V AC, 2 A | 6ES7522-5FF00-0AB0 | **Universal front door**<br>**for I/O modules** | |
| 16 outputs (triac), 230 V AC, 1 A | 6ES7522-5FH00-0AB0 | For 35 mm modules;<br>5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-7AA0 |
| 16 outputs, 24 ... 48 V UC,<br>125 V DC, 0.5 A, isolated | 6ES7522-5EH00-0AB0 | | |
| Module width 25 mm;<br>front connector (push-in)<br>included in delivery package | | For 25 mm modules;<br>5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-0AA0 |
| 16 outputs, 24 V DC;<br>0.5 A, isolated | 6ES7522-1BH10-0AA0 | | |
| 32 outputs, 24 V DC;<br>0.5 A, isolated | 6ES7522-1BL10-0AA0 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Accessories** | | Electronic manuals on DVD,<br>multi-language:<br>LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7,<br>SIMATIC distributed I/O,<br>SIMATIC HMI, SIMATIC Sensors,<br>SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7,<br>SIMATIC PG/PC, SIMATIC S7,<br>SIMATIC Software, SIMATIC TDC | |
| **Front connectors** | | | |
| For 35 mm modules;<br>including four potential bridges, cable ties and individual labeling strips, 40-pin | | | |
| • Screw terminals | 6ES7592-1AM00-0XB0 | | |
| • Push-in | 6ES7592-1BM00-0XB0 | | |
| For 25 mm modules;<br>including cable ties and individual labeling strips; push-in terminal 40-pin;<br>spare part | 6ES7592-1BM00-0XA0 | **SIMATIC Manual Collection**<br>**update service for 1 year** | 6ES7998-8XC01-8YE2 |
| | | Current "Manual Collection" DVD and the three subsequent updates | |
| **Potential bridges**<br>**for front connectors** | 6ES7592-3AA00-0AA0 | | |
| For 35 mm modules;<br>20 pieces; spare part | | | |

## Overview

- 16 digital inputs and 16 digital outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces: particularly economical, without parameters or diagnostic functions

## Technical specifications

| Article number | 6ES7523-1BL00-0AA0 |
|---|---|
| | S7-1500, DI/DQ 16X24CDV/16X24VDC/0.5A BA |
| **General information** | |
| Product type designation | DI 16x24VDC / DQ16x24VDC/0.5A BA |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/integrated as of version | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/GSD revision | V1.0 / V5.1 |
| • PROFINET as of GSD version/GSD revision | V2.3 / - |
| **Operating mode** | |
| • DI | Yes |
| • Counter | No |
| • DQ | Yes |
| • DQ with energy-saving function | No |
| • PWM | No |
| • Oversampling | No |
| • MSI | Yes |
| • MSO | Yes |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes; through internal protection with 7 A per group |
| **Digital inputs** | |
| Number of digital inputs | 16 |
| Digital inputs, parameterizable | No |
| Source/sink input | P-reading |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "1", typ. | 2.7 mA |

| Article number | 6ES7523-1BL00-0AA0 |
|---|---|
| | S7-1500, DI/DQ 16X24CDV/16X24VDC/0.5A BA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | No |
| **for interrupt inputs** | |
| - parameterizable | No |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 16 |
| Current-sourcing | Yes |
| Digital outputs, parameterizable | No |
| Short-circuit protection | Yes |
| Limitation of inductive shutdown voltage to | L+ (-53 V) |
| Controlling a digital input | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A |
| • on lamp load, max. | 5 W |
| **Load resistance range** | |
| • lower limit | 48 Ω |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "1", min. | L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 100 µs |
| • "1" to "0", max. | 500 µs |
| **Parallel switching of two outputs** | |
| • for logic links | Yes |
| • for uprating | No |
| • for redundant control of a load | Yes |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Digital modules

**SM 523 digital input/output modules**

■ **Technical specifications** (continued)

| Article number | 6ES7523-1BL00-0AA0 | | Article number | 6ES7523-1BL00-0AA0 |
|---|---|---|---|---|
| | S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA | | | S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA |
| **Switching frequency** | | | **Diagnostics indication LED** | |
| • with resistive load, max. | 100 Hz | | • RUN LED | Yes; Green LED |
| • with inductive load, max. | 0.5 Hz | | • ERROR LED | Yes; Red LED |
| • on lamp load, max. | 10 Hz | | • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| **Total current of the outputs** | | | • Channel status display | Yes; Green LED |
| • Current per channel, max. | 0.5 A; see additional description in the manual | | • for channel diagnostics | No |
| • Current per group, max. | 4 A; see additional description in the manual | | • for module diagnostics | No |
| • Current per module, max. | 8 A; see additional description in the manual | | **Potential separation** | |
| | | | **Potential separation channels** | |
| **Cable length** | | | • between the channels and backplane bus | Yes |
| • shielded, max. | 1 000 m | | **Isolation** | |
| • unshielded, max. | 600 m | | Isolation tested with | 707 V DC (type test) |
| **Encoder** | | | **Ambient conditions** | |
| **Connectable encoders** | | | **Ambient temperature during operation** | |
| • 2-wire sensor | Yes | | • horizontal installation, min. | 0 °C |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | | • horizontal installation, max. | 60 °C |
| **Isochronous mode** | | | • vertical installation, min. | 0 °C |
| Isochronous operation (application synchronized up to terminal) | No | | • vertical installation, max. | 40 °C |
| | | | **Decentralized operation** | |
| **Interrupts/diagnostics/ status information** | | | Prioritized startup | Yes |
| Diagnostics function | No | | **Dimensions** | |
| Substitute values connectable | No | | Width | 25 mm |
| **Alarms** | | | Height | 147 mm |
| • Diagnostic alarm | No | | Depth | 129 mm |
| • Hardware interrupt | No | | **Weights** | |
| **Diagnostic messages** | | | Weight, approx. | 280 g |
| • Monitoring the supply voltage | No | | **Other** | |
| • Wire-break | No | | Note: | Supplied incl. 40-pole push-in front connectors |
| • Short-circuit | No | | | |
| • Group error | No | | | |

■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SM 523 digital input/output module** | | | **Universal front door for I/O modules** | |
| Module width 25 mm; front connector (push-in) included in delivery package | | | For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-0AA0 |
| 16 inputs, 24 V DC, isolated; 16 outputs, 24 V DC; 0.5 A, isolated | 6ES7523-1BL00-0AA0 | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Accessories** | | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **Front connectors** | | | | |
| For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part | 6ES7592-1BM00-0XA0 | | | |
| **DIN A4 labeling sheets** | | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, AI gray | 6ES7592-1AX00-0AA0 | | Current "Manual Collection" DVD and the three subsequent updates | |
| **U connector** | 6ES7590-0AA00-0AA0 | | | |
| 5 units; spare part | | | | |

## Overview



- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | **6AG1521-1BH00-7AB0** | **6AG1521-1BL00-7AB0** | **6AG1521-1BH50-7AA0** | **6AG1521-1FH00-7AA0** |
|---|---|---|---|---|
| Based on | **6ES7521-1BH00-0AB0** | **6ES7521-1BL00-0AB0** | **6ES7521-1BH50-0AA0** | **6ES7521-1FH00-0AA0** |
| | SIPLUS S7-1500 DI 16X24VDC HF | SIPLUS S7-1500 DI 32X24VDC HF | SIPLUS S7-1500 DI 16X24VDC SRC BA | SIPLUS S7-1500 DI 16X230VAC BA |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin |
| • horizontal installation, max. | 70 °C; = Tmax | 70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 16 | 70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8 | 70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8 |
| • vertical installation, min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin |
| • vertical installation, max. | 40 °C; = Tmax | 40 °C; = Tmax | 40 °C; = Tmax | 40 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 521 digital input modules

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SM 521 digital input modules** | | **Accessories** | See SIMATIC S7-1500 SM 521 digital input modules, page 4/64 |
| (Extended temperature range and exposure to media) | | | |
| 16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts | **6AG1521-1BH00-7AB0** | | |
| 32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts | **6AG1521-1BL00-7AB0** | | |
| 16 inputs, 24 V DC, isolated, input delay 3.2 ms | **6AG1521-1BH50-7AA0** | | |
| 16 inputs, 230 V AC, isolated, input delay 20 ms | **6AG1521-1FH00-7AA0** | | |

**4**

## Overview

- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information has been added.

## Technical specifications

| Article number | 6AG1522-1BF00-7AB0 | 6AG1522-1BH01-7AB0 | 6AG1522-1BL01-7AB0 | 6AG1522-5HF00-2AB0 | 6AG1522-5FF00-7AB0 |
|---|---|---|---|---|---|
| Based on | 6ES7522-1BF00-0AB0 | 6ES7522-1BH01-0AB0 | 6ES7522-1BL01-0AB0 | 6ES7522-5HF00-0AB0 | 6ES7522-5FF00-0AB0 |
| | SIPLUS S7-1500 DQ 8X24VDC/2A HF | SIPLUS S7-1500 DQ 16X24VDC/0.5A HF | SIPLUS S7-1500 DQ 32X24VDC/0.5A HF | SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY) | SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC) |
| **Ambient conditions** | | | | | |
| **Ambient temperature during operation** | | | | | |
| • horizontal installation, min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -25 °C; = Tmin | -40 °C; = Tmin |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C Number of simultaneously controllable outputs max. 8x 0.5 A, max. total current per group 2 A | 70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group | 70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group | 60 °C; = Tmax | 70 °C; = Tmax; > +60 °C number of simultaneously controllable outputs max. 8x 0.25 A, max. total current 2 A |
| • vertical installation, min. | -40 °C; = Tmin | | | -25 °C; = Tmin | -40 °C; = Tmin |
| • vertical installation, max. | 40 °C; = Tmax | | | 40 °C; = Tmax | 40 °C; = Tmax |
| **Extended ambient conditions** | | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS digital modules

## SIPLUS SM 522 digital output modules

### ■ Technical specifications  (continued)

| Article number | 6AG1522-1BF00-7AB0 | 6AG1522-1BH01-7AB0 | 6AG1522-1BL01-7AB0 | 6AG1522-5HF00-2AB0 | 6AG1522-5FF00-7AB0 |
|---|---|---|---|---|---|
| Based on | 6ES7522-1BF00-0AB0 | 6ES7522-1BH01-0AB0 | 6ES7522-1BL01-0AB0 | 6ES7522-5HF00-0AB0 | 6ES7522-5FF00-0AB0 |
| | SIPLUS S7-1500 DQ 8X24VDC/2A HF | SIPLUS S7-1500 DQ 16X24VDC/0.5A HF | SIPLUS S7-1500 DQ 32X24VDC/0.5A HF | SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY) | SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC) |
| **Resistance** | | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

### ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIPLUS SM 522 digital output modules** (Extended temperature range and exposure to media) | | | Accessories | See SIMATIC S7-1500 SM 522 digital output modules, page 4/72 |
| 8 outputs, 24 V DC; 2 A, isolated | **6AG1522-1BF00-7AB0** | | | |
| 16 outputs, 24 V DC; 0.5 A, isolated | **6AG1522-1BH01-7AB0** | | | |
| 32 outputs, 24 V DC; 0.5 A, isolated | **6AG1522-1BL01-7AB0** | | | |
| 8 relay outputs, 230 V AC, 5 A | **6AG1522-5HF00-2AB0** | | | |
| 8 outputs (triac), 230 V AC, 2 A | **6AG1522-5FF00-7AB0** | | | |

## Overview

- 4 or 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

## Technical specifications

| Article number | 6ES7531-7QD00-0AB0 | 6ES7531-7KF00-0AB0 | 6ES7531-7NF10-0AB0 | 6ES7531-7NF00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AI 4XU/I/RTD/TC ST | S7-1500, AI 8XU/I/RTD/TC ST | S7-1500, AI 8XU/I HS | S7-1500, AI 8XU/I HF |
| **General information** | | | | |
| Product type designation | AI 4xU/I/RTD/TC ST | AI 8xU/I/RTD/TC ST | AI 8xU/I HS | AI 8xU/I HF |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Measuring range scalable | No | No | No | No |
| • Scalable measured values | No | No | No | Yes |
| • Adjustment of measuring range | No | No | No | Yes |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13.0.2 | V12 / V12 | V14 / - | V14 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - |
| **Operating mode** | | | | |
| • Oversampling | No | No | Yes | No |
| • MSI | Yes | Yes | Yes | Yes |
| **CiR – Configuration in RUN** | | | | |
| Reparameterization possible in RUN | Yes | Yes | Yes | Yes |
| Calibration possible in RUN | Yes | Yes | Yes | Yes |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 531 analog input modules

### ■ Technical specifications (continued)

| Article number | 6ES7531-7QD00-0AB0 | 6ES7531-7KF00-0AB0 | 6ES7531-7NF10-0AB0 | 6ES7531-7NF00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AI 4XU/I/RTD/TC ST | S7-1500, AI 8XU/I/RTD/TC ST | S7-1500, AI 8XU/I HS | S7-1500, AI 8XU/I HF |
| **Analog inputs** | | | | |
| Number of analog inputs | 4 | 8 | 8 | 8 |
| • For current measurement | 4 | 8 | 8 | 8 |
| • For voltage measurement | 4 | 8 | 8 | 8 |
| • For resistance/resistance thermometer measurement | 2 | 4 | | |
| • For thermocouple measurement | 4 | 8 | | |
| permissible input voltage for voltage input (destruction limit), max. | 28.8 V | 28.8 V | 28.8 V | 28.8 V |
| permissible input current for current input (destruction limit), max. | 40 mA | 40 mA | 40 mA | 40 mA |
| Technical unit for temperature measurement adjustable | Yes; °C/°F/K | Yes; °C/°F/K | | |
| Analog input with oversampling | No | | | |
| Standardization of measured values | No | | | |
| **Input ranges (rated values), voltages** | | | | |
| • 0 to +5 V | No | No | No | No |
| • 0 to +10 V | No | No | No | No |
| • 1 V to 5 V | Yes | Yes | Yes | Yes |
| • -1 V to +1 V | Yes | Yes | | |
| • -10 V to +10 V | Yes | Yes | Yes | Yes |
| • -2.5 V to +2.5 V | Yes | Yes | No | Yes |
| • -25 mV to +25 mV | No | No | No | No |
| • -250 mV to +250 mV | Yes | Yes | No | No |
| • -5 V to +5 V | Yes | Yes | Yes | Yes |
| • -50 mV to +50 mV | Yes | Yes | No | No |
| • -500 mV to +500 mV | Yes | Yes | No | No |
| • -80 mV to +80 mV | Yes | Yes | No | No |
| **Input ranges (rated values), currents** | | | | |
| • 0 to 20 mA | Yes | Yes | Yes | Yes |
| • -20 mA to +20 mA | Yes | Yes | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | | | |
| • Type B | Yes | Yes | No | No |
| • Type C | No | No | No | No |
| • Type E | Yes | Yes | No | No |
| • Type J | Yes | Yes | No | No |
| • Type K | Yes | Yes | No | No |
| • Type L | No | No | No | No |
| • Type N | Yes | Yes | No | No |
| • Type R | Yes | Yes | No | No |
| • Type S | Yes | Yes | No | No |
| • Type T | Yes | Yes | No | No |
| • Type U | No | | | |
| • Type TXK/TXK(L) to GOST | No | No | No | No |

## Technical specifications (continued)

| Article number | 6ES7531-7QD00-0AB0 | 6ES7531-7KF00-0AB0 | 6ES7531-7NF10-0AB0 | 6ES7531-7NF00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AI 4XU/I/RTD/TC ST | S7-1500, AI 8XU/I/RTD/TC ST | S7-1500, AI 8XU/I HS | S7-1500, AI 8XU/I HF |
| **Input ranges (rated values), resistance thermometer** | | | | |
| • Cu 10 | No | No | No | No |
| • Cu 10 according to GOST | No | No | No | No |
| • Cu 50 | No | No | No | No |
| • Cu 50 according to GOST | No | No | No | No |
| • Cu 100 | No | No | No | No |
| • Cu 100 according to GOST | No | No | No | No |
| • Ni 10 | No | No | No | No |
| • Ni 10 according to GOST | No | No | No | No |
| • Ni 100 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Ni 100 according to GOST | No | No | No | No |
| • Ni 1000 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Ni 1000 according to GOST | No | No | No | No |
| • LG-Ni 1000 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Ni 120 | No | No | No | No |
| • Ni 120 according to GOST | No | No | No | No |
| • Ni 200 | No | | No | No |
| • Ni 200 according to GOST | No | No | No | No |
| • Ni 500 | No | No | No | No |
| • Ni 500 according to GOST | No | No | No | No |
| • Pt 10 | No | No | No | No |
| • Pt 10 according to GOST | No | No | No | No |
| • Pt 50 | No | No | No | No |
| • Pt 50 according to GOST | No | No | No | No |
| • Pt 100 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Pt 100 according to GOST | No | No | No | No |
| • Pt 1000 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Pt 1000 according to GOST | No | No | No | No |
| • Pt 200 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Pt 200 according to GOST | No | No | No | No |
| • Pt 500 | Yes; Standard/climate | Yes; Standard/climate | No | No |
| • Pt 500 according to GOST | No | No | No | No |
| **Input ranges (rated values), resistors** | | | | |
| • 0 to 150 ohms | Yes | Yes | No | No |
| • 0 to 300 ohms | Yes | Yes | No | No |
| • 0 to 600 ohms | Yes | Yes | No | No |
| • 0 to 3000 ohms | No | No | No | No |
| • 0 to 6000 ohms | Yes | Yes | No | No |
| • PTC | Yes | Yes | No | No |
| **Thermocouple (TC)** | | | | |
| **Temperature compensation** | | | | |
| - parameterizable | Yes | Yes | | |
| **Cable length** | | | | |
| • shielded, max. | 800 m; for U/I, 200 m for R/RTD, 50 m for TC | 800 m; for U/I, 200 m for R/RTD, 50 m for TC | 800 m | 800 m |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 531 analog input modules

### ■ Technical specifications (continued)

| Article number | 6ES7531-7QD00-0AB0 | 6ES7531-7KF00-0AB0 | 6ES7531-7NF10-0AB0 | 6ES7531-7NF00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AI 4XU/I/RTD/TC ST | S7-1500, AI 8XU/I/RTD/TC ST | S7-1500, AI 8XU/I HS | S7-1500, AI 8XU/I HF |
| **Analog value generation for the inputs** | | | | |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 16 bit | 24 bit; When using the function "Scaling of the measured values" or "Measuring range adaptation" (32-bit REAL format); 16 bits when using the S7 format (16-bit INTEGER) |
| • Integration time, parameterizable | Yes | Yes | | Yes |
| • Integration time (ms) | 2,5 / 16,67 / 20 / 100 ms | 2,5 / 16,67 / 20 / 100 ms | | Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms |
| • Basic conversion time, including integration time (ms) | 9 / 23 / 27 / 107 ms | 9 / 23 / 27 / 107 ms | | Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms |
| - additional conversion time for wire-break monitoring | 9 ms (to be considered in R/RTD/TC measurement) | 9 ms (to be considered in R/RTD/TC measurement) | | |
| - additional conversion time for resistance measurement | 150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms | 150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms | | |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 | 400 / 60 / 50 / 10 Hz | | 400 / 60 / 50 / 10 Hz |
| • Basic execution time of the module (all channels released) | | | | Corresponds to the channel with the highest basic conversion time |
| • Basic execution time of the module (all channels released) | | | 62.5 µs; independent of number of activated channels | |
| **Smoothing of measured values** | | | | |
| • parameterizable | Yes | Yes | Yes | Yes |
| **Encoder** | | | | |
| **Connection of signal encoders** | | | | |
| • for voltage measurement | Yes | Yes | Yes | Yes |
| • for current measurement as 2-wire transducer | Yes | Yes | Yes | Yes; with external transmitter supply |
| - Burden of 2-wire transmitter, max. | 820 Ω | 820 Ω | 820 Ω | |
| • for current measurement as 4-wire transducer | Yes | Yes | Yes | Yes |
| • for resistance measurement with two-wire connection | Yes; Only for PTC | Yes; Only for PTC | No | No |
| • for resistance measurement with three-wire connection | Yes; All measuring ranges except PTC; internal compensation of the cable resistances | Yes; All measuring ranges except PTC; internal compensation of the cable resistances | No | No |
| • for resistance measurement with four-wire connection | Yes; All measuring ranges except PTC | Yes; All measuring ranges except PTC | No | No |

■ **Technical specifications** (continued)

| Article number | **6ES7531-7QD00-0AB0** | **6ES7531-7KF00-0AB0** | **6ES7531-7NF10-0AB0** | **6ES7531-7NF00-0AB0** |
|---|---|---|---|---|
| | S7-1500, AI 4XU/I/RTD/TC ST | S7-1500, AI 8XU/I/RTD/TC ST | S7-1500, AI 8XU/I HS | S7-1500, AI 8XU/I HF |
| **Errors/accuracies** | | | | |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to input range, (+/-) | 0.1 % | 0.1 % | 0.2 % | 0.05 % |
| • Current, relative to input range, (+/-) | 0.1 % | 0.1 % | 0.2 % | 0.05 % |
| • Resistance, relative to input range, (+/-) | 0.1 % | 0.1 % | | |
| • Resistance thermometer, relative to input range, (+/-) | 0.1 %; Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K | Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K | | |
| • Thermocouple, relative to input range, (+/-) | 0.1 %; Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K | Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K | | |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB | 40 dB | | 80 dB; in the Standard operating mode, 40 dB in the Fast operating mode |
| • Common mode voltage, max. | 10 V | 10 V | 10 V | 60 V DC/30 V AC |
| • Common mode interference, min. | 60 dB | 60 dB | 50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz | 80 dB |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | Yes | No |
| Filtering and processing time (TCI), min. | | | 80 µs | |
| Bus cycle time (TDP), min. | | | 250 µs | |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes |
| • Limit value alarm | Yes; two upper and two lower limit values in each case | Yes; two upper and two lower limit values in each case | Yes; two upper and two lower limit values in each case | Yes; two upper and two lower limit values in each case |
| **Diagnostic messages** | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD | Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD | Yes; only for 1 ... 5 V and 4 ... 20 mA | Yes; only for 1 ... 5 V and 4 ... 20 mA |
| • Overflow/underflow | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • for module diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 531 analog input modules

### ◼ Technical specifications (continued)

| Article number | 6ES7531-7QD00-0AB0 | 6ES7531-7KF00-0AB0 | 6ES7531-7NF10-0AB0 | 6ES7531-7NF00-0AB0 |
|---|---|---|---|---|
| | S7-1500,<br>AI 4XU/I/RTD/TC ST | S7-1500,<br>AI 8XU/I/RTD/TC ST | S7-1500,<br>AI 8XU/I HS | S7-1500,<br>AI 8XU/I HF |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C | 40 °C |
| **Decentralized operation** | | | | |
| Prioritized startup | No | No | Yes | Yes |
| **Dimensions** | | | | |
| Width | 25 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 210 g | 310 g | 300 g | 280 g |
| **Other** | | | | |
| Note: | Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermoelement: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K | Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 ohms ±0.02%; resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermocouple: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K | | |

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## ■ Technical specifications (continued)

| Article number | 6ES7531-7PF00-0AB0 |
|---|---|
| | S7-1500, AI 8 X U/R/RTD/TC HF |
| **General information** | |
| Product type designation | AI 8xU/R/RTD/TC HF |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| • Measuring range scalable | Yes |
| • Scalable measured values | No |
| • Adjustment of measuring range | No |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - |
| **Operating mode** | |
| • Oversampling | No |
| • MSI | Yes |
| **CiR – Configuration in RUN** | |
| Reparameterization possible in RUN | Yes |
| Calibration possible in RUN | Yes |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Analog inputs** | |
| Number of analog inputs | 8; Plus one additional RTD (reference) channel |
| • For voltage measurement | 8; Plus one additional RTD (reference) channel |
| • For resistance/resistance thermometer measurement | 8; Plus one additional RTD (reference) channel |
| • For thermocouple measurement | 8; Plus one additional RTD (reference) channel |
| permissible input voltage for voltage input (destruction limit), max. | 20 V |
| Technical unit for temperature measurement adjustable | Yes; °C/°F/K |
| **Input ranges (rated values), voltages** | |
| • 0 to +5 V | No |
| • 0 to +10 V | No |
| • 1 V to 5 V | No |
| • -1 V to +1 V | Yes |
| • -10 V to +10 V | No |
| • -2.5 V to +2.5 V | No |
| • -25 mV to +25 mV | Yes |
| • -250 mV to +250 mV | Yes |
| • -5 V to +5 V | No |
| • -50 mV to +50 mV | Yes |
| • -500 mV to +500 mV | Yes |
| • -80 mV to +80 mV | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | No |
| • -20 mA to +20 mA | No |
| • 4 mA to 20 mA | No |

| Article number | 6ES7531-7PF00-0AB0 |
|---|---|
| | S7-1500, AI 8 X U/R/RTD/TC HF |
| **Input ranges (rated values), thermocouples** | |
| • Type B | Yes |
| • Type C | Yes |
| • Type E | Yes |
| • Type J | Yes |
| • Type K | Yes |
| • Type L | No |
| • Type N | Yes |
| • Type R | Yes |
| • Type S | Yes |
| • Type T | Yes |
| • Type TXK/TXK(L) to GOST | Yes |
| **Input ranges (rated values), resistance thermometer** | |
| • Cu 10 | Yes; Standard/climate |
| • Cu 10 according to GOST | Yes; Standard/climate |
| • Cu 50 | Yes; Standard/climate |
| • Cu 50 according to GOST | Yes; Standard/climate |
| • Cu 100 | Yes; Standard/climate |
| • Cu 100 according to GOST | Yes; Standard/climate |
| • Ni 10 | Yes; Standard/climate |
| • Ni 10 according to GOST | Yes; Standard/climate |
| • Ni 100 | Yes; Standard/climate |
| • Ni 100 according to GOST | Yes; Standard/climate |
| • Ni 1000 | Yes; Standard/climate |
| • Ni 1000 according to GOST | Yes; Standard/climate |
| • LG-Ni 1000 | Yes; Standard/climate |
| • Ni 120 | Yes; Standard/climate |
| • Ni 120 according to GOST | Yes; Standard/climate |
| • Ni 200 | Yes; Standard/climate |
| • Ni 200 according to GOST | Yes; Standard/climate |
| • Ni 500 | Yes; Standard/climate |
| • Ni 500 according to GOST | Yes; Standard/climate |
| • Pt 10 | Yes; Standard/climate |
| • Pt 10 according to GOST | Yes; Standard/climate |
| • Pt 50 | Yes; Standard/climate |
| • Pt 50 according to GOST | Yes; Standard/climate |
| • Pt 100 | Yes; Standard/climate |
| • Pt 100 according to GOST | Yes; Standard/climate |
| • Pt 1000 | Yes; Standard/climate |
| • Pt 1000 according to GOST | Yes; Standard/climate |
| • Pt 200 | Yes; Standard/climate |
| • Pt 200 according to GOST | Yes; Standard/climate |
| • Pt 500 | Yes; Standard/climate |
| • Pt 500 according to GOST | Yes; Standard/climate |
| **Input ranges (rated values), resistors** | |
| • 0 to 150 ohms | Yes |
| • 0 to 300 ohms | Yes |
| • 0 to 600 ohms | Yes |
| • 0 to 3000 ohms | No |
| • 0 to 6000 ohms | Yes |
| • PTC | Yes |
| **Thermocouple (TC)** | |
| **Temperature compensation** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 800 m; at U; 200 m at R/RTD/TC |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

**SM 531 analog input modules**

## Technical specifications (continued)

| Article number | **6ES7531-7PF00-0AB0** | Article number | **6ES7531-7PF00-0AB0** |
|---|---|---|---|
| | S7-1500, AI 8 X U/R/RTD/TC HF | | S7-1500, AI 8 X U/R/RTD/TC HF |
| **Analog value generation for the inputs** | | **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | |
| **Integration and conversion time/ resolution per channel** | | • Series mode interference (peak value of interference < rated value of input range), min. | 80 dB; in the Standard operating mode, 40 dB in the Fast operating mode |
| • Resolution with overrange (bit including sign), max. | 21 bit; For measuring mode RTC and TC when using the function "Scalable temperature measuring range" (32-bit REAL format); 16-bit for measuring mode R and U; 16 bits for all measuring modes when using the S7 format (16-bit INTEGER) | • Common mode voltage, max. | 60 V DC/30 V AC |
| | | • Common mode interference, min. | 80 dB |
| | | **Isochronous mode** | |
| | | Isochronous operation (application synchronized up to terminal) | No |
| • Integration time, parameterizable | Yes | **Interrupts/diagnostics/ status information** | |
| • Integration time (ms) | Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms | Diagnostics function | Yes |
| • Basic conversion time, including integration time (ms) | Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms | **Alarms** | |
| | | • Diagnostic alarm | Yes |
| - additional conversion time for wire-break monitoring | Thermocouples, 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni50, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt500, Pt1000: 13 ms | • Limit value alarm | Yes; two upper and two lower limit values in each case |
| | | **Diagnostic messages** | |
| | | • Monitoring the supply voltage | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 Hz | • Wire-break | Yes; Only with TC, R, RTD |
| • Basic execution time of the module (all channels released) | Corresponds to the channel with the highest basic conversion time | • Overflow/underflow | Yes |
| **Smoothing of measured values** | | **Diagnostics indication LED** | |
| • parameterizable | Yes | • RUN LED | Yes; Green LED |
| **Encoder** | | • ERROR LED | Yes; Red LED |
| **Connection of signal encoders** | | • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • for voltage measurement | Yes | • Channel status display | Yes; Green LED |
| • for current measurement as 2-wire transducer | No | • for channel diagnostics | Yes; Red LED |
| • for current measurement as 4-wire transducer | No | • for module diagnostics | Yes; Red LED |
| • for resistance measurement with two-wire connection | Yes | **Potential separation** | |
| | | **Potential separation channels** | |
| • for resistance measurement with three-wire connection | Yes; All measuring ranges except PTC; internal compensation of the cable resistances | • between the channels and backplane bus | Yes |
| | | **Isolation** | |
| • for resistance measurement with four-wire connection | Yes; All measuring ranges except PTC | Isolation tested with | 2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus |
| **Errors/accuracies** | | | |
| **Basic error limit (operational limit at 25 °C)** | | | |
| • Voltage, relative to input range, (+/-) | 0.05 % | | |
| • Resistance, relative to input range, (+/-) | 0.05 % | **Ambient conditions** | |
| | | **Ambient temperature during operation** | |
| • Resistance thermometer, relative to input range, (+/-) | Cuxxx Standard: ±0.3 K, Cuxxx Klima: ±0.2 K, Ptxxx Standard: ±0.5 K, Ptxxx Klima: ±0.2 K, Nixxx Standard: ±0.3 K, Nixxx Klima: ±0.15 K | • horizontal installation, min. | 0 °C |
| | | • horizontal installation, max. | 60 °C |
| | | • vertical installation, min. | 0 °C |
| | | • vertical installation, max. | 40 °C |
| • Thermocouple, relative to input range, (+/-) | Type B: > 600 °C ±1 K, Type E: > -200 °C ±0.5 K, Type J: > -210 °C ±0.5 K, Type K: > -200 °C ±1 K, Type N: > -200 °C ±1 K, Type R: > 0 °C ±1 K, Type S: > 0 °C ±1 K, Type T: > -200 °C ±0.5 K, Type C: ±2 K, Type TXK/TXK(L): ±0.5 K | **Decentralized operation** | |
| | | Prioritized startup | Yes |
| | | **Dimensions** | |
| | | Width | 35 mm |
| | | Height | 147 mm |
| | | Depth | 129 mm |
| | | **Weights** | |
| | | Weight, approx. | 290 g |
| | | **Other** | |
| | | Note: | For the R/RDT three-wire measurement, the conductor compensation is made alternating with the measurement. This then requires two module cycles for a measured value. |

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SM 531 analog input modules** | | **Accessories** | |
| | | **Front connectors** | |
| 4 x U/I/RTD/TC<br>4 analog inputs, ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 ohms; 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | 6ES7531-7QD00-0AB0 | For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin<br>• Screw terminals<br>• Push-in | 6ES7592-1AM00-0XB0<br>6ES7592-1BM00-0XB0 |
| | | For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part | 6ES7592-1BM00-0XA0 |
| | | **DIN A4 labeling sheets** | |
| | | For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-2AX00-0AA0 |
| 8 x U/I HS<br>8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | 6ES7531-7NF10-0AB0 | For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray | 6ES7592-1AX00-0AA0 |
| | | **U connector** | 6ES7590-0AA00-0AA0 |
| 8 x U/I/RTD/TC<br>8 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 ohms, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | 6ES7531-7KF00-0AB0 | 5 units; spare part | |
| | | **Universal front door for I/O modules** | |
| | | For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-7AA0 |
| | | For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | 6ES7528-0AA00-0AA0 |
| 8 x U/I HF<br>8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | 6ES7531-7NF00-0AB0 | **Shielding set I/O** | |
| | | For 35 mm modules; infeed element, shield bracket, and shield terminal; 5 units, spare part (one shield set supplied with the module). | 6ES7590-5CA00-0AA0 |
| 8 x U/R/RTD/TC<br>8 analog inputs, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, ±25 mV; thermocouples type B, E, J, K, N, R, S, T, TXK/TXK(L) according to GOST; resistance thermometers Cu 10, Cu 50, Cu 100, Ni 10, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, LG-Ni 1000, Pt 10, Pt 50, Pt 100, Pt 200, Pt500, Pt 1000; resistors 0...150/300/600/6000 ohms, PTC; 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | 6ES7531-7PF00-0AB0 | For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module). | 6ES7590-5CA10-0XA0 |
| | | **Shield terminal element** | 6ES7590-5BA00-0AA0 |
| | | 10 units; spare part | |
| | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 532 analog output modules

### ■ Overview



- 2, 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

### ■ Technical specifications

| Article number | 6ES7532-5NB00-0AB0 | 6ES7532-5HD00-0AB0 | 6ES7532-5HF00-0AB0 | 6ES7532-5ND00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AQ 2XU/I ST | S7-1500, AQ 4XU/I ST | S7-1500, AQ 8XU/I HS | S7-1500, AQ 4XU/I HF |
| **General information** | | | | |
| Product type designation | AQ 2xU/I ST | AQ 4xU/I ST | AQ 8xU/I HS | AQ 4xU/I HF |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Output range scalable | No | No | No | |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13.0.2 | V12 / V12 | V14 / - | V14 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | V2.3 / - |
| **Operating mode** | | | | |
| • Oversampling | No | No | Yes | No |
| • MSO | Yes | Yes | Yes | Yes |
| **CiR – Configuration in RUN** | | | | |
| Reparameterization possible in RUN | Yes | Yes | Yes | Yes |
| Calibration possible in RUN | Yes | Yes | Yes | Yes |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes |
| **Analog outputs** | | | | |
| Number of analog outputs | 2 | 4 | 8 | 4 |
| Cycle time (all channels), min. | 3.2 ms; independent of number of activated channels | 3.2 ms; independent of number of activated channels | 125 µs; independent of number of activated channels | 125 µs; independent of number of activated channels |
| **Output ranges, voltage** | | | | |
| • 0 to 10 V | Yes | Yes | Yes | Yes |
| • 1 V to 5 V | Yes | Yes | Yes | Yes |
| • -5 V to +5 V | No | No | No | No |
| • -10 V to +10 V | Yes | Yes | Yes | Yes |

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## Technical specifications (continued)

| Article number | 6ES7532-5NB00-0AB0 | 6ES7532-5HD00-0AB0 | 6ES7532-5HF00-0AB0 | 6ES7532-5ND00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AQ 2XU/I ST | S7-1500, AQ 4XU/I ST | S7-1500, AQ 8XU/I HS | S7-1500, AQ 4XU/I HF |
| **Output ranges, current** | | | | |
| • 0 to 20 mA | Yes | Yes | Yes | Yes |
| • -20 mA to +20 mA | Yes | Yes | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes | Yes |
| **Connection of actuators** | | | | |
| • for voltage output two-wire connection | Yes | Yes | Yes | Yes |
| • for voltage output four-wire connection | Yes | Yes | Yes | Yes |
| • for current output two-wire connection | Yes | Yes | Yes | Yes |
| **Load impedance (in rated range of output)** | | | | |
| • with voltage outputs, min. | 1 kΩ; 0.5 kOhm at 1 to 5 V | 1 kΩ; 0.5 kOhm at 1 to 5 V | 1 kΩ | 1 kΩ; 0.5 kOhm at 1 to 5 V |
| • with voltage outputs, capacitive load, max. | 1 µF | 1 µF | 100 nF | 1 µF |
| • with current outputs, max. | 750 Ω | 750 Ω | 500 Ω | 750 Ω |
| • with current outputs, inductive load, max. | 10 mH | 10 mH | 1 mH | 10 mH |
| **Cable length** | | | | |
| • shielded, max. | 800 m; for current, 200 m for voltage | 800 m; for current, 200 m for voltage | 200 m | 800 m; for current, 200 m for voltage |
| **Analog value generation for the outputs** | | | | |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 16 bit | 16 bit |
| • Conversion time (per channel) | 0.5 ms | 0.5 ms | 50 µs; independent of number of activated channels | 125 µs; independent of number of activated channels |
| **Settling time** | | | | |
| • for resistive load | 1.5 ms | 1.5 ms | 30 µs; see additional description in the manual | 0.2 ms; see additional description in the manual |
| • for capacitive load | 2.5 ms | 2.5 ms | 100 µs; see additional description in the manual | 1.8 ms; see additional description in the manual |
| • for inductive load | 2.5 ms | 2.5 ms | 100 µs; see additional description in the manual | 2 ms; see additional description in the manual |
| **Errors/accuracies** | | | | |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to output range, (+/-) | 0.2 % | 0.2 % | 0.2 % | 0.06 % |
| • Current, relative to output range, (+/-) | 0.2 % | 0.2 % | 0.2 % | 0.1 % |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | Yes | Yes |
| Execution and activation time (TCO), min. | | | 100 µs | 100 µs |
| Bus cycle time (TDP), min. | | | 250 µs | 250 µs |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes |
| Substitute values connectable | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 532 analog output modules

### Technical specifications (continued)

| Article number | 6ES7532-5NB00-0AB0 | 6ES7532-5HD00-0AB0 | 6ES7532-5HF00-0AB0 | 6ES7532-5ND00-0AB0 |
|---|---|---|---|---|
| | S7-1500, AQ 2XU/I ST | S7-1500, AQ 4XU/I ST | S7-1500, AQ 8XU/I HS | S7-1500, AQ 4XU/I HF |
| **Diagnostic messages** | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; Only for output type "current" | Yes; Only for output type "current" | Yes; Only for output type "current" | Yes; Only for output type "current" |
| • Short-circuit | Yes; Only for output type "voltage" | Yes; Only for output type "voltage" | Yes; Only for output type "voltage" | Yes; Only for output type "voltage" |
| • Overflow/underflow | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • for module diagnostics | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | | | |
| • horizontal installation, max. | 60 °C | | | |
| • vertical installation, min. | 0 °C | | | |
| • vertical installation, max. | 40 °C | | | |
| **Decentralized operation** | | | | |
| Prioritized startup | No | No | No | Yes |
| **Dimensions** | | | | |
| Width | 25 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 200 g | 310 g | 325 g | 300 g |
| **Other** | | | | |
| Note: | Supplied incl. 40-pole push-in front connectors | | | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 532 analog output modules** | | **Accessories** | |
| Module width 25 mm | | **Front connectors** | |
| 2 x U/I ST;<br>2 analog outputs, ±10 V, 1 ... 5 V,<br>0 ... 10 V or ±20 mA, 0/4 ... 20 mA,<br>16-bit;<br>incl. infeed element, shield bracket,<br>shield terminal, labeling strips,<br>U connector, printed front door | 6ES7532-5NB00-0AB0 | For 35 mm modules;<br>including four potential bridges,<br>cable ties and individual labeling<br>strips, 40-pin<br>• Screw terminals<br>• Push-in | 6ES7592-1AM00-0XB0<br>6ES7592-1BM00-0XB0 |
| Module width 35 mm | | For 25 mm modules;<br>including cable ties and individual<br>labeling strips; push-in terminal<br>40-pin;<br>spare part | 6ES7592-1BM00-0XA0 |
| 4 x U/I ST;<br>4 analog outputs, ±10 V, 1 ... 5 V,<br>0 ... 10 V or ±20 mA, 0/4 ... 20 mA,<br>16-bit;<br>incl. infeed element, shield bracket,<br>shield terminal, labeling strips,<br>U connector, printed front door | 6ES7532-5HD00-0AB0 | **DIN A4 labeling sheets** | |
| | | For 35 mm modules;<br>10 sheets with 10 labeling strips<br>each for I/O modules; perforated,<br>Al gray | 6ES7592-2AX00-0AA0 |
| 8 x U/I HF;<br>8 analog outputs, ±10 V, 1 ... 5 V,<br>0 ... 10 V or ±20 mA, 0/4 ... 20 mA,<br>16-bit;<br>incl. infeed element, shield bracket,<br>shield terminal, labeling strips,<br>U connector, printed front door | 6ES7532-5HF00-0AB0 | For 25 mm modules;<br>10 sheets with 20 labeling strips<br>each for I/O modules; perforated,<br>Al gray | 6ES7592-1AX00-0AA0 |
| | | **U connector** | 6ES7590-0AA00-0AA0 |
| 4 x U/I HF;<br>4 analog outputs, ±10 V, 1 ... 5 V,<br>0 ... 10 V or ±20 mA, 0/4 ... 20 mA,<br>16-bit;<br>incl. infeed element, shield bracket,<br>shield terminal, labeling strips,<br>U connector, printed front door | 6ES7532-5ND00-0AB0 | 5 units; spare part | |
| | | **Universal front door<br>for I/O modules** | |
| | | For 35 mm modules;<br>5 front doors; with 5 labeling strips<br>(front) and 5 cabling diagrams per<br>front door; spare part | 6ES7528-0AA00-7AA0 |
| | | For 25 mm modules;<br>5 front doors; with 5 labeling strips<br>(front) and 5 cabling diagrams per<br>front door; spare part | 6ES7528-0AA00-0AA0 |
| | | **Shielding set I/O** | |
| | | For 35 mm modules;<br>infeed element, shield bracket,<br>and shield terminal;<br>5 units, spare part (one shield set<br>supplied with the module). | 6ES7590-5CA00-0AA0 |
| | | For 25 mm modules;<br>infeed element, shield bracket,<br>and shield terminal;<br>4 units, spare part (one shield set<br>supplied with the module). | 6ES7590-5CA10-0XA0 |
| | | **Shield connection clamp** | 6ES7590-5BA00-0AA0 |
| | | 10 units; spare part | |
| | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| | | Electronic manuals on DVD,<br>multi-language:<br>LOGO!, SIMADYN, SIMATIC bus<br>components, SIMATIC C7,<br>SIMATIC distributed I/O,<br>SIMATIC HMI, SIMATIC Sensors,<br>SIMATIC NET, SIMATIC PC Based<br>Automation, SIMATIC PCS 7,<br>SIMATIC PG/PC, SIMATIC S7,<br>SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection<br>update service for 1 year** | 6ES7998-8XC01-8YE2 |
| | | Current "Manual Collection" DVD<br>and the three subsequent updates | |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

## SM 534 analog input/output modules

### ■ Overview



- 4 analog inuts/ 2 analog outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces

### ■ Technical specifications

| Article number | 6ES7534-7QE00-0AB0 |
|---|---|
| | S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST |
| **General information** | |
| Product type designation | AI 4xU/I/RTD/TC / AQ 2xU/I ST |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| • Measuring range scalable | No |
| • Scalable measured values | No |
| • Adjustment of measuring range | No |
| • Output range scalable | No |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13.0.2 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - |
| **Operating mode** | |
| • Oversampling | No |
| • MSI | Yes |
| • MSO | Yes |
| **CiR – Configuration in RUN** | |
| Reparameterization possible in RUN | Yes |
| Calibration possible in RUN | Yes |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |

| Article number | 6ES7534-7QE00-0AB0 |
|---|---|
| | S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST |
| **Analog inputs** | |
| Number of analog inputs | 4 |
| • For current measurement | 4 |
| • For voltage measurement | 4 |
| • For resistance/resistance thermometer measurement | 2 |
| • For thermocouple measurement | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 28.8 V |
| permissible input current for current input (destruction limit), max. | 40 mA |
| Technical unit for temperature measurement adjustable | Yes; °C/°F/K |
| Analog input with oversampling | No |
| Standardization of measured values | No |
| **Input ranges (rated values), voltages** | |
| • 0 to +5 V | No |
| • 0 to +10 V | No |
| • 1 V to 5 V | Yes |
| • -1 V to +1 V | Yes |
| • -10 V to +10 V | Yes |
| • -2.5 V to +2.5 V | Yes |
| • -25 mV to +25 mV | No |
| • -250 mV to +250 mV | Yes |
| • -5 V to +5 V | Yes |
| • -50 mV to +50 mV | Yes |
| • -500 mV to +500 mV | Yes |
| • -80 mV to +80 mV | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • -20 mA to +20 mA | Yes |
| • 4 mA to 20 mA | Yes |

■ **Technical specifications** (continued)

| Article number | 6ES7534-7QE00-0AB0 |
|---|---|
| | S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST |
| **Input ranges (rated values), thermocouples** | |
| • Type B | Yes |
| • Type C | No |
| • Type E | Yes |
| • Type J | Yes |
| • Type K | Yes |
| • Type L | No |
| • Type N | Yes |
| • Type R | Yes |
| • Type S | Yes |
| • Type T | Yes |
| • Type U | No |
| • Type TXK/TXK(L) to GOST | No |
| **Input ranges (rated values), resistance thermometer** | |
| • Cu 10 | No |
| • Cu 10 according to GOST | No |
| • Cu 50 | No |
| • Cu 50 according to GOST | No |
| • Cu 100 | No |
| • Cu 100 according to GOST | No |
| • Ni 10 | No |
| • Ni 10 according to GOST | No |
| • Ni 100 | Yes; Standard/climate |
| • Ni 100 according to GOST | No |
| • Ni 1000 | Yes; Standard/climate |
| • Ni 1000 according to GOST | No |
| • LG-Ni 1000 | Yes; Standard/climate |
| • Ni 120 | No |
| • Ni 120 according to GOST | No |
| • Ni 200 | No |
| • Ni 200 according to GOST | No |
| • Ni 500 | No |
| • Ni 500 according to GOST | No |
| • Pt 10 | No |
| • Pt 10 according to GOST | No |
| • Pt 50 | No |
| • Pt 50 according to GOST | No |
| • Pt 100 | Yes; Standard/climate |
| • Pt 100 according to GOST | No |
| • Pt 1000 | Yes; Standard/climate |
| • Pt 1000 according to GOST | No |
| • Pt 200 | Yes; Standard/climate |
| • Pt 200 according to GOST | No |
| • Pt 500 | Yes; Standard/climate |
| • Pt 500 according to GOST | No |
| **Input ranges (rated values), resistors** | |
| • 0 to 150 ohms | Yes |
| • 0 to 300 ohms | Yes |
| • 0 to 600 ohms | Yes |
| • 0 to 3000 ohms | No |
| • 0 to 6000 ohms | Yes |
| • PTC | Yes |

| Article number | 6ES7534-7QE00-0AB0 |
|---|---|
| | S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST |
| **Thermocouple (TC)** | |
| **Temperature compensation** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 800 m; for U/I, 200 m for R/RTD, 50 m for TC |
| **Analog outputs** | |
| Number of analog outputs | 2 |
| Cycle time (all channels), min. | 3.2 ms; ±0.5 ms, regardless of the number of activated channels |
| **Output ranges, voltage** | |
| • 0 to 10 V | Yes |
| • 1 V to 5 V | Yes |
| • -5 V to +5 V | No |
| • -10 V to +10 V | Yes |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • -20 mA to +20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for voltage output two-wire connection | Yes |
| • for voltage output four-wire connection | Yes |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with voltage outputs, min. | 1 kΩ; 0.5 kOhm at 1 to 5 V |
| • with voltage outputs, capacitive load, max. | 1 µF |
| • with current outputs, max. | 750 Ω |
| • with current outputs, inductive load, max. | 10 mH |
| **Cable length** | |
| • shielded, max. | 800 m; for current, 200 m for voltage |
| **Analog value generation for the inputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit |
| • Integration time, parameterizable | Yes |
| • Integration time (ms) | 2,5 / 16,67 / 20 / 100 ms |
| • Basic conversion time, including integration time (ms) | 9 / 23 / 27 / 107 ms |
| - additional conversion time for wire-break monitoring | 9 ms |
| - additional conversion time for resistance measurement | 150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 |
| **Smoothing of measured values** | |
| • parameterizable | Yes |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Analog modules

**SM 534 analog input/output modules**

## ■ Technical specifications (continued)

| Article number | 6ES7534-7QE00-0AB0 | | Article number | 6ES7534-7QE00-0AB0 |
|---|---|---|---|---|
| | S7-1500,<br>AI 4X U/I/RTD/TC/AQ 2X U/I ST | | | S7-1500,<br>AI 4X U/I/RTD/TC/AQ 2X U/I ST |
| **Analog value generation for the outputs** | | | **Interrupts/diagnostics/ status information** | |
| **Integration and conversion time/ resolution per channel** | | | Diagnostics function | Yes |
| • Resolution with overrange (bit including sign), max. | 16 bit | | Substitute values connectable | Yes |
| | | | **Alarms** | |
| • Conversion time (per channel) | 0.5 ms | | • Diagnostic alarm | Yes |
| **Settling time** | | | • Limit value alarm | Yes; two upper and two lower limit values in each case |
| • for resistive load | 1.5 ms | | | |
| • for capacitive load | 2.5 ms | | **Diagnostic messages** | |
| • for inductive load | 2.5 ms | | • Monitoring the supply voltage | Yes |
| **Encoder** | | | • Wire-break | Yes; only for input type 1 ... 5 V, 4 ... 20 mA, TC, R, RTD and output type current |
| **Connection of signal encoders** | | | | |
| • for voltage measurement | Yes | | | |
| • for current measurement as 2-wire transducer | Yes | | • Short-circuit | Yes; Only for output type "voltage" |
| - Burden of 2-wire transmitter, max. | 820 Ω | | • Overflow/underflow | Yes |
| • for current measurement as 4-wire transducer | Yes | | **Diagnostics indication LED** | |
| • for resistance measurement with two-wire connection | Yes; Only for PTC | | • RUN LED | Yes; Green LED |
| • for resistance measurement with three-wire connection | Yes; All measuring ranges except PTC; internal compensation of the cable resistances | | • ERROR LED | Yes; Red LED |
| | | | • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • for resistance measurement with four-wire connection | Yes; All measuring ranges except PTC | | • Channel status display | Yes; Green LED |
| | | | • for channel diagnostics | Yes; Red LED |
| **Errors/accuracies** | | | • for module diagnostics | Yes; Red LED |
| **Basic error limit (operational limit at 25 °C)** | | | **Potential separation** | |
| • Voltage, relative to input range, (+/-) | 0.1 % | | **Potential separation analog inputs** | |
| • Current, relative to input range, (+/-) | 0.1 % | | • between the channels and backplane bus | Yes |
| • Resistance, relative to input range, (+/-) | 0.1 % | | **Potential separation analog outputs** | |
| • Resistance thermometer, relative to input range, (+/-) | 0.1 %;<br>Ptxxx standard: ±0.7 K,<br>Ptxxx climate: ±0.2 K,<br>Nixxx standard: ±0.3 K,<br>Nixxx climate: ±0.15 K | | • between the channels and backplane bus | Yes |
| | | | **Isolation** | |
| | | | Isolation tested with | 707 V DC (type test) |
| • Thermocouple, relative to input range, (+/-) | 0.1 %;<br>Type B: > 600 °C ±1.7 K,<br>type E: > -200 °C ±0.7 K,<br>type J: > -210 °C ±0.8 K,<br>type K: > -200 °C ±1.2 K,<br>type N: > -200 °C ±1.2 K,<br>type R: > 0 °C ±1.9 K,<br>type S: > 0 °C ±1.9 K,<br>type T: > -200 °C ±0.8 K | | **Ambient conditions** | |
| | | | **Ambient temperature during operation** | |
| | | | • horizontal installation, min. | 0 °C |
| | | | • horizontal installation, max. | 60 °C |
| | | | • vertical installation, min. | 0 °C |
| | | | • vertical installation, max. | 40 °C |
| | | | **Decentralized operation** | |
| | | | Prioritized startup | No |
| • Voltage, relative to output range, (+/-) | 0.2 % | | **Dimensions** | |
| • Current, relative to output range, (+/-) | 0.2 % | | Width | 25 mm |
| | | | Height | 147 mm |
| | | | Depth | 129 mm |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | **Weights** | |
| | | | Weight, approx. | 250 g |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB | | **Other** | |
| | | | Note: | Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermoelement: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K |
| • Common mode voltage, max. | 10 V | | | |
| • Common mode interference, min. | 60 dB | | | |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | | | |

| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **SM 534 analog input/output module** | **6ES7534-7QE00-0AB0** | **Accessories** | |
| | | **Front connectors** | |
| Module width 25 mm | | For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part | **6ES7592-1BM00-0XA0** |
| 4 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/ 6000 Ohm, 16 bit; 2 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | | **DIN A4 labeling sheets** | |
| | | For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray | **6ES7592-1AX00-0AA0** |
| | | **U connector** | **6ES7590-0AA00-0AA0** |
| | | 5 units; spare part | |
| | | **Universal front door for I/O modules** | |
| | | For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | **6ES7528-0AA00-0AA0** |
| | | **Shielding set I/O** | |
| | | For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module). | **6ES7590-5CA10-0XA0** |
| | | **Shield terminal element** | **6ES7590-5BA00-0AA0** |
| | | 10 units; spare part | |
| | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS analog modules

**SIPLUS SM 531 analog input modules**

## ■ Overview

- 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | 6AG1531-7NF10-7AB0 | 6AG1531-7KF00-7AB0 |
|---|---|---|
| Based on | **6ES7531-7NF10-0AB0** | **6ES7531-7KF00-0AB0** |
| | SIPLUS S7-1500 AI 8XU/I HS | SIPLUS S7-1500 AI 8XU/I/RTD/TC ST |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C max. 4x ±20 mA or 4x ±10 V permissible | 70 °C; = Tmax; > +60 °C max. 2x ±20 mA or 4x ±10 V or 4x RTD permissible |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 40 °C; = Tmax | 50 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SM 531 analog input modules** | | **Accessories** | See SIMATIC S7-1500 SM 531 analog input modules, page 4/87 |
| (Extended temperature range and exposure to media) | | | |
| 8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | **6AG1531-7NF10-7AB0** | | |
| 8 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V , 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 Ohm, 16 bit | **6AG1531-7KF00-7AB0** | | |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS analog modules

## SIPLUS SM 532 analog output modules

### ◼ Overview



- 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ◼ Technical specifications

| Article number | 6AG1532-5HD00-7AB0 | 6AG1532-5HF00-7AB0 |
|---|---|---|
| Based on | 6ES7532-5HD00-0AB0 | 6ES7532-5HF00-0AB0 |
| | SIPLUS S7-1500 AQ 4XU/I ST | SIPLUS S7-1500 AQ 8XU/I HS |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | -25 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C max. 4x ±10 V permissible | 70 °C; = Tmax; > +60 °C max. 4x ±10 V permissible |
| • vertical installation, min. | -25 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 40 °C; = Tmax | 40 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SM 532 analog output modules** (Extended temperature range and exposure to media) | | **Accessories** | See SIMATIC S7-1500 SM 532 analog output modules, page 4/91 |
| 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit | **6AG1532-5HD00-7AB0** | | |
| 8 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door | **6AG1532-5HF00-7AB0** | | |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## TM Count 2x24V counter module

### ▪ Overview



- 2-channel high-speed counter module
- With comprehensive parameterization options for an optimum adaptation to the task and reduction of control load
- Speed and time period measuring
- Storage and comparison functions
- Connection of 24 V encoders

### ▪ Technical specifications

| Article number | **6ES7550-1AA00-0AB0** |
|---|---|
| | S7-1500, TM COUNT 2X24V |
| **General information** | |
| Product type designation | TM Count 2x24V |
| **Product function** | |
| • I&M data | Yes; I&M 0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 / V12 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - |
| **Installation type/mounting** | |
| Rail mounting | Yes; S7-1500 mounting rail |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, max. | 75 mA; without load |
| **Encoder supply** | |
| Number of outputs | 1; A common 24V encoder supply for both channels |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 1 A; total current of all encoders/ channels |
| **Power** | |
| Power available from the backplane bus | 1.3 W |
| **Power loss** | |
| Power loss, typ. | 4 W |

| Article number | **6ES7550-1AA00-0AB0** |
|---|---|
| | S7-1500, TM COUNT 2X24V |
| **Digital inputs** | |
| Number of digital inputs | 6; 3 per channel |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Gate start/stop | Yes |
| • Capture | Yes |
| • Synchronization | Yes |
| • Freely usable digital input | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| - at "0" to "1", min. | 6 µs; for parameterization "none" |
| - at "1" to "0", min. | 6 µs; for parameterization "none" |
| **for counter/technological functions** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

■ **Technical specifications** (continued)

| Article number | 6ES7550-1AA00-0AB0 |
|---|---|
| | S7-1500, TM COUNT 2X24V |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 4; 2 per channel |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | L+ (-33 V) |
| Controlling a digital input | Yes |
| **Digital output functions, parameterizable** | |
| • Switching tripped by comparison values | Yes |
| • Freely usable digital output | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A; Per digital output |
| • on lamp load, max. | 5 W |
| **Load resistance range** | |
| • lower limit | 48 Ω |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A; Per digital output |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 50 µs |
| • "1" to "0", max. | 50 µs |
| **Switching frequency** | |
| • with resistive load, max. | 10 kHz |
| • with inductive load, max. | 0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per module, max. | 2 A |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |
| **Encoder** | |
| **Connectable encoders** | |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Input voltage | 24 V |
| • Input frequency, max. | 200 kHz |
| • Counting frequency, max. | 800 kHz; with quadruple evaluation |
| • Cable length, shielded, max. | 600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz |
| • Signal filter, parameterizable | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset and zero track | Yes |
| • Pulse encoder | Yes |
| • Pulse encoder with direction | Yes |
| • Pulse encoder with one impulse signal per count direction | Yes |

| Article number | 6ES7550-1AA00-0AB0 |
|---|---|
| | S7-1500, TM COUNT 2X24V |
| **Encoder signal 24 V** | |
| - permissible voltage at input, min. | -30 V |
| - permissible voltage at input, max. | 30 V |
| **Interface types** | |
| • Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| • Source/sink input | Yes |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Filtering and processing time (TCI), min. | 130 µs |
| Bus cycle time (TDP), min. | 250 µs |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| • A/B transition error at incremental encoder | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • Status indicator backward counting (green) | Yes |
| • Status indicator forward counting (green) | Yes |
| **Integrated Functions** | |
| Number of counters | 2 |
| Counting frequency (counter) max. | 800 kHz; with quadruple evaluation |
| **Counting functions** | |
| • Continuous counting | Yes |
| • Counter response parameterizable | Yes |
| • Hardware gate via digital input | Yes |
| • Software gate | Yes |
| • Event-controlled stop | Yes |
| • Synchronization via digital input | Yes |
| • Counting range, parameterizable | Yes |
| **Comparator** | |
| - Number of comparators | 2; Per channel |
| - Direction dependency | Yes |
| - Can be changed from user program | Yes |
| **Position detection** | |
| • Incremental acquisition | Yes |
| • Suitable for S7-1500 Motion Control | Yes |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Technology modules

**TM Count 2x24V counter module**

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| ■ Technical specifications (continued) | |
|---|---|
| Article number | **6ES7550-1AA00-0AB0** |
| | S7-1500, TM COUNT 2X24V |
| **Measuring functions** | |
| • Measuring time, parameterizable | Yes |
| • Dynamic measurement period adjustment | Yes |
| • Number of thresholds, parameterizable | 2 |
| **Measuring range** | |
| - Frequency measurement, min. | 0.04 Hz |
| - Frequency measurement, max. | 800 kHz |
| - Cycle duration measurement, min. | 1.25 µs |
| - Cycle duration measurement, max. | 25 s |
| **Accuracy** | |
| - Frequency measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Cycle duration measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Velocity measurement | 100 ppm; depending on measuring interval and signal evaluation |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Please note derating for inductive loads |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C; Please note derating for inductive loads |
| **Decentralized operation** | |
| to SIMATIC S7-1500 | Yes |
| to standard PROFINET controller | Yes |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 250 g |

| ■ Ordering data | Article No. |
|---|---|
| **TM Count 2x24V counter module** | **6ES7550-1AA00-0AB0** |
| With 2 channels, max. 200 kHz; for 24 V encoder | |
| **Accessories** | |
| **Front connectors** | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | **6ES7592-1AM00-0XB0** |
| • Push-in | **6ES7592-1BM00-0XB0** |
| **DIN A4 labeling sheets** | **6ES7592-2AX00-0AA0** |
| 10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey | |
| **U connector** | **6ES7590-0AA00-0AA0** |
| 5 units; spare part | |
| **Universal front door for I/O modules** | **6ES7528-0AA00-7AA0** |
| 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | |
| **Shielding set I/O** | **6ES7590-5CA00-0AA0** |
| Infeed element, shield bracket, and shield terminal; 5 units, spare part | |
| **Shield terminal element** | **6ES7590-5BA00-0AA0** |
| 10 units; spare part | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

## Overview



- 2-channel counting and position detection module with RS 422 interface
- Extensive parameterization options for optimum task-specific adaptation
- Reduces load on controller due to preprocessing on the module
- Position detection with incremental and SSI absolute encoders
- Speed and time period measuring
- Storage and comparison functions
- Connection of encoders with RS 422 signals or 5V-TTL signals

## Technical specifications

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **General information** | |
| Product type designation | TM PosInput 2 |
| **Product function** | |
| • I&M data | Yes; I&M 0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 SP1 / V12 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - |
| **Installation type/mounting** | |
| Rail mounting | Yes; S7-1500 mounting rail |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, max. | 75 mA; without load |
| **Encoder supply** | |
| Number of outputs | 4; One 5V and 24V encoder supply per channel |
| **5 V encoder supply** | |
| • 5 V | Yes; 5.2 V +/-2% |
| • short-circuit protection | Yes |
| • Output current, max. | 300 mA; Per channel |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 300 mA; Per channel |
| **Power** | |
| Power available from the backplane bus | 1.3 W |
| **Power loss** | |
| Power loss, typ. | 5.5 W |

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **Digital inputs** | |
| Number of digital inputs | 4; 2 per channel |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Gate start/stop | Yes; only for pulse and incremental encoders |
| • Capture | Yes |
| • Synchronization | Yes; only for pulse and incremental encoders |
| • Freely usable digital input | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| - at "0" to "1", min. | 6 µs; for parameterization "none" |
| - at "1" to "0", min. | 6 µs; for parameterization "none" |
| **for counter/technological functions** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## TM PosInput 2 counting and position detection module

### Technical specifications (continued)

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 4; 2 per channel |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | L+ (-33 V) |
| Controlling a digital input | Yes |
| **Digital output functions, parameterizable** | |
| • Switching tripped by comparison values | Yes |
| • Freely usable digital output | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A; Per digital output |
| • on lamp load, max. | 5 W |
| **Load resistance range** | |
| • lower limit | 48 Ω |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A; Per digital output |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 50 µs |
| • "1" to "0", max. | 50 µs |
| **Switching frequency** | |
| • with resistive load, max. | 10 kHz |
| • with inductive load, max. | 0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per module, max. | 2 A |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |
| **Encoder signals, incremental encoder (symmetrical)** | |
| • Input voltage | RS 422 |
| • Input frequency, max. | 1 MHz |
| • Counting frequency, max. | 4 MHz; with quadruple evaluation |
| • Cable length, shielded, max. | 32 m; at 1 MHz |
| • Signal filter, parameterizable | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset and zero track | Yes |
| • Pulse encoder | Yes |
| • Pulse encoder with direction | Yes |
| • Pulse encoder with one impulse signal per count direction | Yes |

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Input voltage | 5 V TTL (push-pull encoders only) |
| • Input frequency, max. | 1 MHz |
| • Counting frequency, max. | 4 MHz; with quadruple evaluation |
| • Signal filter, parameterizable | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset and zero track | Yes |
| • Pulse encoder | Yes |
| • Pulse encoder with direction | Yes |
| • Pulse encoder with one impulse signal per count direction | Yes |
| **Encoder signals, absolute encoder (SSI)** | |
| • Input signal | to RS-422 |
| • Telegram length, parameterizable | 10 ... 40 bit |
| • Clock frequency, max. | 2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz |
| • Binary code | Yes |
| • Gray code | Yes |
| • Cable length, shielded, max. | 320 m; Cable length, RS-422 SSI absolute encoders, Siemens type 6FX2001-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max. 1.5 MHz, 10 meters shielded, max.; 2 MHz, 8 meters shielded, max. |
| • Parity bit, parameterizable | Yes |
| • Monoflop time | 16, 32, 48, 64 µs & automatic |
| • Multiturn | Yes |
| • Singleturn | Yes |
| **Interface types** | |
| • RS 422 | Yes |
| • TTL 5 V | Yes; push-pull encoders only |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Filtering and processing time (TCI), min. | 130 µs; only for pulse and incremental encoders |
| Bus cycle time (TDP), min. | 250 µs |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| • A/B transition error at incremental encoder | Yes |
| • Telegram error at SSI encoder | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |

## Technical specifications (continued)

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **Integrated Functions** | |
| Number of counters | 2 |
| Counting frequency (counter) max. | 4 MHz; with quadruple evaluation |
| **Counting functions** | |
| • Can be used with TO High_Speed_Counter | Yes; only for pulse and incremental encoders |
| • Continuous counting | Yes |
| • Counter response parameterizable | Yes |
| • Hardware gate via digital input | Yes |
| • Software gate | Yes |
| • Event-controlled stop | Yes |
| • Synchronization via digital input | Yes |
| • Counting range, parameterizable | Yes |
| **Comparator** | |
| - Number of comparators | 2; Per channel |
| - Direction dependency | Yes |
| - Can be changed from user program | Yes |
| **Position detection** | |
| • Incremental acquisition | Yes |
| • Absolute acquisition | Yes |
| • Suitable for S7-1500 Motion Control | Yes |
| **Measuring functions** | |
| • Measuring time, parameterizable | Yes |
| • Dynamic measurement period adjustment | Yes |
| • Number of thresholds, parameterizable | 2 |
| **Measuring range** | |
| - Frequency measurement, min. | 0.04 Hz |
| - Frequency measurement, max. | 4 MHz |
| - Cycle duration measurement, min. | 0.25 µs |
| - Cycle duration measurement, max. | 25 s |

| Article number | 6ES7551-1AB00-0AB0 |
|---|---|
| | S7-1500, TM POSINPUT 2 |
| **Accuracy** | |
| - Frequency measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Cycle duration measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Velocity measurement | 100 ppm; depending on measuring interval and signal evaluation |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Please note derating for inductive loads |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C; Please note derating for inductive loads |
| **Decentralized operation** | |
| to SIMATIC S7-1500 | Yes |
| to standard PROFINET controller | Yes |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 325 g |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TM PosInput 2 counting and position detecting module** | **6ES7551-1AB00-0AB0** | **Universal front door for I/O modules** | **6ES7528-0AA00-7AA0** |
| With 2 channels, max. 1 MHz counting frequency; for SSI encoders and incremental encoders with RS 422 or 5V TTL interface | | 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | |
| **Accessories** | | **Shielding set I/O** | **6ES7590-5CA00-0AA0** |
| **Front connectors** | | Infeed element, shield bracket, and shield terminal; 5 units, spare part | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | | **Shield terminal element** | **6ES7590-5BA00-0AA0** |
| • Screw terminals | **6ES7592-1AM00-0XB0** | 10 units; spare part | |
| • Push-in | **6ES7592-1BM00-0XB0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| **DIN A4 labeling sheets** | **6ES7592-2AX00-0AA0** | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| 10 sheets with 10 labeling strips each for I/O modules; perforated, AI grey | | | |
| **U connector** | **6ES7590-0AA00-0AA0** | | |
| 5 units; spare part | | | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## Time-based IO module TM Timer DIDQ 16x24V

### ◼ Overview
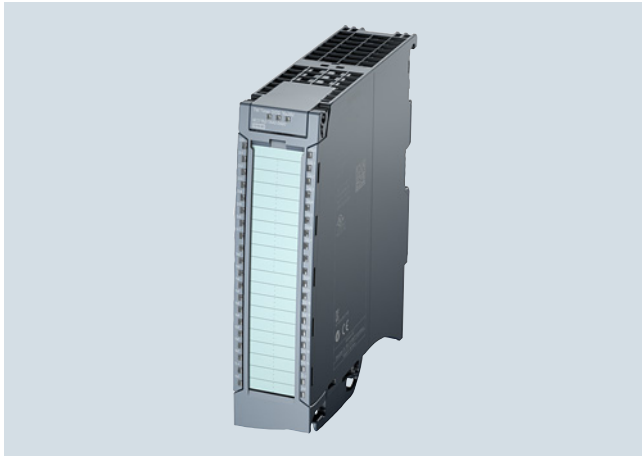


- 8 digital inputs, 16 digital outputs,
  of which up to 16 can be used in different configurations
  as technological, time-controlled channels
- Inputs for detecting the input edges with µs accuracy
- Outputs for outputting switching signals with µs accuracy
- 32x oversampling
- PWM output
- Counter function
- Outputs can be switched between 0.5 A standard and
  especially fast 0.1 A high-speed operation

### ◼ Technical specifications

| Article number | 6ES7552-1AA00-0AB0 |
|---|---|
| | S7-1500, TM TIMER DIDQ 16X24V |
| **General information** | |
| Product type designation | TM Timer DIDQ 16x24V |
| **Product function** | |
| • I&M data | Yes; I&M 0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 Update 3 |
| **Installation type/mounting** | |
| Rail mounting | Yes; S7-1500 mounting rail |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| from load voltage 1L+ (without load), max. | 40 mA; without load |
| from load voltage 2L+ (without load), max. | 30 mA; without load |
| **Encoder supply** | |
| Number of outputs | 8; max. depending on parameterization |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 1.2 A; Total current of all encoders / channels, max. 0.5 A per output |

| Article number | 6ES7552-1AA00-0AB0 |
|---|---|
| | S7-1500, TM TIMER DIDQ 16X24V |
| **Power** | |
| Power available from the backplane bus | 1.3 W |
| **Power loss** | |
| Power loss, typ. | 5 W |
| **Digital inputs** | |
| Number of digital inputs | 8; max. depending on parameterization |
| • in groups of | 8 |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Digital input with time stamp | Yes |
| - Number, max. | 8 |
| • Counter | Yes |
| - Number, max. | 4 |
| • Counter for incremental encoder | Yes |
| - Number, max. | 4 |
| • Digital input with oversampling | Yes |
| - Number, max. | 8 |
| • HW enable for digital input | Yes |
| - Number, max. | 4 |
| • HW enable for digital output | Yes |
| - Number, max. | 4 |

■ **Technical specifications** (continued)

| Article number | 6ES7552-1AA00-0AB0 |
|---|---|
| | S7-1500, TM TIMER DIDQ 16X24V |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| • Minimum pulse width for program reactions | 3 µs for parameterization "none" |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms |
| - at "0" to "1", min. | 4 µs; for parameterization "none" |
| - at "1" to "0", min. | 4 µs; for parameterization "none" |
| **Cable length** | |
| • shielded, max. | 1 000 m; Depending on sensor, cable quality and rate of change |
| • unshielded, max. | 600 m; Depending on sensor, cable quality and rate of change |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 16; max. depending on parameterization |
| • in groups of | 8 |
| Current-sinking | Yes; With High Speed output |
| Current-sourcing | Yes |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | -0.8 V |
| Controlling a digital input | Yes |
| **Digital output functions, parameterizable** | |
| • Digital output with time stamp | Yes |
| - Number, max. | 16 |
| • PWM output | Yes |
| - Number, max. | 16 |
| • Digital output with oversampling | Yes |
| - Number, max. | 16 |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A; 0.1 A with High Speed output |
| • on lamp load, max. | 5 W; 1 W with High Speed output |
| **Load resistance range** | |
| • lower limit | 48 Ω; 240 ohm with High Speed output |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "0", max. | 1 V; With High Speed output |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |

| Article number | 6ES7552-1AA00-0AB0 |
|---|---|
| | S7-1500, TM TIMER DIDQ 16X24V |
| **Output current** | |
| • for signal "1" rated value | 0.5 A; 0.1 A with High Speed output, observe derating |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 1 µs; With High Speed output, 5 µs with Standard output |
| • "1" to "0", max. | 1 µs; With High Speed output, 6 µs with Standard output |
| **Switching frequency** | |
| • with resistive load, max. | 10 kHz |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per group, max. | 4 A |
| • Current per module, max. | 8 A; Observe derating |
| **Cable length** | |
| • shielded, max. | 1 000 m; Depending on load and cable quality |
| • unshielded, max. | 600 m; Depending on load and cable quality |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (asymmetrical) | Yes |
| • 24 V initiator | Yes |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Input voltage | 24 V |
| • Input frequency, max. | 50 kHz |
| • Counting frequency, max. | 200 kHz; with quadruple evaluation |
| • Cable length, shielded, max. | 600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes |
| • Pulse encoder | Yes |
| **Encoder signal 24 V** | |
| - permissible voltage at input, min. | -30 V |
| - permissible voltage at input, max. | 30 V |
| **Interface types** | |
| • Input characteristic curve in accordance with IEC 61131, type 3 | Yes |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## Time-based IO module TM Timer DIDQ 16x24V

### Technical specifications (continued)

| Article number | 6ES7552-1AA00-0AB0 |
|---|---|
| | S7-1500, TM TIMER DIDQ 16X24V |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Bus cycle time (TDP), min. | 250 μs |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| **Integrated Functions** | |
| Number of counters | 4 |
| Counting frequency (counter) max. | 200 kHz; with quadruple evaluation |
| **Counting functions** | |
| • Continuous counting | Yes |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C; Observe derating |
| **Decentralized operation** | |
| to SIMATIC S7-1500 | Yes |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 320 g |

### Ordering data

| | Article No. |
|---|---|
| **Time-based IO module TM Timer DIDQ 16x24V** | **6ES7552-1AA00-0AB0** |
| Max. 16 time-controlled inputs or outputs | |
| **Accessories** | |
| **Front connector** | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | 6ES7592-1AM00-0XB0 |
| • Push-in | 6ES7592-1BM00-0XB0 |
| **DIN A4 labeling sheets** | **6ES7592-2AX00-0AA0** |
| 10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey | |
| **U connector** | **6ES7590-0AA00-0AA0** |
| 5 units; spare part | |
| **Universal front door for I/O modules** | **6ES7528-0AA00-7AA0** |
| 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | |
| **Shielding set I/O** | **6ES7590-5CA00-0AA0** |
| Infeed element, shield bracket, and shield terminal; 5 units, spare part: Note: Only shield bracket and shield terminal are required for the TM Timer DIDQ 16x24V | |
| **Shield terminal element** | **6ES7590-5BA00-0AA0** |
| 10 units; spare part | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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## Overview

- 4-channel interface module for PTO (Pulse Train Output)
- 3 signal interfaces can be configured for speed and direction:
  - 24 V asymmetrical up to 200 kHz
  - RS 422, 5 V symmetrical up to 1 MHz
  - TTL 5 V asymmetrical up to 200 kHz

- 3 signal types can be configured:
  - Pulse and direction
  - Pulses for forward movement and pulses for backwards movement
  - 2 phase-shifted signals, with simple or quadruple evaluation
- Supported technology objects:
  - Speed controlled axis (S7-1500, S7-1500T)
  - Positioning axis (S7-1200, S7-1500, S7-1500T)
  - Synchronous axis (S7-1500, S7-1500T)
  - Probe (S7-1500, S7-1500T)

## Technical specifications

| Article number | **6ES7553-1AA00-0AB0** |
|---|---|
| | S7-1500, TM PTO4 |
| **General information** | |
| Product type designation | TM PTO 4 |
| HW functional status | FS01 |
| Number of channels | 4; Axes |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| • Isochronous mode | Yes |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V14 or higher |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 with GSD file / - |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.32 |
| **Installation type/mounting** | |
| Rail mounting | Yes; S7-1500 mounting rail |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • permissible range, lower limit (DC) | 19.2 V |
| • permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, max. | 70 mA; without load |
| **Power** | |
| Power available from the backplane bus | 1.3 W |
| **Power loss** | |
| Power loss, typ. | 4 W |

| Article number | **6ES7553-1AA00-0AB0** |
|---|---|
| | S7-1500, TM PTO4 |
| **Address area** | |
| **Occupied address area** | |
| • Inputs | 18 byte; Per channel |
| • Outputs | 10 byte; Per channel |
| **Digital inputs** | |
| Number of digital inputs | 12; 3 per channel, of which 1 DIQ |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Synchronization | Yes |
| • Probe | Yes |
| • Drive ready | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -5 ... +5 V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -5 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| - at "0" to "1", min. | 4 µs; for parameterization "none" |
| - at "1" to "0", min. | 4 µs; for parameterization "none" |
| **for counter/technological functions** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Technology modules

**Interface module for PTO (Pulse Train Output) TM PTO 4**

### Technical specifications (continued)

| Article number | 6ES7553-1AA00-0AB0 |
|---|---|
| | S7-1500, TM PTO4 |
| **Digital outputs** | |
| Number of digital outputs | 12; 3 per channel, of which 1 DIQ |
| Current-sinking | Yes; For DQn.0 and DQn.1 push-pull outputs |
| Current-sourcing | Yes |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| • Response threshold, typ. | 0.2 A for DQn.0 and DQn.1, 0.9 A for DIQn.2 |
| Controlling a digital input | Yes |
| **Digital output functions, parameterizable** | |
| • PTO (pulse train output) signal interface | |
|   - 24 V asymmetrical | Yes |
|   - RS 422 symmetrical | No |
|   - TTL (5 V) asymmetrical | No |
| • PTO (pulse train output) signal type | |
|   - Pulse and direction | Yes |
|   - Count up, count down | Yes |
|   - Incremental encoder (A, B phase shift) | Yes |
|   - Incremental encoder (A, B phase shift, quadruple) | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.1 A; 0.5 A for DIQn.2 |
| • on lamp load, max. | 1 W; 5 W for DIQn.2 |
| **Load resistance range** | |
| • lower limit | 240 Ω; 48 ohms for DIQn.2 |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V), L+ (-1.3 V) for DIQn.2 |
| **Output current** | |
| • for signal "1" rated value | 0.1 A; 0.5 A for DIQn.2 |
| • for signal "1" permissible range, max. | 0.12 A; 0.6 A for DIQn.2 |
| • for signal "1" minimum load current | 2 mA |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", typ. | 1 µs; 28 µs for DIQn.2 |
| • "1" to "0", typ. | 1 µs; 25 µs for DIQn.2 |
| **Switching frequency** | |
| • with resistive load, max. | 1 kHz; For DIQn.2 |
| • with inductive load, max. | 0.5 Hz; According to IEC 60947-5-1, DC-13, for DIQn.2 |
| • on lamp load, max. | 10 Hz; For DIQn.2 |
| • For signal interface 24 V asymmetrical | 200 kHz; With DQn.0 and DQn.1 |
| **Cable length** | |
| • shielded, max. | 600 m; Up to 10 kHz, 50 m at 200 kHz |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Bus cycle time (TDP), min. | 250 µs; 375 µs if all 4 channels are used |
| Jitter, max. | 1 µs |

| Article number | 6ES7553-1AA00-0AB0 |
|---|---|
| | S7-1500, TM PTO4 |
| **Interrupts/diagnostics/ status information** | |
|  Diagnostics function | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Short-circuit | Yes; Thermal overload protection |
| • Group error | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Observe derating |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C; Observe derating |
| **Decentralized operation** | |
| to SIMATIC S7-300 | Yes; Via control and feedback interface |
| to SIMATIC S7-400 | Yes; Via control and feedback interface |
| to SIMATIC S7-1200 | Yes |
| to SIMATIC S7-1500 | Yes |
| to standard PROFINET controller | Yes; Via control and feedback interface |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 300 g |

## ▮ Ordering data

| | Article No. |
|---|---|
| **Interface module for TM PTO 4 stepper drives** | **6ES7553-1AA00-0AB0** |
| 4 Pulse Train Output PTO channels; PTO: 24 V or RS 422; 2 DQ PTO, 2 DI 24 V, 1 DIQ 24 V per channel | |
| **Accessories** | |
| **Front connectors** | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | **6ES7592-1AM00-0XB0** |
| • Push-in | **6ES7592-1BM00-0XB0** |
| **DIN A4 labeling sheets** | **6ES7592-2AX00-0AA0** |
| 10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey | |
| **U connector** | **6ES7590-0AA00-0AA0** |
| 5 units; spare part | |
| **Universal front door for I/O modules** | **6ES7528-0AA00-7AA0** |
| 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | |

| | Article No. |
|---|---|
| **Shielding set I/O** | **6ES7590-5CA00-0AA0** |
| Infeed element, shield bracket, and shield terminal; 5 units, spare part | |
| **Shield terminal element** | **6ES7590-5BA00-0AA0** |
| 10 units; spare part | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| SIMATIC Manual Collection on DVD in 5 languages, all manuals for S7-1200/1500/200/300/400,LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering SW, Runtime SW, PCS7, SIMATIC HMI, SIMATIC NET, SIMATIC IDENT | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current Manual Collection DVD and the three subsequent updates | |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## SIWAREX WP521 ST, SIWAREX WP522 ST

### ■ Overview



SIWAREX WP521 ST



SIWAREX WP522 ST

SIWAREX WP521 ST / WP522 ST (ST = Standard) are versatile weighing modules for the SIMATIC S7-1500 Advanced Controller family. With these electronic weighing systems, simple weighing applications, such as platform or hopper scales, can be seamlessly integrated into the S7-1500 automation environment.

### ■ Technical specifications

| SIWAREX WP521 ST, WP522 ST | |
|---|---|
| Weighing modes | • Non-automatic scales, e.g. platform and hopper scales |
| Ports | • 1 x SIMATIC S7-1500 system bus<br>• 1 x Ethernet (SIWATOOL, Modbus TCP/IP)<br>• 1 x RS485 (Modbus RTU or remote display) per channel<br>• 3 x digital outputs (24 V DC) per channel<br>• 4 x digital outputs (24 V DC short-circuit proof) per channel |
| Functions | • 3 limits<br>• Zeroing<br>• Tare<br>• Tare specification<br>• Zero adjustment<br>• Trace function for signal analysis<br>• Internal restore point<br>• SIMATIC S7-1500 integrated and/or stand-alone operation |
| Parameter assignment | • By means of function block in SIMATIC S7-1500 and HMI<br>• Using SIWATOOL V7<br>• Using Modbus TCP/IP<br>• Using Modbus RTU |

| SIWAREX WP521 ST, WP522 ST | |
|---|---|
| **Remote display (see accessories)** | |
| Connection | via RS 485 |
| Display | Additional display for weight value |
| **Measuring accuracy** | |
| Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution | Up to ±4 million parts |
| **Number of measurements/second** | 100 or 120 (selectable) |
| **Filter** | • Low-pass filter 0.05 ... 50 Hz<br>• Average value filter |
| **Weighing functions** | |
| Zeroing | Per command |
| Tare | Per command |
| Tare specification | Per command |

## ■ Technical specifications (continued)

| SIWAREX WP521 ST, WP522 ST | |
| --- | --- |
| Compatible sensors | Analog load cells / full-bridge strain gauges (1-4 mV/V) in 4-wire or 6-wire system |
| Load cell powering | |
| Supply voltage (regulated via feedback) | 4.85 V DC |
| Permissible load resistance | |
| • $R_{Lmin}$ | > 40 Ω |
| • $R_{Lmax}$ | < 4 100 Ω |
| With SIWAREX IS Ex interface | |
| • $R_{Lmin}$ | > 50 Ω |
| • $R_{Lmax}$ | < 4 100 Ω |
| Load cell characteristic | 1 … 4 mV/V |
| Permissible range of the measurement signal (with 4 mV/V sensors) | -21.3 ... +21.3 mV |
| Max. distance of load cells | 800 m (2 624 ft) |
| Connection to load cells in Ex zone 1 | Optionally via SIWAREX IS Ex interface |

| SIWAREX WP521 ST, WP522 ST | |
| --- | --- |
| Certificates | • ATEX Zone 2<br>• UL<br>• KCC<br>• EAC<br>• RCM<br>• FM- IECEx |
| Auxiliary power supply | |
| Rated voltage | 24 V DC |
| Max. power consumption WP521 ST / WP522 ST | 120 mA / 200 mA |
| Max. power consumption SIMATIC Bus | 35 mA @ 15 V |
| IP degree of protection according to DIN EN 60529; IEC 60529 | IP20 |
| Climatic requirements $T_{min(IND)} ... T_{max(IND)}$ (operating temperature) | |
| • Horizontal installation | -10 ... +60 °C (14 ... 140 °F) |
| • Vertical installation | -10 ... +40 °C (14 ... 104 °F) |
| EMC requirements | according to IEC 61000-6-2:2004; IEC 61000-6-4:2007+A1:2011 |
| Dimensions (W x H x D) | 35 x 147 x 129 mm (1.38 x 5.79 x 5.08 in) |

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## ■ Ordering data

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **Weighing module TM SIWAREX WP521 ST**<br><br>Single-channel, for platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set. | 7MH4980-1AA01 | **Configuration package SIWAREX WP521 ST / WP522 ST on CD-ROM**<br>• "Ready for use" software for operating a scale with SIWAREX WP52x ST and a touch panel (in a variety of languages), including function block and HMI visualization<br>• Service software SIWATOOL V7.0<br>• Device manuals (PDF files in a variety of languages) | 7MH4980-1AK01 |
| **Weighing module TM SIWAREX WP522 ST**<br><br>Double channel, for two separate platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), per channel 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set. | 7MH4980-2AA01 | **Ethernet cable patch cord 2 m (7 ft)**<br><br>For connecting SIWAREX WP52x ST to a PC (SIWATOOL V7 or Modbus TCP/IP) | 6XV1850-2GH20 |
| **SIMATIC S7-1500, front connector with screw-type terminals**<br><br>40-pole, for 35 mm wide modules, including 4 jumper links and cable ties | 6ES7592-1AM00-0XB0 | | |
| **SIMATIC S7-1500, front connector with push-in technology**<br><br>40-pole, for 35 mm wide modules, including 4 jumper links and cable ties | 6ES7592-1BM00-0XB0 | | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Technology modules

## SIWAREX WP521 ST, SIWAREX WP522 ST

### Ordering data

| | Article No. |
|---|---|
| **Remote display (optional)** | |
| The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. | |
| Suitable remote display: | |
| S102 | |
| Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de | |
| Detailed information is available from the manufacturer. | |
| **Accessories** | |
| **SIWAREX JB junction box, aluminum housing** | 7MH4710-1BA |
| For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes. | |
| **SIWAREX JB junction box, stainless steel housing** | 7MH4710-1EA |
| For connecting up to 4 load cells in parallel. | |
| **SIWAREX JB junction box, stainless steel housing (ATEX)** | 7MH4710-1EA01 |
| For connecting up to 4 load cells in parallel. (For zone allocation, see manual or type examination certificate) | |

| | Article No. |
|---|---|
| **Ex interface SIWAREX IS** | |
| For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. | |
| • Short-circuit current < 199 mA DC | 7MH4710-5BA |
| • Short-circuit current < 137 mA DC | 7MH4710-5CA |
| **Load cell cable (optional)** | |
| **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY** | |
| For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two extension boxes. For permanent installation. Occasional bending is possible. | |
| External diameter: approx. 10.8 mm (0.43 in) | |
| Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). | |
| Sold by the meter. | |
| • Sheath color: orange | 7MH4702-8AG |
| • For potentially explosive atmospheres. Sheath color: blue | 7MH4702-8AF |

## Overview

- 2-channel high-speed counter module
- With comprehensive parameterization options for an optimum adaptation to the task and reduction of control load
- Speed and time period measuring
- Storage and comparison functions
- Connection of 24 V encoders

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1550-1AA00-7AB0** |
| Based on | **6ES7550-1AA00-0AB0** |
| | SIPLUS S7-1500 TM COUNT 2X24V |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; note derating for inductive loads; > +60 °C total current of the encoder supply max. 0.5 A, total current of the outputs max. 1 A |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 40 °C; Please note derating for inductive loads |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS TM Count 2x24V counter module** | **6AG1550-1AA00-7AB0** |
| (Extended temperature range and exposure to media) | |
| With 2 channels, max. 200 kHz; for 24 V encoder | |
| **Accessories** | See SIMATIC S7-1500, TM Count 2x24V counter module, page 4/102 |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Communication

## CM PtP

### ■ Overview

- Modules for serial communication connections, scaled according to interface types, protocols, and performance
- 4 versions with different physical transmission characteristics:
  - RS 232C, max. 19.2 kbps
  - RS 232C, max.115.2 kbps
  - RS 422/RS 485, max. 19.2 kbps
  - RS 422/RS 485, max. 115.2 kbps
- Protocols supported
  - Freeport: User-parameterizable telegram format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions

### ■ Technical specifications

| Article number | 6ES7540-1AD00-0AA0 | 6ES7541-1AD00-0AB0 | 6ES7540-1AB00-0AA0 | 6ES7541-1AB00-0AB0 |
|---|---|---|---|---|
| | S7-1500, CM PTP RS 232 BA | S7-1500, CM PTP RS 232 HF | S7-1500, CM PTP RS 422/485 BA | S7-1500, CM PTP RS 422/485 HF |
| **General information** | | | | |
| Product type designation | CM PtP RS232 BA | CM PtP RS232 HF | CM PtP RS422/485 BA | CM PtP RS422/485 HF |
| **Product function** | | | | |
| • I&M data | Yes; I&M 0 | Yes; I&M 0 | Yes; I&M 0 | Yes; I&M 0 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 / V12 | V12 / V12 | V12 / V12 | V12 / V12 |
| • STEP 7 configurable/integrated as of version | V5.5 SP2 with GSD file | V5.5 SP2 with GSD file | V5.5 SP2 with GSD file | V5.5 SP2 with GSD file |
| • PROFIBUS as of GSD version/ GSD revision | - / - | - / - | - / - | - / - |
| • PROFINET as of GSD version/ GSD revision | V2.3 | V2.3 / - | V2.3 | V2.3 / - |
| **Installation type/mounting** | | | | |
| Rail mounting | Yes; S7-1500 mounting rail | Yes; S7-1500 mounting rail | Yes; S7-1500 mounting rail | Yes; S7-1500 mounting rail |
| **Supply voltage** | | | | |
| Type of supply voltage | system power supply | system power supply | system power supply | system power supply |
| **Input current** | | | | |
| Current consumption (rated value) | 35 mA; From the backplane bus | 35 mA; From the backplane bus | 33 mA; From the backplane bus | 33 mA; From the backplane bus |
| **Power** | | | | |
| Power available from the backplane bus | 0.65 W | 0.65 W | 0.65 W | 0.65 W |
| **Power loss** | | | | |
| Power loss, typ. | 0.6 W | 0.6 W | 0.6 W | 0.6 W |
| **1. Interface** | | | | |
| **Interface types** | | | | |
| • RS 485 | | | Yes | Yes |
| • RS 422 | | | Yes | Yes |
| • RS 232 | Yes | Yes | | |
| **RS 232** | | | | |
| • Transmission rate, max. | 19.2 kbit/s | 115.2 kbit/s | | |
| • Cable length, max. | 15 m | 15 m | | |
| • RS 232 auxiliary signals | RTS, CTS, DTR, DSR, RI, DCD | RTS, CTS, DTR, DSR, RI, DCD | | |
| **RS 485** | | | | |
| • Transmission rate, max. | | | 19.2 kbit/s | 115.2 kbit/s |
| • Cable length, max. | | | 1 200 m | 1 200 m |

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■ **Technical specifications** (continued)

| Article number | 6ES7540-1AD00-0AA0 | 6ES7541-1AD00-0AB0 | 6ES7540-1AB00-0AA0 | 6ES7541-1AB00-0AB0 |
|---|---|---|---|---|
| | S7-1500, CM PTP RS 232 BA | S7-1500, CM PTP RS 232 HF | S7-1500, CM PTP RS 422/485 BA | S7-1500, CM PTP RS 422/485 HF |
| **RS 422** | | | | |
| • Transmission rate, max. | | | 19.2 kbit/s | 115.2 kbit/s |
| • Cable length, max. | | | 1 200 m | 1 200 m |
| • 4-wire full duplex connection | | | Yes | Yes |
| • 4-wire multipoint connection | | | No | No |
| **Integrated protocols** | | | | |
| **Freeport** | | | | |
| - Telegram length, max. | 1 kbyte | 4 kbyte | 1 kbyte | 4 kbyte |
| - Bits per character | 7 or 8 | 7 or 8 | 7 or 8 | 7 or 8 |
| - Number of stop bits | 1 or 2 bit | 1 or 2 bit | 1 or 2 bit | 1 or 2 bit |
| - Parity | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any |
| **3964 (R)** | | | | |
| - Telegram length, max. | 1 kbyte | 4 kbyte | 1 kbyte | 4 kbyte |
| - Bits per character | 7 or 8 | 7 or 8 | 7 or 8 | 7 or 8 |
| - Number of stop bits | 1 or 2 bit | 1 or 2 bit | 1 or 2 bit | 1 or 2 bit |
| - Parity | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any | None, even, odd, always 1, always 0, any |
| **Modbus RTU master** | | | | |
| - Address area | | 1 to 247, extended 1 to 65535 | | 1 to 247, extended 1 to 65535 |
| - Number of slaves, max. | | 1 | | 32 |
| **MODBUS RTU slave** | | | | |
| - Address area | | 1 to 247, extended 1 to 65535 | | 1 to 247, extended 1 to 65535 |
| **Telegram buffer** | | | | |
| • Buffer memory for telegrams | 2 kbyte | 8 kbyte | 2 kbyte | 8 kbyte |
| • Number of telegrams which can be buffered | 255 | 255 | 255 | 255 |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes |
| • Hardware interrupt | No | No | No | No |
| **Diagnostic messages** | | | | |
| • Wire-break | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • Receive RxD | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED |
| • Transmit TxD | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED |
| **Potential separation** | | | | |
| between backplane bus and interface | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C | 40 °C |
| **Decentralized operation** | | | | |
| to SIMATIC S7-300 | Yes | Yes | Yes | Yes |
| to SIMATIC S7-400 | Yes | Yes | Yes | Yes |
| to SIMATIC S7-1500 | Yes | Yes | Yes | Yes |
| to standard PROFINET controller | Yes | Yes | Yes | Yes |
| Fast Startup supported | Yes | Yes | Yes | Yes |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Communication

## CM PtP

### ■ Technical specifications (continued)

| Article number | 6ES7540-1AD00-0AA0 | 6ES7541-1AD00-0AB0 | 6ES7540-1AB00-0AA0 | 6ES7541-1AB00-0AB0 |
|---|---|---|---|---|
| | S7-1500, CM PTP RS 232 BA | S7-1500, CM PTP RS 232 HF | S7-1500, CM PTP RS 422/485 BA | S7-1500, CM PTP RS 422/485 HF |
| **Dimensions** | | | | |
| Width | 35 mm | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 127 mm | 127 mm | 127 mm | 127 mm |
| **Weights** | | | | |
| Weight, approx. | 0.22 kg | 0.22 kg | 0.22 kg | 0.22 kg |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CM PtP RS 232 BA communication module**<br><br>Basic communication module with one RS 232 interface, Freeport, 3964(R) and USS protocols, 9-pin sub D connector, max. 19.2 kbps | 6ES7540-1AD00-0AA0 | **Accessories** | |
| | | **RS 232 connecting cable**<br>For linking to SIMATIC S7 | |
| | | 5 m | 6ES7902-1AB00-0AA0 |
| **CM PtP RS 232 HF communication module**<br><br>High Feature communication module with one RS 232 interface, Freeport, 3964(R), USS and Modbus RTU protocols, 9-pin sub D connector, max. 115.2 kbps | 6ES7541-1AD00-0AB0 | 10 m | 6ES7902-1AC00-0AA0 |
| | | 15 m | 6ES7902-1AD00-0AA0 |
| | | **RS 422/485 connecting cable**<br>For linking to SIMATIC S7 | |
| | | 5 m | 6ES7902-3AB00-0AA0 |
| **CM PtP RS 422/485 BA communication module**<br><br>Basic communication module with one RS 422/485 interface, Freeport, 3964(R) and USS protocols, 15-pin sub D socket, max. 19.2 kbps | 6ES7540-1AB00-0AA0 | 10 m | 6ES7902-3AC00-0AA0 |
| | | 50 m | 6ES7902-3AG00-0AA0 |
| | | **SIMATIC Manual Collection**<br><br>Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | 6ES7998-8XC01-8YE0 |
| **CM PtP RS 422/485 HF communication module**<br><br>High Feature communication module with one RS 422/485 interface, Freeport, 3964(R), USS and Modbus RTU protocols, 15-pin sub D socket, max. 115.2 kbps | 6ES7541-1AB00-0AB0 | | |
| | | **SIMATIC Manual Collection update service for 1 year**<br><br>Current "Manual Collection" DVD and the three subsequent updates | 6ES7998-8XC01-8YE2 |

## Overview



| DP-M | DP-S | FMS | PG/OP | S7 | |
|------|------|-----|-------|----|--|
| ● | ● | | ● | ● | |

The CM 1542-5 communication module expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The module can also be used to implement separate PROFIBUS lines, in other words, to control a number of different field devices via a number of PROFIBUS segments. The CM 1542-5 assumes all communication tasks, thus reducing the CPU workload.

The CM 1542-5 is suitable for S7 communication as well as for conventional PROFIBUS communication. This makes it possible to establish communication between the S7-1500 Controller and other devices, for example those from the SIMATIC S7-300/400 range.

- PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
  - Open user communication (SEND/RECEIVE) via FDL
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Module replacement without a PG
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

## Technical specifications

| Article number | 6GK7542-5DX00-0XE0 |
|----------------|--------------------|
| Product type designation | CM 1542-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS485) |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 15 V |
| Relative symmetrical tolerance at DC | |
| • at 15 V | 3 % |
| Consumed current | |
| • from backplane bus at DC at 15 V typical | 0.2 A |
| Power loss [W] | 3 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1500 single width |
| Width | 35 mm |
| Height | 142 mm |
| Depth | 129 mm |
| Net weight | 0.4 kg |
| Mounting type | |
| • S7-1500 rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 8 |
| • Note | depending on CPU type |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 30 |
| Amount of data | |
| • as user data per connection for open communication by means of SEND/RECEIVE blocks maximum | 240 byte |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**CM 1542-5**

■ **Technical specifications**  (continued)

| Article number | **6GK7542-5DX00-0XE0** |
|---|---|
| Product type designation | CM 1542-5 |
| **Performance data PROFIBUS DP** | |
| Service as DP master | |
| • DPV1 | Yes |
| Number of DP slaves on DP master usable | 125 |
| Amount of data | |
| • of the address area of the inputs as DP master total | 8 192 byte |
| • of the address area of the outputs as DP master total | 8 192 byte |
| • of the address area of the inputs per DP slave | 244 byte |
| • of the address area of the outputs per DP slave | 244 byte |
| Service as DP slave | |
| • DPV0 | Yes |
| • DPV1 | Yes |
| Amount of data | |
| • of the address area of the inputs as DP slave total | 240 byte |
| • of the address area of the outputs as DP slave total | 240 byte |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 48 |
| • Note | depending on the system upper limit |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 48 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | No |
| Configuration software | |
| • required | STEP 7 Professional V12 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes; yes, via S7-1500 CPU |
| **Product functions Time** | |
| Product function pass on time synchronization | Yes |

■ **Ordering data**  | **Article No.**

| | |
|---|---|
| **CM 1542-5 communication module** | |
| Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as DP master or DP slave; S7 and PG/OP communication, data record routing, time synchronization, diagnostics | **6GK7542-5DX00-0XE0** |
| **Accessories** | |
| **PROFIBUS FastConnect RS 485 connector** | |
| With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbps | |
| • Without PG interface | **6ES7972-0BA52-0XA0** |
| • With PG interface | **6ES7972-0BB52-0XA0** |
| **PROFIBUS FC Standard Cable** | |
| 2-wire bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter | **6XV1830-0EH10** |
| **PROFIBUS FastConnect Stripping Tool** | |
| Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable | **6GK1905-6AA00** |
| **PROFIBUS bus terminal 12M** | |
| Bus terminal for connection of PROFIBUS nodes up to 12 Mbps with connecting cable | **6GK1500-0AA10** |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

## ■ Overview



| DP−M | DP−S | FMS | PG/OP | S7/S5 | |
|------|------|-----|-------|-------|---|
| ● | ● | | ● | | |

The CP 1542-5 communications processor expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The processor also allows the implementation of separate PROFIBUS lines; in other words, the control of multiple field devices via several PROFIBUS segments. The CP 1542-5 handles all communication tasks, thus reducing the CPU load.

• PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)

Communication services:
• PROFIBUS DP
• PG/OP communication
• Time synchronization
• Simple programming and configuration over PROFIBUS
• Cross-network PG communication using S7 routing
• Module replacement without a PG

## ■ Technical specifications

| | |
|---|---|
| Article number | **6GK7542-5FX00-0XE0** |
| Product type designation | CP 1542-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS485) |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 15 V |
| Relative symmetrical tolerance at DC | |
| • at 15 V | 3 % |
| Consumed current | |
| • from backplane bus at DC at 15 V typical | 0.1 A |
| Power loss [W] | 1.5 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1500 single width |
| Width | 35 mm |
| Height | 142 mm |
| Depth | 129 mm |
| Net weight | 0.27 kg |
| Mounting type | |
| • S7-1500 rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 8 |
| • Note | depending on CPU type |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Communication

## CP 1542-5

### ▪ Technical specifications (continued)

| | |
|---|---|
| Article number | **6GK7542-5FX00-0XE0** |
| Product type designation | CP 1542-5 |
| **Performance data PROFIBUS DP** | |
| Service as DP master | |
| • DPV1 | Yes |
| Number of DP slaves on DP master usable | 32 |
| Amount of data | |
| • of the address area of the inputs as DP master total | 2 048 byte |
| • of the address area of the outputs as DP master total | 2 048 byte |
| • of the address area of the inputs per DP slave | 244 byte |
| • of the address area of the outputs per DP slave | 244 byte |
| Service as DP slave | |
| • DPV0 | Yes |
| • DPV1 | Yes |
| Amount of data | |
| • of the address area of the inputs as DP slave total | 240 byte |
| • of the address area of the outputs as DP slave total | 240 byte |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| • Note | depending on the system upper limit |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 16 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | No |
| Configuration software | |
| • required | STEP 7 Professional V12 SP1 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes; yes, via S7-1500 CPU |
| **Product functions Time** | |
| Product function pass on time synchronization | Yes |

### ▪ Ordering data

| | Article No. |
|---|---|
| **CP 1542-5 communications processor** | |
| Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as DP master or DP slave; PG/OP communication, time synchronization, diagnostics; smaller quantity structure | **6GK7542-5FX00-0XE0** |
| **Accessories** | |
| **PROFIBUS FastConnect RS 485 connector** | |
| With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbps | |
| • Without programming device interface | **6ES7972-0BA52-0XA0** |
| • With programming device interface | **6ES7972-0BB52-0XA0** |
| **PROFIBUS FC Standard Cable** | |
| 2-wire bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter | **6XV1830-0EH10** |
| **PROFIBUS FastConnect Stripping Tool** | |
| Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable | **6GK1905-6AA00** |
| **PROFIBUS bus terminal 12M** | |
| Bus terminal for connection of PROFIBUS stations for up to 12 Mbps with connecting cable | **6GK1500-0AA10** |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

**4**

## Overview



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
|     | ●        | ●   | ●   | ●   | ●    | ●     | ●     |

Communication module for connecting a SIMATIC S7-1500 to PROFINET networks as PROFINET IO controller or PROFINET IO device.

The CM 1542-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication;
    - Web diagnostics by means of access to the web server of the S7-1500 system
    - Static IP routing with up to 1 Mbps via IPv4 to other CM 1543-1 / CM 1542-1 units in a S7-1500 system, e.g., for web server accesses without real-time capability

## Technical specifications

| | |
|---|---|
| Article number | **6GK7542-1AX00-0XE0** |
| Product type designation | CM 1542-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 2 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 15 V |
| Relative symmetrical tolerance at DC | |
| • at 15 V | 3 % |
| Consumed current | |
| • from backplane bus at DC at 15 V typical | 0.22 A |
| Power loss [W] | 3.3 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1500 single width |
| Width | 35 mm |
| Height | 142 mm |
| Depth | 129 mm |
| Net weight | 0.4 kg |
| Mounting type | |
| • S7-1500 rail mounting | Yes |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**CM 1542-1**

■ **Technical specifications** (continued)

| Article number | 6GK7542-1AX00-0XE0 |
|---|---|
| Product type designation | CM 1542-1 |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 8 |
| • Note | depending on CPU type |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | 64; depending on the system upper limit |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of T blocks maximum | 65 536 byte |
| Number of Multicast stations | 6 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 64 |
| • Note | depending on the system upper limit |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 64 |
| **Performance data PROFINET communication as PN IO-Controller** | |
| Product function PROFINET IO controller | Yes |
| Number of PN IO devices on PROFINET IO controller usable total | 128 |
| Number of PN IO IRT devices on PROFINET IO controller usable | 64 |
| Number of external PN IO lines with PROFINET per rack | 10 |
| Amount of data | |
| • as user data for input variables as PROFINET IO controller maximum | 8 Kibyte |
| • as user data for input variables as PROFINET IO controller maximum | 8 Kibyte |
| • as user data for input variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for output variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for input variables per PN IO device for each sub-module as PROFINET IO controller maximum | 256 byte |
| • as user data for output variables per PN IO device for each sub-module as PROFINET IO controller maximum | 256 byte |

| Article number | 6GK7542-1AX00-0XE0 |
|---|---|
| Product type designation | CM 1542-1 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP 7 Professional V13 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes; yes, via S7-1500 CPU |
| **Product functions switch** | |
| Product feature Switch | Yes |
| Product function | |
| • switch-managed | No |
| • with IRT PROFINET IO switch | Yes |
| • Configuration with STEP 7 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| Protocol is supported Media Redundancy Protocol (MRP) | Yes |
| **Product functions Security** | |
| Product function | |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | No |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CM 1542-1 communication module**<br><br>For connecting SIMATIC S7-1500 to PROFINET IO, TCP/IP, ISO-on-TCP, UDP, S7 communication, IP broadcast/multicast, SNMPV1, time synchronization via NTP; 2 x RJ45 interface with 10/100 Mbps | **6GK7542-1AX00-0XE0** | **SCALANCE X204-2 Industrial Ethernet switch**<br><br>Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | **6GK5204-2BB10-2AA3** |
| **Accessories** | | | |
| **IE FC RJ45 Plug 4 x 2**<br><br>RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | **SCALANCE X308-2 Industrial Ethernet switch**<br><br>2 x 1000 Mbps SC ports, optical (multimode, glass), up to 750 m 1 x 10/100/1000 Mbps RJ45 port, electrical 7 x 10/100 Mbps RJ45 ports, electrical | **6GK5308-2FL10-2AA3** |
| • 1 pack = 1 unit | **6GK1901-1BB11-2AA0** | | |
| • 1 pack = 10 units | **6GK1901-1BB11-2AB0** | | |
| • 1 pack = 50 units | **6GK1901-1BB11-2AE0** | | |
| **IE FC TP Standard Cable GP 4 x 2**<br><br>8-wire, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applications; with UL approval; <u>sold by the meter;</u> max. quantity 1000 m, minimum order 20 m | | | |
| • AWG22, for connection to IE FC RJ45 modular outlet | **6XV1870-2E** | | |
| • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | **6XV1878-2A** | | |

**4**

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Communication

## CP 1543-1

### ■ Overview



| ISO | TCP/UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|---------|-----|-----|-----|------|-------|-------|
| ● | ● | | | ● | ● | ● | ● |

The SIMATIC CP 1543-1 communications processor securely connects the new SIMATIC S7-1500 Controller to Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols such as FTPS and SNMPv3, the communications processor protects individual S7-1500 stations or even entire automation cells against unauthorized access.

The CP can also be used for linking the S7-1500 station into an IPv6-based network. All functions are configured by means of STEP 7 Professional V12 (TIA Portal) or higher.

The CP 1543-1 supports the following communications services:
- PG/OP communication
- S7 communication
- Open user communication (SEND/RECEIVE, FETCH/WRITE)
- IT communication
  - FTP functions (File Transfer Protocol FTP/FTPS) for file management and access to data blocks in the CPU (client and server function)
  - Access (read and write modes) to csv files stored on the memory card of the CPU via FTP(S)
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
  - Static IP routing with up to 1 Mbps via IPv4 to other CM 1543-1 or CM 1542-1 units in a S7-1500 system, e.g., for web server accesses without real-time capability. Securing a cell by activating the security function in the CP 1543-1 automatically deactivates IP routing.
- Security functions
  - Stateful Packet Inspection (layers 3 and 4) firewall
  - Secure communication via VPN (IPsec)
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure file transfer using FTPS
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
  - Encrypted email communication via SMTPS (Port 587)
  - Open communication over TCP/IP
- Integration of the S7-1500 into IPv6-based networks; An IPv6-compliant IP address can be used for the following communication services:
  - FETCH/WRITE access (CP as server)
  - FTP server mode
  - FTP client mode with addressing by program block
  - Email transfer with addressing by program block

### ■ Technical specifications

| Article number | 6GK7543-1AX00-0XE0 |
|---|---|
| Product type designation | CP 1543-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 1 000 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 15 V |
| Relative symmetrical tolerance at DC | |
| • at 15 V | 3 % |
| Consumed current | |
| • from backplane bus at DC at 15 V typical | 0.35 A |
| Power loss [W] | 5.3 W |

| Article number | 6GK7543-1AX00-0XE0 |
|---|---|
| Product type designation | CP 1543-1 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-1500 single width |
| Width | 35 mm |
| Height | 142 mm |
| Depth | 129 mm |
| Net weight | 0.35 kg |
| Mounting type | |
| • S7-1500 rail mounting | Yes |

■ **Technical specifications** (continued)

| Article number | **6GK7543-1AX00-0XE0** |
|---|---|
| Product type designation | CP 1543-1 |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 8 |
| • Note | depending on CPU type |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | 118; depending on the system upper limit |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of T blocks maximum | 65 536 byte |
| Number of Multicast stations | 118 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 118 |
| • Note | depending on the system upper limit |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 118 |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as client by means of FTP maximum | 32 |
| • as server by means of FTP maximum | 16 |
| • as server by means of HTTP maximum | 4 |
| • as e-mail client maximum | 1 |
| Amount of data as user data for email maximum | 64 Kibyte |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | No |
| Configuration software | |
| • required | STEP 7 Professional V12 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes; yes, via S7-1500 CPU |

| Article number | **6GK7543-1AX00-0XE0** |
|---|---|
| Product type designation | CP 1543-1 |
| **Product functions Routing** | |
| Product function | |
| • Static IP routing | Yes |
| • Static IP routing IPv6 | No |
| • dynamic IP routing | No |
| • dynamic IP routing IPv6 | No |
| Protocol is supported | |
| • RIP v1 | No |
| • RIPv2 | No |
| • RIPnG for IPv6 | No |
| • OSPFv2 | No |
| • OSPFv3 for IPv6 | No |
| • VRRP | No |
| • VRRP for IPv6 | No |
| • BGP | No |
| • PPP | No |
| • PPoE via DSL | No |
| **Product functions Security** | |
| Firewall version | stateful inspection |
| Product function with VPN connection | IPSec |
| Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168, DES-56 |
| Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates |
| Type of hashing algorithms with VPN connection | MD5, SHA-1 |
| Number of possible connections with VPN connection | 16 |
| Product function | |
| • password protection for Web applications | No |
| • ACL - IP-based | No |
| • ACL - IP-based for PLC/routing | No |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | No |
| • log file for unauthorized access | Yes |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

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# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**CP 1543-1**

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 1543-1**<br>**communications processor**<br><br>For connecting SIMATIC S7-1500 to Industrial Ethernet via TCP/IP, ISO and UDP and security functions (VPN, firewall); 1 x RJ45 interface with 10/100/1000 Mbps; SNMPV1/V3; time synchronization via NTP, FTP, email, IPv4/IPv6 | 6GK7543-1AX00-0XE0 | **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br><br>4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | 6XV1840-2AH10 |
| **Accessories** | | **IE FC TP Standard Cable GP 4 x 2** | |
| **IE FC RJ45 Plug 180 2 x 2**<br><br>RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface<br>• 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | <br><br><br><br><br><br><br><br><br>6GK1901-1BB10-2AA0<br>6GK1901-1BB10-2AB0<br>6GK1901-1BB10-2AE0 | 8-wire, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m<br>• AWG22, for connection to IE FC RJ45 modular outlet<br><br>• AWG24, for connection to IE FC RJ45 Plug 4 x 2 | <br><br><br><br><br><br>6XV1870-2E<br><br>6XV1878-2A |
| **IE FC RJ45 Plug 4 x 2**<br><br>RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface<br>• 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | <br><br><br><br><br><br><br><br>6GK1901-1BB11-2AA0<br>6GK1901-1BB11-2AB0<br>6GK1901-1BB11-2AE0 | **IE FC Stripping Tool**<br><br>Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | 6GK1901-1GA00 |
| | | **Industrial Ethernet switch SCALANCE X204-2**<br><br>Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | 6GK5204-2BB10-2AA3 |
| | | **Industrial Ethernet switch SCALANCE X308-2**<br><br>2 x 1000 Mbps multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbps RJ45 port, 7 x 10/100 Mbps RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m | 6GK5308-2FL00-2AA3 |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

4

## Overview

- SINAUT communication module TIM 1531 IRC with four interfaces as a stand-alone unit for SIMATIC S7-1500 for use in wide area networks (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS/UMTS/LTE router, GPRS/UMTS/LTE modem or wireless devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Message frame memory for seamless recording of data and support of redundant communication paths
- Easy configuration in the TIA Portal

## Ordering data

| | Article No. |
|---|---|
| **TIM 1531 IRC communication module** | **6GK7543-1MX00-0XE0** |
| TIM 1531 IRC communication module for SIMATIC S7-1500, S7-400, S7-300 with SINAUT ST7 with three RJ45 interfaces for communication via IP-based networks (WAN/LAN) and an RS 232/RS 485-interface for communication via classical WAN networks | |
| **Accessories** | |
| **STEP 7 Professional V14 SP1** | |
| Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional(64-bit), Windows 8.1 Enterprise (64-bit), WIndows 10 Professional Version 1607, WIndows 10 Enterprise Version 1607, WIndows 10 Enterprise 2016 LTSB, WIndows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (Vollinstallation), Windows Server 2016 Standard (full installation) Type of delivery: English, German, Chinese, Italian, French, Spanish | |
| **STEP 7 Professional V14 SP1, floating license** | **6ES7822-1AA04-0YA5** |
| **STEP 7 Professional V14 SP1, floating license, software download incl. license key** [1] | **6ES7822-1AE04-0YA5** |
| Email address required for delivery | |
| **STEP 7 Professional V14 SP1, trial license** | **6ES7822-1AA04-0YA7** |

| | Article No. |
|---|---|
| **SIMATIC PM 1507** | |
| Stabilized power supply for SIMATIC S7-1500 Input: 120/230 V AC Output: 24 V DC | |
| • Output current 3 A | **6EP1332-4BA00** |
| • Output current 8 A | **6EP1333-4BA00** |
| **IE FC RJ45 Plug 180** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement/terminal contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**SCALANCE W774 RJ45 for use in control cabinet**

■ **Overview**



- Access points in SIMATIC design suitable for applications where the device is to be mounted in the control cabinet

■ **Technical specifications**

| Article number | 6GK5774-1FX00-0AA0<br>6GK5774-1FX00-0AB0 [1] |
| --- | --- |
| Product type designation | SCALANCE W774-1 RJ45 |
| **Transmission rate** | |
| • Transfer rate with WLAN maximum | 300 Mbit/s |
| • Transfer rate for Industrial Ethernet | 10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 2 |
| • for power supply | 1 |
| • for redundant voltage supply | 1 |
| Type of electrical connection | |
| • for network components or terminal equipment | RJ45 socket |
| • for power supply | 4-pole screw terminal, PoE |
| design of the removable storage | |
| • C-PLUG | Yes |
| • KEY-PLUG | Yes |
| **Interfaces wireless** | |
| Number of radio cards permanently installed | 1 |
| Transmission mode for multiple input multiple output (MIMO) | 2x2 |
| Number of spatial streams | 2 |
| Number of electrical connections for external antenna(s) | 2 |
| Type of electrical connection for external antenna(s) | R-SMA (socket) |
| Product feature external antenna can be mounted directly on device | Yes |

| Article number | 6GK5774-1FX00-0AA0<br>6GK5774-1FX00-0AB0 [1] |
| --- | --- |
| Product type designation | SCALANCE W774-1 RJ45 |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 | |
| • from terminal block | 19.2 V |
| Supply voltage 2 | |
| • from terminal block | 28.8 V |
| Supply voltage | |
| • from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af | 48 V |
| Consumed current | |
| • at DC at 24 V typical | 0.25 A |
| • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical | 0.125 A |
| Power loss [W] | |
| • at DC at 24 V typical | 6 W |
| • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical | 6 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | -20 ... +60 °C |
| • during storage | -40 ... +85 °C |
| • during transport | -40 ... +85 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 97 % |
| Ambient condition for operation | When used under hazardous conditions (Zone 2), the SCALANCE W774-1 RJ45 or W734-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529. |
| Protection class IP | IP30 |

[1] Wireless approval in the USA

■ **Technical specifications** (continued)

| Article number | 6GK5774-1FX00-0AA0<br>6GK5774-1FX00-0AB0 [1] |
| --- | --- |
| Product type designation | SCALANCE W774-1 RJ45 |
| **Design, dimensions and weight** | |
| Width | 26 mm |
| Height | 156 mm |
| Depth | 127 mm |
| Width of the enclosure without antenna | 26 mm |
| Height of the enclosure without antenna | 147 mm |
| Depth of the enclosure without antenna | 127 mm |
| Net weight | 0.52 kg |
| Mounting type | wall mounting only if flat mounted |
| • S7-300 rail mounting | Yes |
| • S7-1500 rail mounting | Yes |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |
| **Wireless frequencies** | |
| Operating frequency | |
| • for WLAN in 2.4 GHz frequency band | 2.41 ... 2.48 GHz |
| • for WLAN in 5 GHz frequency band | 4.9 ... 5.8 GHz |
| **Product properties, functions, components general** | |
| Product function Access Point Mode | Yes |
| Product function Client Mode | Yes |
| Number of SSIDs | 4 |
| Product function | |
| • iPCF Access Point | Yes; Only in combination with the 'KEY-PLUG W780 iFeatures' |
| • iPCF client | Yes; Only in combination with the 'KEY-PLUG W740 iFeatures' |
| • iPCF-MC Access Point | No |
| • iPCF-MC client | Yes; Only in combination with the 'KEY-PLUG W740 iFeatures' |
| Number of iPCF-capable radio modules | 1 |
| Product function iREF | Yes |
| Number of iREF-capable radio modules | 1 |
| Product function iPRP | Yes; In combination with the 'KEY-PLUG W780 iFeatures' only |
| **Product functions management, configuration** | |
| Number of manageable IP addresses in client | 8 |
| Product function | |
| • CLI | Yes |
| • web-based management | Yes |
| • MIB support | Yes |
| • TRAPs via email | Yes |
| • Configuration with STEP 7 | Yes |
| • configuration with STEP 7 in the TIA Portal | Yes |
| • operation with IWLAN controller | No |
| • operation with Enterasys WLAN controller | No |
| • forced roaming on IP down with IWLAN | Yes |
| • forced roaming on link down with IWLAN | Yes |
| • WDS | Yes |

| Article number | 6GK5774-1FX00-0AA0<br>6GK5774-1FX00-0AB0 [1] |
| --- | --- |
| Product type designation | SCALANCE W774-1 RJ45 |
| Protocol is supported | |
| • Address Resolution Protocol (ARP) | Yes |
| • ICMP | Yes |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/location designation | Yes |
| **Product functions Diagnosis** | |
| Product function | |
| • PROFINET IO diagnosis | Yes |
| • Link Check | No |
| • connection monitoring IP-Alive | No |
| • localization via Aeroscout | Yes |
| • SysLog | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| **Product functions VLAN** | |
| Product function | |
| • function VLAN with IWLAN | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • in Client Mode DHCP server via LAN | Yes |
| • DHCP Option 82 | Yes |
| **Product functions Redundancy** | |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • MSTP | Yes |
| • RSTP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - MAC-based | Yes |
| • Management security, ACL-IP based | Yes |
| • IEEE 802.1x (radius) | Yes |
| • NAT/NAPT | No |
| • access protection according to IEEE802.11i | Yes |
| • WPA/WPA2 | Yes |
| • TKIP/AES | Yes |
| Protocol is supported | |
| • SSH | Yes |
| • RADIUS | Yes |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| • SNTP | Yes |
| • SIMATIC Time | Yes |

[1] Wireless approval in the USA

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**SCALANCE W774 RJ45 for use in control cabinet**

| ■ **Technical specifications** (continued) | |
|---|---|
| Article number | **6GK5774-1FX00-0AA0** |
| | **6GK5774-1FX00-0AB0** [1] |
| Product type designation | SCALANCE W774-1 RJ45 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4 |
| • for hazardous zone | EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • for safety from CSA and UL | UL 60950-1 CSA C22.2 No. 60950-1 |
| Certificate of suitability | |
| • EC declaration of conformity | Yes |
| • CE marking | Yes |
| • C-Tick | Yes |
| • CCC | No |
| • E1 approval | No |
| • Railway application in accordance with EN 50155 | No |
| • NEMA TS2 | No |
| • IEC 61375 | No |
| • IEC 61850-3 | No |
| • NEMA4X | No |
| • Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af | Yes |
| • Power-over-Ethernet according to IEEE802.3at for type 2 | Yes |
| Standard for wireless communication | |
| • IEEE 802.11a | Yes |
| • IEEE 802.11b | Yes |
| • IEEE 802.11e | Yes |
| • IEEE 802.11g | Yes |
| • IEEE 802.11h | Yes |
| • IEEE 802.11i | Yes |
| • IEEE 802.11n | Yes |
| Wireless approval | You will find the current list of countries at: www.siemens.com/wireless-approvals |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes |
| • Bureau Veritas (BV) | Yes |
| • DNV GL | Yes |
| • Lloyds Register of Shipping (LRS) | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes |
| • Polski Rejestr Statkow (PRS) | Yes |
| • Royal Institution of Naval Architects (RINA) | Yes |
| **Accessories** | |
| accessories | 24 V DC screw terminal included in scope of delivery |

[1] Wireless approval in the USA

| ■ **Ordering data** | **Article No.** |
|---|---|
| **SCALANCE W774 access points** | |
| IWLAN access points with built-in wireless interface for establishing wireless connections with iFeatures; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20°C to +60°C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24V DC; manual on CD-ROM; German/English | |
| **SCALANCE W774-1 RJ45** | |
| IWLAN Access Point with one built-in wireless interface | |
| • National approvals for operation outside the USA | **6GK5774-1FX00-0AA0** |
| • National approvals for operation within the USA [1] | **6GK5774-1FX00-0AB0** |
| **Accessories** | |
| **KEY-PLUG W780 iFeatures** | **6GK5907-8PA00** |
| Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W access points with PLUG compartment | |
| **C-PLUG** | **6GK1900-0AB00** |
| Swap medium for simple replacement of devices if a fault occurs; for storing configuration data; can be used in SIMATIC NET products with PLUG compartment | |
| **IE FC RJ45 Plug 180 2 x 2** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |
| **IE FC Standard Cable GP 2 x 2** | **6XV1840-2AH10** |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| **IE FC Stripping Tool** | **6GK1901-1GA00** |
| Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **Antennas and miscellaneous IWLAN accessories** | See Catalog IK PI or Industry Mall |

[1] Please note national approvals under
http://www.siemens.com/wireless-approvals

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**SCALANCE W734 RJ45 for use in control cabinet**

## ■ Overview



- Client modules in SIMATIC design suitable for applications where the device is to be mounted in the control cabinet



ET 200MP station with SCALANCE W734 RJ45

## ■ Technical specifications

| Article number | 6GK5734-1FX00-0AA0 |
| --- | --- |
| | 6GK5734-1FX00-0AB0 [1] |
| Product type designation | SCALANCE W734-1 RJ45 |
| **Transmission rate** | |
| • Transfer rate with WLAN maximum | 300 Mbit/s |
| • Transfer rate for Industrial Ethernet | 10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 2 |
| • for power supply | 1 |
| • for redundant voltage supply | 1 |
| Type of electrical connection | |
| • for network components or terminal equipment | RJ45 socket |
| • for power supply | 4-pole screw terminal, PoE |
| design of the removable storage | |
| • C-PLUG | Yes |
| • KEY-PLUG | Yes |
| **Interfaces wireless** | |
| Number of radio cards permanently installed | 1 |
| Transmission mode for multiple input multiple output (MIMO) | 2x2 |
| Number of spatial streams | 2 |
| Number of electrical connections for external antenna(s) | 2 |
| Type of electrical connection for external antenna(s) | R-SMA (socket) |
| Product feature external antenna can be mounted directly on device | Yes |

| Article number | 6GK5734-1FX00-0AA0 |
| --- | --- |
| | 6GK5734-1FX00-0AB0 [1] |
| Product type designation | SCALANCE W734-1 RJ45 |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 | |
| • from terminal block | 19.2 V |
| Supply voltage 2 | |
| • from terminal block | 28.8 V |
| Supply voltage | |
| • from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af | 48 V |
| Consumed current | |
| • at DC at 24 V typical | 0.25 A |
| • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical | 0.125 A |
| Power loss [W] | |
| • at DC at 24 V typical | 6 W |
| • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical | 6 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | -20 ... +60 °C |
| • during storage | -40 ... +85 °C |
| • during transport | -40 ... +85 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Ambient condition for operation | When used under hazardous conditions (Zone 2), the SCALANCE W774-1 RJ45 or W734-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529. |
| Protection class IP | IP30 |

[1] Wireless approval in the USA

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## Communication

**SCALANCE W734 RJ45 for use in control cabinet**

### ▪ Technical specifications (continued)

| Article number | 6GK5734-1FX00-0AA0<br>6GK5734-1FX00-0AB0 [1] |
|---|---|
| Product type designation | SCALANCE W734-1 RJ45 |
| **Design, dimensions and weight** | |
| Width | 26 mm |
| Height | 156 mm |
| Depth | 127 mm |
| Width of the enclosure without antenna | 26 mm |
| Height of the enclosure without antenna | 147 mm |
| Depth of the enclosure without antenna | 127 mm |
| Net weight | 0.52 kg |
| Mounting type | wall mounting only if flat mounted |
| • S7-300 rail mounting | Yes |
| • S7-1500 rail mounting | Yes |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | Yes |
| **Wireless frequencies** | |
| Operating frequency | |
| • for WLAN in 2.4 GHz frequency band | 2.41 ... 2.48 GHz |
| • for WLAN in 5 GHz frequency band | 4.9 ... 5.8 GHz |
| **Product properties, functions, components general** | |
| Product function Access Point Mode | No |
| Product function Client Mode | Yes |
| Product function | |
| • iPCF client | Yes; Only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures' |
| • iPCF-MC Access Point | No |
| • iPCF-MC client | Yes; Only in combination with 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures' |
| Number of iPCF-capable radio modules | 1 |
| Product function iPRP | Yes; In combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures' only |
| **Product functions management, configuration** | |
| Number of manageable IP addresses in client | 8 |
| Product function | |
| • CLI | Yes |
| • web-based management | Yes |
| • MIB support | Yes |
| • TRAPs via email | Yes |
| • Configuration with STEP 7 | Yes |
| • configuration with STEP 7 in the TIA Portal | Yes |
| • WDS | No |
| Protocol is supported | |
| • Address Resolution Protocol (ARP) | Yes |
| • ICMP | Yes |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • DCP | Yes |
| • LLDP | No |

| Article number | 6GK5734-1FX00-0AA0<br>6GK5734-1FX00-0AB0 [1] |
|---|---|
| Product type designation | SCALANCE W734-1 RJ45 |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function | |
| • PROFINET IO diagnosis | Yes |
| • Link Check | No |
| • connection monitoring IP-Alive | No |
| • SysLog | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| **Product functions VLAN** | |
| Product function | |
| • function VLAN with IWLAN | No |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • in Client Mode DHCP server via LAN | Yes |
| • DHCP Option 82 | Yes |
| **Product functions Redundancy** | |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • MSTP | Yes |
| • RSTP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - MAC-based | Yes |
| • Management security, ACL-IP based | Yes |
| • IEEE 802.1x (radius) | Yes |
| • NAT/NAPT | Yes |
| • access protection according to IEEE802.11i | Yes |
| • WPA/WPA2 | Yes |
| • TKIP/AES | Yes |
| Protocol is supported | |
| • SSH | Yes |
| • RADIUS | Yes |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| • SNTP | Yes |
| • SIMATIC Time | Yes |

[1] Wireless approval in the USA

## ■ Technical specifications (continued)

| Article number | 6GK5734-1FX00-0AA0 |
| --- | --- |
| | 6GK5734-1FX00-0AB0 [1] |
| Product type designation | SCALANCE W734-1 RJ45 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4 |
| • for hazardous zone | EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • for safety from CSA and UL | UL 60950-1 CSA C22.2 No. 60950-1 |
| Certificate of suitability | |
| • EC declaration of conformity | Yes |
| • CE marking | Yes |
| • C-Tick | Yes |
| • CCC | No |
| • E1 approval | No |
| • Railway application in accordance with EN 50155 | No |
| • NEMA TS2 | No |
| • IEC 61375 | No |
| • IEC 61850-3 | No |
| • NEMA4X | No |
| • Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af | Yes |
| • Power-over-Ethernet according to IEEE802.3at for type 2 | Yes |
| Standard for wireless communication | |
| • IEEE 802.11a | Yes |
| • IEEE 802.11b | Yes |
| • IEEE 802.11e | Yes |
| • IEEE 802.11g | Yes |
| • IEEE 802.11h | Yes |
| • IEEE 802.11i | Yes |
| • IEEE 802.11n | Yes |
| Wireless approval | You will find the current list of countries at: www.siemens.com/wireless-approvals |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes |
| • Bureau Veritas (BV) | Yes |
| • DNV GL | Yes |
| • Lloyds Register of Shipping (LRS) | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes |
| • Polski Rejestr Statkow (PRS) | Yes |
| • Royal Institution of Naval Architects (RINA) | Yes |
| **Accessories** | |
| accessories | 24 V DC screw terminal included in scope of delivery |

[1] Wireless approval in the USA

## ■ Ordering data — Article No.

| | Article No. |
| --- | --- |
| **SCALANCE W734 Client Modules** | |
| IWLAN Ethernet client modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20°C to +60°C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24V DC; manual on CD-ROM; German/English | |
| **SCALANCE W734-1 RJ45** | |
| For managing the wireless connection of up to eight linked devices with Industrial Ethernet connection | |
| • National approvals for operation outside the USA | 6GK5734-1FX00-0AA0 |
| • National approvals for operation within the USA [1] | 6GK5734-1FX00-0AB0 |
| **Accessories** | |
| **KEY-PLUG W740 iFeatures** | 6GK5907-4PA00 |
| Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W client modules with PLUG compartment | |
| **C-PLUG** | 6GK1900-0AB00 |
| Swap medium for simple replacement of devices if a fault occurs; for storing configuration data; can be used in SIMATIC NET products with PLUG compartment | |
| **IE FC RJ45 Plug 180 2 x 2** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 |
| **IE FC Standard Cable GP 2 x 2** | 6XV1840-2AH10 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m minimum order 20 m | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 |
| Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **Antennas and miscellaneous IWLAN accessories** | See Catalog IK PI or Industry Mall |

[1] Please note national approvals under http://www.siemens.com/wireless-approvals

**4**

# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS communication

## Overview

- Modules for serial communication connections, scaled according to interface types, protocols, and performance
- 4 versions with different physical transmission characteristics:
  - RS 232C, max. 19.2 kbps
  - RS 232C, max.115.2 kbps
  - RS 422/RS 485, max. 19.2 kbps
  - RS 422/RS 485, max. 115.2 kbps
- Protocols supported
  - Freeport: User-parameterizable telegram format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1540-1AD00-7AA0 | 6AG1541-1AD00-7AB0 | 6AG1540-1AB00-7AA0 | 6AG1541-1AB00-7AB0 |
|---|---|---|---|---|
| Based on | 6ES7540-1AD00-0AA0 | 6ES7541-1AD00-0AB0 | 6ES7540-1AB00-0AA0 | 6ES7541-1AB00-0AB0 |
| | SIPLUS S7-1500 CM PTP RS 232 BA | SIPLUS S7-1500 CM PTP RS 232 HF | SIPLUS S7-1500 CM PTP RS 422/485 BA | SIPLUS S7-1500 CM PTP RS 422/485 HF |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C | 70 °C | 70 °C | 70 °C |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C | 40 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

## ■ Technical specifications (continued)

| Article number | **6AG1540-1AD00-7AA0** | **6AG1541-1AD00-7AB0** | **6AG1540-1AB00-7AA0** | **6AG1541-1AB00-7AB0** |
|---|---|---|---|---|
| Based on | **6ES7540-1AD00-0AA0** | **6ES7541-1AD00-0AB0** | **6ES7540-1AB00-0AA0** | **6ES7541-1AB00-0AB0** |
| | SIPLUS S7-1500 CM PTP RS 232 BA | SIPLUS S7-1500 CM PTP RS 232 HF | SIPLUS S7-1500 CM PTP RS 422/485 BA | SIPLUS S7-1500 CM PTP RS 422/485 HF |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CM PtP RS 232 BA communication module**<br><br>(Extended temperature range and exposure to media)<br><br>Basic communication module with 1 interface RS 232, Freeport, 3964(R) and USS protocols, 9-pin sub D connector, max. 19.2 kbps | **6AG1540-1AD00-7AA0** | **Accessories** | See SIMATIC S7-1500, CM PtP communication module, page 4/118 |
| **SIPLUS CM PtP RS 232 HF communication module**<br><br>(Extended temperature range and exposure to media)<br><br>High Feature communication module with 1 interface RS 232, Freeport, 3964(R), USS and Modbus RTU protocols, 9-pin sub D connector, max. 115.2 kbps | **6AG1541-1AD00-7AB0** | | |
| **SIPLUS CM PtP RS 422/485 BA communication module**<br><br>(Extended temperature range and exposure to media)<br><br>Basic communication module with 1 interface RS 422/485, Freeport, 3964(R) and USS protocols, 15-pin sub D socket, max. 19.2 kbps | **6AG1540-1AB00-7AA0** | | |
| **SIPLUS CM PtP RS 422/485 HF communication module**<br><br>(Extended temperature range and exposure to media)<br><br>High Feature communication module with 1 interface RS 422/485, Freeport, 3964(R), USS and Modbus RTU protocols, 15-pin sub D socket, max. 115.2 kbps | **6AG1541-1AB00-7AB0** | | |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
SIPLUS communication

## SIPLUS NET CM 1542-5

### Overview

| DP-M | DP-S | FMS | PG/OP | S7/S5 | |
|------|------|-----|-------|-------|---|
| ● | ● | | ● | ● | |

The CM 1542-5 communication module expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The module can also be used to implement separate PROFIBUS lines, in other words, to control a number of different field devices via a number of PROFIBUS segments. The CM 1542-5 handles all communication tasks, thus reducing the CPU load.

Apart from classic PROFIBUS communication; the CM 1542-5 is also suitable for S7 communication. This makes it possible to establish communication between the S7-1500 Controller and other devices, for example those from the SIMATIC S7-300/400 range.

- PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)
- Communications services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Module replacement without a PG
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### Ordering data

| | Article No. |
|---|---|
| **SIPLUS CM 1542-5 communication module** | |
| (Extended temperature range and exposure to media) | |
| Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as a DP master or DP slave | **6AG1542-5DX00-7XE0** |
| **Accessories** | See SIMATIC S7-1500, CM 1542-5 communication module, page 4/120 |

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## Overview



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
| ● | ● | | | ● | ● | ● | ● |

The SIMATIC CP 1543-1 communications processor securely connects the new SIMATIC S7-1500 Controller to Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols such as FTPS and SNMPv3, the communications processor protects individual S7-1500 stations or even entire automation cells against unauthorized access.

The CP can also be used for linking the S7-1500 station into an IPv6-based network. All functions are configured by means of STEP 7 Professional V12 (TIA Portal) or higher.

The CP 1543-1 supports the following communications services:

• PG/OP communication

• S7 communication

• Open communication (SEND/RECEIVE, FETCH/WRITE)

• IT communication
  - FTP functions (File Transfer Protocol FTP/FTPS) for file management and access to data blocks in the CPU (client and server function)
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)

• Security functions
  - Stateful Packet Inspection (layers 3 and 4) firewall
  - Secure communication via VPN (IPsec)
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure file transfer using FTPS
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information

• Integration of the S7-1500 into IPv6-based networks; An IPv6-compliant IP address can be used for the following communication services:
  - FETCH/WRITE access (CP as server)
  - FTP server mode
  - FTP client mode with addressing by program block
  - Email transfer with addressing by program block

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS CP 1543-1 communications processor** | **6AG1543-1AX00-2XE0** |
| (Extended temperature range and exposure to media) | |
| For connection of SIMATIC S7-1500 to Industrial Ethernet via TCP/IP, ISO and UDP and Security functions; 1 x RJ45 interface with 10/100/1000 Mbps; electronic manual on DVD | |
| **Accessories** | See SIMATIC S7-1500, SIMATIC CP 1543-1 communications processor, page 4/128 |

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Connection system

**Front connectors**

## Overview

- Uniform, 40-pin front connector, suitable for SIMATIC S7-1500 I/O modules
- Versions for 25 mm wide or 35 mm wide modules
- With screw-type or push-in terminals
- Connectable wire cross-sections: 0.25 mm$^2$ to 1.5 mm$^2$ (AWG 24 to 16)
- Front connector for 35 mm modules to be ordered separately; front connector for 25 mm modules included in scope of supply of modules

## Design

- 40 terminals, arranged in two rows, numbered consecutively from 1 to 40
- Direct assignment of terminal to LED and labeling simplifies wiring, commissioning, and troubleshooting
- Holders for four potential bridges for simple and flexible creation of potential groups; four units are supplied with the front connector (optionally available as spare parts in packs of 20)
- Integrated shielding concept for analog modules and technology modules; allows space-saving installation without tools and ensures high ruggedness and EMC stability; components supplied with analog modules
- Cable ties for mechanical fixing of the cable bundle and for strain relief; 1 unit supplied with front connector

## Ordering data

| | Article No. |
|---|---|
| **Front connectors** | |
| For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | **6ES7592-1AM00-0XB0** |
| • Push-in | **6ES7592-1BM00-0XB0** |
| For 25 mm modules; including cable ties and individual labeling strips; push-in, 40-pin; spare part | **6ES7592-1BM00-0XA0** |
| **Potential bridges for front connectors** | **6ES7592-3AA00-0AA0** |
| For 35 mm modules; 20 pieces; spare part | |

## Overview



With two cabling systems, SIMATIC TOP connect ensures efficient wiring of the input and output module of the SIMATIC S7-1500: Fully modular connection for fast and clearly arranged connecting to sensors and actuators in the field, and flexible connection for simple wiring inside the control cabinet.

With the TIA Selection Tool, you can select suitable system cabling for the individual I/O modules with a simple mouse click. Suitable components for the respective I/O module are always offered. These can be transferred to the order list and then ordered in the Industry Mall.

More information can be found on the Internet at

http://www.siemens.com/tia-selection-tool

## Design

Two cabling variants are available for a wide range of control cabinet concepts:

### Fully modular connection

The system consists of:

- Front connector module
- Connecting cable
- Connection modules in the following versions: Basic module, signal module and function module

Connection errors are thus practically excluded and installation overhead is significantly reduced. Systematic connection of the SIMATIC system. The assembly overhead for the connecting cables is drastically reduced thanks to the use of pre-assembled or easily assembled cables sold by the meter.
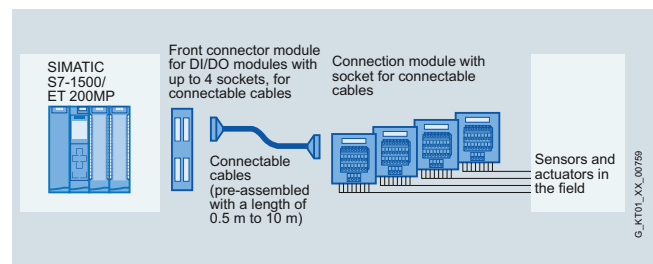


SIMATIC TOP connect for S7-1500/ ET200 MP, fully modular connection

### Flexible connection

Flexible connection with front connectors is available with 20 (Pin1 – 20) or 40 wired single wires.

These are available in lengths from 2.5 m to 10.0 m.

The single wires are available in different versions:

- Wire type H05V-K is used for industrial applications
- The UL/CSA-approved wire is available for export to North America
- The halogen-free version is used where low smoke gas density in the event of fire is required, e.g. in building automation

The blue wires are numbered sequentially and can be routed direct to each element in the control cabinet. The numbering of the single wires corresponds to the coding of the front connector contacts.

In comparison to conventional single wiring, there is a cost saving of 50% for assembly, since the single wires that have already been checked on the connector are fixed.

Thus no complex pre-assembly of up to two times 20 single wires per module is necessary.
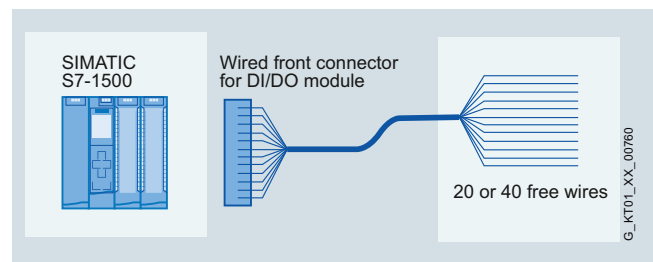


SIMATIC TOP connect for S7-1500/ ET200 MP, flexible connection

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Connection system

**4**

## Overview

The fully modular connection for connecting to the digital I/O modules of the SIMATIC S7-1500 or ET 200MP consists of modified front connectors, called front connector modules, pre-assembled connecting cables of various lengths, and connection modules. Suitable components can be selected for the application in question and joined by means of simple plugs. The connection modules are used instead of conventional terminal blocks and act as the interface to the sensors and actuators.

## Benefits

- Easy plugging in of front connector module, connecting cable and connection module
- Fast and low-cost wiring
- In the case of digital signals, the supply voltage can be connected to the front connector module or the connection module
- Reduction in wiring errors, clear control cabinet wiring
- Byte-by-byte, or four-bye distribution of the signals in the case of digital signals
- Each component can be replaced individually
- Every cable length can be configured without cutting, or pre-assembled cables can be used

## Design

### Front connector module

Modified front connectors, called front connector modules, are available for connecting to the I/O modules. These are plugged into the I/O module to be wired instead of the front connector. The front connector modules are available in many different versions for digital I/O modules, analog I/O modules and for the 24 V, 2-ampère module. The connecting cables are plugged into these front connector modules.

### Connecting cable

The connecting cable is available in two different versions.

As a pre-assembled 16-pole or 50-pole round cable (shielded or unshielded) up to a length of 10 m, or as a 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user; or as 2 x 16-pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with the aid of pliers (can be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting cable connects the front connector module with the connection module.

### Connection module

The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the standard mounting rail. The connection modules with basic or signal functionality are available in 1-byte or 4-byte versions.

Connection modules are available for two different connection methods: with push-in or screw-type terminals. The potential can be fed in at the connection module or at the front connector module.

If other voltage or power levels are required in the field, the connection module for TPRo or TPOo output signals is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, optocouplers are used for the implementation. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC or 110 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that simply converts the 230/110 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (note technical specifications) in order to increase the switching frequency here.



SIMATIC TOP connect for S7-1500/ ET200 MP, fully modular connection

## Technical specifications Front connector modules

| Rated operating voltage | **24 V DC** |
|---|---|
| Max. permissible operating voltage | 60 V DC |
| Max. permissible continuous current • per connector pin | 1 A |
| Max. permissible total current | 2 A/byte |
| Permissible ambient temperature | 0 to +60 °C |
| Test voltage | 0.5 kV, 50 Hz, 60 sec. |
| Clearance and creepage distances | IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2 |

### Wiring rules for the front connector modules

| SIMATIC TOP connect front connector module, connection for potential infeed | | |
|---|---|---|
| | Push-in | Screw terminals |
| | **Modules up to 4 connections** | |
| Connectable cable cross-sections | | |
| • Solid conductors | No | |
| • Flexible cables with/without wire end ferrule | 0.25 to 1.5 mm$^2$ | |
| Number of cables per connection | 1 or a combination of 2 wires up to 1.5 mm$^2$ (total) in a common wire end ferrule | |
| Max. diameter of the cable insulation | 3.1 mm | |
| Stripped length of the cables | | |
| • Without insulating collar | 6 mm | |
| • With insulating collar | - | |
| Wire end ferrules according to DIN 46228 | | |
| • Without insulating collar | Form A; 5 to 7 mm long | |
| • with insulating collar 0.25 to 1.0 mm$^2$ | - | |
| • with insulating collar 1.5 mm$^2$ | - | |
| Blade width of the screwdriver | 3.5 mm (cylindrical design) | |
| Tightening torque for connecting the cables | - | 0.4 Nm to 0.7 Nm |

## Technical specifications Connecting cable

| Technical specifications of connecting cable from SIMATIC S7 to connection module | |
|---|---|
| Operating voltage | 60 V DC |
| Continuous current per signal conductor | 1 A |
| Max. aggregate current | 4 A/byte |
| Operating temperature | 0 to +60 °C |
| Outer diameter of pre-assembled round cable in mm unshielded/ shielded (16-pole) | Approx. 6.5/7.0 |
| Outer diameter of round-sheath ribbon cable in mm 16-pole/2 x 16-pole | Approx. 9.5/11.5 |

## Ordering data · Article No.

### Front connector modules

| | Article No. |
|---|---|
| **Front connector module for digital modules for the connection of 16-pin connecting cables** Power supply via • Push-in • Screw terminals | **6ES7921-5AH20-0AA0** **6ES7921-5AB20-0AA0** |
| **Front connector module for digital modules for the connection of 50-pin connecting cables** Power supply via • Push-in • Screw terminals | **6ES7921-5CH20-0AA0** **6ES7921-5CB20-0AA0** |
| **Front connector module for 2 A digital modules for the connection of 16-pin connecting cables** Power supply via • Push-in • Screw terminals | **6ES7921-5AJ00-0AA0** **6ES7921-5AD00-0AA0** |
| **Front connector module for analog modules for the connection of 16-pin connecting cables** | **6ES7921-5AK20-0AA0** |
| **Front connector module for analog modules for the connection of 50-pin connecting cables** | **6ES7921-5CK20-0AA0** |

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# SIMATIC S7-1500 Advanced Controllers
I/O modules
Connection system

**System cabling for SIMATIC S7-1500 and ET 200MP   > Fully modular connection**

**4**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| *Connecting cables* | | | |

### Connecting cables

| **Connecting cables for SIMATIC S7-300/S7-1500** | | **Connecting cables for S7-1500** | |
|---|---|---|---|
| **Pre-assembled round cable** | | **Pre-assembled round cable** | |
| 16-pin, 0.14 mm$^2$ | | 50-pin, 0.14 mm$^2$ | |
| Unshielded | | Unshielded | |
| • 0.5 m | 6ES7923-0BA50-0CB0 | • 0.5 m | 6ES7923-5BA50-0CB0 |
| • 1.0 m | 6ES7923-0BB00-0CB0 | • 1.0 m | 6ES7923-5BB00-0CB0 |
| • 1.5 m | 6ES7923-0BB50-0CB0 | • 1.5 m | 6ES7923-5BB50-0CB0 |
| • 2.0 m | 6ES7923-0BC00-0CB0 | • 2.0 m | 6ES7923-5BC00-0CB0 |
| • 2.5 m | 6ES7923-0BC50-0CB0 | • 2.5 m | 6ES7923-5BC50-0CB0 |
| • 3.0 m | 6ES7923-0BD00-0CB0 | • 3.0 m | 6ES7923-5BD00-0CB0 |
| • 4.0 m | 6ES7923-0BE00-0CB0 | • 4.0 m | 6ES7923-5BE00-0CB0 |
| • 5.0 m | 6ES7923-0BF00-0CB0 | • 5.0 m | 6ES7923-5BF00-0CB0 |
| • 6.5 m | 6ES7923-0BG50-0CB0 | • 6.5 m | 6ES7923-5BG50-0CB0 |
| • 8.0 m | 6ES7923-0BJ00-0CB0 | • 8.0 m | 6ES7923-5BJ00-0CB0 |
| • 10.0 m | 6ES7923-0CB00-0CB0 | • 10.0 m | 6ES7923-5CB00-0CB0 |
| Shielded | | Shielded | |
| • 1.0 m | 6ES7923-0BB00-0DB0 | • 1.0 m | 6ES7923-5BB00-0DB0 |
| • 2.0 m | 6ES7923-0BC00-0DB0 | • 2.0 m | 6ES7923-5BC00-0DB0 |
| • 2.5 m | 6ES7923-0BC50-0DB0 | • 2.5 m | 6ES7923-5BC50-0DB0 |
| • 3.0 m | 6ES7923-0BD00-0DB0 | • 3.0 m | 6ES7923-5BD00-0DB0 |
| • 4.0 m | 6ES7923-0BE00-0DB0 | • 4.0 m | 6ES7923-5BE00-0DB0 |
| • 5.0 m | 6ES7923-0BF00-0DB0 | • 5.0 m | 6ES7923-5BF00-0DB0 |
| • 6.5 m | 6ES7923-0BG50-0DB0 | • 6.5 m | 6ES7923-5BG50-0DB0 |
| • 8.0 m | 6ES7923-0BJ00-0DB0 | • 8.0 m | 6ES7923-5BJ00-0DB0 |
| • 10.0 m | 6ES7923-0CB00-0DB0 | • 10.0 m | 6ES7923-5CB00-0DB0 |
| Version 4 x 16 to 1 x 50-pin, 0.14 mm$^2$ | | **Accessories** | |
| | | **Manual pliers** | 6ES7928-0AA00-0AA0 |
| Unshielded | | For preparing the connectors (female ribbon connector) | |
| • 0.5 m | 6ES7923-5BA50-0EB0 | | |
| • 1.0 m | 6ES7923-5BB00-0EB0 | | |
| • 1.5 m | 6ES7923-5BB50-0EB0 | | |
| • 2.0 m | 6ES7923-5BC00-0EB0 | | |
| • 2.5 m | 6ES7923-5BC50-0EB0 | | |
| • 3.0 m | 6ES7923-5BD00-0EB0 | | |
| • 4.0 m | 6ES7923-5BE00-0EB0 | | |
| • 5.0 m | 6ES7923-5BF00-0EB0 | | |
| • 6.5 m | 6ES7923-5BG50-0EB0 | | |
| • 8.0 m | 6ES7923-5BJ00-0EB0 | | |
| • 10.0 m | 6ES7923-5CB00-0EB0 | | |
| **Round-sheath ribbon cable** | | | |
| 16-pin, 0.14 mm$^2$ | | | |
| Unshielded | | | |
| • 30 m | 6ES7923-0CD00-0AA0 | | |
| • 60 m | 6ES7923-0CG00-0AA0 | | |
| Shielded | | | |
| • 30 m | 6ES7923-0CD00-0BA0 | | |
| • 60 m | 6ES7923-0CG00-0BA0 | | |
| **Round-sheath ribbon cable** | | | |
| 2 x 16-pin, 0.14 mm$^2$ | | | |
| Unshielded | | | |
| • 30 m | 6ES7923-2CD00-0AA0 | | |
| • 60 m | 6ES7923-2CG00-0AA0 | | |
| **Connector (female ribbon connector)** | 6ES7921-3BE10-0AA0 | | |
| 16-pin, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips | | | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

### Connection modules

| | | | |
|---|---|---|---|
| **Connection module TP1** | | **Connection module for digital output modules 2 A** | |
| For 1-wire connection, for 16-pin connecting cables | | Connection module TP2 | |
| • Push-in terminals without LEDs | 6ES7924-0AA20-0AC0 | • Push-in terminals without LEDs | 6ES7924-0BB20-0AC0 |
| • Screw-type terminals without LEDs | 6ES7924-0AA20-0AA0 | • Screw-type terminals without LEDs | 6ES7924-0BB20-0AA0 |
| • Push-in terminals with LEDs | 6ES7924-0AA20-0BC0 | **Connection module for analog modules (for S7-1500 only)** | |
| • Screw-type terminals with LEDs | 6ES7924-0AA20-0BA0 | Connection module TPA, 16-pin | |
| For 1-wire connection, for 50-pin connecting cables | | • Push-in terminals without LEDs | 6ES7924-0CC20-0AC0 |
| • Push-in terminals without LEDs | 6ES7924-2AA20-0AC0 | • Screw-type terminals without LEDs | 6ES7924-0CC20-0AA0 |
| • Push-in terminals with LEDs | 6ES7924-2AA20-0BC0 | Connection module TPA, 50-pin | |
| • Screw-type terminals without LEDs | 6ES7924-2AA20-0AA0 | • Push-in terminals without LEDs | 6ES7924-2CC20-0AC0 |
| • Screw-type terminals with LEDs | 6ES7924-2AA20-0BA0 | • Screw-type terminals without LEDs | 6ES7924-2CC20-0AA0 |
| **Connection module TP3** | | **Accessories** | |
| For 3-wire connection, for 16-pin connecting cables | | **ID labels for connection modules in S7-1500 design** | |
| • Push-in terminals without LEDs | 6ES7924-0CA20-0AC0 | ID labels, insertable PU = 340 units | 3RT1900-1SB20 |
| • Screw-type terminals without LEDs | 6ES7924-0CA20-0AA0 | **Shield plate for analog connection module** | |
| • Push-in terminals with LEDs | 6ES7924-0CA20-0BC0 | PU = 4 units (for connection of 16-pin connecting cable) | 6ES7928-1AA20-4AA0 |
| • Screw-type terminals with LEDs | 6ES7924-0CA20-0BA0 | PU = 4 units (for connection of 16-pin connecting cable) (for S7-1500 only) | 6ES7928-1BA20-4AA0 |
| • Push-in terminals with LEDs and one isolating terminal per channel | 6ES7924-0CH20-0BC0 | **Shield connection clamp** | |
| • Screw-type terminals with LEDs and one isolating terminal per channel | 6ES7924-0CH20-0BA0 | For shield plate at SIMATIC end, PU = 10 units | 6ES7590-5BA00-0AA0 |
| • Push-in terminals with LED and fuse per channel | 6ES7924-0CL20-0BC0 | For shield plate at field end, 2 x 2 ... 6 mm | 6ES7390-5AB00-0AA0 |
| • Screw-type terminals with LED and fuse per channel | 6ES7924-0CL20-0BA0 | For shield plate at field end, 3 ... 8 mm | 6ES7390-5BA00-0AA0 |
| For 3-wire connection, for 50-pin connecting cables | | For shield plate at field end, 4 ... 13 mm | 6ES7390-5CA00-0AA0 |
| • Push-in terminals without LEDs | 6ES7924-2CA20-0AC0 | | |
| • Screw-type terminals without LEDs | 6ES7924-2CA20-0AA0 | | |
| • Push-in terminals with LEDs | 6ES7924-2CA20-0BC0 | | |
| • Screw-type terminals with LEDs | 6ES7924-2CA20-0BA0 | | |
| **Connection module TPRo** | | | |
| Relay module for 8 outputs, relay as normally open contact | | | |
| • Push-in terminals with LEDs | 6ES7924-0BD20-0BC0 | | |
| • Screw-type terminals with LEDs | 6ES7924-0BD20-0BA0 | | |
| **Connection module TPRi** | | | |
| Relay module for 8 outputs (110 V AC), relay as normally open contact | | | |
| • Push-in terminals with LEDs | 6ES7924-0BG20-0BC0 | | |
| • Screw-type terminals with LEDs | 6ES7924-0BG20-0BA0 | | |
| **Connection module TPRi** | | | |
| Relay module for 8 outputs (230 V AC), relay as normally open contact | | | |
| • Push-in terminals with LEDs | 6ES7924-0BE20-0BC0 | | |
| • Screw-type terminals with LEDs | 6ES7924-0BE20-0BA0 | | |
| **Connection module TPOo** | | | |
| Optocoupler module for 8 outputs (max. 24 V DC/4 A) | | | |
| • Push-in terminals with LEDs | 6ES7924-0BF20-0BC0 | | |
| • Screw-type terminals with LEDs | 6ES7924-0BF20-0BA0 | | |

**4**

# SIMATIC S7-1500 Advanced Controllers
I/O modules
Connection system

## Overview

Can be used for SIMATIC S7-1500 and ET 200MP digital modules (24 V DC)

The front connectors with single wires replace the SIMATIC standard connectors

- 6ES7592-1AM00-0XB0

## Technical specifications

| Front connector with single wires for 16 channels (pins 1-20) | |
|---|---|
| Rated operating voltage | 24 V DC |
| Permissible continuous current with simultaneous load of all wires, max. | 1.5 A |
| Permissible ambient temperature | 0 to 60 °C |
| Wire type | H05V-K, UL 1007/1569; CSA TR64, or halogen-free |
| Number of single wires | 20 |
| Wire cross-section | 0.5 mm$^2$; Cu |
| Bundle diameter in mm | approx. 15 |
| Wire color | Blue, RAL 5010 |
| Designation of wires | Numbered from 1 to 20 (front connector contact = wire number) |
| Assembly | Screw contacts |

| Front connector with single wires for 32 channels (pins 1-40) | |
|---|---|
| Rated operating voltage | 24 V DC |
| Permissible continuous current with simultaneous load of all wires, max. | 1.5 A |
| Permissible ambient temperature | 0 to 60 °C |
| Wire type | H05V-K, UL 1007/1569; CSA TR64, or halogen-free |
| Number of single wires | 40 |
| Wire cross-section | 0.5 mm$^2$; Cu |
| Bundle diameter in mm | approx. 17 |
| Wire color | Blue, RAL 5010 |
| Designation of wires | Numbered from 1 to 40 (front connector contact = wire number) |
| Assembly | Screw contacts |

## Ordering data

| | Article No. |
|---|---|
| **Front connector with single wires for 32 channels (pins 1-40)** | |
| **Wire type H05V-K (0.5 mm$^2$ with screw connection)** | |
| • 2.5 m | **6ES7922-5BC50-0AC0** |
| • 3.2 m | **6ES7922-5BD20-0AC0** |
| • 5.0 m | **6ES7922-5BF00-0AC0** |
| • 6.5 m | **6ES7922-5BG50-0AC0** |
| • 8.0 m | **6ES7922-5BJ00-0AC0** |
| • 10.0 m | **6ES7922-5CB00-0AC0** |
| **Wire type H05Z-K, halogen-free (0.5 mm$^2$ with screw connection)** | |
| • 2.5 m | **6ES7922-5BC50-0HC0** |
| • 3.2 m | **6ES7922-5BD20-0HC0** |
| • 5.0 m | **6ES7922-5BF00-0HC0** |
| • 6.5 m | **6ES7922-5BG50-0HC0** |
| • 8.0 m | **6ES7922-5BJ00-0HC0** |
| • 10.0 m | **6ES7922-5CB00-0HC0** |
| **Wire type UL/CSA-certified (0.5 mm$^2$ with screw connection)** | |
| • 3.2 m | **6ES7922-5BD20-0UC0** |
| • 5.0 m | **6ES7922-5BF00-0UC0** |
| • 6.5 m | **6ES7922-5BG50-0UC0** |
| **Front connector with single wires for 16 channels (pins 1-20)** | |
| **Wire type H05V-K (0.5 mm$^2$ with screw connection)** | |
| • 2.5 m | **6ES7922-5BC50-0AB0** |
| • 3.2 m | **6ES7922-5BD20-0AB0** |
| • 5.0 m | **6ES7922-5BF00-0AB0** |
| • 6.5 m | **6ES7922-5BG50-0AB0** |
| • 8.0 m | **6ES7922-5BJ00-0AB0** |
| • 10.0 m | **6ES7922-5CB00-0AB0** |
| **Wire type H05Z-K, halogen-free (0.5 mm$^2$ with screw connection)** | |
| • 2.5 m | **6ES7922-5BC50-0HB0** |
| • 3.2 m | **6ES7922-5BD20-0HB0** |
| • 5.0 m | **6ES7922-5BF00-0HB0** |
| • 6.5 m | **6ES7922-5BG50-0HB0** |
| • 8.0 m | **6ES7922-5BJ00-0HB0** |
| • 10.0 m | **6ES7922-5CB00-0HB0** |
| **Wire type UL/CSA-certified (0.5 mm$^2$ with screw connection)** | |
| • 3.2 m | **6ES7922-5BD20-0UB0** |
| • 5.0 m | **6ES7922-5BF00-0UB0** |
| • 6.5 m | **6ES7922-5BG50-0UB0** |

4

4

## Overview



Fail-safe digital input module:

F-DI 16x24VDC PROFISAFE

Important properties:

- 16-channel fail-safe digital input module for ET 200MP/S7-1500
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 4 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. Can be used with all fail-safe SIMATIC S7-1500 F-CPUs in the central configuration, as well as ET 200MP distributed I/O with all other SIMATIC S7 F-CPUs.

## Technical specifications

| Article number | 6ES7526-1BH00-0AB0 |
|---|---|
| | ET 200MP, F-DI 16X24VDC |
| **General information** | |
| Product type designation | F-DI 16x24VDC |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 with HSP0086 |
| **Operating mode** | |
| • DI | Yes |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Encoder supply** | |
| Number of outputs | 4 |
| Short-circuit protection | Yes; Electronic (response threshold 0.7 A to 1.8 A) |
| **24 V encoder supply** | |
| • 24 V | Yes; min. L+ (-1.5 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 300 mA; Max. 100 mA when mounted vertically |
| **Digital inputs** | |
| Number of digital inputs | 16 |
| Source/sink input | Yes; P-reading |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +15 to +30V |
| **Input current** | |
| • for signal "1", typ. | 3.7 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 500 m |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | No |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | No |
| • Short-circuit | Yes |
| • Group error | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • for module diagnostics | Yes; Red LED |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## F digital/analog modules

**F digital input modules**

## ■ Technical specifications  (continued)

| Article number | **6ES7526-1BH00-0AB0** |
|---|---|
| | ET 200MP, F-DI 16X24VDC |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 5.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 280 g |

## ■ Ordering data | Article No.

| | |
|---|---|
| **F digital input module** | |
| 16 inputs, 24 V DC, PROFISAFE | **6ES7526-1BH00-0AB0** |
| **Accessories** | |
| **Coding elements** | **6ES7592-6EF00-1AA0** |
| E-coding element type F for ET 200 MP-module F-DI/F-DQ; 5 units, spare part | |
| **Front connectors** | |
| Incl. four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | **6ES7592-1AM00-0XB0** |
| • Push-in | **6ES7592-1BM00-0XB0** |
| **DIN A4 labeling sheets** | **6ES7592-2CX00-0AA0** |
| For 35-mm F-modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, yellow | |
| **U connector** | **6ES7590-0AA00-0AA0** |
| 5 units; spare part | |
| **Front door for F-I/O modules** | |
| 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | **6ES7528-0AA10-7AA0** |
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| **S7 Distributed Safety V5.4 programming tool** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200MP, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license for 1 user | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## Overview

Digital fail-safe digital output module:
F-DQ 8x24VDC 2A PPM PROFISAFE

Important properties:

- 8-channel digital fail-safe output module for ET 200MP/S7-1500
- Fail-safe 2-channel activation (parameterizable PM/PP switching) of actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The module supports PROFIsafe in both PROFIBUS and PROFINET configurations.
- Can be used with all fail-safe SIMATIC S7-1500 F-CPUs in the central configuration, as well as ET 200MP distributed I/O with all other SIMATIC S7 F-CPUs.

## Technical specifications

| Article number | 6ES7526-2BF00-0AB0 |
|---|---|
| | ET 200MP, F-DQ 8X24VDC 2A PPM |
| **General information** | |
| Product type designation | F-DQ 8x24VDC/2A PPM |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 with HSP0086 |
| **Operating mode** | |
| • DQ | Yes |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| Current-sinking | Yes |
| Current-sourcing | Yes |
| Short-circuit protection | Yes |
| Open-circuit detection | Yes |
| Overload protection | Yes |
| Limitation of inductive shutdown voltage to | PM-switching: -24 V + (-47 V), PP-switching: -24 V |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 2 A |
| • on lamp load, max. | 10 W |
| **Load resistance range** | |
| • lower limit | 12 Ω |
| • upper limit | 2 000 Ω |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "1", min. | 24 V; L+ (-0.5 V) |
| **Output current** | |
| • for signal "1" rated value | 2 A |
| • for signal "0" residual current, max. | 0.5 mA; Current-sourcing, or current sourcing and sinking switches individually, current sinking: max. 1 mA |
| **Switching frequency** | |
| • with resistive load, max. | 30 Hz |
| • with inductive load, max. | 0.1 Hz |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per channel, max. | 2 A |
| **Total current of the outputs (per module)** | |
| **horizontal installation** | |
| - up to 40 °C, max. | 16 A |
| - up to 60 °C, max. | 8 A |
| **vertical installation** | |
| - up to 40 °C, max. | 8 A |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 500 m |

# SIMATIC S7-1500 Advanced Controllers
## I/O modules
## F digital/analog modules

**F digital output modules**

## Technical specifications  (continued)

| Article number | **6ES7526-2BF00-0AB0** |
| --- | --- |
| | ET 200MP, F-DQ 8X24VDC 2A PPM |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| Substitute values connectable | No |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| • Group error | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • for module diagnostics | Yes; Red LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 6.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 2.00E-09 1/h |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 300 g |

## Ordering data

| | Article No. |
| --- | --- |
| **F digital output module** | |
| 8 outputs, 24 V DC, 2 A, PROFISAFE, p/m-switching | **6ES7526-2BF00-0AB0** |
| **Accessories** | |
| **Coding elements** | **6ES7592-6EF00-1AA0** |
| E-coding element type F for ET 200 MP-module F-DI/F-DQ; 5 units, spare part | |
| **Front connectors** | |
| Incl. four potential bridges, cable ties and individual labeling strips, 40-pin | |
| • Screw terminals | **6ES7592-1AM00-0XB0** |
| • Push-in | **6ES7592-1BM00-0XB0** |
| **DIN A4 labeling sheets** | **6ES7592-2CX00-0AA0** |
| For 35-mm F-modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, yellow | |
| **U connector** | **6ES7590-0AA00-0AA0** |
| 5 units; spare part | |
| **Front door for F-I/O modules** | |
| 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part | **6ES7528-0AA10-7AA0** |
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| **S7 Distributed Safety V5.4 programming tool** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200MP, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license for 1 user | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |

[1]  For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

**4**

## ■ Overview

The design and functionality of the SIMATIC PM 1507 single-phase load power supply (PM = power module) with automatic range selection of the input voltage makes it an optimal match to the SIMATIC S7-1500 PLC. It supplies the S7-1500 system components such as CPU, system power supply (PS), I/O circuits of the input and output modules and, if necessary, the sensors and actuators with 24 V DC.

## ■ Technical specifications

| Article number | 6EP1332-4BA00 | 6EP1333-4BA00 |
|---|---|---|
| Product | S7-1500 PM1507 | S7-1500 PM1507 |
| Power supply, type | 24 V/3 A | 24 V/8 A |
| **Input** | | |
| Input | 1-phase AC | 1-phase AC |
| Supply voltage | | |
| • 1 at AC Rated value | 120 V | 120 V |
| • 2 at AC Rated value | 230 V | 230 V |
| • Note | Automatic range selection | Automatic range selection |
| Input voltage | | |
| • 1 at AC | 85 ... 132 V | 85 ... 132 V |
| • 2 at AC | 170 ... 264 V | 170 ... 264 V |
| Wide-range input | No | No |
| Overvoltage resistance | $2.3 \times V_{in}$ rated, 1.3 ms | $2.3 \times V_{in}$ rated, 1.3 ms |
| Mains buffering at $I_{out\ rated}$, min. | 20 ms; at $V_{in}$ = 93/187 V | 20 ms; at $V_{in}$ = 93/187 V |
| Rated line frequency 1 | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | 60 Hz |
| Rated line range | 45 ... 65 Hz | 45 ... 65 Hz |
| Input current | | |
| • at rated input voltage 120 V | 1.4 A | 3.7 A |
| • at rated input voltage 230 V | 0.8 A | 1.7 A |
| Switch-on current limiting (+25 °C), max. | 23 A | 62 A |
| Duration of inrush current limiting at 25 °C | | |
| • maximum | 3 ms | 3 ms |
| $I^2t$, max. | 1.3 A²·s | 12 A²·s |
| Built-in incoming fuse | T 3,15 A/250 V (not accessible) | T 6.3 A/250 V (not accessible) |
| Protection in the mains power input (IEC 898) | Recommended miniature circuit breaker: 10 A characteristic B or 6 A characteristic C | Recommended miniature circuit breaker: 16 A characteristic B or 10 A characteristic C |

# SIMATIC S7-1500 Advanced Controllers
Power supplies

## 1-phase, 24 V DC (for S7-1500 and ET200MP)

■ **Technical specifications** (continued)

| Article number | 6EP1332-4BA00 | 6EP1333-4BA00 |
|---|---|---|
| Product | S7-1500 PM1507 | S7-1500 PM1507 |
| Power supply, type | 24 V/3 A | 24 V/8 A |
| **Output** | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 24 V | 24 V |
| Total tolerance, static ± | 1 % | 1 % |
| Static mains compensation, approx. | 0.1 % | 0.1 % |
| Static load balancing, approx. | 0.1 % | 0.1 % |
| Residual ripple peak-peak, max. | 50 mV | 50 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 150 mV | 150 mV |
| Product function Output voltage adjustable | No | No |
| Status display | LED green for 24 V OK; LED red for error; LED yellow for stand-by | LED green for 24 V OK; LED red for error; LED yellow for stand-by |
| On/off behavior | No overshoot of Vout (soft start) | No overshoot of Vout (soft start) |
| Startup delay, max. | 1.5 s | 1.5 s |
| Voltage rise, typ. | 10 ms | 10 ms |
| Rated current value Iout rated | 3 A | 8 A |
| Current range | 0 ... 3 A | 0 ... 8 A |
| Supplied active power typical | 72 W | 192 W |
| Short-term overload current | | |
| • on short-circuiting during the start-up typical | 12 A | 35 A |
| • at short-circuit during operation typical | 12 A | 35 A |
| Duration of overloading capability for excess current | | |
| • on short-circuiting during the start-up | 70 ms | 70 ms |
| • at short-circuit during operation | 70 ms | 70 ms |
| Parallel switching for enhanced performance | No | No |
| **Efficiency** | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 87 % | 90 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 11 W | 21 W |
| **Closed-loop control** | | |
| Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max. | 0.1 % | 0.1 % |
| Dynamic load smoothing ($I_{out}$: 50/100/50 %), $U_{out}$ ± typ. | 1 % | 2 % |
| Dynamic load smoothing ($I_{out}$: 10/90/10 %), $U_{out}$ ± typ. | 3 % | 3 % |
| Load step setting time 10 to 90%, typ. | 5 ms | 5 ms |
| Load step setting time 90 to 10%, typ. | 5 ms | 5 ms |
| Setting time maximum | 5 ms | 5 ms |
| **Protection and monitoring** | | |
| Output overvoltage protection | Additional control loop, limitation (closed loop control) at < 28.8 V | Additional control loop, limitation (closed loop control) at < 28.8 V |
| Current limitation | 3.15 ... 3.6 A | 8.4 ... 9.6 A |
| Current limitation, typ. | 3.4 A | 9 A |
| Property of the output Short-circuit proof | Yes | Yes |
| Short-circuit protection | Electronic shutdown, automatic restart | Electronic shutdown, automatic restart |
| Overload/short-circuit indicator | - | - |
| **Safety** | | |
| Primary/secondary isolation | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 and EN 61131-2 | Safety extra-low output voltage $U_{out}$ acc. to EN 60950-1 and EN 50178 and EN 61131-2 |
| Protection class | Class I | Class I |
| Leakage current | | |
| • maximum | 3.5 mA | 3.5 mA |
| • typical | 0.4 mA | 1.3 mA |

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## Technical specifications  (continued)

| Article number | **6EP1332-4BA00** | **6EP1333-4BA00** |
|---|---|---|
| Product | S7-1500 PM1507 | S7-1500 PM1507 |
| Power supply, type | 24 V/3 A | 24 V/8 A |
| CE mark | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289 | cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289 |
| Explosion protection | IECEx Ex nA nC IIC T4 Gc;<br>ATEX (EX) II 3G Ex nA nC IIC T4 Gc;<br>cULus (ISA 12.12.01, CSA C22.2 No.213) Class I,<br>Div. 2, Group ABCD, T4, File E330455 | IECEx Ex nA nC IIC T3 Gc;<br>ATEX (EX) II 3G Ex nA nC IIC T3 Gc;<br>cULus (ISA 12.12.01, CSA C22.2 No.213) Class I,<br>Div. 2, Group ABCD, T3, File E330455 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | Class I, Div. 2, Group ABCD, T4 |
| CB approval | Yes | Yes |
| Marine approval | GL, ABS, BV, DNV | GL, ABS, BV, DNV |
| Degree of protection (EN 60529) | IP20 | IP20 |
| **EMC** | | |
| Emitted interference | EN 55022 Class B | EN 55022 Class B |
| Supply harmonics limitation | EN 61000-3-2 | EN 61000-3-2 |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | |
| Ambient temperature | | |
| • during operation | 0 ... 60 °C | 0 ... 60 °C |
| - Note | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K3, no condensation |
| **Mechanics** | | |
| Connection technology | Screw-/spring clamp connection | Screw-/spring clamp connection |
| Connections | | |
| • Supply input | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² |
| • Output | L+, M: 2 spring-loaded terminals each for 0.5 to 2.5 mm² | L+, M: 2 spring-loaded terminals each for 0.5 to 2.5 mm² |
| Product function | | |
| • removable terminal at input | Yes | Yes |
| • removable terminal at output | Yes | Yes |
| Width of the enclosure | 50 mm | 75 mm |
| Height of the enclosure | 147 mm | 147 mm |
| Depth of the enclosure | 129 mm | 129 mm |
| Weight, approx. | 0.45 kg | 0.74 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes |
| Installation | Can be mounted onto S7-1500 rail | Can be mounted onto S7-1500 rail |
| MTBF at 40 °C | 1 611 993 h | 1 362 918 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC PM 1507** | | **Power connector** | **6ES7590-8AA00-0AA0** |
| Stabilized power supply for SIMATIC S7-1500<br>Input: 120/230 V AC<br>Output: 24 V DC | | With coding element for power supply module; spare part, 10 units per packing unit | |
| • Output current 3 A | **6EP1332-4BA00** | | |
| • Output current 8 A | **6EP1333-4BA00** | | |

# SIMATIC S7-1500 Advanced Controllers
Power supplies

## System power supplies

### Overview

- System power supplies for the SIMATIC S7-1500
- For conversion of AC or DC line voltages to the operating voltages required for the internal electronics
- 25 or 60 W output power
- Can be used for S7-1500 or ET 200MP
- Engineering and configuration via STEP 7 V12 and higher (PS 60W 24/48/60V DC HF: from STEP 7 V14 SP1)
- In addition with PS 60W 24/48/60V DC HF: Retentive storage of CPU work memory (data) for all S7-1500 CPUs

### Technical specifications

| Article number | 6ES7505-0KA00-0AB0 | 6ES7505-0RA00-0AB0 | 6ES7505-0RB00-0AB0 | 6ES7507-0RA00-0AB0 |
|---|---|---|---|---|
| | S7-1500, PS 25W 24V DC | S7-1500, PS 60W 24/48/60V DC | S7-1500, PS 60W 24/48/60V DC HF | S7-1500, PS 60W 120/230V AC/DC |
| **General information** | | | | |
| Product type designation | PS 25W 24VDC | PS 60W 24/48/60V DC | PS 60W 24/48/60V DC HF | PS 60W 120/230V AC/DC |
| HW functional status | E01 | E01 | E01 | E01 |
| Firmware version | V1.0.0 | V1.0.0 | V1.0.0 | V1.0.0 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V12 / V12 | V12 / V12 | V14 SP1 | V12 / V12 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 or higher | V5.5 SP3 or higher | | V5.5 SP3 or higher |
| **Supply voltage** | | | | |
| Rated value (DC) | 24 V | 24 V / 48 V / 60 V | 24 V / 48 V / 60 V | 120 V / 230 V |
| permissible range, lower limit (DC) | Static 19.2 V, dynamic 18.5 V | Static 19.2 V, dynamic 18.5 V | Static 19.2 V, dynamic 18.5 V | 88 V |
| permissible range, upper limit (DC) | Static 28.8 V, dynamic 30.2 V | Static 72 V, dynamic 75.5 V | Static 72 V, dynamic 75.5 V | 300 V |
| Rated value (AC) | | | | 120 V / 230 V |
| permissible range, lower limit (AC) | | | | 85 V |
| permissible range, upper limit (AC) | | | | 264 V |
| Reverse polarity protection | Yes | Yes | Yes | |
| Short-circuit protection | Yes | Yes | Yes | Yes |
| **Line frequency** | | | | |
| • Rated value 50 Hz | | | | Yes |
| • permissible range, lower limit | | | | 47 Hz |
| • permissible range, upper limit | | | | 63 Hz |
| **Mains buffering** | | | | |
| • Mains/voltage failure stored energy time | 20 ms | 20 ms | 20 ms | 20 ms |
| **Input current** | | | | |
| Rated value at 24 V DC | 1.3 A | 3 A | 3 A | |
| Rated value at 48 V DC | | 1.5 A | 1.5 A | |
| Rated value at 60 V DC | | 1.2 A | 1.2 A | |
| Rated value at 120 V DC | | | | 0.6 A |
| Rated value at 230 V DC | | | | 0.3 A |
| Rated value at 120 V AC | | | | 0.6 A |
| Rated value at 230 V AC | | | | 0.34 A |
| **Output current** | | | | |
| Short-circuit protection | Yes | Yes | Yes | Yes |

## Technical specifications (continued)

| Article number | 6ES7505-0KA00-0AB0 | 6ES7505-0RA00-0AB0 | 6ES7505-0RB00-0AB0 | 6ES7507-0RA00-0AB0 |
|---|---|---|---|---|
| | S7-1500, PS 25W 24V DC | S7-1500, PS 60W 24/48/60V DC | S7-1500, PS 60W 24/48/60V DC HF | S7-1500, PS 60W 120/230V AC/DC |
| **Power** | | | | |
| Infeed power to the backplane bus | 25 W | 60 W | 60 W | 60 W |
| **Power loss** | | | | |
| Power loss at nominal rating conditions | 6.2 W | 12 W | 12 W | 12 W |
| **Interrupts/diagnostics/ status information** | | | | |
| Status indicator | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | |
| primary/secondary | Yes | Yes; Electrical isolation for 230 V AC (reinforced isolation) | | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 2 500 V DC/2 s (routine test) | 2 500 V DC/2 s (routine test) | 2 500 V DC/2 s (routine test) |
| **EMC** | | | | |
| **Interference immunity against voltage surge** | | | | |
| • on the supply lines acc. to IEC 61000-4-5 | Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required | Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required | Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required | Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | IP20 | IP20 | IP20 | IP20 |
| Protection class | 3; with protective conductor | 1; with protective conductor | 1; with protective conductor | 1; with protective conductor |
| **Dimensions** | | | | |
| Width | 35 mm | 70 mm | 105 mm | 70 mm |
| Height | 147 mm | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm | 129 mm |
| **Weights** | | | | |
| Weight, approx. | 350 g | 600 g | 865 g | 600 g |

## Ordering data

| Power supply | Article No. | Accessories | Article No. |
|---|---|---|---|
| **Power supply** | | **Accessories** | |
| For supplying the backplane bus of the S7-1500 | | **SIMATIC S7-1500 mounting rail** | |
| | | Fixed lengths, with grounding elements | |
| 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** | • 160 mm | **6ES7590-1AB60-0AA0** |
| | | • 245 mm | **6ES7590-1AC40-0AA0** |
| 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** | • 482 mm | **6ES7590-1AE80-0AA0** |
| | | • 530 mm | **6ES7590-1AF30-0AA0** |
| 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** | • 830 mm | **6ES7590-1AJ30-0AA0** |
| | | For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** | • 2000 mm | **6ES7590-1BC00-0AA0** |
| | | **PE connection element for mounting rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| | | Spare part, 20 units | |
| | | **Power connector** | **6ES7590-8AA00-0AA0** |
| | | With coding element for power supply module; spare part, 10 units | |

# SIMATIC S7-1500 Advanced Controllers
SIPLUS power supplies

## 1-phase, 24 V DC (for S7-1500 and ET200MP)

### ■ Overview

The design and functionality of the SIMATIC PM 1507 single-phase load power supply (PM = power module) with automatic range selection of the input voltage makes it an optimal match to the SIMATIC S7-1500 PLC. It supplies the S7-1500 system components such as CPU, system power supply (PS), I/O circuits of the input and output modules and, if necessary, the sensors and actuators with 24 V DC.

Note

SIPLUS extreme products are based on Siemens standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

| Article No. | 6AG1332-4BA00-7AA0 | 6AG1333-4BA00-7AA0 |
|---|---|---|
| Article number based on | 6EP1332-4BA00 | 6EP1333-4BA00 |
| Ambient temperature range | -40 ... +70 °C | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical specifications | The technical specifications of the standard product apply, except for the ambient conditions. | |
| **Ambient conditions** | | |
| Extended range of environmental conditions • with reference to ambient temperature, air pressure and altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | |
| Relative humidity • with condensation, max. | 100 %; RH incl. bedewing/frost (no commissioning in bedewed state) | |
| Resistance • to biologically active substances/ compliance with EN 60721-3-3 • to chemically active substances/ compliance with EN 60721-3-3 • to mechanically active substances, compliance with EN 60721-3-3 | Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation. | |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-1500 PM 1507** (Extended temperature range and exposure to media) | | **Accessories** | See SIMATIC PM 1507, 1-phase, 24 V DC (for S7-1500 and ET200MP), page 4/153 |
| Input 120/230 V AC, output 24 V DC, 3 A | 6AG1332-4BA00-7AA0 | | |
| Input 120/230 V AC, output 24 V DC, 8 A | 6AG1333-4BA00-7AA0 | | |

## ■ Overview



- System power supplies for the SIMATIC S7-1500
- For conversion of AC or DC line voltages to the operating voltages required for the internal electronics
- 25 or 60 W output power
- Can be used for S7-1500 or ET 200MP
- Configuration via STEP 7 V12

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | 6AG1505-0KA00-7AB0 | 6AG1505-0RA00-7AB0 | 6AG1507-0RA00-7AB0 |
|---|---|---|---|
| Based on | 6ES7505-0KA00-0AB0 | 6ES7505-0RA00-0AB0 | 6ES7507-0RA00-0AB0 |
| | SIPLUS S7-1500 PS 25W 24V DC | SIPLUS S7-1500 PS 60W 24/48/60V DC | SIPLUS S7-1500 PS 60W 120/230V AC/DC |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax; for vertical mounting position Tmax = +40 °C | 70 °C; = Tmax; > +60 °C max. power input 30 W; for vertical mounting position Tmax = +40 °C | 70 °C; = Tmax; for vertical mounting position Tmax = +40 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | | -40 °C | |
| • max. | | 70 °C | |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-1500 Advanced Controllers
## SIPLUS power supplies

**SIPLUS system power supplies**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-1500 system power supply** | | **Accessories** | See SIMATIC S7-1500, system power supplies, page 4/155 |
| (Extended temperature range and exposure to media) | | | |
| For supplying the backplane bus of the S7-1500 | | | |
| 24 V DC input voltage, power 25 W | **6AG1505-0KA00-7AB0** | | |
| 24/48/60 V DC input voltage, power 60 W | **6AG1505-0RA00-7AB0** | | |
| 120/230 V AC input voltage, power 60 W | **6AG1507-0RA00-7AB0** | | |

**4**

**4**

■ **Overview**





### Basic Panels 2<sup>nd</sup> Generation

*Basic Panels 2nd Generation*

SIMATIC HMI Basic Panels (2nd Generation) with their fully developed HMI basic functions are the ideal entry level series for simple HMI applications.

The device family offers panels with 4", 7", 9" and 12" widescreen displays, as well as combined key and touch operation.

The innovative high-resolution widescreen displays with 64 000 colors are also suitable for upright installation, and they can be dimmed down to 100%. The innovative operator interface with improved usability opens up a diverse range of options thanks to new controls and graphics. The new USB interface enables the connection of keyboard, mouse or barcode scanner, and supports the simple archiving of data on a USB flash drive as well as the manual backup and restoring of the complete panel.

The integrated Ethernet or RS 485/422 interface (version-specific) enables simple connection to the controller.

For more information, see chapter 3, page 3/170.
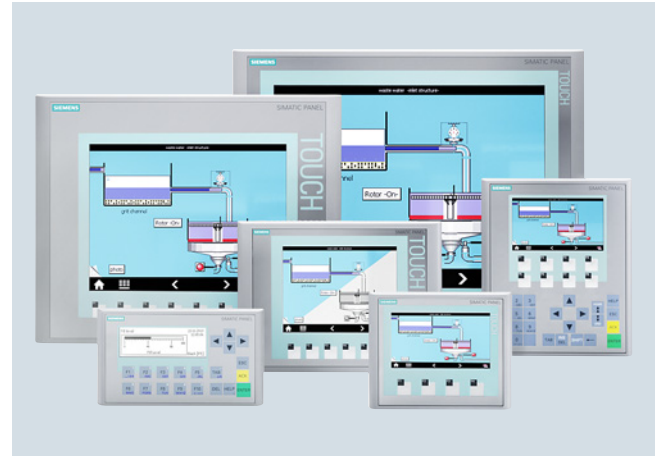
### Basic Panels 1<sup>st</sup> Generation

*Basic Panels 1st Generation*

- Ideal entry-level series from 3" to 15" for operating and monitoring compact machines and systems
- Clear process representation thanks to use of pixel-graphics displays
- Intuitive operation using touch and tactile function keys
- Equipped with all the necessary basic functions such as alarm logging, recipe management, plots, vector graphics, and language switching
- Simple connection to the controller via integral Ethernet interface or separate version with RS 485/422
- Faster commissioning thanks to integrated diagnostics viewer and IP setting for SIMATIC S7-1200 and S7-1500 PLCs

For more information, see chapter 3, page 3/171.

# SIMATIC S7-1500 Advanced Controllers
Operator control and monitoring

## SIPLUS Basic Panels and Comfort Panels

### ■ Overview (continued)



**SIMATIC HMI Comfort Panels - Standard devices**

- Excellent HMI functionality for demanding applications
- Widescreen TFT displays with 4", 7", 9", 12", 15", 19" and 22" diagonals (all 16 million colors) with up to 40% more visualization area as compared to the predecessor devices
- Integrated high-end functionality with archives, scripts, PDF/Word/Excel viewer, Internet Explorer, Media Player and web Server
- Dimmable displays from 0 to 100% via PROFIenergy, via the HMI project or via a controller

- Modern industrial design, cast aluminum fronts for 7" upwards
- Upright installation for all touch devices
- Optimal selection option: seven touch and five key versions are available
- Data security in the event of a power failure for the device and for the SIMATIC HMI Memory Card
- Innovative service and commissioning concept through second SD card (automatic backup)
- Maximum performance with short screen refresh times
- Suitable for extremely harsh industrial environments thanks to extended approvals such as ATEX 2/22 and marine approvals
- Wide range of communication options: PROFIBUS and PROFINET onboard; 2 x PROFINET with integrated switch for 7" models or larger; plus 1 x PROFINET with Gigabit support for 15" models or larger
- All versions can be used as an OPC UA client or as an OPC DA server
- Key-operated devices with LED in every function key and new text input mechanism, similar to the keypads of mobile phones
- All keys have a service life of 2 million operations
- Configuring with the WinCC engineering software of the TIA Portal

Note:

A 7" and 15" Comfort Outdoor version will be available soon.
For more information, please go to:
http://www.siemens.com/hmi

For more Information, see chapter 3, page 3/172.

## SIPLUS Basic Panels and Comfort Panels

### ■ Overview

SIPLUS extreme products are based on SIMATIC standard products.

For SIPLUS technical documentation, see:
http://www.siemens.com/siplus-extreme

For more information, see chapter 3, page 3/174.

## ■ Overview



- Aluminum mounting rail for mounting the SIMATIC S7-1500 or ET 200MP
- With integrated DIN rail for snapping on a wide range of standard components
- Attachment of modules with a single screw
- Installation by screwing to the control cabinet wall.
- Entire length of rail can be used

## ■ Ordering data

| | Article No. |
|---|---|
| **SIMATIC S7-1500 DIN rail** | |
| Fixed lengths, with grounding elements | |
| • 160 mm | **6ES7590-1AB60-0AA0** |
| • 245 mm | **6ES7590-1AC40-0AA0** |
| • 482 mm | **6ES7590-1AE80-0AA0** |
| • 530 mm | **6ES7590-1AF30-0AA0** |
| • 830 mm | **6ES7590-1AJ30-0AA0** |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | |
| • 2000 mm | **6ES7590-1BC00-0AA0** |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** |
| 20 units | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-1500 Advanced Controllers
Accessories

**Labeling sheets**

## ■ Overview



- Film sheets for the application-specific, automatic labeling of I/O modules of the SIMATIC S7-1500 using standard laser printers
- Printing direct from the TIA Portal possible
  - No double entry of symbols and/or addresses
  - Saves time and avoids typing errors
- Plain color films, tear-resistant, dirt-repellent
- Simple handling:
  - Perforated labeling sheets in DIN A4 format for easy separation of the labeling strips.
  - Detached strips can be inserted directly into the I/O modules.
- Different colors to differentiate module types; yellow reserved for fail-safe systems

## ■ Ordering data

| | Article No. |
|---|---|
| **DIN A4 labeling sheet** | |
| For 35 mm module; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray | **6ES7592-2AX00-0AA0** |
| For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray | **6ES7592-1AX00-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

## ■ Overview

### *Front doors*

- Versions:
  - Universal front doors for digital and analog I/O modules
  - Universal front doors for the interface module IM155-5 PN ST
- Included in the scope of delivery of the respective modules. Can be ordered as a spare part in a set consisting of five universal (unlabeled) front doors.
- Front doors for I/O modules: Universal labeling sheets and cabling diagrams are included. Cabling diagrams can be detached from preperforated sheets and inserted inside the door.

### *U connector*
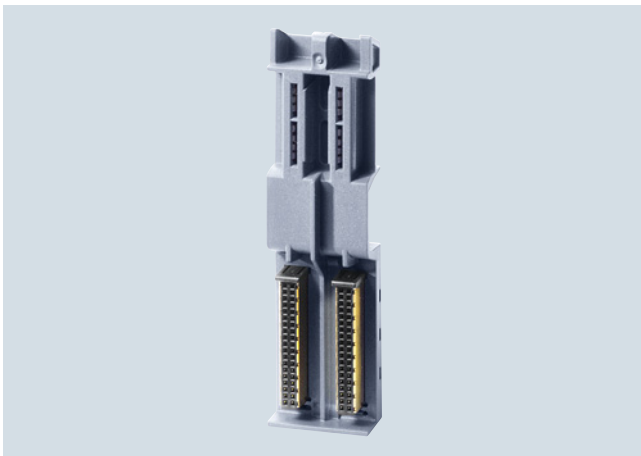
- To interconnect the modules (self-assembling backplane bus)
- Implementation of a rugged, interference-free station setup through
  - Consistent separation of supply voltage of modules and data signals
  - Fully shielded, gold-plated contacts for the data bus
- Included in the scope of delivery of each module. Available as spare part in sets of 5.

### *Shielding*

- Components for implementing the integrated shielding concept of the S7-1500:
  - 24 V DC infeed element for supplying the analog module: strict separation of infeed and analog signals ensures high EMC stability.
  - Shield bracket for insertion in the front connector: allows a low-impedance connection and optimally dissipates interference.
  - Universal shield terminal: connects the cable shield with the shield bracket and is simultaneously used for mechanical fixing.
- Included in the scope of delivery of the analog modules. Available as a spare part in two versions:
  - Shielding set, comprising infeed element, shield bracket, and shield terminal (pack of 5 units each)
  - Individual shield terminals (pack of 20)
- No tool required for assembly/disassembly

# SIMATIC S7-1500 Advanced Controllers
Accessories

| Ordering data | Article No. |
|---|---|
| **Universal front door for IM 155-5 PN ST**<br>5 front doors; spare part | 6ES7528-0AA70-7AA0 |
| **Universal front door for I/O modules**<br>5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part<br>• For 35 mm modules<br>• For 25 mm modules | <br><br><br><br>6ES7528-0AA00-7AA0<br>6ES7528-0AA00-0AA0 |
| **U connector**<br>5 units; spare part | 6ES7590-0AA00-0AA0 |
| **Shielding set I/O**<br>Infeed element, shield bracket, and shield terminal;<br>5 units, spare part<br>• For 35 mm modules<br>• For 25 mm modules | <br><br><br>6ES7590-5CA00-0AA0<br>6ES7590-5CA10-0XA0 |
| **Shield terminal element**<br>10 units; spare part | 6ES7590-5BA00-0AA0 |

| | Article No. |
|---|---|
| **SIMATIC Manual Collection**<br>Electronic manuals on DVD, multi-language:<br>LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | 6ES7998-8XC01-8YE0 |
| **SIMATIC Manual Collection update service for 1 year**<br>Current "Manual Collection" DVD and the three subsequent updates | 6ES7998-8XC01-8YE2 |

***Brochures***

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# SIMATIC S7-300 Advanced Controllers

## Overview



### S7-300

- The modular mini PLC system for the low and mid-performance ranges
- With comprehensive range of modules for optimum adaptation to the automation task
- Flexible use through simple implementation of distributed structures and versatile networking
- User-friendly handling and uncomplicated design without a fan
- Can be expanded without problems when the tasks increase
- Powerful thanks to a range of integrated functions

### S7-300F

- Fail-safe automation system for plants with increased safety requirements for production technology
- Based on S7-300
- Additional ET 200S and ET 200M distributed I/O stations complete with safety-related modules can be connected
- Safety-related communication via PROFIBUS DP with PROFIsafe profile
- Standard modules can be used in addition for non-safety-relevant applications

## Technical specifications

| General technical data SIMATIC S7-300 | |
|---|---|
| Degree of protection | IP20 according to IEC 60 529 |
| Ambient temperature<br>• For horizontal installation<br>• For vertical installation | <br>0 to 60 °C<br>0 to 40 °C |
| Relative humidity | 10 to 95%, non-condensing, corresponds to relative humidity (RH), stress level 2 acc. to IEC 61131, Part 2 |
| Air pressure | From 1080 to 795 hPa (corresponds to an altitude of -1000 to +2000 m) |
| Insulation<br>• < 50 V<br>• < 150 V<br>• < 250 V | <br>500 V DC test voltage<br>2500 V DC test voltage<br>4000 V DC test voltage |
| Electromagnetic compatibility | Requirements of the EMC directive; interference immunity according to IEC 61000-6-2 |
| • Pulse-shaped disturbance variables | Test according to:<br>Electrostatic discharge according to IEC 61000-4-2, burst pulses according to IEC 61000-4-4, energy single pulse (surge) according to IEC 61000-4-5, |
| • Sinusoidal disturbance variables | Test according to:<br>HF irradiation according to IEC 61000-4-3, HF decoupling according to IEC 61000-4-6 |
| • Emission of radio interference | Interference emission according to EN 50081-2 |
| | Test according to:<br>Emitted interference of electromagnetic fields according to EN 55016: Limit value class A, (measured at a distance of 10 m) |
| | Interference emission via AC mains according to EN 55011: Limit value class A, Group 1 |
| Mechanical strength<br>• Vibrations | Frequency range 10 Hz ≤ f ≤ 58 Hz<br>• Continuous: 0.0375 mm amplitude<br>• Occasionally 0.75 mm amplitude |
| | Frequency range 58 Hz ≤ f ≤ 150 Hz<br>• Continuous: 0.5 g constant acceleration<br>• Occasionally 1 g constant acceleration |
| | Testing according to IEC 60068-2-6 Tested with: |
| | 5 Hz ≤ f ≤ 9 Hz, constant amplitude 3.5 mm; 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g; |
| | Duration of oscillation: 10 frequency passes per axis in each direction of the 3 mutually perpendicular axes |
| • Shock | Testing according to IEC 60068-2-27 Tested with: |
| | Half-sine wave: strength of shock 15 g peak value, 11 ms duration; |
| | Shock direction: 3 shocks each in ± direction in each of the 3 mutually vertical axes |

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# SIMATIC S7-300 Advanced Controllers
Introduction

## S7-300/S7-300F, SIPLUS S7-300

■ **Technical specifications** (continued)

| General technical data of SIPLUS S7-300 | |
| --- | --- |
| Ambient temperature range | -40/-25 ... +60/70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the environmental conditions. |
| **Ambient conditions** | |
| Extended range of environmental conditions <br> • with reference to ambient temperature, air pressure and altitude | Tmin ... Tmax <br> at 1080 hPa ... 795 hPa <br> (-1000 m ... +2000 m) // <br> Tmin ... (Tmax - 10K) <br> at 795 hPa ... 658 hPa <br> (+2000 m ... +3500 m) // <br> Tmin ... (Tmax - 20K) <br> at 658 hPa ... 540 hPa <br> (+3500 m ... +5000 m) |
| • At cold restart, min. | 0° C |
| Relative humidity <br> • with condensation, max. | 100 %; RH incl. bedewing/frost (no commissioning in bedewed state) |
| Resistance <br> • to biologically active substances/ compliance with EN 60721-3-3 | Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to chemically active substances/ compliance with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. |
| • to mechanically active substances, compliance with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation. |

## Overview CPU 312



- The entry level CPU in Totally Integrated Automation (TIA)
- For smaller applications with moderate processing performance requirements

SIMATIC Micro Memory Card required for operation of the CPU.

## Overview CPU 314



- For plants with medium program scope requirements
- High processing power in binary and floating-point arithmetic

SIMATIC Micro Memory Card required for operation of CPU.

## Overview CPU 315-2 DP



- The CPU with medium to large program memory and quantity structures for optional use of SIMATIC engineering tools
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFIBUS DP master/slave interface
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- Isochronous mode on PROFIBUS

SIMATIC Micro Memory Card required for operation of CPU.

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Standard CPUs

#### ■ Overview 315-2 PN/DP



- The CPU with mid-range program memory and quantity frameworks
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

#### ■ Overview CPU 317-2 DP



- The CPU with a large program memory and quantity framework for demanding applications
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- High processing power in binary and floating-point arithmetic
- 2 PROFIBUS DP master/slave interfaces
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- Isochronous mode on PROFIBUS
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of CPU.

### Overview CPU 317-2 PN/DP



- The CPU with a large program memory and quantity framework for demanding applications
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- High processing power in binary and floating-point arithmetic
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of CPU.

### Overview CPU 319-3 PN/DP



- The CPU with high command processing performance, large program memory and quantity framework for demanding applications
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O on PROFIBUS and PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller
- PROFINET interface with 2-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integrated web server with the option of creating user-defined web pages
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of the CPU.

# SIMATIC S7-300 Advanced Controllers
Central processing units

## Standard CPUs

### ◼ Technical specifications

| Article number | 6ES7312-1AE14-0AB0 | 6ES7314-1AG14-0AB0 | 6ES7315-2AH14-0AB0 | 6ES7315-2EH14-0AB0 |
|---|---|---|---|---|
| | CPU312, 32KB | CPU314, 128 KB | CPU315-2DP, 256 KB | CPU315-2 PN/DP, 384 KB |
| **General information** | | | | |
| **Engineering with** | | | | |
| • Programming package | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.2 + SP1 or higher with HSP 218 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.2 + SP1 or higher with HSP 218 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.2 + SP1 or higher with HSP 218 | STEP 7 V5.5 or higher |
| **Supply voltage** | | | | |
| Rated value (DC) | | | | |
| • 24 V DC | Yes | Yes | Yes | Yes |
| **Power loss** | | | | |
| Power loss, typ. | 4 W | 4 W | 4.5 W | 4.65 W |
| **Memory** | | | | |
| **Work memory** | | | | |
| • integrated | 32 kbyte | 128 kbyte | 256 kbyte | 384 kbyte |
| • Size of retentive memory for retentive data blocks | 32 kbyte | 64 kbyte | 128 kbyte | 128 kbyte |
| **Load memory** | | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | | |
| for bit operations, typ. | 0.1 µs | 0.06 µs | 0.05 µs | 0.05 µs |
| for word operations, typ. | 0.24 µs | 0.12 µs | 0.09 µs | 0.09 µs |
| for fixed point arithmetic, typ. | 0.32 µs | 0.16 µs | 0.12 µs | 0.12 µs |
| for floating point arithmetic, typ. | 1.1 µs | 0.59 µs | 0.45 µs | 0.45 µs |
| **Counters, timers and their retentivity** | | | | |
| **S7 counter** | | | | |
| • Number | 256 | 256 | 256 | 256 |
| **IEC counter** | | | | |
| • present | Yes | Yes | Yes | Yes |
| **S7 times** | | | | |
| • Number | 256 | 256 | 256 | 256 |
| **IEC timer** | | | | |
| • present | Yes | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | | |
| **Flag** | | | | |
| • Number, max. | 256 byte | 256 byte | 2 048 byte | 2 048 byte |
| **Address area** | | | | |
| **I/O address area** | | | | |
| • Inputs | 1 024 byte | 1 024 byte | 2 048 byte | 2 048 byte |
| • Outputs | 1 024 byte | 1 024 byte | 2 048 byte | 2 048 byte |
| **Process image** | | | | |
| • Inputs, adjustable | 1 024 byte | 1 024 byte | 2 048 byte | 2 048 byte |
| • Outputs, adjustable | 1 024 byte | 1 024 byte | 2 048 byte | 2 048 byte |
| **Time of day** | | | | |
| **Clock** | | | | |
| • Hardware clock (real-time) | | Yes | Yes | Yes |
| **Operating hours counter** | | | | |
| • Number | 1 | 1 | 1 | 1 |

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■ **Technical specifications** (continued)

| Article number | 6ES7312-1AE14-0AB0 CPU312, 32KB | 6ES7314-1AG14-0AB0 CPU314, 128 KB | 6ES7315-2AH14-0AB0 CPU315-2DP, 256 KB | 6ES7315-2EH14-0AB0 CPU315-2 PN/DP, 384 KB |
|---|---|---|---|---|
| **1. Interface** | | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | | |
| • MPI | Yes | Yes | Yes | Yes |
| • PROFIBUS DP master | No | No | No | Yes |
| • PROFIBUS DP slave | No | No | No | Yes |
| • Point-to-point connection | No | No | No | No |
| **DP master** | | | | |
| • Number of DP slaves, max. | | | | 124 |
| **2. Interface** | | | | |
| Interface type | | | Integrated RS 485 interface | PROFINET |
| Physics | | | RS 485 | Ethernet RJ45 |
| **Interface types** | | | | |
| • Number of ports | | | | 2 |
| **Functionality** | | | | |
| • MPI | | | No | No |
| • PROFINET IO Controller | | | | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET IO Device | | | | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | | | | Yes |
| • PROFIBUS DP master | | | Yes | No |
| • PROFIBUS DP slave | | | Yes | No |
| **DP master** | | | | |
| • Number of DP slaves, max. | | | 124; Per station | |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | | | Yes | Yes; Via PROFIBUS DP or PROFINET interface |
| **Communication functions** | | | | |
| PG/OP communication | Yes | Yes | Yes | Yes |
| Data record routing | No | No | Yes | Yes |
| **Global data communication** | | | | |
| • supported | Yes | Yes | Yes | Yes |
| **S7 basic communication** | | | | |
| • supported | Yes | Yes | Yes | Yes |
| **S7 communication** | | | | |
| • supported | Yes | Yes | Yes | Yes |
| **S5 compatible communication** | | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |

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# SIMATIC S7-300 Advanced Controllers
Central processing units

## Standard CPUs

### ■ Technical specifications (continued)

| Article number | 6ES7312-1AE14-0AB0 | 6ES7314-1AG14-0AB0 | 6ES7315-2AH14-0AB0 | 6ES7315-2EH14-0AB0 |
|---|---|---|---|---|
| | CPU312, 32KB | CPU314, 128 KB | CPU315-2DP, 256 KB | CPU315-2 PN/DP, 384 KB |
| **Open IE communication** | | | | |
| • TCP/IP | | | | Yes; via integrated PROFINET interface and loadable FBs |
|   - Number of connections, max. | | | | 8 |
| • ISO-on-TCP (RFC1006) | | | | Yes; via integrated PROFINET interface and loadable FBs |
|   - Number of connections, max. | | | | 8 |
| • UDP | | | | Yes; via integrated PROFINET interface and loadable FBs |
|   - Number of connections, max. | | | | 8 |
| **Web server** | | | | |
| • supported | | | | Yes |
| **Number of connections** | | | | |
| • overall | 6 | 12 | 16 | 16 |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | | |
| **Programming** | | | | |
| **Programming language** | | | | |
|   - LAD | Yes | Yes | Yes | Yes |
|   - FBD | Yes | Yes | Yes | Yes |
|   - STL | Yes | Yes | Yes | Yes |
|   - SCL | Yes | Yes | Yes | Yes |
|   - CFC | | Yes | Yes | Yes |
|   - GRAPH | Yes | Yes | Yes | Yes |
|   - HiGraph® | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm | 130 mm |
| **Weights** | | | | |
| Weight, approx. | 270 g | 280 g | 290 g | 340 g |

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## Technical specifications (continued)

| Article number | 6ES7317-2AK14-0AB0 | 6ES7317-2EK14-0AB0 | 6ES7318-3EL01-0AB0 |
|---|---|---|---|
| | CPU317-2 DP, 1 MB | CPU317-2 PN/DP, 1 MB | CPU319-3 PN/DP, 2 MB |
| **General information** | | | |
| **Engineering with** | | | |
| • Programming package | STEP 7 as of V5.5 + SP1 or STEP 7 V5.2 + SP1 or higher with HSP 202 | STEP 7 V5.5 or higher | STEP 7 V5.5 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | Yes |
| **Power loss** | | | |
| Power loss, typ. | 4.5 W | 4.65 W | 14 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 1 024 kbyte | 1 024 kbyte | 2 048 kbyte |
| • Size of retentive memory for retentive data blocks | 256 kbyte | 256 kbyte | 700 kbyte |
| **Load memory** | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.025 µs | 0.025 µs | 0.004 µs |
| for word operations, typ. | 0.03 µs | 0.03 µs | 0.01 µs |
| for fixed point arithmetic, typ. | 0.04 µs | 0.04 µs | 0.01 µs |
| for floating point arithmetic, typ. | 0.16 µs | 0.16 µs | 0.04 µs |
| **Counters, timers and their retentivity** | | | |
| **S7 counter** | | | |
| • Number | 512 | 512 | 2 048 |
| **IEC counter** | | | |
| • present | Yes | Yes | Yes |
| **S7 times** | | | |
| • Number | 512 | 512 | 2 048 |
| **IEC timer** | | | |
| • present | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 4 096 byte | 4 096 byte | 8 192 byte |
| **Address area** | | | |
| **I/O address area** | | | |
| • Inputs | 8 192 byte | 8 192 byte | 8 192 byte |
| • Outputs | 8 192 byte | 8 192 byte | 8 192 byte |
| **Process image** | | | |
| • Inputs, adjustable | 8 192 byte | 8 192 byte | 8 192 byte |
| • Outputs, adjustable | 8 192 byte | 8 192 byte | 8 192 byte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |
| **Operating hours counter** | | | |
| • Number | 4 | 4 | 4 |
| **1. Interface** | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | |
| • MPI | Yes | Yes | Yes |
| • PROFIBUS DP master | Yes | Yes | Yes |
| • PROFIBUS DP slave | Yes; A DP slave at both interfaces simultaneously is not possible | Yes | Yes; A DP slave at both interfaces simultaneously is not possible |
| • Point-to-point connection | No | No | No |
| **DP master** | | | |
| • Number of DP slaves, max. | 124 | 124 | 124 |

# SIMATIC S7-300 Advanced Controllers
## Central processing units

**Standard CPUs**

### Technical specifications (continued)

| Article number | 6ES7317-2AK14-0AB0 | 6ES7317-2EK14-0AB0 | 6ES7318-3EL01-0AB0 |
|---|---|---|---|
| | CPU317-2 DP, 1 MB | CPU317-2 PN/DP, 1 MB | CPU319-3 PN/DP, 2 MB |
| **2. Interface** | | | |
| Interface type | Integrated RS 485 interface | PROFINET | Integrated RS 485 interface |
| Physics | RS 485 | Ethernet RJ45 | RS 485 |
| **Interface types** | | | |
| • Number of ports | | 2 | |
| **Functionality** | | | |
| • MPI | No | No | No |
| • PROFINET IO Controller | | Yes; Also simultaneously with IO-Device functionality | No |
| • PROFINET IO Device | | Yes; Also simultaneously with IO Controller functionality | No |
| • PROFINET CBA | | Yes | No |
| • PROFIBUS DP master | Yes | No | Yes |
| • PROFIBUS DP slave | Yes; A DP slave at both interfaces simultaneously is not possible | No | Yes; A DP slave at both interfaces simultaneously is not possible |
| **DP master** | | | |
| • Number of DP slaves, max. | 124 | | 124 |
| **3. Interface** | | | |
| Interface type | | | PROFINET |
| Physics | | | Ethernet RJ45 |
| **Interface types** | | | |
| • Number of ports | | | 2 |
| **Functionality** | | | |
| • MPI | | | No |
| • PROFINET IO Controller | | | Yes; Also simultaneously with I-Device functionality |
| • PROFINET IO Device | | | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | | | Yes |
| • PROFIBUS DP master | | | No |
| • PROFIBUS DP slave | | | No |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | | Yes; Via PROFIBUS DP or PROFINET interface | Yes; Via 2nd PROFIBUS DP or PROFINET interface |
| **Communication functions** | | | |
| PG/OP communication | Yes | Yes | Yes |
| Data record routing | Yes | Yes | Yes |
| **Global data communication** | | | |
| • supported | Yes | Yes | Yes |
| **S7 basic communication** | | | |
| • supported | Yes | Yes | Yes |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **S5 compatible communication** | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |

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■ **Technical specifications** (continued)

| Article number | 6ES7317-2AK14-0AB0 | 6ES7317-2EK14-0AB0 | 6ES7318-3EL01-0AB0 |
|---|---|---|---|
| | CPU317-2 DP, 1 MB | CPU317-2 PN/DP, 1 MB | CPU319-3 PN/DP, 2 MB |
| **Open IE communication** | | | |
| • TCP/IP | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 16 | 32 |
| • ISO-on-TCP (RFC1006) | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 16 | 32 |
| • UDP | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 16 | 32 |
| **Web server** | | | |
| • supported | | Yes | Yes |
| **Number of connections** | | | |
| • overall | 32 | 32 | 32 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| - CFC | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes |
| - HiGraph® | Yes | Yes | Yes |
| **Know-how protection** | | | |
| • User program protection/password protection | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm |
| **Weights** | | | |
| Weight, approx. | 360 g | 340 g | 1 250 g |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Standard CPUs

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 312**<br>Work memory 32 KB,<br>supply voltage 24 V DC, MPI;<br>MMC required | **6ES7312-1AE14-0AB0** | **SIMATIC Manual Collection**<br><br>Electronic manuals on DVD,<br>multilingual:<br>LOGO!, SIMADYN, SIMATIC bus<br>components, SIMATIC C7,<br>SIMATIC distributed I/O,<br>SIMATIC HMI, SIMATIC Sensors,<br>SIMATIC NET, SIMATIC PC Based<br>Automation, SIMATIC PCS 7,<br>SIMATIC PG/PC, SIMATIC S7,<br>SIMATIC Software, SIMATIC TDC | **6ES7998-8XC01-8YE0** |
| **CPU 314**<br>Work memory 128 KB,<br>supply voltage 24 V DC, MPI;<br>MMC required | **6ES7314-1AG14-0AB0** | | |
| **CPU 315-2 DP**<br>Work memory 256 KB,<br>supply voltage 24 V DC, MPI,<br>PROFIBUS DP master/slave<br>interface; MMC required | **6ES7315-2AH14-0AB0** | **SIMATIC Manual Collection**<br>**update service for 1 year**<br><br>Current "Manual Collection" DVD<br>and the three subsequent updates | **6ES7998-8XC01-8YE2** |
| **CPU 315-2 PN/DP**<br>Work memory 384 KB,<br>24 V DC power supply, combined<br>MPI/PROFIBUS DP master/slave<br>interface, Ethernet/PROFINET<br>interface with 2-port switch;<br>MMC required | **6ES7315-2EH14-0AB0** | **Power supply connector**<br><br>10 units, spare part | **6ES7391-1AA00-0AA0** |
| | | **USB A2 PC adapter**<br><br>For connecting a PG/PC or<br>Notebook to PROFIBUS or MPI;<br>USB cable included in scope of<br>delivery | **6GK1571-0BA00-0AA0** |
| **CPU 317-2 DP**<br>Work memory 1 MB,<br>supply voltage 24 V DC, MPI,<br>PROFIBUS DP master/slave<br>interface; MMC required | **6ES7317-2AK14-0AB0** | **PROFIBUS bus components** | |
| **CPU 317-2 PN/DP**<br>Work memory 1 MB,<br>24 V DC power supply, combined<br>MPI/PROFIBUS DP master/slave<br>interface, Ethernet/PROFINET<br>interface with 2-port switch;<br>MMC required | **6ES7317-2EK14-0AB0** | **PROFIBUS DP RS 485**<br>**bus connector**<br>• with 90° cable outlet, max. transfer<br>  rate 12 Mbps<br>  - without PG interface<br>  - with PG interface<br>• with 90° cable outlet for<br>  FastConnect connection system,<br>  max. transfer rate 12 Mbps<br>  - without PG interface, 1 unit<br>  - without PG interface, 100 units<br>  - with PG interface, 1 unit<br>  - with PG interface, 100 units<br>• with axial cable outlet for<br>  SIMATIC OP, for connecting to<br>  PPI, MPI, PROFIBUS | <br><br><br><br>**6ES7972-0BA12-0XA0**<br>**6ES7972-0BB12-0XA0**<br><br><br><br>**6ES7972-0BA52-0XA0**<br>**6ES7972-0BA52-0XB0**<br>**6ES7972-0BB52-0XA0**<br>**6ES7972-0BB52-0XB0**<br>**6GK1500-0EA02** |
| **CPU 319-3 PN/DP**<br>Work memory 2 MB,<br>power supply 24 V DC, combined<br>MPI/PROFIBUS DP master/slave<br>interface, PROFIBUS DP master/<br>slave interface, Ethernet/<br>PROFINET interface with 2-port<br>switch; MMC required | **6ES7318-3EL01-0AB0** | **PROFIBUS FastConnect**<br>**bus cable**<br><br>Standard type with special design<br>for quick mounting, 2-wire,<br>shielded, sold by the meter,<br>max. delivery unit 1000 m,<br>minimum ordering quantity 20 m | **6XV1830-0EH10** |
| **SIMATIC Micro Memory Card** | | **RS 485 repeater for PROFIBUS**<br><br>Transmission rate up to 12 Mbps;<br>24 V DC; IP20 enclosure | **6ES7972-0AA02-0XA0** |
| 64 KB | **6ES7953-8LF31-0AA0** | | |
| 128 KB | **6ES7953-8LG31-0AA0** | | |
| 512 KB | **6ES7953-8LJ31-0AA0** | | |
| 2 MB | **6ES7953-8LL31-0AA0** | | |
| 4 MB | **6ES7953-8LM31-0AA0** | | |
| 8 MB | **6ES7953-8LP31-0AA0** | | |
| **MPI cable**<br>For connection of SIMATIC S7 and<br>PG via MPI; 5 m in length | **6ES7901-0BF00-0AA0** | | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** | | |

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **PROFINET bus components** | | **IE FC RJ45 plugs** | |
| **IE FC TP Standard Cable GP 2x2** | **6XV1840-2AH10** | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter | | | |
| | | **IE FC RJ45 Plug 145** | |
| **FO Standard Cable GP (50/125)** | **6XV1873-2A** | 145° cable outlet | |
| Standard cable, splittable, UL approval, sold by the meter | | 1 unit | **6GK1901-1BB30-0AA0** |
| | | 10 units | **6GK1901-1BB30-0AB0** |
| **SCALANCE X204-2 Industrial Ethernet switch** | **6GK5204-2BB10-2AA3** | 50 units | **6GK1901-1BB30-0AE0** |
| | | **IE FC RJ45 Plug 180** | |
| Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | | 180° cable outlet | |
| | | 1 unit | **6GK1901-1BB10-2AA0** |
| | | 10 units | **6GK1901-1BB10-2AB0** |
| | | 50 units | **6GK1901-1BB10-2AE0** |
| **CSM 377 Compact Switch Module** | **6GK7377-1AA00-0AA0** | **PROFIBUS/PROFINET bus components** | See Catalogs IK PI, CA 01 |
| Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three other stations to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM | | For establishing MPI/PROFIBUS/ PROFINET communication | |

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# SIMATIC S7-300 Advanced Controllers
Central processing units

## SIPLUS S7-300 standard CPUs

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### Overview SIPLUS S7-300 CPU 314



- For plants with medium requirements on the program scope
- High processing performance in binary and floating-point arithmetic

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### Overview SIPLUS S7-300 CPU 315-2DP



- The CPU with medium to large program memory and quantity structures for optional use of SIMATIC engineering tools
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For comprehensive I/O expansion
- For configuring distributed I/O structures

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Overview SIPLUS S7-300 CPU 315-2 PN/DP

- The CPU with medium-sized program memory and quantity frameworks
- High processing performance in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Overview SIPLUS S7-300 CPU 317-2 PN/DP

- The CPU with a large program memory and quantity framework for demanding applications
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET IO controller for operating distributed I/O on PROFINET
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- High processing performance in binary and floating-point arithmetic
- Combined MPI/PROFIBUS DP master/slave interface
- Optionally supports the use of SIMATIC engineering tools

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### SIPLUS S7-300 standard CPUs

#### ■ Technical specifications

| Article number | 6AG1314-1AG14-2AY0 | 6AG1314-1AG14-7AB0 | 6AG1315-2AH14-2AY0 | 6AG1315-2AH14-7AB0 |
|---|---|---|---|---|
| Based on | 6ES7314-1AG14-0AB0 | 6ES7314-1AG14-0AB0 | 6ES7315-2AH14-0AB0 | 6ES7315-2AH14-0AB0 |
| | SIPLUS CPU314 EN50155 | SIPLUS S7-300 CPU314 | SIPLUS CPU 315-2DP EN50155 | SIPLUS S7-300 CPU 315-2DP |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Technical specifications (continued)

| Article number | 6AG1315-2EH14-2AY0 | 6AG1315-2EH14-7AB0 | 6AG1317-2EK14-2AY0 | 6AG1317-2EK14-7AB0 |
|---|---|---|---|---|
| Based on | 6ES7315-2EH14-0AB0 | 6ES7315-2EH14-0AB0 | 6ES7317-2EK14-0AB0 | 6ES7317-2EK14-0AB0 |
| | SIPLUS S7-300 CPU315-2PN/DP EN50155 | SIPLUS S7-300 CPU315-2PN/DP | SIPLUS S7-300 CPU317-2PN/DP EN50155 | SIPLUS S7-300 CPU317-2PN/DP |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; @ 60°C for UL/ATEX/FM use |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | | -40 °C |
| • max. | 70 °C | 70 °C | | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) | 100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
Central processing units

## SIPLUS S7-300 standard CPUs

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| Ordering data | Article No. | | Article No. |
|---|---|---|---|

### SIPLUS S7-300 CPU 314

*For industrial applications with extended ambient conditions*

CPU, work memory 128 KB, power supply 24 V DC, MPI; MMC required

Extended temperature range and exposure to media — **6AG1314-1AG14-7AB0**

*For rolling stock railway applications*

CPU, work memory 128 KB, power supply 24 V DC, MPI; MMC required

Conforms to EN 50155 — **6AG1314-1AG14-2AY0**

### SIPLUS S7-300 CPU 315-2 DP

*For industrial applications with extended ambient conditions*

CPU, work memory 256 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface; MMC required

Extended temperature range and exposure to media — **6AG1315-2AH14-7AB0**

*For rolling stock railway applications*

CPU, work memory 256 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface; MMC required

Conforms to EN 50155 — **6AG1315-2AH14-2AY0**

### SIPLUS S7-300 CPU 315-2 PN/DP

*For industrial applications with extended ambient conditions*

CPU, work memory 384 KB, power supply 24 V DC, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required

Extended temperature range and exposure to media — **6AG1315-2EH14-7AB0**

*For rolling stock railway applications*

CPU, work memory 384 KB, power supply 24 V DC, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required

Conforms to EN 50155 — **6AG1315-2EH14-2AY0**

### SIPLUS S7-300 CPU 317-2 PN/DP

*For industrial applications with extended ambient conditions*

CPU, work memory 1 MB, power supply 24 V DC, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required

Extended temperature range and exposure to media — **6AG1317-2EK14-7AB0**

*For rolling stock railway applications*

CPU, work memory 1 MB, power supply 24 V DC, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required

Conforms to EN 50155 — **6AG1317-2EK14-2AY0**

### Accessories

*Mandatory*

**SIMATIC Micro Memory Card**

| | |
|---|---|
| 64 KB | **6ES7953-8LF31-0AA0** |
| 128 KB | **6ES7953-8LG31-0AA0** |
| 512 KB | **6ES7953-8LJ31-0AA0** |
| 2 MB | **6ES7953-8LL31-0AA0** |
| 4 MB | **6ES7953-8LM31-0AA0** |
| 8 MB | **6ES7953-8LP31-0AA0** |

*For communication within the application*

**PROFIBUS DP RS 485 bus connector**

(extended temperature range and exposure to media)

with 90° cable outlet, max. transfer rate 12 Mbps
- Without PG interface — **6AG1972-0BA12-2XA0**
- With PG interface — **6AG1972-0BB12-2XA0**

with inclined cable outlet, max. transmission rate 12 Mbps
- without PG interface — **6AG1972-0BA42-7XA0**
- with PG interface — **6AG1972-0BB42-7XA0**

With insulation displacement terminals, max. transfer rate 12 Mbps
- with PG interface, grounding via control cabinet cover — **6AG1972-0BB70-7XA0**

(extended temperature range)

with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS — **6AG1500-0EA02-2AA0**

| ■ **Ordering data** | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 Plug 180** | | **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 |
| (extended temperature range and exposure to media) | | 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; | |
| 180° cable outlet | | | |
| • 1 unit | 6AG1901-1BB10-7AA0 | Sold by the meter | |
| **SIPLUS SCALANCE X-200 Industrial Ethernet switches** | | **FO Standard Cable GP (50/125)** | 6XV1873-2A |
| Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (except: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | | Standard cable, splittable, UL approval, sold by the meter | |
| | | *For commissioning* | |
| | | **MPI cable** | 6ES7901-0BF00-0AA0 |
| | | For connection of SIMATIC S7 and PG via MPI; 5 m in length | |
| | | **USB A2 PC adapter** | 6GK1571-0BA00-0AA0 |
| • With electrical and optical ports for glass multimode FOC up to 3 km | | For connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |
| • Extended temperature range and exposure to media | | *Consumables* | |
| • **SIPLUS SCALANCE X204-2** with four 10/100 Mbps RJ45 ports and two fiber-optic ports | 6AG1204-2BB10-4AA3 | **Power supply connector** | 6ES7391-1AA00-0AA0 |
| | | 10 units, spare part | |
| **PROFIBUS FastConnect bus cable** | 6XV1830-0EH10 | **Slot number plates** | 6ES7912-0AA00-0AA0 |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m | | *Documentation* | |
| | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **RS 485 repeater for PROFIBUS** | 6AG1972-0AA02-7XA0 | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| (extended temperature range and exposure to media) | | | |
| Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure | | | |
| | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Compact CPUs

#### ■ Overview CPU 312 C



- The compact CPU with integral digital inputs/outputs
- For small applications with increased processing performance requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of CPU.

#### ■ Overview CPU 313C-2 PtP



- The compact CPU with integrated digital inputs/outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

#### ■ Overview CPU 313C



- The compact CPU with integral digital and analog inputs/outputs
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

#### ■ Overview CPU 313C-2 DP



- The compact CPU with integral digital inputs/outputs and PROFIBUS DP master/slave interface
- For plants with high processing performance and response time requirements
- With technological functions
- For tasks with special functions
- For connecting distributed I/Os

SIMATIC Micro Memory Card required for operation of the CPU.

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## ■ Overview CPU 314C-2 PtP

- The compact CPU with integrated digital and analog inputs/outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

## ■ Overview CPU 314C-2 DP

- The compact CPU with integral digital and analog inputs/outputs and PROFIBUS DP master/slave interface
- With technological functions
- For plants with high processing performance and response time requirements
- For connecting distributed I/Os

SIMATIC Micro Memory Card required for operation of the CPU.

## ■ Overview CPU 314C-2 PN/DP

- The compact CPU with integral digital and analog inputs/outputs and technological functions
- High processing performance in binary and floating-point arithmetic
- For connecting distributed I/O via PROFIBUS and PROFINET
- Combined MPI/PROFIBUS DP master/slave interface
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Isochronous mode on PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Technical specifications

| Article number | 6ES7312-5BF04-0AB0 | 6ES7313-5BG04-0AB0 | 6ES7313-6BG04-0AB0 | 6ES7313-6CG04-0AB0 |
|---|---|---|---|---|
| | CPU312C, 10DI/6DO, 64 KB | CPU313C, 24DI/16DO/5AI/2AO, 128 KB | CPU313C-2 PTP, 16DI/16DO, 128 KB | CPU313C-2 DP, 16DI/16DO, 128 KB |
| **General information** | | | | |
| **Engineering with** | | | | |
| • Programming package | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203 | STEP 7 as of V5.5 + SP1 or STEP 7 V5.3 + SP2 or higher with HSP 204 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203 |
| **Supply voltage** | | | | |
| Rated value (DC) | | | | |
| • 24 V DC | Yes | Yes | Yes | Yes |
| **Power loss** | | | | |
| Power loss, typ. | 8 W | 12 W | 9 W | 9 W |
| **Memory** | | | | |
| **Work memory** | | | | |
| • integrated | 64 kbyte | 128 kbyte | 128 kbyte | 128 kbyte |
| • Size of retentive memory for retentive data blocks | 64 kbyte | 64 kbyte | 64 kbyte | 64 kbyte |
| **Load memory** | | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | | |
| for bit operations, typ. | 0.1 µs | 0.07 µs | 0.07 µs | 0.07 µs |
| for word operations, typ. | 0.24 µs | 0.15 µs | 0.15 µs | 0.15 µs |
| for fixed point arithmetic, typ. | 0.32 µs | 0.2 µs | 0.2 µs | 0.2 µs |
| for floating point arithmetic, typ. | 1.1 µs | 0.72 µs | 0.72 µs | 0.72 µs |
| **Counters, timers and their retentivity** | | | | |
| **S7 counter** | | | | |
| • Number | 256 | 256 | 256 | 256 |
| **IEC counter** | | | | |
| • present | Yes | Yes | Yes | Yes |
| **S7 times** | | | | |
| • Number | 256 | 256 | 256 | 256 |
| **IEC timer** | | | | |
| • present | Yes | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | | |
| **Flag** | | | | |
| • Number, max. | 256 byte | 256 byte | 256 byte | 256 byte |
| **Address area** | | | | |
| **I/O address area** | | | | |
| • Inputs | 1 024 byte | 1 024 byte | 1 024 byte | 2 048 byte |
| • Outputs | 1 024 byte | 1 024 byte | 1 024 byte | 2 048 byte |
| **Process image** | | | | |
| • Inputs, adjustable | 1 024 byte | 1 024 byte | 1 024 byte | 2 048 byte |
| • Outputs, adjustable | 1 024 byte | 1 024 byte | 1 024 byte | 2 048 byte |
| **Time of day** | | | | |
| **Clock** | | | | |
| • Hardware clock (real-time) | | Yes | Yes | Yes |
| **Operating hours counter** | | | | |
| • Number | 1 | 1 | 1 | 1 |
| **Digital inputs** | | | | |
| integrated channels (DI) | 10 | 24 | 16 | 16 |
| **Digital outputs** | | | | |
| integrated channels (DO) | 6 | 16 | 16 | 16 |

■ **Technical specifications** (continued)

| Article number | 6ES7312-5BF04-0AB0 | 6ES7313-5BG04-0AB0 | 6ES7313-6BG04-0AB0 | 6ES7313-6CG04-0AB0 |
|---|---|---|---|---|
| | CPU312C, 10DI/6DO, 64 KB | CPU313C, 24DI/16DO/5AI/2AO, 128 KB | CPU313C-2 PTP, 16DI/16DO, 128 KB | CPU313C-2 DP, 16DI/16DO, 128 KB |
| **Analog inputs** | | | | |
| integrated channels (AI) | 0 | 5; 4 x current/voltage, 1 x resistance | 0 | 0 |
| **Input ranges** | | | | |
| • Voltage | | Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ | | |
| • Current | | Yes; ±20 mA / 100 Ω; 0 mA to 20 mA / 100 Ω; 4 mA to 20 mA / 100 Ω | | |
| • Resistance thermometer | | Yes; Pt 100 / 10 MΩ | | |
| • Resistance | | Yes; 0 Ω to 600 Ω / 10 MΩ | | |
| **Analog outputs** | | | | |
| integrated channels (AO) | 0 | 2 | 0 | 0 |
| **Output ranges, voltage** | | | | |
| • 0 to 10 V | | Yes | | |
| • -10 V to +10 V | | Yes | | |
| **Output ranges, current** | | | | |
| • 0 to 20 mA | | Yes | | |
| • -20 mA to +20 mA | | Yes | | |
| • 4 mA to 20 mA | | Yes | | |
| **1. Interface** | | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | | |
| • MPI | Yes | Yes | Yes | Yes |
| • PROFIBUS DP master | No | No | No | No |
| • PROFIBUS DP slave | No | No | No | No |
| • Point-to-point connection | No | No | No | No |
| **2. Interface** | | | | |
| Interface type | | | Integrated RS 422/ 485 interface | Integrated RS 485 interface |
| Physics | | | RS 422/RS 485 (X.27) | RS 485 |
| **Functionality** | | | | |
| • MPI | | | No | No |
| • PROFINET IO Controller | | | No | No |
| • PROFINET IO Device | | | No | No |
| • PROFINET CBA | | | No | No |
| • PROFIBUS DP master | | | No | Yes |
| • PROFIBUS DP slave | | | No | Yes |
| **DP master** | | | | |
| • Number of DP slaves, max. | | | | 124 |
| **Communication functions** | | | | |
| PG/OP communication | Yes | Yes | Yes | Yes |
| Data record routing | No | No | No | Yes |
| **Global data communication** | | | | |
| • supported | Yes | Yes | Yes | Yes |
| **S7 basic communication** | | | | |
| • supported | Yes | Yes | Yes; Server | Yes |
| **S7 communication** | | | | |
| • supported | Yes | Yes | Yes | Yes |
| **S5 compatible communication** | | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |
| **Number of connections** | | | | |
| • overall | 6 | 8 | 8 | 8 |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Compact CPUs

**Technical specifications** (continued)

| Article number | 6ES7312-5BF04-0AB0 | 6ES7313-5BG04-0AB0 | 6ES7313-6BG04-0AB0 | 6ES7313-6CG04-0AB0 |
|---|---|---|---|---|
| | CPU312C, 10DI/6DO, 64 KB | CPU313C, 24DI/16DO/5AI/2AO, 128 KB | CPU313C-2 PTP, 16DI/16DO, 128 KB | CPU313C-2 DP, 16DI/16DO, 128 KB |
| **Integrated Functions** | | | | |
| Number of counters | 2; See "Technological Functions" manual | 3; See "Technological Functions" manual | 3; See "Technological Functions" manual | 3; See "Technological Functions" manual |
| Counting frequency (counter) max. | 10 kHz | 30 kHz | 30 kHz | 30 kHz |
| Frequency measurement | Yes | Yes | Yes | Yes |
| Number of frequency meters | 2; up to 10 kHz (see "Technological Functions" manual) | 3; up to 30 kHz (see "Technological Functions" manual) | 3; up to 30 kHz (see "Technological Functions" manual) | 3; up to 30 kHz (see "Technological Functions" manual) |
| controlled positioning | No | No | No | No |
| integrated function blocks (closed-loop control) | No | Yes; PID controller (see "Technological Functions" manual) | Yes; PID controller (see "Technological Functions" manual) | Yes; PID controller (see "Technological Functions" manual) |
| PID controller | No | Yes | Yes | Yes |
| Number of pulse outputs | 2; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) | 3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) | 3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) | 3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) |
| Limit frequency (pulse) | 2.5 kHz | 2.5 kHz | 2.5 kHz | 2.5 kHz |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | | |
| **Programming** | | | | |
| **Programming language** | | | | |
| - LAD | Yes | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes | Yes |
| - CFC | | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes | Yes |
| - HiGraph® | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | | |
| Width | 80 mm | 120 mm | 80 mm | 80 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm | 130 mm |
| **Weights** | | | | |
| Weight, approx. | 410 g | 660 g | 500 g | 500 g |

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## Technical specifications (continued)

| Article number | 6ES7314-6BH04-0AB0 | 6ES7314-6CH04-0AB0 | 6ES7314-6EH04-0AB0 |
|---|---|---|---|
| | CPU314C-2PTP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2DP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2PN/DP, 24DI/16DO/4AI/2AO, 192KB |
| **General information** | | | |
| **Engineering with** | | | |
| • Programming package | STEP 7 as of V5.5 + SP1 or STEP 7 V5.3 + SP2 or higher with HSP 204 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203 | STEP 7 V5.5 or higher with HSP 191 |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | Yes |
| **Power loss** | | | |
| Power loss, typ. | 13 W | 13 W | 14 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 192 kbyte | 192 kbyte | 192 kbyte |
| • Size of retentive memory for retentive data blocks | 64 kbyte | 64 kbyte | 64 kbyte |
| **Load memory** | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.06 µs | 0.06 µs | 0.06 µs |
| for word operations, typ. | 0.12 µs | 0.12 µs | 0.12 µs |
| for fixed point arithmetic, typ. | 0.16 µs | 0.16 µs | 0.16 µs |
| for floating point arithmetic, typ. | 0.59 µs | 0.59 µs | 0.59 µs |
| **Counters, timers and their retentivity** | | | |
| **S7 counter** | | | |
| • Number | 256 | 256 | 256 |
| **IEC counter** | | | |
| • present | Yes | Yes | Yes |
| **S7 times** | | | |
| • Number | 256 | 256 | 256 |
| **IEC timer** | | | |
| • present | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 256 byte | 256 byte | 256 byte |
| **Address area** | | | |
| **I/O address area** | | | |
| • Inputs | 1 024 byte | 2 048 byte | 2 048 byte |
| • Outputs | 1 024 byte | 2 048 byte | 2 048 byte |
| **Process image** | | | |
| • Inputs, adjustable | 1 024 byte | 2 048 byte | 2 048 byte |
| • Outputs, adjustable | 1 024 byte | 2 048 byte | 2 048 byte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |
| **Operating hours counter** | | | |
| • Number | 1 | 1 | 1 |
| **Digital inputs** | | | |
| integrated channels (DI) | 24 | 24 | 24 |
| **Digital outputs** | | | |
| integrated channels (DO) | 16 | 16 | 16 |

# SIMATIC S7-300 Advanced Controllers
## Central processing units

**Compact CPUs**

### Technical specifications (continued)

| Article number | 6ES7314-6BH04-0AB0 | 6ES7314-6CH04-0AB0 | 6ES7314-6EH04-0AB0 |
|---|---|---|---|
| | CPU314C-2PTP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2DP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2PN/DP, 24DI/16DO/4AI/2AO, 192KB |
| **Analog inputs** | | | |
| integrated channels (AI) | 5; 4 x current/voltage, 1 x resistance | 5; 4 x current/voltage, 1 x resistance | 5; 4 x current/voltage, 1 x resistance |
| **Input ranges** | | | |
| • Voltage | Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ | Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ | Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ |
| • Current | Yes; ±20 mA / 100 Ω; 0 mA to 20 mA / 100 Ω; 4 mA to 20 mA / 100 Ω | Yes; ±20 mA / 100 Ω; 0 mA to 20 mA / 100 Ω; 4 mA to 20 mA / 100 Ω | Yes; ±20 mA / 100 Ω; 0 mA to 20 mA / 100 Ω; 4 mA to 20 mA / 100 Ω |
| • Resistance thermometer | Yes; Pt 100 / 10 MΩ | Yes; Pt 100 / 10 MΩ | Yes; Pt 100 / 10 MΩ |
| • Resistance | Yes; 0 Ω to 600 Ω / 10 MΩ | Yes; 0 Ω to 600 Ω / 10 MΩ | Yes; 0 Ω to 600 Ω / 10 MΩ |
| **Analog outputs** | | | |
| integrated channels (AO) | 2 | 2 | 2 |
| **Output ranges, voltage** | | | |
| • 0 to 10 V | Yes | Yes | Yes |
| • -10 V to +10 V | Yes | Yes | Yes |
| **Output ranges, current** | | | |
| • 0 to 20 mA | Yes | Yes | Yes |
| • -20 mA to +20 mA | Yes | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes |
| **1. Interface** | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | |
| • MPI | Yes | Yes | Yes |
| • PROFIBUS DP master | No | No | Yes |
| • PROFIBUS DP slave | No | No | Yes |
| • Point-to-point connection | No | No | No |
| **DP master** | | | |
| • Number of DP slaves, max. | | | 124 |
| **2. Interface** | | | |
| Interface type | Integrated RS 422/ 485 interface | Integrated RS 485 interface | PROFINET |
| Physics | RS 422/RS 485 (X.27) | RS 485 | Ethernet RJ45 |
| **Interface types** | | | |
| • Number of ports | | | 2 |
| **Functionality** | | | |
| • MPI | No | No | No |
| • PROFINET IO Controller | No | No | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET IO Device | No | No | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | No | No | Yes |
| • PROFIBUS DP master | No | Yes | No |
| • PROFIBUS DP slave | No | Yes | No |
| **DP master** | | | |
| • Number of DP slaves, max. | | 124 | |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | | | Yes; For PROFINET only |
| **Communication functions** | | | |
| PG/OP communication | Yes | Yes | Yes |
| Data record routing | No | Yes | Yes |
| **Global data communication** | | | |
| • supported | Yes | Yes | Yes |

## Technical specifications (continued)

| Article number | 6ES7314-6BH04-0AB0 | 6ES7314-6CH04-0AB0 | 6ES7314-6EH04-0AB0 |
|---|---|---|---|
| | CPU314C-2PTP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2DP, 24DI/16DO/5AI/2AO, 192 KB | CPU314C-2PN/DP, 24DI/16DO/4AI/2AO, 192KB |
| **S7 basic communication** | | | |
| • supported | Yes | Yes | Yes |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **S5 compatible communication** | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |
| **Open IE communication** | | | |
| • TCP/IP | | | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | | 8 |
| • ISO-on-TCP (RFC1006) | | | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | | 8 |
| • UDP | | | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | | 8 |
| **Web server** | | | |
| • supported | | | Yes |
| **Number of connections** | | | |
| • overall | 12 | 12 | 12 |
| **Integrated Functions** | | | |
| Number of counters | 4; See "Technological Functions" manual | 4; See "Technological Functions" manual | 4; See "Technological Functions" manual |
| Counting frequency (counter) max. | 60 kHz | 60 kHz | 60 kHz |
| Frequency measurement | Yes | Yes | Yes |
| Number of frequency meters | 4; up to 60 kHz (see "Technological Functions" manual) | 4; up to 60 kHz (see "Technological Functions" manual) | 4; up to 60 kHz (see "Technological Functions" manual) |
| controlled positioning | Yes | Yes | Yes |
| integrated function blocks (closed-loop control) | Yes; PID controller (see "Technological Functions" manual) | Yes; PID controller (see "Technological Functions" manual) | Yes; PID controller (see "Technological Functions" manual) |
| PID controller | Yes | Yes | Yes |
| Number of pulse outputs | 4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) | 4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) | 4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) |
| Limit frequency (pulse) | 2.5 kHz | 2.5 kHz | 2.5 kHz |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| - CFC | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes |
| - HiGraph® | Yes | Yes | Yes |
| **Know-how protection** | | | |
| • User program protection/password protection | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | |
| Width | 120 mm | 120 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm |
| **Weights** | | | |
| Weight, approx. | 680 g | 680 g | 730 g |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

**Compact CPUs**

| Ordering data | Article No. |
|---|---|
| **CPU 312C** | **6ES7312-5BF04-0AB0** |
| Compact CPU, work memory 64 KB, supply voltage 24 V DC, 10 DI/6 DQ integrated, integrated functions, MPI; including slot number labels; MMC required | |
| **CPU 313C** | **6ES7313-5BG04-0AB0** |
| Compact CPU, work memory 128 KB, supply voltage 24 V DC, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI; MMC required | |
| **CPU 313C-2 PtP** | **6ES7313-6BG04-0AB0** |
| Compact CPU, work memory 128 KB, supply voltage 24 V DC, 16 DI/16 DQ integrated, integrated functions, MPI, RS 422/485 interface; MMC required | |
| **CPU 313C-2 DP** | **6ES7313-6CG04-0AB0** |
| Compact CPU, 128 KB work memory, 24 V DC power supply, 16 DI/16 DQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | |
| **CPU 314C-2 PtP** | **6ES7314-6BH04-0AB0** |
| Compact CPU, work memory 192 KB, supply voltage 24 V DC, 24 DI/16 DQ/4 AI/2 AQ integrated, integrated functions, MPI, RS 422/485 interface; MMC required | |
| **CPU 314C-2 DP** | **6ES7314-6CH04-0AB0** |
| Compact CPU, work memory 192 KB, supply voltage 24 V DC, 24 DI/16 DQ/4 AI/2 AQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | |
| **CPU 314C-2 PN/DP** | **6ES7314-6EH04-0AB0** |
| Compact CPU, 192 KB work memory, 24 V DC power supply, 24 DI/16 DO/4 AI/2 AQ integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; PROFINET IO controller/I-device interface, MMC is required | |
| **SIMATIC Micro Memory Card** | |
| 64 KB | **6ES7953-8LF31-0AA0** |
| 128 KB | **6ES7953-8LG31-0AA0** |
| 512 KB | **6ES7953-8LJ31-0AA0** |
| 2 MB | **6ES7953-8LL31-0AA0** |
| 4 MB | **6ES7953-8LM31-0AA0** |
| 8 MB | **6ES7953-8LP31-0AA0** |
| **MPI cable** | **6ES7901-0BF00-0AA0** |
| For connection of SIMATIC S7 and PG via MPI; 5 m in length | |

| Ordering data | Article No. |
|---|---|
| **Point-to-point link cable** | |
| For connection to CPU 31xC-2 PtP | |
| 5 m | **6ES7902-3AB00-0AA0** |
| 10 m | **6ES7902-3AC00-0AA0** |
| 50 m | **6ES7902-3AG00-0AA0** |
| **Front connector (1 unit)** | |
| For compact CPUs | |
| 40-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AM00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| **SIMATIC TOP connect** | See page 5/248; for information about which components can be used for the respective module, see Industry Mall |
| **Front door, elevated design** | **6ES7328-7AA20-0AA0** |
| For compact CPUs; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in petrol | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |
| **Power supply connector** | **6ES7391-1AA00-0AA0** |
| 10 units, spare part | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 10 units, spare part | |
| **Label cover** | **6ES7392-2XY00-0AA0** |
| 10 units, spare part | |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Labeling sheets for machine inscription** | | **PROFINET bus components** | |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | | **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 |
| Petrol | 6ES7392-2AX10-0AA0 | 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; | |
| Light beige | 6ES7392-2BX10-0AA0 | | |
| Yellow | 6ES7392-2CX10-0AA0 | Sold by the meter: Max. delivery unit 1000 m (3281 ft) minimum order quantity 20 m (65.62 ft) | |
| Red | 6ES7392-2DX10-0AA0 | | |
| **USB A2 PC adapter** | 6GK1571-0BA00-0AA0 | **FO Standard Cable GP (50/125)** | 6XV1873-2A |
| for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | | Standard cable, splittable, UL approval, sold by the meter Max. delivery unit 1000 m (3281 ft) minimum order quantity 20 m (65.62 ft) | |
| **PROFIBUS DP RS 485 bus connector** | | **SCALANCE X204-2 Industrial Ethernet switch** | 6GK5204-2BB10-2AA3 |
| • with 90° cable outlet, max. transfer rate 12 Mbps | | Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | |
|   - without PG interface | 6ES7972-0BA12-0XA0 | | |
|   - with PG interface | 6ES7972-0BB12-0XA0 | | |
| • with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbps | | | |
|   - without PG interface, 1 unit | 6ES7972-0BA52-0XA0 | **CSM 377 Compact Switch Module** | 6GK7377-1AA00-0AA0 |
|   - without PG interface, 100 units | 6ES7972-0BA52-0XB0 | Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM | |
|   - with PG interface, 1 unit | 6ES7972-0BB52-0XA0 | | |
|   - with PG interface, 100 units | 6ES7972-0BB52-0XB0 | | |
| • with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS | 6GK1500-0EA02 | | |
| **PROFIBUS FastConnect bus cable** | 6XV1830-0EH10 | **IE FC RJ45 plugs** | |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| **RS 485 repeater for PROFIBUS** | 6ES7972-0AA02-0XA0 | **IE FC RJ45 Plug 180** | |
| Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure | | 180° cable outlet | |
| | | 1 unit | 6GK1901-1BB10-2AA0 |
| | | 10 units | 6GK1901-1BB10-2AB0 |
| | | 50 units | 6GK1901-1BB10-2AE0 |
| | | **PROFIBUS/PROFINET bus components** | See Catalogs IK PI, CA 01 |
| | | For establishing MPI/PROFIBUS/ PROFINET communication | |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

**SIPLUS S7-300 compact CPUs**

### ■ Overview SIPLUS S7-300 CPU 312C



- The compact CPU with integral digital inputs/outputs
- For small applications with increased processing performance requirements
- With technological functions

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Overview SIPLUS S7-300 CPU 313C-2 DP



- The compact CPU with integral digital inputs/outputs and PROFIBUS DP master/slave interface
- With technological functions
- For tasks with special functions
- For connecting distributed I/O

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Overview SIPLUS S7-300 CPU 313C



- The compact CPU with integral digital and analog inputs/outputs
- For plants with high processing performance and response time requirements
- With technological functions

Micro Memory Card required to operate the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Overview SIPLUS S7-300 CPU 314C-2 PtP



- The compact CPU with integrated digital and analog inputs/outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Overview SIPLUS S7-300 CPU 314C-2 DP



- The compact CPU with integral digital and analog inputs/outputs and PROFIBUS DP master/slave interface
- With technological functions
- For tasks with special functions
- For connecting distributed I/O

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Overview SIPLUS S7-300 CPU 314C-2 PN/DP



- The compact CPU with integral digital and analog inputs/outputs and technological functions
- High processing performance in binary and floating-point arithmetic
- For connecting distributed I/O via PROFIBUS and PROFINET
- Combined MPI/PROFIBUS DP master/slave interface
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Isochronous mode on PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### SIPLUS S7-300 compact CPUs

■ **Technical specifications**

| Article number | **6AG1312-5BF04-2AY0** | **6AG1312-5BF04-7AB0** | **6AG1313-5BG04-2AY0** | **6AG1313-5BG04-7AB0** |
|---|---|---|---|---|
| Based on | **6ES7312-5BF04-0AB0** | **6ES7312-5BF04-0AB0** | **6ES7313-5BG04-0AB0** | **6ES7313-5BG04-0AB0** |
| | SIPLUS S7-300 CPU312C EN50155 | SIPLUS S7-300 CPU312C | SIPLUS S7-300 CPU313C EN50155 | SIPLUS S7-300 CPU313C |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Technical specifications (continued)

| Article number | **6AG1313-6CG04-2AY0** | **6AG1313-6CG04-7AB0** | **6AG1314-6BH04-7AB0** |
|---|---|---|---|
| Based on | **6ES7313-6CG04-0AB0** | **6ES7313-6CG04-0AB0** | **6ES7314-6BH04-0AB0** |
| | SIPLUS S7-300 CPU313C-2DP EN50155 | SIPLUS S7-300 CPU313C-2DP | SIPLUS S7-300 CPU314C-2 PtP |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

### SIPLUS S7-300 compact CPUs

**Technical specifications** (continued)

| Article number | 6AG1314-6CH04-2AY0 | 6AG1314-6CH04-7AB0 | 6AG1314-6EH04-7AB0 |
|---|---|---|---|
| Based on | 6ES7314-6CH04-0AB0 | 6ES7314-6CH04-0AB0 | 6ES7314-6EH04-0AB0 |
| | SIPLUS S7-300 CPU314C-2DP EN50155 | SIPLUS S7-300 CPU314C-2DP | SIPLUS S7-300 CPU314C-2PN/DP |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; @ 60°C for UL/ATEX/FM use |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 CPU 312C** | | **SIPLUS S7-300 CPU 314C-2 PtP** | |
| *For industrial applications with extended ambient conditions* | | *For industrial applications with extended ambient conditions* | |
| Compact CPU, work memory 64 KB, 24 V DC power supply, 10 DI/6 DQ integrated, integrated functions, MPI; including slot number labels; MMC required | | Compact CPU, work memory 192 KB, 24 V DC power supply, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI, RS 422/485 interface; MMC required | |
| Extended temperature range and exposure to media | **6AG1312-5BF04-7AB0** | Extended temperature range and exposure to media | **6AG1314-6BH04-7AB0** |
| *For rolling stock railway applications* | | **SIPLUS S7-300 CPU 314C-2 DP** | |
| Compact CPU, work memory 64 KB, 24 V DC power supply, 10 DI/6 DQ integrated, integrated functions, MPI; including slot number labels; MMC required | | *For industrial applications with extended ambient conditions* | |
| Conforms to EN 50155 | **6AG1312-5BF04-2AY0** | Compact CPU, work memory 192 KB, 24 V DC power supply, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | |
| **SIPLUS S7-300 CPU 313C** | | | |
| *For industrial applications with extended ambient conditions* | | Extended temperature range and exposure to media | **6AG1314-6CH04-7AB0** |
| Compact CPU, work memory 128 KB, supply voltage 24 V DC, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI; MMC required | | *For rolling stock railway applications* | |
| Extended temperature range and exposure to media | **6AG1313-5BG04-7AB0** | Compact CPU, work memory 192 KB, 24 V DC power supply, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | |
| *For rolling stock railway applications* | | | |
| Compact CPU, work memory 128 KB, supply voltage 24 V DC, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI; MMC required | | Conforms to EN 50155 | **6AG1314-6CH04-2AY0** |
| Conforms to EN 50155 | **6AG1313-5BG04-2AY0** | **SIPLUS S7-300 CPU 314C-2 PN/DP** | |
| **SIPLUS S7-300 CPU 313C-2 DP** | | *For industrial applications with extended environmental conditions* | |
| *For industrial applications with extended ambient conditions* | | Compact CPU, work memory 192 KB, 24 V DC supply voltage, 24 DI/16 DQ, 4 AI/2 AQ integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; PROFINET IO controller/ I-device interface, MMC is required | |
| Compact CPU, work memory 128 KB, power supply 24 V DC, 16 DI/16 DQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | | | |
| Extended temperature range and exposure to media | **6AG1313-6CG04-7AB0** | Extended temperature range and exposure to media | **6AG1314-6EH04-7AB0** |
| *For rolling stock railway applications* | | **Accessories** | |
| Compact CPU, work memory 128 KB, power supply 24 V DC, 16 DI/16 DQ integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required | | *Mandatory* | |
| | | **SIMATIC Micro Memory Card** | |
| | | 64 KB | **6ES7953-8LF31-0AA0** |
| Conforms to EN 50155 | **6AG1313-6CG04-2AY0** | 128 KB | **6ES7953-8LG31-0AA0** |
| | | 512 KB | **6ES7953-8LJ31-0AA0** |
| | | 2 MB | **6ES7953-8LL31-0AA0** |
| | | 4 MB | **6ES7953-8LM31-0AA0** |
| | | 8 MB | **6ES7953-8LP31-0AA0** |
| | | **Front connector (1 unit)** | |
| | | For compact CPUs | |
| | | 40-pin, with spring-loaded contacts <br> • 1 unit <br> • 100 units | **6ES7392-1BM01-0AA0** <br> **6ES7392-1BM01-1AB0** |

# SIMATIC S7-300 Advanced Controllers
## Central processing units

### SIPLUS S7-300 compact CPUs

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| *For communication within the application* | | **RS 485 repeater for PROFIBUS** | **6AG1972-0AA02-7XA0** |
| **PROFIBUS DP RS 485 bus connector** | | (extended temperature range and exposure to media) | |
| (extended temperature range and exposure to media) | | Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure | |
| With 90° cable outlet, max. transfer rate 12 Mbps | | **Point-to-point link cable** | |
| • Without PG interface | **6AG1972-0BA12-2XA0** | For connection to CPU 31xC-2 PtP | |
| • With PG interface | **6AG1972-0BB12-2XA0** | 5 m | **6ES7902-3AB00-0AA0** |
| With angled cable outlet, max. transfer rate 12 Mbps | | 10 m | **6ES7902-3AC00-0AA0** |
| • without PG interface | **6AG1972-0BA42-7XA0** | 50 m | **6ES7902-3AG00-0AA0** |
| • with PG interface | **6AG1972-0BB42-7XA0** | *For commissioning* | |
| (extended temperature range) | | **MPI cable** | **6ES7901-0BF00-0AA0** |
| With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS | **6AG1500-0EA02-2AA0** | For connection of SIMATIC S7 and PG via MPI; length 5 m | |
| **IE FC RJ45 Plug 180** | | **USB A2 PC adapter** | **6GK1571-0BA00-0AA0** |
| (extended temperature range and exposure to media) | | For connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |
| 180° cable outlet | | *Consumables* | |
| • 1 unit | **6AG1901-1BB10-7AA0** | **Front door, elevated design** | **6ES7328-7AA20-0AA0** |
| **SIPLUS SCALANCE X-200 Industrial Ethernet switches** | | For compact CPUs; for connecting 1.3 mm$^2$/16 AWG wires; wiring diagram and labels in petrol | |
| Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (exception: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | | **Power supply connector** | **6ES7391-1AA00-0AA0** |
| | | 10 units, spare part | |
| | | **Slot number plates** | **6ES7912-0AA00-0AA0** |
| | | **Labeling strips** | **6ES7392-2XX00-0AA0** |
| | | 10 units, spare part | |
| | | **Label cover** | **6ES7392-2XY00-0AA0** |
| • With electrical and optical ports for glass multimode FOC up to 3 km | | 10 units, spare part | |
| • Extended temperature range and exposure to media | | **Labeling sheets for machine inscription** | |
| • **SIPLUS SCALANCE X204-2** With four 10/100 Mbps RJ45 ports and two fiber-optic ports | **6AG1204-2BB10-4AA3** | For modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| | | Petrol | **6ES7392-2AX10-0AA0** |
| **PROFIBUS FastConnect bus cable** | **6XV1830-0EH10** | Light beige | **6ES7392-2BX10-0AA0** |
| | | Yellow | **6ES7392-2CX10-0AA0** |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter; max. length 1000 m, minimum ordering quantity 20 m | | Red | **6ES7392-2DX10-0AA0** |
| | | *Documentation* | |
| **IE FC TP Standard Cable GP 2x2** | **6XV1840-2AH10** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Sold by the meter; max. length 1 000 m minimum order quantity 20 m | | | |
| **FO Standard Cable GP (50/125)** | **6XV1873-2A** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Standard cable, splittable, UL approval, sold by the meter: max. length 1 000 m minimum order quantity 20 m | | Current "Manual Collection" DVD and the three subsequent updates | |

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### Overview CPU 315F-2 DP



- Based on the SIMATIC CPU 315-2 DP
- For setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Distributed fail-safe I/O modules can be connected locally via the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-oriented applications

SIMATIC Micro Memory Card required for operation of CPU.

### Overview CPU 315F-2 PN/DP



- Based on CPU 315-2 PN/DP
- The CPU with medium-sized program memory and quantity structures for setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Distributed fail-safe I/O modules can be locally connected via the integrated PROFINET interface (PROFIsafe) and/or via the integrated PROFIBUS DP interface (PROFIsafe)

- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component Based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

### Overview CPU 317F-2 DP



- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Fail-safe I/O modules can be connected in a distributed configuration to both integral PROFIBUS DP interfaces (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Standard modules for non-safety-related applications can be operated centrally and locally

SIMATIC Micro Memory Card required for operation of CPU.

# SIMATIC S7-300 Advanced Controllers
## Central processing units

**Fail-safe CPUs**

### ■ Overview CPU 317F-2 PN/DP

- Based on CPU 317-2 PN/DP
- The fail-safe CPU with a large program memory and quantity framework for demanding applications; for setting up a fail-safe automation system in plants with increased safety requirements.
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Distributed fail-safe I/O modules can be locally connected via the integrated PROFINET interface (PROFIsafe) and/or via the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component Based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

### ■ Overview CPU 319F-3 PN/DP

- The fail-safe CPU with high-performance command processing, large program memory and large quantity structure for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to 13849.1
- Distributed fail-safe I/O modules can be locally connected via the integrated PROFINET interface (PROFIsafe) and/or via the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of ET200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and locally
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Isochronous mode on PROFIBUS
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

■ **Technical specifications**

| Article number | 6ES7315-6FF04-0AB0 | 6ES7315-2FJ14-0AB0 | 6ES7317-6FF04-0AB0 | 6ES7317-2FK14-0AB0 | 6ES7318-3FL01-0AB0 |
|---|---|---|---|---|---|
| | CPU315F, 384KB | CPU315F-2 PN/DP, 512 KB | CPU317F-2DP, 1.5 MB | CPU317F-2 PN/DP, 1.5 MB | CPU319F-3 PN/DP, 2.5 MB |
| **General information** | | | | | |
| **Engineering with** | | | | | |
| • Programming package | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.2 + SP1 or higher with HSP 218 + Distributed Safety | STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4 | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.2 + SP1 or higher with HSP 202 + Distributed Safety | STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4 | STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4 |
| **Supply voltage** | | | | | |
| Rated value (DC) | | | | | |
| • 24 V DC | Yes | Yes | Yes | Yes | Yes |
| **Power loss** | | | | | |
| Power loss, typ. | 4.5 W | 4.65 W | 4.5 W | 4.65 W | 14 W |
| **Memory** | | | | | |
| **Work memory** | | | | | |
| • integrated | 384 kbyte | 512 kbyte | 1 536 kbyte | 1 536 kbyte | 2 560 kbyte |
| • Size of retentive memory for retentive data blocks | 128 kbyte | 128 kbyte | 256 kbyte | 256 kbyte | 700 kbyte |
| **Load memory** | | | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | | | |
| for bit operations, typ. | 0.05 μs | 0.05 μs | 0.025 μs | 0.025 μs | 0.004 μs |
| for word operations, typ. | 0.09 μs | 0.09 μs | 0.03 μs | 0.03 μs | 0.01 μs |
| for fixed point arithmetic, typ. | 0.12 μs | 0.12 μs | 0.04 μs | 0.04 μs | 0.01 μs |
| for floating point arithmetic, typ. | 0.45 μs | 0.45 μs | 0.16 μs | 0.16 μs | 0.04 μs |
| **Counters, timers and their retentivity** | | | | | |
| **S7 counter** | | | | | |
| • Number | 256 | 256 | 512 | 512 | 2 048 |
| **IEC counter** | | | | | |
| • present | Yes | Yes | Yes | Yes | Yes |
| **S7 times** | | | | | |
| • Number | 256 | 256 | 512 | 512 | 2 048 |
| **IEC timer** | | | | | |
| • present | Yes | Yes | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | | | |
| **Flag** | | | | | |
| • Number, max. | 2 048 byte | 2 048 byte | 4 096 byte | 4 096 byte | 8 192 byte |
| **Address area** | | | | | |
| **I/O address area** | | | | | |
| • Inputs | 2 048 byte | 2 048 byte | 8 192 byte | 8 192 byte | 8 192 byte |
| • Outputs | 2 048 byte | 2 048 byte | 8 192 byte | 8 192 byte | 8 192 byte |
| **Process image** | | | | | |
| • Inputs, adjustable | 2 048 byte | 2 048 byte | 8 192 byte | 8 192 byte | 8 192 byte |
| • Outputs, adjustable | 2 048 byte | 2 048 byte | 8 192 byte | 8 192 byte | 8 192 byte |
| **Time of day** | | | | | |
| **Clock** | | | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes | Yes | Yes |
| **Operating hours counter** | | | | | |
| • Number | 1 | 1 | 4 | 4 | 4 |

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# SIMATIC S7-300 Advanced Controllers
Central processing units

**Fail-safe CPUs**

## ■ Technical specifications (continued)

| Article number | 6ES7315-6FF04-0AB0 | 6ES7315-2FJ14-0AB0 | 6ES7317-6FF04-0AB0 | 6ES7317-2FK14-0AB0 | 6ES7318-3FL01-0AB0 |
|---|---|---|---|---|---|
| | CPU315F, 384KB | CPU315F-2 PN/DP, 512 KB | CPU317F-2DP, 1.5 MB | CPU317F-2 PN/DP, 1.5 MB | CPU319F-3 PN/DP, 2.5 MB |
| **1. Interface** | | | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | | | |
| • MPI | Yes | Yes | Yes | Yes | Yes |
| • PROFIBUS DP master | No | Yes | Yes | Yes | Yes |
| • PROFIBUS DP slave | No | Yes | Yes; A DP slave at both interfaces simultaneously is not possible | Yes | Yes; A DP slave at both interfaces simultaneously is not possible |
| • Point-to-point connection | No | No | No | No | No |
| **DP master** | | | | | |
| • Number of DP slaves, max. | | 124 | 124 | 124 | 124 |
| **2. Interface** | | | | | |
| Interface type | Integrated RS 485 interface | PROFINET | Integrated RS 485 interface | PROFINET | Integrated RS 485 interface |
| Physics | RS 485 | Ethernet RJ45 | RS 485 | Ethernet RJ45 | RS 485 |
| **Interface types** | | | | | |
| • Number of ports | | 2 | | 2 | |
| **Functionality** | | | | | |
| • MPI | No | No | No | No | No |
| • PROFINET IO Controller | | Yes; Also simultaneously with IO-Device functionality | | Yes; Also simultaneously with IO-Device functionality | No |
| • PROFINET IO Device | | Yes; Also simultaneously with IO Controller functionality | | Yes; Also simultaneously with IO Controller functionality | No |
| • PROFINET CBA | | Yes | | Yes | No |
| • PROFIBUS DP master | Yes | No | Yes | No | Yes |
| • PROFIBUS DP slave | Yes | No | Yes; A DP slave at both interfaces simultaneously is not possible | No | Yes; A DP slave at both interfaces simultaneously is not possible |
| **DP master** | | | | | |
| • Number of DP slaves, max. | 124; Per station | | 124 | | 124 |
| **3. Interface** | | | | | |
| Interface type | | | | | PROFINET |
| Physics | | | | | Ethernet RJ45 |
| **Interface types** | | | | | |
| • Number of ports | | | | | 2 |
| **Functionality** | | | | | |
| • MPI | | | | | No |
| • PROFINET IO Controller | | | | | Yes; Also simultaneously with I-Device functionality |
| • PROFINET IO Device | | | | | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | | | | | Yes |
| • PROFIBUS DP master | | | | | No |
| • PROFIBUS DP slave | | | | | No |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes | Yes; Via PROFIBUS DP or PROFINET interface | | Yes; Via PROFIBUS DP or PROFINET interface | Yes; Via 2nd PROFIBUS DP or PROFINET interface |

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## ◾ Technical specifications (continued)

| Article number | 6ES7315-6FF04-0AB0 | 6ES7315-2FJ14-0AB0 | 6ES7317-6FF04-0AB0 | 6ES7317-2FK14-0AB0 | 6ES7318-3FL01-0AB0 |
|---|---|---|---|---|---|
| | CPU315F, 384KB | CPU315F-2 PN/DP, 512 KB | CPU317F-2DP, 1.5 MB | CPU317F-2 PN/DP, 1.5 MB | CPU319F-3 PN/DP, 2.5 MB |
| **Communication functions** | | | | | |
| PG/OP communication | Yes | Yes | Yes | Yes | Yes |
| Data record routing | Yes | Yes | Yes | Yes | Yes |
| **Global data communication** | | | | | |
| • supported | Yes | Yes | Yes | Yes | Yes |
| **S7 basic communication** | | | | | |
| • supported | Yes | Yes | Yes | Yes | Yes |
| **S7 communication** | | | | | |
| • supported | Yes | Yes | Yes | Yes | Yes |
| **S5 compatible communication** | | | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |
| **Open IE communication** | | | | | |
| • TCP/IP | | Yes; via integrated PROFINET interface and loadable FBs | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 8 | | 16 | 32 |
| • ISO-on-TCP (RFC1006) | | Yes; via integrated PROFINET interface and loadable FBs | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 8 | | 16 | 32 |
| • UDP | | Yes; via integrated PROFINET interface and loadable FBs | | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | | 8 | | 16 | 32 |
| **Web server** | | | | | |
| • supported | | Yes; only read function | | Yes | Yes |
| **Number of connections** | | | | | |
| • overall | 16 | 16 | 32 | 32 | 32 |
| **Ambient conditions** | | | | | |
| **Ambient temperature during operation** | | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | | | |
| **Programming** | | | | | |
| **Programming language** | | | | | |
| - LAD | Yes | Yes | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes | Yes | Yes |
| - CFC | Yes | Yes | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes | Yes | Yes |
| - HiGraph® | Yes | Yes | Yes | Yes | Yes |
| **Know-how protection** | | | | | |
| • User program protection/password protection | Yes | Yes | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm | 130 mm | 130 mm |
| **Weights** | | | | | |
| Weight, approx. | 290 g | 340 g | 360 g | 340 g | 1 250 g |

# SIMATIC S7-300 Advanced Controllers
Central processing units

## Fail-safe CPUs

| Ordering data | Article No. |
|---|---|
| **CPU 315F-2 DP** | **6ES7315-6FF04-0AB0** |
| CPU for SIMATIC S7-300F; work memory 384 KB, supply voltage 24 V DC, MPI, PROFIBUS DP master/slave interface, incl. slot number labels; MMC required | |
| **CPU 315F-2 PN/DP** | **6ES7315-2FJ14-0AB0** |
| CPU for SIMATIC S7-300F; work memory 512 KB, supply voltage 24 V DC; MPI/PROFIBUS DP master/slave interface; Industrial Ethernet PROFINET interface; incl. slot number labels; MMC required | |
| **CPU 317F-2 DP** | **6ES7317-6FF04-0AB0** |
| Work memory 1.5 MB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, MMC required | |
| **CPU 317F-2 PN/DP** | **6ES7317-2FK14-0AB0** |
| Work memory 1.5 MB, supply voltage 24 V DC, MPI, PROFIBUS DP master/slave interface; Industrial Ethernet PROFINET interface; MMC required | |
| **CPU 319F-3 PN/DP** | **6ES7318-3FL01-0AB0** |
| Work memory 2.5 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required | |
| **S7 Distributed Safety V5.4 programming tool** | |
| Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **S7 Distributed Safety upgrade** | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |

| Ordering data | Article No. |
|---|---|
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| **SIMATIC Micro Memory Card** | |
| 64 KB | **6ES7953-8LF31-0AA0** |
| 128 KB | **6ES7953-8LG31-0AA0** |
| 512 KB | **6ES7953-8LJ31-0AA0** |
| 2 MB | **6ES7953-8LL31-0AA0** |
| 4 MB | **6ES7953-8LM31-0AA0** |
| 8 MB | **6ES7953-8LP31-0AA0** |
| **MPI cable** | **6ES7901-0BF00-0AA0** |
| For connection of SIMATIC S7 and PG via MPI; 5 m in length | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |
| **Power supply connector** | **6ES7391-1AA00-0AA0** |
| 10 units, spare part | |
| **USB A2 PC adapter** | **6GK1571-0BA00-0AA0** |
| For connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |

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## Ordering data

| PROFIBUS bus components | Article No. |
|---|---|
| **PROFIBUS DP RS 485 bus connector** | |
| • with 90° cable outlet, max. transfer rate 12 Mbps | |
| - without PG interface | **6ES7972-0BA12-0XA0** |
| - with PG interface | **6ES7972-0BB12-0XA0** |
| • with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbps | |
| - without PG interface, 1 unit | **6ES7972-0BA52-0XA0** |
| - without PG interface, 100 units | **6ES7972-0BA52-0XB0** |
| - with PG interface, 1 unit | **6ES7972-0BB52-0XA0** |
| - with PG interface, 100 units | **6ES7972-0BB52-0XB0** |
| • with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS | **6GK1500-0EA02** |
| **PROFIBUS FastConnect bus cable** | **6XV1830-0EH10** |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m | |
| **RS 485 repeater for PROFIBUS** | **6ES7972-0AA02-0XA0** |
| Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure | |

| PROFINET bus components | Article No. |
|---|---|
| **IE FC TP standard cable GP 2x2** | **6XV1840-2AH10** |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter | |
| **FO Standard Cable GP (50/125)** | **6XV1873-2A** |
| Standard cable, splittable, UL approval, sold by the meter | |
| **SCALANCE X204-2 Industrial Ethernet switch** | **6GK5204-2BB10-2AA3** |
| Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | |
| **CSM 377 Compact Switch Module** | **6GK7377-1AA00-0AA0** |
| Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM | |
| **IE FC RJ45 plugs** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| **IE FC RJ45 Plug 145** | |
| 145° cable outlet | |
| 1 unit | **6GK1901-1BB30-0AA0** |
| 10 units | **6GK1901-1BB30-0AB0** |
| 50 units | **6GK1901-1BB30-0AE0** |
| **IE FC RJ45 plug 180** | |
| 180° cable outlet | |
| 1 unit | **6GK1901-1BB10-2AA0** |
| 10 units | **6GK1901-1BB10-2AB0** |
| 50 units | **6GK1901-1BB10-2AE0** |
| **PROFIBUS/PROFINET bus components** | See Catalogs IK PI, CA 01 |
| For establishing MPI/PROFIBUS/ PROFINET communication | |

1) For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## SIMATIC S7-300 Advanced Controllers
Central processing units

**SIPLUS S7-300 fail-safe CPUs**

### ■ Overview SIPLUS S7-300 CPU 315F-2 DP



- For configuring a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the integral PROFIBUS DP interface (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Overview SIPLUS S7-300 CPU 315F-2 PN/DP



- The CPU with a medium sized program memory and quantity structures to build a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e in accordance with ISO 13849 and up to Cat. 4 of EN 954-1
- The fail-safe I/O modules can be locally connected to the integrated PROFINET interface (PROFIsafe) and/or to the integrated PROFIBUS DP interface (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally
- Component Based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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■ **Overview SIPLUS S7-300 CPU 317F-2 DP**



- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For configuring a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508 and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration to both integral PROFIBUS DP interfaces (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally

Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

■ **Overview SIPLUS S7-300 CPU 317F-2 PN/DP**



- The fail-safe CPU with a large program memory and quantity structures for demanding applications to build a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e in accordance with ISO 13849-1 and up to category 4 of EN 954-1
- The fail-safe I/O modules can be locally connected via the integrated PROFINET interface (PROFIsafe) and/or via the integrated PROFIBUS DP interface (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally
- Component Based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

# SIMATIC S7-300 Advanced Controllers
## Central processing units

**SIPLUS S7-300 fail-safe CPUs**

### Technical specifications

| Article number | **6AG1315-6FF04-2AB0** | **6AG1315-6FF04-2AY0** | **6AG1315-2FJ14-2AB0** | **6AG1315-2FJ14-2AY0** |
| --- | --- | --- | --- | --- |
| Based on | **6ES7315-6FF04-0AB0** | **6ES7315-6FF04-0AB0** | **6ES7315-2FJ14-0AB0** | **6ES7315-2FJ14-0AB0** |
| | SIPLUS S7-300 CPU 315F-2DP | SIPLUS S7-300 CPU 315F-2DP EN50155 | SIPLUS S7-300 CPU315F-2PN/DP | SIPLUS S7-300 CPU315F-2PN/DP EN50155 |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 60 °C; = Tmax | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Technical specifications (continued)

| Article number | 6AG1317-6FF04-2AB0 | 6AG1317-2FK14-2AB0 | 6AG1317-2FK14-2AY0 |
|---|---|---|---|
| Based on | 6ES7317-6FF04-0AB0 | 6ES7317-2FK14-0AB0 | 6ES7317-2FK14-0AB0 |
| | SIPLUS S7-300 CPU317F-2DP | SIPLUS S7-300 CPU317F-2PN/DP | SIPLUS S7-300 CPU317F-2PN/DP EN50155 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax | 60 °C; = Tmax | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
## Central processing units

**SIPLUS S7-300 fail-safe CPUs**

◾ **Ordering data** | **Article No.** | | **Article No.**

| | | | |
|---|---|---|---|
| **SIPLUS S7-300**<br>**CPU 315F-2 DP** | | **SIPLUS S7-300**<br>**CPU 317F-2 PN/DP** | |
| *For industrial applications*<br>*with extended*<br>*ambient conditions* | | *For industrial applications*<br>*with extended*<br>*ambient conditions* | |
| CPU for SIPLUS S7-300F;<br>work memory 384 KB, 24 V DC<br>supply voltage, MPI, PROFIBUS DP<br>master/slave interface; incl. slot<br>number labels; MMC required | | CPU for SIMATIC S7-300F, 1.5 MB<br>work memory, 24 V DC power sup-<br>ply, MPI/ PROFIBUS DP master/<br>slave interface; Industrial Ethernet<br>PROFINET interface; MMC require | |
| Extended temperature range and<br>exposure to media | **6AG1315-6FF04-2AB0** | Extended temperature range and<br>exposure to media | **6AG1317-2FK14-2AB0** |
| *For rolling stock railway*<br>*applications* | | *For rolling stock railway*<br>*applications* | |
| Conforms to EN 50155 | **6AG1315-6FF04-2AY0** | CPU for SIMATIC S7-300F, 1.5 MB<br>work memory, 24 V DC power sup-<br>ply, MPI/ PROFIBUS DP master/<br>slave interface; Industrial Ethernet<br>PROFINET interface; MMC require | |
| **SIPLUS S7-300**<br>**CPU 315F-2 PN/DP** | | conforms to EN 50155 | **6AG1317-2FK14-2AY0** |
| *For industrial applications*<br>*with extended*<br>*ambient conditions* | | **Accessories** | |
| CPU for SIPLUS S7-300F;<br>work memory 512 KB,<br>power supply 24 V DC;<br>MPI/PROFIBUS DP master/slave<br>interface; Industrial Ethernet /<br>PROFINET interface; incl.<br>slot number plates | | *Mandatory* | |
| | | **SIMATIC Micro Memory Card** | |
| | | 64 KB | **6ES7953-8LF31-0AA0** |
| | | 128 KB | **6ES7953-8LG31-0AA0** |
| Extended temperature range and<br>exposure to media | **6AG1315-2FJ14-2AB0** | 512 KB | **6ES7953-8LJ31-0AA0** |
| | | 2 MB | **6ES7953-8LL31-0AA0** |
| *For rolling stock railway*<br>*applications* | | 4 MB | **6ES7953-8LM31-0AA0** |
| CPU for SIPLUS S7-300F;<br>work memory 512 KB,<br>power supply 24 V DC;<br>MPI/PROFIBUS DP master/slave<br>interface; Industrial Ethernet /<br>PROFINET interface; incl. slot<br>number plates | | 8 MB | **6ES7953-8LP31-0AA0** |
| | | *For communication*<br>*within the application* | |
| | | **PROFIBUS DP RS 485**<br>**bus connector** | |
| Conforms to EN 50155 | **6AG1315-2FJ14-2AY0** | (extended temperature range and<br>exposure to media) | |
| **SIPLUS S7-300**<br>**CPU 317F-2 DP** | | With 90° cable outlet,<br>max. transfer rate 12 Mbps | |
| *For industrial applications with*<br>*extended ambient conditions* | | • Without PG interface | **6AG1972-0BA12-2XA0** |
| | | • With PG interface | **6AG1972-0BB12-2XA0** |
| CPU for SIPLUS S7-300F, work<br>memory 1.5 MB, 24 V DC power<br>supply, MPI, PROFIBUS DP master/<br>slave interface; MMC required | | With angled cable outlet, max.<br>transfer rate 12 Mbps | |
| | | • Without PG interface | **6AG1972-0BA42-7XA0** |
| Extended temperature range and<br>exposure to media | **6AG1317-6FF04-2AB0** | • With PG interface | **6AG1972-0BB42-7XA0** |
| | | (extended temperature range) | |
| | | With axial cable outlet for<br>SIMATIC OP, for connecting to PPI,<br>MPI, PROFIBUS | **6AG1500-0EA02-2AA0** |
| | | **RS 485 repeater for PROFIBUS** | **6AG1972-0AA02-7XA0** |
| | | (extended temperature range and<br>exposure to media) | |
| | | Transmission rate up to 12 Mbps;<br>24 V DC; IP20 enclosure | |

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| Ordering data | Article No. |
|---|---|
| **IE FC RJ45 Plug 180** | |
| (extended temperature range and exposure to media) | |
| 180° cable outlet | |
| • 1 unit | **6AG1901-1BB10-7AA0** |
| **SIPLUS SCALANCE X-200 Industrial Ethernet switches** | |
| Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (exception: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | |
| • With electrical and optical ports for glass multimode FOC up to 3 km | |
| • Extended temperature range and exposure to media | |
| • SIPLUS SCALANCE X204-2 with four 10/100 Mbps RJ45 ports and two FO ports | **6AG1204-2BB10-4AA3** |
| **PROFIBUS FastConnect bus cable** | **6XV1830-0EH10** |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering quantity 20 m | |
| **IE FC TP Standard Cable GP 2x2** | **6XV1840-2AH10** |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval | |
| Sold by the meter | |
| **FO Standard Cable GP (50/125)** | **6XV1873-2A** |
| *For commissioning* | |
| **MPI cable** | **6ES7901-0BF00-0AA0** |
| For connection of SIMATIC S7 and PG via MPI; length 5 m | |
| **USB A2 PC adapter** | **6GK1571-0BA00-0AA0** |
| For connecting a programming device/PC or notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |

| | Article No. |
|---|---|
| **S7 Distributed Safety programming tool V5.4** | |
| *Task:* Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 V5.3 SP3 and higher | |
| Floating license | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **S7 Distributed Safety Upgrade** | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |
| **STEP 7 Safety Advanced V14 SP1** | |
| *Task:* Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O *Requirement:* STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| *Consumables* | |
| **Power supply connector** | **6ES7391-1AA00-0AA0** |
| 10 units, spare part | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** |
| *Documentation* | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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# SIMATIC S7-300 Advanced Controllers

Central processing units

## Technology CPUs

### ■ Overview CPU 315T-3 PN/DP

- SIMATIC CPU with integral technology/motion control functionality
- With full standard CPU 315-2 PN/DP functionality (except for CBA)
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7 technology" option package required (version V4.2 SP3 and higher)

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

### ■ Overview CPU 317T-3 PN/DP

- SIMATIC CPU with integral technology/motion control functionality
- With full standard CPU 317-2 PN/DP functionality (except for CBA)
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7 Technology" option package required (version V4.2 SP3 and higher)

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

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## Overview CPU 317TF-3 PN/DP



- Fail-safe SIMATIC CPU 317TF-3 PN/DP with integral technology/motion control functionality
- Spare-part-compatible successor to the CPU 317TF-2 DP (Article No. 6ES7317-6TF14-0AB0)
- With full functionality of the standard CPU 317-2 PN/DP and CPU 317F-2 PN/DP (except for CBA)
- For cross-industry automation tasks in series machine, special machine and plant construction

- Ideal for synchronized motion, such as coupling to a virtual/real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7 Technology" option package required
- "S7 Distributed Safety" option package required (version V4.2 SP3 and higher)

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

## Technical specifications

| Article number | 6ES7315-7TJ10-0AB0<br>CPU315T-3 PN/DP, 384KB | 6ES7317-7TK10-0AB0<br>CPU317T-3 PN/DP, 1024KB | 6ES7317-7UL10-0AB0<br>CPU317TF-3 PN/DP, 1,5 MB |
|---|---|---|---|
| **General information** | | | |
| **Engineering with** | | | |
| • Programming package | STEP 7 V5.5 SP2 or higher and S7-Technology option package V4.2 SP3 | STEP 7 V5.5 SP2 or higher and S7-Technology option package V4.2 SP3 | STEP 7 V5.5 SP2 or higher; S7-Technology option package V4.2 SP3 or higher, Distributed Safety V5.4 SP5 or higher, S7-F Configuration Pack V5.5 SP10 or higher |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | Yes |
| **Power loss** | | | |
| Power loss, typ. | 7.5 W | 7.5 W | 8.5 W |
| **Memory** | | | |
| **Work memory** | | | |
| • integrated | 384 kbyte | 1 024 kbyte | 1 536 kbyte |
| • Size of retentive memory for retentive data blocks | 128 kbyte | 256 kbyte | 256 kbyte |
| **Load memory** | | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | | |
| for bit operations, typ. | 0.05 µs | 0.025 µs | 0.025 µs |
| for word operations, typ. | 0.09 µs | 0.03 µs | 0.03 µs |
| for fixed point arithmetic, typ. | 0.12 µs | 0.04 µs | 0.04 µs |
| for floating point arithmetic, typ. | 0.45 µs | 0.16 µs | 0.16 µs |

# SIMATIC S7-300 Advanced Controllers
## Central processing units

**Technology CPUs**

■ **Technical specifications** (continued)

| Article number | 6ES7315-7TJ10-0AB0 | 6ES7317-7TK10-0AB0 | 6ES7317-7UL10-0AB0 |
|---|---|---|---|
| | CPU315T-3 PN/DP, 384KB | CPU317T-3 PN/DP, 1024KB | CPU317TF-3 PN/DP, 1,5 MB |
| **Counters, timers and their retentivity** | | | |
| **S7 counter** | | | |
| • Number | 256 | 512 | 512 |
| **IEC counter** | | | |
| • present | Yes | Yes | Yes |
| **S7 times** | | | |
| • Number | 256 | 512 | 512 |
| **IEC timer** | | | |
| • present | Yes | Yes | Yes |
| **Data areas and their retentivity** | | | |
| **Flag** | | | |
| • Number, max. | 2 048 byte | 4 096 byte | 4 096 byte |
| **Address area** | | | |
| **I/O address area** | | | |
| • Inputs | 2 048 byte | 8 192 byte | 8 192 byte |
| • Outputs | 2 048 byte | 8 192 byte | 8 192 byte |
| **Process image** | | | |
| • Inputs, adjustable | 2 048 byte | 8 192 byte | 8 192 byte |
| • Outputs, adjustable | 2 048 byte | 8 192 byte | 8 192 byte |
| **Time of day** | | | |
| **Clock** | | | |
| • Hardware clock (real-time) | Yes | Yes | Yes |
| **Operating hours counter** | | | |
| • Number | 1 | 4 | 4 |
| **Digital outputs** | | | |
| **Integrated high-speed cams** | | | |
| • Switching accuracy (+/-) | 70 µs | 70 µs | 70 µs |
| **1. Interface** | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | |
| • MPI | Yes | Yes | Yes |
| • PROFIBUS DP master | Yes | Yes | Yes |
| • PROFIBUS DP slave | Yes | Yes | Yes |
| • Point-to-point connection | No | No | No |
| **DP master** | | | |
| • Number of DP slaves, max. | 124 | 124 | 124 |
| **2. Interface** | | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485 | RS 485 | RS 485 |
| **Functionality** | | | |
| • MPI | No | No | No |
| • PROFIBUS DP master | Yes; DP(DRIVE)-Master | Yes; DP(DRIVE)-Master | Yes; DP(DRIVE)-Master |
| • PROFIBUS DP slave | No | No | No |
| **DP master** | | | |
| • Number of DP slaves, max. | 64 | 64 | 64 |
| **3. Interface** | | | |
| Interface type | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet RJ45 | Ethernet RJ45 | Ethernet RJ45 |
| **Interface types** | | | |
| • Number of ports | 2 | 2 | 2 |
| **Functionality** | | | |
| • MPI | No | No | No |
| • PROFINET IO Controller | Yes; Also simultaneously with IO-Device functionality | Yes; Also simultaneously with IO-Device functionality | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality | Yes; Also simultaneously with IO Controller functionality | Yes; Also simultaneously with IO Controller functionality |
| • PROFIBUS DP master | No | No | No |
| • PROFIBUS DP slave | No | No | No |

■ **Technical specifications** (continued)

| Article number | 6ES7315-7TJ10-0AB0 | 6ES7317-7TK10-0AB0 | 6ES7317-7UL10-0AB0 |
|---|---|---|---|
| | CPU315T-3 PN/DP, 384KB | CPU317T-3 PN/DP, 1024KB | CPU317TF-3 PN/DP, 1,5 MB |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | Yes; Via PROFIBUS DP or PROFINET interface | Yes; Via PROFIBUS DP or PROFINET interface | Yes; Via PROFIBUS DP or PROFINET interface |
| **Communication functions** | | | |
| PG/OP communication | Yes | Yes | Yes |
| Data record routing | Yes | Yes | Yes |
| **Global data communication** | | | |
| • supported | Yes | Yes | Yes |
| **S7 basic communication** | | | |
| • supported | Yes | Yes | Yes |
| **S7 communication** | | | |
| • supported | Yes | Yes | Yes |
| **S5 compatible communication** | | | |
| • supported | Yes; via CP and loadable FC | Yes; via CP and loadable FC | Yes; via CP and loadable FC |
| **Open IE communication** | | | |
| • TCP/IP | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | 8 | 16 | 16 |
| • ISO-on-TCP (RFC1006) | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | 8 | 16 | 16 |
| • UDP | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | 8 | 16 | 16 |
| **Web server** | | | |
| • supported | Yes | Yes | Yes |
| **Number of connections** | | | |
| • overall | 16 | 32 | 32 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Configuration** | | | |
| **Programming** | | | |
| **Programming language** | | | |
| - LAD | Yes | Yes | Yes |
| - FBD | Yes | Yes | Yes |
| - STL | Yes | Yes | Yes |
| - SCL | Yes | Yes | Yes |
| - CFC | Yes | Yes | Yes |
| - GRAPH | Yes | Yes | Yes |
| - HiGraph® | Yes | Yes | Yes |
| **Know-how protection** | | | |
| • User program protection/password protection | Yes | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | | |
| Width | 120 mm | 120 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 130 mm | 130 mm | 130 mm |
| **Weights** | | | |
| Weight, approx. | 640 g | 640 g | 640 g |

# SIMATIC S7-300 Advanced Controllers
## Central processing units

### Technology CPUs

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 315T-3 PN/DP** | **6ES7315-7TJ10-0AB0** | **S7 Distributed Safety V5.4 programming tool** | |
| 384 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP (DRIVE) interface, Ethernet/PROFINET interface with 2-port switch; with technology/motion control functions; MMC required | | Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| | | Floating license for 1 user | 6ES7833-1FC02-0YA5 |
| **CPU 317T-3 PN/DP** | **6ES7317-7TK10-0AB0** | Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | 6ES7833-1FC02-0YH5 |
| 1024 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP (DRIVE) interface, Ethernet/PROFINET interface with 2-port switch; with technology/motion control functions; MMC required | | S7 Distributed Safety upgrade from V5.x to V5.4; floating license for 1 user | 6ES7833-1FC02-0YE5 |
| | | **SIMATIC Micro Memory Card** | |
| | | 8 MB | 6ES7953-8LP31-0AA0 |
| **CPU 317TF-3 PN/DP** | **6ES7317-7UL10-0AB0** | **MPI cable** | **6ES7901-0BF00-0AA0** |
| 1.5 MB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP (DRIVE) interface, Ethernet/PROFINET interface with 2-port switch; with technology/motion control functions; MMC required | | for connection of SIMATIC S7 and PG via MPI; 5 m in length | |
| | | **Front connectors** | |
| | | 40-pin, with screw contacts • 1 unit • 100 units | 6ES7392-1AM00-0AA0 6ES7392-1AM00-1AB0 |
| **S7 Technology V4.2** | | 40-pin, with spring-loaded contacts • 1 unit • 100 units | 6ES7392-1BM01-0AA0 6ES7392-1BM01-1AB0 |
| V4.2 SP3 and higher can be used for CPU 317TF-3 PN/DP | | **Slot number plates** | **6ES7912-0AA00-0AA0** |
| Task: Option package for configuring and programming technology tasks with the SIMATIC S7 CPU 31xT and SIMATIC S7 CPU 317TF Requirement: STEP 7 V5.5 SP5 and higher Type of delivery: incl. up-to-date Service Pack; on DVD; incl. documentation for CPU 31xT-2 DP, CPU 317TF-2 DP (included on DVD) | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Floating license | 6ES7864-1CC42-0YA5 | | |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | 6ES7864-1CC42-0XH5 | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |
| Upgrade to V4.2 | 6ES7864-1CC42-0YE5 | **Power supply connector** | **6ES7391-1AA00-0AA0** |
| Trial license | 6ES7864-1CC42-0YA7 | 10 units, spare part | |
| | | **Labeling strips** | **6ES7392-2XX00-0AA0** |
| | | 10 units, spare part | |
| | | **Label cover** | **6ES7392-2XY00-0AA0** |
| | | 10 units, spare part | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Labeling sheets for machine inscription** | | **PROFINET bus components** | |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | | **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 |
| Petrol | 6ES7392-2AX10-0AA0 | 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter | |
| Light beige | 6ES7392-2BX10-0AA0 | | |
| Yellow | 6ES7392-2CX10-0AA0 | | |
| Red | 6ES7392-2DX10-0AA0 | **FO Standard Cable GP (50/125)** | 6XV1873-2A |
| **USB A2 PC adapter** | 6GK1571-0BA00-0AA0 | Standard cable, splittable, UL approval, sold by the meter | |
| for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | | **SCALANCE X204-2 Industrial Ethernet switch** | 6GK5204-2BB10-2AA3 |
| **PROFIBUS bus components** | | Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | |
| **PROFIBUS DP RS 485 bus connector** | | | |
| • with 90° cable outlet, max. transfer rate 12 Mbps | | | |
| - without PG interface | 6ES7972-0BA12-0XA0 | | |
| - with PG interface | 6ES7972-0BB12-0XA0 | **CSM 377 Compact Switch Module** | 6GK7377-1AA00-0AA0 |
| • with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbps | | Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM | |
| - without PG interface, 1 unit | 6ES7972-0BA52-0XA0 | | |
| - without PG interface, 100 units | 6ES7972-0BA52-0XB0 | | |
| - with PG interface, 1 unit | 6ES7972-0BB52-0XA0 | | |
| - with PG interface, 100 units | 6ES7972-0BB52-0XB0 | **IE FC RJ45 plugs** | |
| • with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS | 6GK1500-0EA02 | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| **PROFIBUS FastConnect bus cable** | 6XV1830-0EH10 | | |
| Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m | | **IE FC RJ45 Plug 180** | |
| | | 180° cable outlet | |
| | | 1 unit | 6GK1901-1BB10-2AA0 |
| **RS 485 repeater for PROFIBUS** | 6ES7972-0AA02-0XA0 | 10 units | 6GK1901-1BB10-2AB0 |
| Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure | | 50 units | 6GK1901-1BB10-2AE0 |
| | | **PROFIBUS/PROFINET bus components** | See Catalogs IK PI, CA 01 |
| | | For establishing MPI/PROFIBUS/ PROFINET communication | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

## SM 321 digital input modules

### ■ Overview



- Digital inputs
- For connecting standard switches and two-wire proximity switches (BEROs)

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### ■ Technical specifications

| Article number | 6ES7321-1BH02-0AA0 | 6ES7321-1BH50-0AA0 | 6ES7321-1BL00-0AA0 | 6ES7321-1BP00-0AA0 | 6ES7321-1BH10-0AA0 |
|---|---|---|---|---|---|
| | SM321, 16DI, DC24V | SM321, 16DI, DC24V, SOURCE INPUT | SM321, 32DI, DC24V | SM321, 64 DI, DC 24V, 3MS, SINK/SOURE | SM321,16DI,DC24V, 0.05MS INPUT DELAY. |
| **Supply voltage** | | | | | |
| **Load voltage L+** | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| **Input current** | | | | | |
| from backplane bus 5 V DC, max. | 10 mA | 10 mA | 15 mA | 100 mA | 110 mA |
| **Power loss** | | | | | |
| Power loss, typ. | 3.5 W | 3.5 W | 6.5 W | 7 W | 3.8 W |
| **Digital inputs** | | | | | |
| Number of digital inputs | 16 | 16 | 32 | 64 | 16 |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | Yes | Yes | Yes | Yes |
| **Number of simultaneously controllable inputs** | | | | | |
| **horizontal installation** | | | | | |
| - up to 40 °C, max. | 16 | 16 | 32 | 64 | 16 |
| - up to 60 °C, max. | 16 | 16 | 16 | 32 | 16 |
| **vertical installation** | | | | | |
| - up to 40 °C, max. | 16 | 16 | 32 | 32 | 16 |
| **Input voltage** | | | | | |
| • Type of input voltage | DC | DC | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| • for signal "0" | -30 to +5V | -5 to +30V | -30 to +5V | -30 to +5V | -30 to +5V |
| • for signal "1" | 13 to 30V | -13 to -30V | 13 to 30V | 13 to 30V | 13 to 30V |
| **Input current** | | | | | |
| • for signal "1", typ. | 7 mA | 7 mA | 7 mA | 4.2 mA | 7 mA |
| **Input delay (for rated value of input voltage)** | | | | | |
| **for standard inputs** | | | | | |
| - parameterizable | No | No | No | No | No |
| - at "0" to "1", min. | 1.2 ms | 1.2 ms | 1.2 ms | 1.2 ms | 25 µs |
| - at "0" to "1", max. | 4.8 ms | 4.8 ms | 4.8 ms | 4.8 ms | 75 µs |
| **Cable length** | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m |

■ **Technical specifications** (continued)

| Article number | 6ES7321-1BH02-0AA0 | 6ES7321-1BH50-0AA0 | 6ES7321-1BL00-0AA0 | 6ES7321-1BP00-0AA0 | 6ES7321-1BH10-0AA0 |
|---|---|---|---|---|---|
| | SM321, 16DI, DC24V | SM321, 16DI, DC24V, SOURCE INPUT | SM321, 32DI, DC24V | SM321, 64 DI, DC 24V, 3MS, SINK/SOURE | SM321,16DI,DC24V, 0.05MS INPUT DELAY. |
| **Encoder** | | | | | |
| **Connectable encoders** | | | | | |
| • 2-wire sensor | Yes | Yes | Yes | No | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA | | 1.5 mA |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | No | Yes |
| **Interrupts/diagnostics/ status information** | | | | | |
| Diagnostic functions | No | No | No | No | No |
| **Alarms** | | | | | |
| • Diagnostic alarm | No | No | No | No | No |
| • Hardware interrupt | No | No | No | No | No |
| **Potential separation** | | | | | |
| **Potential separation digital inputs** | | | | | |
| • between the channels | No | No | No | No | No |
| • between the channels, in groups of | 16 | 16 | 16 | 16 | 16 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | | | |
| Isolation tested with | 500 V DC | 500 V DC | 500 V DC | 500 V DC | 500 V DC |
| **Connection method** | | | | | |
| required front connector | 20-pin | 20-pin | 40-pin | Cable: 6ES7392-4Bxx0-0AA0 terminal blocks: 6ES7392-1xN00-0AA0 | 20-pin |
| **Dimensions** | | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm | 112 mm | 120 mm |
| **Weights** | | | | | |
| Weight, approx. | 200 g | 200 g | 260 g | 230 g | 200 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

**SM 321 digital input modules**

## ▪ Technical specifications (continued)

| Article number | 6ES7321-7BH01-0AB0 | 6ES7321-1CH00-0AA0 | 6ES7321-1CH20-0AA0 | 6ES7321-1FH00-0AA0 |
|---|---|---|---|---|
| | SM321, 16DI, 24V DC | SM321, 16 DI, AC/DC 24-48V, 1CH/COMMON | SM321, 16DI, DC48-125V | SM321, 16 DI, 120/230V AC |
| **Supply voltage** | | | | |
| **Load voltage L+** | | | | |
| • Rated value (DC) | 24 V | 24 V | 48 V | |
| **Load voltage L1** | | | | |
| • Rated value (AC) | | 24 V | | 230 V; 120/230 V AC; all load voltages must have the same phase. |
| **Input current** | | | | |
| from load voltage L+ (without load), max. | 90 mA | | | |
| from backplane bus 5 V DC, max. | 130 mA | 100 mA | 40 mA | 29 mA |
| **Power loss** | | | | |
| Power loss, typ. | 4 W | 1.5 W; at 24 V; 2,8 W at 48 V | 4.3 W | 4.9 W |
| **Digital inputs** | | | | |
| Number of digital inputs | 16 | 16 | 16 | 16 |
| Input characteristic curve in accordance with IEC 61131, type 1 | | Yes | Yes | Yes |
| Input characteristic curve in a ccordance with IEC 61131, type 2 | Yes | | | |
| **Number of simultaneously controllable inputs** | | | | |
| **horizontal installation** | | | | |
| - up to 40 °C, max. | 16 | 16 | 8 | 16 |
| - up to 60 °C, max. | 16 | 16 | 8; 6 to Ue 146 V | 16 |
| **vertical installation** | | | | |
| - up to 40 °C, max. | 16 | 16 | 8 | 16 |
| **Input voltage** | | | | |
| • Type of input voltage | DC | AC/DC | DC | AC |
| • Rated value (DC) | 24 V | 24 V; DC 24 or 48 V | 48 V; 48 V DC to 125 V DC | |
| • Rated value (AC) | | 24 V; AC 24 or 48 V | | 230 V; 120/230V AC |
| • for signal "0" | -30 to +5V | -5V AC to +5V AC | -146 V DC to +15 V DC | 0 to 40V |
| • for signal "1" | 13 to 30V | 14V AC to 60V AC | 30 V DC to 146 V DC | 79 to 264V |
| • Frequency range | | 0 to 63 Hz | | 47 ... 63 Hz |
| **Input current** | | | | |
| • for signal "1", typ. | 7 mA | 2.7 mA | 3.5 mA | 6.5 mA; (120V, 60Hz), 16mA (230V, 50Hz) |
| **Input delay (for rated value of input voltage)** | | | | |
| **for standard inputs** | | | | |
| - parameterizable | Yes; 0.1 / 0.5 / 3 / 15 / 20 ms | No | No | No |
| - at "0" to "1", min. | | 16 ms | 0.1 ms | 25 ms |
| - at "0" to "1", max. | | 16 ms | 3.5 ms | 25 ms |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m |
| **Encoder** | | | | |
| **Connectable encoders** | | | | |
| • 2-wire sensor | Yes | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 2 mA | 1 mA | 1 mA | 2 mA |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes | No | No | No |

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■ **Technical specifications** (continued)

| Article number | **6ES7321-7BH01-0AB0** | **6ES7321-1CH00-0AA0** | **6ES7321-1CH20-0AA0** | **6ES7321-1FH00-0AA0** |
|---|---|---|---|---|
| | SM321, 16DI, 24V DC | SM321, 16 DI, AC/DC 24-48V, 1CH/COMMON | SM321, 16DI, DC48-125V | SM321, 16 DI, 120/230V AC |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostic functions | Yes; Parameterizable | No | No | No |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable | No | No | No |
| • Hardware interrupt | Yes; Parameterizable | No | No | No |
| **Potential separation** | | | | |
| **Potential separation digital inputs** | | | | |
| • between the channels | No | Yes | No | No |
| • between the channels, in groups of | 16 | 1 | 8 | 4 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | | |
| Isolation tested with | 500 V DC | 1500 V AC | 1500 V DC | 4 000 V DC |
| **Connection method** | | | | |
| required front connector | 20-pin | 40-pin | 20-pin | 20-pin |
| **Dimensions** | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm | 120 mm |
| **Weights** | | | | |
| Weight, approx. | 200 g | 260 g | 200 g | 240 g |

| Article number | **6ES7321-1EL00-0AA0** | **6ES7321-1FF01-0AA0** | **6ES7321-1FF10-0AA0** |
|---|---|---|---|
| | SM321, 32DI, AC120V | SM321, 8DI, AC120/230V | SM321, 8 DI, AC/DC 120/230V, 1CH/COMMON |
| **Load voltage L1** | | | |
| • Rated value (AC) | 120 V | 230 V; 120/230V AC | 230 V; 120/230 V AC; all load voltages must have the same phase. |
| **Input current** | | | |
| from backplane bus 5 V DC, max. | 16 mA | 29 mA | 100 mA |
| **Power loss** | | | |
| Power loss, typ. | 4 W | 4.9 W | 4.9 W |
| **Digital inputs** | | | |
| Number of digital inputs | 32 | 8 | 8 |
| Input characteristic curve in accordance with IEC 61131, type 1 | | Yes | Yes |
| Input characteristic curve in accordance with IEC 61131, type 2 | Yes | | |
| **Number of simultaneously controllable inputs** | | | |
| **horizontal installation** | | | |
| - up to 40 °C, max. | 32 | | |
| - up to 60 °C, max. | 24 | 8 | 8 |
| **vertical installation** | | | |
| - up to 40 °C, max. | 32 | 8 | 8 |
| **Input voltage** | | | |
| • Type of input voltage | AC | AC | AC |
| • Rated value (AC) | 120 V | 230 V; 120/230V AC | 120 V; 120/230V AC |
| • for signal "0" | 0 to 20V | 0 to 40V | 0 to 40V |
| • for signal "1" | 74 to 132V | 79 to 264V | 79 to 264V |
| • Frequency range | 47 ... 63 Hz | 47 ... 63 Hz | 47 ... 63 Hz |
| **Input current** | | | |
| • for signal "1", typ. | 21 mA | 6.5 mA; (120 V); 11 mA (230 V) | 7.5 mA; (120 V); 17.3 mA (230 V) |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Digital modules

**SM 321 digital input modules**

### ■ Technical specifications (continued)

| Article number | 6ES7321-1EL00-0AA0 | 6ES7321-1FF01-0AA0 | 6ES7321-1FF10-0AA0 |
|---|---|---|---|
| | SM321, 32DI, AC120V | SM321, 8DI, AC120/230V | SM321, 8 DI, AC/DC 120/230V, 1CH/COMMON |
| **Input delay (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - parameterizable | No | No | No |
| - at "0" to "1", max. | 15 ms | 25 ms | 25 ms |
| **Cable length** | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 4 mA | 2 mA | 2 mA |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No |
| **Interrupts/diagnostics/ status information** | | | |
| Diagnostic functions | No | No | No |
| **Alarms** | | | |
| • Diagnostic alarm | No | No | No |
| • Hardware interrupt | No | No | No |
| **Potential separation** | | | |
| **Potential separation digital inputs** | | | |
| • between the channels | No | No | Yes |
| • between the channels, in groups of | 8 | 2 | 1 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | |
| Isolation tested with | 2500 V DC | 4 000 V DC | 1500 V AC |
| **Connection method** | | | |
| required front connector | 40-pin | 20-pin | 40-pin |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm |
| **Weights** | | | |
| Weight, approx. | 300 g | 240 g | 240 g |

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■ **Ordering data**

| | Article No. |
|---|---|
| **SM 321 digital input modules** | |
| incl. labeling strips, bus connector | |
| 16 inputs, 24 V DC | **6ES7321-1BH02-0AA0** |
| 16 inputs, 24 V DC, active low | **6ES7321-1BH50-0AA0** |
| 32 inputs, 24 V DC | **6ES7321-1BL00-0AA0** |
| 64 inputs, 24 V DC, active high/low | **6ES7321-1BP00-0AA0** |
| Note: 6ES7392-4...0-0AA0 connecting cable and 6ES7392-1.N00-0AA0 terminal blocks necessary. | |
| 16 inputs, 24 to 48 V DC | **6ES7321-1CH00-0AA0** |
| 16 inputs, 48 to 125 V DC | **6ES7321-1CH20-0AA0** |
| 16 inputs, 24 V DC, for isochronous mode | **6ES7321-1BH10-0AA0** |
| 32 inputs, 120 V AC | **6ES7321-1EL00-0AA0** |
| 8 inputs, 120/230 V AC | **6ES7321-1FF01-0AA0** |
| 8 inputs, 120/230 V AC, single root | **6ES7321-1FF10-0AA0** |
| 16 inputs, 120/230 V AC | **6ES7321-1FH00-0AA0** |
| 16 inputs, 24 V DC, for isochronous mode, diagnostics-capable | **6ES7321-7BH01-0AB0** |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| 40-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AM00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| **S7-300 connecting cable** | |
| For 64-channel modules; 2 units | |
| 1 m | **6ES7392-4BB00-0AA0** |
| 2.5 m | **6ES7392-4BC50-0AA0** |
| 5 m | **6ES7392-4BF00-0AA0** |
| **Terminal block** | |
| For 64-channel modules; 2 units | |
| With screw contacts | **6ES7392-1AN00-0AA0** |
| With spring-loaded contacts | **6ES7392-1BN00-0AA0** |

| | Article No. |
|---|---|
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| e.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | |
| **SIMATIC TOP connect** | See page 5/248 |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit (spare part) | |
| **Labeling strips** | |
| 10 units (spare part) | |
| for modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| for modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| **Label cover** | |
| 10 units (spare part) | |
| for modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| for modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| **Labeling sheets for machine inscription** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX00-0AA0** |
| Light beige | **6ES7392-2BX00-0AA0** |
| Yellow | **6ES7392-2CX00-0AA0** |
| Red | **6ES7392-2DX00-0AA0** |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX10-0AA0** |
| Light beige | **6ES7392-2BX10-0AA0** |
| Yellow | **6ES7392-2CX10-0AA0** |
| Red | **6ES7392-2DX10-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

## SM 322 digital output modules

### ■ Overview



- Digital outputs
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

### ■ Technical specifications

| Article number | 6ES7322-1BH01-0AA0 | 6ES7322-1BH10-0AA0 | 6ES7322-1BL00-0AA0 | 6ES7322-1BP00-0AA0 | 6ES7322-1BP50-0AA0 | 6ES7322-8BF00-0AB0 |
|---|---|---|---|---|---|---|
| | SM322, 16DO 24V DC, 0,5A | SM322 HIGH SPEED, 16DO 24V DC, 0.5A | SM322, 32DO 24V DC, 0,5A | SM322 64DA, DC24V, 0,3A P-WRITE | SM322 64DO, DC24V, 0.3A M-WRITE | SM322, 8DO, 24V DC, 0,5A |
| **Supply voltage** | | | | | | |
| **Load voltage L+** | | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V | 24 V |
| **Input current** | | | | | | |
| from load voltage L+ (without load), max. | 80 mA | 110 mA | 160 mA | 75 mA | 75 mA | 90 mA |
| from backplane bus 5 V DC, max. | 80 mA | 70 mA | 110 mA | 100 mA | 100 mA | 70 mA |
| **Power loss** | | | | | | |
| Power loss, typ. | 4.9 W | 5 W | 6.6 W | 6 W | 6 W | 5 W |
| **Digital outputs** | | | | | | |
| Number of digital outputs | 16 | 16 | 32 | 64 | 64 | 8 |
| Limitation of inductive shutdown voltage to | L+ (-53 V) | L+ (-53 V) | L+ (-53 V) | L+ (-53 V) | M+ (45 V) | L+ (-45 V) |
| **Switching capacity of the outputs** | | | | | | |
| • on lamp load, max. | 5 W | 5 W | 5 W | 5 W | 5 W | 5 W |
| **Load resistance range** | | | | | | |
| • lower limit | 48 Ω | 48 Ω | 48 Ω | 80 Ω | 80 Ω | 48 Ω |
| • upper limit | 4 kΩ | 4 kΩ | 4 kΩ | 10 kΩ | 10 kΩ | 3 kΩ |
| **Output voltage** | | | | | | |
| • for signal "1", min. | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-0.5 V) | M+ (0.5 V) | L+ (-0.8 to -1.6 V) |
| **Output current** | | | | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | 0.5 A | 0.3 A | 0.3 A | 0.5 A |
| • for signal "1" permissible range, min. | | | | 2.4 mA | 2.4 mA | |
| • for signal "1" permissible range, max. | | | | 0.36 A | 0.36 A | |
| • for signal "1" permissible range for 0 to 40 °C, min. | 5 mA | 5 mA | 5 mA | | | 10 mA |
| • for signal "1" permissible range for 0 to 40 °C, max. | 0.6 A | 0.6 A | 0.6 A | | | 0.6 A |
| • for signal "1" permissible range for 40 to 60 °C, min. | 5 mA | 5 mA | 5 mA | | | 10 mA |
| • for signal "1" permissible range for 40 to 60 °C, max. | 0.6 A | 0.6 A | 0.6 A | | | 0.6 A |
| • for signal "1" minimum load current | 5 mA | 5 mA | 5 mA | | | 10 mA |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA | 0.5 mA | 0.1 mA | | 0.5 mA |

■ **Technical specifications** (continued)

| Article number | 6ES7322-1BH01-0AA0 | 6ES7322-1BH10-0AA0 | 6ES7322-1BL00-0AA0 | 6ES7322-1BP00-0AA0 | 6ES7322-1BP50-0AA0 | 6ES7322-8BF00-0AB0 |
|---|---|---|---|---|---|---|
| | SM322, 16DO 24V DC, 0,5A | SM322 HIGH SPEED, 16DO 24V DC, 0.5A | SM322, 32DO 24V DC, 0,5A | SM322 64DA, DC24V, 0,3A P-WRITE | SM322 64DO, DC24V, 0.3A M-WRITE | SM322, 8DO, 24V DC, 0,5A |
| **Switching frequency** | | | | | | |
| • with resistive load, max. | 100 Hz | 1 000 Hz | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 2 Hz |
| • on lamp load, max. | 10 Hz | 10 Hz | 10 Hz | 10 Hz | 10 Hz | 10 Hz |
| **Total current of the outputs (per group)** | | | | | | |
| **horizontal installation** | | | | | | |
| - up to 40 °C, max. | 4 A | 4 A | 4 A | 1.6 A | 1.6 A | 4 A |
| - up to 60 °C, max. | 3 A | 3 A | 3 A | 1.2 A | 1.2 A | 3 A |
| **vertical installation** | | | | | | |
| - up to 40 °C, max. | 2 A | 2 A | 2 A | 1.6 A | 1.6 A | 4 A |
| **Total current of the outputs (per module)** | | | | | | |
| **horizontal installation** | | | | | | |
| - up to 60 °C, max. | | | | 4.8 A | 4.8 A | |
| **all other mounting positions** | | | | | | |
| - up to 40 °C, max. | | | | 6.4 A | 6.4 A | |
| **Cable length** | | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m | 600 m |
| **Interrupts/diagnostics/ status information** | | | | | | |
| Diagnostic functions | No | No | No | No | No | Yes; Parameterizable |
| **Alarms** | | | | | | |
| • Diagnostic alarm | No | No | No | No | No | Yes; Parameterizable |
| **Potential separation** | | | | | | |
| **Potential separation digital outputs** | | | | | | |
| • between the channels | Yes | Yes | Yes | No | No | |
| • between the channels, in groups of | 8 | 8 | 8 | 16 | 16 | 8 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | | | | |
| Isolation tested with | 500 V DC | 500 V DC | 500 V DC | 500 V DC | 500 V DC | 500 V DC |
| **Connection method** | | | | | | |
| required front connector | 20-pin | 20-pin | 40-pin | Cable: 6ES7392-4Bxx0-0AA0 terminal blocks: 6ES7392-1xN00-0AA0 | Cable: 6ES7392-4Bxx0-0AA0 terminal blocks: 6ES7392-1xN00-0AA0 | 20-pin |
| **Dimensions** | | | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm | 112 mm | 112 mm | 120 mm |
| **Weights** | | | | | | |
| Weight, approx. | 190 g | 200 g | 260 g | 230 g | 230 g | 210 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

## SM 322 digital output modules

■ **Technical specifications** (continued)

| Article number | 6ES7322-5GH00-0AB0 | 6ES7322-1CF00-0AA0 | 6ES7322-1BF01-0AA0 | 6ES7322-1FF01-0AA0 | 6ES7322-5FF00-0AB0 | 6ES7322-1FH00-0AA0 |
|---|---|---|---|---|---|---|
| | SM322, 16DO, AC/DC24-48V, 0,5A | SM322, 8DO, 48-125V DC, 1,5A | SM322, 8DO, 24V DC, 2A | SM322, 8DO, 120/230V AC, 1A | SM322, 8DO, AC120/230V, 2A | SM322, 16DO, 120/230V AC, 1A |
| **Supply voltage** | | | | | | |
| **Load voltage L+** | | | | | | |
| • Rated value (DC) | 24 V; 24 / 48 | 48 V; 48 V DC to 125 V DC | 24 V | | | |
| **Load voltage L1** | | | | | | |
| • Rated value (AC) | | | | 230 V; 120/230V AC | 230 V; 120/230V AC | 230 V; 120/230V AC |
| **Input current** | | | | | | |
| from supply voltage L+, max. | 200 mA | | | | | |
| from load voltage L+ (without load), max. | | 2 mA | 60 mA | | | |
| from load voltage L1 (without load), max. | | | | 2 mA | 2 mA | 2 mA |
| from backplane bus 5 V DC, max. | 100 mA | 100 mA | 40 mA | 100 mA | 100 mA | 200 mA |
| **Power loss** | | | | | | |
| Power loss, typ. | 2.8 W | 7.2 W | 6.8 W | 8.6 W | 8.6 W | 8.6 W |
| **Digital outputs** | | | | | | |
| Number of digital outputs | 16 | 8 | 8 | 8 | 8 | 16 |
| Limitation of inductive shutdown voltage to | | M (-1 V) | L+ (-48 V) | | | |
| **Switching capacity of the outputs** | | | | | | |
| • on lamp load, max. | 2.5 W | 15 W; 15 W (48 V) or 40 W (125 V) | 10 W | 50 W | 50 W | 50 W |
| **Load resistance range** | | | | | | |
| • lower limit | | | 12 Ω | | | |
| • upper limit | | | 4 kΩ | | | |
| **Output voltage** | | | | | | |
| • for signal "1", min. | L+ (-0.25 V) | L+ (-1.2 V) | L+ (-0.8 V) | L1 (-1.5 V) | L1 (-8.5 V) | |
| **Output current** | | | | | | |
| • for signal "1" rated value | 0.5 A | 1.5 A | 2 A | 2 A | 2 A | 1 A |
| • for signal "1" permissible range for 0 to 40 °C, min. | | 10 mA | 5 mA | 10 mA | 10 mA | 10 mA |
| • for signal "1" permissible range for 0 to 40 °C, max. | 0.5 A | 1.5 A | 2.4 A | 2 A | 2 A | 1 A |
| • for signal "1" permissible range for 40 to 60 °C, min. | | 10 mA | 5 mA | 10 mA | 10 mA | 10 mA |
| • for signal "1" permissible range for 40 to 60 °C, max. | 0.5 A | 1.5 A | 2.4 A | 1 A | 1 A | 0.5 A |
| • for signal "1" minimum load current | | 10 mA | 5 mA | 10 mA | 10 mA | 10 mA |
| • for signal "1" permissible surge current, max. | 1.5 A; for 50 ms, 1 A 2 s one-time | 3 A; for 10 ms | | 20 A; max. 1 AC cycle | 20 A; with 2 half waves | 20 A; with 2 half waves |
| • for signal "0" residual current, max. | 10 μA | 0.5 mA | 0.5 mA | 2 mA | 2 mA | 2 mA |
| **Switching frequency** | | | | | | |
| • with resistive load, max. | 10 Hz | 25 Hz | 100 Hz | 10 Hz | 10 Hz | 10 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 0.5 Hz | 10 Hz | 10 Hz | 1 Hz | 1 Hz | 1 Hz |

■ **Technical specifications** (continued)

| Article number | 6ES7322-5GH00-0AB0 | 6ES7322-1CF00-0AA0 | 6ES7322-1BF01-0AA0 | 6ES7322-1FF01-0AA0 | 6ES7322-5FF00-0AB0 | 6ES7322-1FH00-0AA0 |
|---|---|---|---|---|---|---|
| | SM322, 16DO, AC/DC24-48V, 0,5A | SM322, 8DO, 48-125V DC, 1,5A | SM322, 8DO, 24V DC, 2A | SM322, 8DO, 120/230V AC, 1A | SM322, 8DO, AC120/230V, 2A | SM322, 16DO, 120/230V AC, 1A |
| **Total current of the outputs (per group)** | | | | | | |
| **horizontal installation** | | | | | | |
|   - up to 40 °C, max. | 0.5 A; 8 A per module | 6 A | 4 A | 4 A | 8 A | 4 A |
|   - up to 60 °C, max. | 0.5 A; 8 A per module | 3 A | 4 A | 2 A | 4 A | 2 A |
| **vertical installation** | | | | | | |
|   - up to 40 °C, max. | 0.5 A; 8 A per module | 4 A | 4 A | 2 A | 4 A | 2 A |
| **Cable length** | | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m | 600 m |
| **Interrupts/diagnostics/ status information** | | | | | | |
| Diagnostic functions | Yes; Parameter-izable | No | No | Yes; Fuse blown or load voltage missing | Yes; Parameter-izable | Yes; Fuse blown or load voltage missing |
| **Alarms** | | | | | | |
| • Diagnostic alarm | Yes; Parameter-izable | No | No | No | Yes; Parameter-izable | No |
| **Potential separation** | | | | | | |
| **Potential separation digital outputs** | | | | | | |
| • between the channels | Yes | Yes | Yes | Yes | Yes | |
| • between the channels, in groups of | 1 | 4 | 4 | 4 | 1 | 8 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | | | | |
| Isolation tested with | 1500 V AC | 1500 V AC | 500 V DC | 1500 V AC | 1500 V AC | 4 000 V DC |
| **Connection method** | | | | | | |
| required front connector | 40-pin | 20-pin | 20-pin | 20-pin | 40-pin | 20-pin |
| **Dimensions** | | | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm | 120 mm | 120 mm | 120 mm |
| **Weights** | | | | | | |
| Weight, approx. | 260 g | 250 g | 190 g | 275 g | 275 g | 275 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

**SM 322 digital output modules**

## Technical specifications (continued)

| Article number | 6ES7322-1FL00-0AA0 | 6ES7322-1HF01-0AA0 | 6ES7322-1HF10-0AA0 | 6ES7322-5HF00-0AB0 | 6ES7322-1HH01-0AA0 |
|---|---|---|---|---|---|
| | SM322, 32DO, 120/230V AC, 1A | SM322, 8DA, 24V DC/2A OR 230V AC/2A | SM322, 8DA, 24V DC/5A OR 230V AC/5A | SM322, 8DO RELAY, 24VDC, 120-230V AC, 5A | SM322, 16DO RELAY |
| **Supply voltage** | | | | | |
| **Load voltage L+** | | | | | |
| • Rated value (DC) | | 24 V | 120 V | 24 V | 120 V |
| **Load voltage L1** | | | | | |
| • Rated value (AC) | 120 V; 120/230V AC | | 230 V | 230 V | 230 V |
| **Input current** | | | | | |
| from supply voltage L+, max. | | 160 mA | 125 mA | 160 mA | 250 mA |
| from load voltage L1 (without load), max. | 10 mA | | | | |
| from backplane bus 5 V DC, max. | 190 mA | 40 mA | 40 mA | 100 mA | 100 mA |
| **Power loss** | | | | | |
| Power loss, typ. | 25 W | 3.2 W | 3.2 W | 3.5 W | 4.5 W |
| **Digital outputs** | | | | | |
| Number of digital outputs | 32 | 8; Relays | 8; Relays | 8; Relays | 16; Relays |
| **Switching capacity of the outputs** | | | | | |
| • on lamp load, max. | 50 W | 50 W | 1 500 W; 230 V AC | 1 500 W; 230 V AC | 50 W; 230 V AC |
| **Output voltage** | | | | | |
| • for signal "1", min. | L1 (-0.8 V) | | | | |
| **Output current** | | | | | |
| • for signal "1" rated value | 1 A | 2 A | 5 A | 5 A | 2 A |
| • for signal "1" permissible range for 0 to 40 °C, min. | 10 mA | | | | |
| • for signal "1" permissible range for 0 to 40 °C, max. | 1 A | | | | |
| • for signal "1" permissible range for 40 to 60 °C, min. | 10 mA | | | | |
| • for signal "1" permissible range for 40 to 60 °C, max. | 1 A | | | | |
| • for signal "1" minimum load current | 10 mA | 5 mA | 5 mA | 10 mA | 10 mA |
| • for signal "1" permissible surge current, max. | 10 A; per group (for 2 AC cycles) | | | | |
| • for signal "0" residual current, max. | 2 mA | | | | |
| **Switching frequency** | | | | | |
| • with resistive load, max. | 10 Hz | 2 Hz | 2 Hz | 2 Hz | 1 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 2 Hz | 2 Hz | 2 Hz | 1 Hz |
| • mechanical, max. | | 10 Hz | 10 Hz | 10 Hz | 10 Hz |
| **Total current of the outputs (per group)** | | | | | |
| **horizontal installation** | | | | | |
| - up to 40 °C, max. | 4 A | | | | |
| - up to 60 °C, max. | 3 A | | 5 A | 5 A | 8 A |
| **vertical installation** | | | | | |
| - up to 40 °C, max. | 4 A | | 5 A | 5 A | 8 A |

## Technical specifications (continued)

| Article number | 6ES7322-1FL00-0AA0 | 6ES7322-1HF01-0AA0 | 6ES7322-1HF10-0AA0 | 6ES7322-5HF00-0AB0 | 6ES7322-1HH01-0AA0 |
|---|---|---|---|---|---|
| | SM322, 32DO, 120/230V AC, 1A | SM322, 8DA, 24V DC/2A OR 230V AC/2A | SM322, 8DA, 24V DC/5A OR 230V AC/5A | SM322, 8DO RELAY, 24VDC, 120-230V AC, 5A | SM322, 16DO RELAY |
| **Relay outputs** | | | | | |
| • Rated supply voltage of relay coil L+ (DC) | | 24 V; 110 mA | 24 V | | 24 V |
| • Number of operating cycles, max. | | 300 000; 230 V AC: 100 000; 120 V AC: 200 000; 24 V DC: 300 000 (at 2 A) | 300 000; 300000 (24 V DC, at 2 A); 200000 (120 V AC, at 3 A); 100000 (230 V AC, at 3 A) | 100 000; 100000 (24 V DC, at 2 A), 100000 (230 V AC, at 5 A) | 100 000; 50000 (24 V DC, at 2 A); 700000 (120 V AC, at 2 A); 100000 (230 V AC, at 2 A) |
| **Switching capacity of contacts** | | | | | |
| - with inductive load, max. | | 2 A; 2 A (230 V AC), 2 A (24 V DC) | 3 A; 3 A (230 V DC), 2 A (24 V AC) | 5 A; 5 A (230 V DC), 5 A (24 V AC) | 2 A; 2 A (230 V AC), 2 A (24 V DC) |
| - with resistive load, max. | | 2 A | 8 A; 8 A (230 V DC), 5 A (24 V AC) | 5 A; 5 A (230 V DC), 5 A (24 V AC) | 2 A; 2 A (230 V AC), 2 A (24 V DC) |
| **Cable length** | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m |
| **Interrupts/diagnostics/status information** | | | | | |
| Diagnostic functions | Yes; Fuse blown or load voltage missing | No | No | Yes; Parameterizable | No |
| **Alarms** | | | | | |
| • Diagnostic alarm | No | No | No | Yes; Parameterizable | No |
| **Potential separation** | | | | | |
| **Potential separation digital outputs** | | | | | |
| • between the channels | Yes | Yes | Yes | Yes | Yes |
| • between the channels, in groups of | 8 | 2 | 1 | 1 | 8 |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | | | |
| Isolation tested with | 4 000 V DC | 1500 V AC | 2000 V AC | 1500 V AC | 1500 V AC |
| **Connection method** | | | | | |
| required front connector | 20-pin | 20-pin | 40-pin | 40-pin | 20-pin |
| **Dimensions** | | | | | |
| Width | 80 mm | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 117 mm | 120 mm | 120 mm | 120 mm | 120 mm |
| **Weights** | | | | | |
| Weight, approx. | 500 g | 190 g | 320 g | 320 g | 250 g |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Digital modules

**SM 322 digital output modules**

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 322 digital output modules** | | **Front door, elevated design** | 6ES7328-0AA00-7AA0 |
| incl. labeling strips, bus connector | | e.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG conductors | |
| 8 outputs, 24 V DC, 2 A | 6ES7322-1BF01-0AA0 | | |
| 16 outputs, 24 V DC, 0.5 A | 6ES7322-1BH01-0AA0 | **SIMATIC TOP connect** | See page 5/248 |
| 16 outputs, 24 V DC, 0.5 A, high speed | 6ES7322-1BH10-0AA0 | **Bus connectors** | 6ES7390-0AA00-0AA0 |
| 32 outputs, 24 V DC, 0.5 A | 6ES7322-1BL00-0AA0 | 1 unit (spare part) | |
| 64 outputs, 24 V DC, 0.3 A | 6ES7322-1BP00-0AA0 | **Set of fuses for SM 322** | |
| Note: 6ES7392-4...0-0AA0 connecting cable and 6ES7392-1.N00-0AA0 terminal blocks necessary. | | 10 fuses 8 A quick-response, 2 fuse holders; for 6ES7 322-1FF01-0AA0, 6ES7 322-1FH00-0AA0 | 6ES7973-1HD00-0AA0 |
| 64 outputs, 24 V DC, 0.3 A, sink output | 6ES7322-1BP50-0AA0 | 10 fuses 6.3 A; for 6ES7 322-1CF00-0AA0 | 6ES7973-1GC00-0AA0 |
| Note: 6ES7392-4...0-0AA0 connecting cable and 6ES7392-1.N00-0AA0 terminal blocks necessary. | | **Labeling strips** | |
| | | 10 units (spare part) | |
| 8 outputs, 24 V DC, 0.5 A, diagnostics-capable | 6ES7322-8BF00-0AB0 | for modules with 20-pin front connector | 6ES7392-2XX00-0AA0 |
| 16 outputs, 24/48 V DC, 0.5 A | 6ES7322-5GH00-0AB0 | for modules with 40-pin front connector | 6ES7392-2XX10-0AA0 |
| 8 outputs, 48 to 125 V DC, 1.5 A | 6ES7322-1CF00-0AA0 | **Label cover** | |
| 8 outputs, 120/230 V AC, 1 A | 6ES7322-1FF01-0AA0 | 10 units (spare part) | |
| 8 outputs, 120/230 V AC, 2 A | 6ES7322-5FF00-0AB0 | for modules with 20-pin front connector | 6ES7392-2XY00-0AA0 |
| 16 outputs, 120/230 V AC, 1 A | 6ES7322-1FH00-0AA0 | for modules with 40-pin front connector | 6ES7392-2XY10-0AA0 |
| 32 outputs, 120 V AC, 1 A | 6ES7322-1FL00-0AA0 | **Labeling sheets for machine inscription** | |
| 8 outputs, relay contacts, 2 A | 6ES7322-1HF01-0AA0 | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| 8 outputs, relay contacts, 5 A | 6ES7322-1HF10-0AA0 | Petrol | 6ES7392-2AX00-0AA0 |
| 8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection | 6ES7322-5HF00-0AB0 | Light beige | 6ES7392-2BX00-0AA0 |
| 16 outputs, relay contacts, 8 A | 6ES7322-1HH01-0AA0 | Yellow | 6ES7392-2CX00-0AA0 |
| **Front connector** | | Red | 6ES7392-2DX00-0AA0 |
| 20-pin, with screw contacts | | for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| • 1 unit | 6ES7392-1AJ00-0AA0 | | |
| • 100 units | 6ES7392-1AJ00-1AB0 | Petrol | 6ES7392-2AX10-0AA0 |
| 20-pin, with spring-loaded contacts | | Light beige | 6ES7392-2BX10-0AA0 |
| • 1 unit | 6ES7392-1BJ00-0AA0 | Yellow | 6ES7392-2CX10-0AA0 |
| • 100 units | 6ES7392-1BJ00-1AB0 | Red | 6ES7392-2DX10-0AA0 |
| 40-pin, with screw contacts | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| • 1 unit | 6ES7392-1AM00-0AA0 | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| • 100 units | 6ES7392-1AM00-1AB0 | | |
| 40-pin, with spring-loaded contacts | | | |
| • 1 unit | 6ES7392-1BM01-0AA0 | | |
| • 100 units | 6ES7392-1BM01-1AB0 | | |
| **S7-300 connecting cable** | | | |
| For 64-channel modules; 2 units | | | |
| 1 m | 6ES7392-4BB00-0AA0 | | |
| 2.5 m | 6ES7392-4BC50-0AA0 | | |
| 5 m | 6ES7392-4BF00-0AA0 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Terminal block** | | Current "Manual Collection" DVD and the three subsequent updates | |
| For 64-channel modules; 2 units | | | |
| With screw contacts | 6ES7392-1AN00-0AA0 | | |
| With spring-loaded contacts | 6ES7392-1BN00-0AA0 | | |

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## Overview



- Digital inputs and outputs
- For connecting standard switches, two-wire proximity switches, solenoid valves, contactors, low-power motors, lamps and motor starters

## Technical specifications

| Article number | 6ES7323-1BH01-0AA0 | 6ES7323-1BL00-0AA0 | 6ES7327-1BH00-0AB0 |
|---|---|---|---|
| | SM323, 8DI/8DO, DC24V, 0,5A | SM323, 16DI/DO, DC24V, 0,5A | SIMATIC S7-300, DIGITAL MODULE |
| **Supply voltage** | | | |
| **Load voltage L+** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| **Input current** | | | |
| from load voltage L+ (without load), max. | 40 mA | 80 mA | 20 mA |
| from backplane bus 5 V DC, max. | 40 mA | 80 mA | 60 mA |
| **Power loss** | | | |
| Power loss, typ. | 3.5 W | 6.5 W | 3 W |
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 16 | 8; 8 hard-wired, 8 others individually parameterizable |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | Yes | Yes |
| **Number of simultaneously controllable inputs** | | | |
| **horizontal installation** | | | |
| - up to 60 °C, max. | 8 | 8 | 16 |
| **vertical installation** | | | |
| - up to 40 °C, max. | 8 | 16 | 16 |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • for signal "0" | -30 to +5V | -30 to +5V | -30 to +5V |
| • for signal "1" | 13 to 30V | 13 to 30V | +15 to +30V |
| **Input current** | | | |
| • for signal "1", typ. | 7 mA | 7 mA | 6 mA |
| **Input delay (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - at "0" to "1", min. | 1.2 ms | 1.2 ms | 1.2 ms |
| - at "0" to "1", max. | 4.8 ms | 4.8 ms | 4.8 ms |
| **Cable length** | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Digital modules

## SM 323/SM 327 digital input/output modules

### ■ Technical specifications (continued)

| Article number | 6ES7323-1BH01-0AA0 | 6ES7323-1BL00-0AA0 | 6ES7327-1BH00-0AB0 |
|---|---|---|---|
| | SM323, 8DI/8DO, DC24V, 0,5A | SM323, 16DI/DO, DC24V, 0,5A | SIMATIC S7-300, DIGITAL MODULE |
| **Digital outputs** | | | |
| Number of digital outputs | 8 | 16 | 8; can also be parameterized individually as DI |
| Short-circuit protection | Yes | Yes | Yes |
| • Response threshold, typ. | 1 A | 1 A | 1 A |
| Limitation of inductive shutdown voltage to | L+ (-53 V) | L+ (-48 V) | L+ (-54 V) |
| Controlling a digital input | Yes | Yes | Yes |
| **Switching capacity of the outputs** | | | |
| • on lamp load, max. | 5 W | 5 W | 5 W |
| **Load resistance range** | | | |
| • lower limit | 48 Ω | 48 Ω | 48 Ω |
| • upper limit | 4 kΩ | 4 kΩ | 4 kΩ |
| **Output voltage** | | | |
| • for signal "1", min. | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-1.5 V) |
| **Output current** | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | 0.5 A |
| • for signal "1" permissible range, min. | 5 mA | 5 mA | 5 mA |
| • for signal "1" permissible range, max. | 0.6 A | 0.6 A | 0.6 A |
| • for signal "1" minimum load current | 5 mA | 5 mA | |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA | 0.5 mA |
| **Output delay with resistive load** | | | |
| • "0" to "1", max. | 100 µs | 100 µs | 350 µs |
| • "1" to "0", max. | 500 µs | 500 µs | 500 µs |
| **Parallel switching of two outputs** | | | |
| • for uprating | No | No | No |
| • for redundant control of a load | Yes; only outputs of the same group | Yes; only outputs of the same group | Yes; only outputs of the same group |
| **Switching frequency** | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 10 Hz | 100 Hz | 10 Hz |
| **Total current of the outputs (per group)** | | | |
| **horizontal installation** | | | |
| - up to 40 °C, max. | 4 A | 4 A | 4 A |
| - up to 60 °C, max. | 4 A | 3 A | 3 A |
| **vertical installation** | | | |
| - up to 40 °C, max. | 4 A | 2 A | 2 A |
| **Cable length** | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m |

■ **Technical specifications** (continued)

| Article number | 6ES7323-1BH01-0AA0 | 6ES7323-1BL00-0AA0 | 6ES7327-1BH00-0AB0 |
|---|---|---|---|
| | SM323, 8DI/8DO, DC24V, 0,5A | SM323, 16DI/DO, DC24V, 0,5A | SIMATIC S7-300, DIGITAL MODULE |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 2 mA | 1.5 mA | 1.5 mA |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No |
| **Interrupts/diagnostics/ status information** | | | |
| Alarms | No | No | No |
| Diagnostic functions | No | No | No |
| **Diagnostics indication LED** | | | |
| • Status indicator digital input (green) | Yes | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes | Yes |
| **Potential separation** | | | |
| **Potential separation digital inputs** | | | |
| • between the channels | Yes | Yes | No |
| • between the channels, in groups of | 8 | 16 | |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Potential separation digital outputs** | | | |
| • between the channels | Yes | Yes | No |
| • between the channels, in groups of | 8 | 8 | |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler | Yes; Optocoupler |
| **Isolation** | | | |
| Isolation tested with | 500 V DC | 500 V DC | 500 V DC |
| **Connection method** | | | |
| required front connector | 20-pin | 40-pin | 20-pin |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm |
| **Weights** | | | |
| Weight, approx. | 220 g | 260 g | 200 g |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Digital modules

### SM 323/SM 327 digital input/output modules

■ **Ordering data**

| | Article No. |
|---|---|
| **SM 323 digital input/output modules** | |
| incl. labeling strips, bus connector | |
| 8 inputs, 8 outputs | **6ES7323-1BH01-0AA0** |
| 16 inputs, 16 outputs | **6ES7323-1BL00-0AA0** |
| **SM 327 digital input/output modules** | |
| incl. labeling strips, bus connector | |
| 8 inputs, 8 inputs or outputs (can be configured) | **6ES7327-1BH00-0AB0** |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| 40-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AM00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| e.g. for 32 channel modules; enables connection of 1.3 mm$^2$/16 AWG wires | |
| **SIMATIC TOP connect** | See page 5/248 |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit (spare part) | |
| **Labeling strips** | |
| 10 units (spare part) | |
| for modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| for modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| **Label cover** | |
| 10 units (spare part) | |
| for modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| for modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |

| | Article No. |
|---|---|
| **Labeling sheets for machine inscription** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX00-0AA0** |
| Light beige | **6ES7392-2BX00-0AA0** |
| Yellow | **6ES7392-2CX00-0AA0** |
| Red | **6ES7392-2DX00-0AA0** |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX10-0AA0** |
| Light beige | **6ES7392-2BX10-0AA0** |
| Yellow | **6ES7392-2CX10-0AA0** |
| Red | **6ES7392-2DX10-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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## Overview

- Digital inputs
- For connection of switches and 2-wire proximity switches (BEROs)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1321-1BH02-2AA0 | 6AG1321-1BL00-2AA0 | 6AG1321-1CH20-2AA0 | 6AG1321-1FF01-2AA0 | 6AG1321-1FF10-7AA0 |
|---|---|---|---|---|---|
| Based on | 6ES7321-1BH02-0AA0 | 6ES7321-1BL00-0AA0 | 6ES7321-1CH20-0AA0 | 6ES7321-1FF01-0AA0 | 6ES7321-1FF10-0AA0 |
| | SIPLUS SM321 16DE/24VDC | SIPLUS SM321 32DE/24VDC | SIPLUS SM 321 16DE/ DC 48-125 V | SIPLUS S7-300 SM321 8DE/120/230VAC | SIPLUS S7-300 SM321 8DI/120/230VAC |
| **Ambient conditions** | | | | | |
| **Ambient temperature during operation** | | | | | |
| • min. | -40 °C; = Tmin | -40 °C; = Tmin | -25 °C | -40 °C; = Tmin | -25 °C |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ ULhaz/ATEX/FM use applies | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ ULhaz/ATEX/FM use applies | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ ULhaz/ATEX/FM use applies | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 digital modules

**SIPLUS S7-300 SM 321**

## ▎ Technical specifications (continued)

| Article number | 6AG1321-1BH02-2AA0 | 6AG1321-1BL00-2AA0 | 6AG1321-1CH20-2AA0 | 6AG1321-1FF01-2AA0 | 6AG1321-1FF10-7AA0 |
|---|---|---|---|---|---|
| Based on | 6ES7321-1BH02-0AA0 | 6ES7321-1BL00-0AA0 | 6ES7321-1CH20-0AA0 | 6ES7321-1FF01-0AA0 | 6ES7321-1FF10-0AA0 |
| | SIPLUS SM321 16DE/24VDC | SIPLUS SM321 32DE/24VDC | SIPLUS SM 321 16DE/ DC 48-125 V | SIPLUS S7-300 SM321 8DE/120/230VAC | SIPLUS S7-300 SM321 8DI/120/230VAC |
| **Relative humidity** | | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C 4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1321-1FH00-7AA0 | 6AG1321-7BH01-2AB0 | 6AG1321-7TH00-4AB0 |
|---|---|---|---|
| Based on | 6ES7321-1FH00-0AA0 | 6ES7321-7BH01-0AB0 | 6ES7321-7TH00-0AB0 |
| | SIPLUS S7-300 SM 321 16DI/120/230VAC | SIPLUS SM321 16DE/24VDC | SIPLUS PCS 7 SM321 16DE |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -40 °C; = Tmin | -25 °C | 0 °C |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | | | 0 °C |

## ■ Technical specifications (continued)

| Article number | **6AG1321-1FH00-7AA0** | **6AG1321-7BH01-2AB0** | **6AG1321-7TH00-4AB0** |
|---|---|---|---|
| Based on | **6ES7321-1FH00-0AA0** | **6ES7321-7BH01-0AB0** | **6ES7321-7TH00-0AB0** |
| | SIPLUS S7-300 SM 321 16DI/120/230VAC | SIPLUS SM321 16DE/24VDC | SIPLUS PCS 7 SM321 16DE |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 321 digital input modules** | | *For rolling stock railway applications* | |
| *For industrial applications with extended ambient conditions* | | Conforms to EN 50155 | |
| Extended temperature range and exposure to media | | 16 inputs, 24 V DC | **6AG1321-1BH02-2AA0** |
| 16 inputs, 24 V DC | **6AG1321-1BH02-2AA0** | 32 inputs, 24 V DC | **6AG1321-1BL00-2AA0** |
| 32 inputs, 24 V DC | **6AG1321-1BL00-2AA0** | 16 inputs, 48 to 120 V DC | **6AG1321-1CH20-2AA0** |
| 16 inputs, 48 to 120 V DC | **6AG1321-1CH20-2AA0** | 8 inputs, 120/230 V AC | **6AG1321-1FF01-2AA0** |
| 8 inputs, 120/230 V AC | **6AG1321-1FF01-2AA0** | 16 inputs, 24 V DC, diagnostics-capable | **6AG1321-7BH01-2AB0** |
| 8 inputs, 120/230 V AC, single root | **6AG1321-1FF10-7AA0** | | |
| 16 inputs, 120/230 V AC | **6AG1321-1FH00-7AA0** | | |
| 16 inputs, 24 V DC, diagnostics-capable | **6AG1321-7BH01-2AB0** | | |
| Exposure to media | | | |
| 16 inputs, NAMUR, redundant design possible | **6AG1321-7TH00-4AB0** | | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 digital modules

## SIPLUS S7-300 SM 321

### ■ Ordering data

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | *Documentation* | |
| *Mandatory* | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Front connector** | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| 20-pin, with spring-loaded contacts | | | |
| • 1 unit | 6ES7392-1BJ00-0AA0 | | |
| • 100 units | 6ES7392-1BJ00-1AB0 | | |
| 40-pin, with spring-loaded contacts | | | |
| • 1 unit | 6ES7392-1BM01-0AA0 | | |
| • 100 units | 6ES7392-1BM01-1AB0 | | |
| *Consumables* | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Front door, elevated design** | 6ES7328-0AA00-7AA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | | | |
| **Bus connectors** | 6ES7390-0AA00-0AA0 | | |
| 1 unit (spare part) | | | |
| **Labeling strips** | | | |
| 10 units; spare part | | | |
| For modules with 20-pin front connector | 6ES7392-2XX00-0AA0 | | |
| For modules with 40-pin front connector | 6ES7392-2XX10-0AA0 | | |
| **Label cover** | | | |
| 10 units; spare part | | | |
| For modules with 20-pin front connector | 6ES7392-2XY00-0AA0 | | |
| For modules with 40-pin front connector | 6ES7392-2XY10-0AA0 | | |

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## ■ Overview



- Digital outputs
- For connecting solenoid valves, contactors, small-power motors, lamps and motor starters

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | **6AG1322-1BF01-2XB0** | **6AG1322-8BF00-2AB0** | **6AG1322-1BH01-2AA0** | **6AG1322-1BL00-2AA0** |
|---|---|---|---|---|
| Based on | **6ES7322-1BF01-0AA0** | **6ES7322-8BF00-0AB0** | **6ES7322-1BH01-0AA0** | **6ES7322-1BL00-0AA0** |
| | SIPLUS S7-300 SM322 8DO/24VDC 2A | SIPLUS SM322 8DA/24VDC | SIPLUS S7-300 SM322 16DA/24VDC 0.5A | SIPLUS S7-300 SM322 32DO/24VDC 0.5A |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C | -25 °C; = Tmin | -25 °C | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL use | 70 °C; = Tmax; 60 °C @ UL/cUL use | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | | -40 °C | -40 °C |
| • max. | 70 °C | | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 digital modules

## SIPLUS S7-300 SM 322

### Technical specifications (continued)

| Article number | **6AG1322-1BF01-2XB0** | **6AG1322-8BF00-2AB0** | **6AG1322-1BH01-2AA0** | **6AG1322-1BL00-2AA0** |
|---|---|---|---|---|
| Based on | **6ES7322-1BF01-0AA0** | **6ES7322-8BF00-0AB0** | **6ES7322-1BH01-0AA0** | **6ES7322-1BL00-0AA0** |
| | SIPLUS S7-300 SM322 8DO/24VDC 2A | SIPLUS SM322 8DA/24VDC | SIPLUS S7-300 SM322 16DA/24VDC 0.5A | SIPLUS S7-300 SM322 32DO/24VDC 0.5A |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1322-1CF00-7AA0** | **6AG1322-1HF10-2AA0** | **6AG1322-5HF00-4AB0** | **6AG1322-1FF01-7AA0** |
|---|---|---|---|---|
| Based on | **6ES7322-1CF00-0AA0** | **6ES7322-1HF10-0AA0** | **6ES7322-5HF00-0AB0** | **6ES7322-1FF01-0AA0** |
| | SIPLUS SM322 8DA/48-125VDC | SIPLUS SM322 8DA - Relais | SIPLUS_SM322_8RO | SIPLUS S7-300 SM322 8DA/120/220VAC 1A |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C | -25 °C | 0 °C; = Tmin | -40 °C |
| • max. | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies | 60 °C | 60 °C; = Tmax | 70 °C; = Tmax; for use on railway vehicles according to EN 50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/UL hazardous use applies |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

## ■ Technical specifications (continued)

| Article number | 6AG1322-1CF00-7AA0 | 6AG1322-1HF10-2AA0 | 6AG1322-5HF00-4AB0 | 6AG1322-1FF01-7AA0 |
|---|---|---|---|---|
| Based on | 6ES7322-1CF00-0AA0 | 6ES7322-1HF10-0AA0 | 6ES7322-5HF00-0AB0 | 6ES7322-1FF01-0AA0 |
| | SIPLUS SM322 8DA/48-125VDC | SIPLUS SM322 8DA - Relais | SIPLUS_SM322_8RO | SIPLUS S7-300 SM322 8DA/120/220VAC 1A |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1322-5FF00-4AB0 | 6AG1322-1FH00-7AA0 | 6AG1322-1HH01-2AA0 |
|---|---|---|---|
| Based on | 6ES7322-5FF00-0AB0 | 6ES7322-1FH00-0AA0 | 6ES7322-1HH01-0AA0 |
| | SIPLUS S7-300 SM322 8DO | SIPLUS S7-300 SM 322 16DO 120/230VAC 1A | SIPLUS SM322 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C; = Tmin | -40 °C; = Tmin | -40 °C |
| • max. | 60 °C; = Tmax | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tma x at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 digital modules

## SIPLUS S7-300 SM 322

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 322 digital output modules** | | **Accessories** | |
| *For industrial applications with extended ambient conditions* | | *Mandatory* | |
| | | **Front connector** | |
| <u>Extended temperature range and exposure to media</u> | | 20-pin, with spring-loaded contacts | |
| 8 outputs, 24 V DC, 2 A | **6AG1322-1BF01-2XB0** | • 1 unit | **6ES7392-1BJ00-0AA0** |
| 16 outputs, 24 V DC, 0.5 A | **6AG1322-1BH01-2AA0** | • 100 units | **6ES7392-1BJ00-1AB0** |
| 32 outputs, 24 V DC, 0.5 A | **6AG1322-1BL00-2AA0** | 40-pin, with spring-loaded contacts | |
| 8 outputs, 48 to 125 V DC, 1.5 A | **6AG1322-1CF00-7AA0** | • 1 unit | **6ES7392-1BM01-0AA0** |
| 8 outputs, 120/230 V AC, 1 A | **6AG1322-1FF01-7AA0** | • 100 units | **6ES7392-1BM01-1AB0** |
| 16 outputs, 120/230 V AC, 1 A | **6AG1322-1FH00-7AA0** | *Consumables* | |
| 8 outputs, relay contacts, 5 A | **6AG1322-1HF10-2AA0** | **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| 16 outputs, relay contacts, 8 A | **6AG1322-1HH01-2AA0** | E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | |
| 8 outputs, 24 V DC, 0.5 A, diagnostics-capable | **6AG1322-8BF00-2AB0** | | |
| <u>Exposure to media</u> | | **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 8 outputs, 120/230 V AC, 2 A | **6AG1322-5FF00-4AB0** | 1 unit (spare part) | |
| 8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection | **6AG1322-5HF00-4AB0** | **Labeling strips** | |
| *For rolling stock railway applications* | | 10 units; spare part | |
| | | For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| <u>Conforms to EN 50155</u> | | For modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| 16 outputs, 24 V DC, 0.5 A, high speed | **6AG1322-1BH01-2AA0** | **Label cover** | |
| 32 outputs, 24 V DC, 0.5 A | **6AG1322-1BL00-2AA0** | 10 units; spare part | |
| 8 outputs, relay contacts, 5 A | **6AG1322-1HF10-2AA0** | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| 16 outputs, relay contacts, 8 A | **6AG1322-1HH01-2AA0** | For modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| 8 outputs, 24 V DC, 0.5 A, diagnostics-capable | **6AG1322-8BF00-2AB0** | *Documentation* | |
| | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

## Overview



- Digital inputs and outputs
- For connection of switches, 2-wire proximity switches (BEROs), solenoid valves, contactors, low-power motors, lamps and motor starters

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1323-1BH01-2AA0** |
| Based on | **6ES7323-1BH01-0AA0** |
| | SIPLUS SM323 8DE/8DA |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 digital modules

## SIPLUS S7-300 SM 323

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| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **SIPLUS S7-300 SM 323 digital input/output module** | | **Label cover** | |
| *For industrial applications with extended ambient conditions* | | 10 units; spare part | |
| <u>Extended temperature range and exposure to media</u> | | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| 8 inputs, 8 outputs | **6AG1323-1BH01-2AA0** | For modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| *For rolling stock railway applications* | | *Documentation* | |
| <u>Conforms to EN 50155</u> | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| 8 inputs, 8 outputs | **6AG1323-1BH01-2AA0** | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **Accessories** | | | |
| *Mandatory* | | | |
| **Front connector** | | | |
| 20-pin, with spring-loaded contacts | | | |
| • 1 unit | **6ES7392-1BJ00-0AA0** | | |
| • 100 units | **6ES7392-1BJ00-1AB0** | | |
| 40-pin, with spring-loaded contacts | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| • 1 unit | **6ES7392-1BM01-0AA0** | Current "Manual Collection" DVD and the three subsequent updates | |
| • 100 units | **6ES7392-1BM01-1AB0** | | |
| *Consumables* | | | |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** | | |
| E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | | | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | | |
| 1 unit (spare part) | | | |
| **Labeling strips** | | | |
| 10 units; spare part | | | |
| For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** | | |
| For modules with 40-pin front connector | **6ES7392-2XX10-0AA0** | | |

## Overview

- Analog inputs
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

## Technical specifications

| Article number | 6ES7331-7KF02-0AB0 | 6ES7331-7HF01-0AB0 | 6ES7331-1KF02-0AB0 | 6ES7331-7KB02-0AB0 |
| --- | --- | --- | --- | --- |
| | SM331, 8AI, 9/12/14BIT | SIMATIC S7-300, ANALOG INPUT | SM331, 8AI, 13BIT | SM331, 2AI, 9/12/14BIT |
| **Supply voltage** | | | | |
| **Load voltage L+** | | | | |
| • Rated value (DC) | 24 V | 24 V | | 24 V |
| **Input current** | | | | |
| from load voltage L+ (without load), max. | 30 mA | 50 mA | | 30 mA |
| from backplane bus 5 V DC, max. | 50 mA | 100 mA | 90 mA | 50 mA |
| **Power loss** | | | | |
| Power loss, typ. | 1 W | 1.5 W | 0.4 W | 1 W |
| **Analog inputs** | | | | |
| Number of analog inputs | 8 | 8 | 8 | 2 |
| • For resistance measurement | 4 | | 8 | 1 |
| permissible input voltage for voltage input (destruction limit), max. | 20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20) | 20 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20) | 30 V; 12 V continuous, 30 V for max. 1 s | 20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 40 mA | 40 mA | 40 mA | 40 mA |
| **Input ranges (rated values), voltages** | | | | |
| • 0 to +10 V | No | No | Yes | No |
| • 1 V to 5 V | Yes | Yes | Yes | Yes |
| • 1 V to 10 V | No | | No | No |
| • -1 V to +1 V | Yes | Yes | Yes | Yes |
| • -10 V to +10 V | Yes | Yes | Yes | Yes |
| • -2.5 V to +2.5 V | Yes | | No | Yes |
| • -250 mV to +250 mV | Yes | | No | Yes |
| • -5 V to +5 V | Yes | Yes | Yes | Yes |
| • -50 mV to +50 mV | No | | Yes | No |
| • -500 mV to +500 mV | Yes | Yes | Yes | Yes |
| • -80 mV to +80 mV | Yes | Yes | No | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Analog modules

## SM 331 analog input modules

### Technical specifications (continued)

| Article number | 6ES7331-7KF02-0AB0 | 6ES7331-7HF01-0AB0 | 6ES7331-1KF02-0AB0 | 6ES7331-7KB02-0AB0 |
|---|---|---|---|---|
| | SM331, 8AI, 9/12/14BIT | SIMATIC S7-300, ANALOG INPUT | SM331, 8AI, 13BIT | SM331, 2AI, 9/12/14BIT |
| **Input ranges (rated values), currents** | | | | |
| • 0 to 20 mA | Yes | Yes | Yes | Yes |
| • -10 mA to +10 mA | Yes | | No | Yes |
| • -20 mA to +20 mA | Yes | Yes | Yes | Yes |
| • -3.2 mA to +3.2 mA | Yes | | No | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | | | |
| • Type B | No | | No | No |
| • Type C | No | | No | |
| • Type E | Yes | | No | Yes |
| • Type J | Yes | | No | Yes |
| • Type K | Yes | | No | Yes |
| • Type L | Yes | | No | No |
| • Type N | Yes | | No | Yes |
| • Type R | No | | No | No |
| • Type S | No | | No | No |
| • Type T | No | | No | No |
| • Type U | No | | No | No |
| • Type TXK/TXK(L) to GOST | No | | No | No |
| **Input ranges (rated values), resistance thermometer** | | | | |
| • Cu 10 | No | | No | No |
| • Ni 100 | Yes; Standard | | Yes; Standard/climate | Yes |
| • Ni 1000 | No | | Yes | No |
| • LG-Ni 1000 | No | | Yes; Standard/climate | No |
| • Ni 120 | No | | No | No |
| • Ni 200 | No | | No | No |
| • Ni 500 | No | | No | No |
| • Pt 100 | Yes; Standard | | Yes; Standard/climate | Yes |
| • Pt 1000 | No | | No | No |
| • Pt 200 | No | | No | No |
| • Pt 500 | No | | No | No |
| **Input ranges (rated values), resistors** | | | | |
| • 0 to 150 ohms | Yes | | No | Yes |
| • 0 to 300 ohms | Yes | | No | Yes |
| • 0 to 600 ohms | Yes | | Yes | Yes |
| • 0 to 6000 ohms | No | | Yes | No |
| **Thermocouple (TC)** | | | | |
| **Temperature compensation** | | | | |
| - parameterizable | Yes | | No | Yes |
| - internal temperature compensation | Yes | | No | Yes |
| - external temperature compensation with compensations socket | Yes | | No | Yes |
| **Characteristic linearization** | | | | |
| • parameterizable | Yes | | Yes | Yes |
| - for thermocouples | Type E, J, K, L, N | | No | Type E, J, K, L, N |
| - for resistance thermometer | Pt100 (standard, climatic range), Ni100 (standard, climatic range) | | yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con. | Pt100 (standard, climatic range), Ni100 (standard, climatic range) |
| **Cable length** | | | | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples | 200 m | 200 m; max. 50 m at 50 mV | 200 m; 50 m at 80 mV and thermocouples |

■ **Technical specifications** (continued)

| Article number | **6ES7331-7KF02-0AB0**<br>SM331, 8AI, 9/12/14BIT | **6ES7331-7HF01-0AB0**<br>SIMATIC S7-300,<br>ANALOG INPUT | **6ES7331-1KF02-0AB0**<br>SM331, 8AI, 13BIT | **6ES7331-7KB02-0AB0**<br>SM331, 2AI, 9/12/14BIT |
|---|---|---|---|---|
| **Analog value generation<br>for the inputs** | | | | |
| Measurement principle | integrating | Actual value encryption | integrating | integrating |
| **Integration and conversion time/<br>resolution per channel** | | | | |
| • Resolution with overrange<br>(bit including sign), max. | 15 bit; Unipolar:<br>9/12/12/14 bit; bipolar:<br>9 bit + sign/12 bit + sign/<br>12 bit + sign/14 bit + sign | 14 bit; Unipolar: 14 bit;<br>bipolar: 13 bit + sign | 13 bit | 15 bit; Unipolar:<br>9/12/12/14 bit; bipolar:<br>9 bit + sign/12 bit + sign/<br>12 bit + sign/14 bit + sign |
| • Integration time, parameterizable | Yes; 2,5 / 16,67 / 20 / 100 ms | Yes | Yes; 60 / 50 ms | Yes; 2,5 / 16,67 / 20 / 100 ms |
| • Basic conversion time (ms) | 3 / 17 / 22 / 102 ms | 52 µs per channel | 66 / 55 ms | 3 / 17 / 22 / 102 ms |
| • Interference voltage suppression<br>for interference frequency f1 in Hz | 400 / 60 / 50 / 10 Hz | none / 400 / 60 / 50 Hz | 50 / 60 Hz | 400 / 60 / 50 / 10 Hz |
| **Encoder** | | | | |
| **Connection of signal encoders** | | | | |
| • for current measurement<br>as 2-wire transducer | Yes | Yes | Yes; with external supply | Yes |
| • for current measurement<br>as 4-wire transducer | Yes | Yes | Yes | Yes |
| • for resistance measurement<br>with two-wire connection | Yes | | Yes | Yes |
| • for resistance measurement<br>with three-wire connection | Yes | | Yes | Yes |
| • for resistance measurement<br>with four-wire connection | Yes | | Yes | Yes |
| **Errors/accuracies** | | | | |
| **Operational error limit in overall<br>temperature range** | | | | |
| • Voltage, relative to input range, (+/-) | 1 %; ±1% (80 mV); ±0.6%<br>(250 mV to 1 000 mV);<br>±0.8% (2.5 V to 10 V) | 0.4 % | 0.6 %; +/-0.6% (+/-5 V, 10 V,<br>1 to 5 V, 0 to 10 V); +/-0.5%<br>(+/-50 mV, 500 mV, 1 V) | 1 %; ±1% (80 mV); ±0.6%<br>(250 mV to 1 000 mV);<br>±0.8% (2.5 V to 10 V) |
| • Current, relative to input range, (+/-) | 0.7 %; From 3.2 to 20 mA | 0.3 % | 0.5 %; +/-20 mA, 0 to 20 mA,<br>4 to 20 mA | 0.7 %; From 3.2 to 20 mA |
| • Resistance, relative to input range,<br>(+/-) | 0.7 %; 150, 300, 600 Ohm | | 0.5 %; 0 to 6 kohms,<br>0 to 600 kohms | 0.7 %; 150, 300, 600 Ohm |
| • Resistance thermometer,<br>relative to input range, (+/-) | 0.7 %;<br>+/-0.7% (Pt100/ Ni100);<br>+/-0.8% (Pt100 climate) | | 1 Kelvin (Pt100, Ni100,<br>climatic; Ni1000, LG-Ni1000,<br>standard; Ni1000,<br>LG-Ni1000, climatic);<br>1.2 Kelvin (Pt100, Ni100,<br>standard) | 0.7 %;<br>+/-0.7% (Pt100/ Ni100);<br>+/-0.8% (Pt100 climate) |
| **Basic error limit<br>(operational limit at 25 °C)** | | | | |
| • Voltage, relative to input range, (+/-) | 0.6 %; ±0.4 % (250 mV to<br>1 000 mV); ±0.6 % (2.5 mV<br>to 10 mV); ±0.7 % (80 mV) | 0.25 % | 0.4 %; 0.4% (+/-5 V, 10 V,<br>1 to 5 V, 0 to 10 V); 0.3%<br>(+/-50 mV, 500 mV, 1 V) | 0.6 %; ±0.6% (80 mV, 2.5 V<br>to 10 V); ±0.4% (250 mV to<br>1 000 mV) |
| • Current, relative to input range, (+/-) | 0.5 %; 3.2 to 20 mA | 0.2 % | 0.3 %; +/-20 mA, 0 to 20 mA,<br>4 to 20 mA | 0.5 %; 3.2 to 20 mA |
| • Resistance, relative to input range,<br>(+/-) | 0.5 %; 150, 300, 600 Ohm | | 0.3 %; 0 to 6 kohms, 0 to 600<br>kohms | 0.5 %; 150, 300, 600 Ohm |
| • Resistance thermometer,<br>relative to input range, (+/-) | 0.6 %; ±0.5% (Pt100/ Ni100),<br>±0.6% (Pt100 climate) | | 1 Kelvin (Pt100, Ni100,<br>standard); 0.8 Kelvin (Pt100,<br>Ni100, climatic; Ni1000,<br>LG-Ni1000, standard;<br>Ni1000, LG-Ni1000, climatic) | 0.6 %; ±0.5% (Pt100/Ni100),<br>±0.6% (Pt100 climate) |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Analog modules

## SM 331 analog input modules

**Technical specifications** (continued)

| Article number | 6ES7331-7KF02-0AB0 | 6ES7331-7HF01-0AB0 | 6ES7331-1KF02-0AB0 | 6ES7331-7KB02-0AB0 |
|---|---|---|---|---|
| | SM331, 8AI, 9/12/14BIT | SIMATIC S7-300, ANALOG INPUT | SM331, 8AI, 13BIT | SM331, 2AI, 9/12/14BIT |
| **Interrupts/diagnostics/ status information** | | | | |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable, channels 0 and 2 | Yes; Parameterizable | No | Yes |
| • Limit value alarm | Yes; Parameterizable | Yes; Parameterizable, channels 0 and 2 | No | Yes; Parameterizable, channel 0 |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | No | Yes |
| **Potential separation** | | | | |
| **Potential separation analog inputs** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 500 V DC | 500 V DC | 500 V DC | 500 V DC |
| **Connection method** | | | | |
| required front connector | 20-pin | 20-pin | 40-pin | 20-pin |
| **Dimensions** | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 117 mm | 117 mm | 117 mm | 120 mm |
| **Weights** | | | | |
| Weight, approx. | 250 g | 230 g | 250 g | 250 g |

| Article number | 6ES7331-7PF01-0AB0 | 6ES7331-7PF11-0AB0 | 6ES7331-7PE10-0AB0 | 6ES7331-7NF00-0AB0 | 6ES7331-7NF10-0AB0 |
|---|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT | SM331, 6AI, 16BIT, THERMOCOUPLE | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT |
| **Supply voltage** | | | | | |
| **Load voltage L+** | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | | 24 V |
| **Input current** | | | | | |
| from load voltage L+ (without load), max. | 240 mA | 240 mA | 150 mA | | 200 mA |
| from backplane bus 5 V DC, max. | 100 mA | 100 mA | 100 mA | 130 mA | 100 mA |
| **Power loss** | | | | | |
| Power loss, typ. | 4.6 W | 3 W | 2.2 W | 0.6 W | 3 W |
| **Analog inputs** | | | | | |
| Number of analog inputs | 8 | 8 | 6 | 8 | 8 |
| • For resistance measurement | 8 | | | | |
| permissible input voltage for voltage input (destruction limit), max. | 75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20) | 75 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20) | 35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20) | 50 V; Permanent | 75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | | | | 32 mA | 40 mA |
| **Input ranges (rated values), voltages** | | | | | |
| • 0 to +10 V | No | No | No | No | No |
| • 1 V to 5 V | No | No | No | Yes | Yes |
| • 1 V to 10 V | No | No | No | No | No |
| • -1 V to +1 V | No | No | Yes | No | No |
| • -10 V to +10 V | No | No | No | Yes | Yes |
| • -2.5 V to +2.5 V | No | No | No | No | No |
| • -250 mV to +250 mV | No | No | Yes | No | No |
| • -5 V to +5 V | No | No | No | Yes | Yes |
| • -50 mV to +50 mV | No | No | Yes | No | No |
| • -500 mV to +500 mV | No | No | Yes | No | No |
| • -80 mV to +80 mV | No | No | Yes | No | No |

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## ▇ **Technical specifications** (continued)

| Article number | 6ES7331-7PF01-0AB0 | 6ES7331-7PF11-0AB0 | 6ES7331-7PE10-0AB0 | 6ES7331-7NF00-0AB0 | 6ES7331-7NF10-0AB0 |
|---|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT | SM331, 6AI, 16BIT, THERMOCOUPLE | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT |
| **Input ranges (rated values), currents** | | | | | |
| • 0 to 20 mA | No | No | No | Yes | Yes |
| • -10 mA to +10 mA | No | No | No | No | No |
| • -20 mA to +20 mA | No | No | No | Yes | Yes |
| • -3.2 mA to +3.2 mA | No | No | No | No | No |
| • 4 mA to 20 mA | No | No | No | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | | | | |
| • Type B | No | Yes | Yes | No | No |
| • Type C | No | Yes | Yes | No | No |
| • Type E | No | Yes | Yes | No | No |
| • Type J | No | Yes | Yes | No | No |
| • Type K | No | Yes | Yes | No | No |
| • Type L | No | Yes | Yes | No | No |
| • Type N | No | Yes | Yes | No | No |
| • Type R | No | Yes | Yes | No | No |
| • Type S | No | Yes | Yes | No | No |
| • Type T | No | Yes | Yes | No | No |
| • Type U | No | Yes | Yes | No | No |
| • Type TXK/TXK(L) to GOST | No | Yes | Yes | No | No |
| **Input ranges (rated values), resistance thermometer** | | | | | |
| • Cu 10 | Yes | No | No | No | No |
| • Ni 100 | Yes | No | No | No | No |
| • Ni 1000 | Yes | No | No | No | No |
| • LG-Ni 1000 | Yes | No | No | No | No |
| • Ni 120 | Yes | No | No | No | No |
| • Ni 200 | Yes | No | No | No | No |
| • Ni 500 | Yes | No | No | No | No |
| • Pt 100 | Yes | No | No | No | No |
| • Pt 1000 | Yes | No | No | No | No |
| • Pt 200 | Yes | No | No | No | No |
| • Pt 500 | Yes | No | No | No | No |
| **Input ranges (rated values), resistors** | | | | | |
| • 0 to 150 ohms | Yes | No | No | No | No |
| • 0 to 300 ohms | Yes | No | No | No | No |
| • 0 to 600 ohms | Yes | No | No | No | No |
| • 0 to 6000 ohms | | No | No | No | No |
| **Thermocouple (TC)** | | | | | |
| **Temperature compensation** | | | | | |
| - parameterizable | | Yes | Yes | | |
| - internal temperature compensation | | Yes | Yes | | |
| - external temperature compensation with compensations socket | | Yes | Yes | | |
| - external temperature compensation with Pt100 | | Yes | Yes | | |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Analog modules

**SM 331 analog input modules**

### Technical specifications (continued)

| Article number | 6ES7331-7PF01-0AB0 | 6ES7331-7PF11-0AB0 | 6ES7331-7PE10-0AB0 | 6ES7331-7NF00-0AB0 | 6ES7331-7NF10-0AB0 |
|---|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT | SM331, 6AI, 16BIT, THERMOCOUPLE | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT |
| **Characteristic linearization** | | | | | |
| • parameterizable | Yes | Yes | Yes | | |
| - for thermocouples | | Type B, E, J, K, L, N, R, S. T, U, C | Type B, E, J, K, L, N, R, S. T, U, C, TXK, XK(L) | | |
| - for resistance thermometer | Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10; (standard/climate) | | No | | |
| **Cable length** | | | | | |
| • shielded, max. | 200 m | 100 m | 200 m | 200 m | 200 m |
| **Analog value generation for the inputs** | | | | | |
| Measurement principle | integrating | integrating | integrating | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit; Two's complement | 16 bit; Two's complement | 16 bit; Two's complement | 16 bit; Unipolar: 15/15/15/15 bit; bipolar: 15 bit + sign/ 15 bit + sign/15 bit + sign/15 bit + sign | 16 bit; Unipolar: 15/15/15/15 bit; bipolar: 15 bit + sign/ 15 bit + sign/15 bit + sign/15 bit + sign |
| • Integration time, parameterizable | Yes | Yes | Yes | Yes; 10/ 16.67/ 20/ 100 ms | Yes; 23 / 72 / 83 / 95 ms |
| • Basic conversion time (ms) | up to 4 channels: 10 ms per module, over 5 channels: 190 ms per module, 8 channels: 80 ms | Up to 4 channels: 10 ms per module, 5 channels upwards: 190 ms per module | 30 / 50 / 60 / 300 ms | | 10 ms (4-channel mode); 95/83/72/23 ms (8-channel mode) |
| • Integration time (ms) | | | 10/ 16.67/ 20/ 100 ms | | |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 Hz | 400 / 60 / 50 Hz | 10 / 50 / 60 / 400 Hz | 400 / 60 / 50 / 10 Hz | 400 / 60 / 50 Hz, combinations of 400, 60, 50 Hz |
| **Encoder** | | | | | |
| **Connection of signal encoders** | | | | | |
| • for current measurement as 2-wire transducer | | | | Yes; with external transmitter; possible with separate supply for transmitter | Yes; with external transmitter, current supply; possible with separate supply for transmitter |
| • for current measurement as 4-wire transducer | | | | Yes | Yes |
| • for resistance measurement with two-wire connection | Yes; without resistance correction | | | | |
| • for resistance measurement with three-wire connection | Yes | | | | |
| • for resistance measurement with four-wire connection | Yes | | | | |
| **Errors/accuracies** | | | | | |
| **Operational error limit in overall temperature range** | | | | | |
| • Voltage, relative to input range, (+/-) | | +/- 1 K | Operating error at 0 ... 60 °C: ±0.12% @ ±25 mV, ±0.08% @ ±50 mV, ±0.6% @ ±80 mV, ±0.05% @ ±250 mV, ±0.05% @ 500 mV, ±0.05% @ ±1 V | 0.1 %; At Ucm = 0 V or ±0.7 % at Ucm = 50 V | 0.1 % |
| • Current, relative to input range, (+/-) | | | | 0.3 %; At Ucm = 0 V or ±0.9 % at Ucm = 50 V | 0.1 % |
| • Resistance, relative to input range, (+/-) | 0.1 % | | | | |
| • Resistance thermometer, relative to input range, (+/-) | +/- 1 K | | | | |

■ **Technical specifications** (continued)

| Article number | 6ES7331-7PF01-0AB0 | 6ES7331-7PF11-0AB0 | 6ES7331-7PE10-0AB0 | 6ES7331-7NF00-0AB0 | 6ES7331-7NF10-0AB0 |
|---|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT | SM331, 6AI, 16BIT, THERMOCOUPLE | SIMATIC S7-300, ANALOG INPUT | SIMATIC S7-300, ANALOG INPUT |
| **Basic error limit (operational limit at 25 °C)** | | | | | |
| • Voltage, relative to input range, (+/-) | | | See manual for details | 0.05 % | 0.05 % |
| • Current, relative to input range, (+/-) | | | | 0.05 % | 0.05 % |
| • Resistance, relative to input range, (+/-) | 0.05 % | | | | |
| • Resistance thermometer, relative to input range, (+/-) | +/- 0,5 K | | | | |
| **Interrupts/diagnostics/ status information** | | | | | |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes; Parameterizable per group | Yes; Parameterizable per group | Yes; channel by channel | Yes; Parameterizable | Yes; Parameterizable |
| • Limit value alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable, channels 0 and 2 | Yes; Parameterizable all channels (end of cycle interrupt is also supported across modules) |
| • Hardware interrupt | Yes; Parameterizable, channels 0 to 7 | Yes; Parameterizable, channels 0 to 7 | Yes; Parameterizable | | Yes; Parameterizable, channels 0 to 7 (on exceeding limit value), at end of cycle |
| **Diagnostic messages** | | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | | |
| **Potential separation analog inputs** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 500 V DC | 500 V DC | 2500 V DC | 500 V DC | 500 V AC |
| **Connection method** | | | | | |
| required front connector | 40-pin | 40-pin | 40-pin | 40-pin | 40-pin |
| **Dimensions** | | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm | 117 mm | 117 mm |
| **Weights** | | | | | |
| Weight, approx. | 272 g | 272 g | 272 g | 272 g | 272 g |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Analog modules

**SM 331 analog input modules**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 331 analog input modules** | | **Shield connection clamps** | |
| Including labeling strips, bus connector, measuring range modules | | 2 units | |
| | | For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| 8 inputs, 13-bit resolution | **6ES7331-1KF02-0AB0** | | |
| 8 inputs, resolution 9/12/14 bits | **6ES7331-7KF02-0AB0** | For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| 2 inputs, resolution 9/12/14 bits | **6ES7331-7KB02-0AB0** | For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |
| 8 inputs, enhanced resolution 16 bits | **6ES7331-7NF00-0AB0** | **Label cover** | **6ES7392-2XY00-0AA0** |
| 8 inputs, enhanced resolution 16 bits, 4-channel mode | **6ES7331-7NF10-0AB0** | 10 units (spare part), for modules with 20-pin front connector | |
| 8 inputs, resolution 14 bits, for isochronous mode | **6ES7331-7HF01-0AB0** | **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 6 inputs, for thermal elements, resolution 16 bits | **6ES7331-7PE10-0AB0** | 10 units (spare part), for modules with 20-pin front connector | |
| 8 inputs, for thermal resistors | **6ES7331-7PF01-0AB0** | **Labeling sheets for machine labeling** | |
| 8 inputs, for thermoelements | **6ES7331-7PF11-0AB0** | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| **Measuring range module for analog inputs** | **6ES7974-0AA00-0AA0** | Petrol | **6ES7392-2AX00-0AA0** |
| 1 module for 2 analog inputs; 2 units (spare part) | | Light beige | **6ES7392-2BX00-0AA0** |
| **Front connector** | | Yellow | **6ES7392-2CX00-0AA0** |
| 20-pin, with screw contacts | | Red | **6ES7392-2DX00-0AA0** |
| • 1 unit | **6ES7392-1AJ00-0AA0** | for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| • 100 units | **6ES7392-1AJ00-1AB0** | | |
| 20-pin, with spring-loaded contacts | | | |
| • 1 unit | **6ES7392-1BJ00-0AA0** | Petrol | **6ES7392-2AX10-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** | Light beige | **6ES7392-2BX10-0AA0** |
| 40-pin, with screw contacts | | Yellow | **6ES7392-2CX10-0AA0** |
| • 1 unit | **6ES7392-1AM00-0AA0** | Red | **6ES7392-2DX10-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| 40-pin, with spring-loaded contacts | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| • 1 unit | **6ES7392-1BM01-0AA0** | | |
| • 100 units | **6ES7392-1BM01-1AB0** | | |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** | | |
| e.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG wires | | | |
| **SIMATIC TOP connect** | See page 5/248 | | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| 1 unit (spare part) | | Current "Manual Collection" DVD and the three subsequent updates | |
| **Shield connecting element** | **6ES7390-5AA00-0AA0** | | |
| 80 mm wide, with 2 rows for 4 shield connection clamps each | | | |

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## Overview



- Analog outputs
- For the connection of analog actuators

## Technical specifications

| Article number | **6ES7332-5HB01-0AB0** | **6ES7332-5HD01-0AB0** | **6ES7332-5HF00-0AB0** | **6ES7332-7ND02-0AB0** |
|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7,SM 332 ANALOG OUTPUT |
| **Supply voltage** | | | | |
| **Load voltage L+** | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| **Input current** | | | | |
| from load voltage L+ (without load), max. | 135 mA | 240 mA | 340 mA | 290 mA |
| from backplane bus 5 V DC, max. | 60 mA | 60 mA | 100 mA | 120 mA |
| **Power loss** | | | | |
| Power loss, typ. | 3 W | 3 W | 6 W | 3 W |
| **Analog outputs** | | | | |
| Number of analog outputs | 2 | 4 | 8 | 4; Isochronous mode |
| Voltage output, short-circuit protection | Yes | Yes | Yes | Yes |
| Voltage output, short-circuit current, max. | 25 mA | 25 mA | 25 mA | 40 mA |
| Current output, no-load voltage, max. | 18 V | 18 V | 18 V | 18 V |
| **Output ranges, voltage** | | | | |
| • 0 to 10 V | Yes | Yes | Yes | Yes |
| • 1 V to 5 V | Yes | Yes | Yes | Yes |
| • -10 V to +10 V | Yes | Yes | Yes | Yes |
| **Output ranges, current** | | | | |
| • 0 to 20 mA | Yes | Yes | Yes | Yes |
| • -20 mA to +20 mA | Yes | Yes | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes | Yes | Yes |
| **Load impedance (in rated range of output)** | | | | |
| • with voltage outputs, min. | 1 kΩ | 1 kΩ | 1 kΩ | 1 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF | 1 µF | 1 µF | 1 µF |
| • with current outputs, max. | 500 Ω | 500 Ω | 500 Ω | 500 Ω |
| • with current outputs, inductive load, max. | 10 mH | 10 mH | 10 mH | 1 mH |
| **Cable length** | | | | |
| • shielded, max. | 200 m | 200 m | 200 m | 200 m |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Analog modules

**SM 332 analog output modules**

## ■ Technical specifications (continued)

| Article number | 6ES7332-5HB01-0AB0 | 6ES7332-5HD01-0AB0 | 6ES7332-5HF00-0AB0 | 6ES7332-7ND02-0AB0 |
|---|---|---|---|---|
| | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7-300, ANALOG OUTPUT | SIMATIC S7,SM 332 ANALOG OUTPUT |
| **Analog value generation for the outputs** | | | | |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 12 bit; ±10 V, ±20 mA, 4 mA to 20 mA, 1 V to 5 V: 11 bit + sign; 0 V to 10 V, 0 mA to 20 mA: 12 bit | 12 bit; ±10 V, ±20 mA, 4 mA to 20 mA, 1 V to 5 V: 11 bit + sign; 0 V to 10 V, 0 mA to 20 mA: 12 bit | 12 bit; ±10 V, ±20 mA, 4 mA to 20 mA, 1 V to 5 V: 11 bit + sign; 0 V to 10 V, 0 mA to 20 mA: 12 bit | 16 bit |
| • Conversion time (per channel) | 0.8 ms | 0.8 ms | 0.8 ms | 200 μs; in isochronous mode 640 μs |
| **Settling time** | | | | |
| • for resistive load | 0.2 ms | 0.2 ms | 0.2 ms | 0.2 ms |
| • for capacitive load | 3.3 ms | 3.3 ms | 3.3 ms | 3.3 ms |
| • for inductive load | 0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH) | 0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH) | 0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH) | 0.5 ms |
| **Errors/accuracies** | | | | |
| **Operational error limit in overall temperature range** | | | | |
| • Voltage, relative to output range, (+/-) | 0.5 % | 0.5 % | 0.5 % | 0.12 % |
| • Current, relative to output range, (+/-) | 0.6 % | 0.6 % | 0.6 % | 0.18 % |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to output range, (+/-) | 0.4 % | 0.4 % | 0.4 % | 0.02 % |
| • Current, relative to output range, (+/-) | 0.5 % | 0.5 % | 0.5 % | 0.02 % |
| **Interrupts/diagnostics/ status information** | | | | |
| Substitute values connectable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | |
| **Potential separation analog outputs** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 500 V DC | 500 V DC | 500 V DC | 1500 V DC |
| **Connection method** | | | | |
| required front connector | 20-pin | 20-pin | 40-pin | 20-pin |
| **Dimensions** | | | | |
| Width | 40 mm | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 117 mm | 117 mm | 117 mm | 117 mm |
| **Weights** | | | | |
| Weight, approx. | 220 g | 220 g | 272 g | 220 g |

## Ordering data

| | Article No. |
|---|---|
| **SM 332 analog output modules** | |
| incl. labeling strips, bus connector | |
| 4 outputs, 11/12 bit | **6ES7332-5HD01-0AB0** |
| 4 outputs, 16 bit | **6ES7332-7ND02-0AB0** |
| 2 outputs, 11/12 bit | **6ES7332-5HB01-0AB0** |
| 8 outputs, 11/12 bit | **6ES7332-5HF00-0AB0** |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| 40-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AM00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| e.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG wires | |
| **SIMATIC TOP connect** | See page 5/248 |
| **Bus connectors** | |
| 1 unit (spare part) | **6ES7390-0AA00-0AA0** |
| **Shield connecting element** | **6ES7390-5AA00-0AA0** |
| 80 mm wide, with 2 rows for 4 shield connection clamps each | |
| **Shield connection clamps** | |
| 2 units | |
| For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |

| | Article No. |
|---|---|
| **Label cover** | **6ES7392-2XY00-0AA0** |
| 10 units (spare part), for modules with 20-pin front connector | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 10 units (spare part), for modules with 20-pin front connector | |
| **Labeling sheets for machine labeling** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX00-0AA0** |
| Light beige | **6ES7392-2BX00-0AA0** |
| Yellow | **6ES7392-2CX00-0AA0** |
| Red | **6ES7392-2DX00-0AA0** |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX10-0AA0** |
| Light beige | **6ES7392-2BX10-0AA0** |
| Yellow | **6ES7392-2CX10-0AA0** |
| Red | **6ES7392-2DX10-0AA0** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers

I/O modules
Analog modules

## SM 334 analog input/output modules

### ■ Overview



- Analog inputs and outputs
- For the connection of analog sensors and actuators

### ■ Technical specifications

| Article number | 6ES7334-0CE01-0AA0 | 6ES7334-0KE00-0AB0 |
|---|---|---|
| | SIMATIC S7, ANALOG INPUT MODULE | SIMATIC S7-300, ANALOG MODULE |
| **Supply voltage** | | |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| **Input current** | | |
| from supply and load voltage L+ (without load), max. | 110 mA | 80 mA |
| from backplane bus 5 V DC, max. | 55 mA | 60 mA |
| **Power loss** | | |
| Power loss, typ. | 3 W | 2 W |
| **Analog inputs** | | |
| Number of analog inputs | 4 | 4 |
| • For voltage measurement | 4 | 2 |
| • For resistance measurement | | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 20 V | 20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 40 mA | |
| Cycle time (all channels) max. | 5 ms | 85 ms |
| **Input ranges (rated values), voltages** | | |
| • 0 to +10 V | Yes | Yes |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes | |
| **Input ranges (rated values), resistance thermometer** | | |
| • Pt 100 | | Yes; only climatic range |
| **Input ranges (rated values), resistors** | | |
| • 0 to 10000 ohms | | Yes |
| **Analog outputs** | | |
| Number of analog outputs | 2 | 2 |
| Voltage output, short-circuit protection | Yes | Yes |
| Voltage output, short-circuit current, max. | 11 mA | 30 mA |
| Current output, no-load voltage, max. | 15 V | |

■ **Technical specifications** (continued)

| Article number | 6ES7334-0CE01-0AA0 | 6ES7334-0KE00-0AB0 |
|---|---|---|
| | SIMATIC S7, ANALOG INPUT MODULE | SIMATIC S7-300, ANALOG MODULE |
| **Output ranges, voltage** | | |
| • 0 to 10 V | Yes | Yes |
| **Output ranges, current** | | |
| • 0 to 20 mA | Yes | |
| **Load impedance (in rated range of output)** | | |
| • with voltage outputs, min. | 5 kΩ | 2.5 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF | 1 µF |
| • with current outputs, max. | 300 Ω | |
| • with current outputs, inductive load, max. | 1 mH | |
| **Cable length** | | |
| • shielded, max. | 200 m | 100 m |
| **Analog value generation for the inputs** | | |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 8 bit | 12 bit |
| • Integration time (ms) | | 16,67 / 20 ms |
| **Analog value generation for the outputs** | | |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 8 bit | 12 bit |
| **Settling time** | | |
| • for resistive load | 0.3 ms | 0.8 ms |
| • for capacitive load | 3 ms | 0.8 ms |
| • for inductive load | 0.3 ms | |
| **Encoder** | | |
| **Connection of signal encoders** | | |
| • for current measurement as 2-wire transducer | No | |
| • for current measurement as 4-wire transducer | Yes | |
| • for resistance measurement with two-wire connection | | Yes |
| • for resistance measurement with three-wire connection | | Yes |
| • for resistance measurement with four-wire connection | | Yes |
| **Errors/accuracies** | | |
| **Operational error limit in overall temperature range** | | |
| • Voltage, relative to input range, (+/-) | 0.9 % | 0.7 %; 0 to 10V |
| • Current, relative to input range, (+/-) | 0.8 % | |
| • Resistance, relative to input range, (+/-) | | 3.5 %; 10 kOhm |
| • Resistance thermometer, relative to input range, (+/-) | | 1 % |
| • Voltage, relative to output range, (+/-) | 0.6 % | 1 % |
| • Current, relative to output range, (+/-) | 1 % | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Analog modules

## SM 334 analog input/output modules

### Technical specifications (continued)

| Article number | 6ES7334-0CE01-0AA0 | 6ES7334-0KE00-0AB0 |
|---|---|---|
| | SIMATIC S7, ANALOG INPUT MODULE | SIMATIC S7-300, ANALOG MODULE |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to input range, (+/-) | 0.7 % | 0.5 %; 0 to 10V |
| • Current, relative to input range, (+/-) | 0.6 % | |
| • Resistance, relative to input range, (+/-) | | 2.8 %; 10 kOhm |
| • Resistance thermometer, relative to input range, (+/-) | | 0.8 % |
| • Voltage, relative to output range, (+/-) | 0.5 % | 0.85 % |
| • Current, relative to output range, (+/-) | 0.5 % | |
| **Interrupts/diagnostics/ status information** | | |
| Alarms | No | No |
| Diagnostic functions | No | No |
| **Potential separation** | | |
| **Potential separation analog inputs** | | |
| • between the channels and backplane bus | No | Yes |
| **Potential separation analog outputs** | | |
| • between the channels and backplane bus | No | Yes |
| **Isolation** | | |
| Isolation tested with | 500 V DC | 500 V DC |
| **Connection method** | | |
| required front connector | 20-pin | 20-pin |
| **Dimensions** | | |
| Width | 40 mm | 40 mm |
| Height | 125 mm | 125 mm |
| Depth | 117 mm | 117 mm |
| **Weights** | | |
| Weight, approx. | 285 g | 200 g |

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 334 analog input/output modules** | | **Label cover** | 6ES7392-2XY00-0AA0 |
| incl. Labeling strips, bus connector | | 10 units (spare part), for modules with 20-pin front connector | |
| 4 inputs, 2 outputs | **6ES7334-0CE01-0AA0** | **Labeling strips** | 6ES7392-2XX00-0AA0 |
| 4 inputs, 2 outputs, resistance measurement, Pt 100 | **6ES7334-0KE00-0AB0** | 10 units (spare part), for modules with 20-pin front connector | |
| **Front connector** | | **Labeling sheets for machine labeling** | |
| 20-pin, with screw contacts | | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| • 1 unit | **6ES7392-1AJ00-0AA0** | | |
| • 100 units | **6ES7392-1AJ00-1AB0** | Petrol | **6ES7392-2AX00-0AA0** |
| 20-pin, with spring-loaded terminals | | Light beige | **6ES7392-2BX00-0AA0** |
| • 1 unit | **6ES7392-1BJ00-0AA0** | Yellow | **6ES7392-2CX00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** | Red | **6ES7392-2DX00-0AA0** |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| e.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG wires | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC TOP connect** | See page 5/248 | | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | | |
| 1 unit (spare part) | | | |
| **Shield connecting element** | **6ES7390-5AA00-0AA0** | | |
| 80 mm wide, with 2 rows for 4 shield connection clamps each | | | |
| **Shield connection clamps** | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| 2 units | | Current "Manual Collection" DVD and the three subsequent updates | |
| For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** | | |
| For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** | | |
| For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** | | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 analog modules

## SIPLUS S7-300 SM 331

### ■ Overview



- Analog inputs
- For connecting voltage sensors and current sensors, thermocouples, resistors and resistance thermometers

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | 6AG1331-1KF02-7AB0 | 6AG1331-7KB02-2AB0 | 6AG1331-7KF02-2AB0 |
|---|---|---|---|
| Based on | 6ES7331-1KF02-0AB0 | 6ES7331-7KB02-0AB0 | 6ES7331-7KF02-0AB0 |
| | SIPLUS SM331 8AI | SIPLUS SM331 2AE | SIPLUS SM331 8AI |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies |
| **Ambient temperature during storage/transportation** | | | |
| • min. | | -40 °C | -40 °C |
| • max. | | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

■ **Technical specifications** (continued)

| Article number | **6AG1331-7NF00-2AB0** | **6AG1331-7NF10-2AB0** | **6AG1331-7PF01-4AB0** | **6AG1331-7PF11-4AB0** |
|---|---|---|---|---|
| Based on | **6ES7331-7NF00-0AB0** | **6ES7331-7NF10-0AB0** | **6ES7331-7PF01-0AB0** | **6ES7331-7PF11-0AB0** |
| | SIPLUS S7-300 SM331 8AI - 40pol | SIPLUS SM331 8AI - 40pol | SIPLUS SM331 8AI | SIPLUS S7-300 SM331 8AI 40pol |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | 0 °C; = Tmin | 0 °C; = Tmin |
| • max. | 70 °C; = Tmax; for use on railway vehicles according to EN 50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/UL hazardous use applies | 60 °C; = Tmax | 60 °C; = Tmax | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## SIPLUS S7-300 analog modules

**SIPLUS S7-300 SM 331**

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 331 analog input modules** | | **Accessories** | |
| *For industrial applications with extended ambient conditions* | | *Mandatory* | |
| | | **Front connector** | |
| Extended temperature range and exposure to media | | 20-pin, with spring-loaded contacts | |
| 8 inputs, 13-bit resolution | **6AG1331-1KF02-7AB0** | • 1 unit | **6ES7392-1BJ00-0AA0** |
| 2 inputs, 9/12/14-bit resolution | **6AG1331-7KB02-2AB0** | • 100 units | **6ES7392-1BJ00-1AB0** |
| 8 inputs, 9/12/14-bit resolution | **6AG1331-7KF02-2AB0** | 40-pin, with spring-loaded contacts | |
| 8 inputs, enhanced 16-bit resolution | **6AG1331-7NF00-2AB0** | • 1 unit | **6ES7392-1BM01-0AA0** |
| 8 inputs, enhanced 16-bit resolution, 4-channel mode | **6AG1331-7NF10-2AB0** | • 100 units | **6ES7392-1BM01-1AB0** |
| Exposure to media | | *Consumables* | |
| 8 inputs, for thermal resistors | **6AG1331-7PF01-4AB0** | **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| 8 inputs, for thermocouples | **6AG1331-7PF11-4AB0** | E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | |
| *For rolling stock railway applications* | | | |
| Conforms to EN 50155 | | **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 8 inputs, 9/12/14-bit resolution | **6AG1331-7KF02-2AB0** | 1 unit (spare part) | |
| 8 inputs, enhanced 16-bit resolution | **6AG1331-7NF00-2AB0** | **Labeling strips** | |
| | | 10 units; spare part | |
| | | For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| | | For modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| | | **Label cover** | |
| | | 10 units; spare part | |
| | | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| | | For modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| | | *Documentation* | |
| | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

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## Overview

- Analog outputs
- For connection of analog actuators

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

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## Technical specifications

| Article number | 6AG1332-5HD01-7AB0 | 6AG1332-7ND02-4AB0 | 6AG1332-5HB01-2AB0 | 6AG1332-5HF00-2AB0 |
|---|---|---|---|---|
| Based on | 6ES7332-5HD01-0AB0 | 6ES7332-7ND02-0AB0 | 6ES7332-5HB01-0AB0 | 6ES7332-5HF00-0AB0 |
| | SIPLUS S7-300 SM332 4AA U/I | SIPLUS S7-300 SM332 4AA | SIPLUS S7-300 SM332 2AO | SIPLUS S7-300 SM 332 8AO - 40pol |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C; = Tmin | 0 °C; = Tmin | -25 °C; = Tmin | -25 °C |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax | 70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 analog modules

**SIPLUS S7-300 SM 332**

## ■ Technical specifications (continued)

| Article number | **6AG1332-5HD01-7AB0** | **6AG1332-7ND02-4AB0** | **6AG1332-5HB01-2AB0** | **6AG1332-5HF00-2AB0** |
|---|---|---|---|---|
| Based on | **6ES7332-5HD01-0AB0** | **6ES7332-7ND02-0AB0** | **6ES7332-5HB01-0AB0** | **6ES7332-5HF00-0AB0** |
| | SIPLUS S7-300 SM332 4AA U/I | SIPLUS S7-300 SM332 4AA | SIPLUS S7-300 SM332 2AO | SIPLUS S7-300 SM 332 8AO - 40pol |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 332 analog output modules** | | *Consumables* | |
| *For industrial applications with extended ambient conditions* | | **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| <u>Extended temperature range and exposure to media</u> | | E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | |
| 2 outputs, 11/12-bit | **6AG1332-5HB01-2AB0** | | |
| 4 outputs, 11/12-bit | **6AG1332-5HD01-7AB0** | **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 8 outputs, 11/12-bit | **6AG1332-5HF00-2AB0** | 1 unit (spare part) | |
| <u>Exposure to media</u> | | **Labeling strips** | |
| 4 outputs, 16-bit; only medial exposure | **6AG1332-7ND02-4AB0** | 10 units; spare part | |
| | | For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| *For rolling stock railway applications* | | For modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| <u>Conforms to EN 50155</u> | | **Label cover** | |
| 2 outputs, 11/12-bit | **6AG1332-5HB01-2AB0** | 10 units; spare part | |
| **Accessories** | | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| *Mandatory* | | For modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| **Front connector** | | *Documentation* | |
| 20-pin, with spring-loaded contacts • 1 unit • 100 units | **6ES7392-1BJ00-0AA0** **6ES7392-1BJ00-1AB0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| 40-pin, with spring-loaded contacts • 1 unit • 100 units | **6ES7392-1BM01-0AA0** **6ES7392-1BM01-1AB0** | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |

## Overview



- Analog inputs and outputs
- For connection of analog sensors and actuators

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | **6AG1334-0KE00-7AB0** |
|---|---|
| Based on | **6ES7334-0KE00-0AB0** |
| | SIPLUS S7-300 SM334 4AE 2AA |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 analog modules

## SIPLUS S7-300 SM 334

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 334 analog input/output modules** | | **Bus connectors** | **6ES7390-0AA00-0AA0** |
| *For industrial applications with extended ambient conditions* | | 1 unit (spare part) | |
| | | **Labeling strips** | |
| Extended temperature range and exposure to media | | 10 units; spare part | |
| 4 inputs, 2 outputs; resistance measurement, Pt 100 | **6AG1334-0KE00-7AB0** | For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** |
| **Accessories** | | For modules with 40-pin front connector | **6ES7392-2XX10-0AA0** |
| *Mandatory* | | **Label cover** | |
| **Front connector** | | 10 units; spare part | |
| 20-pin, with spring-loaded contacts<br>• 1 unit<br>• 100 units | **6ES7392-1BJ00-0AA0**<br>**6ES7392-1BJ00-1AB0** | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| 40-pin, with spring-loaded contacts<br>• 1 unit<br>• 100 units | **6ES7392-1BM01-0AA0**<br>**6ES7392-1BM01-1AB0** | For modules with 40-pin front connector | **6ES7392-2XY10-0AA0** |
| *Consumables* | | *Documentation* | |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| E.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG conductors; circuit diagram and nameplates in petrol | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

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## Overview



- Digital inputs for the fail-safe SIMATIC S7 systems
- For connecting:
  - Switches and 2-wire proximity switches
  - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
  - Centrally: with S7-31xF-2 DP
  - Distributed in ET 200M: with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- In standard operation can be used in the same way as S7-300 modules

## Technical specifications

| Article number | **6ES7326-1RF01-0AB0** | **6ES7326-1BK02-0AB0** |
|---|---|---|
| | SM326, 8DE, DC24V, FAIL-SAFE | SM326, F-DI 24 X DC24V, FAIL-SAFE |
| **General information** | | |
| Product type designation | F-DI 8x24VDC Namur | |
| **Supply voltage** | | |
| Rated value (DC) | | 24 V |
| **Input current** | | |
| from load voltage L+ (without load), max. | 160 mA | 450 mA |
| from backplane bus 5 V DC, max. | 90 mA | 100 mA |
| **Encoder supply** | | |
| Number of outputs | 8 | 4; Isolated |
| Type of output voltage | 8.2 V DC | |
| **Output current** | | |
| • Rated value | | 400 mA |
| **Power loss** | | |
| Power loss, typ. | 4.5 W | 10 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 24 |
| **Number of simultaneously controllable inputs** | | |
| **all mounting positions** | | |
|   - up to 40 °C, max. | 8 | 24 |
|   - up to 60 °C, max. | 8 | 24; (at 24 V) or 18 (at 28.8 V) |
| **Input voltage** | | |
| • Type of input voltage | DC | DC |
| • Rated value (DC) | | 24 V |
| • for signal "0" | | -30 to +5V |
| • for signal "1" | | +11 to +30V |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 0.35 to 1.2 mA | 2 mA |
| • for signal "1", typ. | 2.1 to 7 mA | 10 mA |
| **Input delay (for rated value of input voltage)** | | |
| **for standard inputs** | | |
|   - at "0" to "1", max. | | 3.4 ms |
|   - at "1" to "0", max. | | 3.4 ms |
| **for NAMUR inputs** | | |
|   - at "0" to "1", max. | 1.2 to 3 ms | |
|   - at "1" to "0", max. | 1.2 to 3 ms | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
F digital/analog modules

## SM 326 F digital input modules - Safety Integrated

### ■ Technical specifications (continued)

| Article number | 6ES7326-1RF01-0AB0 | 6ES7326-1BK02-0AB0 |
|---|---|---|
| | SM326, 8DE, DC24V, FAIL-SAFE | SM326, F-DI 24 X DC24V, FAIL-SAFE |
| **Cable length** | | |
| • shielded, max. | 200 m | 200 m |
| • unshielded, max. | 100 m | 100 m |
| **Encoder** | | |
| **Connectable encoders** | | |
| • 2-wire sensor | | Yes; if short-circuit test is deactivated |
|   - permissible quiescent current (2-wire sensor), max. | | 2 mA |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes |
| **Diagnostic messages** | | |
| • Diagnostic information readable | | Yes |
| **Ex(i) characteristics** | | |
| Module for Ex(i) protection | Yes | |
| **Maximum values of input circuits (per channel)** | | |
| • Co (permissible external capacity), max. | 3 µF | |
| • Io (short-circuit current), max. | 13.9 mA | |
| • Lo (permissible external inductivity), max. | 80 mH | |
| • Po (power of load), max. | 33.1 mW | |
| • Uo (output no-load voltage), max. | 10 V | |
| • Um (fault voltage), max. | 60 V DC/30 V AC | |
| • Ta (permissible ambient temperature), max. | 60 °C | 60 °C |
| **Potential separation** | | |
| **Potential separation digital inputs** | | |
| • between the channels | Yes | Yes |
| • between the channels, in groups of | | 12 |
| • between the channels and backplane bus | Yes | Yes |
| • between the channels and the power supply of the electronics | Yes | |
| **Isolation** | | |
| Isolation tested with | | 500 V DC/350 V AC |
| **Highest safety class achievable in safety mode** | | |
| • acc. to DIN VDE 0801 | | AK 6 |
| • acc. to EN 954 | Cat. 4 | Cat. 4 |
| • SIL acc. to IEC 61508 | SIL 2 (single-channel), SIL 3 (two-channel) | SIL 3 |
| **Use in hazardous areas** | | |
| • Test number KEMA | 99 ATEX 2671 X | |
| **Connection method** | | |
| required front connector | 1x 40-pin | 40-pin |
| **Dimensions** | | |
| Width | 80 mm | 80 mm |
| Height | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm |
| **Weights** | | |
| Weight, approx. | 482 g | 442 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 326 F digital input module** | | **Active bus module** | **6ES7195-7HC00-0XA0** |
| 24 inputs, 24 V DC | **6ES7326-1BK02-0AB0** | BM 1 x 80 for 1 module with 80 mm width | |
| 8 inputs, 24 V DC, NAMUR | **6ES7326-1RF01-0AB0** | **SITOP power supply module** | **6ES7307-1EA01-0AA0** |
| **S7 Distributed Safety V5.4 programming tool** | | for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E | |
| Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | | **Front connectors** | |
| | | 40-pin, with screw contacts | |
| | | • 1 unit | **6ES7392-1AM00-0AA0** |
| | | • 100 units | **6ES7392-1AM00-1AB0** |
| | | 40-pin, with spring-loaded contacts | |
| Floating license | **6ES7833-1FC02-0YA5** | • 1 unit | **6ES7392-1BM01-0AA0** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** | • 100 units | **6ES7392-1BM01-1AB0** |
| | | **Front door, higher version, for F-modules** | **6ES7328-7AA10-0AA0** |
| **S7 Distributed Safety upgrade** | | For F-modules; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in yellow | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** | **Labeling strips** | **6ES7392-2XX20-0AA0** |
| **STEP 7 Safety Advanced V14 SP1** | | For F-modules (spare part); 10 units | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | | **Label cover** | **6ES7392-2XY20-0AA0** |
| | | For F-modules (spare part); 10 units | |
| | | **LK 393 cable guide** | **6ES7393-4AA10-0AA0** |
| | | For F-modules; L+ and M connections; 5 units | |
| | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** | | |
| **DIN rail for active bus modules** | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| for max. 5 active bus modules for hot swapping function | | Current "Manual Collection" DVD and the three subsequent updates | |
| • 483 mm (19") long | **6ES7195-1GA00-0XA0** | | |
| • 530 mm long | **6ES7195-1GF30-0XA0** | | |
| • 620 mm long | **6ES7195-1GG30-0XA0** | | |
| • 2000 mm long | **6ES7195-1GC00-0XA0** | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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# SIMATIC S7-300 Advanced Controllers
I/O modules
F digital/analog modules

## SM 326 F digital output modules - Safety Integrated

### ■ Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- Two versions (1 x current sourcing, 1 x current sinking)
- For connecting solenoid valves, DC contactors and indicator lights
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
  - Centrally: with S7-31xF DP, S7-31xF PN/DP
  - Distributed in ET 200M: with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-41xF-2 and S7-400F/FH

### ■ Technical specifications

| Article number | 6ES7326-2BF10-0AB0 | 6ES7326-2BF41-0AB0 |
|---|---|---|
| | SM326, F-DO10XDC24V/2A PP, FAIL-SAFE | SM 326, F-DO 8 X DC 24V/2A PM |
| **Supply voltage** | | |
| Rated value (DC) | 24 V; 1L+ | 24 V; 1L+ |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V; 2L+, 3L+ | 24 V; 2L+, 3L+ |
| **Input current** | | |
| from supply voltage 1L+, max. | 100 mA | 75 mA |
| from load voltage 2L+ (without load), max. | 100 mA | 100 mA |
| from load voltage 3L+ (without load), max. | 100 mA | 100 mA |
| from backplane bus 5 V DC, max. | 100 mA | 100 mA |
| **Power loss** | | |
| Power loss, typ. | 6 W | 12 W |
| **Digital outputs** | | |
| Number of digital outputs | 10 | 8 |
| Short-circuit protection | Yes | Yes |
| Limitation of inductive shutdown voltage to | | L+ (-33 V) |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | 5 W | 5 W |
| **Output voltage** | | |
| • for signal "1" without series diode, min. | | L+ (-1.0 V) |
| **Output current** | | |
| • for signal "1" rated value | 2 A | 2 A |
| • for signal "1" permissible range for 0 to 40 °C, min. | 7 mA | 7 mA |
| • for signal "1" permissible range for 0 to 40 °C, max. | 2.4 A | 2 A; 2 A for horizontal installation, 1 A for vertical installation |
| • for signal "1" permissible range for 40 to 60 °C, min. | 7 mA | 7 mA |
| • for signal "1" permissible range for 40 to 60 °C, max. | 2.4 A | 1 A; for horizontal installation |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA |
| **Switching frequency** | | |
| • with resistive load, max. | 25 Hz | 30 Hz |
| • with inductive load, max. | 25 Hz | 2 Hz |
| • on lamp load, max. | 10 Hz | 10 Hz |

## Technical specifications (continued)

| Article number | 6ES7326-2BF10-0AB0 | 6ES7326-2BF41-0AB0 |
|---|---|---|
| | SM326, F-DO10XDC24V/2A PP, FAIL-SAFE | SM 326, F-DO 8 X DC 24V/2A PM |
| **Total current of the outputs (per group)** | | |
| **horizontal installation** | | |
| - up to 40 °C, max. | 10 A | 7.5 A |
| - up to 60 °C, max. | 6 A | 5 A |
| **vertical installation** | | |
| - up to 40 °C, max. | 5 A | 5 A |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 200 m; 200 m for SIL3, AK 6, Cat 4 |
| • unshielded, max. | 600 m | 200 m |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes; Parameterizable |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| **Potential separation** | | |
| **Potential separation digital outputs** | | |
| • between the channels | Yes | Yes |
| • between the channels, in groups of | 5 | 4 |
| • between the channels and backplane bus | Yes | Yes |
| • between the channels and the power supply of the electronics | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 370V for 1 min | 500 V DC/350 V AC |
| **Highest safety class achievable in safety mode** | | |
| • acc. to DIN VDE 0801 | AK 5 and 6 | |
| • acc. to EN 954 | Cat. 4 | Cat. 4 |
| • SIL acc. to IEC 61508 | SIL 3 | SIL 3 |
| **Connection method** | | |
| required front connector | 40-pin | 40-pin |
| **Dimensions** | | |
| Width | 40 mm | 80 mm |
| Height | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm |
| **Weights** | | |
| Weight, approx. | 330 g | 465 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
F digital/analog modules

## SM 326 F digital output modules - Safety Integrated

### Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SM 326 F digital output module** | | | **Active bus modules** | |
| 10 outputs, 24 V DC, 2 A PP; width 40 mm | **6ES7326-2BF10-0AB0** | | BM 2 x 40 for accepting 2 I/O modules each 40 mm wide | **6ES7195-7HB00-0XA0** |
| 8 outputs, 24 V DC, 2 A PM; width 80 mm | **6ES7326-2BF41-0AB0** | | BM 1 x 80 for accepting 1 I/O module 80 mm wide | **6ES7195-7HC00-0XA0** |
| **S7 Distributed Safety V5.4 programming tool** | | | **SITOP power supply module** | **6ES7307-1EA01-0AA0** |
| Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | | | for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E | |
| | | | **Front connectors** | |
| | | | 40-pin, with screw contacts | |
| Floating license | **6ES7833-1FC02-0YA5** | | • 1 unit | **6ES7392-1AM00-0AA0** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** | | • 100 units | **6ES7392-1AM00-1AB0** |
| | | | 40-pin, with spring-loaded contacts | |
| | | | • 1 unit | **6ES7392-1BM01-0AA0** |
| **S7 Distributed Safety upgrade** | | | • 100 units | **6ES7392-1BM01-1AB0** |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** | | **Front door, higher version, for F-modules** | **6ES7328-7AA10-0AA0** |
| **STEP 7 Safety Advanced V14 SP1** | | | For F-modules; for connecting 1.3 mm$^2$/16 AWG wires; wiring diagram and labels in yellow | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | | | **Labeling strips** | **6ES7392-2XX20-0AA0** |
| | | | For F-modules (spare part), 10 units | |
| | | | **Label cover** | **6ES7392-2XY20-0AA0** |
| | | | For F-modules (spare part), 10 units | |
| | | | **LK 393 cable guide** | **6ES7393-4AA10-0AA0** |
| | | | For F-modules; L+ and M connections, 5 units | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **DIN rail for active bus modules** | | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| for max. 5 active bus modules, for function "Insertion and removal" | | | Current "Manual Collection" DVD and the three subsequent updates | |
| • 483 mm (19") long | **6ES7195-1GA00-0XA0** | | | |
| • 530 mm long | **6ES7195-1GF30-0XA0** | | | |
| • 620 mm long | **6ES7195-1GG30-0XA0** | | | |
| • 2000 mm long | **6ES7195-1GC00-0XA0** | | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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■ **Overview**



- Analog inputs for the fail-safe SIMATIC S7 systems
- Applicable in the ET 200M distributed I/O device with IM 153-2 HF as well as centrally with SIMATIC S7-31xF-2 DP
- Properties of the SM 336; F-AI 6 x 0/4 - 20 mA HART:
  - 6 analog inputs with galvanic isolation between channels and backplane bus
  - Input ranges: 0 to 20 mA, 4 to 20 mA
  - Short-circuit proof power supply from 2 or 4-wire transducer via the module
  - External encoder supply possible
  - Applicable in safety mode
  - HART communication
  - Firmware update using HW Config
  - Identification data

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■ **Technical specifications**

| Article number | 6ES7336-4GE00-0AB0 |
|---|---|
| | SM 336, F.AI 6 X 0/4 ... 20MA HART |
| **General information** | |
| Product type designation | SM 336 F-AI 6x0/4 to 20 mA HART |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Input current** | |
| From power supply L+, typ. | 150 mA |
| from backplane bus 5 V DC, max. | 90 mA |
| **Power loss** | |
| Power loss, typ. | 4.5 W |
| **Analog inputs** | |
| Number of analog inputs | 6 |
| permissible input current for current input (destruction limit), max. | 40 mA |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| **Analog value generation for the inputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit; 15 bit + sign |
| • Integration time (ms) | 20 ms @ 50 Hz, 16.7 ms @ 60 Hz |
| • Interference voltage suppression for interference frequency f1 in Hz | f=n x (f1+-0.5%) |
| **Encoder** | |
| **Connection of signal encoders** | |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |

| Article number | 6ES7336-4GE00-0AB0 |
|---|---|
| | SM 336, F.AI 6 X 0/4 ... 20MA HART |
| **Errors/accuracies** | |
| **Operational error limit in overall temperature range** | |
| • Current, relative to input range, (+/-) | 0.2 %; 40 µA |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to input range, (+/-) | 0.1 % |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| **Potential separation** | |
| **Potential separation analog inputs** | |
| • between the channels | Yes |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | Yes |
| **Isolation** | |
| Isolation tested with | 370V for 1 min |
| **Standards, approvals, certificates** | |
| **Highest safety class achievable in safety mode** | |
| • acc. to EN 954 | 4 |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Connection method** | |
| required front connector | 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 350 g |

# SIMATIC S7-300 Advanced Controllers
I/O modules
F digital/analog modules

## SM 336 F analog input modules - Safety Integrated

| Ordering data | Article No. |
|---|---|
| **SM 336 F analog input module** | |
| 6 inputs, 15 bit, 0/4 - 20 mA HART | **6ES7336-4GE00-0AB0** |
| **S7 Distributed Safety V5.4 programming tool** | |
| Task:<br>Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco<br>Requirement:<br>STEP 7 V5.3 SP3 and higher | |
| Floating license | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **S7 Distributed Safety upgrade** | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |
| **STEP 7 Safety Advanced V14 SP1** | |
| Task:<br>Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O<br>Requirement:<br>STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| **DIN rail for active bus modules** | |
| for max. 5 active bus modules for hot swapping function<br>• 483 mm long<br>• 530 mm long<br>• 620 mm long<br>• 2000 mm long | **6ES7195-1GA00-0XA0**<br>**6ES7195-1GF30-0XA0**<br>**6ES7195-1GG30-0XA0**<br>**6ES7195-1GC00-0XA0** |

| | Article No. |
|---|---|
| **Active bus module BM 2x40** | **6ES7195-7HB00-0XA0** |
| Bus module for accepting 2 I/O modules each 40 mm wide | |
| **SITOP power supply module** | **6ES7307-1EA01-0AA0** |
| for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E | |
| **Front connectors** | |
| 20-pin, with screw contacts<br>• 1 unit<br>• 100 units | <br>**6ES7392-1AJ00-0AA0**<br>**6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts<br>• 1 unit<br>• 100 units | <br>**6ES7392-1BJ00-0AA0**<br>**6ES7392-1BJ00-1AB0** |
| **Front door, higher version, for F-modules** | **6ES7328-7AA10-0AA0** |
| For F-modules; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in yellow | |
| **Labeling strips** | **6ES7392-2XX20-0AA0** |
| For F-modules (spare part), 10 units | |
| **Label cover** | **6ES7392-2XY20-0AA0** |
| For F-modules (spare part), 10 units | |
| **LK 393 cable guide** | **6ES7393-4AA10-0AA0** |
| For F-modules; L+ and M connections, 5 units | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## ■ Overview



- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M when Cat. 4 or SIL 3 has to be achieved.
- The isolation module is not required if the safety class or safety category to be achieved is less than SIL 3 or Cat. 4, respectively.

When Cat. 4/SIL 3 is required, the isolation module must be implemented in the following situations:

| Application | Isolation module must be used |
|---|---|
| **Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP** | |
| • Only F-modules in the tier | Yes, behind the CPU |
| • Standard and F-modules in the tier | Yes, after the last standard module and before the first F-module |
| **Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack** | |
| • Only F-modules in the tier | Yes, after the IM 36x |
| • Standard and F-modules in the tier | Yes, after the last standard module and before the first F-module |
| **Distributed behind the IM 153-2 with copper connection** | |
| • Only F-modules in the station | Yes, after the IM 153-2 |
| • Standard and F-modules in the station | Yes, after the last standard module and before the first F-module |
| **Distributed behind the IM 153-2 with fiber-optic connection** | |
| • Only F-modules in the station | No |
| • Standard and F-modules in the station | Yes, after the last standard module and before the first F-module |

## ■ Technical specifications

| Article number | **6ES7195-7KF00-0XA0** |
|---|---|
| | ISOLATION MODULE BETW. F- AND STD-MOD. |
| **Weights** | |
| Weight, approx. | 10 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **Isolation module** | **6ES7195-7KF00-0XA0** |
| For simultaneous operation of fail-safe and standard modules in the same ET 200M | |
| **Bus isolation module** | **6ES7195-7HG00-0XA0** |
| For holding the isolation module in an ET 200M | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 F digital/analog modules

**SIPLUS S7-300 SM 326 - Safety Integrated**

## ■ Overview



- Digital inputs for the fail-safe SIPLUS S7 systems
- For connecting:
  - Switches and 2-wire proximity switches
  - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- In standard operation can be used in the same way as S7-300 modules

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## ■ Technical specifications

| Article number | 6AG1326-1BK02-2AB0 | 6AG1326-1BK02-2AY0 | 6AG1326-1RF01-4AB0 |
|---|---|---|---|
| Based on | 6ES7326-1BK02-0AB0 | 6ES7326-1BK02-0AB0 | 6ES7326-1RF01-0AB0 |
| | SIPLUS S7-300 SM326F DI24 | SIPLUS S7-300 SM326F DI24 | SIPLUS S7-300 SM326F DI8 NAMUR |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | 0 °C; = Tmin |
| • max. | 60 °C; = Tmax; *+70 °C where forced convection with a minimum air velocity of 0.7 m/s through the modules and rated voltage of 24 V ±5 % are ensured. If in the course of maintenance or automatic diagnosis it is determined that the admissible specified parameters have been exceeded, the modules should be subjected to a proof test (function check) by the manufacturer. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 60 °C; = Tmax |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 326 F digital input** | | *Programming tools and documentation* | |
| *For industrial applications with extended ambient conditions* | | **S7 Distributed Safety programming tool V5.4** | |
| <u>Extended temperature range and exposure to media</u> | | Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco | |
| 24 inputs, 24 V DC, fail-safe, with diagnostics interrupt | **6AG1326-1BK02-2AB0** | Requirement: STEP 7 V5.3 SP3 and higher | |
| 8 inputs, 24 V DC, NAMUR, fail-safe | **6AG1326-1RF01-4AB0** | Floating license | **6ES7833-1FC02-0YA5** |
| *For rolling stock railway applications* | | Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| <u>Conforms to EN 50155</u> | | **S7 Distributed Safety upgrade** | |
| 24 inputs, 24 V DC, fail-safe, with diagnostics interrupt | **6AG1326-1BK02-2AY0** | From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |
| **Accessories** | | **STEP 7 Safety Advanced V14 SP1** | |
| *Mandatory* | | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | |
| **Front connector** | | Requirement: STEP 7 Professional V14 SP1 | |
| 40-pin, with spring-loaded contacts | | | |
| • 1 unit | **6ES7392-1BM01-0AA0** | | |
| • 100 units | **6ES7392-1BM01-1AB0** | | |
| *Accessories for hot swapping function* | | Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| **Active bus module** | | | |
| BM 1 x 80 for 1 module, 80 mm wide | **6AG1195-7HC00-2XA0** | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| *Consumables* | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| **DIN rail for active bus modules** | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| For max. 5 active bus modules for hot swapping function | | | |
| • Length 483 mm (19") | **6ES7195-1GA00-0XA0** | | |
| • Length 530 mm | **6ES7195-1GF30-0XA0** | | |
| • Length 620 mm | **6ES7195-1GG30-0XA0** | | |
| • Length 2000 mm | **6ES7195-1GC00-0XA0** | | |
| **Front door, elevated design, for F-modules** | **6ES7328-7AA10-0AA0** | | |
| For F-modules; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in yellow | | | |
| **Labeling strips** | **6ES7392-2XX20-0AA0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| For F-modules (spare part); 10 units | | Current "Manual Collection" DVD and the three subsequent updates | |
| **Label cover** | **6ES7392-2XY20-0AA0** | | |
| For F-modules (spare part); 10 units | | | |
| **LK 393 cable guide** | **6ES7393-4AA10-0AA0** | | |
| For F-modules; L+ and M connections; 5 units | | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 F digital/analog modules

**SIPLUS S7-300 SM 326 - Safety Integrated**

## Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- For connection of solenoid valves, DC contactors and indicator lights
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | **6AG1326-2BF10-2AB0** | **6AG1326-2BF10-2AY0** | **6AG1326-2BF41-2AB0** | **6AG1326-2BF41-2AY0** |
|---|---|---|---|---|
| Based on | **6ES7326-2BF10-0AB0** | **6ES7326-2BF10-0AB0** | **6ES7326-2BF41-0AB0** | **6ES7326-2BF41-0AB0** |
| | SIPLUS S7-300 SM326F 10 DO | SIPLUS S7-300 SM326 10F-DO | SIPLUS S7-300 SM326F DO8 | SIPLUS S7-300 SM326 F DO8 EN50155 |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -25 °C | -25 °C; = Tmin | -25 °C | -25 °C; = Tmin |
| • max. | 60 °C; = T max; *+70 °C when forced convection at a minimum air speed of 0.3 m/s through the modules is ensured. If in the course of maintenance or automatic diagnosis it is determined that the admissible specified parameters have been exceeded, the modules should be subjected to a proof test (function check) by the manufacturer. | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 60 °C | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | |

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## Ordering data

| | Article No. |
|---|---|
| **SIPLUS S7-300 SM 326 F digital output** | |
| *For industrial applications with extended ambient conditions* | |
| <u>Extended temperature range and exposure to media</u> | |
| 10 outputs, 24 V DC, 2 A, fail-safe | **6AG1326-2BF10-2AB0** |
| 8 outputs, 24 V DC, 2 A, fail-safe, source-sinking output | **6AG1326-2BF41-2AB0** |
| *For rolling stock railway applications* | |
| <u>Conforms to EN 50155</u> | |
| 10 outputs, 24 V DC, 2 A, fail-safe | **6AG1326-2BF10-2AY0** |
| 8 outputs, 24 V DC, 2 A, fail-safe, source-sinking output | **6AG1326-2BF41-2AY0** |
| **Accessories** | |
| *Mandatory* | |
| **Front connector** | |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| *Accessories for hot swapping function* | |
| **Active bus module** | |
| BM 2 x 40 for accepting 2 I/O modules each 40 mm wide | **6AG1195-7HB00-7XA0** |
| BM 1 x 80 for 1 module, 80 mm wide | **6AG1195-7HC00-2XA0** |
| *Consumables* | |
| **DIN rail for active bus modules** | |
| For max. 5 active bus modules for hot swapping function | |
| • Length 483 mm (19") | **6ES7195-1GA00-0XA0** |
| • Length 530 mm | **6ES7195-1GF30-0XA0** |
| • Length 620 mm | **6ES7195-1GG30-0XA0** |
| • Length 2000 mm | **6ES7195-1GC00-0XA0** |
| **Front door, elevated design, for F-modules** | **6ES7328-7AA10-0AA0** |
| For F-modules; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in yellow | |
| **Labeling strips** | **6ES7392-2XX20-0AA0** |
| For F-modules (spare part); 10 units | |
| **Label cover** | **6ES7392-2XY20-0AA0** |
| For F-modules (spare part); 10 units | |
| **LK 393 cable guide** | **6ES7393-4AA10-0AA0** |
| For F-modules; L+ and M connections; 5 units | |

| | Article No. |
|---|---|
| *Programming tools and documentation* | |
| **S7 Distributed Safety programming tool V5.4** | |
| Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco | |
| Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **S7 Distributed Safety upgrade** | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | |
| Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 F digital/analog modules

## SIPLUS S7-300 SM 336 - Safety Integrated

■ **Overview**



- Analog inputs for fail-safe SIPLUS S7 systems
- Applicable in the ET 200M distributed I/O device with IM 153-2 HF as well as centrally with SIPLUS S7-31xF-2 DP
- Properties of the SM 336; F-AI 6 x 0/4 ... 20 mA HART:
  - 6 analog inputs with galvanic isolation between channels and backplane bus
  - Input ranges: 0 mA to 20 mA, 4 mA to 20 mA
  - Short-circuit proof power supply of 2 or 4-wire transmitter via the module
  - External encoder supply possible
  - Applicable in safety mode
  - HART communication
  - Firmware update using HW Config
  - Identification data
  - Temperature range -25 ... +70 °C;
    (+70 °C when ensuring a forced convection with a minimal air velocity of 0.3 m/s through the module. If a violation of the permissible, specified parameters is detected during maintenance or by automatic diagnostics, the modules must be proof-tested by the manufacturer. Without this measure the temperature range is -25...60 °C)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

■ **Technical specifications**

| Article number | 6AG1336-4GE00-2AB0 |
|---|---|
| Based on | 6ES7336-4GE00-0AB0 |
| | SIPLUS S7-300 SM336 F 6AI 15BIT |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin; Startup @ -25 °C |
| • max. | 60 °C; = T max; *+70 °C when forced convection at a minimum air speed of 0.3 m/s through the modules is ensured. If in the course of maintenance or automatic diagnosis it is determined that the admissible specified parameters have been exceeded, the modules should be subjected to a proof test (function check) by the manufacturer. |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| • At cold restart, min. | -25 °C |

| Article number | 6AG1336-4GE00-2AB0 |
|---|---|
| Based on | 6ES7336-4GE00-0AB0 |
| | SIPLUS S7-300 SM336 F 6AI 15BIT |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; incl. condensation / frost permitted (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust The supplied connector covers must remain on the unused interfaces during operation! |

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 SM 336 F analog input module** | | *Programming tools and documentation* | |
| *For industrial applications with extended ambient conditions* | | **S7 Distributed Safety programming tool V5.4** | |
| Extended temperature range and exposure to media | | Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco | |
| 6 inputs, 15 bit, 0/4 - 20 mA HART | 6AG1336-4GE00-2AB0 | Requirement: STEP 7 V5.3 SP3 and higher | |
| **Accessories** | | Floating license | 6ES7833-1FC02-0YA5 |
| *Mandatory* | | Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | 6ES7833-1FC02-0YH5 |
| **Front connector** | | | |
| 20-pin, with spring-loaded contacts | | **S7 Distributed Safety upgrade** | |
| • 1 unit | 6ES7392-1BJ00-0AA0 | From V5.x to V5.4; floating license for 1 user | 6ES7833-1FC02-0YE5 |
| • 100 units | 6ES7392-1BJ00-1AB0 | **STEP 7 Safety Advanced V14 SP1** | |
| *Accessories for hot swapping function* | | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | |
| **Active bus module** | | | |
| BM 2 x 40 for accepting 2 I/O modules, each 40 mm wide | 6AG1195-7HB00-7XA0 | | |
| *Consumables* | | Requirement: STEP 7 Professional V14 SP1 | |
| **DIN rail for active bus modules** | | | |
| For max. 5 active bus modules for hot swapping function | | Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| • Length 483 mm (19") | 6ES7195-1GA00-0XA0 | | |
| • Length 530 mm | 6ES7195-1GF30-0XA0 | Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| • Length 620 mm | 6ES7195-1GG30-0XA0 | | |
| • Length 2000 mm | 6ES7195-1GC00-0XA0 | | |
| **Front door, elevated design, for F-modules** | 6ES7328-7AA10-0AA0 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| For F-modules; for connecting 1.3 mm²/16 AWG wires; wiring diagram and labels in yellow | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **Labeling strips** | 6ES7392-2XX20-0AA0 | | |
| For F-modules (spare part); 10 units | | | |
| **Label cover** | 6ES7392-2XY20-0AA0 | | |
| For F-modules (spare part); 10 units | | | |
| **LK 393 cable guide** | 6ES7393-4AA10-0AA0 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| For F-modules; L+ and M connections; 5 units | | Current "Manual Collection" DVD and the three subsequent updates | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 F digital/analog modules

## SIPLUS S7-300 isolation module

■ **Overview**



- Permits combined operation of fail-safe signal modules in safety mode and standard S7-300 modules in the same ET 200M system.
- The isolation module is not required if the safety class SIL 3 or safety category < Cat. 4 is to be achieved.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

■ **Technical specifications**

| Article number | 6AG1195-7KF00-2XA0 |
| --- | --- |
| Based on | 6ES7195-7KF00-0XA0 |
| | SIPLUS S7-300 ISOLATION MODULE |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| UL approval | Yes; File E239877 |
| FM approval | Yes; CofC 3028431 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |

| Article number | 6AG1195-7KF00-2XA0 |
| --- | --- |
| Based on | 6ES7195-7KF00-0XA0 |
| | SIPLUS S7-300 ISOLATION MODULE |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes |

■ **Ordering data**

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **SIPLUS F isolation module** | | **Accessories** | |
| for simultaneous operation of fail-safe and standard modules in the same ET 200M | | **SIPLUS ET 200M bus safety protector F** | |
| *For industrial applications with extended ambient conditions* | | For the simultaneous operation of fail-safe and standard modules in an ET200 M for the hot swapping function | |
| Extended temperature range and exposure to media | 6AG1195-7KF00-2XA0 | Extended temperature range and exposure to media | 6AG1195-7HG00-2XA0 |

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## Overview



- Digital inputs for signals from the Ex field
- For the connection of intrinsically safe digital equipment from the Ex field
- 4 DI NAMUR
- 4 digital inputs in 4 channel modules (single-channel isolation)
- Connectable encoder in accordance with EN 60947-5-6 and NAMUR, optionally with wired or unwired mechanical contacts
- Diagnostics and diagnostics alarm programmable

## Technical specifications

| Article number | 6ES7321-7RD00-0AB0 |
|---|---|
| | SM321, 4DI, DC24V, HAZARDOUS AREAS |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| from load voltage L+ (without load), max. | 50 mA |
| from backplane bus 5 V DC, max. | 80 mA |
| **Encoder supply** | |
| Type of output voltage | via the inputs |
| **Power loss** | |
| Power loss, typ. | 1.1 W |
| **Digital inputs** | |
| Number of NAMUR inputs | 4 |
| **Input voltage** | |
| • Rated value (DC) | 8.2 V; from internal power circuit supply |
| **Input current** | |
| • on wire-break, max. | 0.1 mA |
| • on short-circuit, max. | 8.5 mA |
| **for NAMUR encoders** | |
| - for signal "0" | 0.35 to 1.2 mA |
| - for signal "1" | 2.1 to 7 mA |
| **Input delay (for rated value of input voltage)** | |
| • Input frequency (with a time delay of 0.1 ms), max. | 2 kHz |
| **for NAMUR inputs** | |
| - Parameterizable | Yes; 0.1 / 0.5 / 3 / 15 / 20 ms (plus 0.25 ms preparation time) |
| **Cable length** | |
| • unshielded, max. | 200 m |
| **Encoder** | |
| **Connectable encoders** | |
| • NAMUR encoder | Yes; Two-wire connection |

| Article number | 6ES7321-7RD00-0AB0 |
|---|---|
| | SM321, 4DI, DC24V, HAZARDOUS AREAS |
| **Interrupts/diagnostics/ status information** | |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| **Ex(i) characteristics** | |
| **Maximum values of input circuits (per channel)** | |
| • Co (permissible external capacity), max. | 3 µF |
| • Io (short-circuit current), max. | 14.1 mA |
| • Lo (permissible external inductivity), max. | 100 mH |
| • Po (power of load), max. | 33.7 mW |
| • Uo (output no-load voltage), max. | 10 V |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | Yes |
| • between the channels, in groups of | 1 |
| **Standards, approvals, certificates** | |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC |
| • Type of protection acc. to FM | Class II, Division 2, Group A, B, C, D T4 |
| • Test number PTB | Ex-96.D.2094X |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • max. | 60 °C |
| **Connection method** | |
| required front connector | 20-pin |
| **Weights** | |
| Weight, approx. | 230 g |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Ex digital modules

## Ex digital input modules

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Ex digital input module** | | **Labeling sheets for machine inscription** | |
| 4 inputs, isolated, NAMUR | **6ES7321-7RD00-0AB0** | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| **Front connector** | | Petrol | **6ES7392-2AX00-0AA0** |
| 20-pin, with screw contacts | | Light beige | **6ES7392-2BX00-0AA0** |
| • 1 unit | **6ES7392-1AJ00-0AA0** | Yellow | **6ES7392-2CX00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** | Red | **6ES7392-2DX00-0AA0** |
| **Front door, elevated design** | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| e.g. for 32 channel modules; enables connection of 1.3 mm$^2$/16 AWG wires | **6ES7328-0AA00-7AA0** | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **LK 393 cable guide** | **6ES7393-4AA00-0AA0** | | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |
| **Label cover** | **6ES7392-2XY00-0AA0** | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| 10 units (spare part), for modules with 20-pin front connector | | Current "Manual Collection" DVD and the three subsequent updates | |

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## Overview



- Digital outputs for signals from the Ex field
- For the connection of intrinsically safe digital equipment from the Ex field
- 4 DO 24 V DC/10mA or 4 DO 15 V DC/20 mA
- 4 digital outputs in 4 channel modules (single-channel isolation)
- Diagnostics and diagnostics alarm programmable
- Substitute value behavior programmable

## Technical specifications

| Article number | 6ES7322-5SD00-0AB0 | 6ES7322-5RD00-0AB0 |
|---|---|---|
| | SM322, 4DO, 15V DC,10MA, HAZARDOUS AREAS | SM322, 4DO, 15V DC,20MA, HAZARDOUS AREAS |
| **Supply voltage** | | |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| **Input current** | | |
| from load voltage L+ (without load), max. | 160 mA | 160 mA |
| from backplane bus 5 V DC, max. | 85 mA | 85 mA |
| **Power loss** | | |
| Power loss, typ. | 3 W | 3 W |
| **Digital outputs** | | |
| Number of digital outputs | 4 | 4 |
| Short-circuit protection | Yes; Electronic | Yes; Electronic |
| • Response threshold, typ. | Output current with short-circuit protection, min. 10 mA + 10 % | Output current with short-circuit protection, min. 20.5 mA + 10 % |
| **Load resistance range** | | |
| • upper limit | 390 Ω; Two-wire connection | 200 Ω; Two-wire connection |
| **Output voltage** | | |
| • Rated value (DC) | 24 V | 15 V |
| **Output current** | | |
| • for signal "1" permissible range for 0 to 60 °C, max. | 10 mA; +/-10 % | 20 mA; +/-10 % |
| **Switching frequency** | | |
| • with resistive load, max. | 100 Hz | 100 Hz |
| **Cable length** | | |
| • unshielded, max. | 200 m | 200 m |
| **Interrupts/diagnostics/ status information** | | |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Short-circuit | Yes | Yes |
| **Ex(i) characteristics** | | |
| **Maximum values of output circuits (per channel)** | | |
| • Co (permissible external capacity), max. | 90 nF | 500 nF |
| • Io (short-circuit current), max. | 70 mA | 85 mA |
| • Lo (permissible external inductivity), max. | 6.7 mH | 5 mH |
| • Po (power of load), max. | 440 mW | 335 mW |
| • Uo (output no-load voltage), max. | 25.2 V | 15.75 V |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Ex digital modules

**Ex digital output modules**

## Technical specifications (continued)

| Article number | 6ES7322-5SD00-0AB0 | 6ES7322-5RD00-0AB0 |
|---|---|---|
| | SM322, 4DO, 15V DC,10MA, HAZARDOUS AREAS | SM322, 4DO, 15V DC,20MA, HAZARDOUS AREAS |
| **Potential separation** | | |
| **Potential separation digital outputs** | | |
| • Potential separation digital outputs | Yes | Yes |
| • between the channels, in groups of | 1 | 1 |
| **Standards, approvals, certificates** | | |
| **Use in hazardous areas** | | |
| • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC | [EEx ib] IIC |
| • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4 | AIS CL.1, DIV 1, GP A, B, C, D; CL.I, DIV 2, GP A, B, C, D T4 |
| • Test number PTB | Ex-96.D.2093X | Ex-96.D.2102X |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • max. | 60 °C | 60 °C |
| **Connection method** | | |
| required front connector | 20-pin | 20-pin |
| **Weights** | | |
| Weight, approx. | 230 g | 230 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Ex digital output modules** | | **Labeling sheets for machine inscription** | |
| 4 outputs, isolated, 24 V DC, 10 mA | **6ES7322-5SD00-0AB0** | for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| 4 outputs, isolated, 15 V DC, 20 mA | **6ES7322-5RD00-0AB0** | Petrol | **6ES7392-2AX00-0AA0** |
| **Front connector** | | Light beige | **6ES7392-2BX00-0AA0** |
| 20-pin, with screw contacts | | Yellow | **6ES7392-2CX00-0AA0** |
| • 1 unit | **6ES7392-1AJ00-0AA0** | Red | **6ES7392-2DX00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| **Front door, elevated design** | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| e.g. for 32 channel modules; enables connection of 1.3 mm$^2$/16 AWG wires | **6ES7328-0AA00-7AA0** | | |
| **LK 393 cable guide** | **6ES7393-4AA00-0AA0** | | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |
| **Label cover** | **6ES7392-2XY00-0AA0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| 10 units (spare part), for modules with 20-pin front connector | | Current "Manual Collection" DVD and the three subsequent updates | |

## Overview

- Digital inputs for signals from the Ex field
- For the connection of intrinsically safe digital equipment from the Ex field
- 4 DI NAMUR
- 4 digital inputs in 4 channel modules (single-channel isolation)
- Connectable encoder in accordance with EN 60947-5-6 and NAMUR, optionally with wired or unwired mechanical contacts
- Programmable diagnostics and diagnostic interrupt

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | 6AG1321-7RD00-4AB0 |
|---|---|
| Based on | 6ES7321-7RD00-0AB0 |
| | SIPLUS S7-300 SM 321 4DI NAMUR |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C; = Tmin |
| • max. | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |

| Article number | 6AG1321-7RD00-4AB0 |
|---|---|
| Based on | 6ES7321-7RD00-0AB0 |
| | SIPLUS S7-300 SM 321 4DI NAMUR |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 Ex digital modules

## SIPLUS S7-300 Ex digital input modules

**■ Ordering data** | Article No. | | Article No.
---|---|---|---

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 Ex digital input module** | | **Label cover** | 6ES7392-2XY00-0AA0 |
| <u>Exposure to media</u> | | 10 units (spare part), for modules with 20-pin front connector | |
| 4 inputs, isolated, NAMUR | **6AG1321-7RD00-4AB0** | **Labeling sheets for machine inscription** | |
| **Accessories** | | For modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| *Mandatory* | | | |
| **Front connector** | | | |
| 20-pin, with spring-loaded contacts | | Petrol | **6ES7392-2AX00-0AA0** |
| • 1 unit | **6ES7392-1BJ00-0AA0** | Light beige | **6ES7392-2BX00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** | Yellow | **6ES7392-2CX00-0AA0** |
| *Consumables* | | Red | **6ES7392-2DX00-0AA0** |
| **DIN rail for active bus modules** | | *Documentation* | |
| For max. 5 active bus modules for hot swapping function | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| • Length 483 mm (19") | **6ES7195-1GA00-0XA0** | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| • Length 530 mm | **6ES7195-1GF30-0XA0** | | |
| • Length 620 mm | **6ES7195-1GG30-0XA0** | | |
| • Length 2000 mm | **6ES7195-1GC00-0XA0** | | |
| **Front door, elevated design** | 6ES7328-0AA00-7AA0 | | |
| E.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG conductors; circuit diagram and nameplates in petrol | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **LK 393 cable guide** | 6ES7393-4AA00-0AA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | 6ES7392-2XX00-0AA0 | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |

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## Overview



- Analog inputs for signals from the Ex field
- For the connection of intrinsically safe analog equipment from the Ex field
- 8 or 4 analog inputs in 4 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Diagnostics and diagnostics alarm programmable
- Programmable threshold alarm
- HART-compatible inputs (only 6ES7331-7RD00-0AB0)

## Technical specifications

| Article number | 6ES7331-7RD00-0AB0 | 6ES7331-7SF00-0AB0 |
|---|---|---|
| | SIMATIC S7, SM 331 ANALOG INPUT | SIMATIC S7, SM 331 ANALOG INPUT |
| **Supply voltage** | | |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| **Input current** | | |
| from load voltage L+ (without load), max. | 250 mA | |
| from backplane bus 5 V DC, max. | 60 mA | 120 mA |
| **Output voltage** | | |
| **Power supply to the transmitters** | | |
| • Rated value (DC) | 13 V; at 22 mA | |
| • No-load voltage (DC) | 25.2 V | |
| **Power loss** | | |
| Power loss, typ. | 3 W | 0.6 W |
| **Analog inputs** | | |
| Number of analog inputs | 4 | 8; 8x thermocouples; 4x RTD thermoresistors |
| permissible input current for current input (destruction limit), max. | 40 mA | |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes | |
| • 4 mA to 20 mA | Yes | |
| **Input ranges (rated values), thermocouples** | | |
| • Type B | | Yes |
| • Type E | | Yes |
| • Type J | | Yes |
| • Type K | | Yes |
| • Type L | | Yes |
| • Type N | | Yes |
| • Type R | | Yes |
| • Type S | | Yes |
| • Type T | | Yes |
| • Type U | | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Ex analog modules

**Ex analog input modules**

■ **Technical specifications** (continued)

| Article number | 6ES7331-7RD00-0AB0 | 6ES7331-7SF00-0AB0 |
|---|---|---|
| | SIMATIC S7, SM 331 ANALOG INPUT | SIMATIC S7, SM 331 ANALOG INPUT |
| **Input ranges (rated values), resistance thermometer** | | |
| • Ni 100 | | Yes |
| • Pt 100 | | Yes |
| • Pt 200 | | Yes |
| **Cable length** | | |
| • shielded, max. | 200 m | 200 m; TC: 50 m |
| **Analog value generation for the inputs** | | |
| Measurement principle | Sigma Delta | Sigma Delta |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 16 bit; 10 bit to 15 bit + sign | 16 bit; 10 bit to 15 bit + sign |
| • Integration time, parameterizable | Yes; 2.5 to 100 ms | Yes; 2.5 to 100 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 10 to 400 Hz | 10 to 400 Hz |
| **Encoder** | | |
| **Connection of signal encoders** | | |
| • for current measurement as 2-wire transducer | Yes | Yes |
| • for current measurement as 4-wire transducer | Yes | Yes |
| **Errors/accuracies** | | |
| Temperature error (relative to input range), (+/-) | | 0.001 %/K; Temperature error: 0.001 to 0.002 %/K |
| **Operational error limit in overall temperature range** | | |
| • Current, relative to input range, (+/-) | 0.45 % | |
| • Resistance thermometer, relative to input range, (+/-) | | 0.04 %; 0.09 to 0.04% |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Current, relative to input range, (+/-) | 0.1 % | |
| • Resistance thermometer, relative to input range, (+/-) | | 0.008 %; 0.018 ... 0.008% |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 60 dB | 60 dB |
| • Common mode interference, min. | 130 dB | 130 dB |
| **Interrupts/diagnostics/ status information** | | |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Overrange | Yes | Yes |
| • Wire-break in signal transmitter cable | Yes | Yes |
| • Short-circuit of the signal encoder cable | Yes | Yes |
| **Ex(i) characteristics** | | |
| **Maximum values of input circuits (per channel)** | | |
| • Co (permissible external capacity), max. | 90 nF | 43 µF |
| • Io (short-circuit current), max. | 68.5 mA | 28.8 mA |
| • Lo (permissible external inductivity), max. | 7.5 mH | 40 mH |
| • Po (power of load), max. | 431 mW | 41.4 mW |
| • Ri, max. | 50 Ω | |
| • Uo (output no-load voltage), max. | 25.2 V | 5.9 V |

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## Technical specifications (continued)

| Article number | 6ES7331-7RD00-0AB0 | 6ES7331-7SF00-0AB0 |
|---|---|---|
| | SIMATIC S7, SM 331 ANALOG INPUT | SIMATIC S7, SM 331 ANALOG INPUT |
| **Potential separation** | | |
| **Potential separation analog inputs** | | |
| • Potential separation analog inputs | Yes | Yes |
| **Permissible potential difference** | | |
| between the inputs (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area |
| Between the inputs and MANA (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area |
| **Use in hazardous areas** | | |
| • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC | [EEx ib] IIC |
| • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4 | Class I, Division 2, Group A, B, C, D T4 |
| • Test number PTB | Ex-96.D.2092X | Ex-96.D.2108X |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • max. | 60 °C | 60 °C |
| **Connection method** | | |
| required front connector | 20-pin | 20-pin |
| **Weights** | | |
| Weight, approx. | 290 g | 210 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Ex analog input modules** | | **Labeling sheets for machine inscription** | |
| 4 inputs, isolated, 0/4 to 20 mA, 15 bit | **6ES7331-7RD00-0AB0** | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| 8/4 inputs, isolated, for thermocouples and Pt100, Pt200, Ni100 | **6ES7331-7SF00-0AB0** | Petrol | **6ES7392-2AX00-0AA0** |
| **Front connector** | | Light beige | **6ES7392-2BX00-0AA0** |
| 20-pin, with screw contacts | | Yellow | **6ES7392-2CX00-0AA0** |
| • 1 unit | **6ES7392-1AJ00-0AA0** | Red | **6ES7392-2DX00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **Front door, elevated design** | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| e.g. for 32 channel modules; enables connection of 1.3 mm²/16 AWG wires | **6ES7328-0AA00-7AA0** | | |
| **LK 393 cable guide** | 6ES7393-4AA00-0AA0 | | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | 6ES7392-2XX00-0AA0 | | |
| 10 units (spare part), for modules with 20-pin front connector | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Label cover** | 6ES7392-2XY00-0AA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| 10 units (spare part), for modules with 20-pin front connector | | | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Ex analog modules

## Ex analog output modules

### ■ Overview



- Analog outputs for signals from the Ex field
- For the connection of intrinsically safe analog equipment from the Ex field
- 4 analog outputs in 4 channel modules (single-channel isolation)
- Diagnostics and diagnostics alarm programmable

### ■ Technical specifications

| Article number | 6ES7332-5RD00-0AB0 |
| --- | --- |
| | SIMATIC S7,SM 332 ANALOG OUTPUT |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| from load voltage L+ (without load), max. | 200 mA |
| from backplane bus 5 V DC, max. | 80 mA |
| **Power loss** | |
| Power loss, typ. | 4 W |
| **Analog outputs** | |
| Number of analog outputs | 4 |
| Voltage output, short-circuit protection | Yes |
| Voltage output, short-circuit current, max. | 70 mA |
| Current output, no-load voltage, max. | 14 V |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with current outputs, max. | 500 Ω |
| **Cable length** | |
| • shielded, max. | 200 m |

| Article number | 6ES7332-5RD00-0AB0 |
| --- | --- |
| | SIMATIC S7,SM 332 ANALOG OUTPUT |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 15 bit |
| • Basic conversion time (ms) | 2.5 ms |
| **Errors/accuracies** | |
| **Operational error limit in overall temperature range** | |
| • Current, relative to output range, (+/-) | 0.55 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to output range, (+/-) | 0.2 % |
| **Interrupts/diagnostics/ status information** | |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Overrange | Yes |
| • Wire-break in actuator cable | Yes |
| **Ex(i) characteristics** | |
| **Maximum values of output circuits (per channel)** | |
| • Co (permissible external capacity), max. | 850 nF |
| • Io (short-circuit current), max. | 70 mA |
| • Lo (permissible external inductivity), max. | 6.6 mH |
| • Po (power of load), max. | 440 mW |
| • Uo (output no-load voltage), max. | 14 V |

## Technical specifications (continued)

| Article number | 6ES7332-5RD00-0AB0 | Article number | 6ES7332-5RD00-0AB0 |
|---|---|---|---|
| | SIMATIC S7,SM 332 ANALOG OUTPUT | | SIMATIC S7,SM 332 ANALOG OUTPUT |
| **Potential separation** | | **Standards, approvals, certificates** | |
| **Potential separation analog outputs** | | **Use in hazardous areas** | |
| • Potential separation analog outputs | Yes | • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC |
| **Permissible potential difference** | | • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4 |
| between the outputs (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area | • Test number PTB | Ex-96.D.2026X |
| | | **Ambient conditions** | |
| Between the outputs and MANA (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area | **Ambient temperature during operation** | |
| | | • max. | 60 °C |
| | | **Connection method** | |
| | | required front connector | 20-pin |
| | | **Weights** | |
| | | Weight, approx. | 280 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Ex analog output module** | | **Labeling sheets for machine inscription** | |
| 4 outputs, isolated, 0/4 to 20 mA | **6ES7332-5RD00-0AB0** | for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| **Front connector** | | | |
| 20-pin, with screw contacts | | Petrol | **6ES7392-2AX00-0AA0** |
| • 1 unit | **6ES7392-1AJ00-0AA0** | Light beige | **6ES7392-2BX00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** | Yellow | **6ES7392-2CX00-0AA0** |
| **Front door, elevated design** | | Red | **6ES7392-2DX00-0AA0** |
| e.g. for 32 channel modules; enables connection of 1.3 mm$^2$/16 AWG wires | **6ES7328-0AA00-7AA0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| **LK 393 cable guide** | **6ES7393-4AA00-0AA0** | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |
| **Label cover** | **6ES7392-2XY00-0AA0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| 10 units (spare part), for modules with 20-pin front connector | | Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 Ex analog modules

## SIPLUS S7-300 Ex analog input modules

### ■ Overview



- Analog inputs for signals from the Ex field
- For the connection of intrinsically safe analog equipment from the Ex field
- 4 analog inputs in 4 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Programmable diagnostics and diagnostic interrupt
- Programmable threshold alarm
- HART-compatible inputs (6AG1 331-7RD00-2AB0 only)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | 6AG1331-7RD00-2AB0 | 6AG1331-7SF00-4AB0 |
|---|---|---|
| Based on | 6ES7331-7RD00-0AB0 | 6ES7331-7SF00-0AB0 |
| | SIPLUS S7-300 SM331 4AE | SIPLUS S7-300 SM331 20pol |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C; = Tmin | 0 °C; = Tmin |
| • max. | 60 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use, 70 °C only 4 wire | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | | |
| • min. | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 Ex analog input modules** | | **Label cover** | 6ES7392-2XY00-0AA0 |
| <u>Extended temperature range and exposure to media</u> | | 10 units (spare part), for modules with 20-pin front connector | |
| 4 inputs, isolated, 0/4 to 20 mA, 15 bit | 6AG1331-7RD00-2AB0 | **Labeling sheets for machine inscription** | |
| <u>Exposure to media</u> | | For modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| 8/4 inputs, isolated, for thermocouples and Pt100, Pt200, Ni100; medial exposure only | 6AG1331-7SF00-4AB0 | Petrol | 6ES7392-2AX00-0AA0 |
| **Accessories** | | Light beige | 6ES7392-2BX00-0AA0 |
| *Mandatory* | | Yellow | 6ES7392-2CX00-0AA0 |
| **Front connector** | | Red | 6ES7392-2DX00-0AA0 |
| 20-pin, with spring-loaded contacts | | *Documentation* | |
| • 1 unit | 6ES7392-1BJ00-0AA0 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| • 100 units | 6ES7392-1BJ00-1AB0 | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| *Consumables* | | | |
| **DIN rail for active bus modules** | | | |
| For max. 5 active bus modules for hot swapping function | | | |
| • Length 483 mm (19") | 6ES7195-1GA00-0XA0 | | |
| • Length 530 mm | 6ES7195-1GF30-0XA0 | | |
| • Length 620 mm | 6ES7195-1GG30-0XA0 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| • Length 2000 mm | 6ES7195-1GC00-0XA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| **Front door, elevated design** | 6ES7328-0AA00-7AA0 | | |
| E.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors; circuit diagram and nameplates in petrol | | | |
| **LK 393 cable guide** | 6ES7393-4AA00-0AA0 | | |
| Mandatory for operation in hazardous areas | | | |
| **Labeling strips** | 6ES7392-2XX00-0AA0 | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 350-1 counter module

### ■ Overview



- One-channel intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 specifiable comparison values
- Integrated digital outputs to output the response upon reaching the comparison value.
- Operating modes:
  - Continuous counting
  - Single counting
  - Periodic counting
- Special functions:
  - Set counter
  - Latch counter
- Start/stop counter with gate function

Note:

Incremental encoders and pre-assembled connecting cables for counting and positioning functions are offered under SIMODRIVE Sensor or Motion Connect 500.

http://www.siemens.com/simatic-technology

### ■ Technical specifications

| Article number | 6ES7350-1AH03-0AE0 |
|---|---|
| | SIMATIC S7-300, COUNTER MODULE |
| **Supply voltage** | |
| **Auxiliary voltage 1L+, load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| **non-periodic skip** | |
| - Duration | 500 ms |
| - Recovery time | 50 s |
| - Value | 35 V |
| **Input current** | |
| from load voltage 1L+ (without load), max. | 40 mA |
| from backplane bus 5 V DC, max. | 160 mA |
| **5 V encoder supply** | |
| • 5 V | Yes; 5.2 V +/-2% |
| • Output current, max. | 300 mA |
| **24 V encoder supply** | |
| • 24 V | Yes; 1L+ (-3 V) |
| • Output current, max. | 400 mA |

| Article number | 6ES7350-1AH03-0AE0 |
|---|---|
| | SIMATIC S7-300, COUNTER MODULE |
| **Power loss** | |
| Power loss, typ. | 4.5 W |
| **Digital inputs** | |
| Number of digital inputs | 3 |
| Functions | 1 for gate start, 1 for gate stop, 1 for setting the counter |
| **Input voltage** | |
| • for signal "0" | -28.8 ... +5V |
| • for signal "1" | +11 to +28.8V |
| **Input current** | |
| • for signal "1", typ. | 9 mA |
| **Digital outputs** | |
| Number of digital outputs | 2 |
| Short-circuit protection | Yes; Clocked electronically |
| Limitation of inductive shutdown voltage to | 2L+ (-39 V) |
| **Output voltage** | |
| • for signal "0", max. | 3 V |
| • for signal "1", min. | 2L+ (-1,5 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A |
| • for signal "1" permissible range for 0 to 60 °C, min. | 5 mA |
| • for signal "1" permissible range for 0 to 60 °C, max. | 0.6 A |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 300 µs |

## ■ **Technical specifications** (continued)

| Article number | **6ES7350-1AH03-0AE0** |
|---|---|
| | SIMATIC S7-300, COUNTER MODULE |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (symmetrical) | Yes; With 2 pulse trains offset by 90° |
| • Incremental encoder (asymmetrical) | Yes |
| • 24 V initiator | Yes |
| • 24 V directional element | Yes; 1 pulse train, 1 direction level |
| **Counter** | |
| Number of counter inputs | 1 |
| Counting range, description | 32 bit or ±31 bit |
| Minimum pulse width, adjustable | Yes; 2.5 or 25 µs |
| **Counter input 5 V** | |
| • Type | RS 422 |
| • Terminating resistor | 220 Ω |
| • Differential input voltage | 1,3 V |
| • Counting frequency, max. | 500 kHz |
| **Counter input 24 V** | |
| • Input voltage for signal "0" | -28.8 ... +5V |
| • Input voltage for signal "1" | +11 to +28.8V |
| • Input current for signal "1", typ. | 9 mA |
| • Counting frequency, max. | 200 kHz |
| • Minimum pulse width | 2.5 µs |

| Article number | **6ES7350-1AH03-0AE0** |
|---|---|
| | SIMATIC S7-300, COUNTER MODULE |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • between the channels and backplane bus | Yes; Optocoupler |
| **Potential separation digital outputs** | |
| • between the channels and backplane bus | Yes; Optocoupler |
| **Potential separation counter** | |
| • between the channels and backplane bus | Yes; Optocoupler |
| **Isolation** | |
| Isolation tested with | 500 V |
| **Connection method** | |
| required front connector | 1x 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 250 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 350-1 counter module

### ■ Ordering data

| | Article No. |
|---|---|
| **FM 350-1 counter module** | **6ES7350-1AH03-0AE0** |
| with 1 channel, max. 500 kHz; for incremental encoder | |
| **Coding plug - range card for analog inputs** | **6ES7974-0AA00-0AA0** |
| Spare part | |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit (spare part) | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 10 units (spare part) | |
| **Labeling sheets for machine inscription** | See under "Accessories", page 5/264 |
| **Slot number label** | **6ES7912-0AA00-0AA0** |
| Spare part | |
| **Shield connection element** | **6ES7390-5AA00-0AA0** |
| 80 mm wide, with 2 rows for 4 terminals each | |
| **Shield connection clamps** | |
| 2 units | |
| For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |
| **Connectable incremental encoders 6FX2 001-2...** | Refer to the Industry Mall under SIMODRIVE Sensor or Motion Connect 500 (see also http://www.siemens.com/simatic-technology) |

| | Article No. |
|---|---|
| **Signal cable** | **6FX5002-2CA12-■■■0** |
| Pre-assembled for HTL and TTL encoder, without sub D connector, UL/DESINA | |
| Length code: | |
| 0 m | 1 |
| 100 m | 2 |
| 200 m | 3 |
| 0 m | A |
| 10 m | B |
| 20 m | C |
| 30 m | D |
| 40 m | E |
| 50 m | F |
| 60 m | G |
| 70 m | H |
| 80 m | J |
| 90 m | K |
| 0 m | A |
| 1 m | B |
| 2 m | C |
| 3 m | D |
| 4 m | E |
| 5 m | F |
| 6 m | G |
| 7 m | H |
| 8 m | J |
| 9 m | K |

## Overview



- 8-channel intelligent counter module for universal counting and measuring
- To directly connect 24 V incremental encoders, direction sensors, initiators or NAMUR encoders.
- Check function with preselectable set points (number depends on mode)
- Integrated digital outputs to output the response when the setpoint is reached
- Modes:
  - Continuous/single/periodic counting
  - Frequency/speed measurement
  - Cycle duration measurement
  - Dosing

Note:

Incremental encoder and prefabricated connecting cables for counter and positioning function are offered under SIMODRIVE Sensor and Motion Connect 500.

http://www.siemens.com/simatic-technology

## Technical specifications

| Article number | **6ES7350-2AH01-0AE0** |
|---|---|
| | FM350-2, COUNTER MOD., 8 CHANNELS, 20KHZ |
| **Supply voltage** | |
| **Auxiliary voltage 1L+, load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| from load voltage L+ (without load), max. | 150 mA |
| from backplane bus 5 V DC, max. | 100 mA |
| **Encoder supply** | |
| Type of output voltage | NAMUR-encoder supply: 8.2 V +/-2% |
| Short-circuit protection | Yes |
| **Output current** | |
| • Rated value | 200 mA |
| **Power loss** | |
| Power loss, typ. | 10 W |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Number of NAMUR inputs | 8 |
| Functions | 1 each for gate start/ gate stop |
| **Input voltage** | |
| • for signal "0" | -3 to +5V |
| • for signal "1" | 11 to 30.2 V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 9 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", max. | 50 µs |

| Article number | **6ES7350-2AH01-0AE0** |
|---|---|
| | FM350-2, COUNTER MOD., 8 CHANNELS, 20KHZ |
| **Cable length** | |
| • shielded, max. | 100 m |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| Short-circuit protection | Yes |
| Limitation of inductive shutdown voltage to | L+ (-40 V) |
| **Output voltage** | |
| • for signal "1", min. | L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 300 µs |
| **Switching frequency** | |
| • with resistive load, max. | 500 Hz |
| • with inductive load, max. | 0.5 Hz |
| **Total current of the outputs (per group)** | |
| **horizontal installation** | |
| - up to 40 °C, max. | 4 A |
| - up to 60 °C, max. | 2 A |
| **all other mounting positions** | |
| - up to 40 °C, max. | 2 A |
| **Cable length** | |
| • shielded, max. | 600 m |
| • unshielded, max. | 100 m |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (asymmetrical) | Yes |
| • 24 V initiator | Yes |
| • 24 V directional element | Yes |
| • NAMUR encoder | Yes |
| • 2-wire sensor | Yes |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

**FM 350-2 counter module**

## ▇ Technical specifications (continued)

| Article number | **6ES7350-2AH01-0AE0** |
|---|---|
| | FM350-2, COUNTER MOD., 8 CHANNELS, 20KHZ |
| **NAMUR encoder** | |
| • Input signal | to DIN 19 234 |
| • Input current for signal "0", max. | 1.2 mA |
| • Input current for signal "1", min. | 2.1 mA |
| • Input delay, max. | 50 µs |
| • Input frequency, max. | 20 kHz |
| • Cable length, shielded, max. | 100 m |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes; Diagnostic information readable |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Hardware interrupt | Yes; Parameterizable |
| **Counter input 24 V** | |
| • Number | 8; 32 bit or ±31 bit |
| • Input voltage for signal "0" | -3 to +5V |
| • Input voltage for signal "1" | 11 to 30.2 V |
| • Input current for signal "0", max. (permissible quiescent current) | 2 mA |
| • Input current for signal "1", typ. | 9 mA |
| • Input delay, max. | 50 µs |
| • Counting frequency, max. | 20 kHz; Incremental encoder: 10 kHz |
| • Cable length, max. | 100 m |

| Article number | **6ES7350-2AH01-0AE0** |
|---|---|
| | FM350-2, COUNTER MOD., 8 CHANNELS, 20KHZ |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • between the channels and backplane bus | Yes; and shielding |
| **Potential separation digital outputs** | |
| • between the channels and backplane bus | Yes; and shielding |
| **Potential separation counter** | |
| • between the channels and backplane bus | Yes; and shielding |
| **Connection method** | |
| required front connector | 1x 40-pin |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 460 g |

## ▇ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **FM 350-2 counter module** With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD | **6ES7350-2AH01-0AE0** | **Shield connection element** 80 mm wide, with 2 rows for 4 terminals each | **6ES7390-5AA00-0AA0** |
| **Front connector** 40-pin, with screw contacts | | **Shield connection clamps** 2 units | |
| • 1 unit | **6ES7392-1AM00-0AA0** | For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** | For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| 40-pin, with spring-loaded contacts | | For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |
| • 1 unit | **6ES7392-1BM01-0AA0** | | |
| • 100 units | **6ES7392-1BM01-1AB0** | **Signal cable** Pre-assembled for HTL and TTL encoder, without sub D connector, UL/DESINA | **6FX5002-2CA12- ▪ ▪ ▪ 0** |
| **Bus connectors** 1 unit (spare part) | **6ES7390-0AA00-0AA0** | | |
| **Labeling strips** 10 units (spare part) | **6ES7392-2XX10-0AA0** | Length code: | See FM 350-1, page 5/138 |
| **Labeling sheets for machine inscription** | See under "Accessories", page 5/248 | | |
| **Slot number label** Spare part | **6ES7912-0AA00-0AA0** | | |

## Overview

- Two-channel positioning module for rapid-traverse/ creep-speed drives
- 4 digital outputs per channel for motor control
- Incremental or synchro-serial position decoding

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and pre-assembled connecting cables for counting and positioning functions.

http://www.siemens.com/simatic-technology

## Technical specifications

| Article number | 6ES7351-1AH02-0AE0 |
|---|---|
| | FM351 POSITIONING MOD. RAPID/CREEP FEED |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| Current consumption, max. | 350 mA |
| from backplane bus 5 V DC, max. | 150 mA |
| **Encoder supply** | |
| **5 V encoder supply** | |
| • 5 V | Yes |
| • Output current, max. | 350 mA |
| • Cable length, max. | 32 m |
| **24 V encoder supply** | |
| • 24 V | Yes |
| • Output current, max. | 400 mA; Per channel |
| • Cable length, max. | 100 m |
| **Power loss** | |
| Power loss, typ. | 7.9 W |

| Article number | 6ES7351-1AH02-0AE0 |
|---|---|
| | FM351 POSITIONING MOD. RAPID/CREEP FEED |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Functions | Reference cams, reversing cams, flying actual value setting, start/stop positioning |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -3 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 6 mA |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| Functions | Rapid traverse, creep, run right, run left |
| Short-circuit protection | Yes |
| **Output voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "1", min. | UP - 0.8 V |
| **Output current** | |
| • for signal "1" permissible range for 0 to 60 °C, min. | 5 mA; with UPmax |
| • for signal "1" permissible range for 0 to 60 °C, max. | 600 mA; with UPmax |
| • for signal "0" residual current, max. | 0.5 mA |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

**FM 351 positioning module**

## ■ Technical specifications (continued)

| Article number | 6ES7351-1AH02-0AE0 |
|---|---|
| | FM351 POSITIONING MOD. RAPID/CREEP FEED |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (symmetrical) | Yes |
| • Incremental encoder (asymmetrical) | Yes |
| • Absolute encoder (SSI) | Yes |
| • 2-wire sensor | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 2 mA; on signal "0", max. 2 mA; on signal "1", max. 6 mA |
| **Encoder signals, incremental encoder (symmetrical)** | |
| • Trace mark signals | A, notA, B, notB |
| • Zero mark signal | N, notN |
| • Input signal | 5 V difference signal (phys. RS 422) |
| • Input frequency, max. | 0.5 MHz |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Trace mark signals | A, B |
| • Zero mark signal | N |
| • Input voltage | 24 V |
| • Input frequency, max. | 50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length |

| Article number | 6ES7351-1AH02-0AE0 |
|---|---|
| | FM351 POSITIONING MOD. RAPID/CREEP FEED |
| **Encoder signals, absolute encoder (SSI)** | |
| • Input signal | 5 V difference signal (phys. RS 422) |
| • Data signal | DATA, notDATA |
| • Clock signal | CL, notCL |
| • Telegram length, parameterizable | 13 or 25 bit |
| • Clock frequency, max. | 1.5 MHz |
| • Gray code | Yes |
| • Cable length, shielded, max. | 200 m; At max. 188 kHz |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | Yes |
| **Potential separation digital outputs** | |
| • Potential separation digital outputs | Yes |
| **Connection method** | |
| required front connector | 1x 20-pin |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 550 g |

## ▪ Ordering data

| | Article No. |
|---|---|
| **FM 351 positioning module** | **6ES7351-1AH02-0AE0** |
| for rapid traverse and creep speed drives | |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| | |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit (spare part) | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 10 units (spare part) | |
| **Slot number label** | **6ES7912-0AA00-0AA0** |
| **Labeling sheets for machine inscription** | See under "Accessories", page 5/264 |
| Spare part | |
| **Shield connection element** | **6ES7390-5AA00-0AA0** |
| 80 mm wide, with 2 rows for 4 terminals each | |
| **Shield connection clamps** | |
| 2 units | |
| For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |

| | Article No. | | | | |
|---|---|---|---|---|---|
| **Signal cables** | | | | | |
| Pre-assembled for SSI absolute encoder, UL/DESINA | **6FX50 ▪** | **2-2CC11-** | ▪ | ▪ ▪ | ▪ |
| Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA | **6FX50 ▪** | **2-2CD01-** | ▪ | ▪ ▪ | ▪ |
| Pre-assembled for TTL encoder 24 V, UL/DESINA | **6FX50 ▪** | **2-2CD24-** | ▪ | ▪ ▪ | ▪ |
| | | | | | |
| Not crimped | | **0** | | | |
| Module end crimped, connector case supplied | | **1** | | | |
| Motor end crimped, connector case supplied | | **4** | | | |
| 0 m | | | **1** | | |
| 100 m | | | **2** | | |
| 200 m | | | **3** | | |
| 0 m | | | | **A** | |
| 10 m | | | | **B** | |
| 20 m | | | | **C** | |
| 30 m | | | | **D** | |
| 40 m | | | | **E** | |
| 50 m | | | | **F** | |
| 60 m | | | | **G** | |
| 70 m | | | | **H** | |
| 80 m | | | | **J** | |
| 90 m | | | | **K** | |
| 0 m | | | | **A** | |
| 1 m | | | | **B** | |
| 2 m | | | | **C** | |
| 3 m | | | | **D** | |
| 4 m | | | | **E** | |
| 5 m | | | | **F** | |
| 6 m | | | | **G** | |
| 7 m | | | | **H** | |
| 8 m | | | | **J** | |
| 9 m | | | | **K** | |
| 0.0 m | | | | | **0** |
| 0.1 m | | | | | **1** |
| 0.2 m | | | | | **2** |
| 0.3 m | | | | | **3** |
| 0.4 m | | | | | **4** |
| 0.5 m | | | | | **5** |
| 0.6 m | | | | | **6** |
| 0.7 m | | | | | **7** |
| 0.8 m | | | | | **8** |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## ■ Overview



- Extremely high-speed electronic cam controller
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 13 onboard digital outputs for direct output of actions
- Incremental or synchro-serial position decoding

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and pre-assembled connecting cables for counting and positioning functions.

http://www.siemens.com/simatic-technology

## ■ Technical specifications

| Article number | 6ES7352-1AH02-0AE0 |
|---|---|
| | FM352 ELECTRON. CAM CONTROLLER |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from load voltage L+ (without load), max. | 200 mA |
| from backplane bus 5 V DC, max. | 100 mA |
| **Encoder supply** | |
| **5 V encoder supply** | |
| • 5 V | Yes |
| • Output current, max. | 300 mA |
| • Cable length, max. | 32 m |
| **24 V encoder supply** | |
| • 24 V | Yes |
| • Output current, max. | 300 mA |
| • Cable length, max. | 100 m |
| **Power loss** | |
| Power loss, typ. | 8.1 W |
| **Digital inputs** | |
| Number of digital inputs | 4 |
| Functions | Reference point switch, set floating actual value/length measurement, brake release, enable track output no. 3 |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 9 mA |
| **Digital outputs** | |
| Number of digital outputs | 13 |
| Functions | Cam track |
| Short-circuit protection | Yes |
| **Output voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "1", min. | UP - 0.8 V |

| Article number | 6ES7352-1AH02-0AE0 |
|---|---|
| | FM352 ELECTRON. CAM CONTROLLER |
| **Output current** | |
| • for signal "1" permissible range for 0 to 60 °C, min. | 5 mA; with UPmax |
| • for signal "1" permissible range for 0 to 60 °C, max. | 600 mA; with UPmax |
| • for signal "0" residual current, max. | 0.5 mA |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (symmetrical) | Yes |
| • Incremental encoder (asymmetrical) | Yes |
| • Absolute encoder (SSI) | Yes |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 2 mA |
| **Encoder signals, incremental encoder (symmetrical)** | |
| • Trace mark signals | A, notA, B, notB |
| • Zero mark signal | N, notN |
| • Input signal | 5 V difference signal (phys. RS 422) |
| • Input frequency, max. | 1 MHz |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Trace mark signals | A, B |
| • Zero mark signal | N |
| • Input voltage | 24 V |
| • Input frequency, max. | 50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length |
| **Encoder signals, absolute encoder (SSI)** | |
| • Data signal | DATA, notDATA |
| • Clock signal | CL, notCL |
| • Telegram length, parameterizable | 13 or 25 bit |
| • Clock frequency, max. | 1 MHz |
| • Gray code | 1 |
| • Cable length, shielded, max. | 320 m; at max. 125 kHz |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | No |
| **Potential separation digital outputs** | |
| • Potential separation digital outputs | No |

## Technical specifications (continued)

| Article number | 6ES7352-1AH02-0AE0 |
|---|---|
| | FM352 ELECTRON. CAM CONTROLLER |
| **Connection method** | |
| required front connector | 1x 20-pin |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |

| Article number | 6ES7352-1AH02-0AE0 |
|---|---|
| | FM352 ELECTRON. CAM CONTROLLER |
| **Weights** | |
| Weight, approx. | 550 g |

## Ordering data

| | Article No. |
|---|---|
| **FM352 electronic cam controller** | 6ES7352-1AH02-0AE0 |
| **Front connectors** | |
| 20-pin, with screw contacts | |
| • 1 unit | 6ES7392-1AJ00-0AA0 |
| • 100 units | 6ES7392-1AJ00-1AB0 |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | 6ES7392-1BJ00-0AA0 |
| • 100 units | 6ES7392-1BJ00-1AB0 |
| **Bus connectors** | 6ES7390-0AA00-0AA0 |
| 1 unit (spare part) | |
| **Labeling strips** | 6ES7392-2XX00-0AA0 |
| 10 units (spare part) | |
| **Labeling sheets for machine inscription** | See under "Accessories", page 5/264 |
| **Slot number label** | 6ES7912-0AA00-0AA0 |
| Spare part | |
| **Shield connection element** | 6ES7390-5AA00-0AA0 |
| 80 mm wide, with 2 rows for 4 terminals each | |
| **Shield connection clamps** | |
| 2 units | |
| For 2 cables with 2 mm to 6 mm diameter | 6ES7390-5AB00-0AA0 |
| For 1 cable with 3 mm to 8 mm diameter | 6ES7390-5BA00-0AA0 |
| For 1 cable with 4 mm to 13 mm diameter | 6ES7390-5CA00-0AA0 |

| | Article No. | | | | |
|---|---|---|---|---|---|
| **Signal cable** | | | | | |
| Pre-assembled for SSI absolute encoder, UL/DESINA | 6FX50 ■ | 2-2CC11- ■ ■ ■ ■ | | | |
| Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA | 6FX50 ■ | 2-2CD01- ■ ■ ■ ■ | | | |
| Pre-assembled for TTL encoder 24 V, UL/DESINA | 6FX50 ■ | 2-2CD24- ■ ■ ■ ■ | | | |
| Not crimped | | 0 | | | |
| Module end crimped, connector case supplied | | 1 | | | |
| Motor end crimped, connector case supplied | | 4 | | | |
| 0 m | | | 1 | | |
| 100 m | | | 2 | | |
| 200 m | | | 3 | | |
| 0 m | | | | A | |
| 10 m | | | | B | |
| 20 m | | | | C | |
| 30 m | | | | D | |
| 40 m | | | | E | |
| 50 m | | | | F | |
| 60 m | | | | G | |
| 70 m | | | | H | |
| 80 m | | | | J | |
| 90 m | | | | K | |
| 0 m | | | | | A |
| 1 m | | | | | B |
| 2 m | | | | | C |
| 3 m | | | | | D |
| 4 m | | | | | E |
| 5 m | | | | | F |
| 6 m | | | | | G |
| 7 m | | | | | H |
| 8 m | | | | | J |
| 9 m | | | | | K |
| 0.0 m | | | | | 0 |
| 0.1 m | | | | | 1 |
| 0.2 m | | | | | 2 |
| 0.3 m | | | | | 3 |
| 0.4 m | | | | | 4 |
| 0.5 m | | | | | 5 |
| 0.6 m | | | | | 6 |
| 0.7 m | | | | | 7 |
| 0.8 m | | | | | 8 |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

**FM 352-5 high-speed Boolean processor**

## ■ Overview



- The FM 352-5 high-speed Boolean processor provides extremely fast binary control and also some of the fastest switching processes ever possible (cycle time: 1 µs).
- Programming is possible with LAD or FBD.
- The available set of statements comprises bit statements (partial statement set of STEP 7), timers, counters, frequency dividers, frequency generators, shift registers.
- 12 integral DI / 8 integral DO.
- 2 versions: Current sinking or current sourcing digital outputs.
- 1 channel for connection of a 24-V incremental encoder, a 5-V incremental encoder (RS 422) or an SSI absolute encoder.

Micro Memory Card required for use of the FM 352-5

Note:

Displacement measuring systems and precut/pre-assembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

http://www.siemens.com/simatic-technology

## ■ Technical specifications

| Article number | 6ES7352-5AH01-0AE0 | 6ES7352-5AH11-0AE0 |
|---|---|---|
| | FM 352-5, BOOLEAN PROCESSOR 12DE/8DA | FM 352-5 PNP, BOOLEAN PROCESSOR 12DI/8DO |
| **Supply voltage** | | |
| Rated value (DC) | | |
| • 24 V DC | Yes | Yes |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes |
| **Input current** | | |
| from load voltage1L+, max. | 150 mA; typ. 60 mA | 150 mA; typ. 60 mA |
| from load voltage 2L+ (without load), max. | 200 mA; typ. 60 mA, DI/DO supply | 200 mA; typ. 60 mA, DI/DO supply |
| from load voltage 3L+ (with encoder), max. | 600 mA; typ. 80 mA plus encoder supply | 600 mA; typ. 80 mA plus encoder supply |
| from load voltage 3L+ (without encoder), max. | 200 mA; typ. 80 mA | 200 mA; typ. 80 mA |
| from backplane bus 5 V DC, typ. | 135 mA | 135 mA |
| **Encoder supply** | | |
| **5 V encoder supply** | | |
| • 5 V | Yes | Yes |
| • short-circuit protection | Yes; Electronic overload protection; no protection on applying a normal or counter voltage. | Yes; Electronic overload protection; no protection on applying a normal or counter voltage. |
| • Output current, max. | 250 mA | 250 mA |
| **24 V encoder supply** | | |
| • 24 V | Yes | Yes |
| • Short-circuit protection | Yes; Overvoltage and overheating protection if overloaded; diagnostics if output reaches temperature limit; no protection on applying a normal or counter voltage | Yes; Overvoltage and overheating protection if overloaded; diagnostics if output reaches temperature limit; no protection on applying a normal or counter voltage |
| • Output current, max. | 400 mA | 400 mA |

■ **Technical specifications** (continued)

| Article number | 6ES7352-5AH01-0AE0 | 6ES7352-5AH11-0AE0 |
|---|---|---|
| | FM 352-5, BOOLEAN PROCESSOR 12DE/8DA | FM 352-5 PNP, BOOLEAN PROCESSOR 12DI/8DO |
| **Power loss** | | |
| Power loss, typ. | 6.5 W | 6.5 W |
| **Memory** | | |
| Type of memory | RAM | RAM |
| Memory size | 128 kbyte; required for operation, MMC | 128 kbyte; required for operation, MMC |
| **Digital inputs** | | |
| Number of digital inputs | 8; Standard and up to 12 with 24 V DC encoder inputs as digital inputs | 8; Standard and up to 12 with 24 V DC encoder inputs as digital inputs |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | -30 to +5V | -30 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA | 1.5 mA |
| • for signal "1", typ. | 3.8 mA | 3.8 mA |
| **Input delay (for rated value of input voltage)** | | |
| • Input frequency (with a time delay of 0.1 ms), max. | 200 kHz | 200 kHz |
| • programmable digital filter delay | None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms | None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms |
| • Minimum pulse width for program reactions | 1 µs, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1,6 ms | 1 µs, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1,6 ms |
| **for standard inputs** | | |
| - at "0" to "1", max. | 3 µs; typ. 1.5 µs | 3 µs; typ. 1.5 µs |
| **Cable length** | | |
| • shielded, max. | 600 m | 600 m |
| • unshielded, max. | 100 m; Shielded cable recommended if filtering delay is set to less than 1.6 ms | 100 m; Shielded cable recommended if filtering delay is set to less than 1.6 ms |
| **Digital outputs** | | |
| Number of digital outputs | 8 | 8 |
| Current-sinking | Yes | No |
| Current-sourcing | No | Yes |
| Short-circuit protection | Yes; Overvoltage protection, thermal protection | Yes; Overvoltage protection, thermal protection |
| • Response threshold, typ. | 1.7 to 3.5 A | 1.7 to 3.5 A |
| Limitation of inductive shutdown voltage to | 2M -45 V typ., (-40 V to -55 V); comment: no protection against inductive kickback >55 mJ | 2M -45 V typ., (-40 V to -55 V); comment: no protection against inductive kickback >55 mJ |
| Controlling a digital input | No | Yes |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | 5 W | 5 W |
| **Output voltage** | | |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0", max. | 28.8 V | 28.8 V |
| • for signal "1", max. | 0.5 V | 0.5 V |
| **Output current** | | |
| • for signal "1" rated value | 0.5 A; At 60 °C | 0.5 A; At 60 °C |
| • for signal "1" permissible range for 0 to 60 °C, min. | 5 mA | 5 mA |
| • for signal "1" permissible range for 0 to 60 °C, max. | 600 mA | 600 mA |
| • for signal "0" residual current, max. | 1 mA | 1 mA |
| **Output delay with resistive load** | | |
| • "0" to "1", max. | 1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 A | 1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 A |
| • "1" to "0", max. | 1.5 µs; 1.7 µs 50 mA / 1.5 µs 0.5 A | 1.5 µs; 1.7 µs 50 mA / 1.5 µs 0.5 A |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

**FM 352-5 high-speed Boolean processor**

■ **Technical specifications** (continued)

| Article number | 6ES7352-5AH01-0AE0 | 6ES7352-5AH11-0AE0 |
|---|---|---|
| | FM 352-5, BOOLEAN PROCESSOR 12DE/8DA | FM 352-5 PNP, BOOLEAN PROCESSOR 12DI/8DO |
| **Parallel switching of two outputs** | | |
| • for uprating | Yes; 2 | Yes; 2 |
| **Switching frequency** | | |
| • with resistive load, max. | 100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A | 100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A |
| • with inductive load, max. | 2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes | 2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes |
| • on lamp load, max. | 10 Hz | 10 Hz |
| **Cable length** | | |
| • shielded, max. | 600 m | 600 m |
| • unshielded, max. | 100 m | 100 m |
| **Encoder** | | |
| **Connectable encoders** | | |
| • Incremental encoder (symmetrical) | Yes | Yes |
| • Incremental encoder (asymmetrical) | Yes | Yes |
| • Absolute encoder (SSI) | Yes | Yes |
| • 2-wire sensor | Yes | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA |
| **Encoder signals, incremental encoder (symmetrical)** | | |
| • Trace mark signals | A, notA, B, notB | A, notA, B, notB |
| • Zero mark signal | N, notN | N, notN |
| • Input signal | 5 V difference signal (phys. RS 422) | 5 V difference signal (phys. RS 422) |
| • Input frequency, max. | 500 kHz | 500 kHz |
| • Cable length, shielded, max. | 100 m; 100 m with 24 V supply and 500 kHz; 32 m with 5 V supply and 500 kHz | 100 m; 100 m with 24 V supply and 500 kHz; 32 m with 5 V supply and 500 kHz |
| **Encoder signals, incremental encoder (asymmetrical)** | | |
| • Trace mark signals | A, B | A, B |
| • Zero mark signal | N | N |
| • Input voltage | 24 V | 24 V |
| • Input frequency, max. | 200 kHz | 200 kHz |
| • Cable length, shielded, max. | 50 m; Cable length, HTL incremental encoder, Siemens, type 6FX2001-4: 50 kHz, 25 m shielded, max., 25 kHz, 50 m shielded, max. | 50 m; Cable length, HTL incremental encoder, Siemens, type 6FX2001-4: 50 kHz, 25 m shielded, max., 25 kHz, 50 m shielded, max. |
| **Encoder signals, absolute encoder (SSI)** | | |
| • Data signal | DATA, notDATA | DATA, notDATA |
| • Clock signal | CK, notCK | CK, notCK |
| • Telegram length, parameterizable | 13 or 25 bit | 13 or 25 bit |
| • Clock frequency, max. | 1 MHz; 125 kHz, 250 kHz, 500 kHz or 1 MHz | 1 MHz; 125 kHz, 250 kHz, 500 kHz or 1 MHz |
| • Cable length, shielded, max. | 320 m; At 125 kHz | 320 m; At 125 kHz |
| • Monoflop time | settable: 16/32/48/64 µs | settable: 16/32/48/64 µs |
| • Listening mode | Yes; one or two stations | Yes; one or two stations |
| • Multiturn | Yes; 25 bit message frame | Yes; 25 bit message frame |
| **Encoder signal evaluation** | | |
| • Counting direction, forward | Yes | Yes |
| • Counting direction, backward | Yes | Yes |
| **Response times** | | |
| Input- to output response time | 5 V input to 24 V output, 0 filter: 1 to 4 µs (typ.); 24 V input to 24 V output, 0 filter: 2 to 6 µs (typ.) | 5 V input to 24 V output, 0 filter: 1 to 4 µs (typ.); 24 V input to 24 V output, 0 filter: 2 to 6 µs (typ.) |
| **Interfaces** | | |
| **Point-to-point** | | |
| • Updating times | PLC interface: 1.7 ms | PLC interface: 1.7 ms |

## ▌Technical specifications (continued)

| Article number | 6ES7352-5AH01-0AE0 | 6ES7352-5AH11-0AE0 |
|---|---|---|
| | FM 352-5, BOOLEAN PROCESSOR 12DE/8DA | FM 352-5 PNP, BOOLEAN PROCESSOR 12DI/8DO |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes; 1L, 2L, 3L missing; MMC error; output overload (8); encoder supply overload; differential wire break; parameterization errror; SSI message frame overflow | Yes; 1L, 2L, 3L missing; MMC error; output overload (8); encoder supply overload; differential wire break; parameterization errror; SSI message frame overflow |
| • Hardware interrupt | Yes; 8 available; for generation by user program | Yes; 8 available; for generation by user program |
| **Diagnostic messages** | | |
| • Wire-break in signal transmitter cable | Yes | Yes |
| • Overflow/underflow | Yes | Yes |
| • missing load voltage | Yes | Yes |
| **Counter** | | |
| Counting range, description | Counting range (16-bit counters): -32,768 to 32,767 (user-specific within this range); counting range (32-bit counters): -2,147,483,648 to 2,147,483,647 (user-specific within this range) | Counting range (16-bit counters): -32,768 to 32,767 (user-specific within this range); counting range (32-bit counters): -2,147,483,648 to 2,147,483,647 (user-specific within this range) |
| Counting range, lower limit | -2 147 483 648 | -2 147 483 648 |
| Counting range, upper limit | 2 147 483 647 | 2 147 483 647 |
| **Counting mode** | | |
| • Counting mode, individual | Yes | Yes |
| • Counting mode, continuous | Yes | Yes |
| • Counting mode, periodic | Yes | Yes |
| **Potential separation** | | |
| between 1L and 2L and 3L | Yes | Yes |
| **Potential separation digital inputs** | | |
| • Potential separation digital inputs | Yes; Yes CPU, I/O and sensor units are isolated | Yes; Yes CPU, I/O and sensor units are isolated |
| **Configuration** | | |
| **Programming** | | |
| • Program cycle time (scan) | 1 µs | 1 µs |
| **Connection method** | | |
| required front connector | 1x 40-pin | 1x 40-pin |
| **Dimensions** | | |
| Width | 80 mm | 80 mm |
| Height | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm |
| **Weights** | | |
| Weight, approx. | 434 g; Module weight: approx. 434 g (with 1L connection and without I/O connection or MMC); shipping weight: approx. 500 g (with bus and 1L connection and without I/O connection or MMC) | 434 g; Module weight: approx. 434 g (with 1L connection and without I/O connection or MMC); shipping weight: approx. 500 g (with bus and 1L connection and without I/O connection or MMC) |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 352-5 high-speed Boolean processor

### ■ Ordering data

| | Article No. | | Article No. | | | | |
|---|---|---|---|---|---|---|---|
| **FM 352-5 high-speed Boolean processor** | | **Signal cables** | | | | | |
| with current sinking digital outputs | **6ES7352-5AH01-0AE0** | To HTL and TTL encoders, pre-assembled, without Sub-D connector | **6FX5002-2CA12-**▪ ▪ ▪ **0** | | | | |
| with current sourcing digital outputs | **6ES7352-5AH11-0AE0** | To SSI absolute encoders 6FX2 001-5, pre-assembled, without Sub-D connector | **6FX5002-2CC12-**▪ ▪ ▪ ▪ | | | | |
| **Micro Memory Card** | | Length code: | | | | | |
| 128 KB | **6ES7953-8LG31-0AA0** | 0 m | | **1** | | | |
| 512 KB | **6ES7953-8LJ31-0AA0** | 100 m | | **2** | | | |
| 2 MB | **6ES7953-8LL31-0AA0** | 200 m | | **3** | | | |
| **Front connector** | | 0 m | | | **A** | | |
| 40-pin, with screw contacts | | 10 m | | | **B** | | |
| • 1 unit | **6ES7392-1AM00-0AA0** | 20 m | | | **C** | | |
| • 100 units | **6ES7392-1AM00-1AB0** | 30 m | | | **D** | | |
| | | 40 m | | | **E** | | |
| 40-pin, with spring-loaded contacts | | 50 m | | | **F** | | |
| • 1 unit | **6ES7392-1BM01-0AA0** | 60 m | | | **G** | | |
| • 100 units | **6ES7392-1BM01-1AB0** | 70 m | | | **H** | | |
| | | 80 m | | | **J** | | |
| | | 90 m | | | **K** | | |
| | | 0 m | | | | **A** | |
| | | 1 m | | | | **B** | |
| | | 2 m | | | | **C** | |
| | | 3 m | | | | **D** | |
| | | 4 m | | | | **E** | |
| | | 5 m | | | | **F** | |
| | | 6 m | | | | **G** | |
| | | 7 m | | | | **H** | |
| | | 8 m | | | | **J** | |
| | | 9 m | | | | **K** | |
| | | 0.0 m | | | | | **0** |
| | | 0.1 m | | | | | **1** |
| | | 0.2 m | | | | | **2** |
| | | 0.3 m | | | | | **3** |
| | | 0.4 m | | | | | **4** |
| | | 0.5 m | | | | | **5** |
| | | 0.6 m | | | | | **6** |
| | | 0.7 m | | | | | **7** |
| | | 0.8 m | | | | | **8** |

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## Overview



- Positioning module for stepper motors in machines with high clock-pulse rates
- Can be used for simple point-to-point positioning and for complex traversing profiles

## Technical specifications

| Article number | 6ES7353-1AH01-0AE0 |
|---|---|
| | Positioning control FM 353 (FM step) |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 7 W |
| **Digital inputs** | |
| Number of digital inputs | 4; + 1 input for message signal |
| Functions | Reference cams, flying actual value setting, flying measurement, start/stop positioning, external block change |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -3 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 6 mA; 6 to 15 mA |
| **Digital outputs** | |
| Number of digital outputs | 4 |
| Functions | Position reached: stop, axis travels forward, axis travels back, change M-function M97, change M-function M98, start enable, direct output via data record |
| Short-circuit protection | Yes |

| Article number | 6ES7353-1AH01-0AE0 |
|---|---|
| | Positioning control FM 353 (FM step) |
| **Output voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "1", min. | UP -3 V |
| **Output current** | |
| • for signal "1" permissible range for 0 to 55 °C, max. | 0.6 A; with UPmax |
| • for signal "0" residual current, max. | 2 mA |
| **Drive interface** | |
| **Signal Input** | |
| • Function | "Power section ready" |
| **Stepper drive** | |
| • Differential output voltage, min. | 2 V; RL = 100 Ohm |
| • Differential output voltage for signal "0", max. | 1 V; Io = 20 mA |
| • Differential output voltage for signal "1", min. | 3.7 V; Io = -20 mA |
| • Cable length, shielded, max. | 35 m |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | No |
| **Potential separation digital outputs** | |
| • Potential separation digital outputs | No |
| **Connection method** | |
| required front connector | 1x 20-pin |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 118 mm |
| **Weights** | |
| Weight, approx. | 500 g |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 353 positioning module

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **FM 353 positioning module** | 6ES7353-1AH01-0AE0 | **Bus connectors** | 6ES7390-0AA00-0AA0 |
| For stepper motors; incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising • FM 353 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen form-based configuration software for FM 353 • Standard interactive screen forms for OP7/OP17 | | 1 unit (spare part) | |
| | | **Labeling strips** | 6ES7392-2XX00-0AA0 |
| | | 10 units (spare part) | |
| | | **Labeling sheets for machine inscription** | See under "Accessories", page 5/264 |
| | | **Slot number label** | 6ES7912-0AA00-0AA0 |
| | | Spare part | |
| **FM 353 manual** | | **Shield connection element** | 6ES7390-5AA00-0AA0 |
| German | 6ES7353-1AH01-8AG0 | 80 mm wide, with 2 rows for 4 terminals each | |
| English | 6ES7353-1AH01-8BG0 | | |
| French | 6ES7353-1AH01-8CG0 | **Shield connection clamps** | |
| Italian | 6ES7353-1AH01-8EG0 | 2 units | |
| **Edit FM** | 6FC5263-1AA03-5AB0 | For 2 cables with 2 mm to 6 mm diameter | 6ES7390-5AB00-0AA0 |
| Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM | | For 1 cable with 3 mm to 8 mm diameter | 6ES7390-5BA00-0AA0 |
| | | For 1 cable with 4 mm to 13 mm diameter | 6ES7390-5CA00-0AA0 |
| **Connecting cables and encoders** | See catalog NC 60, CA 01 or in the Industry Mall | | |
| **Front connectors** | | | |
| 20-pin, with screw contacts • 1 unit | 6ES7392-1AJ00-0AA0 | | |
| • 100 units | 6ES7392-1AJ00-1AB0 | | |
| 20-pin, with spring-loaded contacts • 1 unit | 6ES7392-1BJ00-0AA0 | | |
| • 100 units | 6ES7392-1BJ00-1AB0 | | |

## Overview



- 4-channel closed-loop controller module for universal control tasks
- Can be used for temperature, pressure, flow and level controls
- Convenient online self-optimization for temperature controls
- Predefined controller structures
- 2 control algorithms
- 2 versions:
  - FM 355 C as continuous controller;
  - FM 355 S as step or pulse controller
- With 4 analog outputs (FM 355 C) or 8 digital outputs (FM 355 S) for direct control of the most common actuators
- Continuation of control mode also possible with CPU stop or failure

## Technical specifications

| Article number | 6ES7355-0VH10-0AE0 | 6ES7355-1VH10-0AE0 |
|---|---|---|
| | SIMATIC S7-300, CONROL MODULE | SIMATIC S7-300, CONTROL MODULE |
| **Supply voltage** | | |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| **Input current** | | |
| from load voltage L+ (without load), max. | 310 mA; Typ. 260 mA | 270 mA; typ. 220 mA |
| from backplane bus 5 V DC, max. | 75 mA; typ. 50 mA | 75 mA; typ. 50 mA |
| **Power loss** | | |
| Power loss, typ. | 6.5 W | 5.5 W |
| Power loss, max. | 7.8 W | 6.9 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 8 |
| Input characteristic curve in accordance with IEC 61131, type 2 | Yes | Yes |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V |
| • for signal "1" | 13 to 30V | 13 to 30V |
| **Input current** | | |
| • for signal "1", typ. | 7 mA | 7 mA |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m |
| **Digital outputs** | | |
| Number of digital outputs | | 8 |
| Short-circuit protection | | Yes; Electronic |
| Limitation of inductive shutdown voltage to | | L+ (-1.5 V) |
| Controlling a digital input | | Yes |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | | 5 W |
| **Load resistance range** | | |
| • lower limit | | 240 Ω |
| • upper limit | | 4 kΩ |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 355 controller module

### ■ Technical specifications (continued)

| Article number | 6ES7355-0VH10-0AE0 | 6ES7355-1VH10-0AE0 |
|---|---|---|
| | SIMATIC S7-300, CONROL MODULE | SIMATIC S7-300, CONTROL MODULE |
| **Output voltage** | | |
| • for signal "1", min. | | L+ (-2.5 V) |
| **Output current** | | |
| • for signal "1" rated value | | 100 mA |
| • for signal "1" permissible range for 0 to 60 °C, min. | | 5 mA |
| • for signal "1" permissible range for 0 to 60 °C, max. | | 150 mA |
| • for signal "0" residual current, max. | | 0.5 mA |
| **Parallel switching of two outputs** | | |
| • for logic links | | Yes |
| **Switching frequency** | | |
| • with resistive load, max. | | 100 Hz |
| • with inductive load, max. | | 0.5 Hz |
| • on lamp load, max. | | 100 Hz |
| **Total current of the outputs (per group)** | | |
| **all mounting positions** | | |
| - up to 60 °C, max. | | 400 mA |
| **Cable length** | | |
| • shielded, max. | | 1 000 m |
| • unshielded, max. | | 600 m |
| **Analog inputs** | | |
| Number of analog inputs | 4 | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 30 V | 30 V |
| permissible input current for current input (destruction limit), max. | 40 mA | 40 mA |
| **Input ranges (rated values), voltages** | | |
| • 0 to +10 V | Yes | Yes |
| • -1.75 V to +11.75 V | Yes | Yes |
| • -80 mV to +80 mV | Yes | Yes |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes | Yes |
| • 0 to 23.5 mA | Yes | Yes |
| • -3.5 mA to +23.5 mA | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | |
| • Type B | Yes | Yes |
| • Type J | Yes | Yes |
| • Type K | Yes | Yes |
| • Type R | Yes | Yes |
| • Type S | Yes | Yes |
| **Input ranges (rated values), resistance thermometer** | | |
| • Pt 100 | Yes | Yes |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
| - internal temperature compensation | Yes | Yes |
| - external temperature compensation with Pt100 | Yes | Yes |
| **Characteristic linearization** | | |
| • parameterizable | Yes | Yes |
| - for thermocouples | Type B, J, K, R, S | Type B, J, K, R, S |
| - for resistance thermometer | Pt100 (standard) | Pt100 (standard) |

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■ **Technical specifications** (continued)

| Article number | 6ES7355-0VH10-0AE0 | 6ES7355-1VH10-0AE0 |
|---|---|---|
| | SIMATIC S7-300, CONROL MODULE | SIMATIC S7-300, CONTROL MODULE |
| **Cable length** | | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples | 200 m; 50 m at 80 mV and thermocouples |
| **Analog outputs** | | |
| Number of analog outputs | 4 | |
| Voltage output, short-circuit protection | Yes | |
| Voltage output, short-circuit current, max. | 25 mA | |
| Current output, no-load voltage, max. | 18 V | |
| **Output ranges, voltage** | | |
| • 0 to 10 V | Yes | |
| • -10 V to +10 V | Yes | |
| **Output ranges, current** | | |
| • 0 to 20 mA | Yes | |
| • 4 mA to 20 mA | Yes | |
| **Connection of actuators** | | |
| • for voltage output two-wire connection | Yes | |
| • for current output two-wire connection | Yes | |
| **Load impedance (in rated range of output)** | | |
| • with voltage outputs, min. | 1 kΩ | |
| • with voltage outputs, capacitive load, max. | 1 µF | |
| • with current outputs, max. | 500 Ω | |
| • with current outputs, inductive load, max. | 1 mH | |
| **Cable length** | | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples | |
| **Analog value generation for the inputs** | | |
| Measurement principle | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 14 bit; 12 bit or 14 bit, parameterizable | 14 bit; 12 bit or 14 bit, parameterizable |
| • Conversion time (per channel) | 16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 Hz and 60 Hz | 16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 Hz and 60 Hz |
| **Analog value generation for the outputs** | | |
| **Settling time** | | |
| • for resistive load | 0.1 ms | |
| • for capacitive load | 3.3 ms | |
| • for inductive load | 0.5 ms | |
| **Encoder** | | |
| **Connection of signal encoders** | | |
| • for voltage measurement | Yes | Yes |
| • for current measurement as 4-wire transducer | Yes | Yes |
| **Connectable encoders** | | |
| • 2-wire sensor | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA |
| **Errors/accuracies** | | |
| Linearity error (relative to input range), (+/-) | 0.05 % | 0.05 % |
| Temperature error (relative to input range), (+/-) | 0.005 %/K | 0.005 %/K |
| Linearity error (relative to output range), (+/-) | 0.05 % | |
| Temperature error (relative to output range), (+/-) | 0.02 %/K | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 355 controller module

■ **Technical specifications** (continued)

| Article number | **6ES7355-0VH10-0AE0** | **6ES7355-1VH10-0AE0** |
|---|---|---|
| | SIMATIC S7-300, CONROL MODULE | SIMATIC S7-300, CONTROL MODULE |
| **Operational error limit in overall temperature range** | | |
| • Voltage, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-1% | 0.6 %; +/-0.6 to +/-1% |
| • Current, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-1% | 0.6 %; +/-0.6 to +/-1% |
| • Resistance thermometer, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-1% | 0.6 %; +/-0.6 to +/-1% |
| • Voltage, relative to output range, (+/-) | 0.5 % | |
| • Current, relative to output range, (+/-) | 0.6 % | |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to input range, (+/-) | 0.4 %; 80 mV: +/-0.6%; 250 to 1000 mV: +/-0.4%; 2.5 to 10 V: +/-0.6%; 3.2 to 20 mA: +/-0.5% | 0.4 %; 80 mV: +/-0.6%; 250 to 1000 mV: +/-0.4%; 2.5 to 10 V: +/-0.6%; 3.2 to 20 mA: +/-0.5% |
| • Current, relative to input range, (+/-) | 0.4 %; +/-0.4 to +/-0.6 % | 0.4 %; +/-0.4 to +/-0.6 % |
| • Resistance thermometer, relative to input range, (+/-) | 0.4 %; +/-0.4 to +/-0.6 % | 0.4 %; +/-0.4 to +/-0.6 % |
| • Voltage, relative to output range, (+/-) | 0.3 % | |
| • Current, relative to output range, (+/-) | 0.5 % | |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB | 40 dB |
| • Common mode interference (USS < 2.5 V) , min. | 70 dB | 70 dB |
| **Interrupts/diagnostics/ status information** | | |
| Substitute values connectable | Yes; Parameterizable | Yes; Parameterizable |
| **Integrated Functions** | | |
| **Control technology** | | |
| • Number of closed-loop controllers | 4 | 4 |
| **Potential separation** | | |
| **Potential separation controller** | | |
| • between the channels | No | No |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler |
| **Permissible potential difference** | | |
| Between the inputs and MANA (UCM) | 2.5 V DC | 2.5 V DC |
| **Isolation** | | |
| Isolation tested with | 500 V DC | 500 V DC |
| **Connection method** | | |
| required front connector | 2x 20-pin | 2x 20-pin |
| **Dimensions** | | |
| Width | 80 mm | 80 mm |
| Height | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm |
| **Weights** | | |
| Weight, approx. | 470 g | 470 g |

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■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **FM 355 C controller module**<br>with 4 analog outputs for<br>4 continuous-action controllers | 6ES7355-0VH10-0AE0 | | **Labeling sheets<br>for machine inscription** | See under "Accessories",<br>page 5/264 |
| | | | **Slot number label**<br>Spare part | 6ES7912-0AA00-0AA0 |
| **FM 355 S controller module**<br>with 8 digital outputs for 4 step<br>or pulse controllers | 6ES7355-1VH10-0AE0 | | **Shield connection element**<br>80 mm wide, with 2 rows<br>for 4 terminals each | 6ES7390-5AA00-0AA0 |
| **Front connector**<br>20-pin, with screw contacts<br>• 1 unit<br>• 100 units<br>20-pin, with spring-loaded contacts<br>• 1 unit<br>• 100 units | <br><br>6ES7392-1AJ00-0AA0<br>6ES7392-1AJ00-1AB0<br><br>6ES7392-1BJ00-0AA0<br>6ES7392-1BJ00-1AB0 | | **Shield connection clamps**<br>2 units<br>For 2 cables with 2 mm to 6 mm<br>diameter<br>For 1 cable with 3 mm to 8 mm<br>diameter<br>For 1 cable with 4 mm to 13 mm<br>diameter | <br><br>6ES7390-5AB00-0AA0<br><br>6ES7390-5BA00-0AA0<br><br>6ES7390-5CA00-0AA0 |
| **Bus connectors**<br>1 unit (spare part) | 6ES7390-0AA00-0AA0 | | | |
| **Labeling strips**<br>10 units (spare part) | 6ES7392-2XX00-0AA0 | | | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 355-2 temperature controller module

### ◾ Overview

- 4-channel closed-loop controller module specifically for temperature controls
- Including integrated and easy-to-use online self-optimization
- Heating and cooling controllers as well as combined controllers with heating and active cooling function feasible
- Ready-to-use controller structures
- 2 versions:
  - FM 355-2 C as a continuous controller;
  - FM 355-2 S as step or pulse controllers
- With 4 analog outputs (FM 355-2 C) or 8 digital inputs (FM 355-2 S) to directly control the most common final control elements
- Continuation of control mode also possible with CPU stop or failure

### ◾ Technical specifications

| Article number | 6ES7355-2CH00-0AE0 | 6ES7355-2SH00-0AE0 |
|---|---|---|
| | TEMPERATURE CONTROL MOD. FM355-2C | SIMATIC S7-300, TEMPERATURE |
| **Supply voltage** | | |
| **Load voltage L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| **Input current** | | |
| from load voltage L+ (without load), max. | 310 mA; Typ. 260 mA | 270 mA; typ. 220 mA |
| from backplane bus 5 V DC, max. | 75 mA; typ. 50 mA | 75 mA; typ. 50 mA |
| **Power loss** | | |
| Power loss, typ. | 6.5 W | 5.5 W |
| Power loss, max. | 7.8 W | 6.9 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 8 |
| Input characteristic curve in accordance with IEC 61131, type 2 | Yes | Yes |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V |
| • for signal "1" | 13 to 30V | 13 to 30V |
| **Input current** | | |
| • for signal "1", typ. | 7 mA | 7 mA |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m |
| **Digital outputs** | | |
| Number of digital outputs | | 8 |
| Short-circuit protection | | Yes; Electronic |
| Limitation of inductive shutdown voltage to | | L+ (-1.5 V) |
| Controlling a digital input | | Yes |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | | 5 W |
| **Load resistance range** | | |
| • lower limit | | 240 Ω |
| • upper limit | | 4 kΩ |
| **Output voltage** | | |
| • for signal "1", min. | | L+ (-2.5 V) |

■ **Technical specifications** (continued)

| Article number | 6ES7355-2CH00-0AE0 | 6ES7355-2SH00-0AE0 |
| --- | --- | --- |
| | TEMPERATURE CONTROL MOD. FM355-2C | SIMATIC S7-300, TEMPERATURE |
| **Output current** | | |
| • for signal "1" rated value | | 0.1 A |
| • for signal "1" permissible range for 0 to 60 °C, min. | | 5 mA |
| • for signal "1" permissible range for 0 to 60 °C, max. | | 150 mA |
| • for signal "0" residual current, max. | | 0.5 mA |
| **Parallel switching of two outputs** | | |
| • for logic links | | Yes |
| **Switching frequency** | | |
| • with resistive load, max. | | 100 Hz |
| • with inductive load, max. | | 0.5 Hz |
| • on lamp load, max. | | 100 Hz |
| **Total current of the outputs (per group)** | | |
| **all mounting positions** | | |
|   - up to 60 °C, max. | | 400 mA |
| **Cable length** | | |
| • shielded, max. | | 1 000 m |
| • unshielded, max. | | 600 m |
| **Analog inputs** | | |
| Number of analog inputs | 4 | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 20 V | 20 V |
| permissible input current for current input (destruction limit), max. | 40 mA | 40 mA |
| **Input ranges (rated values), voltages** | | |
| • 0 to +10 V | Yes | Yes |
| • -1.75 V to +11.75 V | Yes | Yes |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes | Yes |
| • 0 to 23.5 mA | Yes | Yes |
| • -3.5 mA to +23.5 mA | Yes | Yes |
| • 4 mA to 20 mA | Yes | Yes |
| **Input ranges (rated values), thermocouples** | | |
| • Type B | Yes | Yes |
| • Type E | Yes | Yes |
| • Type J | Yes | Yes |
| • Type K | Yes | Yes |
| • Type R | Yes | Yes |
| • Type S | Yes | Yes |
| **Input ranges (rated values), resistance thermometer** | | |
| • Pt 100 | Yes | Yes |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
|   - internal temperature compensation | Yes | Yes |
|   - external temperature compensation with Pt100 | Yes | Yes |
| **Characteristic linearization** | | |
| • parameterizable | Yes | Yes |
|   - for thermocouples | Type B, E, J, K, R, S | Type B, E, J, K, R, S |
|   - for resistance thermometer | Pt100 (standard) | Pt100 (standard) |
| **Cable length** | | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples | 200 m; 50 m at 80 mV and thermocouples |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 355-2 temperature controller module

### Technical specifications (continued)

| Article number | **6ES7355-2CH00-0AE0** | **6ES7355-2SH00-0AE0** |
|---|---|---|
| | TEMPERATURE CONTROL MOD. FM355-2C | SIMATIC S7-300, TEMPERATURE |
| **Analog outputs** | | |
| Number of analog outputs | 4 | |
| Voltage output, short-circuit protection | Yes | |
| Voltage output, short-circuit current, max. | 25 mA | |
| Current output, no-load voltage, max. | 18 V | |
| **Output ranges, voltage** | | |
| • 0 to 10 V | Yes | |
| • -10 V to +10 V | Yes | |
| **Output ranges, current** | | |
| • 0 to 20 mA | Yes | |
| • 4 mA to 20 mA | Yes | |
| **Connection of actuators** | | |
| • for voltage output two-wire connection | Yes | |
| • for current output two-wire connection | Yes | |
| **Load impedance (in rated range of output)** | | |
| • with voltage outputs, min. | 1 kΩ | |
| • with voltage outputs, capacitive load, max. | 1 μF | |
| • with current outputs, max. | 500 Ω | |
| • with current outputs, inductive load, max. | 1 mH | |
| **Cable length** | | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples | |
| **Analog value generation for the inputs** | | |
| Measurement principle | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 14 bit | 14 bit |
| • Conversion time (per channel) | 100 ms; At 50/60 Hz | 100 ms; At 50/60 Hz |
| **Analog value generation for the outputs** | | |
| **Settling time** | | |
| • for resistive load | 0.1 ms | |
| • for capacitive load | 3.3 ms | |
| • for inductive load | 0.5 ms | |
| **Encoder** | | |
| **Connection of signal encoders** | | |
| • for voltage measurement | Yes | Yes |
| • for current measurement as 4-wire transducer | Yes | Yes |
| **Connectable encoders** | | |
| • 2-wire sensor | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA |
| **Errors/accuracies** | | |
| Linearity error (relative to input range), (+/-) | 0.05 % | 0.05 % |
| Temperature error ( relative to input range), (+/-) | 0.005 %/K | 0.005 %/K |
| Linearity error (relative to output range), (+/-) | 0.05 % | |
| Temperature error (relative to output range), (+/-) | 0.02 %/K | |

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## Technical specifications (continued)

| Article number | 6ES7355-2CH00-0AE0 | 6ES7355-2SH00-0AE0 |
|---|---|---|
| | TEMPERATURE CONTROL MOD. FM355-2C | SIMATIC S7-300, TEMPERATURE |
| **Operational error limit in overall temperature range** | | |
| • Voltage, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-0.7% | 0.06 %; +/-0.06 to +/-0.7% |
| • Current, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-0.7% | 0.06 %; +/-0.06 to +/-0.7% |
| • Resistance thermometer, relative to input range, (+/-) | 0.6 %; +/-0.6 to +/-0.7% | 0.06 %; +/-0.06 to +/-0.7% |
| • Voltage, relative to output range, (+/-) | 0.5 % | |
| • Current, relative to output range, (+/-) | 0.6 % | |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to input range, (+/-) | 0.04 %; +/-0.04 to +/-0.5% | 0.04 %; +/-0.04 to +/-0.5% |
| • Current, relative to input range, (+/-) | 0.04 %; +/-0.04 to +/-0.5% | 0.04 %; +/-0.04 to +/-0.5% |
| • Resistance thermometer, relative to input range, (+/-) | 0.04 %; +/-0.04 to +/-0.5% | 0.04 %; +/-0.04 to +/-0.5% |
| • Voltage, relative to output range, (+/-) | 0.4 % | |
| • Current, relative to output range, (+/-) | 0.5 % | |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB | 40 dB |
| • Common mode interference (USS < 2.5 V) , min. | 70 dB | 70 dB |
| **Interrupts/diagnostics/ status information** | | |
| Substitute values connectable | Yes; Parameterizable | Yes; Parameterizable |
| **Integrated Functions** | | |
| **Control technology** | | |
| • Number of closed-loop controllers | 4 | 4 |
| **Potential separation** | | |
| **Potential separation controller** | | |
| • between the channels | No | No |
| • between the channels and backplane bus | Yes; Optocoupler | Yes; Optocoupler |
| **Permissible potential difference** | | |
| Between the inputs and MANA (UCM) | 2.5 V DC | 2.5 V DC |
| **Isolation** | | |
| Isolation tested with | 500 V DC | 500 V DC |
| **Connection method** | | |
| required front connector | 2x 20-pin | 2x 20-pin |
| **Dimensions** | | |
| Width | 80 mm | 80 mm |
| Height | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm |
| **Weights** | | |
| Weight, approx. | 470 g | 470 g |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## FM 355-2 temperature controller module

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **FM 355-2 C temperature controller module** | **6ES7355-2CH00-0AE0** | **Labeling strips** | **6ES7392-2XX00-0AA0** |
| with 4 analog outputs for 4 continuous-action controllers | | 10 units (spare part) | |
| | | **Labeling sheets for machine inscription** | See under "Accessories", page 5/264 |
| **FM 355-2 S temperature controller module** | **6ES7355-2SH00-0AE0** | **Slot number label** | **6ES7912-0AA00-0AA0** |
| with 8 digital outputs for 4 step or pulse controllers | | Spare part | |
| **Front connector** | | **Shield connection element** | **6ES7390-5AA00-0AA0** |
| 20-pin, with screw contacts | | 80 mm wide, with 2 rows for 4 terminals each | |
| • 1 unit | **6ES7392-1AJ00-0AA0** | | |
| • 100 units | **6ES7392-1AJ00-1AB0** | **Shield connection clamps** | |
| 20-pin, with spring-loaded contacts | | 2 units | |
| • 1 unit | **6ES7392-1BJ00-0AA0** | For 2 cables with 2 mm to 6 mm diameter | **6ES7390-5AB00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** | For 1 cable with 3 mm to 8 mm diameter | **6ES7390-5BA00-0AA0** |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | For 1 cable with 4 mm to 13 mm diameter | **6ES7390-5CA00-0AA0** |
| 1 unit (spare part) | | | |

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## Overview



- Interface between max. 3 absolute encoders (SSI) and the CPU
- For provision of the displacement encoder values for further processing in STEP 7 programs
- Enables direct response of controller to encoder values in moving systems

Note:

Displacement measuring systems and precut/pre-assembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

http://www.siemens.com/simatic-technology

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## Technical specifications

| Article number | 6ES7338-4BC01-0AB0 |
|---|---|
| | SM 338, F. 3 SSI ENCODERS |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| from load voltage L+ (without load), max. | 100 mA |
| from backplane bus 5 V DC, max. | 160 mA |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Output current, max. | 900 mA |
| **Power loss** | |
| Power loss, typ. | 3 W |
| **Digital inputs** | |
| **Input voltage** | |
| • for signal "0" | -3 to +5V |
| • for signal "1" | 11 to 30.2 V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 9 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", min. | 300 µs |
| **Cable length** | |
| • shielded, max. | 600 m |

| Article number | 6ES7338-4BC01-0AB0 |
|---|---|
| | SM 338, F. 3 SSI ENCODERS |
| **Encoder** | |
| Number of connectable encoders, max. | 3 |
| **Connectable encoders** | |
| • Absolute encoder (SSI) | Yes |
| • 2-wire sensor | Yes |
| **Encoder signals, absolute encoder (SSI)** | |
| • Cable length, shielded, max. | 320 m; 320 m at 125 kHz; 160 m at 250 kHz; 60 m at 500 kHz; 20 m at 1 MHz |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Potential separation** | |
| Potential separation exists | No |
| **Connection method** | |
| required front connector | 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 235 g |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## SM 338 POS input module

**■ Ordering data**     Article No.          Article No.

| | Article No. |
|---|---|
| **SM 338 POS input module** | **6ES7338-4BC01-0AB0** |
| For position sensing with 3 SSI encoders | |
| **Front connector** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| e.g. for 32-channel modules; for connecting 1.3 mm$^2$/16 AWG conductors | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

**Signal cable**     Article No.

Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA

**6FX5002-2CC12-■ ■ ■ ■**

| | | | | |
|---|---|---|---|---|
| 0 m | 1 | | | |
| 100 m | 2 | | | |
| 200 m | 3 | | | |
| 0 m | | A | | |
| 10 m | | B | | |
| 20 m | | C | | |
| 30 m | | D | | |
| 40 m | | E | | |
| 50 m | | F | | |
| 60 m | | G | | |
| 70 m | | H | | |
| 80 m | | J | | |
| 90 m | | K | | |
| 0 m | | | A | |
| 1 m | | | B | |
| 2 m | | | C | |
| 3 m | | | D | |
| 4 m | | | E | |
| 5 m | | | F | |
| 6 m | | | G | |
| 7 m | | | H | |
| 8 m | | | J | |
| 9 m | | | K | |
| 0.0 m | | | | 0 |
| 0.1 m | | | | 1 |
| 0.2 m | | | | 2 |
| 0.3 m | | | | 3 |
| 0.4 m | | | | 4 |
| 0.5 m | | | | 5 |
| 0.6 m | | | | 6 |
| 0.7 m | | | | 7 |
| 0.8 m | | | | 8 |

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## Overview



- For connecting up to 4 drives with analog setpoint interface or pulse-direction interface to a controller
- Operation with isochronous PROFIBUS DP
- Connectable drives:
  - Electrical drives
  - Hydraulic drives
  - Stepper drives
- Can be used with:
  - SIMATIC CPU 41x-2 DP, CPU 31x-2 DP, CPU 31xT-2 DP, WinAC RTX 2008
  - SIMOTION C2xx, SIMOTION P350, SIMOTION D4x5
- Can also be used with external encoders

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## Technical specifications

| Article number | 6ES7174-0AA10-0AA0 |
|---|---|
| | IM 174  FOR  CONNECTING ANALOG DRIVES |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| Current consumption, max. | 500 mA |
| from backplane bus 5 V DC, max. | 100 mA |
| **Encoder supply** | |
| **5 V encoder supply** | |
| • 5 V | Yes |
| • Output current, max. | 1.2 A |
| • Cable length, max. | 25 m |
| **24 V encoder supply** | |
| • 24 V | Yes |
| • Output current, max. | 1.4 A |
| • Cable length, max. | 100 m |
| **Absolute encoder (SSI) encoder supply** | |
| • Absolute encoder (SSI) | Yes |
| • short-circuit protection | Yes |
| **Power loss** | |
| Power loss, typ. | 12 W |
| **Digital inputs** | |
| Number of digital inputs | 10 |
| **Input voltage** | |
| • for signal "0" | -3 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 2 mA |
| • for signal "1", typ. | 8 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", min. | 15 µs |

| Article number | 6ES7174-0AA10-0AA0 |
|---|---|
| | IM 174  FOR  CONNECTING ANALOG DRIVES |
| **Cable length** | |
| • shielded, max. | 100 m |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| Short-circuit protection | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 1 A |
| • on lamp load, max. | 30 W |
| **Output voltage** | |
| • Rated value (DC) | 24 V; L+ |
| • for signal "1", min. | L+ (-3 V) |
| • for signal "1", max. | 3 V |
| **Output current** | |
| • for signal "1" permissible range for 0 to 55 °C, min. | 5 mA |
| • for signal "1" permissible range for 0 to 55 °C, max. | 300 mA |
| • for signal "0" residual current, max. | 0.4 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 500 µs |
| **Switching frequency** | |
| • with resistive load, max. | 500 Hz |
| • with inductive load, max. | 0.5 Hz |
| **Relay outputs** | |
| • Number of relay outputs | 4 |
| • Number of operating cycles, max. | 50 000 |
| **Switching capacity of contacts** | |
| - with resistive load, max. | 1 A |
| **Cable length** | |
| • shielded, max. | 600 m |
| **Analog outputs** | |
| Number of analog outputs | 4 |
| **Output ranges, voltage** | |
| • -10 V to +10 V | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## IM 174 PROFIBUS module

### ■ Technical specifications (continued)

| Article number | 6ES7174-0AA10-0AA0 |
| --- | --- |
| | IM 174 FOR CONNECTING ANALOG DRIVES |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 15 bit |
| **Encoder** | |
| Number of connectable encoders, max. | 4 |
| **Connectable encoders** | |
| • Incremental encoder (symmetrical) | Yes |
| • Absolute encoder (SSI) | Yes |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 2 mA |
| **Encoder signals, incremental encoder (symmetrical)** | |
| • Trace mark signals | A, notA, B, notB |
| • Zero mark signal | N, notN |
| • Input signal | 5 V difference signal (phys. RS 422) |
| • Input frequency, max. | 1 MHz |
| • Cable length, shielded, max. | 35 m; 35 m at max. 500 kHz; 10 m at max. 1 MHz |
| **Encoder signals, absolute encoder (SSI)** | |
| • Input signal | 5 V difference signal (phys. RS 422) |
| • Data signal | DATA, notDATA |
| • Clock signal | CL, notCL |
| • Telegram length, parameterizable | 13, 21, 24 bit |
| • Clock frequency, max. | 1.5 MHz; 187.5 KHz 1.5 MHz (parameterizable) |
| • Binary code | Yes |
| • Gray code | Yes |
| • Cable length, shielded, max. | 250 m; 250 m at 187.5 kHz, 10 m at 1.5 MHz |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| shortest clock pulse | 1.5 ms |

| Article number | 6ES7174-0AA10-0AA0 |
| --- | --- |
| | IM 174 FOR CONNECTING ANALOG DRIVES |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Drive interface** | |
| Number of drive interfaces | 4 |
| **Analog drive** | |
| **Setpoint signal** | |
| - Short-circuit proof | Yes; max. 45 mA, min. 3.3 kOhm load impedance |
| - Rated voltage range | -10.5 V to +10.5 V |
| - Output current | -3 to +3 mA |
| **Output controller enable** | |
| - Number of relay contacts | 4 |
| - Switching voltage, max. | 30 V |
| - Switching current, max. | 1 A |
| - Switching capacity, max. | 30 V·A |
| - Number of switching cycles, min. | 50 000; at 30 V DC, 1 A |
| - Cable length, shielded, max. | 35 m |
| **Stepper drive** | |
| • Differential output voltage, min. | 2 V; R = 100 Ohm |
| • Differential output voltage for signal "0", max. | 1 V; For I = -20 mA |
| • Differential output voltage for signal "1", min. | 3.7 V; 3.7 V at I = -20 mA; 4.5 V at I = -100 µA, |
| • Load resistance, min. | 55 Ω |
| • Output current, max. | 60 mA |
| • Pulse frequency | 750 kHz |
| • Cable length, shielded, max. | 50 m; in hybrid operation with analog axes 35 m, in asymmetrical transmission 10 m |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | Yes; to encoders, analog outputs, DP interface; no to other DI/DOs |
| **Potential separation digital outputs** | |
| • Potential separation digital outputs | Yes; to encoders, analog outputs, DP interface; no to other DI/DOs |
| **Connection method** | |
| required front connector | 40-pin |
| **Dimensions** | |
| Width | 160 mm |
| Height | 125 mm |
| Depth | 118 mm |
| **Weights** | |
| Weight, approx. | 1 kg |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 174 PROFIBUS module** | **6ES7174-0AA10-0AA0** | **Setpoint cable** | **6FX2002-3AD01-■ ■ ■ ■** |
| PROFIBUS module for connecting analog drives and stepper drives to a controller | | for the connection between IM 174 and SIMODRIVE 611-A | |
| | | 0 m | **1** |
| | | 100 m | **2** |
| | | 200 m | **3** |
| | | 0 m | **A** |
| | | 10 m | **B** |
| | | 20 m | **C** |
| | | 30 m | **D** |
| | | 40 m | **E** |
| | | 50 m | **F** |
| | | 60 m | **G** |
| | | 70 m | **H** |
| | | 80 m | **J** |
| | | 90 m | **K** |
| | | 0 m | **A** |
| | | 1 m | **B** |
| | | 2 m | **C** |
| | | 3 m | **D** |
| | | 4 m | **E** |
| | | 5 m | **F** |
| | | 6 m | **G** |
| | | 7 m | **H** |
| | | 8 m | **J** |
| | | 9 m | **K** |
| | | 0.0 m | **0** |
| | | 0.1 m | **1** |
| | | 0.2 m | **2** |
| | | 0.3 m | **3** |
| | | 0.4 m | **4** |
| | | 0.5 m | **5** |
| | | 0.6 m | **6** |
| | | 0.7 m | **7** |
| | | 0.8 m | **8** |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## SIWAREX U

### ■ Overview

SIWAREX U is a versatile weighing module for all simple weighing and force measuring tasks. The compact module can be integrated into SIMATIC automation systems without any problems. Complete data access is possible via the SIMATIC.

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### ■ Technical specifications

| SIWAREX U | |
|---|---|
| **Integration in automation systems** | |
| • S7-300 | Direct integration |
| • S7-1500 | Through ET 200M |
| • S7-400 (H) | Through ET 200M |
| • PCS 7 (H) | Through ET 200M |
| • Automation systems from other vendors | Through ET 200M |
| • Stand-alone (without SIMATIC CPU) | Possible with IM 153-1 |
| **Communication interfaces** | • SIMATIC S7 (P bus)<br>• RS 232<br>• TTY |
| **Connection of remote displays** (through TTY serial interface) | Gross, channel 1, 2 or default value 1, 2 |
| **Adjustment of scales settings** | Through SIMATIC (P bus) or PC using SIWATOOL U (RS 232) |
| **Measuring properties** | |
| Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution ADC<br>Data format of weight values | 65535<br>2 byte (fixed-point) |
| **Number of measurements/second** | 50 |
| **Digital filter** | 0.05 ... 5 Hz (in 7 steps), mean value filter |
| **Weighing functions** | |
| Weight values | Gross |
| Limit values | 2 (min./max.) |
| Zero setting function | Per command |
| **Load cells** | Strain gages in 4-wire or 6-wire system |

| SIWAREX U | |
|---|---|
| **Load cell powering** | |
| Supply voltage $U_s$ (rated value) | 6 V DC[1] |
| Max. supply current | ≤ 150 mA per channel |
| Permissible load resistance | |
| • $R_{Lmin}$ | > 40 Ω per channel |
| • $R_{Lmax}$ | < 4010 Ω |
| With Ex(i) interface | |
| • $R_{Lmin}$ | > 87 Ω per channel |
| • $R_{Lmax}$ | < 4010 Ω |
| **Permissible load cell characteristic** | Up to 4 mV/V |
| **Max. distance of load cells** | 500 m[2]<br>150/500 m for gas group IIC<br>500 m[2] for gas group IIB<br>(see SIWAREX IS Manual) |
| **Intrinsically-safe load cell powering** | Optional (Ex interface) with SIWAREX IS |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 150 mA (single-channel) / 240 mA (dual-channel) |
| Current consumption on backplane bus | ≤ 100 mA |
| **Certification** | ATEX 95, FM, cUL$_{US}$ Haz. Loc. |
| **IP degree of protection to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** | |
| $T_{min (IND)}$ to $T_{max (IND)}$) (operating temperature) | |
| • Horizontal installation | 0 ... +60 °C (32 ... 140 °F) |
| • Vertical installation | 0 ... +40 °C (32 ... 104 °F) |
| **EMC requirements according to** | according to NAMUR NE21, Part 1; EN 61326 |
| **Dimensions** | 40 x 125 x 130 mm<br>(1.58 x 4.92 x 5.12 in) |

[1] Load cell supply changed to 6 V DC as compared to 7MH4601-1AA01 and ... 1BA01.

[2] Possible up to 1000 m under certain conditions when using the recommended cable (accessories).

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX U**<br>For SIMATIC S7 and ET 200M,<br>incl. bus connector,<br>weight 0.3 kg (0.661 lb) | | **Installation material<br>(mandatory)** | |
| Single-channel version[1]<br>for connecting one scale | **7MH4950-1AA01** | **20-pin front plug<br>with screw contacts**<br>Required for each<br>SIWAREX module | **6ES7392-1AJ00-0AA0** |
| Two-channel version[2]<br>for connecting two scales | **7MH4950-2AA01** | **Shield connection element**<br>Sufficient for two<br>SIWAREX U modules | **6ES7390-5AA00-0AA0** |
| **SIWAREX U manual** | | **Shield connection clamp** | **6ES7390-5CA00-0AA0** |
| Available in a range of languages | | Contents: 2 units (suitable for<br>cable with diameter 4 ... 13 mm)<br>(0.16 ... 0.51 in) | |
| Free download from the Internet at:<br>http://www.siemens.com/weighing-<br>technology | | Note:<br>one shield connection clamp<br>each is required for:<br>• Scale connection<br>• RS 485 interface<br>• RS 232 interface | |
| **SIWAREX U configuration<br>package for TIA Portal and<br>STEP 7** | **7MH4950-1AK02** | | |
| On CD-ROM<br>• SIWATOOL U PC software<br>  (available in a range of<br>  languages), new design<br>• Sample program "Getting started"<br>  – ready to use application for<br>  SIMATIC S7 and TIA Portal<br>• SIWAREX U manual on CD<br>  (in a range of languages),<br>  new design<br>• HSP Hardware Support Package<br>  for integrating SIWAREX U in<br>  STEP 7 | | **S7 DIN rail**<br>• 160 mm (6.30 in)<br>• 480 mm (18.90 in)<br>• 530 mm (20.87 in)<br>• 830 mm  (32.68 in)<br>• 2000 mm  (78.74 in) | **6ES7390-1AB60-0AA0**<br>**6ES7390-1AE80-0AA0**<br>**6ES7390-1AF30-0AA0**<br>**6ES7390-1AJ30-0AA0**<br>**6ES7390-1BC00-0AA0** |
| | | **Accessories (optional)** | |
| | | **Labeling strips**<br>(10 units, spare part) | **6ES7392-2XX00-0AA0** |
| **SIWAREX U configuration<br>package for PCS7 S7,<br>version 7.0 and V7.1** | **7MH4950-3AK61** | **Remote displays (option)** | |
| Suitable for 7MH4950-1AA01<br>and 7MH4950-2AA01 | | The digital remote displays can be<br>connected directly to SIWAREX U<br>through a TTY interface. | |
| On CD-ROM<br>• Function block for the CFC<br>• Faceplate<br>• SIWATOOL U commissioning<br>  software<br>• Manual | | The following remote displays can<br>be used: | |
| | | S102, S302 | |
| **SIWAREX U configuration<br>package for PCS7, version 8.0** | **7MH4950-3AK62** | Siebert Industrieelektronik GmbH<br>Postfach 1180<br>D-66565 Eppelborn, Germany<br>Tel.: +49 6806/980-0<br>Fax: +49 6806/980-999<br>Internet: http://www.siebert.de | |
| Suitable for 7MH4950-xAA01<br>• Function block for the CFC<br>• Faceplate<br>• SIWATOOL U commissioning<br>  software<br>• Manual | | Detailed information is available<br>from the manufacturer. | |
| **SIWAREX U APL configuration<br>package for PCS7, version 8.0,<br>Update 1** | **7MH4950-3AK65** | **SIWAREX JB junction box,<br>aluminum housing** | **7MH4710-1BA** |
| Suitable for 7MH4950-xAA01<br>• Function block for the CFC<br>• APL-style faceplate<br>• SIWATOOL U commissioning<br>  software<br>• Manual | | For connecting up to 4 load cells<br>in parallel, and for connecting<br>several junction boxes | |
| | | **SIWAREX JB junction box,<br>stainless steel housing** | **7MH4710-1EA** |
| | | For connecting up to 4 load cells<br>in parallel. | |
| **SIWATOOL connecting cable** | **7MH4607-8CA** | **SIWAREX JB junction box,<br>stainless steel housing (ATEX)** | **7MH4710-1EA01** |
| From SIWAREX U/CS with serial PC<br>interface, for 9-pin PC interfaces<br>(RS 232), length 3 m (9.84 ft) | | For parallel connection of up to<br>4 load cells (for zone allocation,<br>see manual or type examination<br>certificate). | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## SIWAREX U

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Ex interface SIWAREX IS** | | **Cable (optional)** | |

**Ex interface SIWAREX IS**
For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.
- With short-circuit current < 199 mA DC — **7MH4710-5BA**
- With short-circuit current < 137 mA DC — **7MH4710-5CA**

**Cable (optional)**

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY**

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible.

External diameter: approx. 10.8 mm (0.43 inch)

Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.
- Sheath color: orange — **7MH4702-8AG**
- For potentially explosive atmospheres. Sheath color: blue — **7MH4702-8AF**

[1] Compatible with 7MH4601-1AA01; supply of load cells changed to 6 V DC.
[2] Compatible with 7MH4601-1BA01; supply of load cells changed to 6 V DC.

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## Overview



SIWAREX FTA (Flexible Technology, Automatic Weighing Instrument) is a versatile and flexible weighing module for industrial use. It can be used in both non-automatic and automatic weighing operation, for example the production of mixtures, and for filling, loading, monitoring and bag filling.

It has the corresponding scale approvals and is also suitable for legal-for-trade weighing systems.

The SIWAREX FTA function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integrated communication, diagnostics and configuration tools.

## Technical specifications

| SIWAREX FTA | |
| --- | --- |
| **Use in automation systems** | |
| S7-300 | Directly or through ET 200M |
| S7-1500 | Through ET 200M |
| S7-400 (H) | Through ET 200M |
| PCS 7 (H) | Through ET 200M |
| **Communication interfaces** | |
| S7 | Through backplane bus |
| RS 232 | For SIWATOOL or printer connection |
| RS 485 | For remote display or digital load cell |
| **Module parameterization** | Using SIMATIC S7 |
| | Using SIWATOOL FTA software (RS 232) |
| **Measuring properties** | |
| EU type approval as non-automatic weighing machine, trade class III | 3 x 6 000 d ≥ 0.5 µV/e |
| Internal resolution | 16 million parts |
| Internal/external updating rate | 400/100 Hz |
| **Several parameterizable digital filters** | Critically dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter |
| **Weighing functions** | |
| Non-automatic weighing machine | OIML R76 |
| Automatic weighing machine | OIML R51, R61, R107 |
| **Load cells** | Strain gages in 4-wire or 6-wire system |
| 3 characteristic value ranges | 1, 2 or 4 mV/V |
| **Load cell powering** | |
| Supply voltage $U_S$ (rated value) | 10.3 V DC |
| Max. supply current | 184 mA |
| Permissible load cell resistance | |
| • $R_{Lmin}$ | > 56 Ω<br>> 87 Ω with Ex interface |
| • $R_{Lmax}$ | ≤ 4 010 Ω |

| SIWAREX FTA | |
| --- | --- |
| **Max. distance of load cells** | |
| When using the recommended cable: | |
| Standard | 1 000 m (3 280 ft) |
| In hazardous area[1]<br>• For gases of group IIC<br>• For gases of group IIB | <br>300 m (984 ft)<br>1000 m (3 280 ft) |
| **Connection to load cells in Ex zone 1** | Optionally via SIWAREX IS Ex interface |
| **Ex approvals zone 2 and safety** | ATEX 95, FM, cUL$_{US}$ Haz. Loc. |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 500 mA |
| Current consumption from backplane bus | typ. 55 mA |
| **Inputs/outputs** | |
| Digital inputs | 7 DI electrically isolated |
| Digital outputs | 8 DO electrically isolated |
| Counter input | Up to 10 kHz |
| Analog output<br>• Current range<br>• Updating rate | <br>0/4 ... 20 mA<br>100 Hz |
| **Approvals** | EU type approval (CE, OIML R76) |
| | EU prototype test to MID (OIML R51, R61, R107) |
| **Degree of protection according to EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** | |
| $T_{min (IND)} \cdots T_{max (IND)}$ (operating temperature)<br>• Horizontal installation<br>• Vertical installation | <br><br>-10 ... 60 °C (14 ... 140 °F)<br>-10 ... 40 °C (14 ... 104 °F) |
| **EMC requirements** | EN 61326, EN 45501, NAMUR NE21, Part 1 |
| **Dimensions** | 80 x 125 x 130 mm (3.15 x 4.92 x 5.12 in) |
| **Weight** | 600 g (0.44 lb) |

[1] For further details, see Ex interface, type SIWAREX IS

# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Function modules

**SIWAREX FTA**

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| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX FTA**<br>Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M.<br>EU type approval 3 x 6000 d<br>Applications: proportioning, filling, bagging, loading.<br>Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline. | 7MH4900-2AA01 | **Calibration set for SIWAREX FTA**<br>For verification of up to 5 scales comprising:<br>• 3 x inscription foil for labeling<br>• 1 x protection foil<br>• Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA manual on CD-ROM | 7MH4900-2AY10 |
| **SIWAREX FTA manual**<br>Available in a range of languages<br>Free download from the Internet at:<br>http://www.siemens.com/weighing-technology | | **SIWATOOL connecting cable**<br>From SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)<br>• 2 m long (6.56 ft)<br>• 5 m long (16.40 ft) | <br><br><br>7MH4702-8CA<br>7MH4702-8CB |
| **SIWAREX FTA "Getting started"**<br>Sample software shows beginners how to program the scales in STEP 7.<br>Free download from the Internet at:<br>http://www.siemens.com/weighing-technology | | **Front connector, 40-pin**<br>Required for each SIWAREX module<br>• With screw contacts<br>• With spring-loaded terminals | <br><br>6ES7392-1AM00-0AA0<br>6ES7392-1BM01-0AA0 |
| **SIWAREX FTA configuration package on CD-ROM, for TIA Portal and STEP 7**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• SIWAREX FTA "Getting started"<br>• SIWATOOL FTA commissioning software<br>• Flexible software for legal-for-trade display in WinCC<br>• Manual | 7MH4900-2AK02 | **Shield connection element**<br>Sufficient for one SIWAREX FTA module | 6ES7390-5AA00-0AA0 |
| **SIWAREX FTA configuration package for PCS 7 V7.0 on CD-ROM**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for CFC<br>• Faceplate<br>• SIWATOOL FTA commissioning software<br>• Manual | 7MH4900-2AK62 | **Shield connection clamp**<br>Contents: 2 units<br>(suitable for cable with diameter 4 ... 13 mm (0.16 ... 0.51 in))<br>Note:<br>one shield connection clamp each is required for:<br>• Scale connection<br>• RS 485 interface<br>• RS 232 interface | 6ES7390-5CA00-0AA0 |
| **SIWAREX FTA configuration package for SIMATIC PCS 7, Version 8.0 on CD-ROM**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for CFC<br>• Faceplate<br>• SIWATOOL FTA commissioning software<br>• Manual | 7MH4900-2AK63 | **S7 DIN rail**<br>• 160 mm (6.30 in)<br>• 480 mm (18.90 in)<br>• 530 mm (20.87 in)<br>• 830 mm (32.68 in)<br>• 2000 mm (78.74 in) | <br>6ES7390-1AB60-0AA0<br>6ES7390-1AE80-0AA0<br>6ES7390-1AF30-0AA0<br>6ES7390-1AJ30-0AA0<br>6ES7390-1BC00-0AA0 |
| **SIWAREX FTA APL configuration package for SIMATIC PCS 7, Version 8.0, Update 1 on CD-ROM**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for CFC<br>• APL-style faceplate<br>• SIWATOOL FTA commissioning software<br>• Manual | 7MH4900-2AK65 | **MMC memory**<br>For data recording up to 32 MB, only for legal-for-trade applications R76, R51 and R107 | 7MH4900-2AY21 |

| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **Remote displays (option)** | | **Cable (optional)** | |
| The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTA via an RS 485 interface. | | **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY** | |
| Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de | | For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. | |
| Detailed information is available from the manufacturer. | | External diameter: approx. 10.8 mm (0.43 in) | |
| **SIWAREX JB junction box, aluminum housing** | **7MH4710-1BA** | Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). | |
| For connecting up to 4 load cells in parallel, and for connecting several junction boxes | | Sold by the meter. • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue | **7MH4702-8AG** **7MH4702-8AF** |
| **SIWAREX JB junction box, stainless steel housing** | **7MH4710-1EA** | | |
| For connecting up to 4 load cells in parallel | | | |
| **SIWAREX JB junction box, stainless steel housing (ATEX)** | **7MH4710-1EA01** | | |
| For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate). | | | |
| **Ex interface SIWAREX IS** | | | |
| For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC | **7MH4710-5BA** **7MH4710-5CA** | | |

**5**

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## SIWAREX FTC

### ■ Overview

The SIWAREX FTC (Flexible Technology for Continuous Weighing) is a versatile and flexible weighing module for belt scales, loss-in-weight scales and bulk flow meters.
It can also be used to record weights and measure force.
The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

### ■ Technical specifications

| SIWAREX FTC | |
|---|---|
| **Use in automation systems** | |
| S7-300 | Directly or via ET 200M |
| S7-1500 | Through ET 200M |
| S7-400 (H) | Through ET 200M |
| PCS 7 (H) | Through ET 200M |
| **Communication interfaces** | |
| S7 | Through backplane bus |
| RS 232 | For SIWATOOL or printer connection |
| RS 485 | For remote display or digital load cell |
| **Module parameterization** | |
| | Using SIMATIC S7 |
| | Using SIWATOOL FTC software (RS 232) |
| **Measuring properties** | |
| Accuracy to EN 45501 | 3 x 6 000 d ≥ 0.5 µV/e |
| Internal resolution | +/- 8 million parts |
| Internal/external updating rate | 400/100 Hz |
| **Several parameterizable digital filters** | Critically dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter |
| **Weighing functions** | |
| | • Non-automatic weighing machine, force measurement |
| | • Conveyor scale |
| | • Differential proportioning weigher |
| | • Bulk flow meter |
| **Load cells** | Strain gages in 4-wire or 6-wire system |
| 3 characteristic value ranges | 1, 2 or 4 mV/V |
| **Load cell powering** | |
| Supply voltage $U_S$ (rated value) | 10.3 V DC |
| Max. supply current | 184 mA |
| Permissible load cell resistance | |
| • $R_{Lmin}$ | > 56 Ω<br>> 87 Ω with Ex interface |
| • $R_{Lmax}$ | ≤ 4 010 Ω |

| SIWAREX FTC | |
|---|---|
| **Max. distance of load cells** | |
| When using the recommended cable: | |
| Standard | 1 000 m (3 280 ft) |
| In hazardous area[1]<br>• For gases of group IIC<br>• For gases of group IIB | <br>300 m (984 ft)<br>1 000 m (3 280 ft) |
| **Connection to load cells in Ex zone 1** | Optionally via SIWAREX IS Ex interface |
| **Ex approvals zone 2 and safety** | ATEX 95, FM, cUL$_{US}$ Haz. Loc. |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | 500 mA |
| Current consumption from backplane bus | typ. 55 mA |
| **Inputs/outputs** | |
| Digital inputs | 7, electrically isolated |
| Digital outputs | 8, electrically isolated |
| Counter input | Up to 10 kHz |
| Analog output<br>• Current range<br>• Updating rate | <br>0/4 ... 20 mA<br>100 Hz |
| **Degree of protection according to EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** | |
| $T_{min (IND)}$ ··· $T_{max (IND)}$ (operating temperature)<br>• Horizontal installation<br>• Vertical installation | <br><br>-10 ... 60 °C (14 ... 140 °F)<br>-10 ... 40 °C (14 ... 104 °F) |
| **EMC requirements** | EN 61326, EN 45501, NAMUR NE21, Part 1 |
| **Dimensions** | 80 x 125 x 130 mm (3.15 x 4.92 x 5.12 in) |
| **Weight** | 600 g (0.44 lb) |

[1] For further details, see Ex interface, type SIWAREX IS

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIWAREX FTC**<br><br>Weighing electronics for S7-300 and ET 200M.<br><br>Applications: Belt scales, force measurement, loss-in-weight scales and solids flowmeters | 7MH4900-3AA01 | **SIWAREX FTC_B configuration package for PCS 7 Version V7.0 and V7.1 on CD-ROM (conveyor scale)**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for CFC<br>• Faceplate<br>• Commissioning software SIWATOOL FTC_B for conveyor scales<br>• Manual | 7MH4900-3AK63 |
| **SIWAREX FTC_B manual for belt scales**<br><br>Available in a range of languages<br><br>Free download from the Internet at: http://www.siemens.com/weighing-technology | | **SIWAREX FTC_B configuration package for PCS 7 Version V8.0 on CD-ROM (conveyor scale)**<br>• HSP Hardware Support Package for FTA/FTC package<br>• Function block for the CFC<br>• Faceplate<br>• SIWATOOL commissioning software<br>• Manual | 7MH4900-3AK65 |
| **SIWAREX FTC_L manual for solids flowmeters and loss-in-weight scales**<br><br>Available in a range of languages<br><br>Free download from the Internet at: http://www.siemens.com/weighing-technology | | **Configuration package SIWAREX FTC_L for PCS 7 V8.0 on CD-ROM (loss-in-weight scales)**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for the CFC<br>• Faceplate<br>• Commissioning software SIWATOOL FTC_L for solids flowmeters and loss-in-weight scales<br>• Manual | 7MH4900-3AK66 |
| **SIWAREX FTC "Getting started" for belt scales**<br><br>Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode<br><br>Free download from the Internet at: http://www.siemens.com/weighing-technology | | | |
| **SIWAREX FTC "Getting started" for solids flowmeters**<br><br>Sample software shows beginners how to program the scales in STEP 7 for bulk flow meter mode<br><br>Free download from the Internet at: http://www.siemens.com/weighing-technology | | **SIWAREX FTC_L configuration package for PCS 7 V7.0 and V7.1 on CD-ROM (loss-in-weight scales)**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• Function block for the CFC<br>• Faceplate<br>• Commissioning software SIWATOOL FTC_L for bulk flow meters and loss-in-weight scales<br>• Manual | 7MH4900-3AK64 |
| **SIWAREX FTC "Getting started" for loss-in-weight scales**<br><br>Sample software shows beginners how to program scales in STEP 7 for differential proportioning weigher mode<br><br>Free download from the Internet at: http://www.siemens.com/weighing-technology | | **SIWATOOL connecting cable**<br>from SIWAREX FTC with serial PC interface, for 9-pin PC interfaces (RS 232)<br>• 2 m long (6.56 ft)<br>• 5 m long (16.40 ft) | <br><br><br><br>7MH4702-8CA<br>7MH4702-8CB |
| **Configuration package SIWAREX FTC_B for the TIA Portal and STEP 7 on CD-ROM (belt scales)**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• "Getting started" for conveyor scales<br>• Commissioning software SIWATOOL FTC_B for conveyor scales<br>• Manual | 7MH4900-3AK03 | **40-pin front plug with screw contacts**<br>Required for each SIWAREX module<br>• With screw contacts<br>• With spring-loaded terminals | <br><br><br>6ES7392-1AM00-0AA0<br>6ES7392-1BM01-0AA0 |
| **Configuration package SIWAREX FTC_L for the TIA Portal and STEP 7 on CD-ROM (solids flowmeters, loss-in-weight scales)**<br>• HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7<br>• "Getting started" for solids flowmeters<br>• "Getting started" for loss-in-weight scales<br>• Commissioning software SIWATOOL_L for bulk flow meters and loss-in-weight scales<br>• Manual | 7MH4900-3AK04 | | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

## SIWAREX FTC

### Ordering data

| Description | Article No. | Description | Article No. |
|---|---|---|---|
| **Shield connection element**<br>Sufficient for one SIWAREX FTC module | **6ES7390-5AA00-0AA0** | **Ex interface SIWAREX IS**<br>For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM).<br>Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.<br>• With short-circuit current < 199 mA DC<br>• With short-circuit current < 137 mA DC | <br><br><br><br><br>**7MH4710-5BA**<br><br>**7MH4710-5CA** |
| **Shield connection clamp**<br>Contents: 2 units (suitable for cable with diameter 4 ... 13 mm)<br>Note:<br>one shield connection clamp each is required for:<br>• Scale connection<br>• RS 485 interface<br>• RS 232 interface | **6ES7390-5CA00-0AA0** | **Cable (optional)** | |
| **S7 DIN rail**<br>• 160 mm (6.30 inch)<br>• 480 mm (18.90 inch)<br>• 530 mm (20.87 inch)<br>• 830 mm (32.68 inch)<br>• 2000 mm (78.74 inch) | **6ES7390-1AB60-0AA0**<br>**6ES7390-1AE80-0AA0**<br>**6ES7390-1AF30-0AA0**<br>**6ES7390-1AJ30-0AA0**<br>**6ES7390-1BC00-0AA0** | **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY**<br>For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible.<br>External diameter: approx. 10.8 mm (0.43 inch)<br>Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).<br>Sold by the meter.<br>• Sheath color: orange<br>• For potentially explosive atmospheres. Sheath color: blue | <br><br><br><br><br><br><br><br>**7MH4702-8AG**<br>**7MH4702-8AF** |
| **MMC memory**<br>For data recording up to 16 MB | **7MH4900-2AY20** | | |
| **Remote display (optional)**<br>The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTC via an RS 485 interface.<br>(Not suitable for belt scale mode)<br>Siebert Industrieelektronik GmbH<br>Postfach 1180<br>D-66565 Eppelborn, Germany<br>Tel.: +49 6806/980-0<br>Fax: +49 6806/980-999<br>Internet: http://www.siebert.de<br>Detailed information available from manufacturer. | | | |
| **SIWAREX JB junction box, aluminum housing**<br>For connecting up to 4 load cells in parallel, and for connecting several junction boxes | **7MH4710-1BA** | | |
| **SIWAREX JB junction box, stainless steel housing**<br>For connecting up to 4 load cells in parallel. | **7MH4710-1EA** | | |
| **SIWAREX JB junction box, stainless steel housing (ATEX)**<br>For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate). | **7MH4710-1EA01** | | |

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## Overview

SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, MC2, FCS200 and FC300.

## Technical specifications

| Measurement of | Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in % |
|---|---|
| **Measurement functions** | |
| • Totalizer 1 | Totalization of mass flow, volume flow, fraction A, fraction B |
| • Totalizer 2 | Totalization of mass flow, volume flow, fraction A, fraction B |
| • Single and 2-stage batch function | Batching function with the use of one or two outputs for dosing in high and low speed |
| • 4 programmable limits | 4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached. |
| **Digital input** | |
| Functions | Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output |
| High signal | • Nominal voltage: 24 V DC<br>• Lower limit: 15 V DC<br>• Upper limit: 30 V DC<br>• Current: 2 … 15 mA |
| Low signal | • Nominal voltage: 0 V DC<br>• Lower limit: -3 V DC<br>• Upper limit: 5 V DC<br>• Current: -15 … +15 mA |
| Input | Approx. 10 kΩ |
| Switching | Max. 100 Hz |

| **Digital output 1 and 2** | |
|---|---|
| Functions | • Output 1:<br>Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch<br>• Output 2:<br>Redundancy pulse, redundancy frequency, 2-stage batch |
| Voltage supply | 3 … 30 V DC (passive output) |
| Switching current | Max. 30 mA at 30 V DC |
| Voltage drop | ≤ 3 V DC at max. current |
| Leakage current | ≤ 0.4 mA at max. voltage 30 V DC |
| Load resistance | 1 … 10 kΩ |
| Switching frequency | 0 … 12 kHz 50 % duty cycle |
| Functions | Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch |
| **Communication** | |
| Modbus RS 232C | • Max. baud rate: 115 200 baud<br>• Max. line length: 15 m at 115 200 baud<br>• Signal level: according to EIA-RS 232C |
| Modbus RS 485 | • Max. baud rate: 115 200 baud<br>• Max. line length: 1200 m at 115 200 baud<br>• Signal level: according to EIA-RS 485<br>• Bus termination: Integrated. Can be enabled by inserting wire jumpers. |
| **Galvanic isolation** | All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V. |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Function modules

■ **Technical specifications** (continued)

| Power | |
|---|---|
| Supply | 24 V DC nominal |
| Tolerance | 20.4 V DC … 28.8 V DC |
| Consumption | Max. 7.2 W |
| Fuse | T1 A/125 V, not replaceable by operator |

| Environment | |
|---|---|
| Ambient temperature | • Storage -40 °C … +70 °C (-40 °F … +158 °F) |
| Operation conditions | Horizontally mounted rail. For SIFLOW FC070 Std.: 0 … 60 °C (32 … 140 °F) For SIFLOW FC070 Ex CT: -40 … +60 °C (-40 … +140 °F) |
| | Vertically mounted rail For SIFLOW FC070 Std.: 0 … 45 °C (32 … 113 °F) For SIFLOW FC070 Ex CT: -40 … +45 °C (-40 … +113 °F) |
| Altitude | • Operation: -1000 … 2000 m (pressure 795 … 1080 hPa) |

| Enclosure | |
|---|---|
| Material | Noryl, color: anthracite |
| Rating | IP20/NEMA 2 according to IEC 60529 |
| Mechanical load | According to SIMATIC standards (S7-300 devices) |

| Ex approvals | |
|---|---|
| SIFLOW FC070 Standard | ATEX: II 3G Ex nA II T4 |
| SIFLOW FC070 Ex CT | ATEX, IECEx, EAC Ex, FM, CSA, NEPSI, INMETRO: |
| | • Zone 2:  Ex nA [ia] IIC T4 |
| | FM: |
| | • Class I, Div. 2: Grp. A, B, C, D (interface to Class I+II+III, Div. 1) |

| Custody transfer approvals | |
|---|---|
| SIFLOW FC070 Ex CT | PTB Germany approval no.: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles NTEP for USA and Canada, approval no: 97-111A3 |

| EMC performance | |
|---|---|
| Emission | EN 55011/CISPR-11 |
| Immunity | EN/IEC 61326-1 |
| **NAMUR** | Within the limits according to "General recommendations" with error criteria A in accordance with NE 21 |

| Programming tools | |
|---|---|
| SIMATIC S7 | Configuration through backplane P-BUS, PLC program and WinCC flexible |
| SIMATIC PCS7 | Configuration trough backplane P-BUS and PLC/WinCC faceplates, certified driver |
| SIMATIC PDM | Through Modbus port RS 232C and RS 485, certified driver |

## Ordering data

| | Article No. |
|---|---|
| **SIFLOW FC070 flow transmitter**<br>Remember to order<br>40-pin front connector | 7ME4120-2DH20-0EA0 |
| **40-pin front connector**<br>with screw contacts | 6ES7392-1AM00-0AA0 |
| **40-pin front connector**<br>with spring contacts | 6ES7392-1BM01-0AA0 |
| **SIFLOW FC070 Ex flow transmitter**<br>Remember to order<br>20-pin front connector. | 7ME4120-2DH21-0EA0 |
| **20-pin front connector**<br> with screw contacts | 6ES7392-1AJ00-0AA0 |
| **20-pin front connector**<br>with spring contacts | 6ES7392-1BJ00-0AA0 |
| **Operating instructions**<br>**for SITRANS F C SIFLOW FC070** | |
| This device is shipped with Safety Notes and a DVD containing further SITRANS F literature.<br><br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **SIFLOW FC070 system manual**<br>• English<br>• German | A5E00924779<br>A5E00924776 |
| **SIFLOW FC070 with S7**<br>• English<br>• German | A5E02254228<br>A5E02665536 |
| **SIFLOW FC070 with PCS 7**<br>• English | A5E03694109 |

| | Article No. |
|---|---|
| **Accessories** | |
| **Cable with multiplug**<br>for connecting MASS 2100, FCS200 and FC300 sensors, 5 x 2 x 0.34 mm$^2$ twisted and screened in pairs.<br>Temperature range<br>-20 °C … +110 °C<br>(-4 °F … +230 °F)<br>• 5 m (16.4 ft)<br>• 10 m (32.8 ft)<br>• 25 m (82 ft)<br>• 50 m (164 ft)<br>• 75 m (246 ft)<br>• 150 m (492 ft) | <br><br><br><br><br><br>FDK:083H3015<br>FDK:083H3016<br>FDK:083H3017<br>FDK:083H3018<br>FDK:083H3054<br>FDK:083H3055 |
| **Cable without multiplug**<br>for connecting MC2 sensors, 5 x 2 x 0.34 mm$^2$ twisted and screened in pairs.<br>Temperature range<br>-20 °C … +110 °C<br>(-4 °F … +230 °F)<br>• 10 m (32.8 ft)<br>• 25 m (82 ft)<br>• 75 m (246 ft)<br>• 150 m (492 ft) | <br><br><br><br><br>FDK:083H3001<br>FDK:083H3002<br>FDK:083H3003<br>FDK:083H3004 |
| **SIMATIC S7-300 rail**<br>The mechanical mounting rack of the SIMATIC S7-300<br>• 160 mm (6.3")<br>• 482 mm (18.9")<br>• 530 mm (20.8")<br>• 830 mm (32.7")<br>• 2000 mm (78.7") | <br><br>6ES7390-1AB60-0AA0<br>6ES7390-1AE80-0AA0<br>6ES7390-1AF30-0AA0<br>6ES7390-1AJ30-0AA0<br>6ES7390-1BC00-0AA0 |
| **SIFLOW FC070 Demo suitcase with MASS 2100 DI 1.5 sensor and SIMATIC HMI TP 177B touch panel** | A5E01075465 |
| **SIMATIC S7-300, stabilized power supply PS307**<br><br>Input: 120/230 V AC<br><br>Output: 24 V DC/2 A | 6ES7307-1BA01-0AA0 |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 function modules

## SIPLUS S7-300 FM 350-1

### Overview

- Single-channel, intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 definable comparison values
- Integrated digital outputs for output of the response on reaching the comparison value
- Operating modes:
  - Continuous counting
  - Single counting
  - Periodic counting
- Special functions:
  - Set counter
  - Latch counter
- Start/stop counter by gate function

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### Technical specifications

| Article number | 6AG1350-1AH03-2AE0 | 6AG1350-1AH03-2AY0 |
|---|---|---|
| Based on | 6ES7350-1AH03-0AE0 | 6ES7350-1AH03-0AE0 |
| | SIPLUS S7-300 FM350-1 | SIPLUS S7-300 FM350-1 |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 FM 350-1 counter module** | | *Documentation* | |
| with 1 channel, max. 500 kHz; for incremental encoder | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| *For industrial applications with extended ambient conditions* | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Extended temperature range and exposure to media | **6AG1350-1AH03-2AE0** | | |
| *For rolling stock railway applications* | | | |
| Conforms to EN 50155 | **6AG1350-1AH03-2AY0** | | |
| **Accessories** | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| *Mandatory* | | Current "Manual Collection" DVD and the three subsequent updates | |
| **Front connector** | | | |
| 20-pin, with spring-loaded contacts • 1 unit • 100 units | **6ES7392-1BJ00-0AA0** **6ES7392-1BJ00-1AB0** | | |
| *Consumables* | | | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | | |
| 1 unit (spare part) | | | |
| **Shield connecting element** | **6ES7390-5AA00-0AA0** | | |
| 80 mm wide, with 2 rows for 4 shield connection clamps each | | | |
| **Shield connection clamps** | | | |
| 2 units | | | |
| For 1 cable, diameter 3 mm to 8 mm | **6ES7390-5BA00-0AA0** | | |
| For 1 cable, diameter 4 mm to 13 mm | **6ES7390-5CA00-0AA0** | | |
| **Label cover** | **6ES7392-2XY00-0AA0** | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** | | |
| 10 units (spare part), for modules with 20-pin front connector | | | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** | | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 function modules

## SIPLUS S7-300 FM 350-2

### ■ Overview



- 8-channel intelligent counter module for universal counting and measuring tasks
- For the direct connection of 24 V incremental encoders, directional encoders, initiators or NAMUR encoders
- Comparison function with predefined comparison values (number depending on operating mode)
- Integrated digital outputs for output of the response on reaching the comparison value
- Operating modes:
  - Continuous / single / periodic counting
  - Frequency and speed control
  - Period measurement
  - Dosing

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | 6AG1350-2AH01-4AE0 |
| --- | --- |
| Based on | 6ES7350-2AH01-0AE0 |
| | SIPLUS S7-300 FM350-2 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C; = Tmin |
| • max. | 60 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | 6AG1350-2AH01-4AE0 |
| --- | --- |
| Based on | 6ES7350-2AH01-0AE0 |
| | SIPLUS S7-300 FM350-2 |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS S7-300 FM 350-2 counter module** | |
| With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; includes configuration package and electronic documentation on CD | |
| Exposure to media | **6AG1350-2AH01-4AE0** |
| **Accessories** | |
| *Mandatory* | |
| **Front connector** | |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| *Consumables* | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit (spare part) | |
| **Shield connection clamps** | |
| 2 units | |
| For 2 cables, diameter 2 mm to 6 mm | **6ES7390-5AB00-0AA0** |
| For 1 cable, diameter 3 mm to 8 mm | **6ES7390-5BA00-0AA0** |
| For 1 cable, diameter 4 mm to 13 mm | **6ES7390-5CA00-0AA0** |
| **Label cover** | **6ES7392-2XY10-0AA0** |
| 10 units (spare part), for modules with 40-pin front connector | |
| **Labeling strips** | **6ES7392-2XX10-0AA0** |
| 10 units (spare part), for modules with 40-pin front connector | |
| **Slot number plates** | **6ES7912-0AA00-0AA0** |

| | Article No. |
|---|---|
| *Documentation* | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 function modules

## SIPLUS SIWAREX U

### ■ Overview

**SIPLUS electronic weighing system SIWAREX U**

SIPLUS SIWAREX U is a flexible weighing module for all simple weighing and force measuring tasks. The compact module can be integrated into SIPLUS automation systems without any problems.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS SIWAREX U electronic weighing system | |
|---|---|
| Article No. | 6AG1 950-2AA01-4AA0 |
| Article No. based on | 7MH4 950-2AA01 |
| Range of ambient temperature | 0 ... +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permitted. No commissioning in bedewed state. |

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS SIWAREX U** | | **Labeling strips** | 6ES7392-2XX00-0AA0 |
| Electronic weighing system for SIPLUS S7 and ET 200M, incl. bus connector | | 10 units; spare part | |
| | | **Label cover** | 6ES7392-2XY00-0AA0 |
| Exposure to media | 6AG1950-2AA01-4AA0 | 10 units; spare part | |
| **Accessories** | | **Slot number plates** | 6ES7912-0AA00-0AA0 |
| *Mandatory* | | **SIWAREX JB junction box, aluminum housing** | 7MH4710-1BA |
| **Front connector** | | For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes | |
| 20-pin, with spring-loaded contacts | | | |
| • 1 unit | 6ES7392-1BJ00-0AA0 | | |
| • 100 units | 6ES7392-1BJ00-1AB0 | **Ex interface, type SIWAREX IS** | |
| *Consumables* | | With ATEX approval, but without UL and FM approvals, for intrinsically-safe connection of load cells | |
| **Bus connectors** | 6ES7390-0AA00-0AA0 | Incl. manual | |
| 1 unit (spare part) | | Suitable for SIWAREX U, CS, MS, FTA, FTC and CF weighing modules | |
| **Shield connection clamps** | | Approved for use in the EU | |
| 2 units | | • With short-circuit current < 199 mA DC | 7MH4710-5BA |
| For 2 cables, diameter 2 mm to 6 mm | 6ES7390-5AB00-0AA0 | • With short-circuit current < 137 mA DC | 7MH4710-5CA |
| For 1 cable, diameter 3 mm to 8 mm | 6ES7390-5BA00-0AA0 | | |
| For 1 cable, diameter 4 mm to 13 mm | 6ES7390-5CA00-0AA0 | | |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Cables (optional)** | | **SIWAREX U configuration package for PCS7 S7, version 7.0 and V7.1** | **7MH4950-3AK61** |
| **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY, orange sheath** | **7MH4702-8AG** | Suitable for 7MH4950-1AA01 and 7MH4950-2AA01 | |
| For connecting SIWAREX U, CS, MS, FTA, FTC and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs; for fixed laying, occasional bending permitted, 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °F) | | On CD-ROM<br>• Function block for the CFC<br>• Faceplate<br>• SIWATOOL U commissioning software<br>• Manual | |
| | | **SIWAREX U configuration package for PCS7, version 8.0** | **7MH4950-3AK62** |
| **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY, blue sheath** | **7MH4702-8AF** | Suitable for 7MH4950-xAA01<br>• Function block for the CFC<br>• Faceplate<br>• SIWATOOL U commissioning software<br>• Manual | |
| For connecting the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °F) | | **SIWAREX U APL configuration package for PCS7, version 8.0, Update 1** | **7MH4950-3AK65** |
| *Configuration software* | | Suitable for 7MH4950-xAA01<br>• Function block for the CFC<br>• APL-style faceplate<br>• SIWATOOL U commissioning software<br>• Manual | |
| **SIWAREX U configuration package for SIMATIC S7 version 5.4 or higher** | **7MH4950-1AK02** | *Documentation* | |
| On CD-ROM<br>• SIWATOOL U PC software (in a range of languages), new design<br>• Sample program "Getting started" – ready to use application for SIMATIC S7<br>• SIWAREX U manual on CD (in a range of languages), new design<br>• HSP Hardware Support Package for integrating SIWAREX U in STEP 7 | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 function modules

## SIPLUS DCF 77 radio clock module

### ■ Overview
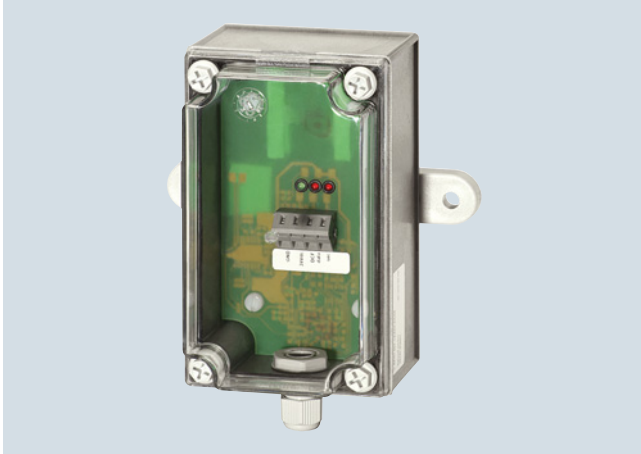


This module can be used to synchronize the real-time clock of the SIMATIC/SIPLUS S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig, Germany.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC PLC and SIPLUS together with a software driver available as a download (function block FB):

http://www.siemens.com/siplus - Support - Tools and Downloads!

### ■ Technical specifications

| Radio clock module SIPLUS DCF 77 | |
| --- | --- |
| Radio frequency | 77.5 Hz |
| Power supply | 24 V DC (20.4 to 28.8 DC) |
| Power consumption, typ. | 50 mA |
| Dimensions (W x H x D) | 75 mm x 125 mm[1] x 75 mm |

[1] Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

### ■ Ordering data

| | Article No. |
| --- | --- |
| **SIPLUS DCF 77 radio clock module** | **6AG1057-1AA03-0AA0** |
| For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig | |

## Overview

- The economical complete solution for serial communication via point-to-point links.
- 3 versions with different transmission interfaces:
  - RS 232C (V.24)
  - 20 mA (TTY)
  - RS 422/RS 485 (X.27)
- Implemented protocols:
  - ASCII
  - 3964 (R) (not for RS 485)
  - Printer driver
- Simple parameterization via a parameterization tool integrated into STEP 7

## Technical specifications

| Article number | 6ES7340-1AH02-0AE0 | 6ES7340-1BH02-0AE0 | 6ES7340-1CH02-0AE0 |
|---|---|---|---|
| | CP 340 W. RS 232C INTERFACE (V.24) | CP 340 W. 20MA INTERFACE (TTY) | CP 340 W. RS 422/485 INTERFACE |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | No; Power supply via backplane bus 5V | No; Power supply via backplane bus 5V | No; Power supply via backplane bus 5V |
| **Input current** | | | |
| from backplane bus 5 V DC, max. | 165 mA | 190 mA | 165 mA |
| **Power loss** | | | |
| Power loss, typ. | 0.6 W | 0.85 W | 0.6 W |
| Power loss, max. | 0.85 W | 0.95 W | 0.85 W |
| **Interfaces** | | | |
| Number of interfaces | 1; Isolated | 1; Isolated | 1; Isolated |
| Interface physics, 20 mA (TTY) | | Yes | |
| Interface physics, RS 232C (V.24) | Yes | | |
| Interface (physical) RS 422/485 (X.27) | | | Yes |
| Transmission rate, min. | 2.4 kbit/s | 2.4 kbit/s | 2.4 kbit/s |
| Transmission rate, max. | 19.2 kbit/s | 19.2 kbit/s | 19.2 kbit/s |
| **Point-to-point** | | | |
| • Cable length, max. | 15 m | 1 000 m; 100 m active, 1000 m passive | 1 200 m |
| • supported printers | HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined | HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined | HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined |
| • Connector type | 9-pin sub D connector | 9-pin sub D socket | 15-pin sub D socket |
| **Integrated protocol driver** | | | |
| - 3964 (R) | Yes | Yes | Yes |
| - ASCII | Yes | Yes | Yes |
| - RK512 | No | No | No |
| - customer-specific drivers reloadable | No | No | No |
| **Telegram length, max.** | | | |
| - 3964 (R) | 1 024 byte | 1 024 byte | 1 024 byte |
| - ASCII | 1 024 byte | 1 024 byte | 1 024 byte |
| **Transmission rate, 20 mA (TTY)** | | | |
| - with 3964 (R) protocol, max. | | 19.2 kbit/s | |
| - with ASCII protocol, max. | | 9.6 kbit/s | |
| - with printer driver, max. | | 9.6 kbit/s | |

# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Communication

**CP 340**

### ■ Technical specifications (continued)

| Article number | 6ES7340-1AH02-0AE0 | 6ES7340-1BH02-0AE0 | 6ES7340-1CH02-0AE0 |
|---|---|---|---|
| | CP 340 W. RS 232C INTERFACE (V.24) | CP 340 W. 20MA INTERFACE (TTY) | CP 340 W. RS 422/485 INTERFACE |
| **Transmission rate, RS 422/485** | | | |
|   - with 3964 (R) protocol, max. | | | 19.2 kbit/s |
|   - with ASCII protocol, max. | | | 9.6 kbit/s |
|   - with printer driver, max. | | | 9.6 kbit/s |
| **Transmission speed, RS 232** | | | |
|   - with 3964 (R) protocol, max. | 19.2 kbit/s | | |
|   - with ASCII protocol, max. | 9.6 kbit/s | | |
|   - with printer driver, max. | 9.6 kbit/s | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Software** | | | |
| **Block** | | | |
| • FB length in RAM, max. | 2 700 byte; Data communication, sending and receiving | 2 700 byte; Data communication, sending and receiving | 2 700 byte; Data communication, sending and receiving |
| **Connection method** | | | |
| Power supply | Over backplane bus | Over backplane bus | Over backplane bus |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm |
| **Weights** | | | |
| Weight, approx. | 300 g | 300 g | 300 g |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 340 communications processor** | **6ES7340-1AH02-0AE0** | **20 mA (TTY) connecting cable** | |
| With one RS 232 C (V.24) interface | | For linking to SIMATIC S7 | |
| **RS 232 connecting cable** | | 5 m | **6ES7902-2AB00-0AA0** |
| For linking to SIMATIC S7 | | 10 m | **6ES7902-2AC00-0AA0** |
| 5 m | **6ES7902-1AB00-0AA0** | 50 m | **6ES7902-2AG00-0AA0** |
| 10 m | **6ES7902-1AC00-0AA0** | **CP 340 communications processor** | 6ES7340-1CH02-0AE0 |
| 15 m | **6ES7902-1AD00-0AA0** | With one RS 422/485 (X.27) interface | |
| **CP 340 communications processor** | 6ES7340-1BH02-0AE0 | **RS 422/485 connecting cable** | |
| With one 20 mA (TTY) interface | | For linking to SIMATIC S7 | |
| | | 5 m | **6ES7902-3AB00-0AA0** |
| | | 10 m | **6ES7902-3AC00-0AA0** |
| | | 50 m | **6ES7902-3AG00-0AA0** |

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## Overview



- For quick, high-performance data exchange via point-to-point coupling
- 3 versions with different transmission physics:
  - RS 232C (V.24),
  - 20 mA (TTY),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512
- The following protocols can also be loaded: Modbus RTU
- Easy configuration using a parameterizing tool integrated in STEP 7

## Technical specifications

| Article number | **6ES7341-1AH02-0AE0** | **6ES7341-1BH02-0AE0** | **6ES7341-1CH02-0AE0** |
|---|---|---|---|
| | CP 341 RS 232C (V.24) | CP341 20MA-INTERFACE (TTY) | CP341 RS 422/485-INTERFACE |
| **General information** | | | |
| Product type designation | CP341 V2 RS232 | CP341 V2 TTY | CP341 V2 RS422/485 |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | Yes | Yes | Yes |
| **Input current** | | | |
| from supply voltage L+, max. | 100 mA | 100 mA | 100 mA |
| from backplane bus 5 V DC, max. | 70 mA | 70 mA | 70 mA |
| **Power loss** | | | |
| Power loss, typ. | 1.6 W | 1.6 W | 1.6 W |
| Power loss, max. | 2.4 W | 2.4 W | 2.4 W |
| **Interfaces** | | | |
| Number of interfaces | 1; Isolated | 1; Isolated | 1; Isolated |
| Interface physics, 20 mA (TTY) | | Yes | |
| Interface physics, RS 232C (V.24) | Yes | | |
| Interface (physical) RS 422/485 (X.27) | | | Yes |
| Transmission rate, min. | 0.3 kbit/s | 0.3 kbit/s | 0.3 kbit/s |
| Transmission rate, max. | 115.2 kbit/s | 19.2 kbit/s | 115.2 kbit/s |
| **Point-to-point** | | | |
| • Cable length, max. | 15 m | 1 000 m | 1 200 m |
| • supported printers | Serial printers | Serial printers | Serial printers |
| • Connector type | 9-pin sub D connector | 9-pin sub D socket | 15-pin sub D socket |
| **Integrated protocol driver** | | | |
| - 3964 (R) | Yes | Yes | Yes; not with RS 485 |
| - ASCII | Yes | Yes | Yes |
| - RK512 | Yes | Yes | Yes; not with RS 485 |
| **Telegram length, max.** | | | |
| - 3964 (R) | 4 096 byte | 4 096 byte | 4 096 byte |
| - ASCII | 4 096 byte | 4 096 byte | 4 096 byte |
| - RK 512 | 4 096 byte | 4 096 byte | 4 096 byte |
| **Transmission rate, 20 mA (TTY)** | | | |
| - with 3964 (R) protocol, max. | | 19.2 kbit/s | |
| - with ASCII protocol, max. | | 19.2 kbit/s | |
| - with printer driver, max. | | 19.2 kbit/s | |
| - with RK 512 protocol, max. | | 19.2 kbit/s | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 341

### ▉ Technical specifications  (continued)

| Article number | 6ES7341-1AH02-0AE0 | 6ES7341-1BH02-0AE0 | 6ES7341-1CH02-0AE0 |
|---|---|---|---|
| | CP 341 RS 232C (V.24) | CP341 20MA-INTERFACE (TTY) | CP341 RS 422/485-INTERFACE |
| **Transmission rate, RS 422/485** | | | |
| - with 3964 (R) protocol, max. | | | 115.2 kbit/s |
| - with ASCII protocol, max. | | | 115.2 kbit/s |
| - with printer driver, max. | | | 115.2 kbit/s |
| - with RK 512 protocol, max. | | | 115.2 kbit/s |
| **Transmission speed, RS 232** | | | |
| - with 3964 (R) protocol, max. | 115.2 kbit/s | | |
| - with ASCII protocol, max. | 115.2 kbit/s | | |
| - with printer driver, max. | 115.2 kbit/s | | |
| - with RK 512 protocol, max. | 115.2 kbit/s | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C | 60 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Software** | | | |
| **Block** | | | |
| • FB length in RAM, max. | 6 100 byte; Data communication, sending and receiving | 6 100 byte; Data communication, sending and receiving | 6 100 byte; Data communication, sending and receiving |
| **Connection method** | | | |
| Power supply | 3 screw-type terminals: L+, M, GND | 3 screw-type terminals: L+, M, GND | 3 screw-type terminals: L+, M, GND |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm |
| **Weights** | | | |
| Weight, approx. | 300 g | 300 g | 300 g |

### ▉ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 341 communications processor** | **6ES7341-1AH02-0AE0** | **CP 341 communications processor** | **6ES7341-1CH02-0AE0** |
| With one RS 232 C (V.24) interface | | With one RS 422/485 (X.27) interface | |
| **RS 232 connecting cable** | | **RS 422/485 connecting cable** | |
| For linking to SIMATIC S7 | | For linking to SIMATIC S7 | |
| 5 m | **6ES7902-1AB00-0AA0** | 5 m | **6ES7902-3AB00-0AA0** |
| 10 m | **6ES7902-1AC00-0AA0** | 10 m | **6ES7902-3AC00-0AA0** |
| 15 m | **6ES7902-1AD00-0AA0** | 50 m | **6ES7902-3AG00-0AA0** |
| **CP 341 communications processor** | **6ES7341-1BH02-0AE0** | **Loadable drivers for CP 341** | |
| With one 20 mA (TTY) interface | | Modbus master (RTU format) | |
| **20 mA (TTY) connecting cable** | | • Single license | **6ES7870-1AA01-0YA0** |
| For linking to SIMATIC S7 | | • Single license, without software or documentation | **6ES7870-1AA01-0YA1** |
| 5 m | **6ES7902-2AB00-0AA0** | Modbus slave (RTU format) | |
| 10 m | **6ES7902-2AC00-0AA0** | • Single license | **6ES7870-1AB01-0YA0** |
| 50 m | **6ES7902-2AG00-0AA0** | • Single license, without software or documentation | **6ES7870-1AB01-0YA1** |

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■ **Overview**

- Drivers for Modbus protocol with RTU message format; communication as master or slave
- Downloadable onto CP 341 and CP 441-2 (6ES7441-2AA05-0AE0)

■ **Technical specifications**

| Parameterization software | Loadable drivers for CP 441-2 and CP 341 |
|---|---|
| Type of license | Simple license, copy license |
| Target system | SIMATIC CP 341, SIMATIC CP 441-2 |

| Technical specifications | Modbus Master |
|---|---|
| Adjustable parameters | • Modbus protocol with RTU format<br>• Master/slave coupling: SIMATIC S7 is master<br>• Function codes implemented: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16<br>• No V.24 control and signal lines<br>• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$<br>• Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) 2-wire or 4-wire<br>• Receive mailbox specified on BRCV<br>• Character delay time 3.5 characters or multiple thereof<br>• Broadcast message possible<br>• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)<br>• Character frame<br>• With/without RS 485 operation for 2-wire connections<br>• With/without modem operation (ignore smudge characters)<br>• Response monitoring time 100 ms to 25.5 s in steps of 100 ms<br>• Factor for the character delay time 1-10<br>• Default setting of receive line when using the X.27 interface module |

| | Modbus slave |
|---|---|
| Adjustable parameters | • Modbus protocol with RTU format<br>• Master/slave coupling: SIMATIC S7 is slave<br>• Function codes implemented: 01, 02, 03, 04, 05, 06, 08, 15, 16<br>• No V.24 control and signal line<br>• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$<br>• Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire<br>• Communications FB 180, instance DB 180 (use of a multi-instance)<br>• Conversion of the Modbus data address to S7 data areas. Data areas which can be processed: DB, bit memories, outputs, inputs, timers, counters<br>• Character delay time 3.5 characters or multiple thereof<br>• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)<br>• Character frame<br>• Slave address of CP (1 to 255)<br>• With/without RS 485 operation for 2-wire connection<br>• With/without modem operation (ignore smudge characters)<br>• Factor for the character delay time 1-10<br>• Number of work DB (for FB processing)<br>• Enabling of memory areas for writing by the master<br>• Default setting of receive line when using the X.27 interface module<br>• Conversion of Modbus addresses to S7 data areas |

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# SIMATIC S7-300 Advanced Controllers
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## Loadable drivers for CP 441-2 and CP 341

■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **Modbus Master V3.1** | | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| Task:<br>Communication<br>via Modbus protocol<br>with RTU format,<br>SIMATIC S7 as master | | | Electronic manuals on DVD,<br>multilingual:<br>LOGO!, SIMADYN, SIMATIC bus<br>components, SIMATIC C7,<br>SIMATIC distributed I/O, | |
| Requirement:<br>CP 341 or CP 441-2;<br>STEP 7 V4.02 and higher | | | SIMATIC HMI, SIMATIC Sensors,<br>SIMATIC NET, SIMATIC PC Based<br>Automation, SIMATIC PCS 7,<br>SIMATIC PG/PC, SIMATIC S7, | |
| Delivery package:<br>Driver program/documentation,<br>English, German, French | | | SIMATIC Software, SIMATIC TDC | |
| Single license | **6ES7870-1AA01-0YA0** | | **SIMATIC Manual Collection<br>update service for 1 year** | 6ES7998-8XC01-8YE2 |
| Single license, without software<br>and documentation | **6ES7870-1AA01-0YA1** | | Current "Manual Collection" DVD<br>and the three subsequent updates | |
| **Modbus Slave V3.1** | | | | |
| Task:<br>Communication<br>via Modbus protocol<br>with RTU format,<br>SIMATIC S7 as slave | | | | |
| Requirement:<br>CP 341 or CP 441-2;<br>STEP 7 V4.02 and higher | | | | |
| Delivery package:<br>Driver program/documentation,<br>English, German, French | | | | |
| Single license | **6ES7870-1AB01-0YA0** | | | |
| Single license, without software<br>and documentation | **6ES7870-1AB01-0YA1** | | | |

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## ■ Overview



CP 343-2P / CP 343-2

The CP 343-2P communications processor is the AS-Interface master for the SIMATIC S7-300 and the ET 200M distributed I/O station, with user-friendly parameterizing options.

The CP 343-2 is the basic version of the module.

The CP 343-2P / CP 343-2 has the following characteristics:

- As many as 62 AS-Interface slaves can be connected
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Status displays of operating states and indication of the readiness for operation of connected slaves by means of LEDs in the front panel
- Fault indications (including AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel.
- Compact enclosure in the design of the SIMATIC S7-300
- Suitable for AS-i Power24V (from product version 2/firmware version 3.1) and for Standard AS-i with 30-V-voltage.
- Additionally for CP 343-2P: Supports the configuration of the AS-Interface network with STEP 7 V5.2 and higher

### Benefits

- Shorter start-up times through simple configuration at the press of a button
- Design of flexible machine-related structures using the ET 200M distributed I/O system
- Enables diagnostics of the AS-Interface network
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
  - Status of the AS-Interface network
  - Slaves connected and their readiness for operation
  - Monitoring of the AS-Interface mains voltage

- Lower costs for stock keeping and spare parts inventory because the CP can be used for the SIMATIC S7-300 and also for the ET 200M
- With CP 343-2P additionally: Improved plant documentation and support for service assignments thanks to a description of the AS-Interface configuration in the STEP 7 project
- No need for the AS-i power supply unit with AS-i Power24V: The AS-Interface cable is powered through an existing 24-V-DC-PELV power supply unit. For decoupling, an AS-i data decoupling module S22.5 is required (e.g. 3RK1901-1DE12-1AA0), see Catalog IC10, Chapter 2 "Industrial Communication" → "AS-Interface" → "Power supply units and data decoupling modules"
- Operation with AS-Interface power supply unit IP20 (see Catalog IC10, Chapter2 "Industrial Communication" → "AS-Interface" → "Power supply units and data decoupling modules") is also possible without restrictions.

### Application

The CP 343-2P/CP 343-2 is the AS-Interface master connection for the SIMATIC S7-300 und ET 200M.

By connecting an AS-Interface, a max. of 248 DI/248 DO can be accessed per CP when using 62 A/B slaves with 4DI/4DO respectively.

The integrated analog processing function can be used to easily transfer analog signals (up to 62 A/B analog slaves with a max. of 2 channels each or up to 31 standard analog slaves, each with a max. of 4 channels per CP).

The CP 343-2P is an enhancement to the CP 343-2 and has exactly the same functions. An existing STEP 7 user program for a CP 343-2 can be used for a CP 343-2P without limitations. The two assemblies are merely configured differently in STEP 7 HW Config, whereby the CP 343-2P offers additional possibilities. We recommend the CP 343-2P for these reasons.

### Design

The CP 343-2P / CP 343-2 is connected like an I/O module to the S7-300. It has:

- Two terminal connections for connecting the AS-Interface cable directly.
- LEDs in the front panel for indicating the operating state and functional readiness of all connected and active slaves
- Pushbuttons for switching over the master operating state and for adopting the existing ACTUAL configuration of the AS-i slave as the TARGET configuration

### Function

The CP 343-2P / CP 343-2 supports all specified functions of the extended AS-Interface Specification V3.0.

The CP 343-2P / CP 343-2 each occupy 16 bytes in the I/O address area of the SIMATIC S7-300. The digital I/O data of the standard slaves and A slaves is saved in this area. The digital I/O data of the B slaves and the analog I/O data can be accessed with the S7 system functions for read/write data records.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

For more information see https://support.industry.siemens.com/cs/ww/en/view/51678777.

# SIMATIC S7-300 Advanced Controllers
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## CP 343-2P / CP 343-2

### ■ Overview (continued)

#### Notes on safety

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

For more information on the topic of Industrial Security, see http://www.siemens.com/industrialsecurity.

#### *Configuration*

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

#### Additionally for CP 343-2P

The CP 343-2P also supports configuring of the AS-Interface network with STEP 7 V5.2 and higher. Specifying the AS-i configuration in HW-Config facilitates the setting of slave parameters and documentation of the plant. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported. The saved configuration cannot be overwritten at the press of a button and is therefore tamper-proof.

### ■ Ordering data

| | Article No. |
|---|---|
| **CP 343-2P communications processor** | 6GK7343-2AH11-0XA0 |
| • For connection of SIMATIC S7-300 and ET 200M to AS-Interface | |
| • Configuration of the AS-i network using the SET key or STEP 7 (V5.2 and higher) | |
| • Without front connector | |
| • Corresponds to AS-Interface Specification V3.0 | |
| • Dimensions (W x H x D / mm): 40 x 125 x 120 | |
| **CP 343-2 communications processor** | 6GK7343-2AH01-0XA0 |
| • Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface | |
| • Configuration of the AS-i network using the SET key | |
| • Without front connector | |
| • Corresponds to AS-Interface Specification V3.0 | |
| • Dimensions (W x H x D / mm): 40 x 125 x 120 | |
| **Accessories** | |
| **Front connector, 20-pin** | |
| • With screw-type terminals | 6ES7392-1AJ00-0AA0 |
| • With spring-loaded terminals | 6ES7392-1BJ00-0AA0 |
| **AS-interface addressing unit V3.0** | 3RK1904-2AB02 |
| • For AS-Interface modules and sensors and actuators with integrated AS-Interface according to AS-i Specification V3.0 | |
| • For setting the AS-i address of standard slaves, and slaves with extended addressing mode (A/B slaves) | |
| • With input/output test function and many other commissioning functions | |
| • Battery operation with four type AA batteries (IEC LR6, NEDA 15) | |
| • Degree of protection IP40 | |
| • Dimensions (W × H × D / mm): 84 × 195 × 35 | |
| • Scope of supply: | |
|   - Addressing unit with 4 batteries | |
|   - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m | |

| | Article No. |
|---|---|
| **More information** | |
| For manuals, see https://support.industry.siemens.com/cs/ww/en/ps/15754/man. | |
| For diagnostics during operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see https://support.industry.siemens.com/cs/ww/en/view/61892138. | |
| AS-Interface function block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog IC 10, Chapter 14, "Parameterization, Configuration and Visualization with SIRIUS". | |

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## Overview



| DP-M | DP-S | FMS | PG/OP | S7/S5 | |
|------|------|-----|-------|-------|--|
| ● | ● | | ● | ● | |

- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 to PROFIBUS at up to 12 Mbps (including 45.45 Kbit/s)
- Communication services:
  - PROFIBUS DP
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

## Technical specifications

| Article number | **6GK7342-5DA03-0XE0** |
|---|---|
| Product type designation | CP 342-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS485) |
| • for power supply | 4-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.15 A |
| • from external supply voltage at DC at 24 V typical | 0.25 A |
| Power loss [W] | 6.75 W |

| Article number | **6GK7342-5DA03-0XE0** |
|---|---|
| Product type designation | CP 342-5 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.3 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 4 |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 16 |
| Amount of data | |
| • as user data per connection for open communication by means of SEND/RECEIVE blocks maximum | 240 byte |

# SIMATIC S7-300 Advanced Controllers
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## CP 342-5

### ■ Technical specifications (continued)

| Article number | 6GK7342-5DA03-0XE0 |
|---|---|
| Product type designation | CP 342-5 |
| **Performance data PROFIBUS DP** | |
| Service as DP master | |
| • DPV0 | Yes |
| Number of DP slaves on DP master usable | 124 |
| Amount of data | |
| • of the address area of the inputs as DP master total | 2 160 byte |
| • of the address area of the outputs as DP master total | 2 160 byte |
| • of the address area of the inputs per DP slave | 244 byte |
| • of the address area of the outputs per DP slave | 244 byte |
| • of the address area of the diagnostic data per DP slave | 240 byte |
| Service as DP slave | |
| • DPV0 | Yes |
| Amount of data | |
| • of the address area of the inputs as DP slave total | 240 byte |
| • of the address area of the outputs as DP slave total | 240 byte |

| Article number | 6GK7342-5DA03-0XE0 |
|---|---|
| Product type designation | CP 342-5 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | |
| • without DP maximum | 32 |
| • with DP maximum | 28 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | No |
| Configuration software | |
| • required | STEP 7 V5.1 SP2 or higher / STEP 7 Professional V12 (TIA Portal) or higher |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 342-5 communications processor** | **6GK7342-5DA03-0XE0** | **PROFIBUS FC Standard Cable** | |
| Communications processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbps, with electronic manual on CD-ROM | | 2-wire bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter | **6XV1830-0EH10** |
| **Accessories** | | **PROFIBUS bus terminal 12M** | |
| **PROFIBUS FastConnect RS 485 connection plug** | | Bus terminal for connection of PROFIBUS nodes up to 12 Mbps with connecting cable | **6GK1500-0AA10** |
| With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbps | | **SIMATIC S7-300 DM 370** | **6ES7370-0AA01-0AA0** |
| • Without PG interface | **6ES7972-0BA52-0XA0** | Dummy module; used for module replacement | |
| • With PG interface | **6ES7972-0BB52-0XA0** | | |
| **PROFIBUS bus connector IP20** | | | |
| With connection to PPI, MPI, PROFIBUS | | | |
| • Without PG interface | **6ES7972-0BA12-0XA0** | | |
| • With PG interface | **6ES7972-0BB12-0XA0** | | |

Note:

You can find order information for software for communication with PC systems in the IK PI catalog or in the Industry Mall.

## Overview



- PROFIBUS DP master or slave with optical interface for connecting the SIMATIC S7-300 to PROFIBUS at up to 12 Mbps (including 45.45 Kbit/s)
- Direct connection to the optical PROFIBUS network over the integrated fiber-optic interface for plastic and PCF fiber-optic cables
- Communication services:
  - PROFIBUS DP
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

| DP-M | DP-S | FMS | PG/OP | S7/S5 | |
|------|------|-----|-------|-------|--|
| ● | ● | | ● | ● | |

## Technical specifications

| Article number | **6GK7342-5DF00-0XE0** |
|---|---|
| Product type designation | CP 342-5 FO |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • for power supply | 1 |
| Number of optical interfaces at the 1st interface acc. to PROFIBUS | 2 |
| Design of the optical interface at the 1st interface acc. to PROFIBUS | Duplex socket |
| Type of electrical connection | |
| • for power supply | 4-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage | 24 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.15 A |
| • from external supply voltage at DC at 24 V typical | 0.25 A |
| Power loss [W] | 6 W |

| Article number | **6GK7342-5DF00-0XE0** |
|---|---|
| Product type designation | CP 342-5 FO |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.3 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 4 |
| Wire length | |
| • for PCF FOC maximum | 300 m |
| • for POF FOC maximum | 50 m |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 16 |
| Amount of data | |
| • as user data per connection for open communication by means of SEND/RECEIVE blocks maximum | 240 byte |

# SIMATIC S7-300 Advanced Controllers
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## CP 342-5 FO

### ▪ Technical specifications  (continued)

| Article number | 6GK7342-5DF00-0XE0 | Article number | 6GK7342-5DF00-0XE0 |
|---|---|---|---|
| Product type designation | CP 342-5 FO | Product type designation | CP 342-5 FO |
| **Performance data PROFIBUS DP** | | **Performance data S7 communication** | |
| Service as DP master | | Number of possible connections for S7 communication | |
| • DPV0 | Yes | • maximum | 16 |
| Number of DP slaves on DP master usable | 124 | **Performance data multi-protocol mode** | |
| Amount of data | | Number of active connections with multi-protocol mode | |
| • of the address area of the inputs as DP master total | 2 160 byte | • without DP maximum | 32 |
| • of the address area of the outputs as DP master total | 2 160 byte | • with DP maximum | 28 |
| • of the address area of the inputs per DP slave | 244 byte | **Performance data telecontrol** | |
| • of the address area of the outputs per DP slave | 244 byte | Protocol is supported | |
| • of the address area of the diagnostic data per DP slave | 240 byte | • TCP/IP | No |
| Service as DP slave | | Configuration software | |
| • DPV0 | Yes | • required | STEP 7 V5.1 SP2 or higher / STEP 7 Professional V12 (TIA Portal) or higher |
| Amount of data | | | |
| • of the address area of the inputs as DP slave total | 240 byte | | |
| • of the address area of the outputs as DP slave total | 240 byte | | |

### ▪ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 342-5 FO communications processor** | 6GK7342-5DF00-0XE0 | **PROFIBUS plastic fiber-optic, stripping tool set** | 6GK1905-6PA10 |
| Communications processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbps with electronic manual on CD-ROM | | Tools for removing the outer sheath or core sheath of plastic fiber optic cables | |
| **Accessories** | | | |
| **PROFIBUS plastic fiber-optic, simplex connector/polishing set** | 6GK1901-0FB00-0AA0 | | |
| 100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP | | | |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall

## Overview



| DP-M | DP-S | FMS | PG/OP | S7/S5 | |
|------|------|-----|-------|-------|--|
| | | ● | ● | ● | |

Connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbps (including 45.45 Kbit/s)

- Communication services:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
  - PROFIBUS FMS
- Easy configuration and programming over PROFIBUS
- Can be easily integrated into the S7-300 system
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

## Technical specifications

| Article number | 6GK7343-5FA01-0XE0 |
|----------------|--------------------|
| Product type designation | CP 343-5 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 0 |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS485) |
| • for power supply | 4-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage | 24 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.15 A |
| • from external supply voltage at DC at 24 V typical | 0.25 A |
| Power loss [W] | 5 W |

| Article number | 6GK7343-5FA01-0XE0 |
|----------------|--------------------|
| Product type designation | CP 343-5 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.3 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 4 |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 16 |
| Amount of data | |
| • as user data per connection for open communication by means of SEND/RECEIVE blocks maximum | 240 byte |

# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Communication

### CP 343-5

■ **Technical specifications** (continued)

| Article number | 6GK7343-5FA01-0XE0 | Article number | 6GK7343-5FA01-0XE0 |
|---|---|---|---|
| Product type designation | CP 343-5 | Product type designation | CP 343-5 |
| **Performance data FMS functions** | | **Performance data multi-protocol mode** | |
| Number of possible connections for FMS connection maximum | 16 | Number of active connections with multi-protocol mode | 48 |
| Amount of data of the variables | | **Performance data telecontrol** | |
| • for READ job maximum | 237 byte | Protocol is supported | |
| • for WRITE and REPORT job maximum | 233 byte | • TCP/IP | No |
| Number of variables | | Configuration software | |
| • Configurable from server to FMS partner | 256 | • required | STEP 7 V5.1 SP3 or higher and NCM S7 for PROFIBUS |
| • Loadable from server to FMS partner | 256 | | |
| **Performance data S7 communication** | | | |
| Number of possible connections for S7 communication | | | |
| • maximum | 16 | | |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 343-5 communications processor** | **6GK7343-5FA01-0XE0** | **PROFIBUS bus connector IP20** | |
| Communications processor for connection of S7-300 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM | | With connection to PPI, MPI, PROFIBUS | |
| | | • Without PG interface | 6ES7972-0BA12-0XA0 |
| | | • With PG interface | 6ES7972-0BB12-0XA0 |
| **Accessories** | | **PROFIBUS bus terminal 12M** | 6GK1500-0AA10 |
| **STEP 7 Version 5.5** | See Chapter 11, page 11/17 | Bus terminal for connection of PROFIBUS nodes at up to 12 Mbps with connecting cable | |
| **PROFIBUS FastConnect RS 485 bus connector** | | **SIMATIC S7-300 DM 370** | 6ES7370-0AA01-0AA0 |
| With 90° cable outlet; insulation displacement technology, max. transfer rate 12 Mbps (1 unit) | | Dummy module; used for module replacement | |
| • Without PG interface | **6ES7972-0BA52-0XA0** | | |
| • With PG interface | **6ES7972-0BB52-0XA0** | | |

## Overview



Communications processor for connecting a SIMATIC S7-300 to Industrial Ethernet networks, also as PROFINET IO device.

The CP supports:
- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication

| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
|     | ●        | ●   | ●   |     |      | ●     | ●     |

## Technical specifications

| Article number | **6GK7343-1CX10-0XE0** |
|---|---|
| Product type designation | CP 343-1 Lean |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 2 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 2 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| • of Industrial Ethernet interface | RJ45 port |
| • for power supply | 2-pole plugable terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage | 24 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.2 A |
| • from external supply voltage at DC at 24 V typical | 0.16 A |
| • from external supply voltage at DC at 24 V maximum | 0.2 A |
| Power loss [W] | 5.8 W |

| Article number | **6GK7343-1CX10-0XE0** |
|---|---|
| Product type designation | CP 343-1 Lean |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.22 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 343-1 Lean

### Technical specifications (continued)

| Article number | 6GK7343-1CX10-0XE0 |
|---|---|
| Product type designation | CP 343-1 Lean |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 8 |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum | 2 Kibyte |
| Number of Multicast stations | 8 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 4 |
| Service | |
| • of SIMATIC communication as server | Yes |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 12 |
| **Performance data PROFINET communication as PN IO-Controller** | |
| Product function PROFINET IO controller | No |
| **Performance data PROFINET communication as PN IO-Device** | |
| Product function PROFINET IO device | Yes |
| Amount of data | |
| • as user data for input variables as PROFINET IO device maximum | 512 byte |
| • as user data for input variables as PROFINET IO device maximum | 512 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for the consistency area for each sub-module | 240 byte |
| Number of submodules per PROFINET IO-Device | 32 |

| Article number | 6GK7343-1CX10-0XE0 |
|---|---|
| Product type designation | CP 343-1 Lean |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP 7 V5.4 or higher / STEP 7 Professional V11 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions switch** | |
| Product feature Switch | Yes |
| Product function | |
| • switch-managed | No |
| • with IRT PROFINET IO switch | No |
| • Configuration with STEP 7 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | No |
| • Parallel Redundancy Protocol (PRP)/ operation in the PRP-network | Yes |
| Protocol is supported Media Redundancy Protocol (MRP) | Yes |
| **Product functions Security** | |
| Product function | |
| • password protection for Web applications | No |
| • ACL - IP-based | Yes |
| • ACL - IP-based for PLC/routing | No |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | Yes |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

■ **Ordering data** | Article No. | | Article No. |

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 343-1 Lean communications processor**<br><br>For connecting SIMATIC S7-300 to Industrial Ethernet through TCP/IP and UDP, Multicast, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, PROFINET IO device, MRP, integrated 2-port switch ERTEC, comprehensive diagnostics facilities, module replacement without PG, SNMP, initial commissioning over LAN; with electronic manual on CD-ROM | **6GK7343-1CX10-0XE0** | **Accessories** | |
| | | **IE FC RJ45 Plug 145** | |
| | | RJ45 plug connector 2 x 2 for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 145° cable outlet<br>• 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | **6GK1901-1BB30-0AA0**<br>**6GK1901-1BB30-0AB0**<br>**6GK1901-1BB30-0AE0** |
| | | **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br><br>4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; <u>sold by the meter</u>; max. length 1000 m, minimum order quantity 20 m | **6XV1840-2AH10** |
| | | **IE FC Stripping Tool**<br><br>Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | **6GK1901-1GA00** |
| | | **CSM 377 Compact Switch Module**<br><br>Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM | **6GK7377-1AA00-0AA0** |

<u>Note:</u>

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 343-1

### ◼ Overview



Communications processor for connecting a SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks, also as PROFINET IO controller or IO device.

The CP supports:
- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication

| ISO | TCP/UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|---------|----|----|----|------|-------|-------|
| ● | ● | ● | ● | | | ● | ● |

### ◼ Technical specifications

| Article number | 6GK7343-1EX30-0XE0 |
|---|---|
| Product type designation | CP 343-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 2 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 2 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| • of Industrial Ethernet interface | RJ45 port |
| • for power supply | 2-pole plugable terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage | 24 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.2 A |
| • from external supply voltage at DC at 24 V typical | 0.16 A |
| • from external supply voltage at DC at 24 V maximum | 0.2 A |
| Power loss [W] | 5.8 W |

| Article number | 6GK7343-1EX30-0XE0 |
|---|---|
| Product type designation | CP 343-1 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.22 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 16 |
| Amount of data | |
| • as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum | 2 Kibyte |
| Number of Multicast stations | 16 |

■ **Technical specifications** (continued)

| Article number | 6GK7343-1EX30-0XE0 |
|---|---|
| Product type designation | CP 343-1 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 32 |
| **Performance data PROFINET communication as PN IO-Controller** | |
| Number of PN IO devices on PROFINET IO controller usable total | 32 |
| Number of external PN IO lines with PROFINET per rack | 1 |
| Amount of data | |
| • as user data for input variables as PROFINET IO controller maximum | 1 Kibyte |
| • as user data for input variables as PROFINET IO controller maximum | 1 Kibyte |
| • as user data for input variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for output variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for input variables per PN IO device for each sub-module as PROFINET IO controller maximum | 240 byte |
| • as user data for output variables per PN IO device for each sub-module as PROFINET IO controller maximum | 240 byte |
| **Performance data PROFINET communication as PN IO-Device** | |
| Product function PROFINET IO device | Yes |
| Amount of data | |
| • as user data for input variables as PROFINET IO device maximum | 512 byte |
| • as user data for input variables as PROFINET IO device maximum | 512 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for the consistency area for each sub-module | 240 byte |
| Number of submodules per PROFINET IO-Device | 32 |

| Article number | 6GK7343-1EX30-0XE0 |
|---|---|
| Product type designation | CP 343-1 |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP 7 V5.4 SP2 or higher / STEP 7 Professional V11 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions switch** | |
| Product feature Switch | Yes |
| Product function | |
| • switch-managed | No |
| • with IRT PROFINET IO switch | Yes |
| • Configuration with STEP 7 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | No |
| • Parallel Redundancy Protocol (PRP)/ operation in the PRP-network | Yes |
| Protocol is supported Media Redundancy Protocol (MRP) | Yes |
| **Product functions Security** | |
| Product function | |
| • password protection for Web applications | No |
| • ACL - IP-based | Yes |
| • ACL - IP-based for PLC/routing | No |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | Yes |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Communication

**CP 343-1**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **CP 343-1 communications processor** | **6GK7343-1EX30-0XE0** | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** |
| For connection of SIMATIC S7-300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO controller or PROFINET IO device, MRP, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, multicast, DHCP, CPU clock synchronization via SIMATIC procedure and NTP, diagnostics, SNMP, access protection through IP access list, initialization over LAN 10/100 Mbps; with electronic manual on DVD | | 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | |
| | | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **Accessories** | | **CSM 377 Compact Switch Module** | **6GK7377-1AA00-0AA0** |
| **IE FC RJ45 Plug 180 2 x 2** | | Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** | **SCALANCE X204-2 Industrial Ethernet switch** | **6GK5204-2BB10-2AA3** |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** | | |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** | Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | |
| **IE FC RJ45 Plug 145** | | | |
| RJ45 plug connector 2 x 2 for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 145° cable outlet | | | |
| • 1 pack = 1 unit | **6GK1901-1BB30-0AA0** | | |
| • 1 pack = 10 units | **6GK1901-1BB30-0AB0** | | |
| • 1 pack = 50 units | **6GK1901-1BB30-0AE0** | | |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

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## Overview

Communications processor for connecting the SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet networks, also as PROFINET IO controller and IO device.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication
- Security functionality, firewall and VPN

In addition, the CP 343-1 Advanced provides email functions and allows users to create their own Web pages - ideal support for maintenance and quality assurance. The Internet functions such as FTP even allow connection to the most diverse PC-based systems. This CP is therefore the bridge between the field level and the management level for the S7-300. The CP 343-1 Advanced connects seamlessly to the security structures of the office and IT world.

| ISO | TCP/UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|---------|----|-----|----|------|-------|-------|
| ● | ● | ● | ● | ● | ● | ● | ● |

## Technical specifications

| Article number | **6GK7343-1GX31-0XE0** |
|---|---|
| Product type designation | CP 343-1 Advanced |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 1 000 Mbit/s |
| • at the 2nd interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 3 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • at the 2nd interface acc. to Industrial Ethernet | 2 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| • at the 2nd interface acc. to Industrial Ethernet | RJ45 port |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |

| Article number | **6GK7343-1GX31-0XE0** |
|---|---|
| Product type designation | CP 343-1 Advanced |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.14 A |
| • from external supply voltage at DC at 24 V typical | 0.48 A |
| • from external supply voltage at DC at 24 V maximum | 0.62 A |
| Power loss [W] | 14.7 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.8 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 343-1 Advanced

### ■ Technical specifications (continued)

| Article number | 6GK7343-1GX31-0XE0 |
|---|---|
| Product type designation | CP 343-1 Advanced |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 16 |
| Amount of data | |
| • as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum | 2 Kibyte |
| Number of Multicast stations | 16 |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 48 |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as client by means of FTP maximum | 10 |
| • as server by means of FTP maximum | 2 |
| • as server by means of HTTP maximum | 4 |
| • as e-mail client maximum | 1 |
| Amount of data as user data for email maximum | 8 Kibyte |
| Storage capacity of the user memory | |
| • as flash memory file system | 28 Mibyte |
| • as RAM | 30 Mibyte |
| Number of possible write cycles of the flash memory cells | 100 000 |
| **Performance data PROFINET communication as PN IO-Controller** | |
| Product function PROFINET IO controller | Yes |
| Number of PN IO devices on PROFINET IO controller usable total | 128 |
| Number of PN IO IRT devices on PROFINET IO controller usable | 128 |
| Number of external PN IO lines with PROFINET per rack | 1 |
| Amount of data | |
| • as user data for input variables as PROFINET IO controller maximum | 4 Kibyte |
| • as user data for input variables as PROFINET IO controller maximum | 4 Kibyte |
| • as user data for input variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for output variables per PN IO device as PROFINET IO controller maximum | 1 433 byte |
| • as user data for input variables per PN IO device for each sub-module as PROFINET IO controller max. | 240 byte |
| • as user data for output variables per PN IO device for each sub-module as PROFINET IO controller max. | 240 byte |

| Article number | 6GK7343-1GX31-0XE0 |
|---|---|
| Product type designation | CP 343-1 Advanced |
| **Performance data PROFINET communication as PN IO-Device** | |
| Product function PROFINET IO device | Yes |
| Amount of data | |
| • as user data for input variables as PROFINET IO device maximum | 1 024 byte |
| • as user data for input variables as PROFINET IO device maximum | 1 024 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for input variables for each sub-module as PROFINET IO device | 240 byte |
| • as user data for the consistency area for each sub-module | 240 byte |
| Number of submodules per PROFINET IO-Device | 32 |
| **Performance data PROFINET CBA** | |
| Number of remote connection partners with PROFINET CBA | 64 |
| Number of connections with PROFINET CBA total | 1 000 |
| Amount of data | |
| • as user data for digital inputs with PROFINET CBA maximum | 8 Kibyte |
| • as user data for digital outputs with PROFINET CBA maximum | 8 Kibyte |
| • as user data for arrays and data types in the case of acyclic transmission with PROFINET CBA maximum | 8 Kibyte |
| • as user data for arrays and data types with PROFINET CBA with cyclical transfer maximum | 250 byte |
| • as user data for arrays and data types with PROFINET CBA in the case of local interconnection maximum | 2 400 byte |
| **Performance data PROFINET CBA remote connection with acyclic transmission** | |
| Refresh time of the remote interconnections in the case of acyclic transmission with PROFINET CBA | 100 ms |
| Number of remote connections to input variables in the case of acyclic transmission with PROFINET CBA maximum | 128 |
| Number of remote connections to output variables in the case of acyclic transmission with PROFINET CBA maximum | 128 |
| Amount of data | |
| • as user data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA | 8 Kibyte |
| • as user data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA | 8 Kibyte |

■ **Technical specifications** (continued)

| Article number | 6GK7343-1GX31-0XE0 |
|---|---|
| Product type designation | CP 343-1 Advanced |
| **Performance data PROFINET CBA remote connection with cyclic transmission** | |
| Refresh time of the remote interconnections with PROFINET CBA with cyclical transfer | 8 ms |
| Number of remote connections to input variables with PROFINET CBA with cyclical transfer maximum | 200 |
| Number of remote connections to output variables with PROFINET CBA with cyclical transfer maximum | 200 |
| Amount of data | |
| • as user data for remote interconnections with input variables with PROFINET CBA with cyclical transfer maximum | 2 000 byte |
| • as user data for remote interconnections with output variables with PROFINET CBA with cyclical transfer maximum | 2 000 byte |
| **Performance data PROFINET CBA HMI variables via PROFINET acyclic** | |
| Number of connectable HMI stations for HMI variables in the case of acyclic transmission with PROFINET CBA | 3 |
| Refresh time of the HMI variables in the case of acyclic transmission with PROFINET CBA | 500 ms |
| Number of HMI variables in the case of acyclic transmission with PROFINET CBA maximum | 200 |
| Amount of data as user data for HMI variables in the case of acyclic transmission with PROFINET CBA maximum | 8 Kibyte |
| **Performance data PROFINET CBA device-internal connections** | |
| Number of internal connections with PROFINET CBA maximum | 256 |
| Amount of data of the internal connections with PROFINET CBA maximum | 2 400 byte |
| **Performance data PROFINET CBA connections to constants** | |
| Number of connections with constants with PROFINET CBA maximum | 200 |
| Amount of data as user data for interconnections with constants with PROFINET CBA maximum | 4 096 byte |
| **Performance data PROFINET CBA PROFIBUS proxy functionality** | |
| Product function with PROFINET CBA PROFIBUS proxy functionality | No |

| Article number | 6GK7343-1GX31-0XE0 |
|---|---|
| Product type designation | CP 343-1 Advanced |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v3 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP7 V5.5 SP2 HF1 or higher / STEP 7 Professional V12 (TIA Portal) or higher |
| • for PROFINET CBA required | SIMATIC iMap V3.0 SP4 and higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions switch** | |
| Product feature Switch | Yes |
| Product function | |
| • switch-managed | No |
| • with IRT PROFINET IO switch | Yes |
| • Configuration with STEP 7 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Parallel Redundancy Protocol (PRP)/ operation in the PRP-network | Yes |
| Protocol is supported Media Redundancy Protocol (MRP) | Yes |
| **Product functions Security** | |
| Firewall version | stateful inspection |
| Product function with VPN connection | IPSec |
| Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168, DES-56 |
| Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates |
| Type of hashing algorithms with VPN connection | MD5, SHA-1 |
| Number of possible connections with VPN connection | 32 |
| Product function | |
| • password protection for Web applications | Yes |
| • ACL - IP-based | Yes |
| • ACL - IP-based for PLC/routing | Yes |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | Yes |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 343-1 Advanced

■ **Ordering data**      **Article No.**               **Article No.**

**5**

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 343-1 Advanced communications processor** | | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1840-2AH10 |
| For connecting the SIMATIC S7-300 CPU to Industrial Ethernet; 1 x 10/100/1000 Mbps; 2 x 10/100 Mbps (IE switch); RJ 45 ports; TCP; UDP; ISO; PROFINET IO controller and device, S7 communication (client + server); open communication (SEND/ RECEIVE); S7 routing; IP configuration via DHCP/block; extended web diagnostics; time synchronization; IP Access Control List; IP routing; FTP; email; PROFINET CBA; C-Plug | | 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | |
| | | **IE FC TP Standard Cable GP 4 x 2** | |
| | | 8-wire, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| • With Security (Firewall + VPN) and PROFIenergy (Controller + Device) | 6GK7343-1GX31-0XE0 | • AWG22, for connection to IE FC RJ45 Modular Outlet | 6XV1870-2E |
| **Accessories** | | • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1878-2A |
| **IE FC RJ45 Plug 180 2 x 2** | | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| | | **CSM 377 Compact Switch Module** | |
| | | Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM | 6GK7377-1AA00-0AA0 |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 | | |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 | | |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 | | |
| **IE FC RJ45 Plug 145** | | **Industrial Ethernet switch SCALANCE X204-2** | 6GK5204-2BB10-2AA3 |
| RJ45 plug connector 2 x 2 for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 145° cable outlet | | Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports | |
| • 1 pack = 1 unit | 6GK1901-1BB30-0AA0 | | |
| • 1 pack = 10 units | 6GK1901-1BB30-0AB0 | **Industrial Ethernet switch SCALANCE X308-2** | 6GK5308-2FL10-2AA3 |
| • 1 pack = 50 units | 6GK1901-1BB30-0AE0 | | |
| **IE FC RJ45 Plug 4 x 2** | | 2 x 1000 Mbps SC ports, optical (multimode, glass), up to 750 m 1 x 10/100/1000 Mbps RJ45 port, electrical 7 x 10/100 Mbps RJ45 ports, electrical | |
| RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | |
| • 1 pack = 1 unit | 6GK1901-1BB11-2AA0 | | |
| • 1 pack = 10 units | 6GK1901-1BB11-2AB0 | | |
| • 1 pack = 50 units | 6GK1901-1BB11-2AE0 | | |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

■ **Overview**

The CP 343-1 ERPC (Enterprise Connect) communications processor for connecting a SIMATIC S7-300 to Industrial Ethernet networks.

The CP supports:
• PG/OP communication
• S7 communication
• Open communication (SEND/RECEIVE)
• ERPC communication

Connection of the SIMATIC S7-300 to various database systems for vertical integration is supported by means of a firmware expansion from ILS-Technology to be ordered separately.

| ERPC | TCP/UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|---|---|---|---|---|---|---|---|
| ● | ● | | | | | ● | ● |

■ **Technical specifications**

| Article number | **6GK7343-1FX00-0XE0** |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 1 000 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | RJ45 port |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 from backplane bus | 5 V |
| Supply voltage external | 24 V |
| Supply voltage external at DC Rated value | 24 V |
| Relative positive tolerance at DC at 24 V | 20 % |
| Relative negative tolerance at DC at 24 V | 15 % |
| Consumed current | |
| • from backplane bus at DC at 5 V typical | 0.3 A |
| • from external supply voltage at DC at 24 V typical | 0.16 A |
| • from external supply voltage at DC at 24 V maximum | 0.6 A |
| Power loss [W] | 14.7 W |

| Article number | **6GK7343-1FX00-0XE0** |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 40 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 double width |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.8 kg |
| Mounting type | |
| • S7-300 rail mounting | Yes |
| **Performance data open communication** | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum | 8 |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum | 8 Kibyte |
| • as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum | 2 Kibyte |
| Number of Multicast stations | 8 |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## CP 343-1 ERPC

### ■ Technical specifications (continued)

| Article number | **6GK7343-1FX00-0XE0** |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 8 |
| • Note | also 2 PG/OP connections and 1 diagnostics connection |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 32 |
| **Performance data IT functions** | |
| Number of possible connections | |
| • as server by means of HTTP maximum | 4 |
| Number of possible write cycles of the flash memory cells | 100 000 |
| **Performance data ERPC functions** | |
| Number of possible connections for communication with ERP or MES stations maximum | 8 |
| Number of possible logical triggers per CP maximum | 8 |
| Number of configurable ERPC symbols for database access | |
| • per CPU maximum | 2 000 |
| • per logical trigger maximum | 255 |
| Amount of data as user data and header information per logical trigger | 8 Kibyte |
| **Performance data telecontrol** | |
| Protocol is supported | |
| • TCP/IP | Yes |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP 7 V5.4 SP5 + HSP or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |

| Article number | **6GK7343-1FX00-0XE0** |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes |
| **Product functions switch** | |
| Product feature Switch | No |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | No |
| **Product functions Security** | |
| Product function | |
| • password protection for Web applications | No |
| • ACL - IP-based | Yes |
| • ACL - IP-based for PLC/routing | No |
| • switch-off of non-required services | Yes |
| • Blocking of communication via physical ports | Yes |
| • log file for unauthorized access | No |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | Yes |
| Protocol is supported | |
| • NTP | Yes |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 343-1 ERPC (Enterprise Connect) communications processor** | **6GK7343-1FX00-0XE0** | **Accessories** | |
| | | **IE FC RJ45 Plug 4 x 2** | |
| For the connection of SIMATIC S7-300 to Industrial Ethernet and for the support of the database connection of the SIMATIC S7-300 to various databases; TCP/UDP, S7 communication, open communication (SEND/RECEIVE), with and without RFC 1006, multicast, web server, setting of CPU's clock using SIMATIC procedures and NTP, access protection via IP access list, SNMP, DHCP, initialization over LAN 10/100/1000 Mbps; with electronic manual on DVD, C-PLUG included in scope of delivery | | RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| | | • 1 pack = 1 unit | **6GK1901-1BB11-2AA0** |
| | | • 1 pack = 10 units | **6GK1901-1BB11-2AB0** |
| | | • 1 pack = 50 units | **6GK1901-1BB11-2AE0** |
| | | **IE FC TP Standard Cable GP 4 x 2** | |
| **deviceWISE Embedded Edition for SIMATIC S7** | See Catalog IK PI 2015, Partner solutions / deviceWISE Embedded Edition for SIMATIC S7 | 8-wire, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| Firmware expansion for database connection of the SIMATIC S7-300 complete with CP 343-1 ERPC to various ERP or MES systems | | • AWG22, for connection to IE FC RJ45 Modular Outlet | **6XV1870-2E** |
| | | • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | **6XV1878-2A** |
| | | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| | | **Industrial Ethernet switch SCALANCE X308-2** | |
| | | 2 x 1000 Mbps SC ports, optical (multimode, glass), up to 750 m, 1 x 10/100/1000 Mbps RJ45 port, electrical 7 x 10/100 Mbps RJ45 ports, electrical | **6GK5308-2FL10-2AA3** |

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

**CSM 377 unmanaged**

## ◼ Overview

- Unmanaged switch for the connection of a SIMATIC S7-300 with integral PROFINET interface or with an Industrial Ethernet CP or ET 200M to an Industrial Ethernet in an electrical linear, tree or star structure
- As many as three additional nodes can be connected
- As an unmanaged switch, the CSM 377 is used for integrating small machines into existing automation networks or for the stand-alone operation of the machines
- Simple, space-saving attachment to S7-300 DIN rail due to design as single-width module in S7-300 format
- Low-cost solution for implementing small, local Ethernet networks
- Rugged, industry-standard node connections with PROFINET-compliant RJ45 connectors that latch onto the enclosure to offer additional strain and bending relief

## ◼ Technical specifications

| Article number | 6GK7377-1AA00-0AA0 |
| --- | --- |
| Product type designation | CSM 377 |
| **Transmission rate** | |
| Transfer rate | 10 Mbit/s, 100 Mbit/s |
| **Interfaces for communication integrated** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 4 |
| Number of 100 Mbit/s SC ports | |
| • for multimode | 0 |
| Number of 1000 Mbit/s LC ports | |
| • for multimode | 0 |
| • for single mode (LD) | 0 |
| **Interfaces others** | |
| Number of electrical connections | |
| • for power supply | 1 |
| Type of electrical connection | |
| • for power supply | 2-pole terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | |
| • external | 24 V |
| • external | 19.2 ... 28.8 V |
| Product component fusing at power supply input | Yes |
| Fuse protection type at input for supply voltage | 0.5 A / 60 V |
| Consumed current maximum | 0.07 A |
| Power loss [W] | |
| • at DC at 24 V | 1.6 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity | |
| • at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |

| Article number | 6GK7377-1AA00-0AA0 |
| --- | --- |
| Product type designation | CSM 377 |
| **Design, dimensions and weight** | |
| Design | SIMATIC S7-300 device design |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 118 mm |
| Net weight | 0.2 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | No |
| • wall mounting | No |
| • S7-300 rail mounting | Yes |
| • S7-1500 rail mounting | No |
| **Product functions management, configuration** | |
| Product function | |
| • multiport mirroring | No |
| • switch-managed | No |
| **Product functions Redundancy** | |
| Product function | |
| • Parallel Redundancy Protocol (PRP)/ operation in the PRP-network | Yes |
| • Parallel Redundancy Protocol (PRP)/ Redundant Network Access (RNA) | No |

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## Technical specifications (continued)

| Article number | 6GK7377-1AA00-0AA0 |
|---|---|
| Product type designation | CSM 377 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta |
| • for hazardous zone | EN 60079-15, II 3 G Ex nA II T., KEMA 06 ATEX 0021 X |
| • for safety from CSA and UL | UL 508, CSA C22.2 No. 142 |
| • for hazardous zone from CSA and UL | UL 1604 and UL 2279-15 (Hazardous Location) |
| • for emitted interference | EN 61000-6-4:2001 |
| • for interference immunity | EN 61000-6-2:2001 |
| Certificate of suitability CE marking | Yes |

| Article number | 6GK7377-1AA00-0AA0 |
|---|---|
| Product type designation | CSM 377 |
| Certificate of suitability | EN 61000-6-2:2001, EN 61000-6-4:2001 |
| • C-Tick | Yes |
| • KC approval | No |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes |
| • Bureau Veritas (BV) | Yes |
| • Det Norske Veritas (DNV) | Yes |
| • Germanische Lloyd (GL) | No |
| • Lloyds Register of Shipping (LRS) | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes |
| • Polski Rejestr Statkow (PRS) | No |
| • Royal Institution of Naval Architects (RINA) | No |
| MTBF at 40 °C | 144 y |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Compact Switch Module CSM 377** | | **Accessories** | |
| Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three further nodes to Industrial Ethernet with 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-300 module including electronic manual on CD-ROM | **6GK7377-1AA00-0AA0** | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | |
| | | 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | **6XV1840-2AH10** |
| | | **IE FC RJ45 Plug 180 2 x 2** | |
| | | RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| | | • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| | | • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| | | • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |
| | | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 3V-IE Advanced (for S7-300)

### ■ Overview



- SINAUT communication module TIM for SIMATIC S7-300 for use in wide area network (WAN) as station, node station, and control center
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem or radio devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

### ■ Technical specifications

| Article number | 6NH7800-3CA00 |
| --- | --- |
| Product type designation | TIM 3V-IE Advanced |
| **Transmission rate** | |
| Transfer rate | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s |
| • acc. to RS 232 | 50 ... 38 400 bit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • for external data transmission acc. to RS 232 | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • of Industrial Ethernet interface | RJ45 port |
| • at interface 1 for external data transmission | 9 pin Sub-D-connector (RS232) |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | No |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 20.4 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 20.4 ... 28.8 V |
| Relative symmetrical tolerance at DC | |
| • at 5 V | 5 % |
| Relative positive tolerance at DC at 24 V | 5 % |
| Relative negative tolerance at DC at 24 V | 5 % |
| Consumed current | |
| • from backplane bus at DC at 24 V maximum | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.2 A |
| Power loss [W] | 5.8 W |
| Product extension optional Backup battery | No |

| Article number | 6NH7800-3CA00 |
| --- | --- |
| Product type designation | TIM 3V-IE Advanced |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.25 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • Note | Number of TIMs per S7-300: multiple, number depends on the connection resources of the S7-300 CPU |
| Wire length | |
| • with RS 232 interface maximum | 6 m |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 24 |
| • with PG connections maximum | 4 |
| • with OP connections maximum | 20 |
| Service | |
| • SINAUT ST7 via S7 communication | Yes |
| • PG/OP communication | Yes |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 24 |

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■ **Technical specifications** (continued)

| Article number | **6NH7800-3CA00** |
|---|---|
| Product type designation | TIM 3V-IE Advanced |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | Yes |
| • substation | Yes |
| • TIM control center | Yes |
| • Note | RS232 and Industrial Ethernet can be operated in parallel |
| Protocol is supported | |
| • TCP/IP | Yes |
| • DNP3 | No |
| • SINAUT ST1 protocol | Yes |
| • SINAUT ST7 protocol | Yes |
| Product function data buffering if connection is aborted | Yes; 32,000 data messages |
| Storage capacity | |
| • of S7 CPU RAM for TD7onCPU mode data blocks on CPU required | 20 Kibyte |
| • of S7 CPU RAM for TD7onTIM mode data blocks on TIM required | 0 Kibyte |
| • Note | TD7onCPU: at least 20 KB, actual requirement determined by data volume and functional scope TD7onTIM: 0 bytes in most favorable case |
| Product feature Buffered message frame memory | No |
| Transmission format | |
| • for SINAUT ST1 protocol with polling 11 bit | Yes |
| • for SINAUT ST1 protocol with spontaneous 10-bit or 11-bit | Yes |
| • for SINAUT ST7 protocol with multi-master polling 10-bit | Yes |
| • for SINAUT ST7 protocol with polling or spontaneous 10-bit or 11-bit | Yes |

| Article number | **6NH7800-3CA00** |
|---|---|
| Product type designation | TIM 3V-IE Advanced |
| Operating mode for scanning of data transmission | |
| • with dedicated line/radio link with SINAUT ST1 protocol | Polling, polling with time slot procedure |
| • with dedicated line/radio link with SINAUT ST7 protocol | Polling, polling with time slot procedure, multi-master polling with time slot procedure |
| • with dial-up network with SINAUT ST1 protocol | spontaneous |
| • with dial-up network with SINAUT ST7 protocol | spontaneous |
| Hamming distance | |
| • for SINAUT ST1 protocol | 4 |
| • for SINAUT ST7 protocol | 4 |
| Configuration software | |
| • required | SINAUT ST7 ES |
| • for CPU configuring required SINAUT TD7 block library for CPU | Yes |
| • for PG configuring required SINAUT ST7 configuration software for PG | Yes |
| Storage location of TIM configuration data | on the TIM |
| **Product functions Security** | |
| Suitability for operation Virtual Private Network | Yes |
| Type of authentication with Virtual Private Network PSK | Yes |
| Product function | |
| • password protection for VPN | Yes |
| • MSC client via GPRS modem with MSC capability | Yes |
| Protocol | |
| • is supported MSC protocol | Yes |
| • with Virtual Private Network MSC is supported | TCP/IP |
| Key length for MSC with Virtual Private Network | 128 bit |
| Number of possible connections | |
| • as MSC client with VPN connection | 1 |
| • as MSC server with VPN connection | 0 |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 3V-IE Advanced (for S7-300)

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **TIM 3V-IE Advanced communications module** | **6NH7800-3CA00** | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| With an RS 232 interface and an RJ45 interface for SINAUT communication via a conventional WAN and an IP-based network (WAN or LAN) | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **SINAUT Engineering Software V5.5** | **6NH7997-0CA55-0AA0** | **Connecting cable** | **6NH7701-4AL** |
| On CD-ROM, comprising<br>• SINAUT ST7 Engineering Software V5.5 for the PG<br>• SINAUT TD7 block library<br>• Electronic manual in German and English | | For connecting a TIM (RS 232) with a SINAUT ST7 MD2, MD3 or MD4 (RS 232) modem; cable length 1.5 m | |
| **Accessories** | | **Connecting cable** | **6NH7701-5AN** |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** | For connecting a TIM (RS 232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS 232 interface; cable length 2.5 m | |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | | **Connecting cable** | **6NH7701-4BN** |
| | | with one end open for connecting a TIM (RS 232) to a third-party modem or radio unit (RS 232); cable length 2.5 m | |
| **IE FC RJ45 Plug 180** | | **Connecting cable** | **6NH7701-0AR** |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | For connecting two TIM modules via their RS 232 interface without modems ("null modem"); cable length 6 m | |
| • 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | **6GK1901-1BB10-2AA0**<br>**6GK1901-1BB10-2AB0**<br>**6GK1901-1BB10-2AE0** | | |

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## Overview

- SINAUT communications module TIM for SIMATIC S7-300 for use in a wide area network (WAN)
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data
- Simple configuration and operation without specialist IT knowledge

## Technical specifications

| Article number | 6NH7800-3BA00 |
|---|---|
| Product type designation | TIM 3V-IE |
| **Transmission rate** | |
| Transfer rate | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s |
| • acc. to RS 232 | 50 ... 38 400 bit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • for external data transmission acc. to RS 232 | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • of Industrial Ethernet interface | RJ45 port |
| • at interface 1 for external data transmission | 9 pin Sub-D-connector (RS232) |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | No |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 20.4 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 20.4 ... 28.8 V |
| Relative symmetrical tolerance at DC | |
| • at 5 V | 5 % |
| Relative positive tolerance at DC at 24 V | 5 % |
| Relative negative tolerance at DC at 24 V | 5 % |
| Consumed current | |
| • from backplane bus at DC at 24 V maximum | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.2 A |
| Power loss [W] | 5.8 W |
| Product extension optional Backup battery | No |

| Article number | 6NH7800-3BA00 |
|---|---|
| Product type designation | TIM 3V-IE |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.25 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 1 |
| • Note | Number of TIMs per S7-300: 1 |
| Wire length | |
| • with RS 232 interface maximum | 6 m |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 8 |
| • with PG connections maximum | 2 |
| • with OP connections maximum | 8 |
| Service | |
| • SINAUT ST7 via S7 communication | Yes |
| • PG/OP communication | Yes |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 12 |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 3V-IE (for S7-300)

### ■ Technical specifications (continued)

| Article number | 6NH7800-3BA00 |
|---|---|
| Product type designation | TIM 3V-IE |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | No |
| • substation | Yes |
| • TIM control center | No |
| • Note | RS232 and Industrial Ethernet can not be operated in parallel |
| Protocol is supported | |
| • TCP/IP | Yes |
| • DNP3 | No |
| • SINAUT ST1 protocol | Yes |
| • SINAUT ST7 protocol | Yes |
| Product function data buffering if connection is aborted | Yes; 16,000 data messages |
| Storage capacity | |
| • of S7 CPU RAM for TD7onCPU mode data blocks on CPU required | 20 Kibyte |
| • of S7 CPU RAM for TD7onTIM mode data blocks on TIM required | 0 Kibyte |
| • Note | TD7onCPU: at least 20 KB, actual requirement determined by data volume and functional scope TD7onTIM: 0 bytes in most favorable case |
| Product feature Buffered message frame memory | No |
| Transmission format | |
| • for SINAUT ST1 protocol with polling 11 bit | Yes |
| • for SINAUT ST1 protocol with spontaneous 10-bit or 11-bit | Yes |
| • for SINAUT ST7 protocol with multi-master polling 10-bit | Yes |
| • for SINAUT ST7 protocol with polling or spontaneous 10-bit or 11-bit | Yes |
| Operating mode for scanning of data transmission | |
| • with dedicated line/radio link with SINAUT ST1 protocol | Polling, polling with time slot procedure |
| • with dedicated line/radio link with SINAUT ST7 protocol | Polling, polling with time slot procedure, multi-master polling with time slot procedure |
| • with dial-up network with SINAUT ST1 protocol | spontaneous |
| • with dial-up network with SINAUT ST7 protocol | spontaneous |

| Article number | 6NH7800-3BA00 |
|---|---|
| Product type designation | TIM 3V-IE |
| Hamming distance | |
| • for SINAUT ST1 protocol | 4 |
| • for SINAUT ST7 protocol | 4 |
| Configuration software | |
| • required | SINAUT ST7 ES |
| • for CPU configuring required SINAUT TD7 block library for CPU | Yes |
| • for PG configuring required SINAUT ST7 configuration software for PG | Yes |
| Storage location of TIM configuration data | on the TIM |
| **Product functions Security** | |
| Suitability for operation Virtual Private Network | Yes |
| Operating mode Virtual Private Network note | VPN operation as MSC client with MSC protocol and password protection only possible in conjunction with GPRS modem with MSC capability |
| Type of authentication with Virtual Private Network PSK | Yes |
| Product function | |
| • password protection for VPN | Yes |
| • MSC client via GPRS modem with MSC capability | Yes |
| Protocol | |
| • is supported MSC protocol | No |
| Key length for MSC with Virtual Private Network | 128 bit |
| Number of possible connections | |
| • as MSC client with VPN connection | 1 |
| • as MSC server with VPN connection | 0 |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TIM 3V-IE communications module**<br><br>With an RS 232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN) | **6NH7800-3BA00** | **IE FC Stripping Tool**<br><br>Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | **6GK1901-1GA00** |
| **SINAUT Engineering Software V5.5**<br><br>On CD-ROM, comprising<br>• SINAUT Engineering Software V5.5 for the PG<br>• SINAUT TD7 block library<br>• Electronic manual in German and English | **6NH7997-0CA55-0AA0** | **Connecting cable**<br><br>For connecting a TIM (RS 232) with a SINAUT ST7 MD2, MD3 or MD4 (RS 232) modem; cable length 1.5 m | **6NH7701-4AL** |
| **Accessories** | | **Connecting cable**<br><br>For connecting a TIM (RS 232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS 232 interface; cable length 2.5 m | **6NH7701-5AN** |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br><br>4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; <u>sold by the meter;</u> max. length 1000 m, minimum order quantity 20 m | **6XV1840-2AH10** | **Connecting cable**<br><br>with one end open for connecting a TIM (RS 232) to a third-party modem or radio unit (RS 232); cable length 2.5 m | **6NH7701-4BN** |
| **IE FC RJ45 Plug 180**<br><br>RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface<br>• 1 pack = 1 unit<br>• 1 pack = 10 units<br>• 1 pack = 50 units | <br><br><br><br><br><br><br><br><br><br>**6GK1901-1BB10-2AA0**<br>**6GK1901-1BB10-2AB0**<br>**6GK1901-1BB10-2AE0** | **Connecting cable**<br><br>For connecting two TIM modules via their RS 232 interface without modems ("null modem"); cable length 6 m | **6NH7701-0AR** |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 4R-IE (for S7-300/-400/PC)

### ■ Overview



- SINAUT communications module TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in the wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

### ■ Technical specifications

| Article number | 6NH7800-4BA00 |
| --- | --- |
| Product type designation | TIM 4R-IE |
| **Transmission rate** | |
| Transfer rate | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s |
| • acc. to RS 232 | 50 ... 38 400 bit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 2 |
| Number of electrical connections | |
| • for external data transmission acc. to RS 232 | 2 |
| • for power supply | 1 |
| Type of electrical connection | |
| • of Industrial Ethernet interface | RJ45 port |
| • at interface 1 for external data transmission | 9 pin Sub-D-connector, RS232 switchable to RS485 |
| • at interface 2 for external data transmission | 9-pole D-sub connector, RS232 can be switched to RS485 |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 20.4 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 20.4 ... 28.8 V |
| Consumed current | |
| • from backplane bus at DC at 24 V maximum | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.17 A |
| Power loss [W] | 4.6 W |

| Article number | 6NH7800-4BA00 |
| --- | --- |
| Product type designation | TIM 4R-IE |
| Product extension optional Backup battery | Yes |
| Type of battery | Lithium AA / 3.6 V / 2.3 Ah |
| Backup current | |
| • typical | 100 µA |
| • maximum | 160 µA |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 double width |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.4 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • Note | Number of TIM 4R-IE per S7-300/S7-400: multiple, number depends on the connection resources of the CPU |
| Wire length | |
| • with RS 232 interface maximum | 6 m |
| • with RS 485 interface maximum | 30 m |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 64 |
| • with PG connections maximum | 2 |
| • with OP connections maximum | 62 |
| Service | |
| • SINAUT ST7 via S7 communication | Yes |
| • PG/OP communication | Yes |

■ **Technical specifications** (continued)

| Article number | 6NH7800-4BA00 |
|---|---|
| Product type designation | TIM 4R-IE |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 128 |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | Yes |
| • substation | Yes |
| • TIM control center | Yes |
| Protocol is supported | |
| • TCP/IP | Yes |
| • DNP3 | No |
| • SINAUT ST1 protocol | Yes |
| • SINAUT ST7 protocol | Yes |
| Product function data buffering if connection is aborted | Yes; 56,000 data messages |
| Storage capacity | |
| • of S7 CPU RAM for TD7onCPU mode data blocks on CPU required | 20 Kibyte |
| • of S7 CPU RAM for TD7onTIM mode data blocks on TIM required | 0 Kibyte |
| • Note | TD7onCPU: at least 20 KB, actual requirement determined by data volume and functional scope TD7onTIM: 0 bytes in most favorable case |
| Product feature Buffered message frame memory | Yes |
| Transmission format | |
| • for SINAUT ST1 protocol with polling 11 bit | Yes |
| • for SINAUT ST1 protocol with spontaneous 10-bit or 11-bit | Yes |
| • for SINAUT ST7 protocol with multi-master polling 10-bit | Yes |
| • for SINAUT ST7 protocol with polling or spontaneous 10-bit or 11-bit | Yes |
| Operating mode for scanning of data transmission | |
| • with dedicated line/radio link with SINAUT ST1 protocol | Polling, polling with time slot procedure |
| • with dedicated line/radio link with SINAUT ST7 protocol | Polling, polling with time slot procedure, multi-master polling with time slot procedure |
| • with dial-up network with SINAUT ST1 protocol | spontaneous |
| • with dial-up network with SINAUT ST7 protocol | spontaneous |

| Article number | 6NH7800-4BA00 |
|---|---|
| Product type designation | TIM 4R-IE |
| Hamming distance | |
| • for SINAUT ST1 protocol | 4 |
| • for SINAUT ST7 protocol | 4 |
| Configuration software | |
| • required | SINAUT ST7 ES |
| • for CPU configuring required SINAUT TD7 block library for CPU | Yes |
| • for PG configuring required SINAUT ST7 configuration software for PG | Yes |
| Storage location of TIM configuration data | on internal TIM flash memory, or on TIM in optional C-PLUG, or on MMC of the S7-300 CPU if TIM installed in S7-300 controller |
| **Product functions Security** | |
| Suitability for operation Virtual Private Network | Yes |
| Type of authentication with Virtual Private Network PSK | Yes |
| Product function | |
| • password protection for VPN | Yes |
| • MSC client via GPRS modem with MSC capability | Yes |
| Protocol | |
| • is supported MSC protocol | Yes |
| • with Virtual Private Network MSC is supported | TCP/IP |
| Key length for MSC with Virtual Private Network | 128 bit |
| Number of possible connections | |
| • as MSC client with VPN connection | 1 |
| • as MSC server with VPN connection | 128 |
| **Product functions Time** | |
| Product component Hardware real-time clock | Yes |
| Product feature Hardware real-time clock w. battery backup | Yes |
| Accuracy of the hardware real-time clock per day maximum | 4 s |
| time synchronization | |
| • from NTP-server | Yes |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 4R-IE (for S7-300/-400/PC)

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **TIM 4R-IE communications module** <br><br> With two combined RS 232/RS 485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN) | 6NH7800-4BA00 | **IE FC Stripping Tool** <br><br> Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | 6GK1901-1GA00 |
| **SINAUT Engineering Software V5.5** <br><br> On CD-ROM, comprising <br> • SINAUT ST7 Engineering Software V5.5 for the PG <br> • SINAUT TD7 block library <br><br> • Electronic manual in German and English | 6NH7997-0CA55-0AA0 | **Connecting cable** <br><br> For connecting a TIM (RS 232) with a SINAUT ST7 MD2, MD3 or MD4 (RS 232) modem; cable length 1.5 m | 6NH7701-4AL |
| **Accessories** | | **Connecting cable** <br><br> For connecting a TIM (RS 232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS 232 interface; cable length 2.5 m | 6NH7701-5AN |
| **Backup battery** <br><br> 3.6 V/2.3 Ah for TIM 4R-IE | 6ES7971-0BA00 | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** <br><br> 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | 6XV1840-2AH10 | **Connecting cable** <br><br> with one end open for connecting a TIM (RS 232) to a third-party modem or radio unit (RS 232); cable length 2.5 m | 6NH7701-4BN |
| **IE FC RJ45 Plug 180** <br><br> RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface <br> • 1 pack = 1 unit <br> • 1 pack = 10 units <br> • 1 pack = 50 units | <br><br><br><br><br><br><br><br><br><br>6GK1901-1BB10-2AA0 <br> 6GK1901-1BB10-2AB0 <br> 6GK1901-1BB10-2AE0 | **Connecting cable** <br><br> For connecting two TIM modules via their RS 232 interface without modems ("null modem"); cable length 6 m | 6NH7701-0AR |
| | | **SITOP compact 24 V/0.6 A** <br><br> 1-phase power supply with wide-range input 85 … 264 V AC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design | 6EP1331-5BA00 |

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## ■ Overview

In a station for the S7-CPU, the new communication module TIM 3V-IE DNP3 V3.0 (TeleControl Interface Module) handles the data exchange with the assigned master system SIMATIC PCS 7 TeleControl V8.0 using the open DNP3 protocol.
In addition, the V3.0 module now also supports master and node functionality.

- With the S7-300 housing, the module can be fully integrated into the S7-300 system
- The module has an RS 232 interface for the connection of an external modem for data transmission via a conventional WAN or the connection of a Modbus RTU slave to an S7-300 system
- The RJ45 port is used for data transmission via IP-based networks

## ■ Technical specifications

| Article number | 6NH7803-3BA00-0AA0 |
|---|---|
| Product type designation | TIM 3V-IE DNP3 |
| **Transmission rate** | |
| Transfer rate | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s |
| • acc. to RS 232 | 9 600 ... 38 400 bit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • for external data transmission acc. to RS 232 | 1 |
| • for power supply | 1 |
| Type of electrical connection | |
| • of Industrial Ethernet interface | RJ45 port |
| • at interface 1 for external data transmission | 9 pin Sub-D-connector (RS232) |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | No |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 20.4 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 20.4 ... 28.8 V |
| Consumed current | |
| • from backplane bus at DC at 24 V maximum | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.2 A |
| Power loss [W] | 5.8 W |
| Product extension optional Backup battery | No |

| Article number | 6NH7803-3BA00-0AA0 |
|---|---|
| Product type designation | TIM 3V-IE DNP3 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 single width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.25 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • Note | Number of TIMs per S7-300: 1 |
| Wire length | |
| • with RS 232 interface maximum | 6 m |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 3 |
| • with PG connections maximum | 2 |
| • with OP connections maximum | 1 |
| • Note | only via LAN |
| Service | |
| • PG/OP communication | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 3V-IE DNP3 (for S7-300)

### ■ Technical specifications (continued)

| Article number | 6NH7803-3BA00-0AA0 | Article number | 6NH7803-3BA00-0AA0 |
|---|---|---|---|
| Product type designation | TIM 3V-IE DNP3 | Product type designation | TIM 3V-IE DNP3 |
| **Performance data telecontrol** | | Product function data buffering if connection is aborted | Yes; 64,000 data points with one master |
| Suitability for use | | Number of DNP3 masters | |
| • Node station | Yes | • for Ethernet maximum | 8 |
| • substation | Yes | • with RS 232 interface maximum | 1 |
| • TIM control center | Yes | Number of Modbus RTU slaves maximum | 1 |
| Protocol is supported | | Configuration software | |
| • TCP/IP | Yes | • required | SINAUT ST7 ES |
| • DNP3 | Yes | Storage location of TIM configuration data | on the CPU or TIM |
| • SINAUT ST1 protocol | No | | |
| • SINAUT ST7 protocol | No | | |
| • Modbus RTU | Yes | | |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TIM 3V-IE DNP3 communications module** | **6NH7803-3BA00-0AA0** | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| With an RS 232 interface for SINAUT communication via a conventional WAN and an IP-based network (WAN or LAN) | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **SINAUT Engineering Software V5.5** | **6NH7997-0CA55-0AA0** | **Connecting cable** | **6NH7701-4AL** |
| On CD-ROM, comprising | | For connecting a TIM (RS 232) with a SINAUT ST7 MD2, MD3 or MD4 (RS 232) modem; cable length 1.5 m | |
| • SINAUT ST7 Engineering Software V5.5 for the PG | | | |
| • SINAUT TD7 block library | | **Connecting cable** | **6NH7701-5AN** |
| • Electronic manual in German and English | | For connecting a TIM (RS 232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS 232 interface; cable length 2.5 m | |
| **Accessories** | | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** | **Connecting cable** | **6NH7701-4BN** |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | | with one end open for connecting a TIM (RS 232) to a third-party modem or radio unit (RS 232); cable length 2.5 m | |
| **IE FC RJ45 Plug 180** | | **Connecting cable** | **6NH7701-0AR** |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | For connecting two TIM modules via their RS 232 interface without modems ("null modem"); cable length 6 m | |
| • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** | | |
| • 1 pack = 10 units | **6GK1901-1BB10-2AB0** | | |
| • 1 pack = 50 units | **6GK1901-1BB10-2AE0** | | |

## Overview

In a station for the S7-CPU, the communication module TIM 4R-IE DNP3 (TeleControl Interface Module) handles the data exchange with the assigned SIMATIC PCS7 TeleControl V8.0 master system using the open DNP3 protocol. In addition, the V3.0 module now also supports master and node functionality.

- With the double-width S7-300 housing, the module can be fully integrated into the S7-300 system
- Can be connected as a stand-alone module to a SIMATIC S7-400 and SIMATIC S7-400 H System
- Two RS 232/RS 485 interfaces support connection of an external modem for data transmission via a conventional WAN or of a Modbus RTU slave to an S7-300 system
- The module has two RJ45 interfaces for data transmission via IP-based networks
- By using physically separate connection paths, the module permits media redundancy without loss of data during the switchover

## Technical specifications

| Article number | 6NH7803-4BA00-0AA0 |
|---|---|
| Product type designation | TIM 4R-IE DNP3 |
| **Transmission rate** | |
| Transfer rate | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s |
| • acc. to RS 232 | 9 600 ... 115 200 bit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 2 |
| Number of electrical connections | |
| • for external data transmission acc. to RS 232 | 2 |
| • for power supply | 1 |
| Type of electrical connection | |
| • of Industrial Ethernet interface | RJ45 port |
| • at interface 1 for external data transmission | 9 pin Sub-D-connector, RS232 switchable to RS485 |
| • at interface 2 for external data transmission | 9-pole D-sub connector, RS232 can be switched to RS485 |
| • for power supply | 2-pole plugable terminal block |
| design of the removable storage C-PLUG | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 20.4 ... 28.8 V |
| Supply voltage external at DC Rated value | 24 V |
| Supply voltage external at DC rated value | 20.4 ... 28.8 V |
| Consumed current | |
| • from backplane bus at DC at 24 V maximum | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.17 A |
| Power loss [W] | 4.6 W |
| Product extension optional Backup battery | Yes |
| Type of battery | Lithium AA / 3.6 V / 2.3 Ah |
| Backup current | |
| • typical | 100 μA |
| • maximum | 160 μA |

| Article number | 6NH7803-4BA00-0AA0 |
|---|---|
| Product type designation | TIM 4R-IE DNP3 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | Compact module S7-300 double width |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.4 kg |
| **Product properties, functions, components general** | |
| Number of units | |
| • Note | Number of TIMs per S7-300 / S7-400: 1 |
| Wire length | |
| • with RS 232 interface maximum | 6 m |
| • with RS 485 interface maximum | 30 m |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 5 |
| • with PG connections maximum | 2 |
| • with OP connections maximum | 1 |
| • Note | only via LAN |
| Service | |
| • PG/OP communication | Yes |
| **Performance data telecontrol** | |
| Suitability for use | |
| • Node station | Yes |
| • substation | Yes |
| • TIM control center | Yes |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

## TIM 4R-IE DNP3 (for S7-300/-400)

### ■ Technical specifications  (continued)

| Article number | 6NH7803-4BA00-0AA0 |
|---|---|
| Product type designation | TIM 4R-IE DNP3 |
| Protocol is supported | |
| • TCP/IP | Yes |
| • DNP3 | Yes |
| • SINAUT ST1 protocol | No |
| • SINAUT ST7 protocol | No |
| • Modbus RTU | Yes |
| Product function data buffering if connection is aborted | Yes; 200,000 data points with one master |
| Number of DNP3 masters | |
| • for Ethernet maximum | 8 |
| • with RS 232 interface maximum | 1 |
| Number of Modbus RTU slaves maximum | 1 |

| Article number | 6NH7803-4BA00-0AA0 |
|---|---|
| Product type designation | TIM 4R-IE DNP3 |
| Configuration software | |
| • required | SINAUT ST7 ES |
| Storage location of TIM configuration data | on the CPU or TIM |
| **Product functions Time** | |
| Product component Hardware real-time clock | Yes |
| Product feature Hardware real-time clock w. battery backup | Yes |
| Accuracy of the hardware real-time clock per day maximum | 4 s |
| time synchronization | |
| • from NTP-server | Yes |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TIM 4R-IE DNP3 communications module**<br>With two combined RS 232/RS 485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN) | 6NH7803-4BA00-0AA0 | **IE FC Stripping Tool**<br>Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | 6GK1901-1GA00 |
| **SINAUT Engineering Software V5.5**<br>On CD-ROM, comprising<br>• SINAUT ST7 Engineering Software V5.5 for the PG<br>• SINAUT TD7 block library<br>• Electronic manual in German and English | 6NH7997-0CA55-0AA0 | **Connecting cable**<br>For connecting a TIM (RS 232) with a SINAUT ST7 MD2, MD3 or MD4 (RS 232) modem; cable length 1.5 m | 6NH7701-4AL |
| **Accessories** | | **Connecting cable**<br>For connecting a TIM (RS 232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS 232 interface; cable length 2.5 m | 6NH7701-5AN |
| **Backup battery**<br>3.6 V/2.3 Ah for TIM 4R-IE DNP3 | 6ES7971-0BA00 | **Connecting cable**<br>with one end open for connecting a TIM (RS 232) to a third-party modem or radio unit (RS 232); cable length 2.5 m | 6NH7701-4BN |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br>4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | 6XV1840-2AH10 | **Connecting cable**<br>For connecting two TIM modules via their RS 232 interface without modems ("null modem"); cable length 6 m | 6NH7701-0AR |
| **IE FC RJ45 Plug 180**<br>RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | **SITOP compact 24 V/0.6 A**<br>1-phase power supply with wide-range input 85 to 264 V AC/110 to 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design | 6EP1331-5BA00 |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 | | |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 | | |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 | | |

## ■ Overview

The ASM 475 is a powerful communication module for connecting the MOBY D, SIMATIC RF200, RF300, RF600 and SIMATIC MV400 identification systems to the S7-300 and ET 200M.

## ■ Technical specifications

| | |
|---|---|
| Article number | **6GT2002-0GA10** |
| Product type designation | ASM 475 communication module |
| Suitability for operation | SIMATIC S7-300, ET200M together with RF200/300/600, MV400, MOBY D/E/I/U |
| **Transmission rate** | |
| Transfer rate at the point-to-point connection serial maximum | 115.2 kbit/s |
| **Interfaces** | |
| Design of the interface for point-to-point connection | RS422 |
| Number of readers connectable | 2 |
| Type of electrical connection | |
| • of the backplane bus | S7-300 backplane bus |
| • of the PROFIBUS interface | (according to the head module) |
| • of Industrial Ethernet interface | (according to the head module) |
| • for supply voltage | Screw-type or spring-loaded terminals |
| Design of the interface to the reader for communication | Screw-type or spring-loaded terminals |
| **Mechanical data** | |
| Material | Noryl |
| Color | anthracite |
| **Supply voltage, current consumption, power loss** | |
| Supply voltage | |
| • at DC Rated value | 24 V |
| • at DC | 20 ... 30 V |
| Consumed current at DC at 24 V | |
| • without connected devices typical | 0.1 A |
| • with connected devices maximum | 1 A |

| | |
|---|---|
| Article number | **6GT2002-0GA10** |
| Product type designation | ASM 475 communication module |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Protection class IP | IP20 |
| Shock resistance | According to IEC 61131-2 |
| Shock acceleration | 150 m/s² |
| Vibrational acceleration | 10 m/s² |
| **Design, dimensions and weight** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.2 kg |
| Mounting type | S7-300 rack |
| Cable length for RS 422 interface maximum | 1 000 m |
| **Product properties, functions, components general** | |
| Display version | 4 LEDs per reader connection, 2 LEDs for device status |
| Product function transponder file handler can be addressed | Yes |
| Protocol is supported | |
| • S7 communication | Yes |
| Type of parameterization | Object manager, GSD |
| Type of programming | FB 45, FB 55, FC 56 (FC 45/55 with limited functionality) |
| Type of computer-mediated communication | acyclic communication |
| **Standards, specifications, approvals** | |
| Certificate of suitability | CE, FCC, UL/CSA |
| **Accessories** | |
| accessories | Front connector with screw-type or spring-loaded terminals |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Communication

**ASM 475**

| **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **ASM 475 communication module**<br>For SIMATIC S7-300 and ET 200M, parameterizable | 6GT2002-0GA10 | **Extension cable**<br>SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers, straight connector | |
| **Accessories** | | 2 m | 6GT2891-4FH20 |
| **Front connector**<br>**(1 x per ASM 475)** | | 5 m | 6GT2891-4FH50 |
| • with screw terminals | 6ES7392-1AJ00-0AA0 | 10 m | 6GT2891-4FN10 |
| • with spring-loaded terminals | 6ES7392-1BJ00-0AA0 | 20 m | 6GT2891-4FN20 |
| **Shield connecting element**<br>**(80 mm wide for 2 x ASM 475)** | 6ES7390-5AA00-0AA0 | 50 m | 6GT2891-4FN50 |
| **Shield connection clamp**<br>**(1 x per reader cable)** | 6ES7390-5BA00-0AA0 | **SIMATIC RF200 / RF300 / RF600 / MV400 connecting cable**<br>pre-assembled, between the ASM 475 and RF200 / RF300 / RF600 / MV400, IP65, straight connector, PUR material, suitable for cable carriers, CMG approval, in the following lengths[1]: | |
| **MOBY D connecting cable**<br>pre-assembled, between ASM 475 and reader D1xS, 9-pole Sub-D plug, PUR material, CMG approved, suitable for cable carriers, in the following lengths: | | | |
| | | 2 m | 6GT2891-4EH20 |
| 5 m | 6GT2491-4EH50 | 5 m | 6GT2891-4EH50 |
| 20 m | 6GT2491-4EN20 | **DVD "RFID Systems Software & Documentation"** | 6GT2080-2AA20 |
| 50 m | 6GT2491-4EN50 | | |

[1] The connecting cables can be extended using RF300 connecting cables of type 6GT2891-4Fxxx. These connecting cables are available in the lengths 2 m, 5 m, 10 m, 20 m and 50 m.

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## Overview

- The low-cost, complete solution for serial communication over a point-to-point connection
- RS 232C (V.24) and RS 422/485 (X.27)
- Implemented protocols:
  - ASCII
  - 3964 (R) (not for RS 485)
  - Printer driver
- Simple parameterization using tool integrated in STEP 7

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

## Technical specifications

| Article number | **6AG1340-1AH02-2AE0** | **6AG1340-1AH02-2AY0** | **6AG1340-1CH02-2AE0** |
|---|---|---|---|
| Based on | **6ES7340-1AH02-0AE0** | **6ES7340-1AH02-0AE0** | **6ES7340-1CH02-0AE0** |
| | SIPLUS S7-300 CP340 RS 232 | SIPLUS S7-300 CP340 RS 232 EN50155 | SIPLUS S7-300 CP340 RS 422/485 |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

**SIPLUS S7-300 CP 340**

| Ordering data | Article No. |
|---|---|
| **SIPLUS S7-300 CP 340 communications processor** | |
| *For industrial applications with extended ambient conditions* | |
| <u>Extended temperature range and exposure to media</u> | |
| with 1 RS 232C interface (V.24) | **6AG1340-1AH02-2AE0** |
| with 1 RS 422/485 (X.27) interface | **6AG1340-1CH02-2AE0** |
| *For rolling stock railway applications* | |
| <u>Conforms to EN 50155</u> | |
| with 1 RS 232C interface (V.24) | **6AG1340-1AH02-2AY0** |

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## Overview

- For fast, high-performance serial data exchange via point-to-point coupling
- Two versions with different physical transmission characteristics:
  - RS 232C (V.24),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customized protocols (can be reloaded)
- Simple parameter assignment using tool integrated in STEP 7

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

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## Technical specifications

| Article number | 6AG1341-1AH02-7AE0 | 6AG1341-1CH02-7AE0 |
|---|---|---|
| Based on | 6ES7341-1AH02-0AE0 | 6ES7341-1CH02-0AE0 |
| | SIPLUS S7-300 CP341 RS 232C | SIPLUS S7-300 CP341 RS 422/485 |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | |
| • min. | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

## SIPLUS S7-300 CP 341

| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **SIPLUS S7-300 CP 341 communications processor** | | **Accessories** | |
| *For industrial applications with extended ambient conditions* | | **Modbus Master V3.1** | |
| <u>Extended temperature range and exposure to media</u> | | Task:<br>Communication via<br>Modbus protocol with RTU format, SIMATIC S7 as master<br>Requirement:<br>CP 341 or CP 441-2;<br>STEP 7 V4.02 and higher<br>Delivery package:<br>Driver program/documentation, English, German, French | |
| with RS 232C interface (V.24) | **6AG1341-1AH02-7AE0** | | |
| with RS 422/485 (X.27) interface | **6AG1341-1CH02-7AE0** | Single license | **6ES7870-1AA01-0YA0** |
| | | Single license, without software and documentation | **6ES7870-1AA01-0YA1** |
| | | **Modbus Slave V3.1** | |
| | | Task:<br>Communication via<br>Modbus protocol with RTU format, SIMATIC S7 as slave<br>Requirement:<br>CP 341 or CP 441-2;<br>STEP 7 V4.02 and higher<br>Delivery package:<br>Driver program/documentation, English, German, French | |
| | | Single license | **6ES7870-1AB01-0YA0** |
| | | Single license, without software and documentation | **6ES7870-1AB01-0YA1** |

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■ **Overview**



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
|  | ● | ● | ● |  |  | ● | ● |

- Interface for the SIMATIC S7-300 to Industrial Ethernet (not for SINUMERIK)
  - 2 x RJ45 interface for 10/100 Mbps full/half duplex connection (with autosensing for automatic switchover and autocrossover function)
  - Integral 2-port real-time switch ERTEC
  - Multi-protocol operation with TCP and UDP transport protocol and PROFINET IO
  - Keep-alive function
- Communications services:
  - Open communication (TCP/IP and UDP)
  - PG/OP communication
  - S7 communication (server)
  - PROFINET IO device
- Multicast for UDP
- Remote programming and initial commissioning is possible over Industrial Ethernet
- IT communication
  - Web function
- Integration into network management through SNMP
- Configuration with STEP 7
- Cross-network PG/OP communication by means of S7 routing
- Diagnostics possibilities in STEP 7 and via web browser

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| **SIPLUS S7-300 CP 343-1 Lean** | | |
|---|---|---|
| **Article No.** | **6AG1343-1CX10-2XE0** | **6AG1343-1CX10-4XE0** |
| **Article No. based on** | **6GK7343-1CX10-0XE0** | **6GK7343-1CX10-0XE0** |
| Ambient temperature range | -25 ... +60 °C | 0 ... +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical data | The technical data of the standard product applies except for the ambient conditions. | |
| **Ambient conditions** | | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. | |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! | |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range <br> 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K <br> 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K | |

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

**SIPLUS S7-300 CP 343-1 Lean**

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| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **SIPLUS CP 343-1 Lean communications processor** | | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** |
| For connecting SIMATIC S7-300 to Industrial Ethernet through TCP/IP and UDP, Multicast, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, PROFINET IO device, integral 2-port switch ERTEC, comprehensive diagnostics facilities, module replacement without PG, SNMP, initial commissioning over LAN; with electronic manual on CD-ROM | | 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m | |
| | | **IE FC stripping tool** | **6GK1901-1GA00** |
| *For industrial applications with extended ambient conditions* | | Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | |
| | | *Programming tools* | |
| Extended temperature range and exposure to media | **6AG1343-1CX10-2XE0** | **STEP 7 Version 5.5** | See Chapter 11 |
| **Accessories** | | **STEP 7 Professional V14 SP1** | See Chapter 11 |
| *Consumables* | | **SOFTNET S7 for Industrial Ethernet** | See Catalog IK PI |
| **IE FC RJ45 Plug 180** | | Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC/STEP 7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A | |
| (extended temperature range and exposure to media) | | | |
| 180° cable outlet | | | |
| • 1 unit | **6AG1901-1BB10-7AA0** | | |

**5**

■ **Overview**



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
| ● | ● | ● | ● | | | ● | ● |

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
  - 2 x RJ45 interface for 10/100 Mbps full/half-duplex connection with autosensing/autonegotiation and autocrossover function
  - Integrated 2-port real-time switch ERTEC
  - Multi-protocol operation with ISO, TCP, UDP transport protocol and PROFINET IO
  - Adjustable keep-alive function
- Communications services:
  - Open communication (ISO, TCP/IP, and UDP)
  - PROFINET IO controller or PROFINET IO device
  - PG/OP communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
- Media redundancy (MRP);
  within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP (V2.2 or higher).
- Multicast for UDP
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection via configurable access list
- Remote programming and commissioning via Industrial Ethernet
- Configuration with STEP 7
- Automatic setting of CPU clock setting over Ethernet with NTP or SIMATIC procedure
- Web diagnostics
- Integration in network management systems via SNMP (MIB2 diagnostics information)
- Diagnostics possibilities in STEP 7 and via web browser

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS CP 343-1 | |
|---|---|
| **Article No.** | **6AG1343-1EX30-7XE0** |
| **Article No. based on** | **6GK7343-1EX30-0XE0** |
| Ambient temperature range | -25 ... +70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range |
| | 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K |
| | 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K |

For further technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

## SIPLUS S7-300 CP 343-1

**5**

| ■ **Ordering data** | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 CP 343-1 communications processor** | | *Communication within the application* | |
| For connection of SIMATIC S7-300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO controller or PROFINET IO device, MRP, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, multicast, DHCP, CPU clock synchronization via SIMATIC procedure and NTP, diagnostics, SNMP, access protection through IP access list, initialization over LAN 10/100 Mbps; with electronic manual on DVD | | **SIPLUS SCALANCE X-200 Industrial Ethernet switches** | |
| | | Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (exception: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | |
| *For industrial applications with extended ambient conditions* | | • With electrical and optical ports for glass multimode FOC up to 3 km | |
| Extended temperature range and exposure to media | **6AG1343-1EX30-7XE0** | • Extended temperature range and exposure to media | |
| **Accessories** | | • **SIPLUS SCALANCE X204-2** with four 10/100 Mbps RJ45 ports and two fiber-optic ports | **6AG1204-2BB10-4AA3** |
| *Consumables* | | *Programming tools* | |
| **IE FC RJ45 Plug 180** | | **STEP 7 Version 5.5** | See Chapter 11 |
| (extended temperature range and exposure to media) | | **STEP 7 Professional V14 SP1** | See Chapter 11 |
| 180° cable outlet | | **SOFTNET S7 for Industrial Ethernet** | See Catalog IK PI |
| • 1 unit | **6AG1901-1BB10-7AA0** | | |
| **C-PLUG** | **6AG1900-0AB00-7AA0** | Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC/STEP 7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A | |
| Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot, -40 ... +70 °C, medial exposure | | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** | | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m | | | |
| **IE FC stripping tool** | **6GK1901-1GA00** | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | | |

**SIPLUS S7-300 CP 343-1 Advanced**

## ■ Overview



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|----------|-----|-----|-----|------|-------|-------|
| ● | ● | ● | ● | ● | ● | ● | ● |

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
  - Multi-protocol operation with TCP and UDP transport protocol
  - Adjustable keep-alive function
- Two separate interfaces (integrated network separation):
  - Gigabit interface with one RJ45 port with 10/100/1 000 Mbps, full/half-duplex with autosensing capability
  - PROFINET interface with two RJ45 ports with 10/100 Mbps full/half-duplex with autosensing and autocrossover functionality via integrated 2-port switch
- Communications services via both interfaces:
  - Open communication (TCP/IP and UDP): Multicast with UDP, including routing between both interfaces
  - PG/OP communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - IT communication: HTTP communication supports access to process data via own web pages; e-mail client function, sending of e-mails directly from user program; FTP communication supports program-controlled FTP client communication; access to data blocks through FTP server
- Communications services via PROFINET interfaces:
  - PROFINET IO controller and IO device with real-time properties (RT and IRT)[1]
  - PROFINET CBA
  - IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
  - Configuration with STEP 7

- Media redundancy (MRP); within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP (V2.2 or higher).
- Access protection by means of configurable IP access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions)
- Extensive diagnostic functions for all modules in the rack
- IT communication
  - Web function
  - E-mail function
  - FTP
- Integration into network management systems through the support of SNMP V1 MIB-II

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS S7-300 CP 343-1 Advanced | |
|---|---|
| **Article No.** | **6AG1343-1GX31-4XE0** |
| **Article No. based on** | **6GK7343-1GX31-0XE0** |
| Ambient temperature range | 0 ... +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies, except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range |
| | 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K |
| | 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K |

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

[1] possible combinations in parallel operation:
  - IO controller with IRT and IO device with RT
  - IO controller with RT and IO device using IRT

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# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

**SIPLUS S7-300 CP 343-1 Advanced**

**5**

■ **Ordering data** | **Article No.** | | **Article No.**
---|---|---|---

| | | | |
|---|---|---|---|
| **SIPLUS S7-300 CP 343-1 Advanced communications processor** | | **IE FC TP Standard Cable GP 4 x 2** | |
| for connecting the SIMATIC S7-300 to Industrial Ethernet, PROFINET IO controller and IO device with RT and IRT, MRP, PROFINET CBA, TCP/IP and UDP, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE with or without RFC 1006, diagnostics extensions, multicast, web server, HTML diagnostics, FTP server, FTP client, e-mail client, CPU clock set via SIMATIC procedure and NTP, access control via IP access List, SNMP, DHCP, initialization over LAN 10/100 Mbps; with electronic manual on DVD; C-PLUG included | | 8-wire, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m | |
| | | • AWG22, for connection to IE FC RJ45 Modular Outlet | **6XV1870-2E** |
| | | • AWG24, for connecting to IE FC RJ45 Plug 4 x 2, IE FC M12 Plug PRO 4 x 2 | **6XV1878-2A** |
| *For industrial applications with extended ambient conditions* | | **IE FC stripping tool** | **6GK1901-1GA00** |
| Exposure to media | **6AG1343-1GX31-4XE0** | Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | |
| **Accessories** | | *Communication within the application* | |
| *Consumables* | | **SIPLUS SCALANCE X-200 Industrial Ethernet switches** | |
| **IE FC RJ45 Plug 180** | | Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (exception: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | |
| (extended temperature range and exposure to media) | | | |
| 180° cable outlet | | | |
| • 1 unit | **6AG1901-1BB10-7AA0** | | |
| **C-PLUG** | **6AG1900-0AB00-7AA0** | | |
| Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot, -40 ... +70 °C, medial exposure | | • With electrical and optical ports for glass multimode FOC up to 3 km | |
| | | • Extended temperature range and exposure to media | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1840-2AH10** | • SIPLUS SCALANCE X204-2 with four 10/100 Mbps RJ45 ports and two FO ports | **6AG1204-2BB10-4AA3** |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m | | *Programming tools* | |
| | | **STEP 7 Version 5.5** | See Chapter 11 |
| | | **STEP 7 Professional V14 SP1** | See Chapter 11 |
| | | **SOFTNET S7 for Industrial Ethernet** | See Catalog IK PI |
| | | Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC/STEP 7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A | |
| | | **SIMATIC iMap** | See Chapter 11 |

## Overview



- SINAUT communication module SIPLUS TIM for SIMATIC S7-300 for use in a wide area network (WAN)
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for seamless recording of data
- Simple configuration and operation without specialist IT knowledge

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS TIM 3V-IE | |
|---|---|
| Article No. | 6AG1800-3BA00-7AA0 |
| Article No. based on | 6NH7800-3BA00 |
| Ambient temperature range | -25 … +70 °C; 60 °C @ UL/cUL, ATEX and FM use |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical specifications | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K |

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS ST7 TIM 3V-IE communication module** With an RS 232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN) | 6AG1800-3BA00-7AA0 | **IE FC RJ45 plug 180** RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| **Accessories** | | • 1 pack = 1 unit, -40 ... +70 °C, medial exposure | 6AG1901-1BB10-7AA0 |
| *Consumables* | | **IE FC stripping tool** | 6GK1901-1GA00 |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m | 6XV1840-2AH10 | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 communication

## SIPLUS TIM 4R-IE for WAN and Ethernet

■ **Overview**



**5**

- SINAUT communication module SIPLUS TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in a wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for seamless recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were adopted from the respective standard products. SIPLUS extreme specific information was added.

| SIPLUS TIM 4R-IE | |
| --- | --- |
| Article No. | 6AG1800-4BA00-7AA0 |
| Article No. based on | 6NH7800-4BA00 |
| Ambient temperature range | -25 ... +70 °C; 60 °C @ UL/cUL, ATEX and FM use |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical specifications | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range |
| | 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K |
| | 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K |

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

■ **Ordering data** — Article No. / Article No.

| SIPLUS ST7 TIM 4R-IE communication module | 6AG1800-4BA00-7AA0 | IE FC RJ45 plug 180 | |
| --- | --- | --- | --- |
| With two combined RS 232/RS 485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN) | | RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| **Accessories** | | • 1 pack = 1 unit; -40 ... +70 °C, medial exposure | 6AG1901-1BB10-7AA0 |
| *Consumables* | | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1840-2AH10 | **IE FC stripping tool** | 6GK1901-1GA00 |
| 4-wire, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |

## Overview



- Simulator module for program testing during commissioning and ongoing operation
- For the simulation of sensor signals using switches
- For display of signal conditions on the outputs using LED
- Simulation of
  - 16 inputs or
  - 16 outputs or
  - 8 inputs and 8 outputs
- Function can be directly adjusted on the module using a screwdriver

## Technical specifications

| Article number | 6ES7374-2XH01-0AA0 |
| --- | --- |
| | SM 374 SIMULATOR MODULE 16I/16O |
| **Input current** | |
| from backplane bus 5 V DC, max. | 80 mA |
| **Power loss** | |
| Power loss, typ. | 0.35 W |
| **Digital inputs** | |
| Number of digital inputs | 16; Switch |
| **Digital outputs** | |
| Number of digital outputs | 16; LEDs |

| Article number | 6ES7374-2XH01-0AA0 |
| --- | --- |
| | SM 374 SIMULATOR MODULE 16I/16O |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • between the channels and backplane bus | No |
| **Potential separation digital outputs** | |
| • between the channels and backplane bus | No |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 190 g |

## Ordering data

| | Article No. |
| --- | --- |
| **SM 374 simulator module** | 6ES7374-2XH01-0AA0 |
| incl. bus connectors, labeling strips | |
| **Bus connectors** | 6ES7390-0AA00-0AA0 |
| 1 unit, spare part | |
| **Labeling strips** | 6ES7392-2XX00-0AA0 |
| 10 units (spare part) | |
| **Label cover** | 6ES7392-2XY00-0AA0 |
| 10 units (spare part) | |

| | Article No. |
| --- | --- |
| **Labeling sheets for machine inscription** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | 6ES7392-2AX00-0AA0 |
| Light beige | 6ES7392-2BX00-0AA0 |
| Yellow | 6ES7392-2CX00-0AA0 |
| Red | 6ES7392-2DX00-0AA0 |

# SIMATIC S7-300 Advanced Controllers
I/O modules
Special modules

## DM 370 dummy module

### Overview



- Dummy module for reserving slots for non-parameterized signal modules
- Structure and address allocation is retained when replaced with a signal module

### Technical specifications

| | |
|---|---|
| Article number | **6ES7370-0AA01-0AA0** |
| | DM 370 DUMMY MODULE |
| **Input current** | |
| from backplane bus 5 V DC, max. | 5 mA |
| **Power loss** | |
| Power loss, max. | 0.03 W |
| **Digital inputs** | |
| Number of digital inputs | 0 |
| **Digital outputs** | |
| Number of digital outputs | 0 |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 180 g |

### Ordering data

| | Article No. |
|---|---|
| **DM 370 dummy module** | **6ES7370-0AA01-0AA0** |
| incl. bus connectors, labeling strips | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** |
| 1 unit, spare part | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| 10 units (spare part) | |
| **Label cover** | **6ES7392-2XY00-0AA0** |
| 10 units (spare part) | |
| **Labeling sheets for machine inscription** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX00-0AA0** |
| Light beige | **6ES7392-2BX00-0AA0** |
| Yellow | **6ES7392-2CX00-0AA0** |
| Red | **6ES7392-2DX00-0AA0** |

## Overview



- Dummy module for reserving slots for unconfigured signal modules
- Retention of design and address assignment when replacing with a signal module

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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## Technical specifications

| Article number | **6AG1370-0AA01-7AA0** |
|---|---|
| Based on | **6ES7370-0AA01-0AA0** |
| | SIPLUS S7-300 Dummy module |
| **Input current** | |
| from backplane bus 5 V DC, max. | 5 mA |
| **Power loss** | |
| Power loss, max. | 0.03 W |
| **Digital inputs** | |
| Number of digital inputs | 0 |
| **Digital outputs** | |
| Number of digital outputs | 0 |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | **6AG1370-0AA01-7AA0** |
|---|---|
| Based on | **6ES7370-0AA01-0AA0** |
| | SIPLUS S7-300 Dummy module |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 180 g |

# SIMATIC S7-300 Advanced Controllers
I/O modules
SIPLUS S7-300 special modules

## SIPLUS S7-300 DM 370

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS S7-300 DM 370 dummy module** | | **Label cover** | |
| for use when replacing modules | | 10 units (spare part) | |
| Extended temperature range and exposure to media | **6AG1370-0AA01-7AA0** | For modules with 20-pin front connector | **6ES7392-2XY00-0AA0** |
| **Accessories** | | **Labeling sheets for machine printing** | |
| *Consumables* | | For modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| **Bus connectors** | **6ES7390-0AA00-0AA0** | | |
| 1 unit (spare part) | | Petrol | **6ES7392-2AX00-0AA0** |
| **Labeling strips** | | Light beige | **6ES7392-2BX00-0AA0** |
| 10 units (spare part) | | Yellow | **6ES7392-2CX00-0AA0** |
| For modules with 20-pin front connector | **6ES7392-2XX00-0AA0** | Red | **6ES7392-2DX00-0AA0** |

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## ■ Overview



- For the simple and user-friendly connection of sensors and actuators to the S7-300 I/O modules
- For maintaining the wiring when replacing modules ("permanent wiring")
- With mechanical coding to avoid errors when replacing modules

## ■ Ordering data

| | Article No. |
|---|---|
| **Front connectors** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| 20-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BJ00-0AA0** |
| • 100 units | **6ES7392-1BJ00-1AB0** |
| 40-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AM00-0AA0** |
| • 100 units | **6ES7392-1AM00-1AB0** |
| 40-pin, with spring-loaded contacts | |
| • 1 unit | **6ES7392-1BM01-0AA0** |
| • 100 units | **6ES7392-1BM01-1AB0** |
| **Front door, elevated design** | **6ES7328-0AA00-7AA0** |
| e.g. for 32 channel modules; enables connection of 1.3 mm$^2$/16 AWG wires | |
| **Front door, higher version, for F-modules** | **6ES7328-7AA10-0AA0** |
| For F-modules; for connecting 1.3 mm$^2$/16 AWG wires; wiring diagram and labels in yellow | |

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## Overview

The fully modular connection for connecting to the digital I/O modules of the SIMATIC S7-1500 or ET 200MP consists of modified front connectors, called front connector modules, pre-assembled connecting cables of various lengths, and connection modules. Suitable components can be selected for the application in question and joined by means of simple plugs. The connection modules are used instead of conventional terminal blocks and act as the interface to the sensors and actuators.

## Benefits

- Easy plugging in of front connector module, connecting cable and connection module
- Fast and low-cost wiring
- Supply voltage connectable to front connector module or connection module for digital and analog signals
- Reduction in wiring errors, clear control cabinet wiring
- Distribution of digital signals by byte or by double-byte
- Each component can be replaced individually.
- Every cable length can be configured without cutting, or pre-assembled cables can be used

## Design

### Front connector module

Modified front connectors, called front connector modules, are available for connecting to the module. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in many different digital and analog versions. The connecting cables are plugged into these front connector modules.

### Connecting cable

The connecting cable is available in two different versions.

As a pre-assembled 16-pole or 50-pole round cable (shielded or unshielded) up to a length of 10 m, or as a 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user; or as 2 x 16-pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with the aid of pliers (can be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting cable connects the front connector module with the connection module.

### Connection module

The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the standard DIN rail. The connection modules with basic or signal functionality are available in 1-byte or 4-byte versions.

Connection modules are available for two different connection methods: with push-in or screw terminals. The potential can be fed in at the connection module or at the front connector module.

If other voltage or power levels are required in the field, the connection module for TPRo or TPOo output signals is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, optocouplers are used for the implementation. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC or 110 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that simply converts the 230/110 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (note technical specifications) in order to increase the switching frequency.

### Shield plate

The shield plate is latched onto the connection module for 3-wire initiators or optionally onto the connection module for analog signals and then snapped onto the DIN rail with the connection module. With the shield connection clamps, optimal shield connection is achieved between the shielded round-sheath ribbon cable or the shielded field cables and the grounded DIN rail.
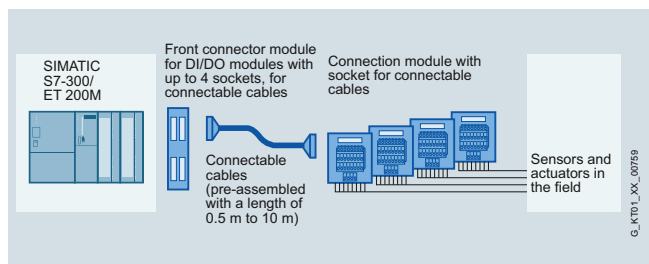


SIMATIC TOP connect for S7-300/ ET200 M, fully modular connection

# SIMATIC S7-300 Advanced Controllers
I/O modules
Connection system

## ▪ Technical specifications front connector module

| Technical data of front connector module | |
|---|---|
| Rated operating voltage | 24 VDC |
| Max. permissible operating voltage | 60 V DC |
| Max. permissible continuous current<br>• per connector pin | 1 A |
| Max. permissible summation current | 4 A/byte |
| Permissible ambient temperature | 0 to + 60°C |
| Test voltage | 0.5 kV, 50 Hz, 60 sec. |
| Air gaps and creepage distances | IEC 664 (1980),<br>IEC 664 A (1981),<br>in accordance with<br>DIN VDE 0110 (01.89),<br>overvoltage class II,<br>pollution degree 2 |

### *Wiring rules for front connector modules*

| | Front connector module<br>SIMATIC TOP connect,<br>connection for potential infeed | |
|---|---|---|
| | Spring connection | Screw connection |
| | **Modules up to 4 connections** | |
| Connectable cable cross-sections | | |
| • solid cables | No | |
| • flexible cables with/without wire end ferrule | 0,25 to 1.5 mm$^2$ | |
| Number of wires per connection | 1 or a combination of 2 conductors up to 1.5 mm$^2$ (total) in a common wire end ferrule | |
| Max. diameter of the cable insulation | 3.1 mm | |
| Stripping length of the cables | | |
| • without insulating collar | 6 mm | |
| • with insulating collar | - | |
| Wire-end ferrules in acc. with DIN 46228 | | |
| • without insulating collar | Form A; 5 to 7 mm long | |
| • with insulating collar 0.25 to 1.0 mm$^2$ | - | |
| • with insulating collar 1.5 mm$^2$ | - | |
| Blade width of the screwdriver | 3.5 mm (cylindrical shape) | |
| Tightening torque for connecting the cables | - | 0.4 to 0.7 Nm |

| | Front connector module<br>SIMATIC TOP connect,<br>connection for potential infeed | |
|---|---|---|
| | Spring connection | Screw connection |
| | **Modules up to 8 connections** | |
| Connectable cable cross-sections | | |
| • solid cables | No | |
| • flexible cables with/without wire end ferrule | 0.25 to 0.75 mm$^2$ | |
| Number of cables per connection | 1 or a combination of 2 wires up to 0.75 mm$^2$ (total) in a common wire end ferrule | |
| Max. diameter of the cable insulation | 2.0 mm | |
| Stripping length of the cables | | |
| • without insulating collar | 6 mm | |
| • with insulating collar | - | |
| Wire-end ferrules in acc. with DIN 46228 | | |
| • without insulating collar | Form A; 5 to 7 mm long | |
| • with insulating collar 0.25 to 1.0 mm$^2$ | - | |
| • with insulating collar 1.5 mm$^2$ | - | |
| Blade width of the screwdriver | 3.5 mm (cylindrical shape) | |
| Tightening torque for connecting the cables | - | 0.4 to 0.7 Nm |

## ▪ Technical specifications connecting cable

| Technical specifications of connecting cable<br>from SIMATIC S7 to connection module | |
|---|---|
| Operating voltage | 60 V DC |
| Continuous current per signal conductor | 1 A |
| Max. aggregate current | 4 A/byte |
| Operating temperature | 0 to +60 °C |
| Outer diameter of pre-assembled round cable in mm unshielded/ shielded (16-pole) | Approx. 6.5/7.0 |
| Outer diameter of round-sheath ribbon cable in mm 16-pole/2 x 16-pole | approx. 9.5/11.5 |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

### Front connection modules

| | Article No. | | Article No. |
|---|---|---|---|
| **Front connector module (compact CPU 312C)** | | **Front connector module (1 x 8 outputs) for 2 ampere digital outputs** | |
| Power supply via | | Power supply via | |
| • Screw terminals | **6ES7921-3AK20-0AA0** | • Spring-loaded terminals | **6ES7921-3AC00-0AA0** |
| | | • Screw terminals | **6ES7921-3AD00-0AA0** |
| **Front connector module (compact CPU 313C/ 314C-2PtP/314C-2DP), slot X1** | | **Front connector module 20-pin (analog)** | |
| Power supply via | | Power supply via | |
| • Screw terminals | **6ES7921-3AM20-0AA0** | • Spring-loaded terminals | **6ES7921-3AF00-0AA0** |
| | | • Screw terminals | **6ES7921-3AG00-0AA0** |
| **Front connector module (digital 2 x 8 I/O)** | | **Front connector module 40-pin (analog)** | |
| Power supply via | | Power supply via | |
| • Spring-loaded terminals | **6ES7921-3AA00-0AA0** | • Spring-loaded terminals | **6ES7921-3AF20-0AA0** |
| • Screw terminals | **6ES7921-3AB00-0AA0** | • Screw terminals | **6ES7921-3AG20-0AA0** |
| **Front connector module (digital 4 x 8 I/O)** | | | |
| Power supply via | | | |
| • Spring-loaded terminals | **6ES7921-3AA20-0AA0** | | |
| • Screw terminals | **6ES7921-3AB20-0AA0** | | |

### Connecting cables

| Pre-assembled round cable | Article No. | Round-sheath ribbon cable | Article No. |
|---|---|---|---|
| 16-pin, 0.14 mm$^2$ | | 16-pin, 0.14 mm$^2$ | |
| Unshielded | | Unshielded | |
| • 0.5 m | **6ES7923-0BA50-0CB0** | • 30 m | **6ES7923-0CD00-0AA0** |
| • 1.0 m | **6ES7923-0BB00-0CB0** | • 60 m | **6ES7923-0CG00-0AA0** |
| • 1.5 m | **6ES7923-0BB50-0CB0** | | |
| • 2.0 m | **6ES7923-0BC00-0CB0** | Shielded | |
| • 2.5 m | **6ES7923-0BC50-0CB0** | • 30 m | **6ES7923-0CD00-0BA0** |
| • 3.0 m | **6ES7923-0BD00-0CB0** | • 60 m | **6ES7923-0CG00-0BA0** |
| • 4.0 m | **6ES7923-0BE00-0CB0** | **Round-sheath ribbon cable** | |
| • 5.0 m | **6ES7923-0BF00-0CB0** | 2 x 16-pin, 0.14 mm$^2$ | |
| • 6.5 m | **6ES7923-0BG50-0CB0** | Unshielded | |
| • 8.0 m | **6ES7923-0BJ00-0CB0** | • 30 m | **6ES7923-2CD00-0AA0** |
| • 10.0 m | **6ES7923-0CB00-0CB0** | • 60 m | **6ES7923-2CG00-0AA0** |
| | | **Connector (female ribbon connector)** | **6ES7921-3BE10-0AA0** |
| Shielded | | | |
| • 1.0 m | **6ES7923-0BB00-0DB0** | 16-pin, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips | |
| • 2.0 m | **6ES7923-0BC00-0DB0** | | |
| • 2.5 m | **6ES7923-0BC50-0DB0** | | |
| • 3.0 m | **6ES7923-0BD00-0DB0** | | |
| • 4.0 m | **6ES7923-0BE00-0DB0** | | |
| • 5.0 m | **6ES7923-0BF00-0DB0** | **Accessories** | |
| • 6.5 m | **6ES7923-0BG50-0DB0** | **Manual pliers** | **6ES7928-0AA00-0AA0** |
| • 8.0 m | **6ES7923-0BJ00-0DB0** | | |
| • 10.0 m | **6ES7923-0CB00-0DB0** | For preparing the connectors (female ribbon connector) | |
| Version 4 x 16 to 1 x 50-pin, 0.14 mm$^2$ | | | |
| Unshielded | | | |
| • 0.5 m | **6ES7923-5BA50-0EB0** | | |
| • 1.0 m | **6ES7923-5BB00-0EB0** | | |
| • 1.5 m | **6ES7923-5BB50-0EB0** | | |
| • 2.0 m | **6ES7923-5BC00-0EB0** | | |
| • 2.5 m | **6ES7923-5BC50-0EB0** | | |
| • 3.0 m | **6ES7923-5BD00-0EB0** | | |
| • 4.0 m | **6ES7923-5BE00-0EB0** | | |
| • 5.0 m | **6ES7923-5BF00-0EB0** | | |
| • 6.5 m | **6ES7923-5BG50-0EB0** | | |
| • 8.0 m | **6ES7923-5BJ00-0EB0** | | |
| • 10.0 m | **6ES7923-5CB00-0EB0** | | |

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# SIMATIC S7-300 Advanced Controllers
## I/O modules
## Connection system

**System cabling for SIMATIC S7-300/400 and ET 200M   > Fully modular connection**

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■ **Ordering data**            Article No.                                          Article No.

*Connection modules*

| | |
|---|---|
| **Connection module TP1** | |
| For 1-wire connection, for 16-pin connecting cables | |
| • Push-in terminals without LEDs | **6ES7924-0AA20-0AC0** |
| • Screw-type terminals without LEDs | **6ES7924-0AA20-0AA0** |
| • Push-in terminals with LEDs | **6ES7924-0AA20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0AA20-0BA0** |
| For 1-wire connection, for 50-pin connecting cables | |
| • Push-in terminals without LEDs | **6ES7924-2AA20-0AC0** |
| • Screw-type terminals | **6ES7924-2AA20-0AA0** |
| • without LEDs | |
| • Push-in terminals with LEDs | **6ES7924-2AA20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-2AA20-0BA0** |

| | |
|---|---|
| **Connection module TP3** | |
| For 3-wire connection, for 16-pin connecting cables | |
| • Push-in terminals without LEDs | **6ES7924-0CA20-0AC0** |
| • Screw-type terminals without LEDs | **6ES7924-0CA20-0AA0** |
| • Push-in terminals with LEDs | **6ES7924-0CA20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0CA20-0BA0** |
| • Push-in terminals with LEDs and one isolating terminal per channel | **6ES7924-0CH20-0BC0** |
| • Screw-type terminals with LEDs and one isolating terminal per channel | **6ES7924-0CH20-0BA0** |
| • Push-in terminals with LED and fuse per channel | **6ES7924-0CL20-0BC0** |
| • Push-in terminals with LED and fuse per channel | **6ES7924-0CL20-0BA0** |
| For 3-wire connection, for 50-pin connecting cables | |
| • Push-in terminals without LEDs | **6ES7924-2CA20-0AC0** |
| • Screw-type terminals without LEDs | **6ES7924-2CA20-0AA0** |
| • Push-in terminals with LEDs | **6ES7924-2CA20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-2CA20-0BA0** |

| | |
|---|---|
| **Connection module TPRo** | |
| Relay module for 8 outputs, relay as normally open contact | |
| • Push-in terminals with LEDs | **6ES7924-0BD20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0BD20-0BA0** |

| | |
|---|---|
| **Connection module TPRi** | |
| Relay module for 8 outputs (110 V AC), relay as normally open contact | |
| • Push-in terminals with LEDs | **6ES7924-0BG20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0BG20-0BA0** |

| | |
|---|---|
| **Connection module TPRi** | |
| Relay module for 8 outputs (230 V AC), relay as normally open contact | |
| • Push-in terminals with LEDs | **6ES7924-0BE20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0BE20-0BA0** |

| | |
|---|---|
| **Connection module TPOo** | |
| Optocoupler module for 8 outputs (max. 24 V DC/4 A) | |
| • Push-in terminals with LEDs | **6ES7924-0BF20-0BC0** |
| • Screw-type terminals with LEDs | **6ES7924-0BF20-0BA0** |
| **Connection module for digital output modules 2 A** | |
| Connection module TP2 | |
| • Push-in terminals without LEDs | **6ES7924-0BB20-0AC0** |
| • Screw-type terminals without LEDs | **6ES7924-0BB20-0AA0** |
| **Connection module for analog modules (for S7-300 only)** | |
| Connection module TPA | |
| • Push-in terminals without LEDs | **6ES7924-0CC21-0AC0** |
| • Screw-type terminals without LEDs | **6ES7924-0CC21-0AA0** |
| **Accessories** | |
| **ID labels for connection modules in S7-1500 design** | |
| ID labels, insertable PU = 340 units | **3RT1900-1SB20** |
| **Shield for analog connection module** | |
| PU = 4 units (for connection of 16-pin connecting cable) | **6ES7928-1AA20-4AA0** |
| PU = 4 units (for connection of 16-pin connecting cable) (for S7-1500 only) | **6ES7928-1BA20-4AA0** |
| **Shield connection clamp** | |
| for shield plate at SIMATIC end, PU = 10 units | **6ES7590-5BA00-0AA0** |
| for shield plate at field end, 2 x 2 ... 6 mm | **6ES7390-5AB00-0AA0** |
| for shield plate at field end, 3 ... 8 mm | **6ES7390-5BA00-0AA0** |
| for shield plate at field end, 4 ... 13 mm | **6ES7390-5CA00-0AA0** |

## Overview



Flexible connection enables fast, direct connection of the SIMATIC S7-300/ET 200 M input/output modules to the individual elements in the control cabinet.

Attached single cores reduce the wiring outlay.

Wire cross-sections of 0.5 mm$^2$ allow higher currents, too.

## Technical specifications

| Front connector with single cores for 16 channels | |
|---|---|
| Rated operating voltage | 24 V DC |
| Permissible continuous current with simultaneous load of all wires, max. | 1.5 A |
| Permissible ambient temperature | 0 to 60 °C |
| Core type | H05V-K or with UL 1007/1569; CSA TR64 |
| Number of single cores | 20 |
| Core cross-section | 0.5 mm$^2$; Cu |
| Bundle diameter in mm | approx. 15 |
| Core color | Blue, RAL 5010 |
| Designation of cores | Numbered from 1 to 20 (front connector contact = core number) |
| Assembly | Screw-type or crimp contacts |

| Front connector with single cores for 32 channels | |
|---|---|
| Rated operating voltage | 24 V DC |
| Permissible continuous current with simultaneous load of all wires, max. | 1.5 A |
| Permissible ambient temperature | 0 to 60 °C |
| Core type | H05V-K or with UL 1007/1569; CSA TR64 |
| Number of single cores | 40 |
| Core cross-section | 0.5 mm$^2$; Cu |
| Bundle diameter in mm | approx. 17 |
| Core color | Blue, RAL 5010 |
| Designation of cores | Numbered from 1 to 40 (front connector contact = core number) |
| Assembly | Screw-type or crimp contacts |

## Ordering data

| | Article No. |
|---|---|
| **Front connector with single cores for 16-channel digital modules SIMATIC S7-300, 20 x 0.5 mm$^2$** | |
| **Core type H05V-K** | |
| Screw-type version | |
| Packing unit: 1 unit Length: | |
| • 2.5 m | **6ES7922-3BC50-0AB0** |
| • 3.2 m | **6ES7922-3BD20-0AB0** |
| • 5 m | **6ES7922-3BF00-0AB0** |
| • Custom lengths | On request |
| Packing unit: 5 units Length: | |
| • 2.5 m | **6ES7922-3BC50-5AB0** |
| • 3.2 m | **6ES7922-3BD20-5AB0** |
| • 5.0 m | **6ES7922-3BF00-5AB0** |
| Crimp version | |
| Packing unit: 1 unit Length: | |
| • 2.5 m | **6ES7922-3BC50-0AF0** |
| • 3.2 m | **6ES7922-3BD20-0AF0** |
| • 5.0 m | **6ES7922-3BF00-0AF0** |
| • Custom lengths | On request |
| **Core type UL/CSA-certified** | |
| Screw-type version | |
| Packing unit: 1 unit Length: | |
| • 3.2 m | **6ES7922-3BD20-0UB0** |
| • 5.0 m | **6ES7922-3BF00-0UB0** |
| **Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0.5 mm$^2$** | |
| **Core type H05V-K** | |
| Screw-type version | |
| Packing unit: 1 unit Length: | |
| • 2.5 m | **6ES7922-3BC50-0AC0** |
| • 3.2 m | **6ES7922-3BD20-0AC0** |
| • 5.0 m | **6ES7922-3BF00-0AC0** |
| • Custom lengths | On request |
| Packing unit: 5 units Length: | |
| • 2.5 m | **6ES7922-3BC50-5AC0** |
| • 3.2 m | **6ES7922-3BD20-5AC0** |
| • 5.0 m | **6ES7922-3BF00-5AC0** |
| Crimp version | |
| Packing unit: 1 unit Length: | |
| • 2.5 m | **6ES7922-3BC50-0AG0** |
| • 3.2 m | **6ES7922-3BD20-0AG0** |
| • 5.0 m | **6ES7922-3BF00-0AG0** |
| • Custom lengths | On request |
| **Core type UL/CSA-certified** | |
| Screw-type version Packing unit: 1 unit Length: | |
| • 3.2 m | **6ES7922-3BD20-0UC0** |
| • 5.0 m | **6ES7922-3BF00-0UC0** |

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# SIMATIC S7-300 Advanced Controllers
I/O modules
Connection system

## Design

### *The front connector is available in two designs*

The 20-pole front connector contains:
- 20 connections for crimp contacts for connecting the wiring
- Strain relief for the cables
- Unlatching key; for unlatching the front connector when replacing the module
- Holder for coding element attachment; there are two coding elements with attachments on the modules. The attachments latch in when inserting into the front connector for the first time.

The 40-pole front connector contains:
- 40 connections for crimp contacts for connecting the wiring
- Strain relief for the cables
- Locking screw; for fixing and detaching the front connector when the module is replaced
- Holder for coding element attachment; there is a coding element with an attachment on the modules. The attachment latches in when inserting into the front connector for the first time.

## Integration

Use of the 20-pole front connector with
- 16-channel signal modules
- Function modules
- CPU 312 IFM

Use of the 40-pole front connector with
- 32-channel signal modules
- Compact CPUs

## Ordering data

| | Article No. |
|---|---|
| **Front connector 20-pole, crimp version without crimp contacts** | |
| Packing unit (100 units) | **6ES7921-3AH00-1AA0** |
| **Front connector 40-pole, crimp version without crimp contacts** | |
| Packing unit (100 units) | **6ES7921-3AH20-1AA0** |
| **Accessories** | |
| **Crimp contacts for front connectors** | **6XX3070** |
| Packing unit (250 units) | |
| **Crimping tool** | **6XX3071** |
| for crimping the crimp contacts | |
| **Unlocking tool for crimp contacts** | **6ES5497-4UC11** |

## ■ Overview



The design and functionality of the SIMATIC PS 307 single-phase load power supply (system and load current supply) with automatic range switchover of the input voltage is an optimal match to the SIMATIC S7-300 PLC. By means of the connecting comb that is supplied with the system and load current supply, the supply to the CPU is quickly established. It is also possible to provide a 24 V supply to other S7-300 system components, input/output circuits of the input/output modules and, if necessary, the sensors and actuators. Comprehensive certifications, such as UL, ATEX or GL facilitate universal use (does not apply to outdoor use).

## ■ Technical specifications

| Article number | 6ES7307-1BA01-0AA0 | 6ES7305-1BA80-0AA0 | 6ES7307-1EA01-0AA0 | 6ES7307-1EA80-0AA0 | 6ES7307-1KA02-0AA0 |
|---|---|---|---|---|---|
| Product | PS 307 | PS 305 Outdoor | PS 307 | PS 307 Outdoor | PS 307 |
| Power supply, type | 24 V/2 A | 24 V/2 A | 24 V/5 A | 24 V/5 A | 24 V/10 A |
| **Input** | | | | | |
| Input | 1-phase AC | DC voltage | 1-phase AC | 1-phase AC | 1-phase AC |
| Supply voltage | | | | | |
| • 1 at AC Rated value | 120 V | | 120 V | 120 V | 120 V |
| • 2 at AC Rated value | 230 V | | 230 V | 230 V | 230 V |
| • at DC | | 24 ... 110 V | | | |
| • Note | Automatic range selection | | Automatic range selection | Set by means of selector switch on the device | Automatic range selection |
| Input voltage | | | | | |
| • 1 at AC | 85 ... 132 V | | 85 ... 132 V | 93 ... 132 V | 85 ... 132 V |
| • 2 at AC | 170 ... 264 V | | 170 ... 264 V | 187 ... 264 V | 170 ... 264 V |
| • at DC | | 16.8 ... 138 V | | | |
| Wide-range input | No | Yes | No | No | No |
| Overvoltage resistance | $2.3 \times V_{in\ rated}$, 1.3 ms | 154 V; 0.1 s | $2.3 \times V_{in\ rated}$, 1.3 ms | $2.3 \times V_{in\ rated}$, 1.3 ms | $2.3 \times V_{in\ rated}$, 1.3 ms |
| Mains buffering at Iout rated, min. | 20 ms; at $V_{in}$ = 93/187 V | 10 ms; at $V_{in}$ rated | 20 ms; at $V_{in}$ = 93/187 V | 20 ms; at $V_{in}$ = 93/187 V | 20 ms; at $V_{in}$ = 93/187 V |
| Rated line frequency 1 | 50 Hz | | 50 Hz | 50 Hz | 50 Hz |
| Rated line frequency 2 | 60 Hz | | 60 Hz | 60 Hz | 60 Hz |
| Rated line range | 47 ... 63 Hz | | 47 ... 63 Hz | 47 ... 63 Hz | 47 ... 63 Hz |
| Input current | | | | | |
| • at rated input voltage 120 V | 0.9 A | | 2.3 A | 2.1 A | 4.2 A |
| • at rated input voltage 230 V | 0.5 A | | 1.2 A | 1.2 A | 1.9 A |
| • at rated input voltage 24 V | | 2.4 A | | | |
| • at rated input voltage 110 V | | 0.6 A | | | |
| Switch-on current limiting (+25 °C), max. | 22 A | 20 A | 20 A | 45 A | 55 A |
| Duration of inrush current limiting at 25 °C | | | | | |
| • maximum | 3 ms | 10 ms | 3 ms | 3 ms | 3 ms |
| I²t, max. | 1 A²·s | 5 A²·s | 1.2 A²·s | 1.8 A²·s | 3.3 A²·s |
| Built-in incoming fuse | T 1.6 A/250 V (not accessible) | T 6.3 A/250 V (not accessible) | T 3,15 A/250 V (not accessible) | T 3,15 A/250 V (not accessible) | T 6.3 A/250 V (not accessible) |
| Protection in the mains power input (IEC 898) | Recommended miniature circuit breaker: 3 A characteristic C | Recommended miniature circuit breaker: from 10 A characteristic C, suitable for DC | Recommended miniature circuit breaker: from 6 A characteristic C | Recommended miniature circuit breaker: from 10 A characteristic C or from 6 A characteristic D | Recommended miniature circuit breaker: from 10 A characteristic C |

# SIMATIC S7-300 Advanced Controllers
Power supplies

## 1-phase, 24 V DC (for S7-300 and ET200M)

■ **Technical specifications** (continued)

| Article number | 6ES7307-1BA01-0AA0 | 6ES7305-1BA80-0AA0 | 6ES7307-1EA01-0AA0 | 6ES7307-1EA80-0AA0 | 6ES7307-1KA02-0AA0 |
|---|---|---|---|---|---|
| Product | PS 307 | PS 305 Outdoor | PS 307 | PS 307 Outdoor | PS 307 |
| Power supply, type | 24 V/2 A | 24 V/2 A | 24 V/5 A | 24 V/5 A | 24 V/10 A |
| **Output** | | | | | |
| Output | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 24 V | 24 V | 24 V | 24 V | 24 V |
| Total tolerance, static ± | 3 % | 3 % | 3 % | 3 % | 3 % |
| Static mains compensation, approx. | 0.1 % | 0.2 % | 0.1 % | 0.2 % | 0.1 % |
| Static load balancing, approx. | 0.2 % | 0.4 % | 0.5 % | 0.4 % | 0.5 % |
| Residual ripple peak-peak, max. | 50 mV | 150 mV | 50 mV | 150 mV | 50 mV |
| Residual ripple peak-peak, typ. | 5 mV | 30 mV | 10 mV | 40 mV | 15 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 150 mV | 240 mV | 150 mV | 240 mV | 150 mV |
| Spikes peak-peak, typ. (bandwidth: 20 MHz) | 20 mV | 150 mV | 20 mV | 90 mV | 60 mV |
| Product function Output voltage adjustable | No | No | No | No | No |
| Output voltage setting | - | - | - | - | - |
| Status display | Green LED for 24 V OK | Green LED for 24 V OK | Green LED for 24 V OK | Green LED for 24 V OK | Green LED for 24 V OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 2 s | 3 s | 2 s | 3 s | 2 s |
| Voltage rise, typ. | 10 ms | 5 ms | 10 ms | 100 ms | 10 ms |
| Rated current value Iout rated | 2 A | 2 A | 5 A | 5 A | 10 A |
| Current range | 0 ... 2 A | 0 ... 3 A | 0 ... 5 A | 0 ... 5 A | 0 ... 10 A |
| • Note | | 3 A up to +60°C at $V_{in}$ > 24 V | | | |
| Supplied active power typical | 48 W | 48 W | 120 W | 120 W | 240 W |
| Short-term overload current | | | | | |
| • on short-circuiting during the start-up typical | 9 A | 9 A | 20 A | 20 A | 38 A |
| • at short-circuit during operation typical | 9 A | 9 A | 20 A | 20 A | 38 A |
| Duration of overloading capability for excess current | | | | | |
| • on short-circuiting during the start-up | 90 ms | 270 ms | 100 ms | 180 ms | 80 ms |
| • at short-circuit during operation | 90 ms | 270 ms | 100 ms | 80 ms | 80 ms |
| Parallel switching for enhanced performance | Yes | Yes | Yes | No | Yes |
| Numbers of parallel switchable units for enhanced performance | 2 | 2 | | | |
| **Efficiency** | | | | | |
| Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 84 % | 75 % | 87 % | 84 % | 90 % |
| Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx. | 9 W | 16 W | 18 W | 23 W | 27 W |
| **Closed-loop control** | | | | | |
| Dynamic mains compensation ($V_{in}$ rated ±15 %), max. | 0.1 % | 0.3 % | 0.1 % | 0.3 % | 0.1 % |
| Dynamic load smoothing ($I_{out}$: 50/100/50 %), $U_{out}$ ± typ. | 0.8 % | 2.5 % | 1 % | 3 % | 2 % |
| Load step setting time 50 to 100%, typ. | 0.5 ms | 2.5 ms | 0.3 ms | 0.2 ms | |
| Load step setting time 100 to 50%, typ. | 0.5 ms | 2.5 ms | 0.3 ms | 0.2 ms | |
| Setting time maximum | 1 ms | 5 ms | | 5 ms | 0.1 ms |

## ■ Technical specifications (continued)

| Article number | 6ES7307-1BA01-0AA0 | 6ES7305-1BA80-0AA0 | 6ES7307-1EA01-0AA0 | 6ES7307-1EA80-0AA0 | 6ES7307-1KA02-0AA0 |
|---|---|---|---|---|---|
| Product | PS 307 | PS 305 Outdoor | PS 307 | PS 307 Outdoor | PS 307 |
| Power supply, type | 24 V/2 A | 24 V/2 A | 24 V/5 A | 24 V/5 A | 24 V/10 A |
| **Protection and monitoring** | | | | | |
| Output overvoltage protection | Additional control loop, shutdown at < 28.8 V, automatic restart | Additional control loop, shutdown at approx. 30 V, automatic restart | Additional control loop, shutdown at < 28.8 V, automatic restart | Additional control loop, shutdown at approx. 30 V, automatic restart | Additional control loop, shutdown at < 28.8 V, automatic restart |
| Current limitation | 2.2 ... 2.6 A | 3.3 ... 3.9 A | 5.5 ... 6.5 A | 5.5 ... 6.5 A | 11 ... 12 A |
| Property of the output Short-circuit proof | Yes | Yes | Yes | Yes | Yes |
| Short-circuit protection | Electronic shutdown, automatic restart | Electronic shutdown, automatic restart | Electronic shutdown, automatic restart | Electronic shutdown, automatic restart | Electronic shutdown, automatic restart |
| Enduring short circuit current RMS value | | | | | |
| • maximum | 2 A | 2 A | 7 A | 5 A | 12 A |
| Overload/short-circuit indicator | - | - | | | - |
| **Safety** | | | | | |
| Primary/secondary isolation | Yes | Yes | Yes | Yes | Yes |
| Galvanic isolation | Safety extra-low output voltage Uout acc. to EN 60950-1 and EN 50178 | Safety extra low output voltage Vout according to EN 60950-1 and EN 50178, creepage distances and clearances > 5 mm | Safety extra-low output voltage Uout acc. to EN 60950-1 and EN 50178 | Safety extra-low output voltage Vout according to EN 60950-1 and EN 50178, creepage distances and clearances > 5 mm | Safety extra-low output voltage Uout acc. to EN 60950-1 and EN 50178 |
| Protection class | Class I | Class I | Class I | Class I | Class I |
| Leakage current | | | | | |
| • maximum | 3.5 mA | | 3.5 mA | 3.5 mA | 3.5 mA |
| • typical | 0.5 mA | | 0.5 mA | 0.3 mA | 0.6 mA |
| CE mark | Yes | Yes | Yes | Yes | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289 | UL-Listed (UL 508), File E143289, CSA (CSA C22.2 No. 142) | cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289 | UL-Listed (UL 508), File E143289, CSA (CSA C22.2 No. 142) | cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289 |
| Explosion protection | ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455 | - | ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455 | - | ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455 |
| FM approval | Class I, Div. 2, Group ABCD, T4 | - | Class I, Div. 2, Group ABCD, T4 | - | Class I, Div. 2, Group ABCD, T4 |
| CB approval | No | No | No | No | No |
| Marine approval | In S7-300 system | - | In S7-300 system | - | In S7-300 system |
| Degree of protection (EN 60529) | IP20 | IP20 | IP20 | IP20 | IP20 |
| **EMC** | | | | | |
| Emitted interference | EN 55022 Class B | EN 55011 Class A | EN 55022 Class B | EN 55011 Class A | EN 55022 Class B |
| Supply harmonics limitation | not applicable | not applicable | EN 61000-3-2 | - | EN 61000-3-2 |
| Noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| **Operating data** | | | | | |
| Ambient temperature | | | | | |
| • during operation | 0 ... 60 °C | -25 ... +70 °C | 0 ... 60 °C | -25 ... +70 °C | 0 ... 60 °C |
| - Note | with natural convection | with natural convection | with natural convection | with natural convection | with natural convection |
| • during transport | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| • during storage | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation | Climate class 3K5, transient condensation permitted | Climate class 3K3, no condensation | Climate class 3K5, transient condensation permitted | Climate class 3K3, no condensation |

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# SIMATIC S7-300 Advanced Controllers
## Power supplies

**1-phase, 24 V DC (for S7-300 and ET200M)**

### ■ Technical specifications  (continued)

| Article number | 6ES7307-1BA01-0AA0 | 6ES7305-1BA80-0AA0 | 6ES7307-1EA01-0AA0 | 6ES7307-1EA80-0AA0 | 6ES7307-1KA02-0AA0 |
|---|---|---|---|---|---|
| Product | PS 307 | PS 305 Outdoor | PS 307 | PS 307 Outdoor | PS 307 |
| Power supply, type | 24 V/2 A | 24 V/2 A | 24 V/5 A | 24 V/5 A | 24 V/10 A |
| **Mechanics** | | | | | |
| Connection technology | screw-type terminals | screw-type terminals | screw-type terminals | screw-type terminals | screw-type terminals |
| Connections | | | | | |
| • Supply input | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L+1, M1, PE: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded | L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm² single-core/finely stranded |
| • Output | L+, M: 2 screw terminals each for 0.5 ... 2.5 mm² | L+, M: 3 screw terminals each for 0.5 ... 2.5 mm² | L+, M: 3 screw terminals each for 0.5 ... 2.5 mm² | L+, M: 3 screw terminals each for 0.5 ... 2.5 mm² | L+, M: 4 screw terminals each for 0.5 ... 2.5 mm² |
| • Auxiliary | - | - | - | - | - |
| Width of the enclosure | 40 mm | 80 mm | 60 mm | 80 mm | 80 mm |
| Height of the enclosure | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth of the enclosure | 120 mm | 120 mm | 120 mm | 120 mm | 120 mm |
| Required spacing | | | | | |
| • top | 40 mm | 50 mm | 40 mm | 50 mm | 40 mm |
| • bottom | 40 mm | 50 mm | 40 mm | 50 mm | 40 mm |
| • left | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm |
| • right | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm |
| Weight, approx. | 0.4 kg | 0.57 kg | 0.6 kg | 0.57 kg | 0.8 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes | Yes | Yes | Yes | Yes |
| Installation | Can be mounted onto S7 rail | Can be mounted onto S7 rail | Can be mounted onto S7 rail | Can be mounted onto S7 rail | Can be mounted onto S7 rail |
| Mechanical accessories | Mounting adapter for standard mounting rail (6EP1971-1BA00) | Mounting adapter for standard mounting rail (6ES7390-6BA00-0AA0) | Mounting adapter for standard mounting rail (6EP1971-1BA00) | Mounting adapter for standard mounting rail (6ES7390-6BA00-0AA0) | Mounting adapter for standard mounting rail (6EP1971-1BA00) |
| MTBF at 40 °C | 2 320 078 h | 964 506 h | 2 480 589 h | 2 231 610 h | 1 504 280 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **PS 307 load current supply, 2A** <br><br> incl. connecting comb <br> Input: 120/230 V AC <br> Output: 24 V DC/2 A | 6ES7307-1BA01-0AA0 | **Accessories** | |
| | | **SIMATIC S7-300 mounting adapter** <br><br> For snapping the new PS 307 onto a 35 mm DIN rail (EN 60715) <br><br> Spare part | 6EP1971-1BA00 |
| **SIMATIC S7-300 Outdoor, 2A** <br><br> Stabilized power supply PS 305 <br> Input: 24 … 110 V DC <br> Output: 24 V DC/2 A | 6ES7305-1BA80-0AA0 | | |
| **PS 307 load power supply, 5 A** <br><br> incl. connecting comb <br> Input: 120/230 V AC <br> Output: 24 V DC/5 A | 6ES7307-1EA01-0AA0 | **SIMATIC S7-300 mounting adapter** <br><br> for snapping the PS 307 onto 35 mm DIN rails | 6ES7390-6BA00-0AA0 |
| **SIMATIC S7-300 Outdoor, 5A** <br><br> Stabilized power supply PS 307 <br> Input: 120/230 V AC <br> Output: 24 V DC/5 A | 6ES7307-1EA80-0AA0 | | |
| **PS 307 load power supply, 10 A** <br><br> Input: 120/230 V AC <br> Output: 24 V DC/10 A | 6ES7307-1KA02-0AA0 | | |

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## ■ Overview

The design and functionality of the SIMATIC PS 305 and PS 307 single-phase load power supplies (system and load current supply) with automatic range switchover of the input voltage are an optimal match for the SIMATIC S7-300 PLC. By means of the connecting comb that is supplied with the system and load current supply, the supply to the CPU is quickly established. It is also possible to provide a 24 V supply to other S7-300 system components, input/output circuits of the input/output modules and, if necessary, the sensors and actuators. Comprehensive certifications, such as UL, ATEX or GL facilitate universal use (does not apply to outdoor use).

Note:

SIPLUS extreme products are based on Siemens standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

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## ■ Technical specifications

| Article number | **6AG1305-1BA80-2AA0** | **6AG1307-1EA01-7AA0** | **6AG1307-1KA02-7AA0** |
|---|---|---|---|
| Based on | **6ES7305-1BA80-0AA0** | **6ES7307-1EA01-0AA0** | **6ES7307-1KA02-0AA0** |
| | SIPLUS PS S7-300 PS305 (EN50155) | SIPLUS PS307 AC 120/230V / DC 24 V/5 A | SIPLUS_PS307_10A |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C; = Tmin | -25 °C; = Tmin | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; for use on railway vehicles according to EN 50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/UL hazardous use applies | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

# SIMATIC S7-300 Advanced Controllers
SIPLUS power supplies

## 1-phase, 24 V DC (for S7-300 and ET200M)

| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS power supplies** | | **Accessories** | |
| *For industrial applications with extended ambient conditions* | | **SIMATIC S7-300 mounting adapter** | **6EP1971-1BA00** |
| **SIPLUS S7-300 PS 305** | **6AG1305-1BA80-2AA0** | For snapping the PS 307 onto a 35 mm DIN rail (EN 60715) | |
| (Extended temperature range and medial exposure) | | **Spare part** | |
| Input: 24 … 110 V DC Output: 24 V DC/2 A | | SIMATIC S7-300 mounting adapter; for snapping the PS 307 onto 35 mm standard rails | **6ES7390-6BA00-0AA0** |
| **SIPLUS S7-300 PS 307 5 A** | **6AG1307-1EA01-7AA0** | | |
| (Extended temperature range and medial exposure) | | | |
| Incl. connection bracket 120/230 V AC; 24 V DC Output current 5 A (dimensions 60 x 125 x 120) | | | |
| **SIPLUS S7-300 PS 307 10 A** | **6AG1307-1KA02-7AA0** | | |
| (Extended temperature range and medial exposure) | | | |
| Incl. connection bracket 120/230 V AC; 24 V DC Output current 10 A (dimensions 80 x 125 x 120) | | | |
| *For rolling stock railway applications* | | | |
| **SIPLUS S7-300 PS 305** | **6AG1305-1BA80-2AA0** | | |
| (Extended temperature range and medial exposure) | | | |
| Conforms to EN 50155 Input: 24 … 110 V DC Output: 24 V DC/2 A | | | |

■ **Overview**



- For connecting mounting racks in multi-tier SIMATIC S7-300 configurations
- IM 365: For design of central controller and max. 1 expansion unit.
  Limited use of modules in the expansion unit (e.g. no CPs or FMs)
- IM 360/IM 361: For design of central controller and max. 3 expansion units.
  No limitation in selection of modules in the expansion unit

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■ **Technical specifications**

| Article number | 6ES7360-3AA01-0AA0 | 6ES7361-3CA01-0AA0 | 6ES7365-0BA01-0AA0 |
|---|---|---|---|
| | SIMATIC S7-300,INTERFACE MODULE | IM 361 NTERFACE MODULE IN ER, WITH K-BUS | SIMATIC S7-300,INTERFACE MODULE |
| **Supply voltage** | | | |
| Rated value (DC) | | | |
| • 24 V DC | | Yes | |
| **Input current** | | | |
| from supply voltage L+, max. | | 500 mA | |
| from backplane bus 5 V DC, max. | 350 mA | | 100 mA |
| **Power loss** | | | |
| Power loss, typ. | 2 W | 5 W | 0.5 W |
| **Hardware configuration** | | | |
| Number of interfaces per CPU, max. | 1 | 3 | 1; 1 pair |
| **Dimensions** | | | |
| Width | 40 mm | 80 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 120 mm | 120 mm | 120 mm |
| **Weights** | | | |
| Weight, approx. | 225 g | 505 g | 580 g |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 360 interface module** | **6ES7360-3AA01-0AA0** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| for expanding the S7-300 with max. 3 EUs; can be plugged into CC | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **IM 361 interface module** | **6ES7361-3CA01-0AA0** | | |
| for expanding the S7-300 with max. 3 EUs; can be plugged into EU | | | |
| **Connecting cable** | | | |
| between IM 360 and IM 361 or IM 361 and IM 361 | | | |
| 1 m | **6ES7368-3BB01-0AA0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| 2.5 m | **6ES7368-3BC51-0AA0** | Current "Manual Collection" DVD and the three subsequent updates | |
| 5 m | **6ES7368-3BF01-0AA0** | | |
| 10 m | **6ES7368-3CB01-0AA0** | | |
| **IM 365 interface module** | **6ES7365-0BA01-0AA0** | | |
| for expanding the S7-300 with max. 1 EU; 2 modules with permanent connecting cable (1 m) | | | |

# SIMATIC S7-300 Advanced Controllers
SIPLUS interface modules

## SIPLUS S7-300 IM 365

### ◾ Overview



- SIPLUS IM 365: For configuration of 1 central controller and max. 1 expansion unit

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

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### ◾ Technical specifications

| Article number | 6AG1365-0BA01-2AA0 |
| --- | --- |
| Based on | 6ES7365-0BA01-0AA0 |
| | SIPLUS S7-300 IM365 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | 6AG1365-0BA01-2AA0 |
| --- | --- |
| Based on | 6ES7365-0BA01-0AA0 |
| | SIPLUS S7-300 IM365 |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

### ◾ Ordering data | Article No.

| **SIPLUS S7-300 IM 365 interface module** | |
| --- | --- |
| for expanding the S7-300 with max. 1 EU; 2 modules with permanent connecting cable (1 m) | |
| Extended temperature range and exposure to media | **6AG1365-0BA01-2AA0** |

■ **Overview**



- The mechanical SIMATIC S7-300 rack
- For accommodating the modules
- Can be attached to walls

■ **Ordering data** | **Article No.**

| DIN rail | |
|---|---|
| 160 mm | 6ES7390-1AB60-0AA0 |
| 482 mm | 6ES7390-1AE80-0AA0 |
| 530 mm | 6ES7390-1AF30-0AA0 |
| 830 mm | 6ES7390-1AJ30-0AA0 |
| 2000 mm | 6ES7390-1BC00-0AA0 |

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# SIMATIC S7-300 Advanced Controllers
Accessories

## Labeling sheets

### ■ Overview

#### *Label sheets*

- Film sheets for the application-specific labeling of I/O modules of the SIMATIC S7-300 using standard laser printers
- Plain color films, tear-resistant, dirt-repellent
- Simple handling:
  - perforated label sheets in DIN A4 format for easy separation of the labeling strips.
  - the separated strips can be attached directly onto the I/O modules.
- Different colors to distinguish between different module types or preferred applications:
  The label sheets are available in the following colors: petrol, light beige, red, and yellow. Yellow is reserved for fail-safe systems.

#### *Label cover*

- Petrol-colored film
- For sealing and fixing of custom labeling strips on normal paper
- Accessories, 10 units

### ■ Technical specifications

| Labeling sheets for S7-300 | |
|---|---|
| Dimensions | DIN A4 |
| Labeling strips per sheet, pre-perforated | 10 |
| Weight, approx. | 0.1 kg |

### ■ Ordering data | Article No.

| **Label sheets** | |
|---|---|
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX00-0AA0** |
| Light beige | **6ES7392-2BX00-0AA0** |
| Yellow | **6ES7392-2CX00-0AA0** |
| Red | **6ES7392-2DX00-0AA0** |
| for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| Petrol | **6ES7392-2AX10-0AA0** |
| Light beige | **6ES7392-2BX10-0AA0** |
| Yellow | **6ES7392-2CX10-0AA0** |
| Red | **6ES7392-2DX10-0AA0** |

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# SIMATIC S7-400 Advanced Controllers

**6**



| **6/2** | **Overview** |
|---------|--------------|
| 6/2 | SIMATIC S7-400 |

# SIMATIC S7-400 Advanced Controllers
## Overview

**SIMATIC S7-400**

■ **Overview**

***SIMATIC S7-400:***
***The powerful controller for system solutions in the***
***manufacturing and process industries***

Within the controller family, the SIMATIC S7-400 is designed for system solutions in the manufacturing and process automation industry.

- The S7-400 is especially suitable for data-intensive tasks in the process industry. High processing speeds and deterministic response times guarantee short machine cycle times on high-speed machines in the manufacturing industry. The high-speed backplane bus of S7-400 ensures efficient linking of central I/O modules.
- The S7-400 is used preferably to coordinate complete plants and to control lower-level devices/stations; this is guaranteed by the high communication power and the integral interfaces.
- The performance is scalable thanks to a graded range of CPUs; the I/O capacity is almost unlimited.
- The power reserves of the CPUs enable new functions to be integrated without further hardware investment, e.g. processing of quality data, user-friendly diagnostics, integration into higher-level MES solutions or high-speed communication via bus systems.

**6**

| SIMATIC S7-400, CPU | 412-1 / 412-2 | 412-2 PN[4] | 414-2 / 414-3 | 414-3 PN/DP[4] | 416-2 / 416-3[4] | 416-3 PN/DP[4] | 417-4[4] |
|---|---|---|---|---|---|---|---|
| **Work memory** | 512KB/ 1[1] MB | 1 MB | 2/4[2] MB | 4 MB | 8/16[3] MB | 16 MB | 32 MB |
| **Processing times (ns)** | | | | | | | |
| Bit/word/fixed point/floating point | 31.25/31.25/ 31.25/62.5 | 31.25/31.25/ 31.25/62.5 | 18.75/18.75/ 18.75/37.5 | 18.75/18.75/ 18.75/37.5 | 12.5/12.5/ 12.5/25 | 12.5/12.5/ 12.5/25 | 7.5/7.5/ 7.5/15 |
| **Timers/counters** | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 |
| **Address range** | | | | | | | |
| Digital inputs/outputs | 32768 each | 32768 each | 65536 each | 65536 each | 131072 each | 131072 each | 131072 each |
| Analog inputs/outputs | 2048 each | 2048 each | 4096 each | 4096 each | 8192 each | 8192 each | 8192 each |
| **DP interfaces** | | | | | | | |
| Number of MPI/DP interfaces | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of DP interfaces | — / 1[1] | — | 1 | — | 1 | 1 | 1 |
| Number of DP slaves per MPI/DP | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Number of DP slaves per DP | 64 | — | 96 each | 125 each | 125 each | 125 each | 125 each |
| Plug-in interface modules | — | — | — / 1 x DP[2] | 1 x DP | — / 1 x DP[3] | 1 x DP | 2 x DP |
| Data set gateway | ● | ● | ● | ● | ● | ● | ● |
| **PN interfaces** | | | | | | | |
| Number of PN interfaces | — | 1 (2 ports) | — | 1 (2 ports) | — | 1 (2 ports) | — |
| PROFINET IO | — | ● | — | ● | — | ● | — |
| PROFINET with IRT | — | ● | — | ● | — | ● | — |
| PROFINET CBA | — | ● | — | ● | — | ● | — |
| TCP/IP | — | ● | — | ● | — | ● | — |
| UDP | — | ● | — | ● | — | ● | — |
| Web server | — | ● | — | ● | — | ● | — |
| ISO-on-TCP (RFC 1006) | — | ● | — | ● | — | ● | — |
| **Mounting dimensions** W x H x D (mm) | 25 x 290 x 219 | 25 x 290 x 219 | 25 x 290 x 219 50 x 290 x 219[2] | 50 x 290 x 219 | 25 x 290 x 219 50 x 290 x 219[3] | 50 x 290 x 219 | 50 x 290 x 219 |

— = cannot be used/not available    [1] CPU 412-2      [2] CPU 414-3      [3] CPU 416-3
● = can be used/available    [4] also as SIPLUSextreme component for corrosive atmosphere/condensation

## Overview (continued)

- The S7-400 can be structured in a modular way without any slot rules; there is a wide range of modules available both for centralized configurations and distributed structures.
- The configuration of the distributed I/O of the S7-400 can be modified during operation. In addition signal modules can be removed and inserted while live (hot swapping). This makes it very easy to expand the system or replace modules in the event of a fault.
- Storage of the entire project data, including symbols and comments, on the CPU simplifies service and maintenance calls.
- Safety engineering and standard automation can be integrated into a single S7-400; plant availability can be increased through the redundant structure of the S7-400.
- Many S7-400 components are also available in a SIPLUS extreme version for extreme environmental conditions, e.g. for use where there is a corrosive atmosphere/condensation. For more detailed information, visit
www.siemens.com/siplus-extreme

For more information, refer to:

www.siemens.com/simatic-s7-400

Detailed information on SIMATIC S7-400, see *Catalog ST 400* in the Information and Download Center or SIOS.

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| SIMATIC S7-400, CPU | 412-5H[4] | 414-5H[4] | 416-5H[4] | 417-5H[4] | 414F-3 PN/DP | 416F-2 | 416F-3 PN/DP |
|---|---|---|---|---|---|---|---|
| **Work memory** | 1 MB | 4 MB | 16 MB | 32 MB | 4 MB | 8 MB | 16 MB |
| **Processing times (ns)** | | | | | | | |
| Bit/word/ fixed point/floating point | 31.25/31.25/ 31.25/62.5 | 18.75/18.75/ 18.75/37.5 | 12.5/12.5/ 12.5/25 | 7.5/7.5/ 7.5/15 | 18.75/18.75/ 18.75/37.5 | 12.5/12.5/ 12.5/25 | 12.5/12.5/ 12.5/25 |
| **Timers/counters** | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 | 2048/2048 |
| **Address ranges** | | | | | | | |
| Digital inputs/outputs | 65536 each | 65536 each | 131072 each | 131072 each | 65536 each | 131072 each | 131072 each |
| Analog inputs/outputs | 4096 each | 4096 each | 8192 each | 8192 each | 4096 each | 8192 each | 8192 each |
| **DP interfaces** | | | | | | | |
| Number of MPI/DP interfaces | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of DP interfaces | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of DP slaves per MPI/DP | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Number of DP slaves per DP | 64 | 96 | 125 | 125 | 125 each | 125 | 125 each |
| Plug-in interface modules | — | — | — | — | 1 x DP | — | 1 x DP |
| Data set gateway | ● | ● | ● | ● | ● | ● | ● |
| **PN interfaces** | | | | | | | |
| Number of PN interfaces | 1 (2 ports) | 1 (2 ports) | 1 (2 ports) | 1 (2 ports) | 1 (2 ports) | — | 1 (2 ports) |
| PROFINET IO | ● | ● | ● | ● | ● | — | ● |
| PROFINET with IRT | — | — | — | — | ● | — | ● |
| PROFINET CBA | — | — | — | — | ● | — | ● |
| TCP/IP | ● | ● | ● | ● | ● | — | ● |
| UDP | ● | ● | ● | ● | ● | — | ● |
| Web server | — | — | — | — | ● | — | ● |
| ISO-on-TCP (RFC 1006) | ● | ● | ● | ● | ● | — | ● |
| **Mounting dimensions** W x H x D (mm) | 50 x 290 x 219 | 50 x 290 x 219 | 50 x 290 x 219 | 50 x 290 x 219 | 50 x 290 x 219 | 25 x 290 x 219 | 50 x 290 x 219 |

— = cannot be used/not available     [4] also as SIPLUSextreme component for corrosive atmosphere/condensation
● = can be used/available

**SIMATIC S7-400 Advanced Controllers**

**Notes**

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*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# Distributed Controllers
based on ET 200SP
Standard CPUs

## Overview



- CPU 1510SP-1 PN for SIMATIC ET 200SP based on S7-1500 CPU 1511-1 PN
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC ET 200SP to third-party devices/systems
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes

Note

SIMATIC Memory Card required for operation of the CPU. The BusAdapter is not included in scope of delivery and is to be ordered separately.

## Technical specifications

| Article number | 6ES7510-1DJ01-0AB0 |
|---|---|
| | CPU 1510SP-1 PN, 100KB PROG./750KB DATA |
| **General information** | |
| Product type designation | CPU 1510SP-1 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.6 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 100 kbyte |
| • integrated (for data) | 750 kbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 72 ns |
| for word operations, typ. | 86 ns |
| for fixed point arithmetic, typ. | 115 ns |
| for floating point arithmetic, typ. | 461 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 288 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

■ **Technical specifications** (continued)

| Article number | **6ES7510-1DJ01-0AB0** |
| --- | --- |
| | CPU 1510SP-1 PN, 100KB PROG./750KB DATA |
| **1. Interface** | |
| **Interface types** | |
| • Number of ports | 3; 1. integr. + 2. via BusAdapter |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 |
| - Number of connectable IO Devices for RT, max. | 64 |
| - of which in line, max. | 64 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 1 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |

| Article number | **6ES7510-1DJ01-0AB0** |
| --- | --- |
| | CPU 1510SP-1 PN, 100KB PROG./750KB DATA |
| **Update time for RT** | |
| - for send cycle of 250 µs | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| **Interface types** | |
| • Number of ports | 1 |
| • RS 485 | Yes; Via CM DP module |
| **Functionality** | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 96 |
| **PROFIBUS DP master** | |
| **Services** | |
| - Number of DP slaves | 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 800 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 40 |
| - per positioning axis | 80 |
| - per synchronous axis | 160 |
| - per external encoder | 80 |
| - per output cam | 20 |
| - per cam track | 160 |
| - per probe | 40 |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

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# Distributed Controllers
based on ET 200SP
Standard CPUs

## CPU 1510SP-1 PN

### ■ Technical specifications  (continued)

| Article number | 6ES7510-1DJ01-0AB0 | | Article number | 6ES7510-1DJ01-0AB0 |
|---|---|---|---|---|
| | CPU 1510SP-1 PN, 100KB PROG./750KB DATA | | | CPU 1510SP-1 PN, 100KB PROG./750KB DATA |
| **Ambient conditions** | | | **Know-how protection** | |
| **Ambient temperature during operation** | | | • User program protection/password protection | Yes |
| • horizontal installation, min. | 0 °C | | • Copy protection | Yes |
| • horizontal installation, max. | 60 °C | | • Block protection | Yes |
| • vertical installation, min. | 0 °C | | **Access protection** | |
| • vertical installation, max. | 50 °C | | • Protection level: Write protection | Yes |
| **Configuration** | | | • Protection level: Read/write protection | Yes |
| **Programming** | | | • Protection level: Complete protection | Yes |
| **Programming language** | | | **Dimensions** | |
| - LAD | Yes | | Width | 100 mm |
| - FBD | Yes | | Height | 117 mm |
| - STL | Yes | | Depth | 75 mm |
| - SCL | Yes | | **Weights** | |
| - GRAPH | Yes | | Weight, approx. | 310 g |

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### ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **CPU 1510SP-1 PN** | 6ES7510-1DJ01-0AB0 | | **Labeling strips** | |
| Work memory 100 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| **Accessories** | | | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| **CM DP for ET 200SP CPU** | 6ES7545-5DA00-0AB0 | | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbit/s | | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 |
| **SIMATIC Memory Card** | | | **IE FC RJ45 plugs** | |
| 4 MB | 6ES7954-8LC02-0AA0 | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| 12 MB | 6ES7954-8LE02-0AA0 | | | |
| 24 MB | 6ES7954-8LF02-0AA0 | | | |
| 256 MB | 6ES7954-8LL02-0AA0 | | | |
| 2 GB | 6ES7954-8LP02-0AA0 | | | |
| 32 GB | 6ES7954-8LT03-0AA0 | | **IE FC RJ45 Plug 90** | |
| **DIN rail 35 mm** | | | 90° cable outlet | |
| • Length: 483 mm for 19" cabinets | 6ES5710-8MA11 | | 1 unit | 6GK1901-1BB20-2AA0 |
| • Length: 530 mm for 600 mm cabinets | 6ES5710-8MA21 | | 10 units | 6GK1901-1BB20-2AB0 |
| • Length: 830 mm for 900 mm cabinets | 6ES5710-8MA31 | | 50 units | 6GK1901-1BB20-2AE0 |
| • Length: 2 m | 6ES5710-8MA41 | | **IE FC RJ45 Plug 180** | |
| **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 | | 180° cable outlet | |
| **BusAdapter BA 2xRJ45** | 6ES7193-6AR00-0AA0 | | 1 unit | 6GK1901-1BB10-2AA0 |
| **BusAdapter BA 2xFC for increased vibration and EMC loads** | 6ES7193-6AF00-0AA0 | | 10 units | 6GK1901-1BB10-2AB0 |
| | | | 50 units | 6GK1901-1BB10-2AE0 |
| **BusAdapter BA 2xSCRJ** | 6ES7193-6AP00-0AA0 | | | |
| **BusAdapter BA SCRJ/RJ45** | 6ES7193-6AP20-0AA0 | | | |
| **BusAdapter BA SCRJ/FC** | 6ES7193-6AP40-0AA0 | | | |
| **Reference identification label** | 6ES7193-6LF30-0AW0 | | | |
| 10 sheets of 16 labels | | | | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Current "Manual Collection" DVD and the three subsequent updates | |
| | | **STEP 7 Professional V14 SP1** | |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | | |
| **Manuals for ET 200SP distributed I/O system** | | | |
| ET 200SP library: ET 200SP Manual Collection, comprising system manual, product information, and device manuals | | | |
| Manuals can be downloaded from the Internet as PDF files: | | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| http://www.siemens.com/simatic-docu | | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| | | Email address required for delivery | |
| | | **Spare parts** | |
| | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| | | Spare part; for connecting the 24 V DC supply voltage • With push-in terminals; 10 units | |
| | | **Cover for bus adapter interface** | 6ES7591-3AA00-0AA0 |
| | | 5 units | |
| | | **Server module** | 6ES7193-6PA00-0AA0 |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# Distributed Controllers
based on ET 200SP
Standard CPUs

## CPU 1512SP-1 PN

### ■ Overview



- CPU 1512SP-1 PN for SIMATIC ET 200SP based on S7-1500 CPU 1513-1 PN
- For applications with medium requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP.
- Increase in availability of systems and machines
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC ET 200SP to third-party devices/systems
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes

Note

SIMATIC Memory Card required for operation of the CPU. BusAdapter is not included in scope of delivery and is to be ordered separately.

### ■ Technical specifications

| | |
|---|---|
| Article number | **6ES7512-1DK01-0AB0** |
| | CPU 1512SP-1 PN, 200KB PROG./1MB DATA |
| **General information** | |
| Product type designation | CPU 1512SP-1 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.6 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 200 kbyte |
| • integrated (for data) | 1 Mbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 48 ns |
| for word operations, typ. | 58 ns |
| for fixed point arithmetic, typ. | 77 ns |
| for floating point arithmetic, typ. | 307 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 288 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

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■ **Technical specifications** (continued)

| Article number | **6ES7512-1DK01-0AB0** | Article number | **6ES7512-1DK01-0AB0** |
|---|---|---|---|
| | CPU 1512SP-1 PN, 200KB PROG./1MB DATA | | CPU 1512SP-1 PN, 200KB PROG./1MB DATA |
| **1. Interface** | | **PROFINET IO Device** | |
| **Interface types** | | **Services** | |
| • Number of ports | 3; 1. integr. + 2. via BusAdapter | - PG/OP communication | Yes |
| • integrated switch | Yes | - S7 routing | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 | - Isochronous mode | No |
| | | - Open IE communication | Yes |
| • BusAdapter (PROFINET) | Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC | - IRT | Yes |
| | | - MRP | Yes |
| | | - MRPD | Yes; Requirement: IRT |
| | | - PROFIenergy | Yes |
| **Functionality** | | - Shared device | Yes |
| • PROFINET IO Controller | Yes | - Number of IO Controllers with shared device, max. | 4 |
| • PROFINET IO Device | Yes | **2. Interface** | |
| • SIMATIC communication | Yes | **Interface types** | |
| • Open IE communication | Yes | • Number of ports | 1 |
| • Web server | Yes | • RS 485 | Yes; Via CM DP module |
| • Media redundancy | Yes | **Functionality** | |
| **PROFINET IO Controller** | | • PROFIBUS DP master | Yes |
| **Services** | | • PROFIBUS DP slave | Yes |
| - PG/OP communication | Yes | • SIMATIC communication | Yes |
| - S7 routing | Yes | **Protocols** | |
| - Isochronous mode | Yes | **Number of connections** | |
| - Open IE communication | Yes | • Number of connections, max. | 128 |
| - IRT | Yes | **PROFIBUS DP master** | |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 | **Services** | |
| | | - Number of DP slaves | 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - MRPD | Requirement: IRT | | |
| - PROFIenergy | Yes | **Isochronous mode** | |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Isochronous operation (application synchronized up to terminal) | Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs |
| - Number of connectable IO Devices, max. | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | **Supported technology objects** | |
| | | Motion Control | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| - Of which IO devices with IRT, max. | 64 | | |
| - Number of connectable IO Devices for RT, max. | 128 | • Number of available Motion Control resources for technology objects (except cam disks) | 800 |
| - of which in line, max. | 128 | • Required Motion Control resources | |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces | - per speed-controlled axis | 40 |
| | | - per positioning axis | 80 |
| - Number of IO Devices per tool, max. | 8 | - per synchronous axis | 160 |
| | | - per external encoder | 80 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | - per output cam | 20 |
| | | - per cam track | 160 |
| | | - per probe | 40 |
| | | Controller | |
| **Update time for IRT** | | • PID_Compact | Yes; Universal PID controller with integrated optimization |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive | • PID_3Step | Yes; PID controller with integrated optimization for valves |
| | | • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| - for send cycle of 500 µs | 500 µs to 8 ms | | |
| - for send cycle of 1 ms | 1 ms to 16 ms | Counting and measuring | |
| - for send cycle of 2 ms | 2 ms to 32 ms | • High-speed counter | Yes |
| - for send cycle of 4 ms | 4 ms to 64 ms | | |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | | |
| **Update time for RT** | | | |
| - for send cycle of 250 µs | 250 µs to 128 ms | | |
| - for send cycle of 500 µs | 500 µs to 256 ms | | |
| - for send cycle of 1 ms | 1 ms to 512 ms | | |
| - for send cycle of 2 ms | 2 ms to 512 ms | | |
| - for send cycle of 4 ms | 4 ms to 512 ms | | |

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# Distributed Controllers
based on ET 200SP
Standard CPUs

**CPU 1512SP-1 PN**

## ◼ Technical specifications (continued)

| Article number | 6ES7512-1DK01-0AB0 |
|---|---|
| | CPU 1512SP-1 PN, 200KB PROG./1MB DATA |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - GRAPH | Yes |

| Article number | 6ES7512-1DK01-0AB0 |
|---|---|
| | CPU 1512SP-1 PN, 200KB PROG./1MB DATA |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** | |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| **Dimensions** | |
| Width | 100 mm |
| Height | 117 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 310 g |

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## ◼ Ordering data

| | Article No. |
|---|---|
| **CPU 1512SP-1 PN** | 6ES7512-1DK01-0AB0 |
| Work memory 200 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **CM DP for ET 200SP CPU** | 6ES7545-5DA00-0AB0 |
| PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbit/s | |
| **SIMATIC Memory Card** | |
| 4 MB | 6ES7954-8LC02-0AA0 |
| 12 MB | 6ES7954-8LE02-0AA0 |
| 24 MB | 6ES7954-8LF02-0AA0 |
| 256 MB | 6ES7954-8LL02-0AA0 |
| 2 GB | 6ES7954-8LP02-0AA0 |
| 32 GB | 6ES7954-8LT03-0AA0 |
| **DIN rail 35 mm** | |
| • Length: 483 mm for 19" cabinets | 6ES5710-8MA11 |
| • Length: 530 mm for 600 mm cabinets | 6ES5710-8MA21 |
| • Length: 830 mm for 900 mm cabinets | 6ES5710-8MA31 |
| • Length: 2 m | 6ES5710-8MA41 |
| **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 |

| | Article No. |
|---|---|
| **BusAdapter BA 2xRJ45** | 6ES7193-6AR00-0AA0 |
| **BusAdapter BA 2xFC for increased vibration and EMC loads** | 6ES7193-6AF00-0AA0 |
| **BusAdapter BA 2xSCRJ** | 6ES7193-6AP00-0AA0 |
| **BusAdapter BA SCRJ/RJ45** | 6ES7193-6AP20-0AA0 |
| **BusAdapter BA SCRJ/FC** | 6ES7193-6AP40-0AA0 |
| **BusAdapter BA 2xLC** | 6ES7193-6AG00-0AA0 |
| **BusAdapter BA LC/RJ45** | 6ES7193-6AG20-0AA0 |
| **BusAdapter BA LC/FC** | 6ES7193-6AG40-0AA0 |
| **Reference identification label** | 6ES7193-6LF30-0AW0 |
| 10 sheets of 16 labels | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 |

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 plugs** | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDCATIC TDC | |
| **IE FC RJ45 Plug 90** | | | |
| 90° cable outlet | | | |
| 1 unit | 6GK1901-1BB20-2AA0 | | |
| 10 units | 6GK1901-1BB20-2AB0 | | |
| 50 units | 6GK1901-1BB20-2AE0 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **IE FC RJ45 Plug 180** | | Current "Manual Collection" DVD and the three subsequent updates | |
| 180° cable outlet | | **STEP 7 Professional V14 SP1** | |
| 1 unitplug | 6GK1901-1BB10-2AA0 | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| 10 units | 6GK1901-1BB10-2AB0 | Requirement: Windows 7 Professional SP1 (64-bit), | |
| 50 units | 6GK1901-1BB10-2AE0 | Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); | |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| | | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | Email address required for delivery | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | **Spare parts** | |
| | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| | | Spare part; for connecting the 24 V DC supply voltage • With push-in terminals; 10 units | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | **Cover for bus adapter interface** | 6ES7591-3AA00-0AA0 |
| **Manuals for ET 200SP distributed I/O system** | | 5 units | |
| ET 200SP library: ET 200SP Manual Collection, comprising system manual, product information, and device manuals | | **Server module** | 6ES7193-6PA00-0AA0 |
| Manuals can be downloaded from the Internet as PDF files: | | | |
| http://www.siemens.com/simatic-docu | | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# Distributed Controllers
based on ET 200SP
SIPLUS standard CPUs

## SIPLUS CPU 1510SP-1 PN

### ■ Overview



- SIPLUS CPU 1510SP-1 PN for SIPLUS ET 200SP based on SIPLUS-S7-1500 CPU 1511-1 PN
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave
  (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.
The BusAdapter is not included in scope of delivery and is to be ordered separately.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | **6AG1510-1DJ01-2AB0** |
|---|---|
| Based on | **6ES7510-1DJ01-0AB0** |
| | SIPLUS ET 200SP CPU 1510SP-1 PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIPLUS CPU 1510SP-1 PN** | **6AG1510-1DJ01-2AB0** | | **Accessories** | |
| (Extended temperature range and exposure to media) | | | **BusAdapter BA 2xRJ45** | **6AG1193-6AR00-7AA0** |
| Work memory 100 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | | | (Extended temperature range and exposure to media) | |
| | | | **BusAdapter BA 2xFC for increased vibration and EMC loads** | **6AG1193-6AF00-7AA0** |
| | | | (Extended temperature range and exposure to media) | |
| | | | **IE FC RJ45 plugs** | |
| | | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| | | | **IE FC RJ45 Plug 180** | |
| | | | (Extended temperature range and exposure to media) | |
| | | | 180° cable outlet | |
| | | | 1 unit | **6AG1901-1BB10-7AA0** |
| | | | **Additional accessories** | see SIMATIC ET 200SP CPU 1510SP-1 PN, page 7/4 |

# Distributed Controllers
based on ET 200SP
SIPLUS standard CPUs

## SIPLUS CPU 1512SP-1 PN

### ■ Overview
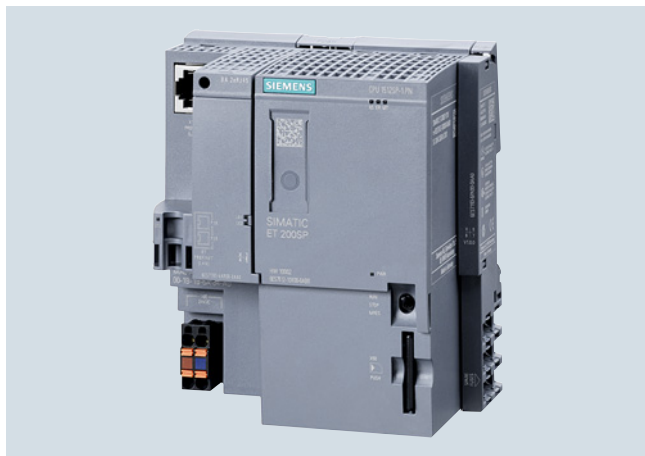


- SIPLUS CPU 1512SP-1 PN for SIPLUS ET 200SP based on SIPLUS-S7-1500 CPU 1513-1 PN
- For applications with medium requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP.
- Increase in availability of systems and machines
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU. BusAdapter is not included in scope of delivery and is to be ordered separately.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

### ■ Technical specifications

| Article number | **6AG1512-1DK01-2AB0** |
|---|---|
| Based on | **6ES7512-1DK01-0AB0** |
| | SIPLUS ET 200SP CPU 1512SP-1 PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ◼ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CPU 1512SP-1 PN** <br><br>(Extended temperature range and exposure to media) <br><br>Work memory 200 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | 6AG1512-1DK01-2AB0 | **Accessories** | |
| | | **BusAdapter BA 2xRJ45** <br><br>(Extended temperature range and exposure to media) | 6AG1193-6AR00-7AA0 |
| | | **BusAdapter BA 2xFC for increased vibration and EMC loads** <br><br>(Extended temperature range and exposure to media) | 6AG1193-6AF00-7AA0 |
| | | **IE FC RJ45 plugs** <br><br>RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| | | **IE FC RJ45 Plug 180** <br><br>180° cable outlet <br><br>1 unit | 6AG1901-1BB10-7AA0 |
| | | **Additional accessories** | see SIMATIC ET 200SP, CPU 1512SP-1 PN, page 7/8 |

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# Distributed Controllers

based on ET 200SP
Fail-safe CPUs

**CPU 1510SP F-1 PN**

## Overview



- CPU 1510SP F-1 PN for SIMATIC ET 200SP based on S7-1500 CPU 1511F-1 PN
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.

The BusAdapter is not included in the scope of supply and must be ordered separately.

## Technical specifications

| Article number | 6ES7510-1SJ01-0AB0 |
|---|---|
| | CPU1510SP F-1 PN, 150KB PROG./750KB DATA |
| **General information** | |
| Product type designation | CPU 1510SP F-1 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.6 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 150 kbyte |
| • integrated (for data) | 750 kbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 72 ns |
| for word operations, typ. | 86 ns |
| for fixed point arithmetic, typ. | 115 ns |
| for floating point arithmetic, typ. | 461 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 288 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

■ **Technical specifications** (continued)

| Article number | 6ES7510-1SJ01-0AB0 |
|---|---|
| | CPU1510SP F-1 PN, 150KB PROG./750KB DATA |
| **1. Interface** | |
| **Interface types** | |
| • Number of ports | 3; 1. integr. + 2. via BusAdapter |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 |
| - Number of connectable IO Devices for RT, max. | 64 |
| - of which in line, max. | 64 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive |
| - for send cycle of 1 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | |
| - for send cycle of 250 µs | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms |

| Article number | 6ES7510-1SJ01-0AB0 |
|---|---|
| | CPU1510SP F-1 PN, 150KB PROG./750KB DATA |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| **Interface types** | |
| • Number of ports | 1 |
| • RS 485 | Yes; Via CM DP module |
| **Functionality** | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 96 |
| **PROFIBUS DP master** | |
| **Services** | |
| - Number of DP slaves | 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 1 600 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 80 |
| - per positioning axis | 160 |
| - per synchronous axis | 160 |
| - per external encoder | 80 |
| - per output cam | 20 |
| - per cam track | 160 |
| - per probe | 40 |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

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# Distributed Controllers

based on ET 200SP
Fail-safe CPUs

**CPU 1510SP F-1 PN**

## ■ Technical specifications (continued)

| Article number | **6ES7510-1SJ01-0AB0** | Article number | **6ES7510-1SJ01-0AB0** |
|---|---|---|---|
| | CPU1510SP F-1 PN, 150KB PROG./750KB DATA | | CPU1510SP F-1 PN, 150KB PROG./750KB DATA |
| **Highest safety class achievable in safety mode** | | **Know-how protection** | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | | • User program protection/password protection | Yes |
| | | • Copy protection | Yes |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 | • Block protection | Yes |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h | **Access protection** | |
| | | • Protection level: Write protection | Yes |
| **Ambient conditions** | | • Protection level: Read/write protection | Yes |
| **Ambient temperature during operation** | | • Protection level: Complete protection | Yes |
| • horizontal installation, min. | 0 °C | **Dimensions** | |
| • horizontal installation, max. | 60 °C | Width | 100 mm |
| • vertical installation, min. | 0 °C | Height | 117 mm |
| • vertical installation, max. | 50 °C | Depth | 75 mm |
| **Configuration** | | **Weights** | |
| **Programming** | | Weight, approx. | 310 g |
| **Programming language** | | | |
| - LAD | Yes; incl. failsafe | | |
| - FBD | Yes; incl. failsafe | | |
| - STL | Yes | | |
| - SCL | Yes | | |
| - GRAPH | Yes | | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1510SP F-1 PN** | **6ES7510-1SJ01-0AB0** | **BusAdapter BA 2xRJ45** | **6ES7193-6AR00-0AA0** |
| Work memory 150 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | | **BusAdapter BA 2xFC for increased vibration and EMC loads** | **6ES7193-6AF00-0AA0** |
| **Accessories** | | **BusAdapter BA 2xSCRJ** | **6ES7193-6AP00-0AA0** |
| **CM DP for ET 200SP CPU** | **6ES7545-5DA00-0AB0** | **BusAdapter BA SCRJ/RJ45** | **6ES7193-6AP20-0AA0** |
| PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbit/s | | **BusAdapter BA SCRJ/FC** | **6ES7193-6AP40-0AA0** |
| | | **Reference identification label** | **6ES7193-6LF30-0AW0** |
| | | 10 sheets of 16 labels | |
| **SIMATIC Memory Card** | | **Labeling strips** | |
| 4 MB | **6ES7954-8LC02-0AA0** | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| 12 MB | **6ES7954-8LE02-0AA0** | | |
| 24 MB | **6ES7954-8LF02-0AA0** | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| 256 MB | **6ES7954-8LL02-0AA0** | | |
| 2 GB | **6ES7954-8LP02-0AA0** | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| 32 GB | **6ES7954-8LT03-0AA0** | | |
| **DIN rail 35 mm** | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| • Length: 483 mm for 19" cabinets | **6ES5710-8MA11** | | |
| • Length: 530 mm for 600 mm cabinets | **6ES5710-8MA21** | **IE FC RJ45 plugs** | |
| • Length: 830 mm for 900 mm cabinets | **6ES5710-8MA31** | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| • Length: 2 m | **6ES5710-8MA41** | | |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** | | |

## ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **IE FC RJ45 Plug 90** | | | **STEP 7 Professional V14 SP1** | |
| 90° cable outlet | | | Target system:<br>SIMATIC S7-1200, S7-1500,<br>S7-300, S7-400, WinAC | |
| 1 unit | 6GK1901-1BB20-2AA0 | | Requirement:<br>Windows 7 Professional SP1 | |
| 10 units | 6GK1901-1BB20-2AB0 | | (64-bit),<br>Windows 7 Enterprise SP1 (64-bit), | |
| 50 units | 6GK1901-1BB20-2AE0 | | Windows 7 Ultimate SP1 (64-bit),<br>Windows 8.1 Professional (64-bit), | |
| **IE FC RJ45 Plug 180** | | | Windows 8.1 Enterprise (64-bit),<br>Windows 10 Professional | |
| 180° cable outlet | | | Version 1607,<br>Windows 10 Enterprise | |
| 1 unit | 6GK1901-1BB10-2AA0 | | Version 1607,<br>Windows 10 Enterprise 2016 LTSB, | |
| 10 units | 6GK1901-1BB10-2AB0 | | Windows 10 Enterprise 2015 LTSB,<br>Windows Server 2008 R2 StdE (full | |
| 50 units | 6GK1901-1BB10-2AE0 | | installation),<br>Windows Server 2012 StdE | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | | (full installation),<br>Windows Server 2016 Standard | |
| 4-wire, shielded TP installation<br>cable for connection to<br>IE FC outlet RJ45/ IE FC RJ45 plug;<br>PROFINET-compatible;<br>with UL approval;<br>sold by the meter;<br>max. delivery unit 1000 m,<br>minimum order quantity 20 m | | | (full installation);<br>Type of delivery:<br>German, English, Chinese, Italian,<br>French, Spanish | |
| | | | STEP 7 Professional V14 SP1,<br>floating license | 6ES7822-1AA04-0YA5 |
| **IE FC TP Trailing Cable 2 x 2<br>(Type C)** | 6XV1840-3AH10 | | STEP 7 Professional V14 SP1,<br>floating license, software download<br>incl. license key [1] | 6ES7822-1AE04-0YA5 |
| 4-wire, shielded TP installation<br>cable for connection to IE FC outlet<br>RJ45/ IE FC RJ45 Plug 180/90 for<br>use as trailing cable;<br>PROFINET-compatible;<br>with UL approval;<br>sold by the meter;<br>max. delivery unit 1000 m,<br>minimum order quantity 20 m | | | Email address required for delivery | |
| | | | **STEP 7 Safety Advanced V14 SP1** | |
| | | | Task:<br>Engineering tool for configuring and<br>programming fail-safe user<br>programs for SIMATIC S7-1200 FC,<br>S7-1500F, S7-1500F Software<br>Controller, S7-300F, S7-400F,<br>WinAC RTX F, ET 200SP F Controller<br>and the fail-safe ET 200SP,<br>ET 200S, ET 200M, ET 200iSP,<br>ET 200pro and ET 200eco I/O<br>Requirement:<br>STEP 7 Professional V14 SP1 | |
| **IE FC TP Marine Cable 2 x 2<br>(Type B)** | 6XV1840-4AH10 | | | |
| 4-wire, shielded TP installation<br>cable for connection to IE FC outlet<br>RJ45/ IE FC RJ45 Plug 180/90 with<br>marine approval,<br>sold by the meter;<br>max. delivery unit 1000 m,<br>minimum order quantity 20 m | | | Floating license for 1 user, software<br>and documentation on DVD,<br>license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | | Floating license for 1 user, software,<br>documentation and license key for<br>download[1];<br>Email address required for delivery | 6ES7833-1FA14-0YH5 |
| Preadjusted stripping tool for fast<br>stripping of Industrial Ethernet<br>FC cables | | | **Spare parts** | |
| **Manuals for ET 200SP distributed<br>I/O system** | | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| ET 200SP library:<br>ET 200SP Manual Collection,<br>comprising system manual, product<br>information, and device manuals | | | Spare part; for connecting the<br>24 V DC supply voltage<br>• With push-in terminals; 10 units | |
| Manuals can be downloaded from<br>the Internet as PDF files: | | | **Cover for bus adapter interface** | 6ES7591-3AA00-0AA0 |
| http://www.siemens.com/simatic-<br>docu | | | 5 units | |
| **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 | | **Server module** | 6ES7193-6PA00-0AA0 |
| Electronic manuals on DVD,<br>multi-language: LOGO!, SIMADYN,<br>SIMATIC bus components,<br>SIMATIC C7, SIMATIC distributed<br>I/O, SIMATIC HMI, SIMATIC<br>Sensors, SIMATIC NET, SIMATIC PC<br>Based Automation, SIMATIC PCS 7,<br>SIMATIC PG/PC, SIMATIC S7,<br>SIMATIC Software, SIMATIC<br>TDCATIC TDC | | | | |
| **SIMATIC Manual Collection<br>update service for 1 year** | 6ES7998-8XC01-8YE2 | | | |
| Current "Manual Collection" DVD<br>and the three subsequent updates | | | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# Distributed Controllers
based on ET 200SP
Fail-safe CPUs

## CPU 1512SP F-1 PN

### Overview



- CPU 1512SP F-1 PN for SIMATIC ET 200SP based on S7-1500 CPU 1513F-1 PN
- For applications with medium requirements in terms of program scope and processing speed, for distributed configurations via PROFINET IO or PROFIBUS DP.
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.

The BusAdapter is not included in the scope of supply and must be ordered separately.

### Technical specifications

| Article number | 6ES7512-1SK01-0AB0 |
|---|---|
| | CPU 1512SP F-1 PN, 300KB PROG./1MB DATA |
| **General information** | |
| Product type designation | CPU 1512SP-1 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.6 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 300 kbyte |
| • integrated (for data) | 1 Mbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 48 ns |
| for word operations, typ. | 58 ns |
| for fixed point arithmetic, typ. | 77 ns |
| for floating point arithmetic, typ. | 307 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 288 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

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## ■ Technical specifications (continued)

| Article number | 6ES7512-1SK01-0AB0 |
|---|---|
| | CPU 1512SP F-1 PN, 300KB PROG./1MB DATA |
| **1. Interface** | |
| **Interface types** | |
| • Number of ports | 3; 1. integr. + 2. via BusAdapter |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 |
| - Number of connectable IO Devices for RT, max. | 128 |
| - of which in line, max. | 128 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | |
| - for send cycle of 250 µs | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms |

| Article number | 6ES7512-1SK01-0AB0 |
|---|---|
| | CPU 1512SP F-1 PN, 300KB PROG./1MB DATA |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| **Interface types** | |
| • Number of ports | 1 |
| • RS 485 | Yes; Via CM DP module |
| **Functionality** | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 128 |
| **PROFIBUS DP master** | |
| **Services** | |
| - Number of DP slaves | 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 1 600 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 80 |
| - per positioning axis | 160 |
| - per synchronous axis | 160 |
| - per external encoder | 80 |
| - per output cam | 20 |
| - per cam track | 160 |
| - per probe | 40 |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

# Distributed Controllers
based on ET 200SP
Fail-safe CPUs

## ■ Technical specifications  (continued)

| Article number | 6ES7512-1SK01-0AB0 |
|---|---|
|  | CPU 1512SP F-1 PN, 300KB PROG./1MB DATA |
| **Highest safety class achievable in safety mode** |  |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** |  |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 |
| **Ambient conditions** |  |
| **Ambient temperature during operation** |  |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Configuration** |  |
| **Programming** |  |
| **Programming language** |  |
| - LAD | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe |
| - STL | Yes |
| - SCL | Yes |
| - GRAPH | Yes |

| Article number | 6ES7512-1SK01-0AB0 |
|---|---|
|  | CPU 1512SP F-1 PN, 300KB PROG./1MB DATA |
| **Know-how protection** |  |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** |  |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| **Dimensions** |  |
| Width | 100 mm |
| Height | 117 mm |
| Depth | 75 mm |
| **Weights** |  |
| Weight, approx. | 310 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1512SP F-1 PN** | 6ES7512-1SK01-0AB0 | **BusAdapter BA 2xRJ45** | 6ES7193-6AR00-0AA0 |
| Work memory 300 KB for program, 1 MB for data, PROFINET IO IRT interface, SIMATIC Memory Card required | | **BusAdapter BA 2xFC for increased vibration and EMC loads** | 6ES7193-6AF00-0AA0 |
| **Accessories** | | **BusAdapter BA 2xSCRJ** | 6ES7193-6AP00-0AA0 |
| **CM DP for ET 200SP CPU** | 6ES7545-5DA00-0AB0 | **BusAdapter BA SCRJ/RJ45** | 6ES7193-6AP20-0AA0 |
| PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbit/s | | **BusAdapter BA SCRJ/FC** | 6ES7193-6AP40-0AA0 |
| | | **Reference identification label** | 6ES7193-6LF30-0AW0 |
| | | 10 sheets of 16 labels | |
| **SIMATIC Memory Card** | | **Labeling strips** | |
| 4 MB | 6ES7954-8LC02-0AA0 | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| 12 MB | 6ES7954-8LE02-0AA0 | | |
| 24 MB | 6ES7954-8LF02-0AA0 | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| 256 MB | 6ES7954-8LL02-0AA0 | | |
| 2 GB | 6ES7954-8LP02-0AA0 | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| 32 GB | 6ES7954-8LT03-0AA0 | | |
| **DIN rail 35 mm** | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 |
| • Length: 483 mm for 19" cabinets | 6ES5710-8MA11 | | |
| • Length: 530 mm for 600 mm cabinets | 6ES5710-8MA21 | | |
| • Length: 830 mm for 900 mm cabinets | 6ES5710-8MA31 | | |
| • Length: 2 m | 6ES5710-8MA41 | | |
| **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 | | |

■ **Ordering data**     Article No.                Article No.

| | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 plugs** | | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | | Current "Manual Collection" DVD and the three subsequent updates | |
| | | **STEP 7 Professional V14 SP1** | |
| **IE FC RJ45 Plug 90** | | Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC | |
| 90° cable outlet | | Requirement: Windows 7 Professional SP1 (64-bit), | |
| 1 unit | 6GK1901-1BB20-2AA0 | Windows 7 Enterprise SP1 (64-bit), | |
| 10 units | 6GK1901-1BB20-2AB0 | Windows 7 Ultimate SP1 (64-bit), | |
| 50 units | 6GK1901-1BB20-2AE0 | Windows 8.1 Professional (64-bit), | |
| **IE FC RJ45 Plug 180** | | Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, | |
| 180° cable outlet | | Windows 10 Enterprise Version 1607, | |
| 1 unit | 6GK1901-1BB10-2AA0 | Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, | |
| 10 units | 6GK1901-1BB10-2AB0 | Windows Server 2008 R2 StdE (full installation), | |
| 50 units | 6GK1901-1BB10-2AE0 | Windows Server 2012 StdE (full installation), | |
| **IE FC TP Standard Cable GP 2x2** | 6XV1840-2AH10 | Windows Server 2016 Standard (full installation); | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| | | STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| **IE FC TP Trailing Cable 2 x 2 (Type C)** | 6XV1840-3AH10 | STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Email address required for delivery | |
| | | **STEP 7 Safety Advanced V14 SP1** | |
| | | Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | |
| **IE FC TP Marine Cable 2 x 2 (Type B)** | 6XV1840-4AH10 | Requirement: STEP 7 Professional V14 SP1 | |
| 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | | Floating license for 1 user, software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| **IE FC Stripping Tool** | 6GK1901-1GA00 | Floating license for 1 user, software, documentation and license key for download [1]; Email address required for delivery | 6ES7833-1FA14-0YH5 |
| Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | | **Spare parts** | |
| **Manuals for ET 200SP distributed I/O system** | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| ET 200SP library: ET 200SP Manual Collection, comprising system manual, product information, and device manuals | | Spare part; for connecting the 24 V DC supply voltage • With push-in terminals; 10 units | |
| Manuals can be downloaded from the Internet as PDF files: | | **Cover for bus adapter interface** | 6ES7591-3AA00-0AA0 |
| http://www.siemens.com/simatic-docu | | 5 units | |
| **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 | **Server module** | 6ES7193-6PA00-0AA0 |
| Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDCATIC TDC | | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

# Distributed Controllers
based on ET 200SP
SIPLUS fail-safe CPUs

## SIPLUS CPU 1510SP F-1 PN

### Overview



- SIPLUS CPU 1510SP F-1 PN for SIPLUS ET 200SP based on S7-1500 CPU 1511F-1 PN
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.

The BusAdapter is not included in the scope of supply and must be ordered separately.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

### Technical specifications

| | |
|---|---|
| Article number | **6AG1510-1SJ01-2AB0** |
| Based on | **6ES7510-1SJ01-0AB0** |
| | SIPLUS ET 200SP CPU 1510SP F-1PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C; = Tmin |
| • horizontal installation, max. | 60 °C; = Tmax |
| • vertical installation, min. | -25 °C; = Tmin |
| • vertical installation, max. | 50 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

### Ordering data

| | Article No. |
|---|---|
| **SIPLUS CPU 1510SP F-1 PN** | **6AG1510-1SJ01-2AB0** |
| (Extended temperature range and environmental stress) | |
| Work memory 150 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **SIPLUS BusAdapter BA 2xRJ45** | **6AG1193-6AR00-7AA0** |
| **IE FC RJ45 plugs** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| **IE FC RJ45 Plug 180** | |
| (Extended temperature range and environmental stress) | |
| 180° cable outlet | |
| 1 unit | **6AG1901-1BB10-7AA0** |
| **Other accessories** | See SIMATIC ET 200SP, CPU 1510 F-1 PN, page 7/16 |

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# Distributed Controllers
based on ET 200SP
SIPLUS fail-safe CPUs

**SIPLUS CPU 1512SP F-1 PN**

## Overview



- SIPLUS CPU 1512SP F-1 PN for SIPLUS ET 200SP based on S7-1500 CPU 1513F-1 PN
- For applications with medium requirements in terms of program scope and processing speed, for distributed configurations via PROFINET IO or PROFIBUS DP.
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options: PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.

The BusAdapter is not included in the scope of supply and must be ordered separately.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1512-1SK01-2AB0** |
| Based on | **6ES7512-1SK01-0AB0** |
| | SIPLUS ET 200SP CPU 1512SP F-1PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C; = Tmin |
| • horizontal installation, max. | 60 °C; = Tmax |
| • vertical installation, min. | -25 °C; = Tmin |
| • vertical installation, max. | 50 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS CPU 1512SP F-1 PN** | **6AG1512-1SK01-2AB0** |
| (Extended temperature range and environmental stress) | |
| Work memory 300 KB for program, 1 MB for data, PROFINET IO IRT interface, SIMATIC Memory Card required | |
| **Accessories** | |
| **SIPLUS BusAdapter BA 2xRJ45** | **6AG1193-6AR00-7AA0** |
| **IE FC RJ45 plugs** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| **IE FC RJ45 Plug 180** | |
| (Extended temperature range and environmental stress) | |
| 180° cable outlet | |
| 1 unit | **6AG1901-1BB10-7AA0** |
| **Other accessories** | See SIMATIC ET 200SP, CPU 1512 F-1 PN, page 7/20 |

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# Distributed Controllers
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

## CPU 1515SP PC (F)

### ■ Overview



- Turnkey, all-in-one solution with pre-installed SIMATIC S7-1500 Software Controller or fail-safe, optionally pre-installed WinCC Runtime Advanced
- Fail-safe versions make it possible to control machines or plants in a fail-safe environment. This makes it possible to address applications which require an SIL3 (Safety Integrity Level) safety class according to IEC 61508 2nd Edition or a PL e (Performance Level) according to ISO 13849.
- Central expansion via ET 200SP modules (station width up to 1 m or up to 64 modules)
- SIMATIC Hypervisor: for separating Windows systems from control functions

- Dual-core processor for optimal use of the hypervisor
- Swappable flash memory (CFast card) for operating system, runtime and project data
- Integrated DVI-I graphics connection; 3x USB 2.0 connection
- 2 PROFINET interfaces: X1 via PN-IO bus adapter (RJ45 or FC) with 2 ports; X2: GB-Ethernet interface (RJ45)
- PROFINET IRT
- Open Ethernet communication (TCP/IP, UDP, Iso-on-TCP)
- Web server functionality for information, status, diagnostics and user-defined webpages
- PROFIBUS DP communication optionally via CM DP module as DP master
- Configuration control (option handling)
- Improved know-how and copy protection; Security Integrated
- Integrated system diagnostics
- Integrated motion control functionalities for controlling speed-controlled and positioning axes with support for external encoders.
- Trace function
- Especially suitable for high data volumes and user-specific, open applications
- Integration of control functions and applications implemented in C/C++ (using SIMATIC ODK-1500S Open Development Kit)

### ■ Technical specifications

| Article number | 6ES7677-2AA31-0EB0 | 6ES7677-2AA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC 4GB | CPU 1515SP PC 4GB |
| **General information** | | |
| Product type designation | CPU 1515SP PC | CPU 1515SP PC |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 |
| **PC configuration** | | |
| Processor | Dual-Core 1 GHz, AMD G Series APU T40E | Dual-Core 1 GHz, AMD G Series APU T40E |
| Main memory | 4 GB RAM | 4 GB RAM |
| Flash Disk | 8 GB | 16 GB |
| Operating systems | Windows Embedded Standard 7 E 32-bit | Windows Embedded Standard 7 P 64-bit |
| **Installed software** | | |
| • Visualization | No | No |
| • Control | S7-1500 software controller CPU 1505SP V2.0 | S7-1500 software controller CPU 1505SP V2.0 |
| **Supply voltage** | | |
| Type of supply voltage | 24 V DC | 24 V DC |
| **Power loss** | | |
| Power loss, typ. | 15 W; without ET 200SP modules and without using USB | 15 W; without ET 200SP modules and without using USB |
| **Memory** | | |
| Type of memory | DDR3-SDRAM | DDR3-SDRAM |
| CFast memory card | Yes; 8 GB flash memory | Yes; 16 GB flash memory |
| **Work memory** | | |
| • integrated (for program) | 1 Mbyte | 1 Mbyte |
| • integrated (for data) | 5 Mbyte | 5 Mbyte |
| • Integrated (for ODK application) | 10 Mbyte | 10 Mbyte |
| **Load memory** | | |
| • integrated (on PC mass storage) | 320 Mbyte | 320 Mbyte |

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**Distributed Controllers**
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

CPU 1515SP PC (F)

## ■ Technical specifications (continued)

| Article number | **6ES7677-2AA31-0EB0** | **6ES7677-2AA41-0FB0** |
|---|---|---|
| | CPU 1515SP PC 4GB | CPU 1515SP PC 4GB |
| **CPU processing times** | | |
| for bit operations, typ. | 10 ns | 10 ns |
| for word operations, typ. | 12 ns | 12 ns |
| for fixed point arithmetic, typ. | 16 ns | 16 ns |
| for floating point arithmetic, typ. | 64 ns | 64 ns |
| **CPU-blocks** | | |
| Number of elements (total) | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| **DB** | | |
| • Number, max. | 5 999; Number range: 1 to 65535 | 5 999; Number range: 1 to 65535 |
| • Size, max. | 5 Mbyte | 5 Mbyte |
| **FB** | | |
| • Number, max. | 5 998; Number range: 1 to 65535 | 5 998; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte | 512 kbyte |
| **FC** | | |
| • Number, max. | 5 999; Number range: 1 to 65535 | 5 999; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte | 512 kbyte |
| **OB** | | |
| • Size, max. | 1 048 kbyte | 1 048 kbyte |
| **Nesting depth** | | |
| • per priority class | 24 | 24 |
| **Counters, timers and their retentivity** | | |
| **S7 counter** | | |
| • Number | 2 048 | 2 048 |
| **IEC counter** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | |
| • Number | 2 048 | 2 048 |
| **IEC timer** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **Data areas and their retentivity** | | |
| **Flag** | | |
| • Number, max. | 16 kbyte | 16 kbyte |
| **Address area** | | |
| **I/O address area** | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Hardware configuration** | | |
| Integrated power supply | Yes | Yes |
| **Time of day** | | |
| **Clock** | | |
| • Type | Hardware clock | Hardware clock |
| • Hardware clock (real-time) | Yes; Resolution: 1 s | Yes; Resolution: 1 s |
| **Interfaces** | | |
| Number of industrial Ethernet interfaces | 2 | 2 |
| Number of PROFINET interfaces | 1 | 1 |
| Number of PROFIBUS interfaces | 1 | 1 |
| Number of RS 485 interfaces | 1; Via CM DP module | 1; Via CM DP module |
| Number of USB interfaces | 3; 3x USB 2.0 on the front, 500 mA each – of which 2x 500 mA and 1x 100 mA simultaneously | 3; 3x USB 2.0 on the front, 500 mA each – of which 2x 500 mA and 1x 100 mA simultaneously |
| Number of SD card slots | 1 | 1 |
| **Video interfaces** | | |
| • Graphics interface | 1x DVI-I | 1x DVI-I |
| **1. Interface** | | |
| Interface type | PROFINET | PROFINET |
| automatic detection of transmission rate | Yes | Yes |
| Autonegotiation | Yes | Yes |
| Autocrossing | Yes | Yes |

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# Distributed Controllers
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

## CPU 1515SP PC (F)

■ **Technical specifications** (continued)

| Article number | 6ES7677-2AA31-0EB0 | 6ES7677-2AA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC 4GB | CPU 1515SP PC 4GB |
| **Interface types** | | |
| • Number of ports | 2 | 2 |
| • integrated switch | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; Via BusAdapter BA 2x RJ45 | Yes; Via BusAdapter BA 2x RJ45 |
|   - Transmission rate, max. | 100 Mbit/s | 100 Mbit/s |
|   - Industrial Ethernet status LED | Yes | Yes |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC |
| **Functionality** | | |
| • Number of connections via this interface | 88 | 88 |
| • PROFINET IO Controller | Yes | Yes |
| • PROFINET IO Device | Yes | Yes |
| • SIMATIC communication | Yes | Yes |
| • Open IE communication | Yes | Yes |
| • Web server | Yes | Yes |
| **PROFINET IO Controller** | | |
| **Services** | | |
|   - Isochronous mode | Yes | Yes |
|   - shortest clock pulse | 500 µs | 500 µs |
|   - IRT | Yes | Yes |
|   - MRP | Yes | Yes |
|   - MRPD | Yes | Yes |
|   - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
|   - Number of connectable IO Devices, max. | 128 | 128 |
|   - Of which IO devices with IRT, max. | 64 | 64 |
|   - of which in line, max. | 64 | 64 |
|   - Number of connectable IO Devices for RT, max. | 128 | 128 |
|   - of which in line, max. | 128 | 128 |
|   - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8 | 8 |
|   - IO Devices changing during operation (partner ports), supported | Yes | Yes |
|   - Number of IO Devices per tool, max. | 8 | 8 |
|   - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | |
|   - for send cycle of 500 µs | 500 µs to 8 ms | 500 µs to 8 ms |
|   - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms |
|   - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms |
|   - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms |
|   - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | |
|   - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms |
|   - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms |
|   - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms |
|   - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | |
| **Services** | | |
|   - Isochronous mode | No | No |
|   - IRT | Yes | Yes |
|   - MRP | Yes | Yes |
|   - MRPD | Yes | Yes |
|   - Prioritized startup | Yes | Yes |
|   - Shared device | Yes | Yes |
|   - Number of IO Controllers with shared device, max. | 4 | 4 |

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**Distributed Controllers**
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

**CPU 1515SP PC (F)**

■ **Technical specifications** (continued)

| Article number | 6ES7677-2AA31-0EB0 | 6ES7677-2AA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC 4GB | CPU 1515SP PC 4GB |
| **2. Interface** | | |
| Interface type | Integrated Ethernet interface | Integrated Ethernet interface |
| automatic detection of transmission rate | Yes | Yes |
| Autonegotiation | Yes | Yes |
| Autocrossing | Yes | Yes |
| **Interface types** | | |
| • Number of ports | 1 | 1 |
| • RJ 45 (Ethernet) | Yes; Integrated | Yes; Integrated |
|   - Transmission rate, max. | 1 000 Mbit/s | 1 000 Mbit/s |
|   - Industrial Ethernet status LED | No | No |
| **3. Interface** | | |
| Interface type | PROFIBUS with CM DP | PROFIBUS with CM DP |
| **Interface types** | | |
| • RS 485 | Yes | Yes |
| **Functionality** | | |
| • Number of connections via this interface | 44 | 44 |
| • PROFIBUS DP master | Yes | Yes |
| • PROFIBUS DP slave | Yes | Yes |
| • SIMATIC communication | Yes | Yes |
| **DP master** | | |
| **Services** | | |
|   - Equidistance | No | No |
|   - Isochronous mode | No | No |
|   - Number of connectable DP slaves, max. | 125 | 125 |
| **DP slave** | | |
| **Services** | | |
|   - Equidistance | No | No |
|   - Isochronous mode | No | No |
| **Protocols** | | |
| **Number of connections** | | |
| • Number of connections, max. | 88 | 88 |
| **Supported technology objects** | | |
| Motion Control | Yes | Yes |
| • Number of available Motion Control resources for technology objects (except cam disks) | 2 400 | |
| • Required Motion Control resources | | |
|   - per speed-controlled axis | 40; per axis | 40; per axis |
|   - per positioning axis | 80; per axis | 80; per axis |
|   - per synchronous axis | 160; per axis | 160; per axis |
|   - per external encoder | 80; per external encoder | 80; per external encoder |
|   - per output cam | 20; per cam | 20; per cam |
|   - per cam track | 160; per cam track | 160; per cam track |
|   - per probe | 40; per probe | 40; per probe |
| Controller | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | |
| • High-speed counter | Yes | Yes |

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# Distributed Controllers
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

## CPU 1515SP PC (F)

### ■ Technical specifications (continued)

| Article number | **6ES7677-2AA31-0EB0** | **6ES7677-2AA41-0FB0** |
|---|---|---|
| | CPU 1515SP PC 4GB | CPU 1515SP PC 4GB |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | 0 °C |
| • max. | Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load | Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load |
| • horizontal installation, min. | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C |
| • vertical installation, max. | 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load | 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load |
| **Configuration** | | |
| **Programming** | | |
| **Programming language** | | |
| - LAD | Yes | Yes |
| - FBD | Yes | Yes |
| - STL | Yes | Yes |
| - SCL | Yes | Yes |
| - CFC | No | No |
| - GRAPH | Yes | Yes |
| **Know-how protection** | | |
| • User program protection/password protection | Yes | Yes |
| • Copy protection | Yes | Yes |
| • Block protection | Yes | Yes |
| **Access protection** | | |
| • Protection level: Write protection | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes |
| **Open Development interfaces** | | |
| • Size of ODK SO file, max. | 3.8 Mbyte | 3.8 Mbyte |
| **Peripherals/Options** | | |
| Peripherals | | |
| • SD card | Optionally for additional mass storage | Optionally for additional mass storage |
| **Dimensions** | | |
| Width | 160 mm | 160 mm |
| Height | 117 mm | 117 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 0.83 kg | 0.83 kg |

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**Distributed Controllers**
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

CPU 1515SP PC (F)

■ **Technical specifications** (continued)

| Article number | 6ES7677-2FA31-0EB0 | 6ES7677-2FA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC F | CPU 1515SP PC F |
| **General information** | | |
| Product type designation | CPU 1515SP PC F | CPU 1515SP PC F |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 | V14 |
| **PC configuration** | | |
| Processor | Dual-Core 1 GHz, AMD G Series APU T40E | Dual-Core 1 GHz, AMD G Series APU T40E |
| Main memory | 4 GB RAM | 4 GB RAM |
| Flash Disk | 8 GB | 16 GB |
| Operating systems | Windows Embedded Standard 7 E 32-bit | Windows Embedded Standard 7 P 64-bit |
| **Installed software** | | |
| • Visualization | No | No |
| • Control | S7-1500 Software Controller CPU 1505SP F V2.0 | S7-1500 Software Controller CPU 1505SP F V2.0 |
| **Supply voltage** | | |
| Type of supply voltage | 24 V DC | 24 V DC |
| **Power loss** | | |
| Power loss, typ. | 15 W; without ET 200SP modules and without using USB | 15 W; without ET 200SP modules and without using USB |
| **Memory** | | |
| Type of memory | DDR3-SDRAM | DDR3-SDRAM |
| CFast memory card | Yes; 8 GB flash memory | Yes; 16 GB flash memory |
| **Work memory** | | |
| • integrated (for program) | 1.5 Mbyte | 1.5 Mbyte |
| • integrated (for data) | 5 Mbyte | 5 Mbyte |
| • Integrated (for ODK application) | 10 Mbyte | 10 Mbyte |
| **Load memory** | | |
| • integrated (on PC mass storage) | 320 Mbyte | 320 Mbyte |
| **CPU processing times** | | |
| for bit operations, typ. | 10 ns | 10 ns |
| for word operations, typ. | 12 ns | 12 ns |
| for fixed point arithmetic, typ. | 16 ns | 16 ns |
| for floating point arithmetic, typ. | 64 ns | 64 ns |
| **CPU-blocks** | | |
| Number of elements (total) | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| **DB** | | |
| • Number, max. | 5 999; Number range: 1 to 65535 | 5 999; Number range: 1 to 65535 |
| • Size, max. | 5 Mbyte | 5 Mbyte |
| **FB** | | |
| • Number, max. | 5 998; Number range: 1 to 65535 | 5 998; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte | 512 kbyte |
| **FC** | | |
| • Number, max. | 5 999; Number range: 1 to 65535 | 5 999; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte | 512 kbyte |
| **OB** | | |
| • Size, max. | 512 kbyte | 512 kbyte |
| **Nesting depth** | | |
| • per priority class | 24; Up to 8 possible for F-blocks | 24; Up to 8 possible for F-blocks |
| **Counters, timers and their retentivity** | | |
| **S7 counter** | | |
| • Number | 2 048 | 2 048 |
| **IEC counter** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |
| **S7 times** | | |
| • Number | 2 048 | 2 048 |
| **IEC timer** | | |
| • Number | Any (only limited by the main memory) | Any (only limited by the main memory) |

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# Distributed Controllers
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

**CPU 1515SP PC (F)**

■ **Technical specifications** (continued)

| Article number | 6ES7677-2FA31-0EB0 | 6ES7677-2FA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC F | CPU 1515SP PC F |
| **Data areas and their retentivity** | | |
| **Flag** | | |
| • Number, max. | 16 kbyte | 16 kbyte |
| **Address area** | | |
| **I/O address area** | | |
| • Inputs | 32 kbyte; All inputs are in the process image | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image | 32 kbyte; All outputs are in the process image |
| **Hardware configuration** | | |
| Integrated power supply | Yes | Yes |
| **Time of day** | | |
| **Clock** | | |
| • Type | Hardware clock | Hardware clock |
| • Hardware clock (real-time) | Yes; Resolution: 1 s | Yes; Resolution: 1 s |
| **Interfaces** | | |
| Number of industrial Ethernet interfaces | 2 | 2 |
| Number of PROFINET interfaces | 1 | 1 |
| Number of PROFIBUS interfaces | 1 | 1 |
| Number of RS 485 interfaces | 1; Via CM DP module | 1; Via CM DP module |
| Number of USB interfaces | 3; 3x USB 2.0 on the front, 500 mA each – of which 2x 500 mA and 1x 100 mA simultaneously | 3; 3x USB 2.0 on the front, 500 mA each – of which 2x 500 mA and 1x 100 mA simultaneously |
| Number of SD card slots | 1 | 1 |
| **Video interfaces** | | |
| • Graphics interface | 1x DVI-I | 1x DVI-I |
| **1. Interface** | | |
| Interface type | PROFINET | PROFINET |
| automatic detection of transmission rate | Yes | Yes |
| Autonegotiation | Yes | Yes |
| Autocrossing | Yes | Yes |
| **Interface types** | | |
| • Number of ports | 2 | 2 |
| • integrated switch | Yes | Yes |
| • RJ 45 (Ethernet) | Yes; Via BusAdapter BA 2x RJ45 | Yes; Via BusAdapter BA 2x RJ45 |
| - Transmission rate, max. | 100 Mbit/s | 100 Mbit/s |
| - Industrial Ethernet status LED | Yes | Yes |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC |
| **Functionality** | | |
| • Number of connections via this interface | 88 | 88 |
| • PROFINET IO Controller | Yes | Yes |
| • PROFINET IO Device | Yes | Yes |
| • SIMATIC communication | Yes | Yes |
| • Open IE communication | Yes | Yes |
| • Web server | Yes | Yes |

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**Distributed Controllers**
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

**CPU 1515SP PC (F)**

■ **Technical specifications** (continued)

| Article number | 6ES7677-2FA31-0EB0 | 6ES7677-2FA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC F | CPU 1515SP PC F |
| **PROFINET IO Controller** | | |
| **Services** | | |
| - Isochronous mode | Yes | Yes |
| - shortest clock pulse | 500 µs | 500 µs |
| - IRT | Yes | Yes |
| - MRP | Yes | Yes |
| - MRPD | Yes | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 128 | 128 |
| - Of which IO devices with IRT, max. | 64 | 64 |
| - of which in line, max. | 64 | 64 |
| - Number of connectable IO Devices for RT, max. | 128 | 128 |
| - of which in line, max. | 128 | 128 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8 | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes | Yes |
| - Number of IO Devices per tool, max. | 8 | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | | |
| - for send cycle of 500 µs | 500 µs to 8 ms | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | | |
| - for send cycle of 500 µs | 500 µs to 256 ms | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms | 4 ms to 512 ms |
| **PROFINET IO Device** | | |
| **Services** | | |
| - Isochronous mode | No | No |
| - IRT | Yes | Yes |
| - MRP | Yes | Yes |
| - MRPD | Yes | Yes |
| - Prioritized startup | Yes | Yes |
| - Shared device | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 4 | 4 |
| **2. Interface** | | |
| Interface type | Integrated Ethernet interface | Integrated Ethernet interface |
| automatic detection of transmission rate | Yes | Yes |
| Autonegotiation | Yes | Yes |
| Autocrossing | Yes | Yes |
| **Interface types** | | |
| • Number of ports | 1 | 1 |
| • RJ 45 (Ethernet) | Yes; Integrated | Yes; Integrated |
| - Transmission rate, max. | 1 000 Mbit/s | 1 000 Mbit/s |
| - Industrial Ethernet status LED | No | No |

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# Distributed Controllers
## based on ET 200SP
## ET 200SP Open Controllers standard and fail-safe

**CPU 1515SP PC (F)**

■ **Technical specifications** (continued)

| Article number | 6ES7677-2FA31-0EB0 | 6ES7677-2FA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC F | CPU 1515SP PC F |
| **3. Interface** | | |
| Interface type | PROFIBUS with CM DP | PROFIBUS with CM DP |
| **Interface types** | | |
| • RS 485 | Yes | Yes |
| **Functionality** | | |
| • Number of connections via this interface | 44 | 44 |
| • PROFIBUS DP master | Yes | Yes |
| • PROFIBUS DP slave | Yes | Yes |
| • SIMATIC communication | Yes | Yes |
| **DP master** | | |
| **Services** | | |
| - Equidistance | No | No |
| - Isochronous mode | No | No |
| - Number of connectable DP slaves, max. | 125 | 125 |
| **DP slave** | | |
| **Services** | | |
| - Equidistance | No | No |
| - Isochronous mode | No | No |
| **Protocols** | | |
| **Number of connections** | | |
| • Number of connections, max. | 88 | 88 |
| **Supported technology objects** | | |
| Motion Control | Yes | Yes |
| • Number of available Motion Control resources for technology objects (except cam disks) | 2 400 | 2 400 |
| • Required Motion Control resources | | |
| - per speed-controlled axis | 40; per axis | 40; per axis |
| - per positioning axis | 80; per axis | 80; per axis |
| - per synchronous axis | 160; per axis | 160; per axis |
| - per external encoder | 80; per external encoder | 80; per external encoder |
| - per output cam | 20; per cam | 20; per cam |
| - per cam track | 160; per cam track | 160; per cam track |
| - per probe | 40; per probe | 40; per probe |
| Controller | | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | | |
| • High-speed counter | Yes | Yes |
| **Standards, approvals, certificates** | | |
| **Highest safety class achievable in safety mode** | | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h | < 1.00E-09 1/h |

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# Distributed Controllers
## based on ET 200SP
### ET 200SP Open Controllers standard and fail-safe

**CPU 1515SP PC (F)**

## Technical specifications (continued)

| Article number | 6ES7677-2FA31-0EB0 | 6ES7677-2FA41-0FB0 |
|---|---|---|
| | CPU 1515SP PC F | CPU 1515SP PC F |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | 0 °C |
| • max. | Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load | Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load |
| • horizontal installation, min. | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C |
| • vertical installation, max. | 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load | 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load |
| **Configuration** | | |
| **Programming** | | |
| **Programming language** | | |
| - LAD | Yes; incl. failsafe | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe | Yes; incl. failsafe |
| - STL | Yes | Yes |
| - SCL | Yes | Yes |
| - CFC | No | No |
| - GRAPH | Yes | Yes |
| **Know-how protection** | | |
| • User program protection/password protection | Yes | Yes |
| • Copy protection | Yes | Yes |
| • Block protection | Yes | Yes |
| **Access protection** | | |
| • Protection level: Write protection | Yes | Yes |
| • Protection level: Read/write protection | Yes | Yes |
| • Protection level: Complete protection | Yes | Yes |
| **Open Development interfaces** | | |
| • Size of ODK SO file, max. | 3.8 Mbyte | 3.8 Mbyte |
| **Peripherals/Options** | | |
| Peripherals | | |
| • SD card | Optionally for additional mass storage | Optionally for additional mass storage |
| **Dimensions** | | |
| Width | 160 mm | 160 mm |
| Height | 117 mm | 117 mm |
| Depth | 75 mm | 75 mm |
| **Weights** | | |
| Weight, approx. | 0.83 kg | 0.83 kg |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC ET 200SP Open Controller CPU 1515SP PC (F) (+ HMI)** | | **Windows embedded Standard 7 P 64-bit (Multitouch), 16 GB CFast card** | |
| ET 200SP CPU with Windows Embedded Standard 7 and pre-installed SIMATIC S7-1500 Software Controller (optionally with WinCC RT Advanced) | | • CPU 1515SP PC (4 GB RAM) | **6ES7677-2AA41-0FB0** |
| | | • CPU 1515SP PC + HMI 128PT (4 GB RAM) | **6ES7677-2AA41-0FK0** |
| Type of delivery: English, German, Chinese, Italian, French, Spanish | | • CPU 1515SP PC + HMI 512PT (4 GB RAM) | **6ES7677-2AA41-0FL0** |
| | | • CPU 1515SP PC + HMI 2048PT (4 GB RAM) | **6ES7677-2AA41-0FM0** |
| | | • CPU 1515SP PC F (4 GB RAM) | **6ES7677-2FA41-0FB0** |
| **Windows embedded Standard 7 E 32-bit, 8 GB CFast card** | | • CPU 1515SP PC F + HMI 128PT (4 GB RAM) | **6ES7677-2FA41-0FK0** |
| • CPU 1515SP PC (4 GB RAM) | **6ES7677-2AA31-0EB0** | • CPU 1515SP PC F + HMI 512PT (4 GB RAM) | **6ES7677-2FA41-0FL0** |
| • CPU 1515SP PC F (4 GB RAM) | **6ES7677-2FA31-0EB0** | • CPU 1515SP PC F + HMI 2048PT (4 GB RAM) | **6ES7677-2FA41-0FM0** |

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# Distributed Controllers
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

## CPU 1515SP PC (F)

| Ordering data | Article No. |
|---|---|
| **Accessories** | |
| **Upgrade from SIMATIC S7-1500 Software Controller CPU 1505SP to SIMATIC Open Controller** | 6ES7672-5DC01-0YK0 |
| From V 1.x to V 2.0; software download incl. documentation and license key. | |
| Email address required for delivery | |
| **BusAdapter BA 2xRJ45** | 6ES7193-6AR00-0AA0 |
| **BusAdapter BA 2xFC** | 6ES7193-6AF00-0AA0 |
| **BusAdapter BA 2xSCRJ** | 6ES7193-6AP00-0AA0 |
| **BusAdapter BA SCRJ/RJ45** | 6ES7193-6AP20-0AA0 |
| **BusAdapter BA SCRJ/FC** | 6ES7193-6AP40-0AA0 |
| for increased vibration and EMC loads | |
| **CM DP for ET 200SP CPU** | 6ES7545-5DA00-0AB0 |
| PROFIBUS DP master with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbit/s | |
| **Server module** | 6ES7193-6PA00-0AA0 |
| Spare parts | |
| **Power supply connector** | 6ES7193-4JB00-0AA0 |
| Spare part; for connecting the 24 V DC supply voltage; with push-in terminals (10 units) | |
| **Reference identification label** | 6ES7193-6LF30-0AW0 |
| 10 sheets of 16 labels | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| **STEP 7 Professional V14 SP1** | |
| Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] | 6ES7822-1AE04-0YA5 |
| Email address required for delivery | |

| Ordering data | Article No. |
|---|---|
| **STEP 7 Safety Advanced V14** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| Floating license for 1 user, software, documentation and license key for download [1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| **SIMATIC ODK 1500S** | |
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; supplied on DVD | 6ES7806-2CD02-0YA0 |
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; software download including license key [1] | 6ES7806-2CD02-0YG0 |
| Email address required for delivery | |
| **SIMATIC WinCC Advanced V14** | |
| Engineering software for the configuration and simulation of SIMATIC Panels; SIMATIC WinCC Runtime Advanced electronic documentation in English, German, French, Italian, Spanish, Chinese | |
| • Software and documentation on DVD, floating license, license key on USB flash drive | 6AV2102-0AA04-0AA5 |
| • As download [1], software and license key download, floating license, email address required for the delivery | 6AV2102-0AA04-0AH5 |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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**Distributed Controllers**
based on ET 200SP
ET 200SP Open Controllers standard and fail-safe

ODK 1500S

## ◼ Overview

- For developing dynamically loadable function libraries for S7-1500 Software Controller and S7-1500 CPU 1518 ODK:
  - Implementation of function libraries by means of high-level programming with C/C++.
  - Execution of the library functions under Windows or in the real-time context of the software controllers.
  - Calling the functions directly from the PLC program.
- Development environment for real-time library functions included in the scope of delivery
- Development of Windows library functions with MS Visual Studio.
- Automatic creation of function blocks for calling the library functions.
- Simple integration of the function blocks into STEP 7 by importing.
- Simple use of the library functions in the controller without specific high-level language know-how.

## ◼ Ordering data | Article No.

**SIMATIC ODK 1500S**

| | |
|---|---|
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; supplied on DVD | **6ES7806-2CD02-0YA0** |
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; software download including license key [1] | **6ES7806-2CD02-0YG0** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# Distributed Controllers
based on ET 200Pro
Standard CPUs

## IM 154-8 PN/DP CPU

## ■ Overview



- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Interface module for exchanging pre-processed I/O data between the ET 200pro and a higher-level master/IO controller via PROFIBUS DP/PROFINET IO
- PROFINET IO controller to operate distributed I/Os on PROFINET
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET interface with 3-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integrated web server with the option of creating user-defined web pages
- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Fail-safe IM 154-8F PN/DP CPU PROFIsafe available

Note

SIMATIC Micro Memory Card required for operation of CPU.

## ■ Technical specifications

| Article number | **6ES7154-8AB01-0AB0** |
|---|---|
| | ET200PRO: IM 154-8 PN/DP CPU, 384KB |
| **General information** | |
| **Engineering with** | |
| • Programming package | STEP 7 V5.5 or higher |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| **Power loss** | |
| Power loss, typ. | 8.5 W |
| **Memory** | |
| **Work memory** | |
| • integrated | 384 kbyte |
| **Load memory** | |
| • Plug-in (MMC), max. | 8 Mbyte |
| **CPU processing times** | |
| for bit operations, typ. | 0.05 µs |
| for word operations, typ. | 0.09 µs |
| for fixed point arithmetic, typ. | 0.12 µs |
| for floating point arithmetic, typ. | 0.45 µs |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 256 |
| **IEC counter** | |
| • present | Yes |
| **S7 times** | |
| • Number | 256 |
| **IEC timer** | |
| • present | Yes |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 2 048 byte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 2 048 byte |
| • Outputs | 2 048 byte |
| **Process image** | |
| • Inputs, adjustable | 2 048 byte |
| • Outputs, adjustable | 2 048 byte |
| **Time of day** | |
| **Clock** | |
| • Hardware clock (real-time) | Yes |
| **Operating hours counter** | |
| • Number | 1 |
| **1. Interface** | |
| Interface type | Integrated RS 485 interface |
| Physics | RS 485/connection: 2 x M12 b-coded |
| **Functionality** | |
| • MPI | Yes |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • Point-to-point connection | No |
| **DP master** | |
| • Number of DP slaves, max. | 124 |

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## ■ Technical specifications (continued)

| Article number | 6ES7154-8AB01-0AB0 |
|---|---|
| | ET200PRO: IM 154-8 PN/DP CPU, 384KB |
| **2. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet (2 x M12 d-coded; 1 x RJ45) |
| **Interface types** | |
| • Number of ports | 3 |
| **Functionality** | |
| • MPI | No |
| • PROFINET IO Controller | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | Yes |
| • PROFIBUS DP master | No |
| • PROFIBUS DP slave | No |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Via PROFIBUS DP or PROFINET interface |
| **Communication functions** | |
| PG/OP communication | Yes |
| **Global data communication** | |
| • supported | Yes |
| **S7 basic communication** | |
| • supported | Yes |
| **S7 communication** | |
| • supported | Yes |
| **Open IE communication** | |
| • TCP/IP | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | 8 |
| • ISO-on-TCP (RFC1006) | Yes |
| - Number of connections, max. | 8 |
| • UDP | Yes |
| - Number of connections, max. | 8 |
| **Web server** | |
| • supported | Yes |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - CFC | Yes |
| - GRAPH | Yes |
| - HiGraph® | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Block encryption | Yes; With S7 block Privacy |
| **Dimensions** | |
| Width | 135 mm |
| Height | 130 mm |
| Depth | 65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket |
| **Weights** | |
| Weight, approx. | 720 g |

## ■ Ordering data / Article No.

| | Article No. |
|---|---|
| **IM 154-8 PN/DP CPU interface module, V3.2** | **6ES7154-8AB01-0AB0** |
| PROFINET IO controller for operating distributed I/Os on PROFINET, with integrated PLC functionality. | |
| **Accessories** | |
| **MMC 64 KB** [1] | **6ES7953-8LF31-0AA0** |
| For program backup. | |
| **MMC 128 KB** [1] | **6ES7953-8LG31-0AA0** |
| For program backup. | |
| **MMC 512 KB** [1] | **6ES7953-8LJ31-0AA0** |
| For program backup. | |
| **MMC 2 MB** [1] | **6ES7953-8LL31-0AA0** |
| For program backup and/or firmware updates. | |
| **MMC 4 MB** [1] | **6ES7953-8LM31-0AA0** |
| For program backup. | |
| **MMC 8 MB** [1] | **6ES7953-8LP31-0AA0** |
| For program backup. | |
| **Connection module** | **6ES7194-4AN00-0AA0** |
| For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", for connecting PROFINET and PROFIBUS DP. | |
| **SCALANCE X-200 Industrial Ethernet switches** | **6GK5208-0HA10-2AA6** |
| With integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps. | |
| **Industrial Ethernet FC RJ45 Plug 180** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | |
| • 1 unit | 6GK1901-1BB10-2AA0 |
| • 10 units | 6GK1901-1BB10-2AB0 |
| • 50 units | 6GK1901-1BB10-2AE0 |
| **Industrial Ethernet Fast Connect installation cables** | |
| • FastConnect Standard Cable | **6XV1840-2AH10** |
| • FastConnect Trailing Cable | **6XV1840-3AH10** |
| • FastConnect Marine Cable | **6XV1840-4AH10** |
| **Industrial Ethernet FastConnect installation cables** | |
| • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2D** |
| • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2F** |
| **Industrial Ethernet Fast Connect** | |
| Stripping Tool | **6GK1901-1GA00** |

[1] An MMC is essential for operating the CPU

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# Distributed Controllers
based on ET 200Pro
Standard CPUs

## IM 154-8 PN/DP CPU

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **IE connecting cable M12-180/M12-180** | | **7/8" connecting cable to power supply** | |
| • Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths: | | 5-wire, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths: | |
| - 0.3 m | 6XV1870-8AE30 | - 1.5 m | 6XV1822-5BH15 |
| - 0.5 m | 6XV1870-8AE50 | - 2.0 m | 6XV1822-5BH20 |
| - 1.0 m | 6XV1870-8AH10 | - 3.0 m | 6XV1822-5BH30 |
| - 1.5 m | 6XV1870-8AH15 | - 5.0 m | 6XV1822-5BH50 |
| - 2.0 m | 6XV1870-8AH20 | - 10 m | 6XV1822-5BN10 |
| - 3.0 m | 6XV1870-8AH30 | - 15 m | 6XV1822-5BN15 |
| - 5.0 m | 6XV1870-8AH50 | - Other special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 |
| - 10 m | 6XV1870-8AN10 | | |
| - 15 m | 6XV1870-8AN15 | | |
| • PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert), in various lengths: | | • Power cable, can be trailed, 5 x 1.5 mm², preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end), in various lengths: | |
| - 3.0 m | 3RK1902-2NB30 | - 3.0 m | 3RK1902-3NB30 |
| - 5.0 m | 3RK1902-2NB50 | - 5.0 m | 3RK1902-3NB50 |
| - 10 m | 3RK1902-2NC10 | - 10 m | 3RK1902-3NC10 |
| • PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end open), in various lengths: | | • Power cable, can be trailed, 5 x 1.5 mm², preassembled at one end with 7/8" angled connector with female insert (female insert at one end, other end open), in various lengths: | |
| - 3.0 m | 3RK1902-2HB30 | - 3.0 m | 3RK1902-3GB30 |
| - 5.0 m | 3RK1902-2HB50 | - 5.0 m | 3RK1902-3GB50 |
| - 10 m | 3RK1902-2HC10 | - 10 m | 3RK1902-3GC10 |
| **IE FC M12 Plug PRO** | | **Power line** | 6XV1830-8AH10 |
| PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet. | | 5-wire, 5 x 1.5 mm², trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | |
| • 1 unit | 6GK1901-0DB20-6AA0 | | |
| • 8 units | 6GK1901-0DB20-6AA8 | **7/8" cable connector** | |
| • PROFINET M12 plug connector, D-coded, angled. | 3RK1902-2DA00 | For ET 200eco, with axial cable outlet | |
| **IE panel feed-through** | | • with male insert, 5-pack | 6GK1905-0FA00 |
| Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units. | 6GK1901-0DM20-2AA5 | • with female insert, 5-pack | 6GK1905-0FB00 |
| | | • angled, with female insert, 1 unit | 3RK1902-3DA00 |
| | | • angled, with male insert, 1 unit | 3RK1902-3BA00 |
| | | 7/8" cover cap, 10 per pack | 6ES7194-3JA00-0AA0 |

■ **Ordering data**

| | Article No. |
|---|---|
| **Twisted Pair cables 4x2 with RJ45 connectors** | |
| 0.5 m | 6XV1870-3QE50 |
| 1 m | 6XV1870-3QH10 |
| 2 m | 6XV1870-3QH20 |
| 6 m | 6XV1870-3QH60 |
| 10 m | 6XV1870-3QN10 |
| **Crossed Twisted Pair cables 4x2 with RJ45 connectors** | |
| 0.5 m | 6XV1870-3RE50 |
| 1 m | 6XV1870-3RH10 |
| 2 m | 6XV1870-3RH20 |
| 6 m | 6XV1870-3RH60 |
| 10 m | 6XV1870-3RN10 |
| **M12 sealing cap** | 3RX9802-0AA00 |
| For protection of unused M12 connections with ET 200pro | |
| **M12 sealing caps with female thread** | 6ES7194-4JD60-0AA0 |
| 5 units | |
| **PROFIBUS M12 connecting cable** | |
| Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m, in various lengths: | |
| 1.5 m | 6XV1830-3DH15 |
| 2.0 m | 6XV1830-3DH20 |
| 3.0 m | 6XV1830-3DH30 |
| 5.0 m | 6XV1830-3DH50 |
| 10 m | 6XV1830-3DN10 |
| 15 m | 6XV1830-3DN15 |
| Other special lengths with 90° or 180° cable outlet | See http://support.automation.siemens.com/WW/view/en/26999294 |

| | Article No. |
|---|---|
| **M12 bus termination connector for PROFIBUS, female insert** | 6GK1905-0ED00 |
| **M12 bus termination connector for PROFIBUS, male insert** | 6GK1905-0EC00 |
| **M12 plug connector, axial outlet, with male insert** | 6GK1905-0EA00 |
| **PROFIBUS FC Standard Cable GP** Standard type with special design for fast mounting, 2-wire, shielded. Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | 6XV1830-0EH10 |
| **PROFIBUS FC Trailing Cable** 2-wire, shielded. | 6XV1830-3EH10 |
| **PROFIBUS FC Food Cable** 2-wire, shielded. Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | 6XV1830-0GH10 |
| **PROFIBUS FC Robust Cable** 2-wire, shielded Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | 6XV1830-0JH10 |
| **PROFIBUS M12 cable connector** 5-pole, B-coded, metal casing, 1 pack = 5 units. • Female insert | 6GK1905-0EB00 |

# Distributed Controllers
based on ET 200Pro
Standard CPUs

## CPU 1516pro-2 PN

### ■ Overview



- CPU 1516pro-2 PN for SIMATIC ET 200pro based on S7-1500 CPU 1516-3 PN/DP
- For applications with high requirements on the program scope and processing speed, for distributed setup via PROFINET IO
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO RT/IRT interface with integrated 3-port switch
- Additional PROFINET IO RT interface with separate IP address
- Isochronous mode on PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- OPC UA Data Access Server
- Integrated web server with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operating the CPU

### ■ Technical specifications

| Article number | **6ES7516-2PN00-0AB0** |
|---|---|
| | ET 200pro: CPU 1516PRO-2 PN |
| **General information** | |
| Product type designation | CPU 1516pro-2 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.3 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 1 Mbyte |
| • integrated (for data) | 5 Mbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 10 ns |
| for word operations, typ. | 12 ns |
| for fixed point arithmetic, typ. | 16 ns |
| for floating point arithmetic, typ. | 64 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 256 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 4 096 byte; for central inputs and outputs; depending on configuration |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

■ **Technical specifications** (continued)

| Article number | 6ES7516-2PN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO-2 PN |
| **1. Interface** | |
| **Interface types** | |
| • Number of ports | 3; 2x M12 + 1x RJ45 |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3 |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 |
| - Number of connectable IO Devices for RT, max. | 256 |
| - of which in line, max. | 256 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communi-cation share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | |
| - for send cycle of 250 μs | 250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 μs of the isochronous OB is decisive |
| - for send cycle of 500 μs | 500 μs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs ... 3 875 μs) |
| **Update time for RT** | |
| - for send cycle of 250 μs | 250 μs to 128 ms |
| - for send cycle of 500 μs | 500 μs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms |

| Article number | 6ES7516-2PN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO-2 PN |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| **Interface types** | |
| • Number of ports | 1; 1x M12 |
| • integrated switch | No |
| • RJ 45 (Ethernet) | No |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | No |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - MRP | No |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Number of connectable IO Devices, max. | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | 32 |
| - of which in line, max. | 32 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communi-cation share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | |
| - for send cycle of 1 ms | 1 ms to 512 ms |

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# Distributed Controllers
based on ET 200Pro
Standard CPUs

## CPU 1516pro-2 PN

■ **Technical specifications** (continued)

| Article number | 6ES7516-2PN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO-2 PN |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - MRP | No |
| - MRPD | No |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 128; Via integrated interfaces of the CPU |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Via X1, with minimum OB 6x cycle of 500 µs |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 2 400 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 40 |
| - per positioning axis | 80 |
| - per synchronous axis | 160 |
| - per external encoder | 80 |
| - per output cam | 20 |
| - per cam track | 160 |
| - per probe | 40 |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

| Article number | 6ES7516-2PN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO-2 PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 55 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 55 °C |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - GRAPH | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** | |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| **Dimensions** | |
| Width | 135 mm |
| Height | 130 mm |
| Depth | 65 mm |
| **Weights** | |
| Weight, approx. | 614 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CPU 1516pro-2 PN** | **6ES7516-2PN00-0AB0** | **IE Connecting Cable M12-180/M12-180** | |
| Work memory 1 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | | • Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths: | |
| **Accessories** | | • 0.3 m | **6XV1870-8AE30** |
| **SIMATIC Memory Card** | | • 0.5 m | **6XV1870-8AE50** |
| 4 MB[1] | **6ES7954-8LC02-0AA0** | • 1.0 m | **6XV1870-8AH10** |
| 12 MB[1] | **6ES7954-8LE02-0AA0** | • 1.5 m | **6XV1870-8AH15** |
| 24 MB[1] | **6ES7954-8LF02-0AA0** | • 2.0 m | **6XV1870-8AH20** |
| 256 MB[1] | **6ES7954-8LL02-0AA0** | • 3.0 m | **6XV1870-8AH30** |
| 2 GB[1] | **6ES7954-8LP02-0AA0** | • 5.0 m | **6XV1870-8AH50** |
| 32 GB[1] | **6ES7954-8LT03-0AA0** | • 10 m | **6XV1870-8AN10** |
| **Connection module** | **6ES7194-4AP00-0AA0** | • 15 m | **6XV1870-8AN15** |
| CM CPU 2PN M12 / 7/8"; with 3 x M12 and 2 x 7/8", for connecting 2 x PROFINET | | • PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert), in various lengths: | |
| **Industrial Ethernet FC RJ45 Plug 180** | | • 3.0 m | **3RK1902-2NB30** |
| | | • 5.0 m | **3RK1902-2NB50** |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | | • 10 m | **3RK1902-2NC10** |
| | | • PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end open), in various lengths: | |
| • 1 unit | **6GK1901-1BB10-2AA0** | • 3.0 m | **3RK1902-2HB30** |
| • 10 units | **6GK1901-1BB10-2AB0** | • 5.0 m | **3RK1902-2HB50** |
| • 50 units | **6GK1901-1BB10-2AE0** | • 10 m | **3RK1902-2HC10** |
| **Industrial Ethernet Fast Connect installation cables** | | **IE FC M12 Plug PRO** | |
| • FastConnect Standard Cable | **6XV1840-2AH10** | PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet. | |
| • FastConnect Trailing Cable | **6XV1840-3AH10** | • 1 unit | **6GK1901-0DB20-6AA0** |
| • FastConnect Marine Cable | **6XV1840-4AH10** | • 8 units | **6GK1901-0DB20-6AA8** |
| **Industrial Ethernet FastConnect installation cables** | | • PROFINET M12 plug connector, D-coded, angled. | **3RK1902-2DA00** |
| • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2D** | **IE panel feedthrough** | |
| • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2F** | Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units. | **6GK1901-0DM20-2AA5** |
| **Industrial Ethernet FastConnect** | | | |
| Stripping Tool | **6GK1901-1GA00** | | |

[1] An MMC is essential for operating the CPU

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# Distributed Controllers
based on ET 200Pro
Standard CPUs

## CPU 1516pro-2 PN

### ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **7/8" connecting cable to power supply** | | | **Twisted Pair cables 4x2 with RJ45 connectors** | |
| 5-wire, 5 x 1.5 mm$^2$, trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths: | | | 0.5 m | **6XV1870-3QE50** |
| | | | 1 m | **6XV1870-3QH10** |
| | | | 2 m | **6XV1870-3QH20** |
| • 1.5 m | **6XV1822-5BH15** | | 6 m | **6XV1870-3QH60** |
| • 2.0 m | **6XV1822-5BH20** | | 10 m | **6XV1870-3QN10** |
| • 3.0 m | **6XV1822-5BH30** | | **Crossed Twisted Pair cables 4x2 with RJ45 connectors** | |
| • 5.0 m | **6XV1822-5BH50** | | | |
| • 10 m | **6XV1822-5BN10** | | 0.5 m | **6XV1870-3RE50** |
| • 15 m | **6XV1822-5BN15** | | 1 m | **6XV1870-3RH10** |
| • Other special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 | | 2 m | **6XV1870-3RH20** |
| | | | 6 m | **6XV1870-3RH60** |
| • Power cable, can be trailed, 5 x 1.5 mm$^2$, preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end), in various lengths: | | | 10 m | **6XV1870-3RN10** |
| | | | **M12 sealing cap** | **3RX9802-0AA00** |
| | | | For protection of unused M12 connections with ET 200pro | |
| • 3.0 m | **3RK1902-3NB30** | | **M12 sealing caps with female thread** | **6ES7194-4JD60-0AA0** |
| • 5.0 m | **3RK1902-3NB50** | | | |
| • 10 m | **3RK1902-3NC10** | | 5 units | |
| • Power cable, can be trailed, 5 x 1.5 mm2, preassembled at one end with 7/8" angled connector with female contact insert (female contact insert at one end, other end open), in various lengths: | | | | |
| • 3.0 m | **3RK1902-3GB30** | | | |
| • 5.0 m | **3RK1902-3GB50** | | | |
| • 10 m | **3RK1902-3GC10** | | | |
| **Power line** | **6XV1830-8AH10** | | | |
| 5-wire, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | | | | |
| **7/8" cable connector** | | | | |
| For ET 200eco, with axial cable outlet | | | | |
| • with male insert, 5-pack | **6GK1905-0FA00** | | | |
| • with female insert, 5-pack | **6GK1905-0FB00** | | | |
| • angled, with female insert, 1 unit | **3RK1902-3DA00** | | | |
| • angled, with male insert, 1 unit | **3RK1902-3BA00** | | | |
| 7/8" cover cap, 10 per pack | **6ES7194-3JA00-0AA0** | | | |

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## Overview



- Interface module for SIMATIC ET 200pro with integrated fail-safe CPU
- CPU with PLC functionality equivalent to CPU S7-315F PN/DP; with distributed intelligence for preprocessing

- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061 and PLe according to ISO 13849.1:2006
- For high-performance control solutions in ET 200pro
- Increase of the availability of systems and machines
- Integral web server with the option of creating user-defined Web sites
- Isochronous mode on PROFIBUS or PROFINET
- PROFINET IO controller for up to 128 IO devices
- PROFINET interface with integrated 3-port switch
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

## Technical specifications

| Article number | 6ES7154-8FB01-0AB0 | 6ES7154-8FX00-0AB0 |
|---|---|---|
| | ET200PRO: IM 154-8F PN/DP CPU, 512KB | ET200PRO: IM 154-8FX PN/DP CPU, 1,5MB |
| **General information** | | |
| **Engineering with** | | |
| • Programming package | STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4 | As of STEP 7 V5.5 with HSP 222 + Distributed Safety V5.4 SP4 |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| **Power loss** | | |
| Power loss, typ. | 8.5 W | 8.5 W |
| **Memory** | | |
| **Work memory** | | |
| • integrated | 512 kbyte | 1 536 kbyte |
| **Load memory** | | |
| • Plug-in (MMC), max. | 8 Mbyte | 8 Mbyte |
| **CPU processing times** | | |
| for bit operations, typ. | 0.05 µs | 0.025 µs |
| for word operations, typ. | 0.09 µs | 0.03 µs |
| for fixed point arithmetic, typ. | 0.12 µs | 0.04 µs |
| for floating point arithmetic, typ. | 0.45 µs | 0.16 µs |
| **Counters, timers and their retentivity** | | |
| **S7 counter** | | |
| • Number | 256 | 256 |
| **IEC counter** | | |
| • present | Yes | Yes |
| **S7 times** | | |
| • Number | 256 | 256 |
| **IEC timer** | | |
| • present | Yes | Yes |
| **Data areas and their retentivity** | | |
| **Flag** | | |
| • Number, max. | 2 048 byte | 2 048 byte |

# Distributed Controllers
based on ET 200Pro
Fail-safe CPUs

## IM 154-8 F PN/DP CPU

■ **Technical specifications** (continued)

| Article number | 6ES7154-8FB01-0AB0 | 6ES7154-8FX00-0AB0 |
|---|---|---|
| | ET200PRO: IM 154-8F PN/DP CPU, 512KB | ET200PRO: IM 154-8FX PN/DP CPU, 1,5MB |
| **Address area** | | |
| **I/O address area** | | |
| • Inputs | 2 048 byte | 2 048 byte |
| • Outputs | 2 048 byte | 2 048 byte |
| **Process image** | | |
| • Inputs, adjustable | 2 048 byte | 2 048 byte |
| • Outputs, adjustable | 2 048 byte | 2 048 byte |
| **Time of day** | | |
| **Clock** | | |
| • Hardware clock (real-time) | Yes | Yes |
| **Operating hours counter** | | |
| • Number | 1 | 1 |
| **1. Interface** | | |
| Interface type | Integrated RS 485 interface | Integrated RS 485 interface |
| Physics | RS 485/connection: 2 x M12 b-coded | RS 485/connection: 2 x M12 b-coded |
| **Functionality** | | |
| • MPI | Yes | Yes |
| • PROFIBUS DP master | Yes | Yes |
| • PROFIBUS DP slave | Yes | Yes |
| • Point-to-point connection | No | No |
| **DP master** | | |
| • Number of DP slaves, max. | 124 | 124 |
| **2. Interface** | | |
| Interface type | PROFINET | PROFINET |
| Physics | Ethernet (2 x M12 d-coded; 1 x RJ45) | Ethernet (2 x M12 d-coded; 1 x RJ45) |
| **Interface types** | | |
| • Number of ports | 3 | 3 |
| **Functionality** | | |
| • MPI | No | No |
| • PROFINET IO Controller | Yes; Also simultaneously with IO-Device functionality | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | Yes | Yes |
| • PROFIBUS DP master | No | No |
| • PROFIBUS DP slave | No | No |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | Yes; Via PROFIBUS DP or PROFINET interface | Yes; Via PROFIBUS DP or PROFINET interface |
| **Communication functions** | | |
| PG/OP communication | Yes | Yes |
| **Global data communication** | | |
| • supported | Yes | Yes |
| **S7 basic communication** | | |
| • supported | Yes | Yes |
| **S7 communication** | | |
| • supported | Yes | Yes |
| **Open IE communication** | | |
| • TCP/IP | Yes; via integrated PROFINET interface and loadable FBs | Yes; via integrated PROFINET interface and loadable FBs |
| - Number of connections, max. | 8 | 8 |
| • ISO-on-TCP (RFC1006) | Yes | Yes |
| - Number of connections, max. | 8 | 8 |
| • UDP | Yes | Yes |
| - Number of connections, max. | 8 | 8 |
| **Web server** | | |
| • supported | Yes | Yes |

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**Technical specifications** (continued)

| Article number | 6ES7154-8FB01-0AB0 | 6ES7154-8FX00-0AB0 |
|---|---|---|
| | ET200PRO: IM 154-8F PN/DP CPU, 512KB | ET200PRO: IM 154-8FX PN/DP CPU, 1,5MB |
| **Configuration** | | |
| **Programming** | | |
| **Programming language** | | |
| - LAD | Yes | Yes |
| - FBD | Yes | Yes |
| - STL | Yes | Yes |
| - SCL | Yes | Yes |
| - CFC | Yes | Yes |
| - GRAPH | Yes | Yes |
| - HiGraph® | Yes | Yes |
| **Know-how protection** | | |
| • User program protection/password protection | Yes | Yes |
| • Block encryption | Yes; With S7 block Privacy | Yes; With S7 block Privacy |
| **Dimensions** | | |
| Width | 135 mm | 135 mm |
| Height | 130 mm | 130 mm |
| Depth | 65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket | 65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket |
| **Weights** | | |
| Weight, approx. | 720 g | 720 g |

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**Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 154-8 F PN/DP CPU interface module, V3.2** | | **STEP 7 Safety Advanced V14** | |

**IM 154-8 F PN/DP CPU interface module, V3.2**

Fail-safe PROFINET IO controller for operating distributed I/Os on PROFINET, with integrated PLC functionality.

| • 512 KB work memory | **6ES7154-8FB01-0AB0** |
|---|---|
| • 1.5 MB work memory | **6ES7154-8FX00-0AB0** |

**Distributed Safety V5.4 programming tool**

Task:
Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco
Requirement:
STEP 7 V5.3 SP3 and higher

| Floating license | **6ES7833-1FC02-0YA5** |
|---|---|
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery. | **6ES7833-1FC02-0YH5** |

**Distributed Safety Upgrade**

| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |
|---|---|

**STEP 7 Safety Advanced V14**

Task:
Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O
Requirement:
STEP 7 Professional V14

| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | **6ES7833-1FA14-0YA5** |
|---|---|
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | **6ES7833-1FA14-0YH5** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# Distributed Controllers
based on ET 200Pro
Fail-safe CPUs

## IM 154-8 F PN/DP CPU

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | **Industrial Ethernet FastConnect installation cables** | |
| **SIMATIC Micro Memory Cards** | | • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | 6XV1870-2D |
| **MMC 64 KB** [2] | 6ES7953-8LF31-0AA0 | | |
| For program backup. | | | |
| **MMC 128 KB** [2] | 6ES7953-8LG31-0AA0 | • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | 6XV1870-2F |
| For program backup. | | | |
| **MMC 512 KB** [2] | 6ES7953-8LJ31-0AA0 | **Industrial Ethernet FastConnect** | |
| For program backup. | | Stripping Tool | 6GK1901-1GA00 |
| **MMC 2 MB** [2] | 6ES7953-8LL31-0AA0 | **IE Connecting Cable M12-180/M12-180** | |
| For program backup and/or firmware updates. | | • Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths: | |
| **MMC 4 MB** [2] | 6ES7953-8LM31-0AA0 | - 0.3 m | 6XV1870-8AE30 |
| For program backup. | | - 0.5 m | 6XV1870-8AE50 |
| **MMC 8 MB** [2] | 6ES7953-8LP31-0AA0 | - 1.0 m | 6XV1870-8AH10 |
| For program backup. | | - 1.5 m | 6XV1870-8AH15 |
| **Connection module** | 6ES7194-4AN00-0AA0 | - 2.0 m | 6XV1870-8AH20 |
| For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", for connecting PROFINET and PROFIBUS DP. | | - 3.0 m | 6XV1870-8AH30 |
| | | - 5.0 m | 6XV1870-8AH50 |
| | | - 10 m | 6XV1870-8AN10 |
| | | - 15 m | 6XV1870-8AN15 |
| **SCALANCE X-200 Industrial Ethernet switches** | 6GK5208-0HA10-2AA6 | • PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male contact insert), in various lengths: | |
| With integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps. | | - 3.0 m | 3RK1902-2NB30 |
| | | - 5.0 m | 3RK1902-2NB50 |
| | | - 10 m | 3RK1902-2NC10 |
| | | • PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male contact insert at one end, other end open), in various lengths: | |
| **Industrial Ethernet FC RJ45 Plug 90** | | - 3.0 m | 3RK1902-2HB30 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet. | | - 5.0 m | 3RK1902-2HB50 |
| | | - 10 m | 3RK1902-2HC10 |
| • 1 unit | 6GK1901-1BB20-2AA0 | **IE FC M12 Plug PRO** | |
| • 10 units | 6GK1901-1BB20-2AB0 | PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet. | |
| **Industrial Ethernet FC RJ45 Plug 180** | | • 1 unit | 6GK1901-0DB20-6AA0 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | | • 8 units | 6GK1901-0DB20-6AA8 |
| | | • PROFINET M12 plug connector, D-coded, angled | 3RK1902-2DA00 |
| • 1 unit | 6GK1901-1BB10-2AA0 | **IE panel feedthrough** | |
| • 10 units | 6GK1901-1BB10-2AB0 | Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units | 6GK1901-0DM20-2AA5 |
| • 50 units | 6GK1901-1BB10-2AE0 | | |
| **Industrial Ethernet FastConnect installation cables** | | | |
| • FastConnect Standard Cable | 6XV1840-2AH10 | | |
| • FastConnect Trailing Cable | 6XV1840-3AH10 | | |
| • FastConnect Marine Cable | 6XV1840-4AH10 | | |

[2] An MMC is essential for operating the CPU

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **7/8" connecting cable to power supply** | | **M12 sealing cap** | 3RX9802-0AA00 |
| • 5-wire, 5 x 1.5 mm$^2$, trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths: | | For protection of unused M12 connections with ET 200pro | |
| | | **M12 sealing caps with female thread** | 6ES7194-4JD60-0AA0 |
| - 1.5 m | 6XV1822-5BH15 | 5 units | |
| - 2.0 m | 6XV1822-5BH20 | **PROFIBUS M12 connecting cable** | |
| - 3.0 m | 6XV1822-5BH30 | Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m, in various lengths: | |
| - 5.0 m | 6XV1822-5BH50 | | |
| - 10 m | 6XV1822-5BN10 | 1.5 m | 6XV1830-3DH15 |
| - 15 m | 6XV1822-5BN15 | 2.0 m | 6XV1830-3DH20 |
| - Other special lengths with 90° or 180° cable outlet | See http://support.automation.siemens.com/WW/view/en/26999294 | 3.0 m | 6XV1830-3DH30 |
| | | 5.0 m | 6XV1830-3DH50 |
| • Power cable, can be trailed, 5 x 1.5 mm$^2$, preassembled at both ends with 7/8" angled connectors (female contact insert at one end, male contact insert at the other end), in various lengths: | | 10 m | 6XV1830-3DN10 |
| | | 15 m | 6XV1830-3DN15 |
| - 3.0 m | 3RK1902-3NB30 | Additional special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 |
| - 5.0 m | 3RK1902-3NB50 | | |
| - 10 m | 3RK1902-3NC10 | **M12 bus termination connector for PROFIBUS, female contact insert** | 6GK1905-0ED00 |
| • Power cable, can be trailed, 5 x 1.5 mm$^2$, preassembled at one end with 7/8" angled connector with female contact insert (female contact insert at one end, other end open), in various lengths: | | | |
| | | **M12 bus termination connector for PROFIBUS, male contact insert** | 6GK1905-0EC00 |
| - 3.0 m | 3RK1902-3GB30 | **M12 plug connector, axial outlet, with male contact insert** | 6GK1905-0EA00 |
| - 5.0 m | 3RK1902-3GB50 | | |
| - 10 m | 3RK1902-3GC10 | **PROFIBUS FC Standard Cable GP** | 6XV1830-0EH10 |
| **Power line** | 6XV1830-8AH10 | Standard type with special design for fast mounting, 2-wire, shielded. | |
| 5-wire, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | | Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | |
| **7/8" cable connector** | | **PROFIBUS FC Trailing Cable** | 6XV1830-3EH10 |
| For ET 200eco, with axial cable outlet | | 2-wire, shielded. | |
| • with male contact insert, 5-pack | 6GK1905-0FA00 | **PROFIBUS FC Food Cable** | 6XV1830-0GH10 |
| • with female contact insert, 5-pack | 6GK1905-0FB00 | 2-wire, shielded. | |
| • angled, with female contact insert, 1 unit | 3RK1902-3DA00 | Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | |
| • angled, with male contact insert, 1 unit | 3RK1902-3BA00 | **PROFIBUS FC Robust Cable** | 6XV1830-0JH10 |
| 7/8" cover cap, 10 per pack | 6ES7194-3JA00-0AA0 | 2-wire, shielded. | |
| **Twisted Pair cables 4x2 with RJ45 connectors** | | Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m. | |
| 0.5 m | 6XV1870-3QE50 | **PROFIBUS M12 cable connector** | |
| 1 m | 6XV1870-3QH10 | 5-pole, B-coded, metal casing, 1 pack = 5 units. | |
| 2 m | 6XV1870-3QH20 | • Female contact insert | 6GK1905-0EB00 |
| 6 m | 6XV1870-3QH60 | | |
| 10 m | 6XV1870-3QN10 | | |
| **Crossed Twisted Pair cables 4x2 with RJ45 connectors** | | | |
| 0.5 m | 6XV1870-3RE50 | | |
| 1 m | 6XV1870-3RH10 | | |
| 2 m | 6XV1870-3RH20 | | |
| 6 m | 6XV1870-3RH60 | | |
| 10 m | 6XV1870-3RN10 | | |

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# Distributed Controllers
based on ET 200Pro
Fail-safe CPUs

## CPU 1516pro F-2 PN

### Overview



- Fail-safe CPU 1516pro F-2 PN for SIMATIC ET 200pro based on S7-1500 CPU 1516F-3 PN/DP
- For applications with high requirements on the program scope and processing speed, for distributed setup via PROFINET IO
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET Shared I-Device for 4 controllers
- PROFINET IO RT/IRT interface with integrated 3-port switch
- Additional PROFINET IO RT interface with separate IP address
- Isochronous mode on PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- OPC UA Data Access Server
- Integrated web server with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

### Technical specifications

| Article number | 6ES7516-2GN00-0AB0 |
| --- | --- |
| | ET 200pro: CPU 1516PRO F-2 PN |
| **General information** | |
| Product type designation | CPU 1516pro F-2 PN |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| **Power loss** | |
| Power loss, typ. | 5.3 W |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 1.5 Mbyte |
| • integrated (for data) | 5 Mbyte |
| **Load memory** | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| **CPU processing times** | |
| for bit operations, typ. | 10 ns |
| for word operations, typ. | 12 ns |
| for fixed point arithmetic, typ. | 16 ns |
| for floating point arithmetic, typ. | 64 ns |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte; All inputs are in the process image |
| • Outputs | 32 kbyte; All outputs are in the process image |
| **Address space per module** | |
| • Address space per module, max. | 256 byte; For input and output data respectively |
| **Address space per station** | |
| • Address space per station, max. | 4 096 byte; for central inputs and outputs; depending on configuration |
| **Time of day** | |
| **Clock** | |
| • Type | Hardware clock |

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## ▪ Technical specifications (continued)

| Article number | 6ES7516-2GN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO F-2 PN |
| **1. Interface** | |
| **Interface types** | |
| • Number of ports | 3; 2x M12 + 1x RJ45 |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; X1 P3 |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | Yes; Max. 32 PROFINET devices |
| - Number of connectable IO Devices, max. | 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Of which IO devices with IRT, max. | 64 |
| - Number of connectable IO Devices for RT, max. | 256 |
| - of which in line, max. | 256 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for IRT** | |
| - for send cycle of 250 µs | 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive |
| - for send cycle of 500 µs | 500 µs to 8 ms |
| - for send cycle of 1 ms | 1 ms to 16 ms |
| - for send cycle of 2 ms | 2 ms to 32 ms |
| - for send cycle of 4 ms | 4 ms to 64 ms |
| - With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| **Update time for RT** | |
| - for send cycle of 250 µs | 250 µs to 128 ms |
| - for send cycle of 500 µs | 500 µs to 256 ms |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| - for send cycle of 2 ms | 2 ms to 512 ms |
| - for send cycle of 4 ms | 4 ms to 512 ms |

| Article number | 6ES7516-2GN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO F-2 PN |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | Yes |
| - MRP | Yes |
| - MRPD | Yes; Requirement: IRT |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| **Interface types** | |
| • Number of ports | 1; 1x M12 |
| • integrated switch | No |
| • RJ 45 (Ethernet) | No |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| • Media redundancy | No |
| **PROFINET IO Controller** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - MRP | No |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Number of connectable IO Devices, max. | 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| - Number of connectable IO Devices for RT, max. | 32 |
| - of which in line, max. | 32 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8; in total across all interfaces |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | |
| - for send cycle of 1 ms | 1 ms to 512 ms |

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# Distributed Controllers
based on ET 200Pro
Fail-safe CPUs

## CPU 1516pro F-2 PN

### ■ Technical specifications (continued)

| Article number | 6ES7516-2GN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO F-2 PN |
| **PROFINET IO Device** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - MRP | No |
| - MRPD | No |
| - PROFIenergy | Yes |
| - Prioritized startup | No |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 128; Via integrated interfaces of the CPU |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes; Via X1, with minimum OB 6x cycle of 375 μs |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 2 400 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 40; per axis |
| - per positioning axis | 80; per axis |
| - per synchronous axis | 160; per axis |
| - per external encoder | 80; per external encoder |
| - per output cam | 20; per cam |
| - per cam track | 160; per cam track |
| - per probe | 40; per probe |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |
| **Highest safety class achievable in safety mode** | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 |

| Article number | 6ES7516-2GN00-0AB0 |
|---|---|
| | ET 200pro: CPU 1516PRO F-2 PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 55 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 55 °C |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe |
| - STL | Yes |
| - SCL | Yes |
| - GRAPH | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** | |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| **Dimensions** | |
| Width | 135 mm |
| Height | 130 mm |
| Depth | 65 mm |
| **Weights** | |
| Weight, approx. | 614 g |

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■ **Ordering data**

| | Article No. |
|---|---|
| **CPU 1516pro F-2 PN** | **6ES7516-2GN00-0AB0** |
| Work memory 1.5 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required | |
| **Accessories** | |
| **SIMATIC Memory Card** | |
| 4 MB[1] | **6ES7954-8LC02-0AA0** |
| 12 MB[1] | **6ES7954-8LE02-0AA0** |
| 24 MB[1] | **6ES7954-8LF02-0AA0** |
| 256 MB[1] | **6ES7954-8LL02-0AA0** |
| 2 GB[1] | **6ES7954-8LP02-0AA0** |
| 32 GB[1] | **6ES7954-8LT03-0AA0** |
| **Connection module** | **6ES7194-4AP00-0AA0** |
| CM CPU 2PN M12 / 7/8"; with 3 x M12 and 2 x 7/8", for connecting 2 x PROFINET | |
| **Industrial Ethernet FC RJ45 Plug 180** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | |
| • 1 unit | **6GK1901-1BB10-2AA0** |
| • 10 units | **6GK1901-1BB10-2AB0** |
| • 50 units | **6GK1901-1BB10-2AE0** |
| **Industrial Ethernet Fast Connect installation cables** | |
| • FastConnect Standard Cable | **6XV1840-2AH10** |
| • FastConnect Trailing Cable | **6XV1840-3AH10** |
| • FastConnect Marine Cable | **6XV1840-4AH10** |
| **Industrial Ethernet FastConnect installation cables** | |
| • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2D** |
| • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | **6XV1870-2F** |
| **Industrial Ethernet Fast Connect** | |
| Stripping Tool | **6GK1901-1GA00** |

| | Article No. |
|---|---|
| **IE Connecting Cable M12-180/M12-180** | |
| Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths: | |
| • 0.3 m | **6XV1870-8AE30** |
| • 0.5 m | **6XV1870-8AE50** |
| • 1.0 m | **6XV1870-8AH10** |
| • 1.5 m | **6XV1870-8AH15** |
| • 2.0 m | **6XV1870-8AH20** |
| • 3.0 m | **6XV1870-8AH30** |
| • 5.0 m | **6XV1870-8AH50** |
| • 10 m | **6XV1870-8AN10** |
| • 15 m | **6XV1870-8AN15** |
| PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert), in various lengths: | |
| • 3.0 m | **3RK1902-2NB30** |
| • 5.0 m | **3RK1902-2NB50** |
| • 10 m | **3RK1902-2NC10** |
| PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end open), in various lengths: | |
| • 3.0 m | **3RK1902-2HB30** |
| • 5.0 m | **3RK1902-2HB50** |
| • 10 m | **3RK1902-2HC10** |
| **IE FC M12 Plug PRO** | |
| PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet. | |
| • 1 unit | **6GK1901-0DB20-6AA0** |
| • 8 units | **6GK1901-0DB20-6AA8** |
| • PROFINET M12 plug connector, D-coded, angled. | **3RK1902-2DA00** |
| **IE panel feedthrough** | |
| Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units. | **6GK1901-0DM20-2AA5** |

[1] An MMC is essential for operating the CPU

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# Distributed Controllers
based on ET 200Pro
Fail-safe CPUs

## CPU 1516pro F-2 PN

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **7/8" connecting cable to power supply** | | **7/8" cable connector** | |
| 5-wire, 5 x 1.5 mm$^2$, trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths: | | For ET 200eco, with axial cable outlet. | |
| | | • with male insert, 5-pack | 6GK1905-0FA00 |
| • 1.5 m | 6XV1822-5BH15 | • with female insert, 5-pack | 6GK1905-0FB00 |
| • 2.0 m | 6XV1822-5BH20 | • angled, with female insert, 1 unit | 3RK1902-3DA00 |
| • 3.0 m | 6XV1822-5BH30 | • angled, with male insert, 1 unit | 3RK1902-3BA00 |
| • 5.0 m | 6XV1822-5BH50 | 7/8" cover cap, 10 per pack | 6ES7194-3JA00-0AA0 |
| • 10 m | 6XV1822-5BN10 | **Twisted Pair cables 4x2 with RJ45 connectors** | |
| • 15 m | 6XV1822-5BN15 | | |
| • Other special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 | 0.5 m | 6XV1870-3QE50 |
| | | 1 m | 6XV1870-3QH10 |
| | | 2 m | 6XV1870-3QH20 |
| | | 6 m | 6XV1870-3QH60 |
| Power cable, can be trailed, 5 x 1.5 mm$^2$, preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end), in various lengths: | | 10 m | 6XV1870-3QN10 |
| | | **Crossed Twisted Pair cables 4x2 with RJ45 connectors** | |
| • 3.0 m | 3RK1902-3NB30 | 0.5 m | 6XV1870-3RE50 |
| • 5.0 m | 3RK1902-3NB50 | 1 m | 6XV1870-3RH10 |
| • 10 m | 3RK1902-3NC10 | 2 m | 6XV1870-3RH20 |
| | | 6 m | 6XV1870-3RH60 |
| Power cable, can be trailed, 5 x 1.5 mm$^2$, preassembled at one end with 7/8" angled connector with female insert (female insert at one end, other end open), in various lengths: | | 10 m | 6XV1870-3RN10 |
| | | **M12 sealing cap** | 3RX9802-0AA00 |
| | | For protection of unused M12 connections with ET 200pro | |
| • 3.0 m | 3RK1902-3GB30 | **M12 sealing caps with female thread** | 6ES7194-4JD60-0AA0 |
| • 5.0 m | 3RK1902-3GB50 | | |
| • 10 m | 3RK1902-3GC10 | 5 units | |
| **Power line** | 6XV1830-8AH10 | | |
| 5-wire, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | | | |

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*Brochures*

For brochures serving as selection
guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# Software Controllers
## SIMATIC S7-1500 Software Controllers
## Standard CPUs

### CPU 1507S

■ **Overview**
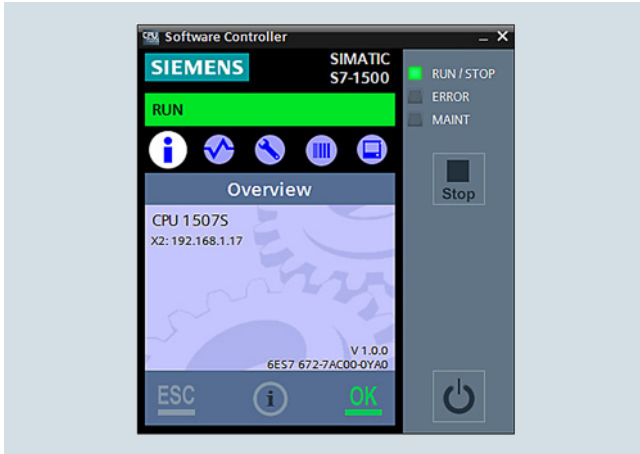


- Software Controller for implementing the functions of a SIMATIC S7-1500 Controller on a SIMATIC IPC
- Optimized for PC-based control tasks with the IPC427 Microbox PC and the IPC477D Panel PC.
- Can also be used on IPC227E, IPC627D, and IPC827D Box PCs, IPC277E and IPC677D Panel PCs, and IPC647D and IPC847D Rack PCs
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ under Windows and locally in the CPU 1507S
- Used as a PC-based controller in machines with distributed I/O via PROFINET and PROFIBUS
- Use of the IPC onboard interfaces and PC plug-in cards for PROFINET and PROFIBUS connections
- Integrated motion control functionalities for controlling speed-controlled and positioning axes as well as synchronous operation, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

■ **Technical specifications**

| Article number | 6ES7672-7AC01-0YA0 |
|---|---|
| | SIMATIC Software Controller CPU 1507S |
| **General information** | |
| Product type designation | CPU 1507S |
| Software version | V2.0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 5 Mbyte |
| • integrated (for data) | 20 Mbyte |
| • Integrated (for ODK application) | 20 Mbyte |
| **Load memory** | |
| • integrated (on PC mass storage) | 320 Mbyte |
| **CPU processing times** | |
| for bit operations, typ. | 1 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for word operations, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for fixed point arithmetic, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for floating point arithmetic, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| **CPU-blocks** | |
| Number of elements (total) | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| **DB** | |
| • Number, max. | 5 999; Number range: 1 to 65535 |
| • Size, max. | 16 Mbyte |
| **FB** | |
| • Number, max. | 5 998; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte |
| **FC** | |
| • Number, max. | 5 999; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte |
| **OB** | |
| • Size, max. | 512 kbyte |

| Article number | 6ES7672-7AC01-0YA0 |
|---|---|
| | SIMATIC Software Controller CPU 1507S |
| **Nesting depth** | |
| • per priority class | 24 |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte |
| • Outputs | 32 kbyte |
| **Time of day** | |
| **Clock** | |
| • Type | Software clock, synchronizable, no battery backup |
| **Interfaces** | |
| Number of interfaces | 3 |
| **1. Interface** | |
| Interface type | Onboard PROFINET / IE interface X2 of the SIMATIC IPC, Intel Springville i210T |
| **Interface types** | |
| • Number of ports | 1 |
| • integrated switch | No |
| • RJ 45 (Ethernet) | Yes |
| - Transmission rate, max. | 100 Mbit/s |
| - Industrial Ethernet status LED | Yes |

■ **Technical specifications** (continued)

| Article number | 6ES7672-7AC01-0YA0 |
|---|---|
| | SIMATIC Software Controller CPU 1507S |
| **Functionality** | |
| • Number of connections via this interface | 128 |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - Isochronous mode | No |
| - IRT | No |
| - MRP | No |
| - MRPD | No |
| - Prioritized startup | Yes; Max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) |
| - Number of connectable IO Devices, max. | 128 |
| - Number of connectable IO Devices for RT, max. | 128 |
| - of which in line, max. | 128 |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes; The CPU and changing IO devices must be separated by a switch (e.g. SCALANCE X205) |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| **PROFINET IO Device** | |
| **Services** | |
| - Isochronous mode | No |
| - IRT | No |
| - MRP | No |
| - Prioritized startup | Yes; If you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |

| Article number | 6ES7672-7AC01-0YA0 |
|---|---|
| | SIMATIC Software Controller CPU 1507S |
| **2. Interface** | |
| Interface type | PROFIBUS with CP 5622, CP 5622 onboard |
| **Interface types** | |
| • RS 485 | Yes |
| **Functionality** | |
| • Number of connections via this interface | 44 |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes; no PG/STEP 7 connection possible |
| **DP master** | |
| **Services** | |
| - Equidistance | No |
| - Isochronous mode | No |
| - Number of connectable DP slaves, max. | 64 |
| **3. Interface** | |
| Interface type | PROFIBUS with CP 5623 |
| **Interface types** | |
| • RS 485 | Yes |
| **Functionality** | |
| • Number of connections via this interface | 44 |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes; no PG/STEP 7 connection possible |
| **DP master** | |
| **Services** | |
| - Equidistance | No |
| - Isochronous mode | No |
| - Number of connectable DP slaves, max. | 125 |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 128 |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 4 800 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 40; per axis |
| - per positioning axis | 80; per axis |
| - per synchronous axis | 160; per axis |
| - per external encoder | 80; per external encoder |
| - per output cam | 20; per cam |
| - per cam track | 160; per cam track |
| - per probe | 40; per probe |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

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## Software Controllers
SIMATIC S7-1500 Software Controllers
Standard CPUs

**CPU 1507S**

### ■ Technical specifications  (continued)

| Article number | **6ES7672-7AC01-0YA0** |
|---|---|
| | SIMATIC Software Controller CPU 1507S |
| **Hardware requirement** | |
| Hardware required | SIMATIC IPC2x7E, IPC4x7D, IPC6x7D, IPC8x7D |
| **Processor** | |
| • Single-core processor | No |
| • Single-core processor with hyper-threading | No |
| • Multi-core processor | Yes |
| • Multi-core processor with hyper-threading | Yes |
| • occupied cores | 1; For multicore processors with activated Hyper-Threading, one complete physical core is reserved for the CPU 1507S |
| **Lifetime of module** | |
| • Work memory, min. | 4 Gbyte |
| • Hard disk memory required for installation | 720 Mbyte |
| • Temporary hard disk memory for installation | 230 Mbyte |
| • Hard disk memory required at runtime | 400 Mbyte |
| **Operating systems** | |
| **pre-installed operating system** | |
| • Windows XP | No |
| • Windows 7 | Yes; Professional, Enterprise, Ultimate (32 bits and 64 bits) |
| • Windows Embedded Standard 7 | Yes; With the delivery image of the SIMATIC PC |
| • Windows 8 | No |
| • Windows Embedded Standard 8 | No |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - CFC | No |
| - GRAPH | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** | |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| **Open Development interfaces** | |
| • Size of ODK SO file, max. | 5.8 Mbyte |
| **Dimensions** | |
| Width | 18.2 cm; Packaging |
| Height | 26.5 cm |
| Depth | 3 cm |
| **Weights** | |
| Weight, approx. | 200 g |

### ■ Ordering data

| | Article No. |
|---|---|
| **SIMATIC S7-1500 Software Controller CPU 1507S** | |
| For implementing the function of an S7-1500 Controller on SIMATIC IPC
Target system:
Optimized for
Microbox PC IPC427E
Panel PC IPC477E;
can also be used with
Panel PC IPC277E,
Panel PC IPC477D,
Panel PC IPC677D,
Box PC IPC227E, Box PC IPC427D,
Box PC IPC627D, Box PC IPC827D,
Rack PC IPC647D,
Rack PC IPC847D
Requirement:
Windows 7
Type of delivery:
German, English, Chinese, Italian, French, Spanish | |
| • Single license for one installation; software and documentation on DVD, license key on USB flash drive | **6ES7672-7AC01-0YA0** |
| • Single license for one installation; software download including license key [1] | **6ES7672-7AC01-0YG0** |
| **Accessories** | |
| **Upgrade of SIMATIC S7-1500 Software Controller CPU 1507S** | **6ES7672-7AC01-0YK0** |
| From V 1.8 to V 2.0; software download incl. documentation and license key.
Email address required for delivery | |
| **SIMATIC IPC** | |
| • MIcrobox PC SIMATIC IPC427E | **6AG4141-…..-….** |
| • Panel PC SIMATIC IPC477E | **6AV7241-…..-….** |
| • Microbox PC SIMATIC IPC427D | **6AG4140-…..-….** |
| • Nanobox PC SIMATIC IPC227E | **6ES7647-8B…-….** |
| • Panel PC SIMATIC IPC277E | **6AV7882-0…0-…0** |
| • Panel PC SIMATIC IPC477D | **6AV7240-…..-….** |
| • Panel PC SIMATIC IPC677D | **6AV7260-…..-….** |
| • Box PC SIMATIC IPC627D | **6AG4131-2….-….** |
| • Box PC SIMATIC IPC827D | **6AG4132-2….-….** |
| • Rack PC SIMATIC IPC647D | **6AG4112-2….-….** |
| • Rack PC SIMATIC IPC847D | **6AG4114-2….-….** |
| For more information, see Catalog ST 80 / ST PC | |
| **CP 5622 communications processor** | **6GK1562-2AA00** |
| PCI Express x1 card (32-bit) for connection of a programming device or PC to PROFIBUS | |
| **CP 5623 communications processor** | **6GK1562-3AA00** |
| PCI Express x1 card (32-bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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## ■ Overview

- Software Controller for implementing the functions of a SIMATIC S7-1500 Controller on a SIMATIC IPC
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- Optimized for PC-based control tasks with the IPC427E Microbox PC and the IPC477E Panel PC.
- Can also be used on IPC227E, IPC427D, IPC627D and IPC827D Box PCs, IPC277E, IPC477D and IPC677D Panel PCs, and IPC647D and IPC847D Rack PCs
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ under Windows and locally in the CPU 1507S

- Used as a PC-based controller in machines with distributed I/O via PROFINET and PROFIBUS
- Supports PROFIsafe in centralized and distributed configurations
- Use of the IPC onboard interfaces and PC plug-in cards for PROFINET and PROFIBUS connections
- Integrated motion control functionalities for controlling speed-controlled and positioning axes as well as synchronous operation, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

## ■ Technical specifications

| Article number | **6ES7672-7FC01-0YA0** |
|---|---|
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **General information** | |
| Product type designation | CPU 1507S F |
| Software version | V2.0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 |
| **Memory** | |
| **Work memory** | |
| • integrated (for program) | 7.5 Mbyte |
| • integrated (for data) | 20 Mbyte |
| • Integrated (for ODK application) | 20 Mbyte |
| **Load memory** | |
| • integrated (on PC mass storage) | 320 Mbyte |
| **CPU processing times** | |
| for bit operations, typ. | 1 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for word operations, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for fixed point arithmetic, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| for floating point arithmetic, typ. | 2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz |
| **CPU-blocks** | |
| Number of elements (total) | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| **DB** | |
| • Number, max. | 5 999; Number range: 1 to 65535 |
| • Size, max. | 16 Mbyte |
| **FB** | |
| • Number, max. | 5 998; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte |
| **FC** | |
| • Number, max. | 5 999; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte |
| **OB** | |
| • Size, max. | 512 kbyte |
| **Nesting depth** | |
| • per priority class | 24; Up to 8 possible for F-blocks |

| Article number | **6ES7672-7FC01-0YA0** |
|---|---|
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **IEC counter** | |
| • Number | Any (only limited by the main memory) |
| **S7 times** | |
| • Number | 2 048 |
| **IEC timer** | |
| • Number | Any (only limited by the main memory) |
| **Data areas and their retentivity** | |
| **Flag** | |
| • Number, max. | 16 kbyte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 32 kbyte |
| • Outputs | 32 kbyte |
| **Time of day** | |
| **Clock** | |
| • Type | Software clock, synchronizable, no battery backup |
| **Interfaces** | |
| Number of interfaces | 3 |
| **1. Interface** | |
| Interface type | Onboard PROFINET / IE interface X2 of the SIMATIC IPC, Intel Springville i210T |
| **Interface types** | |
| • Number of ports | 1 |
| • integrated switch | No |
| • RJ 45 (Ethernet) | Yes |
| - Transmission rate, max. | 100 Mbit/s |
| - Industrial Ethernet status LED | Yes |
| **Functionality** | |
| • Number of connections via this interface | 128 |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| **PROFINET IO Controller** | |
| **Services** | |
| - Isochronous mode | No |
| - IRT | No |
| - MRP | No |

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## Software Controllers
SIMATIC S7-1500 Software Controllers
Fail-safe CPUs

**CPU 1507S F**

■ **Technical specifications** (continued)

| Article number | 6ES7672-7FC01-0YA0 |
|---|---|
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **Services (continued)** | |
| - Prioritized startup | Yes; Max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) |
| - Number of connectable IO Devices, max. | 128 |
| - Number of connectable IO Devices for RT, max. | 128 |
| - of which in line, max. | 128 |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes |
| - Number of IO Devices per tool, max. | 8 |
| - Updating times | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| **Update time for RT** | |
| - for send cycle of 1 ms | 1 ms to 512 ms |
| **PROFINET IO Device** | |
| **Services** | |
| - Isochronous mode | No |
| - IRT | No |
| - MRP | No |
| - Prioritized startup | Yes; If you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| Interface type | PROFIBUS with CP 5622, CP 5622 onboard |
| **Interface types** | |
| • RS 485 | Yes |
| **Functionality** | |
| • Number of connections via this interface | 44 |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes; no PG/STEP 7 connection possible |
| **DP master** | |
| **Services** | |
| - Equidistance | No |
| - Isochronous mode | No |
| - Number of connectable DP slaves, max. | 64 |
| **3. Interface** | |
| Interface type | PROFIBUS with CP 5623 |
| **Interface types** | |
| • RS 485 | Yes |

| Article number | 6ES7672-7FC01-0YA0 |
|---|---|
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **Functionality** | |
| • Number of connections via this interface | 44 |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes; no PG/STEP 7 connection possible |
| **DP master** | |
| **Services** | |
| - Equidistance | No |
| - Isochronous mode | No |
| - Number of connectable DP slaves, max. | 125 |
| **Protocols** | |
| **Number of connections** | |
| • Number of connections, max. | 128 |
| **Supported technology objects** | |
| Motion Control | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| • Number of available Motion Control resources for technology objects (except cam disks) | 4 800 |
| • Required Motion Control resources | |
| - per speed-controlled axis | 40; per axis |
| - per positioning axis | 80; per axis |
| - per synchronous axis | 160; per axis |
| - per external encoder | 80; per external encoder |
| - per output cam | 20; per cam |
| - per cam track | 160; per cam track |
| - per probe | 40; per probe |
| Controller | |
| • PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |
| **Standards, approvals, certificates** | |
| **Highest safety class achievable in safety mode** | |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Hardware requirement** | |
| Hardware required | SIMATIC IPC227E, IPC277E, IPC427D, IPC477D |
| **Processor** | |
| • Single-core processor | No |
| • Single-core processor with hyper-threading | No |
| • Multi-core processor | Yes |
| • Multi-core processor with hyper-threading | Yes |
| • occupied cores | 1; For multicore processors with activated Hyper-Threading, one complete physical core is reserved for the CPU 1507S |

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## Technical specifications (continued)

| Article number | 6ES7672-7FC01-0YA0 |
| --- | --- |
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **Lifetime of module** | |
| • Work memory, min. | 4 Gbyte |
| • Hard disk memory required for installation | 720 Mbyte |
| • Temporary hard disk memory for installation | 230 Mbyte |
| • Hard disk memory required at runtime | 400 Mbyte |
| **Operating systems** | |
| **pre-installed operating system** | |
| • Windows XP | No |
| • Windows 7 | Yes; Professional, Enterprise, Ultimate (32 bits and 64 bits) |
| • Windows Embedded Standard 7 | Yes; With the delivery image of the SIMATIC PC |
| • Windows 8 | No |
| • Windows Embedded Standard 8 | No |
| **Configuration** | |
| **Programming** | |
| **Programming language** | |
| - LAD | Yes; incl. failsafe |
| - FBD | Yes; incl. failsafe |
| - STL | Yes |
| - SCL | Yes |
| - GRAPH | Yes |

| Article number | 6ES7672-7FC01-0YA0 |
| --- | --- |
| | SIMATIC Fail-safe SW Ctrl CPU 1507S F |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| **Access protection** | |
| • Protection level: Write protection | Yes |
| • Protection level: Read/write protection | Yes |
| • Protection level: Write protection for Failsafe | Yes |
| • Protection level: Complete protection | Yes |
| **Open Development interfaces** | |
| • Size of ODK SO file, max. | 5.8 Mbyte |
| **Dimensions** | |
| Width | 18.2 cm; Packaging |
| Height | 26.5 cm |
| Depth | 3 cm |
| **Weights** | |
| Weight, approx. | 200 g |

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## Ordering data

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **SIMATIC S7-1500 Software Controller CPU 1507S F** | | **SIMATIC IPC** | |
| | | • SIMATIC IPC427E Microbox PC | **6AG4141-…..-….** |
| For implementing the function of a fail-safe S7-1500 controller on SIMATIC IPC | | • SIMATIC IPC477E Panel PC | **6AV7241-…..-….** |
| Target system: | | • SIMATIC IPC427D Microbox PC | **6AG4140-.....-....** |
| Optimized for Microbox PC IPC427E, Panel PC IPC477E; can also be used with Panel PC IPC277E, Panel PC IPC477D, Panel PC IPC677D, Box PC IPC227E, Box PC IPC427D, Box PC IPC627D, Box PC IPC827D, Rack PC IPC647D, Rack PC IPC847D | | • SIMATIC IPC227E Nanobox PC | **6ES7647-8B…-….** |
| | | • SIMATIC IPC277E Panel PC | **6AV7882-0…0-…0** |
| | | • SIMATIC IPC477D Panel PC | **6AV7240-.....-....** |
| | | • SIMATIC IPC677D Panel PC | **6AV7260-.....-....** |
| | | • SIMATIC IPC627D Box PC | **6AG4131-2....-....** |
| | | • SIMATIC IPC827D Box PC | **6AG4132-2....-....** |
| | | • SIMATIC IPC647D Rack PC | **6AG4112-2....-....** |
| | | • SIMATIC IPC847D Rack PC | **6AG4114-2....-....** |
| Requirement: Windows 7 / Windows Embedded Standard 7 | | For more information, see Catalog ST 80 / ST PC | |
| Type of delivery: German, English, Chinese, Italian, French, Spanish | | **CP 5622 communications processor** | **6GK1562-2AA00** |
| • Single license for one installation; software and documentation on DVD, license key on USB flash drive | **6ES7672-7FC01-0YA0** | PCI Express x1 card (32-bit) for connection of a programming device or PC to PROFIBUS | |
| • Single license for one installation; software download including license key [1] | **6ES7672-7FC01-0YG0** | **CP 5623 communications processor** | **6GK1562-3AA00** |
| **Accessories** | | PCI Express x1 card (32-bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English | |
| **Upgrade of SIMATIC S7-1500 Software Controller CPU 1507S** | **6ES7672-7AC01-0YK0** | | |
| Upgrade from V 1.8 to V 2.1; software download incl. documentation and license key.[1]. Email address required for delivery | | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

# Software Controllers
## SIMATIC S7-1500 Software Controllers

### ODK 1500S

### ■ Overview

- For developing dynamically loadable function libraries for S7-1500 Software Controller and S7-1500 CPU 1518 ODK:
  - Implementation of function libraries by means of high-level programming with C/C++.
  - Execution of the library functions under Windows or in the real-time context of the software controllers.
  - Calling the functions directly from the PLC program.
- Development environment for real-time library functions included in the scope of delivery
- Development of Windows library functions with MS Visual Studio.
- Automatic creation of function blocks for calling the library functions.
- Simple integration of the function blocks into STEP 7 by importing.
- Simple use of the library functions in the controller without specific high-level language know-how.

### ■ Technical specifications

#### System requirements

The SIMATIC ODK 1500S can be used on PC platforms with the following requirements:

- Operating systems Windows 7/8.1/10
- Min. 150 MB hard drive memory
- Min. 4 GB work memory
- Mouse, keyboard, monitor

### ■ Ordering data | Article No.

| | |
|---|---|
| **SIMATIC ODK 1500S** | |
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; supplied on DVD | **6ES7806-2CD02-0YA0** |
| Open Development Kit for support in developing Windows and real-time library functions for S7-1500 Software Controllers; software download including license key [1] | **6ES7806-2CD02-0YG0** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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## ODK 1500S SQL driver

### ■ Overview

#### *Note*

This catalog entry contains non-binding information on a supple-mentary application software for the SIMATIC S7-1500 Software Controller and the SIMATIC ET 200SP Open Controller.

#### *Overview*

The ODK 1500S SQL driver enables direct access to an SQL database from the PLC program. In this case the database can be installed on the same computer as the S7-1500 Software Controller or in the network.

- Direct data exchange with SQL-based database by means of SQL commands from the PCL program
- Connection to SQL-based database on the same PC or to database servers in the network

### ■ Application

Generally the ODK1500S SQL driver can be used in all application scenarios in which an SQL database is required. Typical fields of application are warehouse management, message memory management or recipe management

### ■ Technical specifications

| Supported SQL commands | • SELECT |
| | • INSERT |
| | • UPDATE |
| | • DELETE |
| Supported data types | All standard SQL data types |
| System requirements | |
| • Runtime PC | SIMATIC IPC with S7-1500 Software Controller or SIMATIC ET 200SP Open Controller |
| • Engineering | STEP 7 in the TIA Portal V13 SP1 |

### ■ More information

If you are interested, please contact your sales representative: http://www.automation.siemens.com/partner/

You can find Service and Support at: https://support.industry.siemens.com/cs/ww/en/view/109479140

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## ODK 1500S XML Data Access driver

### ■ Overview

#### *Note*

This catalog entry contains non-binding information on a supple-mentary application software for the SIMATIC S7-1500 Software Controller and the SIMATIC ET 200SP Open Controller.

#### *Overview*

With the function blocks of the ODK 1500S XML Data Access driver it is possible to access specific information in XML files in the Windows file system from the PLC program.

XPath expressions are used for accessing XML file elements since they provide the highest possible flexibility for processing XML data. This means that extremely large XML files can be edited, too.

The driver offers the following functionality:

- XML data can be read into and processed in the PLC.
- XML data can be modified and written back to the XML file.

### ■ Application

- Reading in of parameters or recipes that have been made available as XML files by the control system.
- Return of production data which need to be made available in the form of an XML file.

### ■ Technical specifications

| System requirements | |
| • Runtime PC | SIMATIC IPC with S7-1500 Software Controller or SIMATIC ET 200SP Open Controller |
| • Engineering | STEP 7 in the TIA Portal V13 SP1 |

### ■ More information

If you are interested, please contact your sales representative: http://www.automation.siemens.com/partner/

You can find Service and Support at: https://support.industry.siemens.com/cs/ww/en/view/109479496

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## Software Controllers
SIMATIC S7-1500 Software Controllers
Add-on applications

**ODK 1500S FileServer**

### ■ Overview

#### *Note*

This catalog entry contains non-binding information on a supplementary application software for the SIMATIC S7-1500 Software Controller and the SIMATIC ET 200SP Open Controller.

#### *Overview*

The ODK 1500S FileServer enhances the file functions of the SIMATIC S7-1500 Software Controller with an option enabling direct access to the Windows file system of the PC from the STEP 7 program.

The driver enables reading and writing of data blocks in/from files in structured form. Various file formats are supported.

There are also FBs available for handling (e.g. renaming, deleting) files.

### ■ Application

Driver blocks enable file operations to be directly integrated in automation solutions, e.g.:

• Writing of measured values to CSV
• Writing of quality data to CSV
• Reading of parameters from INI file
• Reading of recipes from XML file

### ■ Technical specifications

| Supported file formats | • CSV |
| | • ASCII |
| | • Windows-INI |
| | • XML[1] |
| | • Binary |
| System requirements | |
| • Runtime PC | SIMATIC IPC with S7-1500 Software Controller or SIMATIC ET 200SP Open Controller |
| • Engineering | STEP 7 in the TIA Portal V13 SP1 |

[1] The XML format is predefined. A DB can be saved and read in as an XML file. It is not possible to parse any particular XML file.

### ■ More information

If you are interested, please contact your sales representative:
http://www.automation.siemens.com/partner/

You can find Service and Support at:
https://support.industry.siemens.com/cs/ww/en/view/109479497

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## Overview
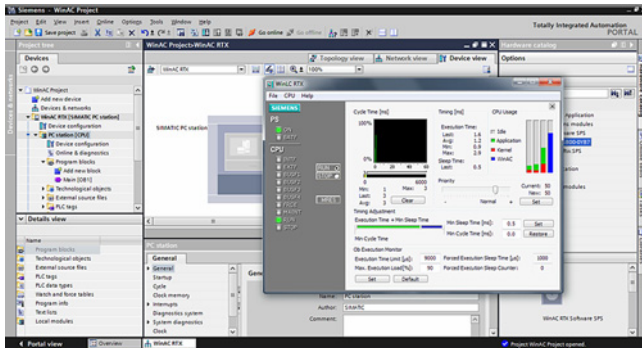


- SIMATIC WinAC RTX:
  Optimized for applications that require a high degree of flexibility and integration capability.
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.

## Technical specifications

| Article number | **6ES7671-0RC08-0YA0** |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **General information** | |
| Product type designation | SIMATIC WinAC RTX 2010 |
| Firmware version | V4.6 |
| **Engineering with** | |
| • Programming package | STEP 7 V5.5 or higher / iMap V3.0 SP1; STEP 7 in TIA Portal V13 or higher |
| **Memory** | |
| Type of memory | RAM |
| **Work memory** | |
| • integrated (for program) | 4 Mbyte; Adjustable; depends on Non Paged Memory Pool |
| • integrated (for data) | 4 Mbyte; Adjustable; depends on Non Paged Memory Pool |
| **Load memory** | |
| • integrated RAM, max. | 8 Mbyte; Adjustable; depends on Non Paged Memory Pool |
| **CPU processing times** | |
| for bit operations, typ. | 0.004 µs; Typical |
| for fixed point arithmetic, typ. | 0.003 µs; Typical |
| for floating point arithmetic, typ. | 0.004 µs; Typical |
| Reference platform | Pentium 4, 2.4 GHz |
| **CPU-blocks** | |
| **DB** | |
| • Number, max. | 65 535; Limited only by RAM set for data |
| • Size, max. | 64 kbyte |
| **FB** | |
| • Number, max. | 65 536; Limited only by RAM set for code |
| • Size, max. | 64 kbyte |
| **FC** | |
| • Number, max. | 65 536; Limited only by RAM set for code |
| • Size, max. | 64 kbyte |
| **OB** | |
| • Size, max. | 64 kbyte |
| **Nesting depth** | |
| • per priority class | 24 |
| • additional within an error OB | 24 |

| Article number | **6ES7671-0RC08-0YA0** |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **Retentivity** | |
| - adjustable | Yes |
| - lower limit | 0 |
| - upper limit | 2 047 |
| - preset | 8 |
| **Counting range** | |
| - can be set | Yes |
| - lower limit | 0 |
| - upper limit | 999 |
| **IEC counter** | |
| • present | Yes |
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |
| **S7 times** | |
| • Number | 2 048 |
| **Retentivity** | |
| - adjustable | Yes |
| - lower limit | 0 |
| - upper limit | 2 047 |
| - preset | 0 |
| **Time range** | |
| - lower limit | 10 ms |
| - upper limit | 9 990 s |
| **IEC timer** | |
| • present | Yes |
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |

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# Software Controllers
SIMATIC WinAC

## SIMATIC WinAC RTX

■ **Technical specifications** (continued)

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Data areas and their retentivity** | |
| Retentivity without UPS and PS Extension Board | 128 kbyte with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request |
| Retentivity with UPS | all data |
| **Flag** | |
| • Number, max. | 16 kbyte |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8 |
| **Data blocks** | |
| • Retentivity adjustable | Yes; via non-retain property on DB |
| • Retentivity preset | Yes |
| **Local data** | |
| • adjustable, max. | 64 kbyte |
| • preset | 32 kbyte |
| • per priority class, max. | 61 440 byte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 16 kbyte |
| • Outputs | 16 kbyte |
| **of which distributed** | |
| - DP interface, inputs | 16 kbyte |
| - DP interface, outputs | 16 kbyte |
| - PROFINET interface, inputs | 16 kbyte |
| - PROFINET interface, outputs | 16 kbyte |
| **Process image** | |
| • Inputs, adjustable | 8 kbyte; 16 KB with STEP 7 V5.5 SP3 or higher |
| • Outputs, adjustable | 8 kbyte; 16 KB with STEP 7 V5.5 SP3 or higher |
| • Inputs, default | 512 byte |
| • Outputs, default | 512 byte |
| **Subprocess images** | |
| • Number of subprocess images, max. | 15 |
| **Digital channels** | |
| • Inputs | 128 000 |
| • Outputs | 128 000 |
| **Analog channels** | |
| • Inputs | 8 000 |
| • Outputs | 8 000 |
| **Number of operable FMs and CPs (recommended)** | |
| • FM | FM distributed: FM 350-1 / 350-2, FM 351, FM 352, FM 353, FM 355 / 355-2 |
| • CP, PtP | 2; CP 340, CP 341 distributed |
| • CP, LAN | Over PC CP |
| **Submodules** | |
| • Number of submodules, max | 4 |
| - of which PROFIBUS, max. | 4; Supported interfaces: see 1st and 2nd interface |
| - of which Industrial Ethernet, max. | 1; Supported interfaces: see 3rd and 4th interface |

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Time of day** | |
| **Clock** | |
| • Hardware clock (real-time) | Yes |
| • retentive and synchronizable | Yes |
| **Operating hours counter** | |
| • Number | 8 |
| **Clock synchronization** | |
| • supported | Yes |
| • to PC-CP, slave | Yes |
| • on Ethernet via NTP | Yes |
| **1. Interface** | |
| Interface type | CP 5611, CP 5611-A2, CP 5612, CP 5621, CP 5622, integrated PROFIBUS interface of the SIMATIC PC |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1 |
| Power supply to interface (15 to 30 V DC), max. | does not exist |
| **Functionality** | |
| • MPI | No |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| **DP master** | |
| • Number of connections, max. | 8 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 64 |
| **Services** | |
| - PG/OP communication | Yes |
| - Global data communication | No |
| - S7 basic communication | No |
| - S7 communication | Yes |
| - S7 communication, as client | Yes |
| - S7 communication, as server | Yes |
| - Equidistance | Yes; Only in conjunction with isochronous mode |
| - Isochronous mode | Yes |
| - SYNC/FREEZE | Yes |
| - Activation/deactivation of DP slaves | Yes |
| - Direct data exchange (slave-to-slave communication) | Yes |
| - DPV1 | Yes |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| **User data per DP slave** | |
| - Inputs, max. | 244 byte |
| - Outputs, max. | 244 byte |

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## Technical specifications (continued)

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **2. Interface** | |
| Interface type | CP 5613, CP 5613-A2, CP 5613-A3, CP 5603, CP 5623 |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 4 |
| **Functionality** | |
| • MPI | No |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| **DP master** | |
| • Number of connections, max. | 50 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 125 |
| **Services** | |
| - PG/OP communication | Yes |
| - Global data communication | No |
| - S7 basic communication | No |
| - S7 communication | Yes |
| - S7 communication, as client | Yes |
| - S7 communication, as server | Yes |
| - Equidistance | Yes; Only in conjunction with isochronous mode |
| - Isochronous mode | Yes |
| - SYNC/FREEZE | Yes |
| - Activation/deactivation of DP slaves | Yes |
| - Direct data exchange (slave-to-slave communication) | Yes |
| - DPV1 | Yes |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| **User data per DP slave** | |
| - Inputs, max. | 244 byte |
| - Outputs, max. | 244 byte |
| **3. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); Intel i210T; integrated IE interface SIMATIC PC IPC4x7C, IPC6x7C, IPC8x7C, IPC2x7D, IPC4x7D, IPC6x7D, IPC8x7D, IPC547E |
| automatic detection of transmission rate | Yes; 10/100 Mbit/s |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| **Interface types** | |
| • Number of ports | 1 |
| • integrated switch | No |
| **Media redundancy** | |
| • supported | No |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | No |
| • PROFINET CBA | Yes |
| • Open IE communication | Yes |

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **PROFINET IO Controller** | |
| • Transmission rate, max. | 100 Mbit/s |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - S7 communication | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - Prioritized startup | Yes |
| - Number of IO devices with prioritized startup, max. | 32 |
| - Number of connectable IO Devices for RT, max. | 128 |
| - of which in line, max. | 128 |
| - Activation/deactivation of IO Devices | Yes |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes |
| - Device replacement without swap medium | Yes |
| - Send cycles | 1 ms |
| - Updating time | 1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data) |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| - User data per address area, max. | 2 kbyte |
| - User data consistency, max. | 256 byte |
| **Open IE communication** | |
| • Number of connections, max. | 32 |
| • Local port numbers used at the system end | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| • Keep-alive function, supported | Yes |
| **4. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1; CP 1616 (hardware release 8 or higher), CP 1604 (hardware release 7 or higher), integrated PROFINET interface of SIMATIC IPC and S7-mEC |
| automatic detection of transmission rate | Yes; 10/100 Mbit/s |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Change of IP address at runtime, supported | Yes |
| **Interface types** | |
| • Number of ports | 3 |
| • integrated switch | Yes |
| **Media redundancy** | |
| • supported | Yes |
| • Switchover time on line break, typ. | 200 ms |
| • Number of stations in the ring, max. | 50 |

# Software Controllers
## SIMATIC WinAC

**SIMATIC WinAC RTX**

### ■ Technical specifications (continued)

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | No |
| • PROFINET CBA | Yes |
| • Open IE communication | Yes |
| **PROFINET IO Controller** | |
| • Transmission rate, max. | 100 Mbit/s |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - S7 communication | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - Prioritized startup | Yes |
| - Number of IO devices with prioritized startup, max. | 32 |
| - Number of connectable IO Devices, max. | 256 |
| - Of which IO devices with IRT, max. | 64 |
| - of which in line, max. | 32 |
| - Number of IO Devices with IRT and the option "high flexibility" | 64 |
| - of which in line, max. | 32 |
| - Number of connectable IO Devices for RT, max. | 256 |
| - of which in line, max. | 256 |
| - Activation/deactivation of IO Devices | Yes |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes |
| - Device replacement without swap medium | Yes |
| - Send cycles | 250 µs, 500 µs, 1 ms |
| - Updating time | 0.25...512 depending on the send cycle |
| **Address area** | |
| - User data per address area, max. | 2 kbyte |
| - User data consistency, max. | 256 byte |
| **Open IE communication** | |
| • Number of connections, max. | 32 |
| • Local port numbers used at the system end | 0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Number of DP masters with isochronous mode | 2 |
| User data per isochronous slave, max. | 128 byte |
| Equidistance | Yes |
| shortest clock pulse | 2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image |

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Communication functions** | |
| PG/OP communication | Yes |
| Data record routing | Yes; only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC |
| **Global data communication** | |
| • supported | No |
| **S7 basic communication** | |
| • supported | No |
| **S7 communication** | |
| • supported | Yes |
| • as server | Yes |
| • as client | Yes |
| • User data per job, max. | 64 kbyte; when using BSEND/USEND |
| **Open IE communication** | |
| • TCP/IP | Yes |
| - Number of connections, max. | 32 |
| - Data length for connection type 01H, max. | Not supported |
| - Data length for connection type 11H, max. | 65 534 byte |
| - Data length, max. | 65 534 byte |
| • ISO-on-TCP (RFC1006) | Yes |
| - Number of connections, max. | 32 |
| - Data length, max. | 65 534 byte |
| • UDP | Yes |
| - Number of connections, max. | 32 |
| - Data length, max. | 1 472 byte |
| **Web server** | |
| • supported | Yes |
| • Number of HTTP clients | 2 |
| • User-defined websites | No |
| **PROFINET CBA (at set setpoint communication load)** | |
| • Setpoint for the CPU communication load | 20 % |
| • Number of remote interconnection partners | 64 |
| • Number of functions, master/slave | 30 |
| • Total of all master/slave connections | 1 000 |
| • Data length of all incoming connections master/slave, max. | 6 800 byte |
| • Data length of all outgoing connections master/slave, max. | 6 800 byte |
| • Number of device-internal and PROFIBUS interconnections | 500 |
| • Data length of device-internal und PROFIBUS interconnections, max. | 4 000 byte |
| • Data length per connection, max. | 1 400 byte |
| **Remote interconnections with acyclic transmission** | |
| - Sampling frequency: Sampling time, min. | 500 ms |
| - Number of incoming interconnections | 100 |
| - Number of outgoing interconnections | 100 |
| - Data length of all incoming interconnections, max. | 2 000 byte |
| - Data length of all outgoing interconnections, max. | 2 000 byte |
| - Data length per connection, max. | 1 400 byte |

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■ **Technical specifications** (continued)

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Remote interconnections with cyclic transmission** | |
| - Transmission frequency: Transmission interval, min. | 10 ms |
| - Number of incoming interconnections | 200 |
| - Number of outgoing interconnections | 200 |
| - Data length of all incoming interconnections, max. | 4 800 byte |
| - Data length of all outgoing interconnections, max. | 4 800 byte |
| - Data length per connection, max. | 250 byte |
| **HMI variables via PROFINET (acyclic)** | |
| - Number of stations that can log on for HMI variables (PN OPC/iMap) | 3 |
| - HMI variable updating | 500 ms |
| - Number of HMI variables | 200 |
| - Data length of all HMI variables, max. | 2 000 byte |
| **PROFIBUS proxy functionality** | |
| - supported | Yes |
| - Number of linked PROFIBUS devices | 16 |
| - Data length per connection, max. | 240 byte; Slave-dependent |
| **Number of connections** | |
| • overall | 96 |
| **S7 message functions** | |
| Number of login stations for message functions, max. | 62 |
| SCAN procedure | No |
| Process diagnostic messages | Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ |
| simultaneously active Alarm-S blocks, max. | 20; of a total of 20 for all SFCs |
| Alarm 8-blocks | Yes |
| • Number of instances for alarm 8 and S7 communication blocks, max. | 4 000 |
| Process control messages | No |
| **Test commissioning functions** | |
| Status block | Yes |
| Single step | Yes |
| Number of breakpoints | 20 |
| **Status/control** | |
| • Status/control variable | Yes |
| **Forcing** | |
| • Forcing | No |
| **Diagnostic buffer** | |
| • present | Yes |
| • Number of entries, max. | |
| - adjustable | Yes |
| - preset | 120 |

| Article number | 6ES7671-0RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX 2010 |
| **Hardware requirement** | |
| Hardware required | PC with color monitor, keyboard, mouse or pointing device for Windows |
| **Processor** | |
| • Processor | Intel Celeron M, 900 MHz or compatible |
| - Multi-processor system | Yes; Dual Pentium, CoreDuo, Core2Duo or compatible |
| - Hyper-threading | Yes |
| **Lifetime of module** | |
| • Main memory, min. | 1 Gbyte; WES7: 2 GB |
| • Required memory on hard disk | 100 Mbyte |
| **Operating systems** | |
| **pre-installed operating system** | |
| • Windows NT 4.0 | No |
| • Windows 2000 | No |
| • Windows Vista | No |
| • Windows XP | Yes; Professional, SP2 and SP3 |
| • Windows XP Embedded | Yes; With the delivery image of the SIMATIC PC |
| - supported HAL types under Windows XP | ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC |
| • Windows 7 | Yes; Professional, Enterprise, Ultimate (only 32 bits) |
| • Windows Embedded Standard 7 | Yes; With delivery image of SIMATIC PC (only 32-bit) |
| **Configuration** | |
| **Programming** | |
| • Nesting levels | 8 |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - CFC | Yes |
| - GRAPH | Yes |
| - HiGraph® | Yes |
| **Software libraries** | |
| - Easy Motion Control | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Block encryption | No |
| **Open Development interfaces** | |
| • CCX (Custom Code Extension) | Yes; WinAC ODK V4.2 or higher |
| • CMI (Controller Management Interface) | Yes; WinAC ODK V4.2 or higher |
| • SMX (Shared Memory Extension) | Yes; WinAC ODK V4.2 or higher |
| - Inputs | 4 kbyte |
| - Outputs | 4 kbyte |
| **Weights** | |
| Weight, approx. | 100 g; With packaging |

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# Software Controllers
## SIMATIC WinAC

### SIMATIC WinAC RTX

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC WinAC RTX 2010**<br><br>Software PLC for PC-based automation tasks with stringent deterministic requirements; PROFIBUS and PROFINET; CD-ROM with electronic documentation d, e, f; executable under Windows XP SP2 and SP3 as well as Windows 7 (32-bit)<br>• Single license for one installation; software and documentation on DVD, license key on USB flash drive<br>• Single license for one installation; software download including license key [1] | <br><br><br><br><br><br><br><br><br>6ES7671-0RC08-0YA0<br><br><br><br>6ES7671-0RC08-0YG0 | **CP 5613 A3 communications processor**<br><br>PCI card (32-bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software; DP-RAM interface for DP master, incl. PG and FDL protocols; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software V12; English/German | 6GK1561-3AA02 |
| **SIMATIC WinAC RTX 2010 Upgrade**<br><br>For upgrading from basic/RTX V3.x, V4.0, V4.1 2005, 2008 and 2009; single license, executable under Windows XP SP2 and SP3 and Windows 7 (32-bit) | 6ES7671-0RC08-0YE0 | **CP 5623 communications processor**<br><br>PCI Express x1 card (32-bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English | 6GK1562-3AA00 |
| **CP 5612 communications processor**<br><br>PCI card (32-bit) for connection of a programming device or PC to PROFIBUS | 6GK1561-2AA00 | **CP 1616 communications processor**<br><br>PCI card (32-bit; 3.3/5 V universal key) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO controller (RT operation) and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional; German/English | 6GK1161-6AA02 |
| **CP 5622 communications processor**<br><br>PCI Express x1 card (32-bit) for connection of a programming device or PC to PROFIBUS | 6GK1562-2AA00 | | |
| **CP 5603 Microbox Package**<br><br>Comprising CP 5603 module and Microbox expansion rack | 6GK1560-3AU00 | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## ■ Overview

- SIMATIC WinAC RTX F:
  Optimized for applications that demand a high degree of flexibility and integration capability and that must also satisfy safety requirements up to SIL 3 (IEC 61508).
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.
- Distributed I/O can be connected over PROFIBUS and/or PROFINET, also safety-related over PROFIsafe.

## ■ Technical specifications

| Article number | 6ES7671-1RC08-0YA0 |
| --- | --- |
| | SIMATIC WINAC RTX F 2010 |
| **General information** | |
| Product type designation | SIMATIC WinAC RTX F 2010 |
| Firmware version | V4.6 |
| **Engineering with** | |
| • Programming package | STEP 7 V5.5 or higher + S7 Distributed Safety V5.4 SP5 or higher + S7 F Configuration Pack V5.5 SP6 HF1 / iMap V3.0 SP1; STEP 7 in TIA Portal V13 or higher + STEP 7 Safety Advanced V13 |
| **Memory** | |
| Type of memory | RAM |
| **Work memory** | |
| • integrated (for program) | 4 Mbyte; Adjustable; depends on Non Paged Memory Pool |
| • integrated (for data) | 4 Mbyte; Adjustable; depends on Non Paged Memory Pool |
| **Load memory** | |
| • integrated RAM, max. | Adjustable; depends on Non Paged Memory Pool |
| **CPU processing times** | |
| for bit operations, typ. | 0.004 μs; Typical |
| for fixed point arithmetic, typ. | 0.003 μs; Typical |
| for floating point arithmetic, typ. | 0.004 μs; Typical |
| Reference platform | Pentium 4, 2.4 GHz |
| **CPU-blocks** | |
| **DB** | |
| • Number, max. | 65 535; Limited only by RAM set for data |
| • Size, max. | 64 kbyte |
| **FB** | |
| • Number, max. | 65 536; Limited only by RAM set for code |
| • Size, max. | 64 kbyte |
| **FC** | |
| • Number, max. | 65 536; Limited only by RAM set for code |
| • Size, max. | 64 kbyte |
| **OB** | |
| • Size, max. | 64 kbyte |

| Article number | 6ES7671-1RC08-0YA0 |
| --- | --- |
| | SIMATIC WINAC RTX F 2010 |
| **Nesting depth** | |
| • per priority class | 24 |
| • additional within an error OB | 24 |
| **Counters, timers and their retentivity** | |
| **S7 counter** | |
| • Number | 2 048 |
| **Retentivity** | |
| - adjustable | Yes |
| - lower limit | 0 |
| - upper limit | 2 047 |
| - preset | 8 |
| **Counting range** | |
| - can be set | Yes |
| - lower limit | 0 |
| - upper limit | 999 |
| **IEC counter** | |
| • present | Yes |
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |
| **S7 times** | |
| • Number | 2 048 |
| **Retentivity** | |
| - adjustable | Yes |
| - lower limit | 0 |
| - upper limit | 2 047 |
| - preset | 0 |
| **Time range** | |
| - lower limit | 10 ms |
| - upper limit | 9 990 s |
| **IEC timer** | |
| • present | Yes |
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |

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# Software Controllers
## SIMATIC WinAC

### SIMATIC WinAC RTX F

■ **Technical specifications** (continued)

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Data areas and their retentivity** | |
| Retentivity without UPS and PS Extension Board | 128 kbyte with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request |
| Retentivity with UPS | all data |
| **Flag** | |
| • Number, max. | 16 kbyte |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8 |
| **Data blocks** | |
| • Retentivity adjustable | Yes; via non-retain property on DB |
| • Retentivity preset | Yes |
| **Local data** | |
| • adjustable, max. | 64 kbyte |
| • preset | 32 kbyte |
| • per priority class, max. | 61 440 byte |
| **Address area** | |
| **I/O address area** | |
| • Inputs | 16 kbyte |
| • Outputs | 16 kbyte |
| **of which distributed** | |
| - DP interface, inputs | 16 kbyte |
| - DP interface, outputs | 16 kbyte |
| - PROFINET interface, inputs | 16 kbyte |
| - PROFINET interface, outputs | 16 kbyte |
| **Process image** | |
| • Inputs, adjustable | 8 kbyte |
| • Outputs, adjustable | 8 kbyte |
| • Inputs, default | 512 byte |
| • Outputs, default | 512 byte |
| **Subprocess images** | |
| • Number of subprocess images, max. | 15 |
| **Digital channels** | |
| • Inputs | 128 000 |
| • Outputs | 128 000 |
| **Analog channels** | |
| • Inputs | 8 000 |
| • Outputs | 8 000 |
| **Number of operable FMs and CPs (recommended)** | |
| • FM | 4; FM distributed: FM 350-1, FM 350-2, FM 351, FM 352 / FM 352-5, FM 353, FM 354, FM 355, FM 355-2 |
| • CP, PtP | 2; CP 340, CP 341 distributed |
| • CP, LAN | Over PC CP |
| **Submodules** | |
| • Number of submodules, max | 4 |
| - of which PROFIBUS, max. | 4; Supported interfaces: see 1st and 2nd interface |
| - of which Industrial Ethernet, max. | 1; Supported interfaces: see 3rd and 4th interface |

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Time of day** | |
| **Clock** | |
| • Hardware clock (real-time) | Yes |
| • retentive and synchronizable | Yes |
| **Operating hours counter** | |
| • Number | 8 |
| **Clock synchronization** | |
| • supported | Yes |
| • to PC-CP, slave | Yes |
| • on Ethernet via NTP | Yes |
| **1. Interface** | |
| Interface type | CP 5611-A2, CP 5621, integrated PROFIBUS interface of the SIMATIC PC |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1 |
| Power supply to interface (15 to 30 V DC), max. | does not exist |
| **Functionality** | |
| • MPI | No |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| **DP master** | |
| • Number of connections, max. | 8 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 64 |
| **Services** | |
| - PG/OP communication | Yes |
| - Global data communication | No |
| - S7 basic communication | No |
| - S7 communication | Yes |
| - S7 communication, as client | Yes |
| - S7 communication, as server | Yes |
| - Equidistance | Yes; Only in conjunction with isochronous mode |
| - Isochronous mode | Yes |
| - SYNC/FREEZE | Yes |
| - Activation/deactivation of DP slaves | Yes |
| - Direct data exchange (slave-to-slave communication) | Yes |
| - DPV1 | Yes |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| **User data per DP slave** | |
| - Inputs, max. | 244 byte |
| - Outputs, max. | 244 byte |
| **2. Interface** | |
| Interface type | CP 5613, CP 5613-A2, CP 5603, CP 5623 |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 4 |

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## ■ Technical specifications (continued)

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Functionality** | |
| • MPI | No |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| **DP master** | |
| • Number of connections, max. | 50 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 125 |
| **Services** | |
| - PG/OP communication | Yes |
| - Global data communication | No |
| - S7 basic communication | No |
| - S7 communication | Yes |
| - S7 communication, as client | Yes |
| - S7 communication, as server | Yes |
| - Equidistance | Yes; Only in conjunction with isochronous mode |
| - Isochronous mode | Yes |
| - SYNC/FREEZE | Yes |
| - Activation/deactivation of DP slaves | Yes |
| - Direct data exchange (slave-to-slave communication) | Yes |
| - DPV1 | Yes |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| **User data per DP slave** | |
| - Inputs, max. | 244 byte |
| - Outputs, max. | 244 byte |
| **3. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C |
| automatic detection of transmission rate | Yes; 10/100 Mbit/s |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| **Interface types** | |
| • Number of ports | 1 |
| • integrated switch | No |
| **Media redundancy** | |
| • supported | No |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | No |
| • PROFINET CBA | Yes |
| • Open IE communication | Yes |

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **PROFINET IO Controller** | |
| • Transmission rate, max. | 100 Mbit/s |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - S7 communication | Yes |
| - Isochronous mode | No |
| - Open IE communication | Yes |
| - IRT | No |
| - Prioritized startup | Yes |
| - Number of IO devices with prioritized startup, max. | 32 |
| - Number of connectable IO Devices, max. | 128 |
| - Number of connectable IO Devices for RT, max. | 128 |
| - of which in line, max. | 128 |
| - Activation/deactivation of IO Devices | Yes |
| - Number of IO Devices that can be simultaneously activated/ deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes |
| - Device replacement without swap medium | Yes |
| - Send cycles | 1 ms |
| - Updating time | 1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data) |
| **Address area** | |
| - Inputs, max. | 16 kbyte |
| - Outputs, max. | 16 kbyte |
| - User data per address area, max. | 2 kbyte |
| - User data consistency, max. | 254 byte |
| **Open IE communication** | |
| • Number of connections, max. | 32 |
| • Local port numbers used at the system end | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| • Keep-alive function, supported | Yes |
| **4. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet |
| Isolated | Yes |
| Number of simultaneously operable CPs, max. | 1; CP 1616 (HW release 8 or above), CP 1604 (HW release 7 or higher), integrated PROFINET interface of SIMATIC PC and S7-mEC |
| automatic detection of transmission rate | Yes; 10/100 Mbit/s |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Change of IP address at runtime, supported | Yes |
| **Interface types** | |
| • Number of ports | 3 |
| • integrated switch | Yes |

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## Software Controllers
SIMATIC WinAC

### SIMATIC WinAC RTX F

■ **Technical specifications** (continued)

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Media redundancy** | |
| • supported | Yes |
| • Switchover time on line break, typ. | 200 ms |
| • Number of stations in the ring, max. | 50 |
| **Functionality** | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | No |
| • PROFINET CBA | Yes |
| • Open IE communication | Yes |
| **PROFINET IO Controller** | |
| • Transmission rate, max. | 100 Mbit/s |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - S7 communication | Yes |
| - Isochronous mode | Yes |
| - Open IE communication | Yes |
| - IRT | Yes |
| - Prioritized startup | Yes |
| - Number of IO devices with prioritized startup, max. | 32 |
| - Number of connectable IO Devices, max. | 256 |
| - Of which IO devices with IRT, max. | 64 |
| - of which in line, max. | 64 |
| - Number of IO Devices with IRT and the option "high flexibility" | 64 |
| - of which in line, max. | 32 |
| - Number of connectable IO Devices for RT, max. | 256 |
| - of which in line, max. | 256 |
| - Activation/deactivation of IO Devices | Yes |
| - Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| - IO Devices changing during operation (partner ports), supported | Yes |
| - Device replacement without swap medium | Yes |
| - Send cycles | 250 µs, 500 µs, 1 ms |
| - Updating time | 0.25...512 depending on the send cycle |
| **Address area** | |
| - User data per address area, max. | 2 kbyte |
| - User data consistency, max. | 254 byte |
| **Open IE communication** | |
| • Number of connections, max. | 32 |
| • Local port numbers used at the system end | 0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Number of DP masters with isochronous mode | 2 |
| User data per isochronous slave, max. | 128 byte |
| Equidistance | Yes |
| shortest clock pulse | 2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image |

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Communication functions** | |
| PG/OP communication | Yes |
| Data record routing | Yes; only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC |
| **Global data communication** | |
| • supported | No |
| **S7 basic communication** | |
| • supported | No |
| **S7 communication** | |
| • supported | Yes |
| • as server | Yes |
| • as client | Yes |
| • User data per job, max. | 64 kbyte; Depends on which block is used: BSEND/USEND or PUT/GET |
| **Open IE communication** | |
| • TCP/IP | Yes |
| - Number of connections, max. | 32 |
| - Data length for connection type 01H, max. | Not supported |
| - Data length for connection type 11H, max. | 65 534 byte |
| - Data length, max. | 65 534 byte |
| • ISO-on-TCP (RFC1006) | Yes |
| - Number of connections, max. | 32 |
| - Data length, max. | 65 534 byte |
| • UDP | Yes |
| - Number of connections, max. | 32 |
| - Data length, max. | 1 472 byte |
| **Web server** | |
| • supported | Yes |
| • Number of HTTP clients | 2 |
| • User-defined websites | No |
| **PROFINET CBA (at set setpoint communication load)** | |
| • Setpoint for the CPU communication load | 20 % |
| • Number of remote interconnection partners | 64 |
| • Number of functions, master/slave | 30 |
| • Total of all master/slave connections | 1 000 |
| • Data length of all incoming connections master/slave, max. | 6 800 byte |
| • Data length of all outgoing connections master/slave, max. | 6 800 byte |
| • Number of device-internal and PROFIBUS interconnections | 500 |
| • Data length of device-internal und PROFIBUS interconnections, max. | 4 000 byte |
| • Data length per connection, max. | 1 400 byte |
| **Remote interconnections with acyclic transmission** | |
| - Sampling frequency: Sampling time, min. | 500 ms |
| - Number of incoming interconnections | 100 |
| - Number of outgoing interconnections | 100 |
| - Data length of all incoming interconnections, max. | 2 000 byte |
| - Data length of all outgoing interconnections, max. | 2 000 byte |
| - Data length per connection, max. | 1 400 byte |

## Technical specifications (continued)

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Remote interconnections with cyclic transmission** | |
| - Transmission frequency: Transmission interval, min. | 10 ms |
| - Number of incoming interconnections | 200 |
| - Number of outgoing interconnections | 200 |
| - Data length of all incoming interconnections, max. | 4 800 byte |
| - Data length of all outgoing interconnections, max. | 4 800 byte |
| - Data length per connection, max. | 250 byte |
| **HMI variables via PROFINET (acyclic)** | |
| - Number of stations that can log on for HMI variables (PN OPC/iMap) | 3 |
| - HMI variable updating | 500 ms |
| - Number of HMI variables | 200 |
| - Data length of all HMI variables, max. | 2 000 byte |
| **PROFIBUS proxy functionality** | |
| - supported | Yes |
| - Number of linked PROFIBUS devices | 16 |
| - Data length per connection, max. | 240 byte; Slave-dependent |
| **Number of connections** | |
| • overall | 96 |
| **S7 message functions** | |
| Number of login stations for message functions, max. | 62 |
| SCAN procedure | No |
| Process diagnostic messages | Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ |
| simultaneously active Alarm-S blocks, max. | 20; of a total of 20 for all SFCs |
| Alarm 8-blocks | Yes |
| • Number of instances for alarm 8 and S7 communication blocks, max. | 4 000 |
| Process control messages | No |
| **Test commissioning functions** | |
| Status block | Yes |
| Single step | Yes |
| Number of breakpoints | 20 |
| **Status/control** | |
| • Status/control variable | Yes |
| **Forcing** | |
| • Forcing | No |
| **Diagnostic buffer** | |
| • present | Yes |
| • Number of entries, max. | |
| - adjustable | Yes |
| - preset | 120 |
| **Hardware requirement** | |
| Hardware required | PC with color monitor, keyboard, mouse or pointing device for Windows |

| Article number | 6ES7671-1RC08-0YA0 |
|---|---|
| | SIMATIC WINAC RTX F 2010 |
| **Processor** | |
| • Processor | Intel Celeron M 900 MHz or compatible (older PC systems with Programmable Interrupt Controllers (PIC) are not suitable for WinAC RTX F 2010.) |
| - Multi-processor system | No |
| - Hyper-threading | Yes |
| **Lifetime of module** | |
| • Main memory, min. | 1 Gbyte |
| • Required memory on hard disk | 100 Mbyte |
| **Operating systems** | |
| **pre-installed operating system** | |
| • Windows NT 4.0 | No |
| • Windows 2000 | No |
| • Windows Vista | No |
| • Windows XP | Yes; Professional, SP2 and SP3 |
| • Windows XP Embedded | Yes; With the delivery image of the SIMATIC PC |
| - supported HAL types under Windows XP | ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC |
| • Windows 7 | Yes; Professional, Enterprise, Ultimate (only 32 bits) |
| • Windows Embedded Standard 7 | No |
| **Configuration** | |
| **Programming** | |
| • Nesting levels | 8 |
| **Programming language** | |
| - LAD | Yes |
| - FBD | Yes |
| - STL | Yes |
| - SCL | Yes |
| - CFC | Yes |
| - GRAPH | Yes |
| - HiGraph® | Yes |
| **Software libraries** | |
| - Easy Motion Control | Yes |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| • Block encryption | No |
| **Open Development interfaces** | |
| • CCX (Custom Code Extension) | Yes; WinAC ODK V4.2 or higher |
| • CMI (Controller Management Interface) | Yes; WinAC ODK V4.2 or higher |
| • SMX (Shared Memory Extension) | Yes; WinAC ODK V4.2 or higher |
| - Inputs | 4 kbyte |
| - Outputs | 4 kbyte |
| **Weights** | |
| Weight, approx. | 100 g; With packaging |

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## Software Controllers
SIMATIC WinAC

**SIMATIC WinAC RTX F**

| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC WinAC RTX F 2010**<br><br>Fail-safe software PLC for PC-based automation tasks with stringent deterministic requirements; PROFIBUS and PROFINET; DVD with electronic documentation d, e; executable under Windows XP SP2 and SP3 as well as Windows 7 (32-bit) | | **CP 5613 A3 communications processor**<br><br>PCI card (32-bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software; DP-RAM interface for DP master, incl. PG and FDL protocols; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software V12; English/German | **6GK1561-3AA02** |
| • Single license for one installation; software and documentation on DVD, license key on USB flash drive | **6ES7671-1RC08-0YA0** | | |
| • Single license for one installation; software download including license key [1] | **6ES7671-1RC08-0YG0** | | |
| **SIMATIC WinAC RTX F 2010 upgrade**<br><br>For upgrading from WinAC RTX F version 2009; single license, executable under Windows XP SP2 and SP3 and Windows 7 (32-bit) | **6ES7671-1RC08-0YE0** | **CP 5623 communications processor**<br><br>PCI Express x1 card (32-bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English | **6GK1562-3AA00** |
| **CP 5612 communications processor**<br><br>PCI card (32-bit) for connection of a programming device or PC to PROFIBUS | **6GK1561-2AA00** | | |
| **CP 5622 communications processor**<br><br>PCI Express x1 card (32-bit) for connection of a programming device or PC to PROFIBUS | **6GK1562-2AA00** | **CP 1616 communications processor**<br><br>PCI card (32-bit; 3.3/5 V universal key) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO controller (RT operation) and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional; German/English | **6GK1161-6AA02** |
| **CP 5603 Microbox Package**<br><br>Comprising CP 5603 module and Microbox expansion rack | **6GK1560-3AU00** | | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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## Overview



- SIMATIC WinAC software PLCs support powerful interfaces which permit close meshing of the control task with PC-based applications.
- WinAC ODK allows the user to develop applications or to integrate already existing applications into the control task.

## Technical specifications

| Article number | 6ES7806-1CC03-0BA0 |
|---|---|
| | SIMATIC WINAC ODK V4.2 |
| **General information** | |
| Product type designation | SIMATIC WinAC ODK V4.2 SP1 |
| **Hardware requirement** | |
| Hardware required | PC with color monitor, keyboard, mouse or pointing device for Windows |
| **Processor** | |
| • Processor | Intel Pentium 800 MHz |
| **Lifetime of module** | |
| • Main memory, min. | 1 Gbyte |
| • Required memory on hard disk | 30 Mbyte |
| **Operating systems** | |
| **pre-installed operating system** | |
| • Windows XP | Yes; Professional, SP2 and SP3 |
| • Windows 7 | Yes; Professional, Enterprise, Ultimate (only 32 bits) |
| **Open Development interfaces** | |
| • CCX (Custom Code Extension) | Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241 |
| • CMI (Controller Management Interface) | Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241 |
| • SMX (Shared Memory Extension) | Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241 |
| **Weights** | |
| Weight, approx. | 200 g |

## Ordering data — Article No.

**SIMATIC WinAC ODK V4.2**

For integration of C/C++ code in WinAC PLCs, executable under Windows XP SP2 or SP3; CD-ROM with electronic documentation

Single license — **6ES7806-1CC03-0BA0**

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## Software Controllers

**Notes**

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***Brochures***

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# I/O systems

## Overview



***SIMATIC ET 200 offers the right solution for every application***

With SIMATIC ET 200 a wide range of distributed I/O systems is available - for solutions in the control cabinet or without a control cabinet directly at the machine, as well as for applications in hazardous areas. The modular design makes it possible to scale and expand the ET 200 systems simply and in small stages. Already integrated add-on modules reduce costs and at the same time offer a widely diverse range of possible applications. You can choose from many different combination options: digital and analog inputs/outputs, intelligent modules with CPU functionality, safety systems, motor starters, pneumatic devices, frequency converters, as well as various different technology modules (e.g. for counting, positioning).

Communication over PROFINET and PROFIBUS, uniform engineering, transparent diagnostic possibilities as well as optimal interfacing to SIMATIC controllers and HMI units prove the unique integration of Totally Integrated Automation.

### PROFINET

PROFINET is the open, cross-vendor Industrial Ethernet standard (IEC 61158/61784) for automation.

Based on Industrial Ethernet, PROFINET enables direct communication between field devices (IO devices) and controllers (IO Controllers), up to and including the solution of isochronous drive controls for motion control applications.

As PROFINET is based on Standard Ethernet according to IEEE 802.3, any devices from the field level to the management level can be connected.

In this way, PROFINET enables system-wide communication, supports plant-wide engineering and applies IT standards, such as web server or FTP, right down to field level. Tried and tested fieldbus systems, such as PROFIBUS or AS-Interface, can be easily integrated without any modification to the existing devices.

### PROFIBUS

PROFIBUS is the international standard (IEC 61158/61784) for the field level. It is the only fieldbus to allow communication both in manufacturing applications and in process-oriented applications.

PROFIBUS is used to connect field devices, e.g. distributed I/O devices or drives, to automation systems such as SIMATIC S7, SIMOTION, SINUMERIK, or PCs.

PROFIBUS is standardized in accordance with IEC 61158 and is a powerful, open and rugged fieldbus system with short response times. PROFIBUS is available in different forms for various applications.

### PROFIBUS DP (Distributed I/O)

PROFIBUS DP is used for connecting distributed field devices, e.g. SIMATIC ET 200, or drives with extremely fast response times. PROFIBUS DP is used when sensors or actuators are distributed at the machine or in the plant (e.g. field level).

### AS-Interface

AS-Interface is the international standard (IEC 62026/EN 50295) which, as an alternative to the cable harness, links especially cost-effective sensors and actuators by means of a two-wire line. This two-wire line is also used to supply the individual stations with power. This makes the AS-Interface the ideal partner for PROFINET and PROFIBUS DP. AS-i communication modules in the ET 200SP enable the flexible combination of AS-Interface and distributed I/Os. AS-Interface transmits standard data and safety data up to PL e / SIL 3 in the same AS-i network. AS-Interface is not only suitable for efficient transmission of digital and analog I/O signals but also ideal for the user-friendly connection of EMERGENCY STOP pushbuttons and protective doors.

### IO-Link

The communication standard IO-Link permits the intelligent connection of sensors and switching devices to the control level. IO-Link facilitates the integration of all components in the control cabinet and on the field level - for maximum integration and seamless communication on the final meters to the process.

IO-Link solutions from Siemens ensure maximum precision and cost-effectiveness in any production system. IO-Link is completely integrated in Totally Integrated Automation (TIA) and offers many advantages.

- The open standard permits the networking of devices from different manufacturers
- Simple wiring facilitates the installation process
- Reduced wiring effort saves time and money during installation
- Efficient engineering facilitates configuration and commissioning
- High-speed diagnostics ensures short plant standstill times and high plant availability
- High process transparency permits, for example, efficient power management

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# I/O systems
SIMATIC ET 200 systems for the control cabinet

## SIMATIC ET 200SP

### ■ Overview

#### *SIMATIC ET 200SP*



The scalable SIMATIC ET 200SP I/O system is a highly flexible, modular I/O system with IP20 degree of protection. Via an interface module with PROFINET or PROFIBUS interface it can exchange IO data of the connected I/O modules with a higher-level control system. Alternatively, as further head-end stations, various PLC, F-PLC and Open Controllers are available as compact S7-1500 controllers (distributed controllers). ET 200SP components are available as SIPLUS version for extreme requirements and a high degree of robustness.

Compact design
• Modular configuration with up to 64 modules
• System-integrated self-assembling load group supply without power module via light BaseUnits
• Small size and highly flexible due to the modular design and comprehensive product range
• Up to 16 channels per module
• Permanent wiring
• Hot swapping: Module replacement without tools in RUN
• Operation with gaps

Flexible connection system
• Push-in terminals for cross-sections up to 1.5 mm² with wire end ferrule, and up 2.5 mm² without wire end ferrule
• BaseUnits for 1-wire or direct multi-wire connection
• Optimum accessibility for wiring due to spring release and measuring tap next to the conductor opening
• Flexible PROFINET connection via BusAdapter (RJ45, FastConnect, plastic or glass fiber-optic cables), also as integrated media converter

Safety Integrated
• Easy integration of fail-safe modules
• Easy F parameter assignment via software
• Group-by-group disconnection of non-fail-safe modules

High performance
• Isochronous PROFINET
• Internal data transfer with up to 100 Mbps
• Record analog values and output as of 50 µs
• Record digital values and output as of 1 µs

High-performance technology
• Modules for the functions Counting, Positioning, Weighing

Energy efficiency
• Energy meter for recording electrical variables
• System-integrated PROFIenergy with interval substitute values

Advanced functions
• Configuration control: application-based adaptation of the actual configuration via user software (option handling)
• Time-based IO: time stamping of the signals to the µs
• MSI/MSO: Simultaneous access to I/O data from up to 4 PLCs
• Oversampling: n-fold acquisition or output of digital and analog signals within a PN cycle
• Adaptation of measuring range: increased resolution by adapting the measuring range to a limited section of a measuring range supported by the analog input module
• Scaling of measured values: permits the transmission of the analog value normalized to the required physical value as a REAL value (32-bit floating point)

Communication standards
• PROFINET IO
• PROFIBUS DP V0/V1
• ET connection for connecting the ET 200AL (IP67)
• IO-Link V1.1
• AS-Interface
• Point-to-point (RS 232, RS 485, RS 422)

CPU
• PROFINET connection with 3 ports
• IO controller and PN IO device
• Optional expansion as DP master/slave
• Also as fail-safe version and Open Controller

Labeling of I/O modules
• Meaningful labeling on the front of the I/O modules
• Optionally expandable with
  - Labeling strips
  - Equipment labeling plate

## Overview (continued)

### Overview of ET 200SP components

| Basic components | Function |
|---|---|
| **DIN rail according to EN 60715** | The DIN rail is the module support of the ET 200SP.<br>The ET 200SP is mounted on the DIN rail. |
| **CPU** | The CPU:<br>• executes the user program<br>• is used as IO controller, I-device on PROFINET IO, or as stand-alone CPU<br>• connects the ET 200SP with the IO devices or the IO controller<br>• exchanges data with the I/O modules via the backplane bus<br><br>Further functions of the CPU:<br>• Communication via PROFIBUS DP (in combination with the CM DP communication module, the CPU can be used as DP master or slave)<br>• Integrated web server<br>• Integrated technology<br>• Integrated trace functionality<br>• Integrated system diagnostics<br>• Integrated safety |
| **Open controller** | As the first controller of this type, the SIMATIC ET 200SP Open Controller combines the functions of a PC-based software controller with visualization, PC applications and central I/Os (inputs/outputs) in a single, compact device.<br>• All in one<br>• High system availability<br>• Compact and modular<br>• Rugged<br>• User-friendly design<br>• Efficient engineering in the TIA Portal |
| **Interface module for PROFINET IO (IM 155-6PN)** | The interface module:<br>• is used as IO device on the PROFINET IO<br>• connects the ET 200SP with the IO controller<br>• exchanges data with the I/O modules via the backplane bus |
| **Interface module for PROFIBUS DP (IM 155-6DP)** | The interface module:<br>• is used as DP slave on the PROFIBUS DP<br>• connects the ET 200SP with the DP master<br>• exchanges data with the I/O modules via the backplane bus |
| **BusAdapter (BA)** | BusAdapters permit the free selection of the connection method and connection technology for head-end stations with PROFINET interface.<br><br>Various versions are available for the connection of copper cables or plastic and glass fiber-optic cables. Hybrid copper/fiber-optic versions are also available as integrated media converters.<br><br>Cable length between 2 stations:<br>max. 100 m (Cu),<br>max. 50 m (POF),<br>max. 100 m (PCF),<br>max. 3 km (glass FOC).<br><br>For expanding the station with the I/O systems ET 200AL via ET connection, the BA-Send BusAdapter is available. |

| Basic components | Function |
|---|---|
| **BaseUnit (BU)** | The BaseUnits provide the electrical and mechanical connection for the ET 200SP components.<br>• Bright BaseUnits permit a new potential group up to max. 10 A<br>• Dark BaseUnits forward the self-assembling voltage busbars P1, P2 and AUX from the left to the right BaseUnit<br>• Suitable BaseUnits with 12 to 28 terminals are available for different connection systems (single or direct multi-conductor connection) and functions<br>• The I/O module is plugged onto the desired BaseUnit and determines the potential assignment of the terminals on the BaseUnit<br>• For expanding the station with the I/O systems ET 200AL via ET connection, the BaseUnit BU-Send is available |
| **I/O modules and fail-safe I/O modules** | The I/O module determines the function at the terminals. The controller detects the current process state via the connected sensors and triggers corresponding responses via the connected actuators.<br>Some I/O modules feature extended functions, in part they are also designed as individual operating mode. I/O modules are divided into the following module types; the fail-safe versions are identified by a preceding "F-" and a yellow module enclosure.<br>• DI (digital input)<br>• DQ (digital output)<br>• AI (analog input)<br>• AQ (analog output)<br>• TM (technology modules)<br>• CM (communication modules)<br>• SM (special modules) |
| **Protective cover (BU cover)** | The ET 200SP system can be operated with any number of slot gaps (BU slot without I/O module). Applications for this include:<br>• partial commissioning<br>• pre-wired, and currently unequipped options<br><br>To protect against damage, such slot gaps must be covered by a BU cover. Within the BU cover, an equipment labeling plate can be kept for the possible later use of an I/O module.<br><br>Versions:<br>• for BaseUnits with a width of 15 mm<br>• for BaseUnits with a width of 20 mm |
| **Server module** | The server module concludes the setup of an ET 200SP station. On the server module there are holders for 3 spare fuses ($5 \times 20$ mm).<br>The server module is included in the scope of delivery of all head-end stations. |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet

**SIMATIC ET 200SP**

### ■ Overview (continued)

| Basic components | Function |
|---|---|
| **Coding element** | When plugging an I/O module onto a BaseUnit for the first time, the coding element moves from the I/O module to the BaseUnit. There it prevents the destruction of the ET 200SP components in the event of a subsequent module replacement with incorrectly selected I/O module. |
| | The coding element is available in two versions:<br>• Mechanical coding element<br>• Electronic coding element: Additionally features an electronic, re-writable memory for the redundant storage of module-specific configuration data (e.g. F target address for fail-safe modules, parameter data for IO-Link master). Thus these data are automatically backed up during a module replacement |
| **Shield connection** | The shield connection permits the connection of cable shields. Compared to external shield supports, the system offers the following advantages:<br>• Quick installation without tools by plugging the shield connection element onto the BaseUnit<br>• Automatic low-impedance connection to the functional ground (DIN rail)<br>• Optimized EMC properties by separating the supply voltage lines from the signal lines by means of the shield connection element and short, unshielded cable lengths<br>• Low space requirements |
| **Labeling strips** | Optionally, for system-specific marking the head-end stations and I/O modules can be equipped with labeling strips (13 x 31 mm). The labeling strips can be inscribed mechanically. Labeling strips are available in two versions in the colors light gray and yellow:<br>• 500 strips on the roll, for printing on thermal transfer printers. Core diameter 40 mm, external diameter 70 mm, width 62 mm<br>• 10 DIN A4 sheets with 100 strips each, card 180 g/mm$^2$, perforated, for printing with a laser printer direct from TIA Portal or via print templates |

| Basic components | Function |
|---|---|
| **Equipment labeling plate** | Optionally, one equipment labeling plate each can be plugged onto head-end stations, BusAdapters, BaseUnits, and I/O modules. Equipment labeling plates are supplied in packs of 10 sheets with 16 labels each. The labels can be printed with thermal transfer card printers or plotters, or stickers can be attached to them. Advantages compared to labels that are attached directly:<br>• The inscription on the front is not covered<br>• Simple label replacement when replacing a module<br>• No parallax errors when marking the BaseUnits on the mounting plate |
| | The size of the inscribable area of the labels is 14.8 x 10.5 mm (W x H) |
| **Color-coded labels** | The I/O modules that are plugged onto the BaseUnits determine the potentials connected at the process terminals. The +/- potentials can optionally be identified using module-specific color-coded labels. The potentials of the AUX and add-on terminals can also be marked using color-coded labels. Advantages of the color-coded labels:<br>• Quick installation (one label for marking 16 terminals)<br>• Avoidance of wiring errors<br>• Simple detection of potentials during servicing |

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## ■ Overview



Thanks to their wide scope of functions, the interface modules of the scalable SIMATIC ET 200SP I/O system, even in their basic versions, cover a wide range of applications. The basic functions of the interface modules include:

- Short data update times of typically 1 ms
- Single Hot Swap (withdrawing and insertion of an I/O module during operation without impairing the communication with the remaining modules)
- Operation with gaps (empty BaseUnits)
- Complete diagnostic support, extending to channel-by-channel diagnostics
- Configuration control / option handling (adaptation of the actual configuration via user software)
- Device replacement without programming device
- I&M data 0 to 3 (electronic rating plate with non-volatile storage of plant data)
- Firmware update
- Pluggable 24 V DC supply connection
- Network / power failure bridging time of 5 ms
- Labeling option via optional labeling strips and equipment labeling plates

When using PROFINET interface modules, the following basic functions are also included:

- Media redundancy (MRP)
- Integrated 2-port switch
- Freely selectable connection system (Standard function class and above) and physical connection (High Feature function class and above) by means of SIMATIC BusAdapters, also as system-integrated media converter from fiber-optic to copper cable
- Reset button for simple return to factory settings without the need for programming device
- Replacement without programming device even in case of non-topological configuration with subsequent automatic launching
- Automatic synchronization of the backplane bus to the PROFINET cycle to minimize the response time fluctuations (jitter)

Listed below is a short overview of the interface modules available for the ET 200SP, showing the essential differences. A clear and more precise comparison of functions of the different interface modules is offered by the TIA Selection Tool.

SIMATIC IM155-6DP High Feature with PROFIBUS connection

- Max. 32 I/O modules, also PROFIsafe modules with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 244 bytes in each case for input and output data per module and per station
- Data update time: typ. 5 ms
- PROFIBUS connection via 9-pin sub D female connector
- Package inclusive of server module and PROFIBUS connector with programming device socket

SIMATIC IM155-6PN Basic with PROFINET access

- Max. 12 I/O modules, no PROFIsafe modules, with complete diagnostic support
- Max. 32 bytes in each case for input and output data per module and per station
- Data update time: typ.1 ms
- PROFINET connection via 2 integrated RJ45 sockets (integrated 2-port switch)
- Package inclusive of server module

SIMATIC IM155-6PN Standard with PROFINET interface

- Max. 32 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 256 bytes in each case for input and output data per module and max. 512 bytes per station (depending on configuration)
- Data update time: typ.1 ms
- Selection of the type of connection of the PROFINET by means of SIMATIC BusAdapter (BusAdapter for copper cables only)
- Two forms of delivery:
  - As package with IM155-6PN ST, with pre-assembled BA 2xRJ45 BusAdapter, including server module
  - As package with IM155-6PN ST, without BusAdapter, including server module

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

### ■ Overview (continued)

SIMATIC IM155-6PN High Feature with PROFINET interface

- Max. 64 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 288 bytes in each case for input and output data per module and max. 1440 bytes per station (depending on configuration)
- Fast data refresh time: isochronous mode from 250 µs
- S2 system redundancy
- Choice of connection type and physical connection of the PROFINET by means of SIMATIC BusAdapter. All BusAdapters with a connection for copper and/or fiber-optic cables can be used; BusAdapter must be ordered separately
- Package includes server module

SIMATIC IM155-6PN High Speed with PROFINET interface

- Max. 30 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Max. 32 bytes in each case for input and output data per module and max. 968 bytes per station (depending on configuration)
- Fast data refresh time: isochronous mode from 125 µs
- Performance upgrade for PROFINET
- Choice of connection type and physical connection of the PROFINET by means of SIMATIC BusAdapter. All BusAdapters with a connection for copper and/or fiber-optic cables can be used; BusAdapter must be ordered separately
- Package inclusive of server module

### ■ Technical specifications

| Article number | 6ES7155-6AR00-0AN0 | 6ES7155-6AA00-0BN0 | 6ES7155-6AU00-0BN0 | 6ES7155-6AU00-0CN0 | 6ES7155-6AU00-0DN0 | 6ES7155-6BA00-0CN0 |
|---|---|---|---|---|---|---|
| | ET 200SP, IM155-6PN BASIC | ET 200SP, IM155-6PN ST INCL. BA 2XRJ45 | ET 200SP, IM155-6PN ST | ET 200SP, IM155-6PN HF | ET 200SP, IM155-6PN HS | ET 200SP, IM155-6DP HF INCL. DP-CONNECT. |
| **General information** | | | | | | |
| Product type designation | IM 155-6 PN BA with 2x RJ45 ports and server module | IM 155-6 PN ST with BA 2xRJ45 and server module | IM 155-6 PN ST with server module | IM 155-6 PN HF with server module | ET 200SP, IM 155-6 PN HS with server module | IM155-6DP HF with PROFIBUS connector and server module |
| **Product function** | | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M4 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 | V13 SP1 | V13 SP1 | V13 SP1 Update 6 | STEP 7 V14 or higher | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 and higher | V5.5 SP4 and higher | V5.5 SP4 and higher | V5.5 SP4 and higher | V5.5 SP4 and higher | V5.5 SP4 and higher |
| • PROFIBUS as of GSD version/ GSD revision | | | | | | One GSD file each, Revision 3 and 5 and higher |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - | - / V2.3 | - / V2.3 | |
| **Supply voltage** | | | | | | |
| Type of supply voltage | | | | | | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes | Yes | Yes |
| **Mains buffering** | | | | | | |
| • Mains/voltage failure stored energy time | 5 ms | 5 ms | 5 ms | 5 ms | 5 ms | 5 ms |
| **Hardware configuration** | | | | | | |
| **Rack** | | | | | | |
| • Modules per rack, max. | 12 | 32; + 16 ET 200AL modules | 32; + 16 ET 200AL modules | 64; + 16 ET 200AL modules | 30 | 32; + 16 ET 200AL modules |
| **Submodules** | | | | | | |
| • Number of submodules per station, max. | | 256 | 256 | 256 | 125 | |
| **Interfaces** | | | | | | |
| Number of PROFINET interfaces | 1; 2 ports (switch) | 1; 2 ports (switch) | 1; 2 ports (switch) | 1; 2 ports (switch) | 1; 2 ports (switch) | |
| Number of PROFIBUS interfaces | | | | | | 1 |

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■ **Technical specifications** (continued)

| Article number | 6ES7155-6AR00-0AN0 | 6ES7155-6AA00-0BN0 | 6ES7155-6AU00-0BN0 | 6ES7155-6AU00-0CN0 | 6ES7155-6AU00-0DN0 | 6ES7155-6BA00-0CN0 |
|---|---|---|---|---|---|---|
| | ET 200SP, IM155-6PN BASIC | ET 200SP, IM155-6PN ST INCL. BA 2XRJ45 | ET 200SP, IM155-6PN ST | ET 200SP, IM155-6PN HF | ET 200SP, IM155-6PN HS | ET 200SP, IM155-6DP HF INCL. DP-CONNECT. |
| **1. Interface** | | | | | | |
| **Interface types** | | | | | | |
| • Number of ports | 2 | 2 | 2 | 2 | 2 | |
| • integrated switch | Yes | Yes | Yes | Yes | Yes | |
| • RJ 45 (Ethernet) | Yes; 2 integrated RJ45 ports | Yes; Pre-assembled BusAdapter BA 2x RJ45 | | | | |
| • RS 485 | | | | | | Yes |
| • BusAdapter (PROFINET) | No | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC | Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3) | Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC | |
| • Output current of the interface, max. | | | | | | 90 mA |
| **Functionality** | | | | | | |
| • PROFINET IO Device | Yes | Yes | Yes | Yes | Yes | |
| • PROFIBUS DP slave | | | | | | Yes |
| • Open IE communication | Yes | Yes | Yes | Yes | Yes | |
| • Media redundancy | Yes; PROFINET MRP | Yes; PROFINET MRP | Yes; PROFINET MRP | Yes; PROFINET MRP | Yes; As MRP or MRPD client; max. 50 or 30 devices in the ring | |
| **Interface types** | | | | | | |
| **RJ 45 (Ethernet)** | | | | | | |
| • Transmission procedure | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | |
| • 10 Mbps | No | No | No | No | No | |
| • 100 Mbps | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) | |
| • Autonegotiation | Yes | Yes | Yes | Yes | Yes | |
| • Autocrossing | Yes | Yes | Yes | Yes | Yes | |
| **RS 485** | | | | | | |
| • Transmission rate, max. | | | | | | 12 Mbit/s |
| **PROFINET IO Device** | | | | | | |
| **Services** | | | | | | |
| - Isochronous mode | No | No | No | Yes; Bus cycle time: min. 250 µs | Yes; Bus cycle time: min. 125 µs | |
| - Open IE communication | Yes | Yes | Yes | Yes | Yes | |
| - IRT | No | Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs | Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs | Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame | Yes; 125 µs, 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## ■ Technical specifications (continued)

| Article number | 6ES7155-6AR00-0AN0 | 6ES7155-6AA00-0BN0 | 6ES7155-6AU00-0BN0 | 6ES7155-6AU00-0CN0 | 6ES7155-6AU00-0DN0 | 6ES7155-6BA00-0CN0 |
|---|---|---|---|---|---|---|
| | ET 200SP, IM155-6PN BASIC | ET 200SP, IM155-6PN ST INCL. BA 2XRJ45 | ET 200SP, IM155-6PN ST | ET 200SP, IM155-6PN HF | ET 200SP, IM155-6PN HS | ET 200SP, IM155-6DP HF INCL. DP-CONNECT. |
| **Services (continued)** | | | | | | |
| - MRP | Yes | Yes | Yes | Yes | Yes | |
| - MRPD | No | No | No | No | Yes | |
| - PROFINET system redundancy | No | No | No | Yes; NAP S2 | No | |
| - PROFIenergy | No | Yes | Yes | Yes | Yes | |
| - Prioritized startup | No | Yes | Yes | Yes | Yes | |
| - Shared device | No | Yes | Yes | Yes | Yes | |
| - Number of IO Controllers with shared device, max. | | 2 | 2 | 4 | 4 | |
| **Open IE communication** | | | | | | |
| • TCP/IP | Yes | Yes | Yes | Yes | Yes | |
| • SNMP | Yes | Yes | Yes | Yes | Yes | |
| • LLDP | Yes | Yes | Yes | Yes | Yes | |
| **PROFIBUS** | | | | | | |
| **Services** | | | | | | |
| - SYNC capability | | | | | | Yes |
| - FREEZE capability | | | | | | Yes |
| - DPV0 | | | | | | Yes |
| - DPV1 | | | | | | Yes |
| **Isochronous mode** | | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | Yes | Yes | No |
| Equidistance | No | No | No | Yes | Yes | |
| shortest clock pulse | | | | 250 µs | 125 µs | |
| max. cycle | | | | 4 ms | 4 ms | |
| Bus cycle time (TDP), min. | | | | 250 µs | 125 µs | |
| **Interrupts/diagnostics/ status information** | | | | | | |
| Status indicator | Yes | Yes | Yes | Yes | Yes | Yes |
| Alarms | Yes | Yes | Yes | Yes | Yes | Yes |
| Diagnostic functions | Yes | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Connection display LINK TX/RX | Yes; 2x green LED | Yes; 2x green link LEDs on BusAdapter | Yes; 2x green link LEDs on BusAdapter | Yes; 2x green link LEDs on BusAdapter | Yes; 2x green link LEDs on BusAdapter | |
| • Connection display DP | | | | | | Yes; Green DP LED |
| **Isolation** | | | | | | |
| Isolation tested with | | 707 V DC between supply voltage and electronics; 1 500 V AC between Ethernet and electronics | 707 V DC between supply voltage and electronics; 1 500 V AC between Ethernet and electronics | 707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test) | 707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | | | |
| Network loading class | 2 | 2 | 2 | 3 | 3 | |
| Security level | | According to Security Level 1 Test Cases V1.1.1 | According to Security Level 1 Test Cases V1.1.1 | According to Security Level 1 Test Cases V1.1.1 | According to Security Level 1 Test Cases V1.1.1 | |

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## Technical specifications  (continued)

| Article number | 6ES7155-6AR00-0AN0 | 6ES7155-6AA00-0BN0 | 6ES7155-6AU00-0BN0 | 6ES7155-6AU00-0CN0 | 6ES7155-6AU00-0DN0 | 6ES7155-6BA00-0CN0 |
|---|---|---|---|---|---|---|
| | ET 200SP, IM155-6PN BASIC | ET 200SP, IM155-6PN ST INCL. BA 2XRJ45 | ET 200SP, IM155-6PN ST | ET 200SP, IM155-6PN HF | ET 200SP, IM155-6PN HS | ET 200SP, IM155-6DP HF INCL. DP-CONNECT. |
| **Ambient conditions** | | | | | | |
| **Ambient temperature during operation** | | | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 50 °C | 50 °C | 50 °C | 50 °C | 50 °C | 50 °C |
| **Dimensions** | | | | | | |
| Width | 35 mm | 50 mm | 50 mm | 50 mm | 50 mm | 50 mm |
| Height | 117 mm | 117 mm | 117 mm | 117 mm | 117 mm | 117 mm |
| Depth | 74 mm | 74 mm | 74 mm | 74 mm | 74 mm | 74 mm |
| **Weights** | | | | | | |
| Weight, approx. | 125 g | 191 g; IM155PN ST with BA 2x RJ45 (mounted) | 147 g; without BusAdapter | 147 g; without BusAdapter | 147 g; without BusAdapter | 150 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM155-6PN Basic PROFINET interface module**<br><br>With server module; two integrated RJ45 sockets | 6ES7155-6AR00-0AN0 | **SIMATIC BA SCRJ/RJ45 BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 50 m (POF, copper) or 100 m (PCF) | 6ES7193-6AP20-0AA0 |
| **IM155-6PN Basic PROFINET interface module**<br><br>With server module<br>• With attached SIMATIC BA 2xRJ45 BusAdapter<br>• Without SIMATIC BusAdapter | <br><br><br>6ES7155-6AA00-0BN0<br><br>6ES7155-6AU00-0BN0 | **SIMATIC BA SCRJ/FC BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 50 m (POF, copper) or 100 m (PCF) | 6ES7193-6AP40-0AA0 |
| **IM155-6PN High Feature PROFINET interface module**<br><br>With server module, without SIMATIC BusAdapter | 6ES7155-6AU00-0CN0 | **SIMATIC BA 2XLC BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km | 6ES7193-6AG00-0AA0 |
| **IM155-6PN High Speed PROFINET interface module**<br><br>With server module, without SIMATIC BusAdapter | 6ES7155-6AU00-0DN0 | **SIMATIC BA LC/RJ45 BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (glass) or 50 m (copper) | 6ES7193-6AG20-0AA0 |
| **IM155-6DP High Feature PROFIBUS interface module**<br><br>With server module, with PROFIBUS plug with PG socket | 6ES7155-6BA00-0CN0 | **SIMATIC BA LC/FC BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (glass) or 50 m (copper) | 6ES7193-6AG40-0AA0 |
| **Accessories** | | | |
| **SIMATIC BA 2xRJ45 BusAdapter**<br><br>For PROFINET interface modules from Standard function class or above; max. cable length 50 m | 6ES7193-6AR00-0AA0 | | |
| **SIMATIC BA 2xFC BusAdapter**<br><br>For PROFINET interface modules from Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m | 6ES7193-6AF00-0AA0 | | |
| **SIMATIC BA 2xSCRJ BusAdapter**<br><br>For PROFINET interface modules from High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | 6ES7193-6AP00-0AA0 | | |

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Station expansion with IP67 I/O system ET 200AL** | | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| **ET 200SP BA-Send 1 x FC BusAdapter** | 6ES7193-6AS00-0AA0 | Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **BaseUnit BU-Send** | 6ES7193-6BN00-0NE0 | | |
| **Additional accessories** | | | |
| **Labeling strips** | | | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 | | |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | 6ES7193-6LA10-0AA0 | Current "Manual Collection" DVD and the three subsequent updates | |
| 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | 6ES7193-6LA10-0AG0 | **Spare parts** | |
| **Equipment labeling plate** | 6ES7193-6LF30-0AW0 | **Server module** | 6ES7193-6PA00-0AA0 |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | | Terminates an ET 200SP station; included in the scope of delivery of the interface modules | |
| **DIN rail 35 mm** | | **Power supply connector for interface module** | |
| Length: 483 mm for 19" cabinets | 6ES5710-8MA11 | For connecting the 24 V DC supply voltage | |
| Length: 530 mm for 600 mm cabinets | 6ES5710-8MA21 | with push-in terminals (10 units) | 6ES7193-4JB00-0AA0 |
| Length: 830 mm for 900 mm cabinets | 6ES5710-8MA31 | with screw-type terminals (10 units) | 6ES7193-4JB50-0AA0 |
| Length: 2 m | 6ES5710-8MA41 | | |

**Manuals for ET 200SP distributed I/O system**

SIMATIC ET 200SP Manual Collection:
PDF file with the following content:
- Basic information
  System manual, product information, overview tables, correction information or manual supplements
- Device-specific information
  Device manuals for the interface modules, PLC, OC and I/O modules, including fail-safe
- Comprehensive information
  Function manuals

The Manual Collection can be downloaded from the Internet as a PDF file:

https://support.industry.siemens.com/cs/de/en/view/84133942

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## Overview



- Interface module for linking the I/O modules to a higher level controller with PROFINET or PROFIBUS
- Server module included in the scope of supply
- Station expansion with IP67 I/O system ET 200AL via ET connection to BU-Send / BA-Send
- PROFINET bus connection
  - 2 ports for line configuration
  - PN connection selected via BusAdapter (ST, HF) Two integrated RJ45 sockets (BA)
- PROFIBUS bus connection
  - 9-pin sub D socket
  - PROFIBUS connector included in scope of delivery
  - Hot swapping (module replacement during operation)
  - Startup and operation with gaps
  - Dynamic re-parameterization in RUN mode
  - Configuration control (option handling)
  - Pluggable 24 V DC supply connector
  - Electronically readable rating plate (I&M data)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1155-6AA00-7BN0 | 6AG1155-6AU00-4CN0 | 6AG1155-6BA00-7CN0 |
|---|---|---|---|
| Based on | 6ES7155-6AA00-0BN0 | 6ES7155-6AU00-0CN0 | 6ES7155-6BA00-0CN0 |
| | SIPLUS ET 200SP IM155-6PN ST | SIPLUS ET 200SP IM155-6PN HF | SIPLUS ET 200SP IM155-6DP HF |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax | 60 °C | 70 °C; = Tmax |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | 0 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax | 50 °C | 50 °C; = Tmax |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**Interface modules   > SIPLUS interface modules**

| ■ Ordering data | Article No. | | Accessories | Article No. |
|---|---|---|---|---|
| **SIPLUS interface module Standard** | | | Accessories | See SIMATIC ET 200SP, IM 155-6 interface module, page 9/11 |
| (Extended temperature range and exposure to media) | | | | |
| • IM 155-6PN ST, with server module and installed BA 2xRJ45 BusAdapter | **6AG1155-6AA00-7BN0** | | | |
| **SIPLUS interface module High Feature** | | | | |
| (Extended temperature range and exposure to media) | | | | |
| • IM 155-6DP HF, with server module, with multi-hot-swap, incl. PROFIBUS connector | **6AG1155-6BA00-7CN0** | | | |
| (Exposure to media) | | | | |
| • IM 155-6PN HF, incl. server module, without BusAdapter | **6AG1155-6AU00-4CN0** | | | |

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■ **Overview**

• 4, 8 and 16-channel digital input (DI) modules

• Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital input modules offer:

• Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DI

• BaseUnits for single or multiple-conductor connection with automatic slot coding

• Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)

• Connection option of sensors compliant with IEC 61131 Type 1, 2 or 3 (module-dependent) for rated voltages of up to 24 V DC or 230 V AC

• PNP (sink input) and NPN (source input) versions

• Clear labeling on front of module

• LEDs for diagnostics, status, power supply and faults

• Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)

• Extended functions and additional operating modes in some cases
  - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
  - Counting operating mode (multi-channel counter for pulse generators with 32-bit counting width and up to 10 kHz counting frequency)
  - Oversampling operating mode (n-fold equidistant acquisition of digital values within one PN cycle for increasing the time resolution for slow CPU cycles)
  - Parameterizable input delay time
  - Isochronous mode (simultaneous equidistant reading of all input channels)
  - Hardware interrupts
  - Pulse extension
  - Re-parameterization during operation
  - Firmware update
  - Diagnosis of wire break and short-circuit (on channel or module basis)
  - Value status (optional binary validity information of the input signal in the process image)
  - Supports the PROFIenergy profile

• Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC Code
  - Shielding terminal

A quick and clear comparison of the functions of the different DI modules is offered by the TIA Selection Tool.

Overview of digital input modules

| Digital input | PU | Article No. | CC Code | BU type |
|---|---|---|---|---|
| DI 16 x 24 V DC ST | 1 | 6ES7131-6BH00-0BA0 | CC00 | A0 |
| DI 16 x 24 V DC ST | 10 | 6ES7131-6BH00-2BA0 | CC00 | A0 |
| DI 8 x 24 V DC BA | 1 | 6ES7131-6BF00-0AA0 | CC01 | A0 |
| DI 8 x 24 V DC BA | 10 | 6ES7131-6BF00-2AA0 | CC01 | A0 |
| DI 8 x 24 V DC SRC BA | 1 | 6ES7131-6BF60-0AA0 | CC02 | A0 |
| DI 8 x 24 V DC ST | 1 | 6ES7131-6BF00-0BA0 | CC01 | A0 |
| DI 8 x 24 V DC ST | 10 | 6ES7131-6BF00-2BA0 | CC01 | A0 |
| DI 8 x 24 V DC HF | 1 | 6ES7131-6BF00-0CA0 | CC01 | A0 |
| DI 8 x NAMUR HF | 1 | 6ES7131-6TF00-0CA0 | CC01 | A0 |
| DI 8 x 24 V DC HS<br><br>With three operating modes:<br>• High-speed isochronous DI<br>• 4 pulse counters, 32-bit, 10 kHz<br>• Oversampling | 1 | 6ES7131-6BF00-0DA0 | CC01 | A0 |
| DI 4 x 120...230 V AC ST | 1 | 6ES7131-6FD00-0BB1 | CC41 | B1 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Digital input modules**

## ▪ Overview (continued)

Overview of BaseUnits

| BaseUnit | PU | Article No. | CC Codes for process terminals | CC Codes for AUX terminals |
|---|---|---|---|---|
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0BA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2BA0 | CC01 to CC05 | -- |
| **BU type B1**<br>• Forwarding of load group (dark)<br>• 12 process terminals<br>• 2 x 2 (1L, 2L, 1N, 2N) direct infeed module<br>• Without AUX terminals | 1 | 6ES7193-6BP20-0BB1 | CC41 | -- |

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## Technical specifications

| Article number | **6ES7131-6BF00-0AA0** | **6ES7131-6BF60-0AA0** | **6ES7131-6BF00-0BA0** | **6ES7131-6BH00-0BA0** |
|---|---|---|---|---|
| | ET 200SP, DI 8X24VDC BASIC | ET 200SP, DI 8X24VDC SOURCE BA | ET 200SP, DI 8X24VDC ST | ET 200SP, DI 16X24VDC ST |
| **General information** | | | | |
| Product type designation | ET 200SP, DI 8x 24 V DC BA, PU 1 | ET 200SP, DI 8x 24 V DC SRC BA, PU 1 | ET 200SP, DI 8x 24 V DC ST, PU 1 | ET 200SP, DI 16x 24 V DC ST, PU 1 |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 | V13 / V13 | V11 SP2 / V13 | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 / - |
| • PCS 7 configurable/integrated as of version | | | V8.1 SP1 | V8.1 SP1 |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | |
| • DI | Yes | Yes | Yes | Yes |
| • Counter | No | No | No | No |
| • Oversampling | No | No | No | No |
| • MSI | No | No | No | No |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | 24 V DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes |
| **Encoder supply** | | | | |
| Number of outputs | 8 | | 8 | |
| Output voltage encoder supply, min. | 19.2 V | | 19.2 V | |
| Short-circuit protection | No | No | Yes; per module | No |
| **24 V encoder supply** | | | | |
| • 24 V | Yes | | Yes | No |
| • Short-circuit protection | Yes | | Yes | No |
| • Output current, max. | 700 mA | | 700 mA; Total current of all encoders | |
| **Digital inputs** | | | | |
| Number of digital inputs | 8 | 8 | 8 | 16 |
| Source/sink input | P-reading | Yes; m-reading | P-reading | P-reading |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | Yes | Yes | Yes |
| Input characteristic curve in accordance with IEC 61131, type 2 | Yes | No | No | No |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes | Yes | Yes |
| Pulse extension | No | No | No | No |
| **Input voltage** | | | | |
| • Type of input voltage | DC | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| • for signal "0" | -30 to +5V | 30 V to -5 V (reference potential is L+) | -30 to +5V | -30 to +5V |
| • for signal "1" | +11 to +30V | -11 V to -30 V (reference potential is L+) | +11 to +30V | +11 to +30V |
| **Input current** | | | | |
| • for signal "1", typ. | 6.8 mA | 6 mA | 2.5 mA | 2.5 mA |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Digital input modules**

■ **Technical specifications** (continued)

| Article number | 6ES7131-6BF00-0AA0 | 6ES7131-6BF60-0AA0 | 6ES7131-6BF00-0BA0 | 6ES7131-6BH00-0BA0 |
|---|---|---|---|---|
| | ET 200SP, DI 8X24VDC BASIC | ET 200SP, DI 8X24VDC SOURCE BA | ET 200SP, DI 8X24VDC ST | ET 200SP, DI 16X24VDC ST |
| **Input delay (for rated value of input voltage)** | | | | |
| **for standard inputs** | | | | |
| - parameterizable | Yes; None / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 µs to 500 µs, depending on line length) | Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length) | Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length) | Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length) |
| **for interrupt inputs** | | | | |
| - parameterizable | No | No | No | No |
| **for counter/technological functions** | | | | |
| - parameterizable | No | No | No | No |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 200 m | 600 m | 600 m |
| **Encoder** | | | | |
| **Connectable encoders** | | | | |
| • 2-wire sensor | Yes | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 2 mA | 1.5 mA | 1.5 mA | 1.5 mA |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | No |
| **Interrupts/diagnostics/status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes |
| • Hardware interrupt | | No | | |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes |
| - parameterizable | Yes | Yes | Yes | Yes |
| • Monitoring of encoder power supply | No | No | Yes; Module-wise | No |
| • Wire-break | No | No | Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm | Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm |
| • Short-circuit | No | No | Yes; Module-wise | No |
| • Group error | | Yes | | Yes |
| **Diagnostics indication LED** | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No | No | No |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | |
| Suitable for safety functions | No | No | No | No |
| **Dimensions** | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | |
| Weight, approx. | 28 g | 28 g | 28 g | 28 g |

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## ■ Technical specifications (continued)

| Article number | 6ES7131-6BF00-0CA0 | 6ES7131-6BF00-0DA0 | 6ES7131-6TF00-0CA0 | 6ES7131-6FD00-0BB1 |
|---|---|---|---|---|
| | ET 200SP, DI 8X24VDC HF | ET 200SP, DI 8X24VDC HIGH SPEED | ET 200SP, DI 8XNAMUR HF | ET 200SP, DI 4X120..230VAC ST |
| **General information** | | | | |
| Product type designation | ET 200SP, DI 8x 24 V DC HF, PU 1 | ET 200SP, DI 8x 24 V DC High Speed, PU 1 | DI 8xNAMUR HF | DI 4x120 ... 230VAC ST |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 / - | V13 SP1 | V13 / V13 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PCS 7 configurable/integrated as of version | V8.1 SP1 | | | |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | |
| • DI | Yes | Yes | Yes | Yes |
| • Counter | No | Yes | No | No |
| • Oversampling | No | Yes | No | No |
| • MSI | Yes | No | No | No |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | 24 V DC | 100 - 240 V AC |
| Rated value (DC) | 24 V | 24 V | 24 V | |
| Rated value (AC) | | | | 230 V |
| Reverse polarity protection | Yes | Yes | Yes | No |
| **Encoder supply** | | | | |
| Number of outputs | | | 8 | 4 |
| Short-circuit protection | | | Yes | No; when using BU type B1, a fuse with 10 A tripping current must be provided |
| **Output current** | | | | |
| • up to 60 °C, max. | | | | 10 A |
| **24 V encoder supply** | | | | |
| • 24 V | Yes | Yes | No | No |
| • Short-circuit protection | Yes; per channel, electronic | Yes; per module, electronic | No | No |
| • Output current, max. | 700 mA; Per channel | 700 mA | | |
| **Digital inputs** | | | | |
| Number of digital inputs | 8 | 8 | 8 | 4 |
| Digital inputs, parameterizable | | | Yes | |
| Type | | | NAMUR | |
| Source/sink input | P-reading | P-reading | | No |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | | | |
| Input characteristic curve in accordance with IEC 61131, type 2 | No | | | |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | | | Yes |
| Pulse extension | Yes; Pulse duration from 4 µs | Yes | Yes; 0.5 s, 1 s, 2 s | No |
| • Length | 2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s | 2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s | | |
| Edge evaluation | Yes; rising edge, falling edge, edge change | | Yes; rising edge, falling edge, edge change | |
| Signal change flutter | | | Yes; 2 to 32 signal changes | |
| Flutter observation window | | | Yes; 0.5 s, 1 s to 100 s in 1-s steps | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Digital input modules**

## ■ Technical specifications (continued)

| Article number | 6ES7131-6BF00-0CA0 | 6ES7131-6BF00-0DA0 | 6ES7131-6TF00-0CA0 | 6ES7131-6FD00-0BB1 |
|---|---|---|---|---|
| | ET 200SP, DI 8X24VDC HF | ET 200SP, DI 8X24VDC HIGH SPEED | ET 200SP, DI 8XNAMUR HF | ET 200SP, DI 4X120..230VAC ST |
| **Digital input functions, parameterizable** | | | | |
| • Gate start/stop | | Yes | | |
| • Freely usable digital input | | Yes | | |
| • Counter | | Yes | | |
|   - Number, max. | | 4 | | |
|   - Counting frequency, max. | | 10 kHz | | |
|   - Counting width | | 32 bit | | |
|   - Counting direction up/down | | Yes | | |
| • Digital input with oversampling | | Yes | | |
|   - Number, max. | | 8 | | |
|   - Values per cycle, max. | | 32 | | |
|   - Resolution, min. | | 7.8125 µs | | |
| **Input voltage** | | | | |
| • Type of input voltage | DC | DC | DC | 120/230V AC (47 Hz to 63 Hz) |
| • Rated value (DC) | 24 V | 24 V | 8.2 V | |
| • Rated value (AC) | | | | 230 V |
| • for signal "0" | -30 to +5V | -30 to +5V | | 0V AC to 40V AC |
| • for signal "1" | +11 to +30V | +11 to +30V | | 74 V AC to 264 V AC |
| **Input current** | | | | |
| • for signal "1", typ. | 2.5 mA | 6 mA | | 10.8 mA |
| **for 10 k switched contact** | | | | |
|   - for signal "0" | | | 0.35 to 1.2 mA | |
|   - for signal "1" | | | 2.1 to 7 mA | |
| **for unswitched contact** | | | | |
|   - for signal "0", max. (permissible quiescent current) | | | 0.5 mA | |
|   - for signal "1" | | | typ. 8 mA | |
| **for NAMUR encoders** | | | | |
|   - for signal "0" | | | 0.35 to 1.2 mA | |
|   - for signal "1" | | | 2.1 to 7 mA | |
| **Input delay (for rated value of input voltage)** | | | | |
| • tolerated changeover time for changeover contacts | | | 300 ms | |
| **for standard inputs** | | | | |
|   - parameterizable | Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length) | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms | No | No |
| **for interrupt inputs** | | | | |
|   - parameterizable | Yes | Yes | | |
| **for counter/technological functions** | | | | |
|   - parameterizable | No | Yes | | |
| **for NAMUR inputs** | | | | |
|   - at "0" to "1", max. | | | 12 ms | |
|   - at "1" to "0", max. | | | 12 ms | |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 50 m | 200 m | 1 000 m |
| • unshielded, max. | 600 m | 50 m | | 600 m |

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■ **Technical specifications** (continued)

| Article number | 6ES7131-6BF00-0CA0 | 6ES7131-6BF00-0DA0 | 6ES7131-6TF00-0CA0 | 6ES7131-6FD00-0BB1 |
|---|---|---|---|---|
| | ET 200SP, DI 8X24VDC HF | ET 200SP, DI 8X24VDC HIGH SPEED | ET 200SP, DI 8XNAMUR HF | ET 200SP, DI 4X120..230VAC ST |
| **Encoder** | | | | |
| **Connectable encoders** | | | | |
| • NAMUR encoder/changeover contact according to EN 60947 | | | Yes | |
| • Single contact / changeover contact unconnected | | | Yes | |
| • Single contact / changeover contact connected with 10 kΩ | | | Yes | |
| • 2-wire sensor | Yes | Yes | | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | | |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | Yes | Yes | No | No |
| Filtering and processing time (TCI), min. | 420 µs | | | |
| Bus cycle time (TDP), min. | 500 µs | 125 µs | | |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; channel by channel | Yes | Yes; channel by channel | No |
| • Hardware interrupt | Yes; Parameterizable, channels 0 to 7 | Yes | Yes; Parameterizable, channels 0 to 7 | No |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | |
| • Monitoring the supply voltage | Yes | Yes | Yes | |
|   - parameterizable | Yes | Yes | Yes | |
| • Monitoring of encoder power supply | Yes; channel by channel | Yes; Module-wise | Yes; channel by channel | |
| • Wire-break | Yes; Channel by channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm | No | Yes; channel by channel | No |
| • Short-circuit | Yes; channel by channel | Yes; Module-wise | Yes; channel by channel | No |
| • Group error | | | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | No | Yes; Red LED | No |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 2 545 V DC/2 s (routine test) |
| **Standards, approvals, certificates** | | | | |
| Suitable for safety functions | No | No | No | No |
| **Dimensions** | | | | |
| Width | 15 mm | 15 mm | 15 mm | 20 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | |
| Weight, approx. | 28 g | 28 g | 32 g | 36 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Digital input modules**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Digital input modules** | | **Usable BaseUnits** | |
| Delivery options: Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. | | **BU15-P16+A10+2D** | |
| | | BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10. | | • 1 unit | 6ES7193-6BP20-0DA0 |
| | | • 10 units | 6ES7193-6BP20-2DA0 |
| | | **BU15-P16+A0+2D** | |
| Digital input module DI 8x24 V DC, Basic, BU type A0, color code CC01 | | BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| • PU: 1 unit | 6ES7131-6BF00-0AA0 | • 1 unit | 6ES7193-6BP00-0DA0 |
| • PU: 10 units | 6ES7131-6BF00-2AA0 | • 10 units | 6ES7193-6BP00-2DA0 |
| Digital input module DI 8x24 V DC Source Input, Basic, BU type A0, color code CC02; PU: 1 unit | 6ES7131-6BF60-0AA0 | **BU15-P16+A10+2B** | |
| | | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| Digital input module DI 8x24 V DC Standard, BU type A0, color code CC01 | | | |
| • PU: 1 unit | 6ES7131-6BF00-0BA0 | • 1 unit | 6ES7193-6BP20-0BA0 |
| • PU: 10 units | 6ES7131-6BF00-2BA0 | • 10 units | 6ES7193-6BP20-2BA0 |
| Digital input module DI 16x24 V DC Standard, BU type A0, color code CC00 | | **BU15-P16+A0+2B** | |
| | | BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| • PU: 1 unit | 6ES7131-6BH00-0BA0 | • 1 unit | 6ES7193-6BP00-0BA0 |
| • PU: 10 units | 6ES7131-6BH00-2BA0 | • 10 units | 6ES7193-6BP00-2BA0 |
| Digital input module DI 8x24 V DC High Feature, BU type A0, color code CC01, channel-specific diagnostics, isochronous mode, shared input (MSI); PU: 1 unit | 6ES7131-6BF00-0CA0 | **BU20-P12+A0+4B** | 6ES7193-6BP20-0BB1 |
| | | BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit | |
| Digital input module DI 8x24 V DC High Speed, BU type A0, color code CC01; 3 operating modes (fast isochronous DI, 4 pulse counters 32-bit 10 kHz, oversampling); PU: 1 unit | 6ES7131-6BF00-0DA0 | | |
| Digital input module DI 8xNAMUR High Feature, BU type A0, color code CC01; PU: 1 unit | 6ES7131-6TF00-0CA0 | | |
| Digital input module DI 4x120 V AC - 230 V AC Standard, BU type B1, color code CC41; PU: 1 unit | 6ES7131-6FD00-0BB1 | | |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | **Color-coded labels for 15 mm-wide BaseUnits** | |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** | Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | **6ES7193-6CP00-2MA0** |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | | Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | **6ES7193-6CP01-2MA0** |
| **Labeling strips** | | Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units | **6ES7193-6CP02-2MA0** |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** | | |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** | Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units | **6ES7193-6CP71-2AA0** |
| 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AA0** | Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units | **6ES7193-6CP72-2AA0** |
| 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AG0** | Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units | **6ES7193-6CP73-2AA0** |
| **BU cover** | | **Color-coded labels for 20 mm-wide BaseUnits** | |
| For covering empty slots (gaps); 5 units • 15 mm wide | **6ES7133-6CV15-1AM0** | Color code CC41, for 16 push-in terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12); 10 units | **6ES7193-6CP41-2MB0** |
| **Shield connection** | **6ES7193-6SC00-1AM0** | | |
| 5 shield supports and 5 shield terminals | | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Digital output modules**

## Overview



- 4, 8 and 16-channel digital output (DQ) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:

- Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DQ (see "Fail-safe I/O modules")
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting actuators with rated load voltages of up to 120 V DC or 230 V AC and load currents of up to 5 A (depending on module)
- Relay modules
  - NO contact or changeover contact
  - for load or signal voltages (coupling relay)
  - with manual operation (as simulation module for inputs and outputs, jog mode for commissioning or emergency operation on failure of controller)
- PNP (source output) and NPN (sink output) versions
- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults

- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
  - MSO operating mode (simultaneous reading of input data from as many as three other controllers)
  - Pulse width modulation mode (output value as pulse-pause ratio of between 0.0% and 100.0% for controlling the output current)
  - Oversampling (n-fold equidistant output of digital values within a PN cycle for the precise time control of an output or a sequence of output values)
  - Isochronous mode (simultaneous equidistant output of all output channels)
  - Output of substitute value in the event of interruptions to communication (0, 1 or last value retained)
  - Re-parameterization during operation
  - Firmware update
  - Valve control (output signal does not switch automatically after a set pickup time to a current-saving PWM output)
  - Diagnosis of wire break and short-circuit (on channel or module basis)
  - Value status (optional binary validity information of the output signal in the process image)
  - Supports the PROFIenergy profile
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the different DQ modules is offered by the TIA Selection Tool.

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■ **Overview** (continued)

Overview of digital output modules

| Digital output | PU | Article No. | CC code | BU type |
|---|---|---|---|---|
| DQ 16 x 24 V DC/0.5 A ST | 1 | 6ES7132-6BH00-0BA0 | CC00 | A0 |
| DQ 16 x 24 V DC/0.5 A ST | 10 | 6ES7132-6BH00-2BA0 | CC00 | A0 |
| DQ 8 x 24 V DC/0.5 A SNK BA | 1 | 6ES7132-6BF60-0AA0 | CC01 | A0 |
| DQ 8 x 24 V DC/0.5 A BA | 1 | 6ES7132-6BF00-0AA0 | CC02 | A0 |
| DQ 8 x 24 V DC/0.5 A BA | 10 | 6ES7132-6BF00-2AA0 | CC02 | A0 |
| DQ 8 x 24 V DC/0.5 A ST | 1 | 6ES7132-6BF00-0BA0 | CC02 | A0 |
| DQ 8 x 24 V DC/0.5 A ST | 10 | 6ES7132-6BF00-2BA0 | CC02 | A0 |
| DQ 8 x 24 V DC/0.5 A HF | 1 | 6ES7132-6BF00-0CA0 | CC02 | A0 |
| DQ 4 x 24 V DC/2 A ST | 1 | 6ES7132-6BD20-0BA0 | CC02 | A0 |
| DQ 4 x 24 V DC/2 A ST | 10 | 6ES7132-6BD20-2BA0 | CC02 | A0 |
| DQ 4 x 24 V DC/2 A HF | 1 | 6ES7132-6BD20-0CA0 | CC02 | A0 |
| DQ 4 x 24 V DC/2 A HS<br><br>With three operating modes:<br>• Fast isochronous DQ with valve control<br>• Pulse width modulation<br>• Oversampling | 1 | 6ES7132-6BD20-0DA0 | CC02 | A0 |
| DQ 4 x 24...230 V AC/2 A ST | 1 | 6ES7132-6FD00-0BB1 | CC41 | B0, B1 |
| DQ 4 x 24 ... 230 V AC/2 A ST | 10 | 6ES7132-6FD00-2BB1 | CC41 | B0, B1 |
| RQ 4 x 24 V UC/2 A CO ST | 1 | 6ES7132-6GD50-0BA0 | -- | A0 |
| RQ 4 x 120 V DC-230 V AC/5 A NO ST | 1 | 6ES7132-6HD00-0BB1 | -- | B0, B1 |
| RQ 4 x 120 V DC-230 V AC/5 A NO ST | 10 | 6ES7132-6HD00-2BB1 | -- | B0, B1 |
| RQ MA 4 x 120 V DC...230 V AC/5A NO ST | 1 | 6ES7132-6MD00-0BB1 | -- | B0, B1 |

Overview of BaseUnits

| BaseUnit | PU | Article No. | CC codes for process terminals | CC codes for AUX terminals |
|---|---|---|---|---|
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2BA0 | CC01 to CC05 | CC71 to CC73 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Digital output modules**

## Overview (continued)

| BaseUnit | PU | Article No. | CC codes for process terminals | CC codes for AUX terminals |
|---|---|---|---|---|
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0BA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2BA0 | CC01 to CC05 | -- |
| **BU type B0**<br>• Forwarding of load group (dark)<br>• 12 process terminals<br>• With 4 AUX terminals | 1 | 6ES7193-6BP20-0BB0 | CC41 | CC81 to CC83 |
| **BU type B0**<br>• Forwarding of load group (dark)<br>• 12 process terminals<br>• With 4 AUX terminals | 10 | 6ES7193-6BP20-0BB0 | CC41 | CC81 to CC83 |
| **BU type B1**<br>• Forwarding of load group (dark)<br>• 12 process terminals<br>• 2 x 2 (1L, 2L, 1N, 2N) direct infeed module<br>• Without AUX terminals | 1 | 6ES7193-6BP20-0BB1 | CC41 | -- |

## Technical specifications

| Article number | 6ES7132-6BH00-0BA0<br>ET 200SP, DQ 16X24VDC/0,5A ST | 6ES7132-6BF60-0AA0<br>ET 200SP, DQ 8X24VDC/0,5A SINK BASIC | 6ES7132-6BF00-0AA0<br>ET 200SP, DQ 8X24VDC/0,5A BASIC, PU 1 | 6ES7132-6BF00-0BA0<br>ET 200SP, DQ 8X24VDC/0,5A ST | 6ES7132-6BF00-0CA0<br>ET 200SP, DQ 8X24VDC/0,5A HF |
|---|---|---|---|---|---|
| **General information** | | | | | |
| Product type designation | ET 200SP, DQ 16x 24 V DC/0.5 A ST, PU 1 | DQ 8x24VDC/0.5A SNK BA | ET 200SP, DQ 8x 24 V DC/0.5 A BA, PU 1 | ET 200SP, DQ 8x 24 V DC/0.5 A ST, PU 1 | ET 200SP, DQ 8x 24 V DC/0.5 A HF, PU 1 |
| **Product function** | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V11 SP2 / V13 | V13 / V13 | V13 SP1 / - | V11 SP2 / V13 | V13 SP1 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 / - |
| • PCS 7 configurable/integrated as of version | V8.1 SP1 | | | V8.1 SP1 | V8.1 SP1 |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | One GSD file each, Revision 3 and 5 and higher |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | | |
| • DQ | Yes | Yes | Yes | Yes | Yes |
| • DQ with energy-saving function | No | No | No | No | No |
| • PWM | No | No | No | No | No |
| • Oversampling | No | No | No | No | No |
| • MSO | No | No | No | No | Yes |
| **Supply voltage** | | | | | |
| Type of supply voltage | DC | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | | Yes | Yes | Yes |

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■ **Technical specifications** (continued)

| Article number | 6ES7132-6BH00-0BA0 | 6ES7132-6BF60-0AA0 | 6ES7132-6BF00-0AA0 | 6ES7132-6BF00-0BA0 | 6ES7132-6BF00-0CA0 |
|---|---|---|---|---|---|
| | ET 200SP, DQ 16X24VDC/0,5A ST | ET 200SP, DQ 8X24VDC/0,5A SINK BASIC | ET 200SP, DQ 8X24VDC/0,5A BASIC, PU 1 | ET 200SP, DQ 8X24VDC/0,5A ST | ET 200SP, DQ 8X24VDC/0,5A HF |
| **Digital outputs** | | | | | |
| Type of digital output | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) |
| Number of digital outputs | 16 | 8 | 8 | 8 | 8 |
| Current-sinking | No | Yes | No | No | No |
| Current-sourcing | Yes | No | Yes | Yes | Yes |
| Digital outputs, parameterizable | Yes | Yes | Yes | Yes | Yes |
| Short-circuit protection | Yes | Yes | Yes; per channel, electronic | Yes | Yes |
| Open-circuit detection | | No | | | |
| Limitation of inductive shutdown voltage to | Typ. L+ (-50 V) | Typ. 47 V | Typ. L+ (-53 V) | Typ. L+ (-50 V) | Typ. L+ (-50 V) |
| Controlling a digital input | Yes | Yes | Yes | Yes | Yes |
| **Switching capacity of the outputs** | | | | | |
| • with resistive load, max. | 0.5 A | 0.5 A | 0.5 A | 0.5 A | 0.5 A |
| • on lamp load, max. | 5 W | 5 W | 5 W | 5 W | 5 W |
| **Load resistance range** | | | | | |
| • lower limit | 48 Ω | 48 Ω | 48 Ω | 48 Ω | 48 Ω |
| • upper limit | 12 kΩ | 3 400 Ω | 100 kΩ | 12 kΩ | 12 kΩ |
| **Output voltage** | | | | | |
| • Type of output voltage | DC | DC | DC | DC | DC |
| **Output current** | | | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | 0.5 A | 0.5 A | 0.5 A |
| • for signal "0" residual current, max. | 0.1 mA | 5 µA | 1 mA | 0.1 mA | 0.1 mA |
| **Output delay with resistive load** | | | | | |
| • "0" to "1", typ. | 50 µs | | | | 50 µs |
| • "0" to "1", max. | | 300 µs | 100 µs; at rated load | 50 µs; at rated load | |
| • "1" to "0", typ. | 100 µs | | | | 100 µs |
| • "1" to "0", max. | | 600 µs | 150 µs; at rated load | 100 µs; at rated load | |
| **Parallel switching of two outputs** | | | | | |
| • for uprating | No | No | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes; per module | Yes | Yes |
| **Switching frequency** | | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 2 Hz | 0.5 Hz | 2 Hz | 2 Hz | 2 Hz |
| • on lamp load, max. | 10 Hz | 10 Hz | 10 Hz | 10 Hz | 10 Hz |
| **Total current of the outputs** | | | | | |
| • Current per channel, max. | 0.5 A | 0.5 A | 0.5 A | 0.5 A | 0.5 A |
| • Current per module, max. | 8 A | 4 A | 4 A | 4 A | 4 A |
| **Total current of the outputs (per module)** | | | | | |
| **horizontal installation** | | | | | |
| - up to 30 °C, max. | 8 A | | | | |
| - up to 40 °C, max. | 8 A | | | | |
| - up to 50 °C, max. | 6 A | | | | |
| - up to 60 °C, max. | 4 A | 4 A | 4 A | 4 A | 4 A |
| **vertical installation** | | | | | |
| - up to 30 °C, max. | 8 A | | | | |
| - up to 40 °C, max. | 6 A | | | | |
| - up to 50 °C, max. | 4 A | | 4 A | 4 A | 4 A; in all other mounting positions |
| - up to 60 °C, max. | 4 A | 4 A | | | |
| **Cable length** | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 1 000 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 600 m | 600 m | 600 m |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules  > Digital output modules**

## Technical specifications (continued)

| Article number | 6ES7132-6BH00-0BA0 | 6ES7132-6BF60-0AA0 | 6ES7132-6BF00-0AA0 | 6ES7132-6BF00-0BA0 | 6ES7132-6BF00-0CA0 |
|---|---|---|---|---|---|
| | ET 200SP, DQ 16X24VDC/0,5A ST | ET 200SP, DQ 8X24VDC/0,5A SINK BASIC | ET 200SP, DQ 8X24VDC/0,5A BASIC, PU 1 | ET 200SP, DQ 8X24VDC/0,5A ST | ET 200SP, DQ 8X24VDC/0,5A HF |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | No | Yes |
| Execution and activation time (TCO), min. | | | | | 48 µs |
| Bus cycle time (TDP), min. | | | | | 500 µs |
| **Interrupts/diagnostics/ status information** | | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes | Yes |
| Substitute values connectable | Yes | No | Yes | Yes | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| **Diagnostic messages** | | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; Module-wise | No | No | Yes; Module-wise | Yes; channel by channel |
| • Short-circuit | Yes; Module-wise | No | No | Yes; Module-wise | Yes; channel by channel |
| • Group error | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No | No | No | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | | |
| **Potential separation channels** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | | |
| Suitable for safety functions | No | No | No | No | No |
| **Dimensions** | | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | | |
| Weight, approx. | 28 g | 30 g | 28 g | 28 g | 30 g |

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## Technical specifications (continued)

| Article number | 6ES7132-6BD20-0BA0 | 6ES7132-6BD20-0CA0 | 6ES7132-6BD20-0DA0 | 6ES7132-6FD00-0BB1 | 6ES7132-6GD50-0BA0 |
|---|---|---|---|---|---|
| | ET 200SP, DQ 4X24VDC/2A ST | ET 200SP, DQ 4X24VDC/2A HF | ET 200SP, DQ 4X24VDC/2A HIGH SPEED, PU 1 | ET 200SP, DQ 4X24..230VAC/2A ST | ET 200SP, RQ 4X24VDC/2A CO ST |
| **General information** | | | | | |
| Product type designation | ET 200SP, DQ 4x 24 V DC/2 A ST, PU 1 | ET 200SP, DQ 4x 24 V DC/2 A HF, PU 1 | ET 200SP, DQ 4x 24 V DC/2 A High Speed, PU 1 | ET 200SP, DQ 4x 24 ... 230 V AC/ 2 A ST, PU 1 | RQ 4x24VUC/2A CO ST |
| **Product function** | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V11 SP2 / V13 | V13 / V13 | V13 SP1 | V13 / V13 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PCS 7 configurable/integrated as of version | V8.1 SP1 | | | | |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | | |
| • DQ | Yes | Yes | Yes | Yes | Yes |
| • DQ with energy-saving function | No | No | Yes; Valve control | No | No |
| • PWM | No | No | Yes | No | No |
| • Oversampling | No | No | Yes | No | No |
| • MSO | No | Yes | No | No | No |
| **Supply voltage** | | | | | |
| Type of supply voltage | DC | DC | DC | 24V AC to 230V AC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | | 24 V |
| Rated value (AC) | | | | 230 V | |
| Reverse polarity protection | Yes | Yes | Yes | | |
| **Digital outputs** | | | | | |
| Type of digital output | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) | Source output (PNP, current-sourcing) | Triac with zero point detection | Relays |
| Number of digital outputs | 4 | 4 | 4 | 4 | 4 |
| Current-sinking | No | No | No | No | |
| Current-sourcing | Yes | Yes | Yes; Push-pull output | Yes | |
| Digital outputs, parameterizable | Yes | Yes | Yes | No | |
| Short-circuit protection | Yes | Yes | Yes | No; When using BU type B1, a miniature, quick-response fuse with 10 A tripping current must be provided | No |
| Limitation of inductive shutdown voltage to | Typ. L+ (-50 V) | L+ -(37 to 41V) | M (-1 V) | | |
| Controlling a digital input | Yes | Yes; Minimum current consumption 7 mA | No | Yes | |
| **Digital output functions, parameterizable** | | | | | |
| • PWM output | | | Yes | | |
| - Number, max. | | | 4 | | |
| - Cycle duration, parameterizable | | | Yes; 0 ms, 0.2 ms, 0.4 ms, 0.93 ms, 1.33 ms, 4.27 ms, 10.67 ms, 21.33 ms, 34.13 ms, 59.73 ms | | |
| • Digital output with oversampling | | | Yes | | |
| - Number, max. | | | 4 | | |
| - Values per cycle, max. | | | 32 | | |
| - Resolution, min. | | | 100 μs | | |
| **Switching capacity of the outputs** | | | | | |
| • with resistive load, max. | 2 A | 2 A | 2 A | 2 A | |
| • on lamp load, max. | 10 W | 10 W | 10 W | 100 W | |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules > Digital output modules**

### ■ Technical specifications (continued)

| Article number | 6ES7132-6BD20-0BA0 | 6ES7132-6BD20-0CA0 | 6ES7132-6BD20-0DA0 | 6ES7132-6FD00-0BB1 | 6ES7132-6GD50-0BA0 |
|---|---|---|---|---|---|
| | ET 200SP, DQ 4X24VDC/2A ST | ET 200SP, DQ 4X24VDC/2A HF | ET 200SP, DQ 4X24VDC/2A HIGH SPEED, PU 1 | ET 200SP, DQ 4X24..230VAC/2A ST | ET 200SP, RQ 4X24VDC/2A CO ST |
| **Load resistance range** | | | | | |
| • lower limit | 12 Ω | 12 Ω | 12 Ω | | |
| • upper limit | 3 400 Ω | 3 400 Ω | 3 400 Ω | | |
| **Output voltage** | | | | | |
| • Type of output voltage | DC | DC | DC | 24V AC to 230V AC | DC |
| • for signal "1", min. | | | | 20.4 V | |
| • permissible voltage at output, min. | | | | 20.4 V | |
| • permissible voltage at output, max. | | | | 264 V | |
| **Output current** | | | | | |
| • for signal "1" rated value | 2 A | 2 A | 2 A | 2 A | |
| • for signal "0" residual current, max. | 0.1 mA | 0.1 mA | 0.1 mA | 460 µA | |
| **Output delay with resistive load** | | | | | |
| • "0" to "1", typ. | 50 µs | 50 µs | | | |
| • "0" to "1", max. | 50 µs | | 1 µs | 10 ms | |
| • "1" to "0", typ. | 100 µs | 100 µs | | | |
| • "1" to "0", max. | 100 µs | | 1 µs | 10 ms | |
| **Parallel switching of two outputs** | | | | | |
| • for logic links | | | | No | |
| • for uprating | No | No | No | No | |
| • for redundant control of a load | Yes | | | Yes | |
| **Switching frequency** | | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 5 kHz | 10 Hz | 2 Hz |
| • with inductive load, max. | 2 Hz | 2 Hz | 5 kHz | 0.5 Hz; Higher frequencies are possible, see Equipment Manual / Product Information | |
| • on lamp load, max. | 10 Hz | 10 Hz | 5 kHz | 1 Hz | |
| **Total current of the outputs** | | | | | |
| • Current per channel, max. | 2 A | 2 A | 2 A | 2 A | 2 A |
| • Current per module, max. | 8 A | 8 A | 8 A | 8 A | 8 A |
| **Total current of the outputs (per module)** | | | | | |
| **horizontal installation** | | | | | |
| - up to 30 °C, max. | 8 A | 8 A | 8 A; DQ mode | | |
| - up to 40 °C, max. | 8 A | 8 A | 6.9 A; DQ mode | 8 A | |
| - up to 50 °C, max. | 6 A | 6 A | 4.7 A; DQ mode | 6 A | |
| - up to 60 °C, max. | 4 A | 4 A | 2.5 A; DQ mode | 4 A | 8 A |
| **vertical installation** | | | | | |
| - up to 30 °C, max. | 8 A | 8 A | 7.2 A; DQ mode | 8 A | |
| - up to 40 °C, max. | 6 A | 6 A | 5.6 A; DQ mode | 6 A | |
| - up to 50 °C, max. | 4 A | 4 A | 4 A; DQ mode | 4 A | |
| - up to 60 °C, max. | 4 A | 4 A | 4 A; DQ mode | | 8 A |
| **Relay outputs** | | | | | |
| • Number of relay outputs | | | | | 4 |
| • Rated supply voltage of relay coil L+ (DC) | | | | | 24 V |
| • Current consumption of relays (coil current of all relays), max. | | | | | 40 mA |
| **Switching capacity of contacts** | | | | | |
| - with resistive load, max. | | | | | 2 A |
| - Thermal continuous current, max. | | | | | 2 A |
| - Switching current, min. | | | | | 1 mA; 5 V DC |
| - Rated switching voltage (DC) | | | | | 24 V |
| - Rated switching voltage (AC) | | | | | 24 V |

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■ **Technical specifications** (continued)

| Article number | 6ES7132-6BD20-0BA0 | 6ES7132-6BD20-0CA0 | 6ES7132-6BD20-0DA0 | 6ES7132-6FD00-0BB1 | 6ES7132-6GD50-0BA0 |
|---|---|---|---|---|---|
| | ET 200SP, DQ 4X24VDC/2A ST | ET 200SP, DQ 4X24VDC/2A HF | ET 200SP, DQ 4X24VDC/2A HIGH SPEED, PU 1 | ET 200SP, DQ 4X24..230VAC/2A ST | ET 200SP, RQ 4X24VDC/2A CO ST |
| **Triac outputs** | | | | | |
| • Size of motor starters according to NEMA, max. | | | | 5 | |
| **Cable length** | | | | | |
| • shielded, max. | 1 000 m | 1 000 m | 50 m | 1 000 m | 1 000 m |
| • unshielded, max. | 600 m | 600 m | 50 m | 600 m | 200 m |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | Yes | Yes; Operating modes DQ and OVS only | No | No |
| Bus cycle time (TDP), min. | | 500 µs | 125 µs | | |
| **Interrupts/diagnostics/ status information** | | | | | |
| Diagnostics function | Yes | Yes | Yes | No | Yes |
| Substitute values connectable | Yes | Yes | Yes | Yes | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | No | Yes |
| **Diagnostic messages** | | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | No | Yes |
| • Wire-break | Yes; Module-wise | Yes; channel by channel | No | No | No |
| • Short-circuit | Yes; Module-wise | Yes; channel by channel | Yes; Module-wise | No | No |
| • Group error | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | Yes; Red LED | No | No | No |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | | |
| **Potential separation channels** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 2 545 V DC/2 s (routine test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | | |
| Suitable for safety functions | No | No | No | No | No |
| **Dimensions** | | | | | |
| Width | 15 mm | 15 mm | 15 mm | 20 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | | |
| Weight, approx. | 30 g | 30 g | 31 g | 50 g | 30 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Digital output modules**

## ▪ Technical specifications (continued)

| Article number | 6ES7132-6HD00-0BB1 | 6ES7132-6MD00-0BB1 |
|---|---|---|
| | ET 200SP, RQ NO 4X120VDC..230VAC/5A ST | ET 200SP,RQ NO-MA 4X120VDC..230VAC/5A ST |
| **General information** | | |
| Product type designation | ET 200SP, RQ 4x120VDC-230VAC/5A NO ST, PU 1 | ET 200SP, RQ 4x120VDC-230VAC/5A NO MA ST |
| **Product function** | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | |
| • DQ | Yes | Yes |
| • DQ with energy-saving function | No | No |
| • PWM | No | No |
| • Oversampling | No | No |
| • MSO | No | No |
| **Supply voltage** | | |
| Type of supply voltage | DC | DC |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes |
| **Digital outputs** | | |
| Type of digital output | Relays | Relays |
| Number of digital outputs | 4 | 4 |
| Short-circuit protection | No | No |
| **Output voltage** | | |
| • Type of output voltage | AC/DC | AC/DC |
| **Switching frequency** | | |
| • with resistive load, max. | 2 Hz | 2 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 2 Hz | 2 Hz |
| **Total current of the outputs** | | |
| • Current per channel, max. | 5 A | 5 A |
| • Current per module, max. | 20 A | 20 A |
| **Total current of the outputs (per module)** | | |
| **horizontal installation** | | |
| - up to 50 °C, max. | | 20 A |
| - up to 60 °C, max. | 20 A | 16 A |
| **vertical installation** | | |
| - up to 40 °C, max. | | 20 A |
| - up to 50 °C, max. | | 16 A |
| - up to 60 °C, max. | 20 A | |
| **Relay outputs** | | |
| • Number of relay outputs | 4 | 4 |
| • Rated supply voltage of relay coil L+ (DC) | 24 V | 24 V |
| • Current consumption of relays (coil current of all relays), max. | 40 mA | 40 mA |
| • external protection for relay outputs | Yes, with 6A | Yes, with 6A |
| • Number of operating cycles, max. | 7 000 000; see additional description in the manual | 7 000 000; see additional description in the manual |
| **Switching capacity of contacts** | | |
| - with inductive load, max. | 2 A; see additional description in the manual | 2 A; see additional description in the manual |
| - with resistive load, max. | 5 A; see additional description in the manual | 5 A; see additional description in the manual |
| - Thermal continuous current, max. | 5 A; Max. 1 385 VA, 150 W | 5 A |
| - Switching current, min. | 100 mA; 5 V DC | 100 mA; 5 V DC |
| - Rated switching voltage (DC) | 24 V DC to 120 V DC | 24 V DC to 120 V DC |
| - Rated switching voltage (AC) | 24V AC to 230V AC | 24V AC to 230V AC |

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■ **Technical specifications** (continued)

| Article number | 6ES7132-6HD00-0BB1 | 6ES7132-6MD00-0BB1 |
|---|---|---|
| | ET 200SP, RQ NO 4X120VDC..230VAC/5A ST | ET 200SP,RQ NO-MA 4X120VDC..230VAC/5A ST |
| **Cable length** | | |
| • shielded, max. | 1 000 m | 1 000 m |
| • unshielded, max. | 200 m | 200 m |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | No | No |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostics function | Yes | Yes |
| Substitute values connectable | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | Yes | Yes |
| • Wire-break | No | No |
| • Short-circuit | No | No |
| • Group error | Yes | Yes |
| **Diagnostics indication LED** | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | |
| **Potential separation channels** | | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 2 500 V DC (type test) | 2 500 V DC (type test) |
| **tested with** | | |
| • between channels and backplane bus/supply voltage | 2500 V DC | 2500 V DC |
| • between backplane bus and supply voltage | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | |
| Suitable for safety functions | No | No |
| **Dimensions** | | |
| Width | 20 mm | 20 mm |
| Height | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm |
| **Weights** | | |
| Weight, approx. | 40 g | 45 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## I/O modules > Digital output modules

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital output modules** | | **Digital output modules (continued)** | |
| Delivery options: Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. | | Signal relay module RQ CO 4x24 V UC/2 A Standard, changeover contact, BU type A0, color code CC00; PU: 1 unit | 6ES7132-6GD50-0BA0 |
| The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10. | | Relay module RQ NO 4x120 V DC-230 V AC/5 A Standard, NO contact, BU type B0, B1 | |
| | | • PU: 1 unit | 6ES7132-6HD00-0BB1 |
| | | • PU: 10 units | 6ES7132-6HD00-2BB1 |
| Digital output module DQ 16x24 V DC/0.5 A Standard, BU type A0, color code CC00 | | Relay module RQ NO 4x120 V DC-230 V AC/5 A Standard, NO contact, with manual operation, BU type B0, B1 | 6ES7132-6MD00-0BB1 |
| • PU: 1 unit | 6ES7132-6BH00-0BA0 | | |
| • PU: 10 units | 6ES7132-6BH00-2BA0 | **Usable BaseUnits** | |
| Digital output module DQ 8x24 V DC/0.5 A sink output, basic, BU type A0, color code CC01; PU: 1 unit | 6ES7132-6BF60-0AA0 | **BU15-P16+A10+2D** | |
| | | BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| Digital output module DQ 8x24 V DC/0.5 A basic, BU type A0, color code CC02 | | | |
| • PU: 1 unit | 6ES7132-6BF00-0AA0 | • PU: 1 unit | 6ES7193-6BP20-0DA0 |
| • PU: 10 units | 6ES7132-6BF00-2AA0 | • PU: 10 units | 6ES7193-6BP20-2DA0 |
| Digital output module DQ 8x24 V DC/0.5 A Standard, BU type A0, color code CC02 | | **BU15-P16+A0+2D** | |
| | | BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| • PU: 1 unit | 6ES7132-6BF00-0BA0 | | |
| • PU: 10 units | 6ES7132-6BF00-2BA0 | • PU: 1 unit | 6ES7193-6BP00-0DA0 |
| Digital output module DQ 8x24 V DC/0.5 A High Feature, BU type A0, color code CC02; PU: 1 unit | 6ES7132-6BF00-0CA0 | • PU: 10 units | 6ES7193-6BP00-2DA0 |
| | | **BU15-P16+A10+2B** | |
| Digital output module DQ 4x24 V DC/2 A Standard, BU type A0, color code CC02 | | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| • PU: 1 unit | 6ES7132-6BD20-0BA0 | • PU: 1 unit | 6ES7193-6BP20-0BA0 |
| • PU: 10 units | 6ES7132-6BD20-2BA0 | • PU: 10 units | 6ES7193-6BP20-2BA0 |
| Digital output module DQ 4x24 V DC/2 A High Feature, BU type A0, color code CC02, channel-precise diagnostics, isochronous mode, shared output (MSO); PU: 1 unit | 6ES7132-6BD20-0CA0 | **BU15-P16+A0+2B** | |
| | | BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| | | • PU: 1 unit | 6ES7193-6BP00-0BA0 |
| Digital output module DQ 4x24 V DC/2 A High Feature, BU type A0, color code CC02, 3 operating modes (fast isochronous DQ with valve control, pulse width modulation, oversampling); PU: 1 unit | 6ES7132-6BD20-0DA0 | • PU: 10 units | 6ES7193-6BP00-2BA0 |
| | | **BU20-P12+A4+0B** | |
| | | BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group | |
| Digital output module DQ 4x24 V AC...230 V AC/2 A Standard for BU type B1, color code CC41 | | • PU: 1 unit | 6ES7193-6BP20-0BB0 |
| | | • PU: 10 units | 6ES7193-6BP20-2BB0 |
| • PU: 1 unit | 6ES7132-6FD00-0BB1 | **BU20-P12+A0+4B** | 6ES7193-6BP20-0BB1 |
| • PU: 10 units | 6ES7132-6FD00-2BB1 | BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; PU: 1 unit | |

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## ■ Ordering data

| | Article No. |
|---|---|
| **Accessories** | |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| **BU cover** | |
| for covering empty slots (gaps); 5 units | |
| • 15 mm wide | **6ES7133-6CV15-1AM0** |
| • 20 mm wide | **6ES7133-6CV20-1AM0** |
| **Shield connection** | **6ES7193-6SC00-1AM0** |
| 5 shield supports and 5 shield terminals | |
| **Color-coded labels for 15 mm-wide BaseUnits** | |
| Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | **6ES7193-6CP00-2MA0** |
| Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | **6ES7193-6CP01-2MA0** |
| Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units | **6ES7193-6CP02-2MA0** |
| Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units | **6ES7193-6CP71-2AA0** |
| Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units | **6ES7193-6CP72-2AA0** |
| Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units | **6ES7193-6CP73-2AA0** |

| | Article No. |
|---|---|
| **Color-coded labels for 20 mm-wide BaseUnits** | |
| Color code CC41, for 16 push-in terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12); 10 units | **6ES7193-6CP41-2MB0** |
| Color code CC81, for 4 AUX terminals, BU type B0, yellow/green (terminals 1 A to 4 A); 10 units | **6ES7193-6CP81-2AB0** |
| Color code CC82, for 4 AUX terminals, BU type B0, red (terminals 1 A to 4 A); 10 units | **6ES7193-6CP82-2AB0** |
| Color code CC83, for 4 AUX terminals, BU type B0, blue (terminals 1 A to 4 A); 10 units | **6ES7193-6CP83-2AB0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Analog input modules**

■ **Overview**



- 2, 4 and 8-channel analog input (AI) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:
- Function classes Basic, Standard, High Feature and High-Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting current, voltage and resistance sensors, as well as thermocouples
- Energy Meter for recording up to 200 electrical variables
- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)

- Extended functions and additional operating modes in some cases
  - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
  - Oversampling operating mode (n-fold equidistant acquisition of analog values within one PN cycle for increasing the time resolution for slow CPU cycles)
  - Isochronous mode (simultaneous equidistant reading in of all analog values)
  - Scalable measuring range (adaptation of measuring range, increase of the 16-bit resolution by adapting the measuring range to a limited section)
  - Scaling of the measured values (transmission of the analog value normalized to the required physical value as a 32-bit floating point value)
  - Internal compensation of the line resistance for thermocouples by means of terminal temperature measurement in the BaseUnit for BU type A1
  - Internal compensation also for 2-conductor resistance measurement by means of adjustable line resistance
  - Calibration during runtime
  - Single-channel electrical isolation
  - HART communication
  - Re-parameterization during operation
  - Firmware update
  - Diagnosis of wire break, short circuit, overflow, underflow
  - Two upper and lower hardware interrupts in each case, interference frequency suppression, smoothing
  - Value status (optional binary validity information of the analog signal in the process image)
  - Supports the PROFIenergy profile
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the AI modules is offered by the TIA Selection Tool.

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■ **Overview** (continued)

Overview of analog input modules

| Analog input | PU | Article No. | CC code | BU type |
|---|---|---|---|---|
| AI 8 x I 2/4-wire BA | 1 | 6ES7134-6GF00-0AA1 | CC01 | A0, A1 |
| AI 2 x U ST | 1 | 6ES7134-6FB00-0BA1 | CC00 | A0, A1 |
| AI 8 x U BA | 1 | 6ES7134-6FF00-0AA1 | CC02 | A0, A1 |
| AI 4 x U/I 2-wire ST | 1 | 6ES7134-6HD00-0BA1 | CC03 | A0, A1 |
| AI 4 x U/I 2-wire ST | 10 | 6ES7134-6HD00-2BA1 | CC03 | A0, A1 |
| AI 2 x I 2/4-wire ST | 1 | 6ES7134-6GB00-0BA1 | CC05 | A0, A1 |
| AI 4 x I 2/4-wire ST | 1 | 6ES7134-6GD00-0BA1 | CC03 | A0, A1 |
| AI 4 x I 2-wire 4...20 mA HART | 1 | 6ES7134-6TD00-0CA1 | CC03 | A0, A1 |
| AI 2 x U/I 2/4-wire HF | 1 | 6ES7134-6HB00-0CA1 | CC05 | A0, A1 |
| AI 2xU/I 2/4-wire HS<br><br>With two operating modes:<br>• High-speed isochronous AI<br>• Oversampling | 1 | 6ES7134-6HB00-0DA1 | CC00 | A0, A1 |
| AI 8 x RTD/TC 2-wire HF | 1 | 6ES7134-6JF00-0CA1 | CC00 | A0, A1 |
| AI 8 x RTD/TC 2-wire HF | 10 | 6ES7134-6JF00-2CA1 | CC00 | A0, A1 |
| AI 4 x RTD/TC 2/3/4-wire HF | 1 | 6ES7134-6JD00-0CA1 | CC00 | A0, A1 |
| AI 4 x RTD/TC 2/3/4-wire HF | 10 | 6ES7134-6JD00-2CA1 | CC00 | A0, A1 |
| AI Energy Meter 400 V AC ST | 1 | 6ES7134-6PA01-0BD0 | -- | D0 |
| AI Energy Meter 480 V AC ST | 1 | 6ES7134-6PA20-0BD0 | -- | D0 |

Overview of BaseUnits

| BaseUnit | PU | Article No. | CC codes<br>for process terminals | CC codes<br>for AUX terminals |
|---|---|---|---|---|
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0BA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2BA0 | CC01 to CC05 | -- |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules   > Analog input modules**

### ◼ Overview (continued)

| BaseUnit | PU | Article No. | CC codes for process terminals | CC codes for AUX terminals |
|---|---|---|---|---|
| **BU type A1** <br>• New load group (light) <br>• With temperature sensor <br>• 16 process terminals <br>• With 2x5 additional terminals | 1 | 6ES7193-6BP40-0DA1 | CC01 to CC05 | CC74 |
| **BU type A1** <br>• New load group (light) <br>• With temperature sensor <br>• 16 process terminals <br>• Without 2x5 additional terminals | 1 | 6ES7193-6BP00-0DA1 | CC01 to CC05 | -- |
| **BU type A1** <br>• Forwarding of load group (dark) <br>• With temperature sensor <br>• 16 process terminals <br>• With 2x5 additional terminals | 1 | 6ES7193-6BP40-0BA1 | CC01 to CC05 | CC74 |
| **BU type A1** <br>• Forwarding of load group (dark) <br>• With temperature sensor <br>• 16 process terminals <br>• Without 2x5 additional terminals | 1 | 6ES7193-6BP00-0BA1 | CC01 to CC05 | -- |
| **BU type D0** <br>• Forwarding of load group (dark) <br>• 12 process terminals <br>• Without AUX terminals | 1 | 6ES7193-6BP00-0BD0 | -- | -- |

### ◼ Technical specifications

| Article number | 6ES7134-6GF00-0AA1 | 6ES7134-6FB00-0BA1 | 6ES7134-6FF00-0AA1 | 6ES7134-6HD00-0BA1 | 6ES7134-6GB00-0BA1 |
|---|---|---|---|---|---|
| | ET 200SP, AI 8XI 2/4-WIRE BASIC | ET 200SP, AI 2XU STANDARD, PU 1 | ET 200SP, AI 8XU BASIC | ET 200SP, AI 4XU/I 2-WIRE ST | ET 200SP, AI 2XI 2/4-WIRE ST, PU 1 |
| **General information** | | | | | |
| Product type designation | ET 200SP, AI 8xI 2-/4-wire Basic | ET 200SP, AI 2xU Standard | ET 200SP, 8xU Basic | AI 4xU/I 2-wire ST | ET 200SP, AI 2xI 2-/4-wire ST, PU 1 |
| **Product function** | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Measuring range scalable | No | No | No | No | No |
| **Engineering with** | | | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 | V13 SP1 | V13 SP1 | V11 SP2 / V13 | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 |
| • PCS 7 configurable/integrated as of version | | | | V8.1 SP1 | |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | V2.3 / - |
| **Operating mode** | | | | | |
| • Oversampling | No | No | No | No | No |
| • MSI | No | No | No | No | No |
| **CiR – Configuration in RUN** | | | | | |
| Reparameterization possible in RUN | Yes | Yes | Yes | Yes | Yes |
| Calibration possible in RUN | No | No | No | No | No |
| **Supply voltage** | | | | | |
| Type of supply voltage | DC | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |

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■ **Technical specifications** (continued)

| Article number | 6ES7134-6GF00-0AA1 | 6ES7134-6FB00-0BA1 | 6ES7134-6FF00-0AA1 | 6ES7134-6HD00-0BA1 | 6ES7134-6GB00-0BA1 |
|---|---|---|---|---|---|
| | ET 200SP, AI 8XI 2/4-WIRE BASIC | ET 200SP, AI 2XU STANDARD, PU 1 | ET 200SP, AI 8XU BASIC | ET 200SP, AI 4XU/I 2-WIRE ST | ET 200SP, AI 2XI 2/4-WIRE ST, PU 1 |
| **Analog inputs** | | | | | |
| Number of analog inputs | 8; Single-ended | 2 | 8; Single-ended | 4; Differential inputs | 2 |
| permissible input voltage for voltage input (destruction limit), max. | | 30 V | 30 V | 30 V | |
| permissible input current for current input (destruction limit), max. | 50 mA | | | 50 mA | 50 mA |
| Cycle time (all channels), min. | 1 ms; per channel | 500 µs | 1 ms; per channel | Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels) | 500 µs |
| **Input ranges (rated values), voltages** | | | | | |
| • 0 to +10 V | | Yes; 15 bit | Yes; 15 bit | Yes; 15 bit | |
| • 1 V to 5 V | | Yes; 15 bit | | Yes; 15 bit | |
| • -10 V to +10 V | | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign | |
| • -5 V to +5 V | | Yes; 16 bit incl. sign | | Yes; 16 bit incl. sign | |
| **Input ranges (rated values), currents** | | | | | |
| • 0 to 20 mA | Yes | | | Yes; 15 bit | Yes; 15 bit |
| • -20 mA to +20 mA | Yes | | | | Yes; 16 bit incl. sign |
| • 4 mA to 20 mA | Yes | | | Yes; 15 bit | Yes; 15 bit |
| **Cable length** | | | | | |
| • shielded, max. | 200 m | 200 m | 200 m | 1 000 m; 200 m for voltage measurement | 1 000 m |
| **Analog value generation for the inputs** | | | | | |
| **Integration and conversion time/ resolution per channel** | | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 16 bit | 16 bit | 16 bit |
| • Integration time, parameterizable | Yes | Yes | Yes | Yes | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 16.67 / 50 / 60 / 4 800 (16.67 / 50 / 60) | 16.6 / 50 / 60 Hz / off | 16.67 / 50 / 60 / 4 800 (16.67 / 50 / 60) | 16.6 / 50 / 60 Hz | 16.6 / 50 / 60 Hz / off |
| • Conversion time (per channel) | 180 / 60 / 50 / 0.625 (67.5 / 22.5 / 18.75) ms | 50 ms @ 60 Hz, 60 ms @ 50 Hz, 180 ms @ 16.6 Hz, 250 µs without filter | 180 / 60 / 50 / 0.625 (67.5 / 22.5 / 18.75) ms | 180 / 60 / 50 ms | 50 ms @ 60 Hz, 60 ms @ 50 Hz, 180 ms @ 16.6 Hz, 250 µs without filter |
| **Smoothing of measured values** | | | | | |
| • Number of smoothing levels | 4; None; 4/8/16 times | 4 | 4; None; 4/8/16 times | 4; None; 4/8/16 times | 4 |
| • parameterizable | Yes | Yes | Yes | Yes | Yes |
| **Encoder** | | | | | |
| **Connection of signal encoders** | | | | | |
| • for voltage measurement | No | Yes | Yes | Yes | |
| • for current measurement as 2-wire transducer | Yes | | | Yes | Yes |
|   - Burden of 2-wire transmitter, max. | 650 Ω | | | 650 Ω | 650 Ω |
| • for current measurement as 4-wire transducer | Yes | | No | No | Yes |
| **Errors/accuracies** | | | | | |
| **Basic error limit (operational limit at 25 °C)** | | | | | |
| • Voltage, relative to input range, (+/-) | | 0.3 % | 0.3 % | 0.3 % | |
| • Current, relative to input range, (+/-) | 0.3 % | | | 0.3 % | 0.3 % |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Analog input modules**

### Technical specifications (continued)

| Article number | 6ES7134-6GF00-0AA1 | 6ES7134-6FB00-0BA1 | 6ES7134-6FF00-0AA1 | 6ES7134-6HD00-0BA1 | 6ES7134-6GB00-0BA1 |
|---|---|---|---|---|---|
| | ET 200SP, AI 8XI 2/4-WIRE BASIC | ET 200SP, AI 2XU STANDARD, PU 1 | ET 200SP, AI 8XU BASIC | ET 200SP, AI 4XU/I 2-WIRE ST | ET 200SP, AI 2XI 2/4-WIRE ST, PU 1 |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB | 70 dB | 70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB | 70 dB | 70 dB |
| • Common mode voltage, max. | | 10 V | | 10 V | 10 V |
| • Common mode interference, min. | | 90 dB | | 90 dB | 90 dB |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | No | No |
| **Interrupts/diagnostics/ status information** | | | | | |
| Diagnostics function | Yes | Yes | Yes | | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| • Limit value alarm | No | No | No | No | No |
| **Diagnostic messages** | | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; at 4 to 20 mA | No | No | Yes; at 4 to 20 mA | Yes; at 4 to 20 mA |
| • Short-circuit | Yes; Sensor supply to M; module by module | Yes; at 1 to 5 V | No | Yes; with 1 to 5 V or 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply | Yes; Short-circuit of the encoder supply |
| • Group error | Yes | Yes | Yes | Yes | Yes |
| • Overflow/underflow | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; green PWR LED | Yes; green PWR LED | Yes; Green LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No | No | No | No |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; Green/red LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | | |
| **Potential separation channels** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | | |
| Suitable for safety functions | No | No | No | No | No |
| **Dimensions** | | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | | |
| Weight, approx. | 31 g | 31 g | 31 g | 31 g | 32 g |

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## ■ Technical specifications (continued)

| Article number | 6ES7134-6GD00-0BA1 | 6ES7134-6TD00-0CA1 | 6ES7134-6HB00-0CA1 | 6ES7134-6HB00-0DA1 |
|---|---|---|---|---|
| | ET 200SP, AI 4XI 2/4-WIRE ST | ET 200SP, AI 4XI 2-WIRE 4...20MA HART | ET 200SP AI 2 X U/I 2, 4-WIRE HF | ET 200SP AI 2 X U/I 2, 4-WIRE HS |
| **General information** | | | | |
| Product type designation | ET 200SP, AI 4xI 2-/4-wire ST, PU 1 | AI 4xI 2-wire 4 ... 20 mA HART | ET 200SP, AI 2x U/I 2-/4-wire High Feature, PU 1 | ET 200SP, AI 2xU/I 2-/4-wire High Speed |
| **Product function** | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Measuring range scalable | No | No | No | No |
| • Scalable measured values | | | | No |
| • Adjustment of measuring range | | | | No |
| **Engineering with** | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V11 SP2 / V13 | V13 SP1 | V13 | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP4 and higher | V5.5 / - | V5.5 SP3 / - |
| • PCS 7 configurable/integrated as of version | V8.1 SP1 | V8.1 SP1 | V8.1 SP1 | |
| • PROFIBUS as of GSD version/GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | |
| • Oversampling | No | No | No | Yes; 2 channels per module |
| • MSI | No | No | Yes | No |
| **CiR – Configuration in RUN** | | | | |
| Reparameterization possible in RUN | Yes | Yes | Yes | Yes |
| Calibration possible in RUN | No | No | Yes | No |
| **Supply voltage** | | | | |
| Type of supply voltage | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes |
| **Analog inputs** | | | | |
| Number of analog inputs | 4; Differential inputs | 4; Differential inputs | 2; Differential inputs | 2; Differential inputs |
| permissible input voltage for voltage input (destruction limit), max. | | | 30 V | 30 V |
| permissible input current for current input (destruction limit), max. | 50 mA | 50 mA | 50 mA | 50 mA |
| Cycle time (all channels), min. | Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels) | | | 125 µs |
| Analog input with oversampling | | | No | Yes |
| • Values per cycle, max. | | | | 16 |
| • Resolution, min. | | | | 50 µs |
| Standardization of measured values | | | Yes | |
| **Input ranges (rated values), voltages** | | | | |
| • 0 to +10 V | | | Yes; 15 bit | Yes; 15 bit |
| • 1 V to 5 V | | | Yes; 15 bit | Yes; 13 bit |
| • -10 V to +10 V | | | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • -5 V to +5 V | | | Yes; 16 bit incl. sign | Yes; 15 bit incl. sign |
| **Input ranges (rated values), currents** | | | | |
| • 0 to 20 mA | Yes | No | Yes; 15 bit | Yes; 15 bit |
| • -20 mA to +20 mA | Yes | No | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • 4 mA to 20 mA | Yes | Yes; 15 bit + sign | Yes; 15 bit | Yes; 14 bit |
| **Cable length** | | | | |
| • shielded, max. | 1 000 m | 800 m | 1 000 m; 200 m for voltage measurement | 1 000 m; 200 m for voltage measurement |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Analog input modules**

■ **Technical specifications** (continued)

| Article number | 6ES7134-6GD00-0BA1 | 6ES7134-6TD00-0CA1 | 6ES7134-6HB00-0CA1 | 6ES7134-6HB00-0DA1 |
|---|---|---|---|---|
| | ET 200SP,<br>AI 4XI 2/4-WIRE ST | ET 200SP,<br>AI 4XI 2-WIRE 4...20MA HART | ET 200SP<br>AI 2 X U/I 2, 4-WIRE HF | ET 200SP<br>AI 2 X U/I 2, 4-WIRE HS |
| **Analog value generation for the inputs** | | | | |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 16 bit | 16 bit |
| • Integration time, parameterizable | Yes | Yes; channel by channel | Yes | |
| • Integration time (ms) | | | 67.5 / 22.5 / 18.75 / 10 / 5 / 2.5 / 1.25 / 0.625 ms | |
| • Basic conversion time, including integration time (ms) | | | 68.03 / 22.83 / 19.03 / 10.28 / 5.23 / 2.68 / 1.43 / 0.730 ms | |
| • Interference voltage suppression for interference frequency f1 in Hz | 16.6 / 50 / 60 Hz | 10 / 50 / 60 Hz | 16.6 / 50 / 60 / 300 / 600 / 1 200 / 2 400 / 4 800 | No |
| • Conversion time (per channel) | 180 / 60 / 50 ms | | | 10 µs |
| • Basic execution time of the module (all channels released) | | | 1 ms | |
| **Smoothing of measured values** | | | | |
| • Number of smoothing levels | 4; None; 4/8/16 times | 4; None; 4/8/16 times | 6; none; 2-/4-/8-/16-/32-fold | 7; none; 2-/4-/8-/16-/32-/64-fold |
| • parameterizable | Yes | Yes | Yes | Yes |
| **Encoder** | | | | |
| **Connection of signal encoders** | | | | |
| • for voltage measurement | No | No | Yes | Yes |
| • for current measurement as 2-wire transducer | Yes | Yes | Yes | Yes |
| - Burden of 2-wire transmitter, max. | 650 Ω | | 650 Ω | 650 Ω |
| • for current measurement as 4-wire transducer | Yes | | Yes | Yes |
| **Errors/accuracies** | | | | |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to input range, (+/-) | | | 0.05 %; 0.1 % at SFU 4.8 kHz | 0.2 % |
| • Current, relative to input range, (+/-) | 0.3 % | 0.3 % | 0.05 %; 0.1 % at SFU 4.8 kHz | 0.2 % |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 70 dB | 60 dB | | |
| • Common mode voltage, max. | 10 V | | 35 V | 35 V |
| • Common mode interference, min. | 90 dB | | 90 dB | 90 dB |
| **Isochronous mode** | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | Yes | Yes |
| Filtering and processing time (TCI), min. | | | 800 µs | 80 µs |
| Bus cycle time (TDP), min. | | | 1 ms | 125 µs; Starting from firmware Version V2.0.1 |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostics function | Yes | Yes | Yes | |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes |
| • Limit value alarm | No | Yes | Yes; two upper and two lower limit values in each case | Yes; two upper and two lower limit values in each case |

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## ■ Technical specifications (continued)

| Article number | 6ES7134-6GD00-0BA1 | 6ES7134-6TD00-0CA1 | 6ES7134-6HB00-0CA1 | 6ES7134-6HB00-0DA1 |
|---|---|---|---|---|
| | ET 200SP, AI 4XI 2/4-WIRE ST | ET 200SP, AI 4XI 2-WIRE 4...20MA HART | ET 200SP AI 2 X U/I 2, 4-WIRE HF | ET 200SP AI 2 X U/I 2, 4-WIRE HS |
| **Diagnostic messages** | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | |
| • Wire-break | Yes; at 4 to 20 mA | Yes; channel by channel | Yes; Measuring range 4 to 20 mA only | Yes; channel-by-channel, at 4 to 20 mA only |
| • Short-circuit | Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply | Yes; Channel-by-channel, short-circuit of the encoder supply to ground or of an input to the encoder supply | Yes; channel-by-channel, at 1 to 5 V or for short-circuit in encoder supply | Yes; channel-by-channel, at 1 to 5 V or for current measuring ranges short-circuit in encoder supply |
| • Group error | Yes | Yes | Yes | Yes |
| • Overflow/underflow | Yes | Yes; channel by channel | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; Green LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • for module diagnostics | Yes; Green/red LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | |
| **Potential separation channels** | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | | |
| Suitable for safety functions | No | | No | No |
| **Dimensions** | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | |
| Weight, approx. | 31 g | 31 g | 32 g | 32 g |

| Article number | 6ES7134-6JF00-0CA1 | 6ES7134-6JD00-0CA1 |
|---|---|---|
| | ET 200SP, AI 8XRTD/TC 2-WIRE HF | ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF |
| **General information** | | |
| Product type designation | ET 200SP, AI 8x RTD/TC 2-wire HF, PU 1 | ET 200SP, AI 4x RTD/TC 2-/3-/4-wire HF, PU 1 |
| **Product function** | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 | V12 SP1 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 / - | V5.5 SP3 / V5.5 SP4 |
| • PCS 7 configurable/integrated as of version | | V8.1 SP1 |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | |
| • Oversampling | No | No |
| • MSI | No | No |
| **CiR – Configuration in RUN** | | |
| Reparameterization possible in RUN | Yes | Yes |
| Calibration possible in RUN | Yes | Yes |
| **Supply voltage** | | |
| Type of supply voltage | DC | DC |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Analog input modules**

◼ **Technical specifications** (continued)

| Article number | 6ES7134-6JF00-0CA1 | 6ES7134-6JD00-0CA1 |
|---|---|---|
| | ET 200SP, AI 8XRTD/TC 2-WIRE HF | ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF |
| **Analog inputs** | | |
| Number of analog inputs | 8 | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 30 V | 30 V |
| Constant measurement current for resistance-type transmitter, typ. | 2 mA | 0.7 mA; 1.7 mA for Cu10 sensors |
| Cycle time (all channels), min. | Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels) | Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary |
| Technical unit for temperature measurement adjustable | Yes; °C/°F/K | Yes; °C/°F/K |
| **Input ranges (rated values), voltages** | | |
| • -1 V to +1 V | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • -250 mV to +250 mV | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • -50 mV to +50 mV | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • -80 mV to +80 mV | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| **Input ranges (rated values), thermocouples** | | |
| • Type B | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type C | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type E | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type J | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type K | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type L | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type N | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type R | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type S | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type T | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type U | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Type TXK/TXK(L) to GOST | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| **Input ranges (rated values), resistance thermometer** | | |
| • Cu 10 | | Yes; 16 bit incl. sign |
| • Ni 100 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Ni 1000 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • LG-Ni 1000 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Ni 120 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Ni 200 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Ni 500 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Pt 100 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Pt 1000 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Pt 200 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • Pt 500 | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| **Input ranges (rated values), resistors** | | |
| • 0 to 150 ohms | Yes; 15 bit | Yes; 15 bit |
| • 0 to 300 ohms | Yes; 15 bit | Yes; 15 bit |
| • 0 to 600 ohms | Yes; 15 bit | Yes; 15 bit |
| • 0 to 3000 ohms | Yes; 15 bit | Yes; 15 bit |
| • 0 to 6000 ohms | Yes; 15 bit | Yes; 15 bit |
| • PTC | Yes; 15 bit | Yes; 15 bit |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
| - parameterizable | Yes | Yes |
| **Cable length** | | |
| • shielded, max. | 200 m; 50 m with thermocouples | 200 m; 50 m with thermocouples |

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## Technical specifications (continued)

| Article number | 6ES7134-6JF00-0CA1 | 6ES7134-6JD00-0CA1 |
|---|---|---|
| | ET 200SP, AI 8XRTD/TC 2-WIRE HF | ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF |
| **Analog value generation for the inputs** | | |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit |
| • Integration time, parameterizable | Yes | Yes |
| • Basic conversion time, including integration time (ms) | | |
| - additional processing time for wire-break check | 2 ms; In the ranges resistance thermometers, resistors and thermocouples | 2 ms; In the ranges resistance thermometers, resistors and thermocouples |
| - additional power line wire-break check | | 2 ms; for 3/4 wire transducer (resistance thermometer and resistor) |
| • Interference voltage suppression for interference frequency f1 in Hz | 16.6 / 50 / 60 Hz | 16.6 / 50 / 60 Hz |
| • Conversion time (per channel) | 180 / 60 / 50 ms | 180 / 60 / 50 ms |
| **Smoothing of measured values** | | |
| • Number of smoothing levels | 4; None; 4/8/16 times | 4; None; 4/8/16 times |
| • parameterizable | Yes | Yes |
| **Encoder** | | |
| **Connection of signal encoders** | | |
| • for voltage measurement | Yes | Yes |
| • for resistance measurement with two-wire connection | Yes | Yes |
| • for resistance measurement with three-wire connection | No | Yes |
| • for resistance measurement with four-wire connection | No | Yes |
| **Errors/accuracies** | | |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to input range, (+/-) | 0.05 % | 0.05 % |
| • Resistance, relative to input range, (+/-) | 0.05 % | 0.05 % |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 70 dB | 70 dB |
| • Common mode voltage, max. | 10 V | 10 V |
| • Common mode interference, min. | 90 dB | 90 dB |
| **Isochronous mode** | | |
| Isochronous operation (application synchronized up to terminal) | No | No |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostics function | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| • Limit value alarm | Yes; two upper and two lower limit values in each case | Yes; two upper and two lower limit values in each case |
| **Diagnostic messages** | | |
| • Monitoring the supply voltage | Yes | Yes |
| • Wire-break | Yes; channel by channel | Yes; channel by channel |
| • Group error | Yes | Yes |
| • Overflow/underflow | Yes; channel by channel | Yes; channel by channel |
| **Diagnostics indication LED** | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules   > Analog input modules**

■ **Technical specifications** (continued)

| Article number | **6ES7134-6JF00-0CA1** | **6ES7134-6JD00-0CA1** |
|---|---|---|
| | ET 200SP, AI 8XRTD/TC 2-WIRE HF | ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF |
| **Potential separation** | | |
| **Potential separation channels** | | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | |
| Suitable for safety functions | No | No |
| **Dimensions** | | |
| Width | 15 mm | 15 mm |
| Height | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm |
| **Weights** | | |
| Weight, approx. | 32 g | 30 g |

| Article number | **6ES7134-6PA01-0BD0** | **6ES7134-6PA20-0BD0** |
|---|---|---|
| | ET 200SP AI ENERGY METER 400VAC ST | ET 200SP AI ENERGY METER 480VAC ST |
| **General information** | | |
| Product type designation | ET 200SP, AI Energy Meter 400 V AC ST, PU 1 | ET 200SP, AI Energy Meter 480 V AC ST, PU 1 |
| **Product function** | | |
| • Voltage measurement | Yes | Yes |
| • Voltage measurement with voltage transformers | No | Yes |
| • Current measurement | Yes | Yes |
| • Phase current measurement without current transformers | No | No |
| • Phase current measurement with current transformers | Yes | Yes |
| • Energy measurement | Yes | Yes |
| • Frequency measurement | Yes | Yes |
| • Power measurement | Yes | Yes |
| • Active power measurement | Yes | Yes |
| • Reactive power measurement | Yes | Yes |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Isochronous mode | No | No |
| **Engineering with** | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 | V13 SP1 |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 and higher | V5.5 SP4 and higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | V2.3 | V2.3 |
| **Operating mode** | | |
| • cyclic measurement | Yes | Yes |
| • acyclic measurement | Yes | Yes |
| • Acyclic measured value access | Yes | Yes |
| • Fixed measured value sets | Yes | Yes |
| • Freely definable measured value sets | No | Yes |
| **CiR – Configuration in RUN** | | |
| Reparameterization possible in RUN | Yes | Yes |
| Calibration possible in RUN | No | Yes |
| **Installation type/mounting** | | |
| Mounting position | Any | Any |

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■ **Technical specifications** (continued)

| Article number | 6ES7134-6PA01-0BD0 | 6ES7134-6PA20-0BD0 |
|---|---|---|
| | ET 200SP AI ENERGY METER 400VAC ST | ET 200SP AI ENERGY METER 480VAC ST |
| **Supply voltage** | | |
| Design of the power supply | Supply via voltage measurement channel L1 | Supply via voltage measurement channel L1 |
| Type of supply voltage | 100 - 240 V AC | AC 100 - 277 V |
| permissible range, lower limit (AC) | 90 V | 90 V |
| permissible range, upper limit (AC) | 264 V | 293 V |
| **Line frequency** | | |
| • permissible range, lower limit | 47 Hz | 47 Hz |
| • permissible range, upper limit | 63 Hz | 63 Hz |
| **Address area** | | |
| **Address space per module** | | |
| • Address space per module, max. | 44 byte; 32 byte input / 12 byte output | 268 byte; 256 byte input / 12 byte output |
| **Analog inputs** | | |
| Cycle time (all channels), typ. | 50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data) | 50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data) |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| • Limit value alarm | No | Yes |
| • Hardware interrupt | No | Yes; Monitoring of up to 16 freely selectable process values (exceeding or undershooting of value) |
| **Diagnostics indication LED** | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes | Yes |
| • Channel status display | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | Yes; red Fn LED | Yes; red Fn LED |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Integrated Functions** | | |
| **Measuring functions** | | |
| • Measuring procedure for voltage measurement | TRMS | TRMS |
| • Measuring procedure for current measurement | TRMS | TRMS |
| • Type of measured value acquisition | seamless | seamless |
| • Curve shape of voltage | Sinusoidal or distorted | Sinusoidal or distorted |
| • Buffering of measured variables | No | Yes |
| • Parameter length | 38 byte | 74 byte |
| • Bandwidth of measured value acquisition | 2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz | 2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz |
| **Operating mode for measured value acquisition** | | |
| - automatic detection of line frequency | No; Parameterizable | No; Parameterizable |
| **Measuring range** | | |
| - Frequency measurement, min. | 45 Hz | 45 Hz |
| - Frequency measurement, max. | 65 Hz | 65 Hz |
| **Measuring inputs for voltage** | | |
| - Measurable line voltage between phase and neutral conductor | 230 V | 277 V |
| - Measurable line voltage between the line conductors | 400 V | 480 V |
| - Measurable line voltage between phase and neutral conductor, min. | 90 V | 90 V |
| - Measurable line voltage between phase and neutral conductor, max. | 264 V | 293 V |
| - Measurable line voltage between the line conductors, min. | 155 V | 155 V |
| - Measurable line voltage between the line conductors, max. | 460 V | 508 V |
| - Measurement category for voltage measurement in accordance with IEC 61010-2-030 | CAT II; CAT III in case of guaranteed protection level of 1.5 kV | CAT II; CAT III in case of guaranteed protection level of 1.5 kV |
| - Internal resistance line conductor and neutral conductor | 3.4 MΩ | 3.4 MΩ |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Analog input modules**

■ **Technical specifications** (continued)

| Article number | 6ES7134-6PA01-0BD0 | 6ES7134-6PA20-0BD0 |
|---|---|---|
| | ET 200SP AI ENERGY METER 400VAC ST | ET 200SP AI ENERGY METER 480VAC ST |
| **Measuring inputs for voltage (continued)** | | |
| - Power consumption per phase | 20 mW | 20 mW |
| - Impulse voltage resistance 1,2/50µs | 1 kV | 1 kV |
| **Measuring inputs for current** | | |
| - measurable relative current (AC), min. | 5 %; Relative to the secondary rated current; 1 A, 5 A | 1 %; Relative to the secondary rated current 5 A |
| - measurable relative current (AC), max. | 100 %; Relative to the secondary rated current; 1 A, 5 A | 100 %; Relative to the secondary rated current 5 A |
| - Continuous current with AC, maximum permissible | 5 A | 5 A |
| - Apparent power consumption per phase for measuring range 5 A | 0.6 V·A | 0.6 V·A |
| - Rated value short-time withstand current restricted to 1 s | 100 A | 100 A |
| - Input resistance measuring range 0 to 5 A | 25 mΩ; At the terminal | 25 mΩ; At the terminal |
| - Zero point suppression | Parameterizable: 20 - 250 mA, default 50 mA | Parameterizable: 2 - 250 mA, default 50 mA |
| - Surge strength | 10 A; for 1 minute | 10 A; for 1 minute |
| **Accuracy class according to IEC 61557-12** | | |
| - Measured variable voltage | 0.5 | 0,2 |
| - Measured variable current | 0.5 | 0,2 |
| - Measured variable apparent power | 1 | 0.5 |
| - Measured variable active power | 1 | 0.5 |
| - Measured variable reactive power | 1 | 1 |
| - Measured variable power factor | 0.5 | 0.5 |
| - Measured variable active energy | 1 | 0.5 |
| - Measured variable reactive energy | 2 | 1 |
| - Measured variable neutral current | | 0.5; calculated |
| - Measured variable phase angle | ±1 °; not covered by IEC 61557-12 | ±1 °; not covered by IEC 61557-12 |
| - Measured variable frequency | 0.05 | 0.05 |
| **Potential separation** | | |
| **Potential separation channels** | | |
| • between the channels and backplane bus | Yes; 3 700V AC (type test) CAT III | Yes; 3 700V AC (type test) CAT III |
| **Isolation** | | |
| Isolation tested with | 2 300V AC for 1 min. (type test) | 2 300V AC for 1 min. (type test) |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C |
| • vertical installation, max. | 50 °C | 50 °C |
| **Dimensions** | | |
| Width | 20 mm | 20 mm |
| Height | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm |
| **Weights** | | |
| Weight (without packaging) | 45 g | 45 g |
| **Data for selecting a current transformer** | | |
| • Burden power current transformer x/1A, min. | As a function of cable length and cross section, see device manual | As a function of cable length and cross section, see device manual |
| • Burden power current transformer x/5A, min. | As a function of cable length and cross section, see device manual | As a function of cable length and cross section, see device manual |

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## ■ Ordering data

| | Article No. |
|---|---|
| **Analog input modules** | |
| Delivery options: Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. | |
| The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10. | |
| Analog input module AI 8xI 2/4-wire BA, BU type A0 or A1, color code CC01 | **6ES7 134-6GF00-0AA1** |
| Analog input module AI 2xU ST, BU type A0 or A1, color code CC00 | **6ES7134-6FB00-0BA1** |
| Analog input module AI 8xU BA, BU type A0 or A1, color code CC02 | **6ES7 134-6FF00-0AA1** |
| Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ± 0.3% | |
| • 1 unit | **6ES7134-6HD00-0BA1** |
| • 10 units | **6ES7134-6HD00-2BA1** |
| Analog input module AI 2xI 2/4-wire Standard, BU type A0 or A1, color code CC05, 16-bit | **6ES7134-6GB00-0BA1** |
| Analog input module AI 4xI 2/4-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ± 0.3% | **6ES7134-6GD00-0BA1** |
| Analog input module AI 4xI 2-wire 4...20 mA HART, BU type A0 or A1, color code CC03 | **6ES7134-6TD00-0CA1** |
| Analog input module AI 2xU/I 2/4-wire High Feature, BU type A0 or A1, color code CC05, 16-bit, ± 0.1%, independent channel isolation, isochronous mode above 1 ms | **6ES7134-6HB00-0CA1** |
| Analog input module AI 2xU/I 2/4-wire High Speed, BU type A0 or A1, color code CC00, 16-bit, ± 0.3%, isochronous mode above 250 µs, oversampling above 50 µs | **6ES7134-6HB00-0DA1** |
| Analog input module AI 8xRTD/TC 2-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ± 0.1%, scalable measuring range | |
| • 1 unit | **6ES7134-6JF00-0CA1** |
| • 10 units | **6ES7134-6JF00-2CA1** |

| | Article No. |
|---|---|
| **Analog input modules (continued)** | |
| Analog input module AI 4xRTD/TC 2, 3, 4-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ± 0.1%, scalable measuring range | |
| • 1 unit | **6ES7134-6JD00-0CA1** |
| • 10 units | **6ES7134-6JD00-2CA1** |
| Analog input module AI Energy Meter Standard, 400 V AC, BU type D0 | **6ES7134-6PA01-0BD0** |
| Analog input module AI Energy Meter Standard, 480 V AC, BU type D0 | **6ES7134-6PA20-0BD0** |
| **Usable type A0 BaseUnits** | |
| **BU15-P16+A10+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP20-0DA0** |
| • 10 units | **6ES7193-6BP20-2DA0** |
| **BU15-P16+A0+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP00-0DA0** |
| • 10 units | **6ES7193-6BP00-2DA0** |
| **BU15-P16+A10+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| • 1 unit | **6ES7193-6BP20-0BA0** |
| • 10 units | **6ES7193-6BP20-2BA0** |
| **BU15-P16+A0+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| • 1 unit | **6ES7193-6BP00-0BA0** |
| • 10 units | **6ES7193-6BP00-2BA0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Analog input modules**

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Usable type A1 BaseUnits (temperature detection)** | | **Shield connection** | 6ES7193-6SC00-1AM0 |
| **BU15-P16+A0+12D/T** | 6ES7193-6BP40-0DA1 | 5 shield supports and 5 shield terminals | |
| BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | | **Color-coded labels** | |
| | | Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | 6ES7193-6CP00-2MA0 |
| **BU15-P16+A0+2D/T** | 6ES7193-6BP00-0DA1 | Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | 6ES7193-6CP01-2MA0 |
| BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units | 6ES7193-6CP02-2MA0 |
| **BU15-P16+A0+12B/T** | 6ES7193-6BP40-0BA1 | Color code CC03, for 16 push-in terminals, for BU type A0, A1 gray (terminals 1 to 8), red (terminals 9 to 12), gray (terminals 13 to 16); 10 units | 6ES7193-6CP03-2MA0 |
| BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | | Color code CC05, for 16 push-in terminals, for BU type A0, A1, gray (terminals 1 to 12), red (terminals 13 to 14), blue (terminals 15 to 16); 10 units | 6ES7193-6CP05-2MA0 |
| **BU15-P16+A0+2B/T** | 6ES7193-6BP00-0BA1 | Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units | 6ES7193-6CP71-2AA0 |
| BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units | 6ES7193-6CP72-2AA0 |
| **Usable type D0 BaseUnits** | | Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units | 6ES7193-6CP73-2AA0 |
| **BU20-P12+A0+0B** | 6ES7193-6BP00-0BD0 | Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C); 10 units | 6ES7193-6CP74-2AA0 |
| BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left | | | |
| **Accessories** | | | |
| **Equipment labeling plate** | 6ES7193-6LF30-0AW0 | | |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | | | |
| **Labeling strips** | | | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 | | |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 | | |
| 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | 6ES7193-6LA10-0AA0 | | |
| 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | 6ES7193-6LA10-0AG0 | | |
| **BU cover** | | | |
| for covering empty slots (gaps); 5 units | | | |
| • 15 mm wide | 6ES7133-6CV15-1AM0 | | |
| • 20 mm wide | 6ES7133-6CV20-1AM0 | | |

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## Overview



- 2 and 4-channel analog output (AQ) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:
- Function classes Standard, High Feature and High-Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option for connecting current and voltage actuators

- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
   - Oversampling (n-fold equidistant output of an analog value within one PN cycle and thus the precisely timed output of an analog value or a sequence of analog values)
   - Isochronous mode (simultaneous equidistant output of analog values)
   - Output of substitute value in the event of interruptions to communication (shutdown, output adjustable substitute value, or keep last value)
   - Calibration during runtime
   - Re-parameterization during operation
   - Firmware update
   - Diagnosis of wire break, short circuit, overflow, underflow
   - Value status (optional binary validity information of the analog signal in the process image)
   - Supports the PROFIenergy profile
- Optional accessories
   - Labeling strips (film or card)
   - Equipment labeling plate
   - Color-coded label with module-specific CC code
   - Shielding terminal

A quick and clear comparison of the functions of the AQ modules is offered by the TIA Selection Tool.

Overview of analog output modules

| Analog output | PU | Article No. | CC code | BU type |
|---|---|---|---|---|
| AQ 2 x U ST | 1 | 6ES7135-6FB00-0BA1 | CC00 | A0, A1 |
| AQ 2 x I ST | 1 | 6ES7135-6GB00-0BA1 | CC00 | A0, A1 |
| AQ 4 x U/I ST | 1 | 6ES7135-6HD00-0BA1 | CC00 | A0, A1 |
| AQ 2 x U/I HF | 1 | 6ES7135-6HB00-0CA1 | CC00 | A0, A1 |
| AQ 2 x U/I HS<br>With two operating modes:<br>• High-speed isochronous AQ<br>• Oversampling | 1 | 6ES7135-6HB00-0DA1 | CC00 | A0, A1 |

# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules  > Analog output modules**

## ■ Overview (continued)

Overview of BaseUnits

| BaseUnit | PU | Article No. | CC codes for process terminals | CC codes for AUX terminals |
|---|---|---|---|---|
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2DA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2DA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 1 | 6ES7193-6BP20-0BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 10 | 6ES7193-6BP20-2BA0 | CC01 to CC05 | CC71 to CC73 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 1 | 6ES7193-6BP00-0BA0 | CC01 to CC05 | -- |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 10 | 6ES7193-6BP00-2BA0 | CC01 to CC05 | -- |
| **BU type A1**<br>• New load group (light)<br>• With temperature sensor<br>• 16 process terminals<br>• With 2x5 additional terminals | 1 | 6ES7193-6BP40-0DA1 | CC01 to CC05 | CC74 |
| **BU type A1**<br>• New load group (light)<br>• With temperature sensor<br>• 16 process terminals<br>• Without 2x5 additional terminals | 1 | 6ES7193-6BP00-0DA1 | CC01 to CC05 | -- |
| **BU type A1**<br>• Forwarding of load group (dark)<br>• With temperature sensor<br>• 16 process terminals<br>• With 2x5 additional terminals | 1 | 6ES7193-6BP40-0BA1 | CC01 to CC05 | CC74 |
| **BU type A1**<br>• Forwarding of load group (dark)<br>• With temperature sensor<br>• 16 process terminals<br>• Without 2x5 additional terminals | 1 | 6ES7193-6BP00-0BA1 | CC01 to CC05 | -- |

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## Technical specifications

| Article number | 6ES7135-6FB00-0BA1 | 6ES7135-6GB00-0BA1 | 6ES7135-6HD00-0BA1 | 6ES7135-6HB00-0DA1 | 6ES7135-6HB00-0CA1 |
|---|---|---|---|---|---|
| | ET 200SP, AQ 2XU STANDARD, PU 1 | ET 200SP, AQ 2XI STANDARD, PU 1 | ET 200SP, AQ 4XU/I ST | ET 200SP, AQ 2 X U/I HIGH SPEED | ET 200SP, AQ 2 X U/I HIGH FEATURE |
| **General information** | | | | | |
| Product type designation | ET 200SP, AQ 2xU Standard | ET 200SP, AQ 2xI Standard | ET 200SP, AQ 4xU/I Standard | ET 200SP, AQ 2xU/I High Speed | AQ 2xU/I HF |
| **Product function** | | | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| • Output range scalable | No | No | No | | |
| **Engineering with** | | | | | |
| • STEP 7 TIA Portal configurable/integrated as of version | V13 SP1 / - | V13 SP1 / - | V11 SP2 / V13 | V13 SP1 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PCS 7 configurable/integrated as of version | | | V8.1 SP1 | | V8.1 SP1 |
| • PROFIBUS as of GSD version/GSD revision | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 | GSD Revision 5 |
| • PROFINET as of GSD version/GSD revision | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 | GSDML V2.3 |
| **Operating mode** | | | | | |
| • Oversampling | No | No | No | Yes; 2 channels per module | No |
| • MSO | No | No | No | No | No |
| **CiR – Configuration in RUN** | | | | | |
| Reparameterization possible in RUN | Yes | Yes | Yes | Yes | Yes |
| Calibration possible in RUN | No | No | No | Yes | Yes |
| **Supply voltage** | | | | | |
| Type of supply voltage | DC | DC | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |
| **Analog outputs** | | | | | |
| Number of analog outputs | 2 | 2 | 4 | 2 | 2 |
| Cycle time (all channels), min. | 1 ms | 1 ms | 5 ms | 125 µs | 750 µs |
| Analog output with oversampling | No | No | No | Yes | |
| • Values per cycle, max. | | | | 16 | |
| • Resolution, min. | | | | 45 µs; (2 channels), 35 µs (1 channel) | |
| **Output ranges, voltage** | | | | | |
| • 0 to 10 V | Yes; 15 bit | | Yes; 15 bit | Yes; 15 bit | Yes; 15 bit |
| • 1 V to 5 V | Yes; 13 bit | | Yes; 13 bit | Yes; 13 bit | Yes; 13 bit |
| • -5 V to +5 V | Yes; 15 bit incl. sign | | Yes; 15 bit incl. sign | Yes; 15 bit incl. sign | Yes; 15 bit incl. sign |
| • -10 V to +10 V | Yes; 16 bit incl. sign | | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| **Output ranges, current** | | | | | |
| • 0 to 20 mA | | Yes; 15 bit | Yes; 15 bit | Yes; 15 bit | Yes; 15 bit |
| • -20 mA to +20 mA | | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign | Yes; 16 bit incl. sign |
| • 4 mA to 20 mA | | Yes; 14 bit | Yes; 14 bit | Yes; 14 bit | Yes; 14 bit |
| **Connection of actuators** | | | | | |
| • for voltage output two-wire connection | Yes | | Yes | Yes | Yes |
| • for voltage output four-wire connection | No | | Yes | Yes | Yes |
| • for current output two-wire connection | | Yes | Yes | Yes | Yes |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Analog output modules**

## ▮ Technical specifications (continued)

| Article number | 6ES7135-6FB00-0BA1 | 6ES7135-6GB00-0BA1 | 6ES7135-6HD00-0BA1 | 6ES7135-6HB00-0DA1 | 6ES7135-6HB00-0CA1 |
|---|---|---|---|---|---|
| | ET 200SP, AQ 2XU STANDARD, PU 1 | ET 200SP, AQ 2XI STANDARD, PU 1 | ET 200SP, AQ 4XU/I ST | ET 200SP, AQ 2 X U/I HIGH SPEED | ET 200SP, AQ 2 X U/I HIGH FEATURE |
| **Load impedance (in rated range of output)** | | | | | |
| • with voltage outputs, min. | 2 kΩ | | 2 kΩ | 2 kΩ | 2 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF | | 1 µF | 1 µF | 1 µF |
| • with current outputs, max. | | 500 Ω | 500 Ω | 500 Ω | 500 Ω |
| • with current outputs, inductive load, max. | | 1 mH | 1 mH | 1 mH | 1 mH |
| **Cable length** | | | | | |
| • shielded, max. | 200 m | 1 000 m | 1 000 m; 200 m for voltage output | 1 000 m; 200 m for voltage output | 1 000 m; 200 m for voltage output |
| **Analog value generation for the outputs** | | | | | |
| **Integration and conversion time/ resolution per channel** | | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 16 bit | 16 bit | 16 bit |
| **Settling time** | | | | | |
| • for resistive load | 0.1 ms | 0.1 ms; Typical value | 0.1 ms | 0.05 ms | 0.05 ms |
| • for capacitive load | 1 ms | | 1 ms | 0.05 ms; Max. 47 nF and 20 m cable length | 0.05 ms; Max. 47 nF and 20 m cable length |
| • for inductive load | | 0.5 ms | 0.5 ms | 0.05 ms | 0.05 ms |
| **Errors/accuracies** | | | | | |
| **Basic error limit (operational limit at 25 °C)** | | | | | |
| • Voltage, relative to output range, (+/-) | 0.3 % | 0.3 % | 0.3 % | 0.1 % | 0.1 % |
| • Current, relative to output range, (+/-) | 0.3 % | 0.3 % | 0.3 % | 0.1 % | 0.1 % |
| **Isochronous mode** | | | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No | Yes | Yes |
| Execution and activation time (TCO), min. | | | | 70 µs | 500 µs |
| Bus cycle time (TDP), min. | | | | 125 µs | 750 µs |
| **Interrupts/diagnostics/ status information** | | | | | |
| Diagnostics function | Yes | Yes | Yes | Yes | Yes |
| Substitute values connectable | Yes | Yes | Yes | Yes | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| **Diagnostic messages** | | | | | |
| • Monitoring the supply voltage | Yes | Yes | Yes | Yes | Yes |
| • Wire-break | | Yes | Yes | Yes; channel-by-channel, only for output type "current" | Yes; channel-by-channel, only for output type "current" |
| • Short-circuit | Yes | | Yes | Yes; channel-by-channel, only for output type "voltage" | Yes; channel-by-channel, only for output type "voltage" |
| • Group error | Yes | Yes | Yes | Yes | Yes |
| • Overflow/underflow | Yes | Yes | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | | | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED | Yes; green PWR LED |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for channel diagnostics | No | No | No | Yes; Red LED | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED | Yes; green/red DIAG LED |
| **Potential separation** | | | | | |
| **Potential separation channels** | | | | | |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes | Yes |
| **Isolation** | | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |

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## Technical specifications  (continued)

| Article number | 6ES7135-6FB00-0BA1 | 6ES7135-6GB00-0BA1 | 6ES7135-6HD00-0BA1 | 6ES7135-6HB00-0DA1 | 6ES7135-6HB00-0CA1 |
|---|---|---|---|---|---|
| | ET 200SP, AQ 2XU STANDARD, PU 1 | ET 200SP, AQ 2XI STANDARD, PU 1 | ET 200SP, AQ 4XU/I ST | ET 200SP, AQ 2 X U/I HIGH SPEED | ET 200SP, AQ 2 X U/I HIGH FEATURE |
| **Ambient conditions** | | | | | |
| **Ambient temperature during operation** | | | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C; Observe derating | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 50 °C | 50 °C | 50 °C; Observe derating | 50 °C | 50 °C |
| **Dimensions** | | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 73 mm | 73 mm | 73 mm | 73 mm | 73 mm |
| Depth | 58 mm | 58 mm | 58 mm | 58 mm | 58 mm |
| **Weights** | | | | | |
| Weight, approx. | 31 g | 31 g | 31 g | 31 g | 31 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Analog output modules** | | **Usable type A0 BaseUnits** | |
| Analog output module AQ 2xU Standard, BU type A0 or A1, color code CC00, 16-bit | 6ES7135-6FB00-0BA1 | Delivery options: Apart from the standard delivery form in an individual package, selected BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. | |
| Analog output module AQ 2xI Standard, BU type A0 or A1, color code CC00, 16-bit | 6ES7135-6GB00-0BA1 | | |
| Analog output module AQ 4xU/I Standard, BU type A0 or A1, color code CC00, 16-bit, ± 0.3% | 6ES7135-6HD00-0BA1 | The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10. | |
| Analog output module AQ 2xU/I High Feature, BU type A0 or A1, color code CC00, 16-bit, ± 0.1% | 6ES7135-6HB00-0CA1 | **BU15-P16+A10+2D** | |
| Analog output module AQ 2xU/I High Speed, BU type A0 or A1, color code CC00, 16-bit, ± 0.3% | 6ES7135-6HB00-0DA1 | BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| | | • 1 unit | 6ES7193-6BP20-0DA0 |
| | | • 10 units | 6ES7193-6BP20-2DA0 |
| | | **BU15-P16+A0+2D** | |
| | | BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| | | • 1 unit | 6ES7193-6BP00-0DA0 |
| | | • 10 units | 6ES7193-6BP00-2DA0 |
| | | **BU15-P16+A10+2B** | |
| | | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| | | • 1 unit | 6ES7193-6BP20-0BA0 |
| | | • 10 units | 6ES7193-6BP20-2BA0 |
| | | **BU15-P16+A0+2B** | |
| | | BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| | | • 1 unit | 6ES7193-6BP00-0BA0 |
| | | • 10 units | 6ES7193-6BP00-2BA0 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## I/O modules   > Analog output modules

■ **Ordering data**

| Ordering data | Article No. | Accessories | Article No. |
|---|---|---|---|
| **Usable type A1 BaseUnits (temperature detection)** | | **Accessories** | |
| | | **Equipment labeling plate** | **6ES7193-6LF30-0AW0** |
| **BU15-P16+A0+12D/T** | **6ES7193-6BP40-0DA1** | 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | |
| BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | | **Labeling strips** | |
| | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| **BU15-P16+A0+2D/T** | **6ES7193-6BP00-0DA1** | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| **BU15-P16+A0+12B/T** | **6ES7193-6BP40-0BA1** | 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | | **BU cover** | |
| | | for covering empty slots (gaps); 5 units | |
| **BU15-P16+A0+2B/T** | **6ES7193-6BP00-0BA1** | • 15 mm | **6ES7133-6CV15-1AM0** |
| BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | • 20 mm | **6ES7133-6CV20-1AM0** |
| | | **Shield connection** | **6ES7193-6SC00-1AM0** |
| | | 5 shield supports and 5 shield terminals | |
| | | **Color-coded labels** | |
| | | Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units | **6ES7193-6CP00-2MA0** |
| | | Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units | **6ES7193-6CP71-2AA0** |
| | | Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units | **6ES7193-6CP72-2AA0** |
| | | Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units | **6ES7193-6CP73-2AA0** |
| | | Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C); 10 units | **6ES7193-6CP74-2AA0** |

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## Overview



- 8 and 16-channel digital input modules for the ET 200SP
- Can be plugged onto Type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1131-6BF00-7BA0 | 6AG1131-6BH00-7BA0 |
| --- | --- | --- |
| Based on | 6ES7131-6BF00-0BA0 | 6ES7131-6BH00-0BA0 |
| | SIPLUS ET 200SP DI 8x24VDC ST | SIPLUS ET 200SP DI 16x24VDC ST |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 6 | 70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 4 |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax | 50 °C; = Tmax |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > SIPLUS digital inputs**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS digital input modules** | | **BU15-P16+A10+2D** | **6AG1193-6BP20-7DA0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| DI 8x24 V DC Standard, BU type A0, color code CC01 | **6AG1131-6BF00-7BA0** | BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| DI 16x24 V DC Standard, BU type A0, color code CC00 | **6AG1131-6BH00-7BA0** | | |
| **Usable SIPLUS BaseUnits** | | **BU15-P16+A10+2B** | **6AG1193-6BP20-7BA0** |
| **BU15-P16+A0+2D** | **6AG1193-6BP00-7DA0** | (Extended temperature range and exposure to media) | |
| (Extended temperature range and exposure to media) | | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | | |
| **BU15-P16+A0+2B** | **6AG1193-6BP00-7BA0** | **Accessories** | See SIMATIC ET 200SP, digital input modules, page 9/23 |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |

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■ **Overview**



- 4, 8 and 16-channel DQ modules
- 4-channel RQ modules
- BaseUnits for single conductor or multiple-conductor connection
- Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DQ and RQ
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories:
  - Labeling strips
  - Equipment marking label
  - Color-coded label with module-specific CC code
  - Shielding terminal

*Overview of digital output modules*

| Digital output | Article No. | CC code | BU type | VPE |
|---|---|---|---|---|
| DQ 16 x 24 V DC/0.5 A ST | 6AG1132-6BH00-7BA0 | CC00 | A0 | 1 |
| DQ 8 x 24 V DC/0.5 A ST | 6AG1132-6BF00-7BA0 | CC02 | A0 | 1 |
| DQ 8 x 24 V DC/0.5 A HF | 6AG1132-6BF00-7CA0 | CC02 | A0 | 1 |
| DQ 4 x 24 V DC/2 A ST | 6AG1132-6BD20-7BA0 | CC02 | A0 | 1 |
| RQ 4 x 24 V UC/2 A CO ST | 6AG1132-6GD50-2BA0 | CC00 | A0 | 1 |
| RQ 4 x 120 V DC-230 V AC/5 A NO ST | 6AG1132-6HD00-7BB0 | CC00 | B0 | 1 |

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## I/O modules > SIPLUS digital outputs

### Technical specifications

| Article number | 6AG1132-6BD20-7BA0 | 6AG1132-6BF00-7BA0 | 6AG1132-6BH00-7BA0 |
|---|---|---|---|
| Based on | 6ES7132-6BD20-0BA0 | 6ES7132-6BF00-0BA0 | 6ES7132-6BH00-0BA0 |
| | SIPLUS ET 200SP DQ 4x24VDC/2A ST | SIPLUS ET 200SP DQ 8x24VDC/0,5A ST | SIPLUS ET 200SP DQ 16x24VDC/0,5A ST |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax ; > +60 °C number of simultaneously controllable outputs max. 2 x 0.25 A or max. 4 x 0.125 A, max. total current 0.5 A | 70 °C; = Tmax; > +60 °C max. total current 1.0 A | 70 °C; = Tmax; > +60 °C max. total current 1.0 A |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C; = Tmax |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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■ **Technical specifications** (continued)

| Article number | 6AG1132-6BF00-7CA0 | 6AG1132-6GD50-2BA0 | 6AG1132-6HD00-7BB1 |
|---|---|---|---|
| | **6ES7132-6BF00-0CA0** | **6ES7132-6GD50-0BA0** | **6ES7132-6HD00-0BB0** |
| | SIPLUS ET 200SP<br>DQ 8X24VDC/0,5A HF | SIPLUS ET 200SP<br>RQ 4X24VDC/2A CO ST | SIPLUS ET 200SP<br>RQ 4x120VDC/230VAC/5A |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin |
| • horizontal installation, max. | 70 °C; = Tmax;<br>> +60 °C max. total current 1.0 A | 60 °C; = Tmax | 70 °C; = Tmax;<br>see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. continuous current of 3 A per relay |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at<br>1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K) at<br>795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K) at<br>658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) | Tmin ... Tmax at<br>1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) | 3 000 m with: Tmin ... Tmax at<br>1 080 hPa ... 795 hPa<br>(-1 000 m ... +2 000 m) //<br>Tmin ... (Tmax - 10 K) at<br>795 hPa ... 658 hPa<br>(+2 000 m ... +3 500 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > SIPLUS digital outputs**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS digital output modules** | | **BU15-P16+A10+2D** | **6AG1193-6BP20-7DA0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| Digital output module DQ 4x24 V DC/2 A Standard, BU type A0, color code CC02 | **6AG1132-6BD20-7BA0** | BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| Digital output module DQ 8x24 V DC/0.5 A Standard, BU type A0, color code CC02 | **6AG1132-6BF00-7BA0** | | |
| Digital output module DQ 8x24 V DC/0.5 A High Feature, BU type A0, color code CC02 | **6AG1132-6BF00-7CA0** | **BU15-P16+A10+2B** | **6AG1193-6BP20-7BA0** |
| | | (Extended temperature range and exposure to media) | |
| Digital output module DQ 16x24 V DC/0.5 A Standard, BU type A0, color code CC00 | **6AG1132-6BH00-7BA0** | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| Signal relay module RQ CO 4x24 V UC/2 A Standard, changeover contact, BU type A0, color code CC00 | **6AG1132-6GD50-2BA0** | | |
| Relay module RQ NO 4x120 V DC - 230 V AC/5 A Standard, normally open, BU type B0, color code CC00 | **6AG1132-6HD00-7BB1** | **BU20-P12+A4+0B** | **6AG1193-6BP20-7BB0** |
| **Usable SIPLUS BaseUnits** | | (Extended temperature range and exposure to media) | |
| **BU15-P16+A0+2D** | **6AG1193-6BP00-7DA0** | BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit | |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | | **Accessories** | See SIMATIC ET 200SP, digital output modules, page 9/35 |
| **BU15-P16+A0+2B** | **6AG1193-6BP00-7BA0** | | |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |

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■ **Overview**

- 2, 4 and 8-channel AI modules
- Measuring ranges for current, voltage, thermocouples, resistance thermometer, resistor and PTC
- BaseUnits for 2, 3 and 4-conductor connection
- Function classes Basic, Standard, High Feature and High Speed
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories:
  - Labeling strips
  - Equipment marking label
  - Color-coded label with module-specific CC code
  - Shielding terminal

*Overview of SIPLUS analog input modules*

| Analog input | Article No. | CC code | BU type | PU |
|---|---|---|---|---|
| AI 4 x U/I 2-wire ST | 6AG1134-6HD00-7BA1 | CC03 | A0, A1 | 1 |
| AI 4 x I 2/4-wire ST | 6AG1134-6GD00-7BA1 | CC03 | A0, A1 | 1 |
| AI 4 x I 2-wire 4...20 mA HART | 6AG1134-6TD00-2CA1 | CC03 | A0, A1 | 1 |
| AI 2 x U/I 2/4-wire HF | 6AG1134-6HB00-2CA1 | CC05 | A0, A1 | 1 |
| AI 2xU/I 2/4-wire HS<br>With two operating modes:<br>• High-speed isochronous AI<br>• Oversampling | 6AG1134-6HB00-2DA1 | CC00 | A0, A1 | 1 |
| AI 8 x RTD/TC 2-wire HF | 6AG1134-6JF00-2CA1 | CC00 | A0, A1 | 1 |
| AI 4 x RTD/TC 2/3/4-wire HF | 6AG1134-6JD00-2CA1 | CC00 | A0, A1 | 1 |
| AI Energy Meter 400 V AC ST | 6AG1134-6PA00-7BD0 | -- | D0 | 1 |

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > SIPLUS analog inputs**

## ◼ Technical specifications

| Article number | **6AG1134-6HD00-7BA1** | **6AG1134-6GD00-7BA1** | **6AG1134-6TD00-2CA1** |
|---|---|---|---|
| Based on | **6ES7134-6HD00-0BA1** | **6ES7134-6GD00-0BA1** | **6ES7134-6TD00-0CA1** |
| | SIPLUS ET 200SP<br>AI 4xU/I 2-wire ST | SIPLUS ET 200SP<br>AI 4xI 2/4-wire ST | SIPLUS ET 200SP<br>AI 4XI 2-WIRE 4...20MA H |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > 60 °C max.<br>1x +/- 20 mA or 4x +/- 10 V permissible | 70 °C; = Tmax; > 60 °C max.<br>1x +/- 20 mA permissible | 60 °C |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax | 50 °C; = Tmax | 50 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | | | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1134-6HB00-2CA1** | **6AG1134-6HB00-2DA1** | **6AG1134-6JF00-2CA1** | **6AG1134-6JD00-2CA1** |
|---|---|---|---|---|
| Based on | **6ES7134-6HB00-0CA1** | **6ES7134-6HB00-0DA1** | **6ES7134-6JF00-0CA1** | **6ES7134-6JD00-0CA1** |
| | SIPLUS ET 200SP<br>AI 2 X U/I 2, 4-WIRE HF | SIPLUS ET 200SP<br>AI 2 X U/I 2, 4-WIRE HS | SIPLUS ET 200SP<br>AI 8XRTD/TC 2-WIRE HF | SIPLUS ET 200SP<br>AI 4xRTD/TC HF |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -40 °C; = Tmin;<br>Startup @ -25 °C | -40 °C; = Tmin;<br>Startup @ -25 °C | -40 °C; = Tmin;<br>Startup @ -25 °C | -40 °C; = Tmin;<br>Startup @ -25 °C |
| • horizontal installation, max. | 60 °C; = Tmax | 60 °C; = Tmax | 60 °C | 60 °C; = Tmax |
| • vertical installation, min. | | | -40 °C; = Tmin;<br>Startup @ -25 °C | -40 °C; = Tmin;<br>Startup @ -25 °C |
| • vertical installation, max. | | | 50 °C | 50 °C; = Tmax |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) | Tmin ... Tmax<br>at 1080 hPa ... 795 hPa<br>(-1000 m ... +2000 m) //<br>Tmin ... (Tmax - 10K)<br>at 795 hPa ... 658 hPa<br>(+2000 m ... +3500 m) //<br>Tmin ... (Tmax - 20K)<br>at 658 hPa ... 540 hPa<br>(+3500 m ... +5000 m) | |

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## ■ Technical specifications (continued)

| Article number | 6AG1134-6HB00-2CA1 | 6AG1134-6HB00-2DA1 | 6AG1134-6JF00-2CA1 | 6AG1134-6JD00-2CA1 |
|---|---|---|---|---|
| Based on | 6ES7134-6HB00-0CA1 | 6ES7134-6HB00-0DA1 | 6ES7134-6JF00-0CA1 | 6ES7134-6JD00-0CA1 |
| | SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HF | SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HS | SIPLUS ET 200SP AI 8XRTD/TC 2-WIRE HF | SIPLUS ET 200SP AI 4xRTD/TC HF |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | 6AG1134-6PA00-7BD0 |
|---|---|
| Based on | 6ES7134-6PA00-0BD0 |
| | SIPLUS ET 200SP AI Energy Meter |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C max. permissible current 1 A per phase |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | 6AG1134-6PA00-7BD0 |
|---|---|
| Based on | 6ES7134-6PA00-0BD0 |
| | SIPLUS ET 200SP AI Energy Meter |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > SIPLUS analog inputs**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS analog input modules** | | **BU15-P16+A10+2B** | **6AG1193-6BP20-7BA0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ± 0.3% | **6AG1134-6HD00-7BA1** | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| Analog input module AI 4xI 2/4-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ± 0.3% | **6AG1134-6GD00-7BA1** | **Usable SIPLUS BaseUnits type A1 (temperature detection)** | |
| Analog input module AI 4xRTD/TC 2, 3, 4-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ± 0.1%, scalable measuring range | **6AG1134-6JD00-2CA1** | **BU15-P16+A0+2D/T** | **6AG1193-6BP00-7DA1** |
| | | (Extended temperature range and exposure to media) | |
| Analog input module AI 4xI 2-wire 4...20 mA HART, BU type A0 or A1, color code CC03 | **6AG1134-6TD00-2CA1** | BU type A1; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | |
| Analog input module AI 2xU/I 2/4-wire High Feature, BU type A0 or A1, color code CC05, 16-bit, ± 0.1%, independent channel isolation, isochronous mode above 1 ms | **6AG1134-6HB00-2CA1** | **BU15-P16+A0+2B/T** | **6AG1193-6BP00-7BA1** |
| | | (Extended temperature range and exposure to media) | |
| | | BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| Analog input module AI 2xU/I 2/4-wire High Speed, BU type A0 or A1, color code CC00, 16-bit, ± 0.3%, isochronous mode above 250 µs, oversampling above 50 µs | **6AG1134-6HB00-2DA1** | **BU15-P16+A0+12D/T** | **6AG1193-6BP40-7DA1** |
| | | (Extended temperature range and exposure to media) | |
| Analog input module AI 8xRTD/TC 2-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ± 0.1%, scalable measuring range | **6AG1134-6JF00-2CA1** | BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | |
| Analog input module AI Energy Meter Standard, BU type D0 | **6AG1134-6PA00-7BD0** | **BU15-P16+A0+12B/T** | **6AG1193-6BP40-7BA1** |
| **Usable SIPLUS BaseUnits type A0** | | (Extended temperature range and exposure to media) | |
| **BU15-P16+A0+2D** | **6AG1193-6BP00-7DA0** | BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | | **Usable SIPLUS BaseUnits type D0** | |
| **BU15-P16+A0+2B** | **6AG1193-6BP00-7BA0** | **BU20-P12+A0+0B** | **6AG1193-6BP00-7BD0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left | |
| **BU15-P16+A10+2D** | **6AG1193-6BP20-7DA0** | **Accessories** | See SIMATIC ET 200SP, analog input modules, page 9/50 |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | | |

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## Overview



- 2 and 4-channel AQ modules
- Output ranges for current, voltage
- BaseUnits for 2, 3 and 4-conductor connection
- Function classes Standard, High Feature and High Speed
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories
  - Labeling strips
  - Reference identification label
  - Color-coded label with module-specific CC code
  - Shielding terminal

### Overview of analog output modules

| Analog output | Article No. | CC code | BU type | PU |
|---|---|---|---|---|
| AQ 4 x U/I ST | 6AG1135-6HD00-7BA1 | CC00 | A0, A1 | 1 |
| AQ 2xU/I HS | 6AG1135-6HB00-2DA1 | CC00 | A0, A1 | 1 |
| With two operating modes: <br>• High-speed isochronous AQ <br>• Oversampling | | | | |

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1135-6HD00-7BA1 | 6AG1135-6HB00-2DA1 |
|---|---|---|
| Based on | 6ES7135-6HD00-0BA1 | 6ES7135-6HB00-0DA1 |
| | SIPLUS ET 200SP AQ 4xU/I ST | SIPLUS ET 200SP AQ 2 X U/I HIGH SPEED |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 70 °C; = Tmax; > +60 °C max. 2x +/- 10 V permissible | 60 °C; = Tmax |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C | |
| • vertical installation, max. | 50 °C; = Tmax | |
| **Extended ambient conditions** | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation |
| **Resistance** | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > SIPLUS analog outputs**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS analog output modules** | | **Usable SIPLUS BaseUnits type A1 (temperature detection)** | |
| (Extended temperature range and exposure to media) | | **BU15-P16+A0+2D/T** | 6AG1193-6BP00-7DA1 |
| AQ 4XU/l Standard, BU type A0 or A1, color code CC03 | 6AG1135-6HD00-7BA1 | (Extended temperature range and exposure to media) | |
| Analog output module AQ 2xU/I High Speed, BU type A0 or A1, color code CC00, 16-bit, ± 0.3% | 6AG1135-6HB00-2DA1 | BU type A1; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | |
| **Usable SIPLUS BaseUnits type A0** | | **BU15-P16+A0+2B/T** | 6AG1193-6BP00-7BA1 |
| **BU15-P16+A0+2D** | 6AG1193-6BP00-7DA0 | (Extended temperature range and exposure to media) | |
| (Extended temperature range and exposure to media) | | BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | | **BU15-P16+A0+12D/T** | 6AG1193-6BP40-7DA1 |
| **BU15-P16+A0+2B** | 6AG1193-6BP00-7BA0 | (Extended temperature range and exposure to media) | |
| (Extended temperature range and exposure to media) | | BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |
| **BU15-P16+A10+2D** | 6AG1193-6BP20-7DA0 | **BU15-P16+A0+12B/T** | 6AG1193-6BP40-7BA1 |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | |
| **BU15-P16+A10+2B** | 6AG1193-6BP20-7BA0 | **Accessories** | See SIMATIC ET 200SP, analog output modules, page 9/56 |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | | |

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## Overview



• Counting frequency 200 kHz
  (800 kHz with quadruple evaluation)
• Counting range: +/- 31-bits
• Measurement function
• Parameterizable hardware interrupts
• Parameterizable input filters for suppressing interferences
  at sensor and digital inputs

### Supported types of encoders/signals
• 24 V incremental encoder with and without signal N
• 24 V pulse encoder with direction signal
• 24 V pulse encoder without direction signal
• 24 V pulse encoder for pulse up and down respectively

### Supported system functions
• Isochronous mode
• Firmware update
• Identification data I&M

### Technical properties

• Counter module for ET 200SP
• Interfaces:
  - 24 V encoder signals A, B and N from P, M
    or push-pull-switching encoders and sensors
  - 24 V encoder supply output, short-circuit proof
  - 3 digital inputs for controlling the count operation,
    for saving or for setting the count value
  - 2 digital outputs for fast reactions regardless of the counter
    status or measured value

## Technical specifications

| Article number | **6ES7138-6AA00-0BA0** |
|---|---|
| | ET 200SP, TM COUNT 1X24V |
| **General information** | |
| Product type designation | TM Count 1x24V |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / - |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 |
| **Installation type/mounting** | |
| Rack mounting | Yes |
| Rail mounting | Yes |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, max. | 60 mA; without load |
| **Encoder supply** | |
| Number of outputs | 1 |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes; electronic/thermal |
| • Output current, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 1 W |

| Article number | **6ES7138-6AA00-0BA0** |
|---|---|
| | ET 200SP, TM COUNT 1X24V |
| **Digital inputs** | |
| Number of digital inputs | 3 |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Gate start/stop | Yes |
| • Capture | Yes |
| • Synchronization | Yes |
| • Freely usable digital input | Yes |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| - at "0" to "1", min. | 6 µs; for parameterization "none" |
| - at "1" to "0", min. | 6 µs; for parameterization "none" |
| **for counter/technological functions** | |
| - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Technology modules > TM Count 1x24V counter module**

## ■ Technical specifications (continued)

| Article number | 6ES7138-6AA00-0BA0 | Article number | 6ES7138-6AA00-0BA0 |
|---|---|---|---|
| | ET 200SP, TM COUNT 1X24V | | ET 200SP, TM COUNT 1X24V |
| **Digital outputs** | | **Encoder signal 24 V** | |
| Type of digital output | Transistor | - permissible voltage at input, min. | -30 V |
| Number of digital outputs | 2 | - permissible voltage at input, max. | 30 V |
| Digital outputs, parameterizable | Yes | **Interface types** | |
| Short-circuit protection | Yes; electronic/thermal | • Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| Limitation of inductive shutdown voltage to | L+ (-33 V) | • Source/sink input | Yes |
| Controlling a digital input | Yes | **Isochronous mode** | |
| **Digital output functions, parameterizable** | | Isochronous operation (application synchronized up to terminal) | Yes |
| • Switching tripped by comparison values | Yes | **Interrupts/diagnostics/ status information** | |
| • Freely usable digital output | Yes | Substitute values connectable | Yes; Parameterizable |
| **Switching capacity of the outputs** | | **Alarms** | |
| • with resistive load, max. | 0.5 A; Per digital output | • Diagnostic alarm | Yes |
| • on lamp load, max. | 5 W | • Hardware interrupt | Yes |
| **Load resistance range** | | **Diagnostic messages** | |
| • lower limit | 48 Ω | • Monitoring the supply voltage | Yes |
| • upper limit | 12 kΩ | • Wire-break | Yes |
| **Output voltage** | | • Short-circuit | Yes |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) | • A/B transition error at incremental encoder | Yes |
| **Output current** | | • Group error | Yes |
| • for signal "1" rated value | 0.5 A; Per digital output | **Diagnostics indication LED** | |
| • for signal "0" residual current, max. | 0.5 mA | • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| **Output delay with resistive load** | | • for module diagnostics | Yes; green/red DIAG LED |
| • "0" to "1", max. | 50 µs | • Status indicator backward counting (green) | Yes |
| • "1" to "0", max. | 50 µs | • Status indicator forward counting (green) | Yes |
| **Switching frequency** | | **Integrated Functions** | |
| • with resistive load, max. | 10 kHz | Number of counters | 1 |
| • with inductive load, max. | 0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve | Counting frequency (counter) max. | 800 kHz; with quadruple evaluation |
| • on lamp load, max. | 10 Hz | **Counting functions** | |
| **Total current of the outputs** | | • Can be used with TO High_Speed_Counter | Yes |
| • Current per module, max. | 1 A | • Continuous counting | Yes |
| **Cable length** | | • Counter response parameterizable | Yes |
| • shielded, max. | 1 000 m | • Hardware gate via digital input | Yes |
| • unshielded, max. | 600 m | • Software gate | Yes |
| **Encoder** | | • Event-controlled stop | Yes |
| **Connectable encoders** | | • Synchronization via digital input | Yes |
| • 2-wire sensor | Yes | • Counting range, parameterizable | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | **Comparator** | |
| **Encoder signals, incremental encoder (asymmetrical)** | | - Number of comparators | 2 |
| • Input voltage | 24 V | - Direction dependency | Yes |
| • Input frequency, max. | 200 kHz | - Can be changed from user program | Yes |
| • Counting frequency, max. | 800 kHz; with quadruple evaluation | **Position detection** | |
| • Cable length, shielded, max. | 600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz | • Incremental acquisition | Yes |
| | | • Suitable for S7-1500 Motion Control | Yes |
| • Signal filter, parameterizable | Yes | **Measuring functions** | |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes | • Measuring time, parameterizable | Yes |
| • Incremental encoder with A/B tracks, 90° phase offset and zero track | Yes | • Dynamic measurement period adjustment | Yes |
| • Pulse encoder | Yes | • Number of thresholds, parameterizable | 2 |
| • Pulse encoder with direction | Yes | | |
| • Pulse encoder with one impulse signal per count direction | Yes | | |

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## ■ Technical specifications (continued)

| Article number | 6ES7138-6AA00-0BA0 |
|---|---|
| | ET 200SP, TM COUNT 1X24V |
| **Measuring range** | |
| - Frequency measurement, min. | 0.04 Hz |
| - Frequency measurement, max. | 800 kHz |
| - Cycle duration measurement, min. | 1.25 µs |
| - Cycle duration measurement, max. | 25 s |
| **Accuracy** | |
| - Frequency measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Cycle duration measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Velocity measurement | 100 ppm; depending on measuring interval and signal evaluation |

| Article number | 6ES7138-6AA00-0BA0 |
|---|---|
| | ET 200SP, TM COUNT 1X24V |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Dimensions** | |
| Width | 15 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 45 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TM Count 1x24V counter module** | | **Accessories** | |
| With one channel, max. 200 kHz; for 24 V encoder | 6ES7138-6AA00-0BA0 | **Reference identification label** | 6ES7193-6LF30-0AW0 |
| **Usable BaseUnits** | | 10 sheets of 16 labels | |
| **BU15-P16+A0+2D** | | **Labeling strips** | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| • 1 unit | 6ES7193-6BP00-0DA0 | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| • 10 units | 6ES7193-6BP00-2DA0 | | |
| **BU15-P16+A0+2B** | | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 |
| • 1 unit | 6ES7193-6BP00-0BA0 | **BU cover** | |
| • 10 units | 6ES7193-6BP00-2BA0 | for covering empty slots (gaps); 5 units | |
| **BU15-P16+A10+2D** | | • 15 mm wide | 6ES7133-6CV15-1AM0 |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | • 20 mm wide | 6ES7133-6CV20-1AM0 |
| | | **Shield connection** | 6ES7193-6SC00-1AM0 |
| • 1 unit | 6ES7193-6BP20-0DA0 | 5 shield supports and 5 shield terminals | |
| • 10 units | 6ES7193-6BP20-2DA0 | | |
| **BU15-P16+A10+2B** | | **Color-coded labels** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | 6ES7193-6CP71-2AA0 |
| | | • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | 6ES7193-6CP72-2AA0 |
| • 1 unit | 6ES7193-6BP20-0BA0 | • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | 6ES7193-6CP73-2AA0 |
| • 10 units | 6ES7193-6BP20-2BA0 | | |

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# I/O systems

## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules > Technology modules > TM PosInput 1 counting and position detection module**

### Overview



#### Technical properties

- Counting and position detection module for ET 200SP
- Interfaces:
  - Encoder signals A, B and N for 5 V TTL or RS 422 differential signals
  - SSI interface with clock and data for RS 422 differential signals
  - 24 V encoder supply output, short-circuit proof
  - 2 digital inputs for controlling the counting process, for saving or setting the counter or position value
  - 2 digital outputs for fast reactions depending on the counter reading, position value or measured value

- Counter frequency 1 MHz (4 MHz with four-fold evaluation)
- Counting range: +/- 31 bits
- Measurement function
- Parameterizable hardware interrupts
- Parameterizable input filters for suppressing interferences at sensor and digital inputs

#### *Supported types of encoders/signals*

- Incremental encoders with or without N signal
- Pulse encoders with directional signal
- Pulse encoders without directional signal
- Pulse encoders for forward or reverse pulses
- SSI encoders with a frame length of 10 to 40 bits, of which up to 31 bits position value

#### *Supported system functions*

- Isochronous mode
- Firmware update
- Identification data (I&M)

### Technical specifications

| Article number | **6ES7138-6BA00-0BA0** | Article number | **6ES7138-6BA00-0BA0** |
|---|---|---|---|
| | ET 200SP, TM POSINPUT 1 | | ET 200SP, TM POSINPUT 1 |
| **General information** | | **Encoder supply** | |
| Product type designation | TM PosInput 1 | Number of outputs | 1 |
| **Product function** | | **24 V encoder supply** | |
| • I&M data | Yes; I&M0 to I&M3 | • 24 V | Yes; L+ (-0.8 V) |
| **Engineering with** | | • Short-circuit protection | Yes |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13 | • Output current, max. | 300 mA |
| | | **Power loss** | |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / V5.5 SP4 | Power loss, typ. | 1.9 W |
| | | **Digital inputs** | |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 | Number of digital inputs | 2 |
| | | Digital inputs, parameterizable | Yes |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Installation type/mounting** | | **Digital input functions, parameterizable** | |
| Rack mounting | Yes | • Gate start/stop | Yes; only for pulse and incremental encoders |
| Rail mounting | Yes | | |
| **Supply voltage** | | • Capture | Yes |
| **Load voltage L+** | | • Synchronization | Yes; only for pulse and incremental encoders |
| • Rated value (DC) | 24 V | | |
| • Reverse polarity protection | Yes | • Freely usable digital input | Yes |
| **Input current** | | **Input voltage** | |
| Current consumption, max. | 75 mA; without load | • Rated value (DC) | 24 V |
| | | • for signal "0" | -30 to +5V |
| | | • for signal "1" | +11 to +30V |
| | | • permissible voltage at input, min. | -30 V |
| | | • permissible voltage at input, max. | 30 V |

## ▪ Technical specifications (continued)

| Article number | 6ES7138-6BA00-0BA0 |
|---|---|
| | ET 200SP, TM POSINPUT 1 |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay**<br>**(for rated value of input voltage)** | |
| **for standard inputs** | |
|   - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 /<br>3.2 / 12.8 / 20 ms |
|   - at "0" to "1", min. | 6 µs; for parameterization "none" |
|   - at "1" to "0", min. | 6 µs; for parameterization "none" |
| **for counter/technological functions** | |
|   - parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 2 |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | L+ (-33 V) |
| Controlling a digital input | Yes |
| **Digital output functions,**<br>**parameterizable** | |
| • Switching tripped by comparison values | Yes |
| • Freely usable digital output | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A; Per digital output |
| • on lamp load, max. | 5 W |
| **Load resistance range** | |
| • lower limit | 48 Ω |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A; Per digital output |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 50 µs |
| • "1" to "0", max. | 50 µs |
| **Switching frequency** | |
| • with resistive load, max. | 10 kHz |
| • with inductive load, max. | 0.5 Hz; Acc. to IEC 60947-5-1,<br>DC-13; observe derating curve |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per module, max. | 1 A |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

| Article number | 6ES7138-6BA00-0BA0 |
|---|---|
| | ET 200SP, TM POSINPUT 1 |
| **Encoder signals, incremental**<br>**encoder (symmetrical)** | |
| • Input voltage | RS 422 |
| • Input frequency, max. | 1 MHz |
| • Counting frequency, max. | 4 MHz; with quadruple evaluation |
| • Cable length, shielded, max. | 32 m; at 1 MHz |
| • Signal filter, parameterizable | Yes |
| • Incremental encoder with<br>A/B tracks, 90° phase offset | Yes |
| • Incremental encoder with<br>A/B tracks, 90° phase offset and<br>zero track | Yes |
| • Pulse encoder | Yes |
| • Pulse encoder with direction | Yes |
| • Pulse encoder with one impulse<br>signal per count direction | Yes |
| **Encoder signals, incremental**<br>**encoder (asymmetrical)** | |
| • Input voltage | 5 V TTL (push-pull encoders only) |
| • Input frequency, max. | 1 MHz |
| • Counting frequency, max. | 4 MHz; with quadruple evaluation |
| • Signal filter, parameterizable | Yes |
| • Incremental encoder with<br>A/B tracks, 90° phase offset | Yes |
| • Incremental encoder with<br>A/B tracks, 90° phase offset and<br>zero track | Yes |
| • Pulse encoder | Yes |
| • Pulse encoder with direction | Yes |
| • Pulse encoder with one impulse<br>signal per count direction | Yes |
| **Encoder signals, absolute encoder**<br>**(SSI)** | |
| • Input signal | to RS-422 |
| • Telegram length, parameterizable | 10 ... 40 bit |
| • Clock frequency, max. | 2 MHz; 125 kHz, 250 kHz, 500 kHz,<br>1 MHz, 1.5 MHz or 2 MHz |
| • Binary code | Yes |
| • Gray code | Yes |
| • Cable length, shielded, max. | 320 m; Cable length, RS-422 SSI<br>absolute encoders, Siemens type<br>6FX2001-5, 24 V supply:<br>125 kHz, 320 meters shielded, max.;<br>250 kHz, 160 meters shielded, max.;<br>500 kHz, 60 meters shielded, max.;<br>1 MHz, 20 meters shielded, max.<br>1.5 MHz, 10 meters shielded, max.;<br>2 MHz, 8 meters shielded, max. |
| • Parity bit, parameterizable | Yes |
| • Monoflop time | 16, 32, 48, 64 µs & automatic |
| • Multiturn | Yes |
| • Singleturn | Yes |
| **Interface types** | |
| • RS 422 | Yes |
| • TTL 5 V | Yes; push-pull encoders only |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## ■ Technical specifications (continued)

| Article number | **6ES7138-6BA00-0BA0** |
|---|---|
| | ET 200SP, TM POSINPUT 1 |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| **Interrupts/diagnostics/ status information** | |
| Substitute values connectable | Yes; Parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| • A/B transition error at incremental encoder | Yes |
| • Telegram error at SSI encoder | Yes |
| • Group error | Yes |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| • Status indicator backward counting (green) | Yes |
| • Status indicator forward counting (green) | Yes |
| **Integrated Functions** | |
| Number of counters | 1 |
| Counting frequency (counter) max. | 4 MHz; with quadruple evaluation |
| **Counting functions** | |
| • Can be used with TO High_Speed_Counter | Yes; only for pulse and incremental encoders |
| • Continuous counting | Yes |
| • Counter response parameterizable | Yes |
| • Hardware gate via digital input | Yes |
| • Software gate | Yes |
| • Event-controlled stop | Yes |
| • Synchronization via digital input | Yes |
| • Counting range, parameterizable | Yes |
| **Comparator** | |
| - Number of comparators | 2 |
| - Direction dependency | Yes |
| - Can be changed from user program | Yes |
| **Position detection** | |
| • Incremental acquisition | Yes |
| • Absolute acquisition | Yes |
| • Suitable for S7-1500 Motion Control | Yes |
| **Measuring functions** | |
| • Measuring time, parameterizable | Yes |
| • Dynamic measurement period adjustment | Yes |
| • Number of thresholds, parameterizable | 2 |

| Article number | **6ES7138-6BA00-0BA0** |
|---|---|
| | ET 200SP, TM POSINPUT 1 |
| **Measuring range** | |
| - Frequency measurement, min. | 0.04 Hz |
| - Frequency measurement, max. | 4 MHz |
| - Cycle duration measurement, min. | 0.25 µs |
| - Cycle duration measurement, max. | 25 s |
| **Accuracy** | |
| - Frequency measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Cycle duration measurement | 100 ppm; depending on measuring interval and signal evaluation |
| - Velocity measurement | 100 ppm; depending on measuring interval and signal evaluation |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Observe derating |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C; Observe derating |
| **Dimensions** | |
| Width | 15 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 45 g |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TM PosInput 1 counting and position detection module** | | **Accessories** | |
| With one channel, max. 1 MHz for 5 V TTL or RS 422 differential signals or SSI absolute encoder | **6ES7138-6BA00-0BA0** | **Reference identification label** 10 sheets of 16 labels | **6ES7193-6LF30-0AW0** |
| **Usable BaseUnits** | | **Labeling strips** | |
| **BU15-P16+A0+2D** | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| • 1 unit | **6ES7193-6BP00-0DA0** | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| • 10 units | **6ES7193-6BP00-2DA0** | | |
| **BU15-P16+A0+2B** | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | **BU cover** | |
| • 1 unit | **6ES7193-6BP00-0BA0** | for covering empty slots (gaps); 5 units | |
| • 10 units | **6ES7193-6BP00-2BA0** | • 15 mm wide | **6ES7133-6CV15-1AM0** |
| **BU15-P16+A10+2D** | | • 20 mm wide | **6ES7133-6CV20-1AM0** |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | **Shield connection** 5 shield supports and 5 shield terminals | **6ES7193-6SC00-1AM0** |
| • 1 unit | **6ES7193-6BP20-0DA0** | **Color-coded labels** | |
| • 10 units | **6ES7193-6BP20-2DA0** | • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | **6ES7193-6CP71-2AA0** |
| **BU15-P16+A10+2B** | | • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | **6ES7193-6CP72-2AA0** |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | **6ES7193-6CP73-2AA0** |
| • 1 unit | **6ES7193-6BP20-0BA0** | | |
| • 10 units | **6ES7193-6BP20-2BA0** | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Technology modules > TM Timer DIDQ 10x24V time-based I/O module**

## ■ Overview



- 4 digital inputs, 6 digital outputs
- Inputs for detecting the input edges with µs accuracy
- Outputs for outputting the switching signals with µs accuracy
- 32x oversampling
- PWM output
- Counter function
- Outputs can be switched between 0.5 A standard and especially fast 0.1 A high-speed mode

## ■ Technical specifications

| Article number | 6ES7138-6CG00-0BA0 |
|---|---|
| | ET 200SP, TM TIMER DIDQ 10X24V |
| **General information** | |
| Product type designation | TM Timer DIDQ 10x24V |
| **Product function** | |
| • I&M data | Yes; I&M 0 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 Update 3 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption, max. | 50 mA; without load |
| **Encoder supply** | |
| Number of outputs | 1 |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 500 mA; Observe derating |
| **Power loss** | |
| Power loss, typ. | 1.5 W |
| **Digital inputs** | |
| Number of digital inputs | 4 |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |

| Article number | 6ES7138-6CG00-0BA0 |
|---|---|
| | ET 200SP, TM TIMER DIDQ 10X24V |
| **Digital input functions, parameterizable** | |
| • Digital input with time stamp | Yes |
| - Number, max. | 4 |
| • Counter | Yes |
| - Number, max. | 3 |
| • Counter for incremental encoder | Yes |
| - Number, max. | 1 |
| • Digital input with oversampling | Yes |
| - Number, max. | 4 |
| • HW enable for digital input | Yes |
| - Number, max. | 1 |
| • HW enable for digital output | Yes |
| - Number, max. | 3 |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay (for rated value of input voltage)** | |
| • Minimum pulse width for program reactions | 3 µs for parameterization "none" |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms |
| - at "0" to "1", min. | 4 µs |
| - at "1" to "0", min. | 4 µs |
| **Cable length** | |
| • shielded, max. | 1 000 m; Depending on sensor, cable quality and rate of change |
| • unshielded, max. | 600 m; Depending on sensor, cable quality and rate of change |

## Technical specifications (continued)

| Article number | 6ES7138-6CG00-0BA0 |
|---|---|
| | ET 200SP, TM TIMER DIDQ 10X24V |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 6 |
| Current-sinking | Yes; With High Speed output |
| Current-sourcing | Yes |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | -0.8 V |
| **Digital output functions, parameterizable** | |
| • Digital output with time stamp | Yes |
| - Number, max. | 6 |
| • PWM output | Yes |
| - Number, max. | 6 |
| • Digital output with oversampling | Yes |
| - Number, max. | 6 |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 0.5 A; 0.1 A with High Speed output |
| • on lamp load, max. | 5 W; 1 W with High Speed output |
| **Load resistance range** | |
| • lower limit | 48 $\Omega$; 240 ohm with High Speed output |
| • upper limit | 12 k$\Omega$ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "0", max. | 1 V; With High Speed output |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 0.5 A; 0.1 A with High Speed output, observe derating |
| • for signal "0" residual current, max. | 0.5 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 1 µs; With High Speed output, 5 µs with Standard output |
| • "1" to "0", max. | 1 µs; With High Speed output, 6 µs with Standard output |
| **Switching frequency** | |
| • with resistive load, max. | 10 kHz |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per module, max. | 3.5 A; Observe derating |
| **Cable length** | |
| • shielded, max. | 1 000 m; Depending on load and cable quality |
| • unshielded, max. | 600 m; Depending on load and cable quality |
| **Encoder** | |
| **Connectable encoders** | |
| • Incremental encoder (asymmetrical) | Yes |
| • 24 V initiator | Yes |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA |

| Article number | 6ES7138-6CG00-0BA0 |
|---|---|
| | ET 200SP, TM TIMER DIDQ 10X24V |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Input voltage | 24 V |
| • Input frequency, max. | 50 kHz |
| • Counting frequency, max. | 200 kHz; with quadruple evaluation |
| • Cable length, shielded, max. | 600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes |
| • Pulse encoder | Yes |
| **Encoder signal 24 V** | |
| - permissible voltage at input, min. | -30 V |
| - permissible voltage at input, max. | 30 V |
| **Interface types** | |
| • Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Bus cycle time (TDP), min. | 375 µs |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Integrated Functions** | |
| Number of counters | 3 |
| Counting frequency (counter) max. | 200 kHz; with quadruple evaluation |
| **Counting functions** | |
| • Continuous counting | Yes |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Observe derating |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C; Observe derating |
| **Decentralized operation** | |
| to SIMATIC S7-1500 | Yes |
| **Dimensions** | |
| Width | 15 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 45 g |

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## Ordering data

| | Article No. |
|---|---|
| **TM Timer DIDQ 10x24V time-based I/O module** | |
| 4 time-controlled inputs, 6 time-controlled outputs | **6ES7138-6CG00-0BA0** |
| **Usable BaseUnits** | |
| **BU15-P16+A0+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP00-0DA0** |
| • 10 units | **6ES7193-6BP00-2DA0** |
| **BU15-P16+A0+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| • 1 unit | **6ES7193-6BP00-0BA0** |
| • 10 units | **6ES7193-6BP00-2BA0** |
| **BU15-P16+A10+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP20-0DA0** |
| • 10 units | **6ES7193-6BP20-2DA0** |
| **BU15-P16+A10+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| • 1 unit | **6ES7193-6BP20-0BA0** |
| • 10 units | **6ES7193-6BP20-2BA0** |

| | Article No. |
|---|---|
| **Accessories** | |
| **Reference identification label** | **6ES7193-6LF30-0AW0** |
| 10 sheets of 16 labels | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| **BU cover** | |
| for covering empty slots (gaps); 5 units | |
| • 15 mm wide | **6ES7133-6CV15-1AM0** |
| • 20 mm wide | **6ES7133-6CV20-1AM0** |
| **Shield connection** | **6ES7193-6SC00-1AM0** |
| 5 shield supports and 5 shield terminals | |
| **Color-coded labels** | |
| • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | **6ES7193-6CP71-2AA0** |
| • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | **6ES7193-6CP72-2AA0** |
| • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | **6ES7193-6CP73-2AA0** |

## Overview

2-channel pulse output module for ET 200SP

- Operating modes:
  - Single pulse with defined length
  - Pulse chain with defined number of pulses
  - Pulse width modulation (with flexible ON period, optional current control and dither function)
  - PWM signal for controlling a DC motor
  - ON and OFF delay; rising and falling edge can be delayed separately to the microsecond
  - Frequency output with defined output frequency

- Hardware:
  - 2 channels 24 V, 2 A output current
  - Parallel switching for enhanced performance on 4 A output current
  - Switching frequencies to 10 kHz; at reduced output current to 0.1 A up to 100 kHz
  - Push-pull output driver for especially steep edges at the outputs
  - Polarity change in DC motor operation for direction reversal
  - 1 high-speed 24 V digital input per channel with parameterizable input delay from 4 µs

- Channel functions:
  - HW enable;
    start of signal output with the onboard digital input
  - Parameterizable ON delay;
    for precise deceleration between the HW enable and the start of output
  - Current measurement in the operating modes pulse-width modulation and pulse chain;
    enables control of the output current mean value over a period. Temperature influences can thus be balanced to the resistance of the actuator
  - Cyclic control of the respective main setpoint from the PLC in every operating mode;
    other values can be modified flexibly from the user program

- Supported system functions:
  - Isochronous mode;
    enables precision-timed connection of the setpoint output to a higher-level controller
  - Firmware update
  - Identification data I&M

## Technical specifications

| Article number | 6ES7138-6DB00-0BB1 |
| --- | --- |
| | ET 200SP, TM PULSE 2X24V |
| **General information** | |
| Product type designation | TM Pulse 2x24 V |
| **Product function** | |
| • I&M data | Yes; I&M 0 |
| • Isochronous mode | Yes |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 SP1 + HSP |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 and higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.31 |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Short-circuit protection | Yes |
| • Reverse polarity protection | Yes; against destruction |

| Article number | 6ES7138-6DB00-0BB1 |
| --- | --- |
| | ET 200SP, TM PULSE 2X24V |
| **Input current** | |
| Current consumption, max. | 70 mA; without load |
| **Encoder supply** | |
| Number of outputs | 2; A common 24V encoder supply for both channels |
| **24 V encoder supply** | |
| • 24 V | Yes; L+ (-0.8 V) |
| • Short-circuit protection | Yes; per module, electronic |
| • Output current, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 1.7 W |
| **Digital inputs** | |
| Number of digital inputs | 2; 1 per channel |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Digital input functions, parameterizable** | |
| • Freely usable digital input | Yes |
| • HW enable for digital output | Yes |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Technology modules > TM Pulse 2x24V pulse output module**

## Technical specifications (continued)

| Article number | 6ES7138-6DB00-0BB1 |
|---|---|
| | ET 200SP, TM PULSE 2X24V |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +11 to +30V |
| • permissible voltage at input, min. | -30 V |
| • permissible voltage at input, max. | 30 V |
| **Input current** | |
| • for signal "1", typ. | 2.5 mA |
| **Input delay**<br>**(for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| - at "0" to "1", min. | 4 µs; for parameterization "none" |
| - at "1" to "0", min. | 4 µs; for parameterization "none" |
| **Digital outputs** | |
| Type of digital output | P- and M-switching |
| Number of digital outputs | 2; 1 per channel |
| Current-sinking | Yes |
| Current-sourcing | Yes |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| Limitation of inductive shutdown voltage to | -0.8 V |
| Controlling a digital input | Yes |
| **Digital output functions, parameterizable** | |
| • Freely usable digital output | Yes |
| • PWM output | Yes |
| - Number, max. | 2; 1 per channel |
| • Connection of a proportional valve | Yes |
| • Dithering | Yes |
| • Current measurement | Yes |
| • Current control | Yes |
| • Connection of a DC motor | Yes |
| • ON-delay | Yes |
| • OFF-delay | Yes |
| • Frequency output | Yes |
| • Pulse train | Yes |
| • Pulse output | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 2 A |
| • on lamp load, max. | 10 W; 1 W with High Speed output |

| Article number | 6ES7138-6DB00-0BB1 |
|---|---|
| | ET 200SP, TM PULSE 2X24V |
| **Load resistance range** | |
| • lower limit | 12 Ω; 240 ohm with High Speed output |
| • upper limit | 12 kΩ |
| **Output voltage** | |
| • Type of output voltage | DC |
| • for signal "0", max. | 1 V |
| • for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 2 A; 0.1 A with High Speed output, observe derating |
| **Output delay with resistive load** | |
| • "0" to "1", typ. | 0 µs; With High Speed output, 4.5 µs with Standard output |
| • "0" to "1", max. | 0.8 µs; With High Speed output, 9 µs with Standard output |
| • "1" to "0", typ. | 0 µs; With High Speed output, 4.5 µs with Standard output |
| • "1" to "0", max. | 0.8 µs; With High Speed output, 9 µs with Standard output |
| **Parallel switching of two outputs** | |
| • for uprating | Yes |
| **Switching frequency** | |
| • with resistive load, max. | 100 kHz; With High Speed output, 10 kHz with standard output |
| • with inductive load, max. | 100 kHz; With High Speed output, 10 kHz with standard output |
| • on lamp load, max. | 10 Hz |
| **Total current of the outputs** | |
| • Current per channel, max. | 2 A |
| • Current per group, max. | 4 A |
| • Current per module, max. | 4 A |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Bus cycle time (TDP), min. | 250 µs; with 1 channel configuration, 375 µs with 2 channel configuration |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| Substitute values connectable | Yes; Parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes |
| • for module diagnostics | Yes; green/red DIAG LED |

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## ■ Technical specifications (continued)

| Article number | 6ES7138-6DB00-0BB1 |
|---|---|
|  | ET 200SP, TM PULSE 2X24V |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, max. | 60 °C; Observe derating |
| • vertical installation, max. | 50 °C; Observe derating |

| Article number | 6ES7138-6DB00-0BB1 |
|---|---|
|  | ET 200SP, TM PULSE 2X24V |
| **Decentralized operation** | |
| to SIMATIC S7-300 | Yes |
| to SIMATIC S7-400 | Yes |
| to SIMATIC S7-1200 | Yes |
| to SIMATIC S7-1500 | Yes |
| to standard PROFIBUS master | Yes |
| to standard PROFINET controller | Yes |
| **Dimensions** | |
| Width | 20 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 50 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TM Pulse 2x24V pulse output module** | | **Accessories** | |
| PWM and pulse output, 2 channels of 2 A for proportional valves and DC motors | **6ES7138-6DB00-0BB1** | **Reference identification label** | **6ES7193-6LF30-0AW0** |
| | | 10 sheets of 16 labels | |
| **Usable BaseUnits** | | **Labeling strips** | |
| **BU20-P12+A0+4B** | **6ES7193-6BP20-0BB1** | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| BU type B1; BaseUnit (dark); without AUX terminals; for continuing the load group | | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| | | 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| | | 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| | | **BU cover** | |
| | | for covering empty slots (gaps); 5 units | |
| | | • 15 mm wide | **6ES7133-6CV15-1AM0** |
| | | • 20 mm wide | **6ES7133-6CV20-1AM0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Technology modules > SIWAREX WP321**

## ■ Overview



SIWAREX WP321 is a versatile and flexible weighing module for the seamless integration of a static scale into the SIMATIC automation environment.

The electronic weighing system is integrated in the SIMATIC ET 200SP series and uses all the features of a modern automation system, such as integrated communication, operator control and monitoring, diagnostic system and configuration tools in the TIA Portal, SIMATIC STEP 7, WinCC flexible and PCS 7.

## ■ Technical specifications

| SIWAREX WP321 | |
|---|---|
| **Integration in automation systems** | |
| SIMATIC S7-300, S7-400, S7-1200 and S7-1500 | Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET) |
| Other manufacturers (with restrictions) | Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET) |
| **Communication interfaces** | • SIMATIC ET 200SP backplane bus <br> • RS 485 (SIWATOOL, Siebert remote display) |
| **Commissioning options** | • Using SIWATOOL V7 <br> • Using function block in SIMATIC CPU / Touch Panel |
| **Measuring accuracy** | |
| according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K) | 0.05% |
| Internal resolution | ± 2 million parts |
| Measuring frequency | 100 / 120 Hz |
| **Digital filter** | Variable adjustable low-pass and average filter |
| **Typical applications** | • Non-automatic weighing instruments <br> • Force measurements <br> • Fill-level monitoring <br> • Belt tension monitors |
| **Weighing functions** | |
| Weight values | • Gross <br> • Net <br> • Tare |
| Limit values | • 2 x min/max <br> • Empty |
| Zeroing | Via command by controller or HMI |
| Tare | Via command by controller or HMI |
| External tare specification | Via command by controller or HMI |
| Calibration commands | Via command by controller or HMI |
| **Load cells** | Full-bridge strain gauges in 4-wire or 6-wire system |
| **Load cell powering** | |
| Supply voltage (value applies at sensor, cable-related voltage drops of up to 5 V are controlled) | 4.85 V DC ±2% |

| SIWAREX WP321 | |
|---|---|
| Permissible load resistance <br> • $R_{Lmin}$ <br> • $R_{Lmax}$ | <br> > 40 Ω <br> < 4100 Ω |
| With SIWAREX IS Ex interface <br> • $R_{Lmin}$ <br> • $R_{Lmax}$ | <br> > 50 Ω <br> < 4100 Ω |
| **Load cell characteristic** | 1 … 4 mV/V |
| **Permissible range of measuring signal (at greatest set characteristic value)** | -21.3 ... +21.3 mV |
| **Max. distance of load cells** | 1000 m (459.32 ft) |
| **Connection to load cells in Ex zone 1** | Optionally via SIWAREX IS Ex interface (compatibility of the load cells must be checked) |
| **Approvals/certificates** | • ATEX Zone 2 <br> • UL <br> • FM <br> • EAC <br> • KCC <br> • IECEx <br> • RCM |
| **Auxiliary power supply** | |
| Rated voltage | 24 V DC |
| Max. power consumption | typ. 0.1 A @ 24 V DC (0.2 A max.) |
| Max. power consumption SIMATIC Bus | 30 mA |
| **IP degree of protection according to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** <br> $T_{min\ (IND)}$ ... $T_{max\ (IND)}$ <br> **(operating temperature)** | |
| • Vertical installation in SIMATIC S7 [1] | -25 ... +50 °C (-13 ... 122 °F) |
| • Horizontal installation in SIMATIC S7 [1] | -25 ... +60 °C (-13 ... 140 °F) |
| **EMC requirements** | according to IEC 61000-6-2, IEC 61000-6-4, OIML-R76-1 |
| **Dimensions (width)** | 15 mm (0.6 in) |

[1] The S7 standard modules may not be operated at temperatures below 0 °C (32 °F). For operating conditions below 0 °C (32 °F), SIMATIC modules from the SIPLUS series must be used.

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## ▇ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**TM SIWAREX WP321 weighing module** — **7MH4138-6AA00-0BA0**

Single-channel, for platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 1 x RS 485

**SIWAREX WP321 manual**

Available in a range of languages

Free download from the Internet at: http://www.siemens.com/weighing-technology

**SIWAREX WP321 "Ready for Use"**

TIA Portal and SIMATIC Manager sample configuration

Free download from the Internet at: http://www.siemens.com/weighing-technology

**SIWAREX WP321 configuration package for TIA Portal** — **7MH4138-1AK01**
- "Ready for use" software for operating a scale with SIWAREX WP321 and a touch panel (in many different languages)
- SIWATOOL V7.0
- Device manuals (PDF files in a variety of languages)

**SIWAREX WP321 configuration package for PCS 7 V8.1** — **7MH4138-1AK61**
- APL function block and faceplate
- SIWATOOL V7.0
- Device manuals (PDF files in a variety of languages)

**Accessories (mandatory requirement)**

**BaseUnit (Type A0 – one BaseUnit required for each WP321)**
- For opening a new potential group
  - BU15P-16+A0+2D or — **6ES7193-6BP00-0DA0**
  - BU15P-16+A10+2D — **6ES7193-6BP20-0DA0**
- For continuing the potential group
  - BU15P-16+A0+2B — **6ES7193-6BP00-0BA0**
  - BU15P-16+A10+2B — **6ES7193-6BP20-0BA0**

**Shielded connection for BaseUnit (5 units / for 5 scales) For laying the load cell cable** — **6ES7193-6SC00-1AM0**

**Accessories (optional)**

**SIWAREX JB junction box, aluminum housing** — **7MH4710-1BA**

For connecting up to 4 load cells in parallel, and for connecting several junction boxes

**SIWAREX JB junction box, stainless steel housing** — **7MH4710-1EA**

For connecting up to 4 load cells in parallel

**SIWAREX JB junction box, stainless steel housing (ATEX)** — **7MH4710-1EA01**

For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate)

**Ex interface SIWAREX IS**

For intrinsically safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked

Approved for use in the EU
- Short-circuit current < 199 mA DC — **7MH4710-5BA**
- Short-circuit current < 137 mA DC — **7MH4710-5CA**

**Cable (optional)**

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY**

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible

External diameter: approx. 10.8 mm (0.43 in)

Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.
- Sheath color: orange — **7MH4702-8AG**
- For potentially explosive atmospheres. Sheath color: blue — **7MH4702-8AF**

**RS 485/USB interface converter**

Commercially available interface converter with FTDI chip, e.g. USB-Nano from CTI

https://www.cti-shop.com/epages/15488632.sf/en_GB/?ViewObject-Path=%2FShops%2F15488632%2FProducts%2F95031010

**Remote display**

The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTA via an RS 485 interface

Siebert Industrieelektronik GmbH Postfach 1180D-65565 Eppelborn, Germany
Tel.: +49 6806/980-9
Fax: +49 6806/980-999
Internet: http://www.siebert.de

Detailed information is available from the manufacturer

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules   > Communication   > CM PtP serial interface**

## Overview



- CM PtP communication module;
  module for serial communication connections with RS 232 and RS 422 interfaces. RS 485 for the Freeport, 3964(R), Modbus RTU and USS protocols, max. 115.2 Kbps, 2 KB frame length, 4 KB receive buffer

- Protocols supported
  - Freeport: User-parameterizable frame format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU master (requires instructions in SIMATIC S7)
  - Modbus RTU slave (requires instructions in SIMATIC S7)
  - USS, implemented through instructions

- Interface properties
  - RS 232 with auxiliary signals
  - RS 422 for full-duplex connections
  - RS 485 for half-duplex and multi-point connections
  - Transmission rates from 300 to 115200 bit/s

- Can be plugged onto Type A0 BaseUnits (BU) with automatic coding

- LED display for errors, operation and supply voltage

- Communication display for sending and receiving

- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the CM module type: silver
  - Hardware and firmware version
  - Complete Article No.

- Optional labeling accessories
  - Labeling strips
  - Reference identification label

- Optional system-integrated shield connection

## Technical specifications

| Article number | **6ES7137-6AA00-0BA0** | | Article number | **6ES7137-6AA00-0BA0** |
|---|---|---|---|---|
| | ET 200SP, CM PTP | | | ET 200SP, CM PTP |
| **General information** | | | **Input current** | |
| Product type designation | ET 200SP CM PtP | | Current consumption (rated value) | 29 mA |
| **Product function** | | | **Power loss** | |
| • I&M data | Yes; I&M0 to I&M3 | | Power loss, typ. | 0.7 W |
| **Engineering with** | | | **1. Interface** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 / V12 | | **Interface types** | |
| • STEP 7 configurable/integrated as of version | V5.5 SP2 with GSD file | | • RS 485 | Yes |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 | | • RS 422 | Yes |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3 | | • RS 232 | Yes |
| **Installation type/mounting** | | | **RS 232** | |
| Rack mounting | Yes | | • Transmission rate, max. | 115.2 kbit/s |
| Rail mounting | Yes | | • Cable length, max. | 15 m |
| **Supply voltage** | | | • RS 232 auxiliary signals | RTS, CTS, DTR, DSR, RI, DCD |
| Type of supply voltage | 24 V DC | | **RS 485** | |
| Rated value (DC) | 24 V | | • Transmission rate, max. | 115.2 kbit/s |
| Reverse polarity protection | Yes | | • Cable length, max. | 1 200 m |
| | | | **RS 422** | |
| | | | • Transmission rate, max. | 115.2 kbit/s |
| | | | • Cable length, max. | 1 200 m |
| | | | • 4-wire full duplex connection | Yes |
| | | | • 4-wire multipoint connection | Yes |

## Technical specifications  (continued)

| Article number | 6ES7137-6AA00-0BA0 |
|---|---|
| | ET 200SP, CM PTP |
| **Integrated protocols** | |
| **Freeport** | |
| - Telegram length, max. | 2 kbyte |
| - Bits per character | 7 or 8 |
| - Number of stop bits | 1 or 2 bit |
| - Parity | None, even, odd, always 1, always 0, any |
| **3964 (R)** | |
| - Telegram length, max. | 2 kbyte |
| - Bits per character | 7 or 8 |
| - Number of stop bits | 1 or 2 bit |
| - Parity | None, even, odd, always 1, always 0, any |
| **Modbus RTU master** | |
| - Address area | 1 to 247, extended 1 to 65535 |
| - Number of slaves, max. | 32 |
| **MODBUS RTU slave** | |
| - Address area | 1 to 247, extended 1 to 65535 |
| **Telegram buffer** | |
| • Buffer memory for telegrams | 4 kbyte |
| • Number of telegrams which can be buffered | 255 |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | No |
| **Diagnostic messages** | |
| • Wire-break | Yes |

| Article number | 6ES7137-6AA00-0BA0 |
|---|---|
| | ET 200SP, CM PTP |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| • Receive RxD | Yes; Green LED |
| • Transmit TxD | Yes; Green LED |
| **Potential separation** | |
| between backplane bus and interface | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Decentralized operation** | |
| to SIMATIC S7-300 | Yes |
| to SIMATIC S7-400 | Yes |
| to SIMATIC S7-1200 | Yes |
| to SIMATIC S7-1500 | Yes |
| to standard PROFINET controller | Yes |
| **Dimensions** | |
| Width | 15 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 30 g |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CM PtP communication module** | 6ES7137-6AA00-0BA0 | **Reference identification label** | 6ES7193-6LF30-0AW0 |
| For serial communication connections with RS 232, RS 422, RS 485 interfaces, BU type A0, color code CC00 | | 10 sheets of 16 labels | |
| | | **Labeling strips** | 6ES7193-6LR10-0AA0 |
| **Accessories** | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | |
| **BU15-P16+A0+2D** | 6ES7193-6BP00-0DA0 | **Shield connection** | 6ES7193-6SC00-1AM0 |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | 5 shield supports and 5 shield terminals, for direct connection | |
| **BU15-P16+A0+2B** | 6ES7193-6BP00-0BA0 | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |
| **BU15-P16+A10+2D** | 6ES7193-6BP20-0DA0 | | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | | |
| **BU15-P16+A10+2B** | 6ES7193-6BP20-0BA0 | | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | | |

# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > CM 4x IO-Link**

## ■ Overview



- CM 4x IO-Link communication module
  Serial communication module for connecting up to 4 IO-Link devices in accordance with IO-Link specification V1.0 and V1.1. The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.0 and higher
- Time-based IO
  Time-based IO ensures that signals are output with a precisely defined response time. By combining inputs and outputs, for example, passing products can be accurately measured or fluids dosed in precise quantities
- Supported data transfer rates
  - COM1 (4.8 Kbps)
  - COM2 (38.4 Kbps)
  - COM3 (230.4 Kbps)

- Expansion limits
  - Length of cable: Max. 20 m
  - Max. 32 bytes of input and output data per port
  - Max. 144 bytes of input data and 128 bytes of output data per module
- Supported ET 200SP system functions
  - Replacement without PG with automatic backup without the engineering tool of the IO-Link device parameter (V1.1 devices only) and the IO-Link master parameters by means of redundant saving of parameters on the e-coding element
  - Re-parameterization during operation
  - Identification data I&M
  - Firmware update
  - PROFIenergy
- Can be plugged onto Type A0 BaseUnits (BU) with automatic e-coding
- LEDs
  - DIAG: Operating state indicator (green/red) of the module
  - C1..C4: Port status indicator (green) for Port 1, 2, 3 and 4
  - Q1..Q4: Channel status indicator (green) for Port 1, 2, 3 and 4
  - F1..F4: Port fault indicator (red) for Port 1, 2, 3 and 4
  - PWR: Supply voltage indicator (green)
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color-coding of the CM module class: silver
  - Hardware and firmware version
  - Complete Article No.
- Optional accessories
  - Labeling strips
  - Equipment labeling plate
  - Color-coding plate with color code CC04
- Optional system-integrated shield connection

### Overview of CM 4 x IO-Link

| Communication module | Article No. | CC Code | BU type | PU |
|---|---|---|---|---|
| CM 4 x IO-Link | 6ES7137-6BD00-0BA0 | CC04 | A0 | 1 |

### Overview of BaseUnits

| BaseUnit | Article No. | CC Codes for process terminals | CC Codes for AUX terminals | PU |
|---|---|---|---|---|
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 6ES7193-6BP20-0DA0 | CC01 to CC05 | CC71 to CC73 | 1 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• With 10 AUX terminals | 6ES7193-6BP20-2DA0 | CC01 to CC05 | CC71 to CC73 | 10 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 6ES7193-6BP00-0DA0 | CC01 to CC05 | -- | 1 |
| **BU type A0**<br>• New load group (light)<br>• 16 process terminals<br>• Without AUX terminals | 6ES7193-6BP00-2DA0 | CC01 to CC05 | -- | 10 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 6ES7193-6BP20-0BA0 | CC01 to CC05 | CC71 to CC73 | 1 |

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## Overview (continued)

| BaseUnit | Article No. | CC Codes for process terminals | CC Codes for AUX terminals | PU |
|---|---|---|---|---|
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• With 10 AUX terminals | 6ES7193-6BP20-2BA0 | CC01 to CC05 | CC71 to CC73 | 10 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 6ES7193-6BP00-0BA0 | CC01 to CC05 | -- | 1 |
| **BU type A0**<br>• Forwarding of load group (dark)<br>• 16 process terminals<br>• Without AUX terminals | 6ES7193-6BP00-2BA0 | CC01 to CC05 | -- | 10 |

## Technical specifications

| Article number | **6ES7137-6BD00-0BA0** |
|---|---|
| | ET 200SP, CM 4 X IO-LINK ST |
| **General information** | |
| Product type designation | ET 200SP, CM 4xIO-Link |
| **Product function** | |
| • I&M data | Yes |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 / - |
| • PROFIBUS as of GSD version/ GSD revision | GSD Revision 5 |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, max. | 45 mA; without load |
| **Encoder supply** | |
| Number of outputs | 4 |
| **Output current** | |
| • Rated value | 200 mA |
| **Power loss** | |
| Power loss, typ. | 1 W |
| **Isochronous mode** | |
| Equidistance | Yes |

| Article number | **6ES7137-6BD00-0BA0** |
|---|---|
| | ET 200SP, CM 4 X IO-LINK ST |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes; The port diagnosis is available in the IO-Link mode only. |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| **Diagnostics indication LED** | |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes; one green LED for channel status Qn (SIO mode) and port status Cn (IO-Link mode) per channel |
| • for channel diagnostics | Yes; red Fn LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Dimensions** | |
| Width | 15 mm |
| **Weights** | |
| Weight, approx. | 30 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > CM 4x IO-Link**

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CM 4x IO-Link master V1.1 Standard communication module** | **6ES7137-6BD00-0BA0** | **Labeling strips** | |
| Serial communication module for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04 | | 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| **Accessories** | | 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| **Usable type A0 BaseUnits** | | 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| **BU15-P16+A10+2D** | | | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| • 1 unit | **6ES7193-6BP20-0DA0** | **Color-coding plates** | |
| • 10 units | **6ES7193-6BP20-2DA0** | Color code CC04, for 16 push-in terminals, BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 12), blue (terminals 13 to 16); 10 units | **6ES7193-6CP04-2MA0** |
| **BU15-P16+A0+2D** | | | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units | **6ES7193-6CP71-2AA0** |
| • 1 unit | **6ES7193-6BP00-0DA0** | Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units | **6ES7193-6CP72-2AA0** |
| • 10 units | **6ES7193-6BP00-2DA0** | | |
| **BU15-P16+A10+2B** | | Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units | **6ES7193-6CP73-2AA0** |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | **Spare parts** | |
| • 1 unit | **6ES7193-6BP20-0BA0** | **Electronic coding element type H** | **6ES7193-6EH00-1AA0** |
| • 10 units | **6ES7193-6BP20-2BA0** | Pack of 5 units; included in scope of supply of CM 4x IO-Link module | |
| **BU15-P16+A0+2B** | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |
| • 1 unit | **6ES7193-6BP00-0BA0** | | |
| • 10 units | **6ES7193-6BP00-2BA0** | | |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** | | |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | | | |

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■ **Overview**
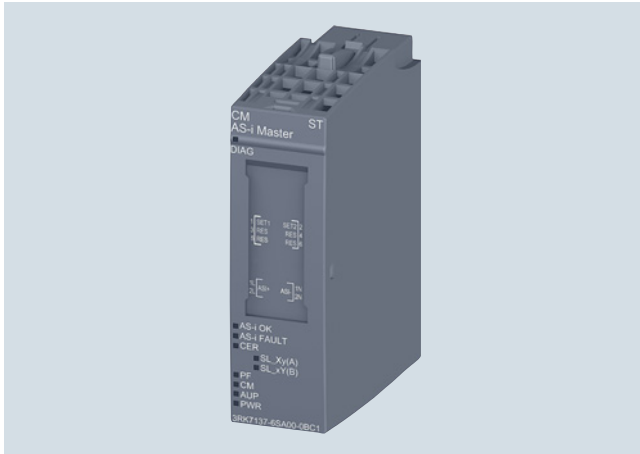


CM AS-i Master ST for SIMATIC ET 200SP

The CM AS-i Master ST communication module is designed for use in the SIMATIC ET 200SP distributed I/O system and has the following features:

- As many as 62 AS-Interface slaves can be connected
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- User-friendly configuration with graphic display of the AS-i line in TIA Portal V12 and higher, or via GSD in other systems
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Integrated ground-fault monitoring for the AS-Interface cable
- Through connection to AS-Interface, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI/496 DO on the AS-Interface per CM AS-i Master ST)
- Integrated analog value processing

### *ET 200SP Distributed I/O System*

SIMATIC ET 200SP is a scalable and highly flexible distributed I/O system for connecting the process signals to a central control system via PROFIBUS or PROFINET.

Up to eight CM AS-i Master STs can be plugged onto a SIMATIC ET 200SP with the IM 155-6 PN standard interface module.

For more information, see
"SIMATIC ET 200SP Distributed I/O system" System Manual,
https://support.industry.siemens.com/cs/ww/en/view/58649293.

### *Design*

The CM AS-i Master ST module has an ET 200SP module enclosure with a width of 20 mm. A C0 type BaseUnit (BU) is required for use in the ET 200SP.

The communication module has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status and offers informative front-side module inscription for:

- Plain-text marking of the module type and function class
- 2D matrix code (Article No. and serial number)
- Connection diagram
- Color coding of the CM module type: light gray
- Hardware and firmware version
- Complete Article No.

### *Function*

The CM AS-i Master ST supports all specified functions of the AS-Interface Specification V3.0.

The input/output values of the digital AS-i slaves can be activated via the cyclic process image. The values of the analog AS-i slaves can be attained via the cyclic process image (firmware V1.1 or higher) or via data record transfer.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM AS-i Master ST in STEP 7.

Expansions from firmware version V1.1

In order to implement modular machine concepts, the AS-i slaves can be activated or deactivated via the PLC program (option handling). The configuration of AS-i slaves can be modified while being executed, thus enabling variable machine setups and tool changing with integrated input/output modules during ongoing operation. Without deactivating the controller, AS-i input/output modules can be added in the system.

An existing AS-i installation can be read into the STEP 7 hardware configuration and then adapted and documented in the project. Analog values are transmitted via the cyclic process image, the length of which is adjustable and extendable up to 288 bytes (depending on the interface module (IM) used).

Diagnostic information is accessed via automatic alarm indications, via the process image or data record reading in the user program or in the STEP 7 engineering system in a graphical overview matrix. The AS-i network's transmission quality can also be read out. To avoid configuration errors, duplicate addresses in the AS-i network can be detected.

The new functions are available with TIA Portal STEP 7 V13 SP1 or with STEP 7 V5.5 with HSP 2092 V3.0[1]. Configuration is possible with SIMATIC CPUs S7-300 up to S7-1500 and with a SINUMERIK 840D sl or other controller.

In the network view, the AS-i slaves' online diagnostics status can be displayed directly on the slaves (in the case of S7-1500 CPUs with updated TIA Portal STEP 7 V14 firmware or higher).

[1] HSP 2092, see
https://support.industry.siemens.com/cs/ww/en/view/23183356.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## ■ Overview (continued)

Notes on safety

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

For more information on the topic of Industrial Security, see http://www.siemens.com/industrialsecurity.

### *Configuration*

The following software is required for configuration of the CM AS-i Master ST module:

- STEP 7 (classic) V5.5 SP3 HF4 or higher with HSP 2092 or HSP 2092 V3.0 (for firmware V1.1) or
- STEP 7 (TIA Portal) V12 or higher or V13 SP1 or higher (for firmware V1.1) or
- the GSD file of the ET 200SP with STEP 7 or another engineering tool

STEP 7 enables user-friendly configuration and diagnostics of the AS-i master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration as the DESIRED configuration at the "touch of a button" via the control panel integrated in the TIA Portal or an optional expansion button. Configuration with the GSD file is possible only with the button.

The CM AS-i Master ST module occupies up to 288 input bytes and up to 288 output bytes in the I/O data of the ET 200SP station. The I/O assignment depends on the configuration in STEP 7.

Together with an ET 200SP CPU 1510SP/1512SP (firmware V1.8 or higher) or 1515SP PC, preprocessing of safe AS-i signals directly in the ET 200SP station and setting up of an independent AS-i station without a higher-level CPU are possible (TIA Portal V13 SP1 Update 4 and higher).
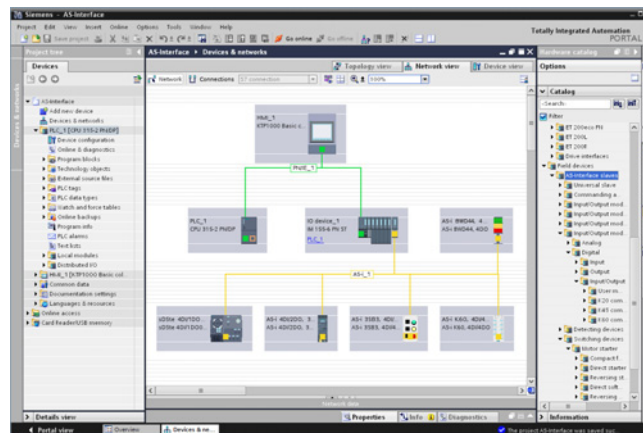


Configuration of an AS-Interface network with CM AS-i Master ST via TIA Portal

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CM AS-i Master ST communication module**<br>• AS-Interface Master for SIMATIC ET 200SP<br>• Can be plugged onto BaseUnit type C0<br>• Corresponds to AS-Interface Specification V3.0<br>• Dimensions (W x H x D / mm): 90 x 132 x 88.5 | 3RK7137-6SA00-0BC1 | **BusAdapters for PROFINET**<br>For connection of the Ethernet cable to the PROFINET IM 155-6 PN interface module<br>• 2 x RJ45 connection (supplied without RJ45 connector)<br>• 2 x FC connection (FastConnect)<br><br>For more BusAdapters with fiber-optic cable connection, see Catalog IK PI "Industrial Communication" or the Industry Mall. | <br><br><br><br>6ES7193-6AR00-0AA0<br><br>6ES7193-6AF00-0AA0 |
| **Accessories** | | | |
| **BaseUnit BU20-P6+A2+4D**<br>• BaseUnit (light), BU type C0<br>• Suitable for the CM AS-i Master ST module<br>• For connection of AS-Interface cable to the CM AS-i Master ST<br>• Beginning of an AS-i network, disconnection of AS-i voltage to the left-hand module | 6ES7193-6BP20-0DC0 | **AS-Interface addressing unit V3.0**<br>• For AS-Interface modules and sensors and actuators with integrated AS-Interface according to AS-i Specification V3.0<br>• For setting the AS-i address of standard slaves, and slaves with extended addressing mode (A/B slaves)<br>• With input/output test function and many other commissioning functions<br>• Battery operation with four type AA batteries (IEC LR6, NEDA 15)<br>• Degree of protection IP40<br>• Dimensions (W × H × D / mm): 84 × 195 × 35<br>• Scope of supply:<br>  - Addressing unit with 4 batteries<br>  - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m | 3RK1904-2AB02 |
| **PROFINET IM 155-6 PN Basic interface module**<br><br>Max. 12 I/O modules, max. 32 bytes I/O data per station<br>• Including server module and BusAdapter 2 x RJ45 ports (supplied without RJ45 plug) | 6ES7155-6AR00-0AN0 | | |
| **PROFINET IM 155-6 PN Standard interface module**<br><br>Max. 32 I/O modules, max. 256 bytes I/O data per station<br>• Including server module and BusAdapter 2 x RJ45 (supplied without RJ45 plug)<br>• Including server module (BusAdapter must be ordered separately, see right) | <br><br><br><br>6ES7155-6AA00-0BN0<br><br>6ES7155-6AU00-0BN0 | **More information**<br>For the Manual "CM AS-i Master ST for SIMATIC ET 200SP", see https://support.industry.siemens.com/cs/ww/en/view/71756485.<br><br>AS-Interface function block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog IC 10, Chapter 14, "Parameterization, Configuration and Visualization with SIRIUS". | |
| **PROFINET IM 155-6 DP Standard High Feature interface module**<br><br>Max. 64 I/O modules, max. 1 440 bytes I/O data per station<br>• Including server module BusAdapter must be ordered separately, see right)<br>• Including server module and PROFIBUS connector | <br><br><br><br>6ES7155-6AU00-0CN0<br><br>6ES7155-6BA00-0CN0 | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > CM DP for ET 200SP CPU**

## Overview



- PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps
- Expands the ET 200SP CPUs 1510SP-1 PN / 1512SP-1 PN by one PROFIBUS connection
- For communication with lower-level PROFIBUS devices at bandwidths of 9.6 Kbps to 12 Mbps
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication:
    This makes it possible to establish communication between the ET 200SP CPU and other devices, for example those from the SIMATIC S7-300/400/1500 range.
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Data set routing

## Technical specifications

| Article number | **6ES7545-5DA00-0AB0** |
|---|---|
| | ET 200SP, CM DP FOR ET 200SP CPU |
| **General information** | |
| Product type designation | ET 200SP, CM DP |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 Update 3 |
| **Installation type/mounting** | |
| Rack mounting | No |
| Rail mounting | Yes; Standard - DIN rail |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **1. Interface** | |
| **Interface types** | |
| • RS 485 | Yes |
| **Functionality** | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| **RS 485** | |
| • Transmission rate, max. | 12 Mbit/s |
| • Cable length, max. | 100 m |
| **Protocols** | |
| **PROFIBUS DP master** | |
| **Services** | |
| - PG/OP communication | Yes |
| - S7 routing | Yes |
| - Data record routing | Yes |
| - Isochronous mode | No |
| - Equidistance | No |
| - Number of DP slaves | 125 |
| - Activation/deactivation of DP slaves | Yes |

| Article number | **6ES7545-5DA00-0AB0** |
|---|---|
| | ET 200SP, CM DP FOR ET 200SP CPU |
| **PROFIBUS DP slave** | |
| • Transmission rate, max. | 12 Mbit/s |
| • automatic baud rate search | Yes |
| • Address area, max. | 120 |
| • User data per address area, max. | 128 byte |
| **Services** | |
| - PG/OP communication | Yes; Only with active interface |
| - Routing | Yes; Only with active interface |
| - S7 communication | Yes; Only with active interface |
| - Direct data exchange (slave-to-slave communication) | Yes; No subscriber possible - only passive publisher |
| - DPV1 | Yes |
| **Transfer memory** | |
| - Inputs | 244 byte |
| - Outputs | 244 byte |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes |
| **Diagnostics indication LED** | |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Potential separation** | |
| between backplane bus and interface | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Dimensions** | |
| Width | 35 mm |
| Height | 117 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 80 g |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CM DP for ET 200SP CPU** | **6ES7545-5DA00-0AB0** | **PROFIBUS DP bus connector RS 485** | |
| PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps | | with 90° cable outlet, max. transfer rate 12 Mbps | |
| | | • without PG interface | **6ES7972-0BA12-0XA0** |
| **Accessories** | | • with PG interface | **6ES7972-0BB12-0XA0** |
| **Reference identification label** | **6ES7193-6LF30-0AW0** | with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbps | |
| 10 sheets of 16 labels | | • without PG interface, 1 unit | **6ES7972-0BA52-0XA0** |
| **Labeling strips** | | • without PG interface, 100 units | **6ES7972-0BA52-0XB0** |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** | • with PG interface, 1 unit | **6ES7972-0BB52-0XA0** |
| | | • with PG interface, 100 units | **6ES7972-0BB52-0XB0** |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** | **FastConnect bus cable** | **6XV1830-0EH10** |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** | Standard type with special design for quick mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m | |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

I/O modules   > Communication   > CP 1542SP-1

## Overview



| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7 |
|---|---|---|---|---|---|---|---|
|  | ● |  |  | ● |  | ● | ● |

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The CP 1542SP-1 communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks.

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions are configured using STEP 7 Professional V14 (TIA Portal) or higher.

The CP 1542SP-1 supports the following communication services:
• PG/OP communication
• S7 communication
• Open communication (Open User Communication)
• IT communication
  - Sending emails via SMTP for authentication on an email server (also with IPv6)
  - SNMPv1 for transfer of network analysis information
• Integration of the ET 200SP Distributed Controller into IPv6-based networks

## Technical specifications

| Article number | 6GK7542-6UX00-0XE0 |
|---|---|
| Product type designation | CP 1542SP-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 2 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | via ET200SP bus adaptor (RJ45, FC, LC, SCRJ),  switch integrated |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 19.2 ... 28.8 V |
| Power loss [W] | 2.64 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 50 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |

| Article number | 6GK7542-6UX00-0XE0 |
|---|---|
| Product type designation | CP 1542SP-1 |
| **Design, dimensions and weight** | |
| Width | 60 mm |
| Height | 117 mm |
| Depth | 74 mm |
| Net weight | 0.18 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 2 |
| • Note | 2 CPs can be pluged in per CPU, simultaneous operation with BA Send and CM DP is possible |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | 32 |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of T blocks maximum | 65 536 byte |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| • with OP connections maximum | 16 |

■ **Technical specifications** (continued)

| Article number | 6GK7542-6UX00-0XE0 |
| --- | --- |
| Product type designation | CP 1542SP-1 |
| **Performance data multi-protocol mode** | |
| Number of active connections with multi-protocol mode | 32 |
| Product function MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v3 | No |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software | |
| • required | STEP 7 Professional V14 (TIA Portal) or higher |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function Web-based diagnostics | Yes; yes, via ET 200SP CPU |

| Article number | 6GK7542-6UX00-0XE0 |
| --- | --- |
| Product type designation | CP 1542SP-1 |
| **Product functions Security** | |
| Product function | |
| • Blocking of communication via physical ports | Yes |
| **Product functions Time** | |
| Product function SICLOCK support | Yes |
| Product function pass on time synchronization | No |
| Protocol is supported | |
| • NTP | Yes |
| • NTP (secure) | No |
| time synchronization | |
| • from NTP-server | Yes |

■ **Ordering data** | **Article No.** | | **Article No.** |

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **CP 1542SP-1 communications processor** | 6GK7542-6UX00-0XE0 | **SIMATIC BA SCRJ/RJ45 BusAdapter** | 6ES7193-6AP20-0AA0 |
| For connection of SIMATIC S7 ET 200SP to Industrial Ethernet, open IE communication (TCP/IP, ISO-ON-TCP, UDP), PG/OP, S7 routing, IP broadcast/ multicast, SNMPv1, DHCP, email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required | | For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | |
| **Accessories** | | **SIMATIC BA SCRJ/FC BusAdapter** | 6ES7193-6AP40-0AA0 |
| **SIMATIC BA 2xRJ45 BusAdapter** | 6ES7193-6AR00-0AA0 | For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 50 m (POF, copper) or 100 m (PCF) | |
| For PROFINET interface modules, Standard function class or above; max. cable length 50 m | | | |
| **SIMATIC BA 2xFC BusAdapter** | 6ES7193-6AF00-0AA0 | **SIMATIC BA 2XLC BusAdapter** | 6ES7193-6AG00-0AA0 |
| For PROFINET interface modules, Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m | | For PROFINET interface modules, High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km | |
| **SIMATIC BA 2xSCRJ BusAdapter** | 6ES7193-6AP00-0AA0 | **SIMATIC BA LC/RJ45 BusAdapter** | 6ES7193-6AG20-0AA0 |
| For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | | For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | |
| | | **SIMATIC BA LC/FC BusAdapter** | 6ES7193-6AG40-0AA0 |
| | | For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > CP 1542SP-1**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **IE FC RJ45 Plug 180 2 x 2** | | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| | | **Labeling strips** | |
| | | 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 | 500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 | | |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 | 1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer | 6ES7193-6LA10-0AA0 |
| **IE FC RJ45 Plug 4 x 2** | | | |
| RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | 1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer | 6ES7193-6LA10-0AG0 |
| | | **Equipment labeling plate** | 6ES7193-6LF30-0AW0 |
| | | 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | |
| | | **Spare parts** | |
| • 1 pack = 1 unit | 6GK1901-1BB11-2AA0 | **Server module** | 6ES7193-6PA00-0AA0 |
| • 1 pack = 10 units | 6GK1901-1BB11-2AB0 | Terminates an ET 200SP station; included in the scope of delivery of the interface modules | |
| • 1 pack = 50 units | 6GK1901-1BB11-2AE0 | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1840-2AH10 | **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 |
| 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | | 20 units | |
| | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| | | Spare part; for connecting the 24 V DC supply voltage; with push-in terminals | |
| **IE FC TP Standard Cable GP 4 x 2** | | | |
| 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | | | |
| • AWG22, for connection to IE FC RJ45 Modular Outlet | 6XV1870-2E | | |
| • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1878-2A | | |

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Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

## Overview

encryption protocols (e.g. SNMPv3), the communications processor protects individual ET 200SP Distributed Controllers or even entire automation cells against unauthorized access.

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions can be configured with STEP 7 Professional V14 (TIA Portal) and higher.

The CP 1543SP-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
- Security functions
  - Stateful Packet Inspection (layer 3 and 4 firewall)
  - Secure communication via VPN (IPsec)
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
- Integration of the ET 200SP Distributed Controller into IPv6-based networks

| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7 |
|-----|----------|-----|-----|-----|------|-------|-----|
|     | ●        |     |     | ●   |      | ●     | ●   |

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The CP 1543SP-1 communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data

## Technical specifications

| Article number | 6GK7543-6WX00-0XE0 |
|---|---|
| Product type designation | CP 1543SP-1 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface | 10 ... 100 Mbit/s |
| **Interfaces** | |
| Number of interfaces acc. to Industrial Ethernet | 1 |
| Number of electrical connections | |
| • at the 1st interface acc. to Industrial Ethernet | 2 |
| Type of electrical connection | |
| • at the 1st interface acc. to Industrial Ethernet | via ET200SP bus adaptor (RJ45, FC, LC, SCRJ),  switch integrated |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage | 24 V |
| Supply voltage | 19.2 ... 28.8 V |
| Power loss [W] | 2.64 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • for vertical installation during operation | 0 ... 50 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Protection class IP | IP20 |

| Article number | 6GK7543-6WX00-0XE0 |
|---|---|
| Product type designation | CP 1543SP-1 |
| **Design, dimensions and weight** | |
| Width | 60 mm |
| Height | 117 mm |
| Depth | 74 mm |
| Net weight | 0.18 kg |
| Mounting type | |
| • 35 mm DIN rail mounting | Yes |
| **Product properties, functions, components general** | |
| Number of units | |
| • per CPU maximum | 2 |
| • Note | 2 CPs can be pluged in per CPU, simultaneous operation with BA Send and CM DP is possible |
| **Performance data open communication** | |
| Number of possible connections for open communication | |
| • by means of T blocks maximum | 32 |
| Amount of data | |
| • as user data per ISO on TCP connection for open communication by means of T blocks maximum | 65 536 byte |
| **Performance data S7 communication** | |
| Number of possible connections for S7 communication | |
| • maximum | 16 |
| • with OP connections maximum | 16 |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules > Communication > CP 1543SP-1**

■ **Technical specifications** (continued)

| Article number | **6GK7543-6WX00-0XE0** | Article number | **6GK7543-6WX00-0XE0** |
|---|---|---|---|
| Product type designation | CP 1543SP-1 | Product type designation | CP 1543SP-1 |
| **Performance data multi-protocol mode** | | **Product functions Security** | |
| Number of active connections with multi-protocol mode | 32 | Firewall version | stateful inspection |
| Product function MIB support | Yes | Product function with VPN connection | IPSec |
| Protocol is supported | | Type of encryption algorithms with VPN connection | AES-256, AES-192, AES-128, 3DES-168, DES-56 |
| • SNMP v1 | Yes | Type of authentication procedure with VPN connection | Preshared key (PSK), X.509v3 certificates |
| • SNMP v3 | Yes | Type of hashing algorithms with VPN connection | MD5, SHA-1 |
| • DCP | Yes | Number of possible connections with VPN connection | 4 |
| • LLDP | Yes | Product function | |
| Configuration software | | • switch-off of non-required services | Yes |
| • required | STEP 7 Professional V14 (TIA Portal) or higher | • Blocking of communication via physical ports | Yes |
| Identification & maintenance function | | • log file for unauthorized access | Yes |
| • I&M0 - device-specific information | Yes | **Product functions Time** | |
| • I&M1 – higher-level designation/ location designation | Yes | Product function SICLOCK support | Yes |
| **Product functions Diagnosis** | | Product function pass on time synchronization | No |
| Product function Web-based diagnostics | Yes; yes, via ET 200SP CPU | Protocol is supported | |
| | | • NTP | Yes |
| | | • NTP (secure) | Yes |
| | | time synchronization | |
| | | • from NTP-server | Yes |

■ **Ordering data**

| | **Article No.** | | **Article No.** |
|---|---|---|---|
| **CP 1543SP-1 communications processor** | **6GK7543-6WX00-0XE0** | **SIMATIC BA SCRJ/RJ45 BusAdapter** | **6ES7193-6AP20-0AA0** |
| CP 1543SP-1 communications processor for connecting SIMATIC S7-ET 200SP to Industrial Ethernet, Security (firewall and VPN), open IE communication (TCP/IP, ISO-on-TCP, UDP) PG/OP, S7 routing, IP broadcast/multicast, SNMPv1/V3, DHCP, secure email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required | | For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | |
| **Accessories** | | **SIMATIC BA SCRJ/FC BusAdapter** | **6ES7193-6AP40-0AA0** |
| **SIMATIC BA 2xRJ45 BusAdapter** | 6ES7193-6AR00-0AA0 | for PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 50 m (POF, copper) or 100 m (PCF) | |
| For PROFINET interface modules, Standard function class or above; max. cable length 50 m | | | |
| **SIMATIC BA 2xFC BusAdapter** | 6ES7193-6AF00-0AA0 | **SIMATIC BA 2XLC BusAdapter** | **6ES7193-6AG00-0AA0** |
| For PROFINET interface modules, Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m | | For PROFINET interface modules, High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km | |
| **SIMATIC BA 2xSCRJ BusAdapter** | 6ES7193-6AP00-0AA0 | **SIMATIC BA LC/RJ45 BusAdapter** | **6ES7193-6AG20-0AA0** |
| For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | | For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | |

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■ **Ordering data**

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIMATIC BA LC/FC BusAdapter** | 6ES7193-6AG40-0AA0 | | **IE FC TP Standard Cable GP 4 x 2** | |
| For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | | | 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m | |
| **IE FC RJ45 Plug 180 2 x 2** | | | • AWG22, for connection to IE FC RJ45 Modular Outlet | 6XV1870-2E |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1878-2A |
| | | | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| | | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 | | **Labeling strips** | |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 | | 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 | | | |
| **IE FC RJ45 Plug 4 x 2** | | | 500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | 1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer | 6ES7193-6LA10-0AA0 |
| | | | 1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer | 6ES7193-6LA10-0AG0 |
| • 1 pack = 1 unit | 6GK1901-1BB11-2AA0 | | **Equipment labeling plate** | 6ES7193-6LF30-0AW0 |
| • 1 pack = 10 units | 6GK1901-1BB11-2AB0 | | 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | |
| • 1 pack = 50 units | 6GK1901-1BB11-2AE0 | | | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1840-2AH10 | | **Spare parts** | |
| 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | | | **Server module** | 6ES7193-6PA00-0AA0 |
| | | | Terminates an ET 200SP station; included in the scope of delivery of the interface modules | |
| | | | **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 |
| | | | 20 units | |
| | | | **Power supply connector** | 6ES7193-4JB00-0AA0 |
| | | | Spare part; for connecting the 24 V DC supply voltage; with push-in terminals | |

Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > Communication   > CP 1542SP-1 IRC**

## ◾ Overview

| ISO | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7 |
|-----|----------|-----|-----|-----|------|-------|-----|
|     | ●        |     |     | ●   |      | ●     | ●   |

G_IK10_XX_50730

The CP 1542SP-1 IRC communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks. In addition, control centers can be connected using various telecontrol protocols.

The CP is characterized by the following:
• Ethernet-based connection to TeleControl Server Basic, e.g. via Internet
• Ethernet-based connection to the control center via IEC 60870-5-104 or DNP3 protocol
• Data transfer of measured values, control variable values or alarms optimized for telecontrol systems
• Automatic sending of alert emails
• Data buffering of up to 100,000 values ensures a secure database, even with temporary connection failures
• Clearly laid out LED signaling for fast and easy diagnostics
• Fast commissioning thanks to easy configuration using STEP 7

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions are configured using STEP 7 Professional V14 (TIA Portal) or higher.

The CP 1542SP-1 IRC supports the following communication services:
• Supports multiple telecontrol protocols such as DNP3, IEC 60870-5-104 and TeleControl Basic
• PG/OP communication
• S7 communication
• Open communication (Open User Communication)
• IT communication
  - Sending emails via SMTP or SMTPS with "SMTP-Auth" for authentication on an email server (also with IPv6)
  - Email transfer with addressing by program block
  - Email transfer via "Notifications" (alerts)

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## ■ Technical specifications

| | | | | |
|---|---|---|---|---|
| Article number | **6GK7542-6VX00-0XE0** | | Article number | **6GK7542-6VX00-0XE0** |
| Product type designation | CP 1542SP-1 IRC | | Product type designation | CP 1542SP-1 IRC |
| **Transmission rate** | | | **Performance data multi-protocol mode** | |
| Transfer rate | | | Number of active connections with multi-protocol mode | 32 |
| • at the 1st interface | 10 ... 100 Mbit/s | | **Performance data telecontrol** | |
| **Interfaces** | | | Suitability for use | |
| Number of interfaces acc. to Industrial Ethernet | 1 | | • Node station | No |
| Number of electrical connections | | | • substation | Yes |
| • at the 1st interface acc. to Industrial Ethernet | 2 | | • TIM control center | No |
| Type of electrical connection | | | Control center connection | IEC 60870-5, DNP3, (Modbus TCP using software components of the CPU) capable control stations and connection to Telecontrol Server Basic |
| • at the 1st interface acc. to Industrial Ethernet | via ET200SP bus adaptor (RJ45, FC, LC, SCRJ),  switch integrated | | | |
| **Supply voltage, current consumption, power loss** | | | • by means of a permanent connection | supported |
| Type of voltage of the supply voltage | DC | | • by means of demand-oriented connection | supported |
| Supply voltage | 24 V | | • Note | Connection to SCADA system using IEC 60870-5 104, DNP3 and Telecontrol Server Basic |
| Supply voltage | 19.2 ... 28.8 V | | | |
| Power loss [W] | 2.64 W | | Protocol is supported | |
| **Permitted ambient conditions** | | | • TCP/IP | Yes |
| Ambient temperature | | | • DNP3 | Yes |
| • for vertical installation during operation | 0 ... 50 °C | | • IEC 60870-5 | Yes |
| • for horizontally arranged busbars during operation | 0 ... 60 °C | | Product function data buffering if connection is aborted | Yes |
| • during storage | -40 ... +70 °C | | Number of data points per station maximum | 500 |
| • during transport | -40 ... +70 °C | | Product function MIB support | Yes |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % | | Protocol is supported | |
| | | | • SNMP v1 | Yes |
| Protection class IP | IP20 | | • SNMP v3 | No |
| **Design, dimensions and weight** | | | • DCP | Yes |
| Width | 60 mm | | • LLDP | Yes |
| Height | 117 mm | | Configuration software | |
| Depth | 74 mm | | • required | STEP 7 Professional V14 (TIA Portal) or higher |
| Net weight | 0.18 kg | | | |
| Mounting type | | | Identification & maintenance function | |
| • 35 mm DIN rail mounting | Yes | | • I&M0 - device-specific information | Yes |
| **Product properties, functions, components general** | | | • I&M1 – higher-level designation/ location designation | Yes |
| Number of units | | | **Product functions Diagnosis** | |
| • per CPU maximum | 2 | | Product function Web-based diagnostics | Yes; yes, via ET 200SP CPU |
| • Note | 2 CPs can be pluged in per CPU, simultaneous operation with BA Send and CM DP is possible | | **Product functions Security** | |
| | | | Product function | |
| | | | • Blocking of communication via physical ports | Yes |
| **Performance data open communication** | | | **Product functions Time** | |
| Number of possible connections for open communication | | | Product function SICLOCK support | Yes |
| • by means of T blocks maximum | 32 | | Product function pass on time synchronization | Yes |
| Amount of data | | | Protocol is supported | |
| • as user data per ISO on TCP connection for open communication by means of T blocks maximum | 65 536 byte | | • NTP | Yes |
| | | | • NTP (secure) | No |
| **Performance data S7 communication** | | | time synchronization | |
| Number of possible connections for S7 communication | | | • from NTP-server | Yes |
| • maximum | 16 | | • from control center | Yes |
| • with OP connections maximum | 16 | | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules  > Communication  > CP 1542SP-1 IRC**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **CP 1542SP-1 IRC communications processor** | 6GK7542-6VX00-0XE0 | **SIMATIC BA LC/FC BusAdapter** | 6ES7193-6AG40-0AA0 |
| CP 1542SP-1 IRC communications processor for connection of SIMATIC S7 ET 200SP to Industrial Ethernet, TeleControl Server Basic, IEC 60870-5-104 or DNP3 protocol to a control center; open IE communication (TCP/IP, ISO-on-TCP, UDP), IP broadcast/multicast, SNMPv1, DHCP, secure email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required | | For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | |
| **Accessories** | | **IE FC RJ45 Plug 180 2 x 2** | |
| **SIMATIC BA 2xRJ45 BusAdapter** | 6ES7193-6AR00-0AA0 | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| For PROFINET interface modules, Standard function class or above; max. cable length 50 m | | • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 |
| **SIMATIC BA 2xFC BusAdapter** | 6ES7193-6AF00-0AA0 | • 1 pack = 10 units | 6GK1901-1BB10-2AB0 |
| | | • 1 pack = 50 units | 6GK1901-1BB10-2AE0 |
| For PROFINET interface modules, Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m | | **IE FC RJ45 Plug 4 x 2** | |
| **SIMATIC BA 2xSCRJ BusAdapter** | 6ES7193-6AP00-0AA0 | RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | | • 1 pack = 1 unit | 6GK1901-1BB11-2AA0 |
| | | • 1 pack = 10 units | 6GK1901-1BB11-2AB0 |
| **SIMATIC BA SCRJ/RJ45 BusAdapter** | 6ES7193-6AP20-0AA0 | • 1 pack = 50 units | 6GK1901-1BB11-2AE0 |
| For PROFINET interface modules, High Feature function class or above; fiber-optic cable connection for POF or PCF; for increased vibration and EMC load capacity; max. cable length 50 m (POF) or 100 m (PCF) | | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1840-2AH10 |
| | | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | |
| **SIMATIC BA SCRJ/FC BusAdapter** | 6ES7193-6AP40-0AA0 | **IE FC TP Standard Cable GP 4 x 2** | |
| for PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 50 m (POF, copper) or 100 m (PCF) | | 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m | |
| **SIMATIC BA 2XLC BusAdapter** | 6ES7193-6AG00-0AA0 | • AWG22, for connection to IE FC RJ45 Modular Outlet | 6XV1870-2E |
| For PROFINET interface modules, High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km | | • AWG24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1878-2A |
| **SIMATIC BA LC/RJ45 BusAdapter** | 6ES7193-6AG20-0AA0 | | |
| For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper) | | | |

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **IE FC Stripping Tool** | **6GK1901-1GA00** | **TeleControl Server Basic V3.0** | |
| Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | | Software for 8 to 5000 stations; single license for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 MS Windows Server 2008 R2 Standard 64-bit + Service Pack 1 | |
| **Labeling strips** | | | |
| 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer | **6ES7193-6LR10-0AA0** | | |
| 500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer | **6ES7193-6LR10-0AG0** | | |
| 1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer | **6ES7193-6LA10-0AA0** | | |
| 1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer | **6ES7193-6LA10-0AG0** | | |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** | • **TeleControl Server Basic 8 V3** Connection management for 8 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AA0** |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | | • **TeleControl Server Basic 32 V3** Connection management for 32 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AF0** |
| **Spare parts** | | • **TeleControl Server Basic 64 V3** Connection management for 64 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AB0** |
| **Server module** | **6ES7193-6PA00-0AA0** | • **TeleControl Server Basic 256 V3** Connection management for 256 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AC0** |
| Terminates an ET 200SP station; included in the scope of delivery of the interface modules | | • **TeleControl Server Basic 1000 V3** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AD0** |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** | • **TeleControl Server Basic 5000 V3** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | **6NH9910-0AA21-0AE0** |
| 20 units | | • **TeleControl Server Basic UPGR V3** Upgrade package from Version V2.x to V3 for all license sizes | **6NH9910-0AA21-0GA0** |
| **Power supply connector** | **6ES7193-4JB00-0AA0** | | |
| Spare part; for connecting the 24 V DC supply voltage; with push-in terminals | | | |

Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > SCALANCE W761 RJ45 for the control cabinet**

## ■ Overview



- Low-cost Access Point, suitable for applications where the device is to be mounted in the control cabinet

## ■ Technical specifications

| Article number | **6GK5761-1FC00-0AA0** | Article number | **6GK5761-1FC00-0AA0** |
|---|---|---|---|
| | 6GK5761-1FC00-0AB0 [1] | | 6GK5761-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W761-1 RJ45 | Product type designation | SCALANCE W761-1 RJ45 |
| **Transmission rate** | | **Permitted ambient conditions** | |
| | | Ambient temperature | |
| • Transfer rate with WLAN maximum | 150 Mbit/s | • during operation | 0 ... 55 °C |
| • Transfer rate for Industrial Ethernet | 10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s | • during storage | -40 ... +85 °C |
| | | • during transport | -40 ... +85 °C |
| **Interfaces** | | Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Number of electrical connections | | | |
| • for network components or terminal equipment | 1 | Ambient condition for operation | When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529. |
| • for power supply | 1 | | |
| • for redundant voltage supply | 0 | | |
| Type of electrical connection | | | |
| • for network components or terminal equipment | RJ45 socket | | |
| • for power supply | 3-pole screw terminal | Protection class IP | IP20 |
| design of the removable storage | | **Design, dimensions and weight** | |
| • C-PLUG | No | Width | 50 mm |
| • KEY-PLUG | No | Height | 114 mm |
| **Interfaces wireless** | | Depth | 74 mm |
| Number of radio cards permanently installed | 1 | Width of the enclosure without antenna | 50 mm |
| Number of electrical connections for external antenna(s) | 1 | Height of the enclosure without antenna | 114 mm |
| Type of electrical connection for external antenna(s) | R-SMA (socket) | Depth of the enclosure without antenna | 74 mm |
| Product feature external antenna can be mounted directly on device | Yes | Net weight | 0.13 kg |
| **Supply voltage, current consumption, power loss** | | Mounting type | |
| | | • S7-300 rail mounting | No |
| Type of voltage of the supply voltage | DC | • S7-1500 rail mounting | No |
| Supply voltage 1 | | • 35 mm DIN rail mounting | Yes |
| • from terminal block | 19.2 V | • wall mounting | No |
| Supply voltage 2 | | | |
| • from terminal block | 28.8 V | | |
| Consumed current | | | |
| • at DC at 24 V typical | 0.15 A | | |
| Power loss [W] | | | |
| • at DC at 24 V typical | 3.6 W | | |

[1] Wireless approval in the USA

■ **Technical specifications** (continued)

| Article number | 6GK5761-1FC00-0AA0 |
|---|---|
| | 6GK5761-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W761-1 RJ45 |
| **Wireless frequencies** | |
| Operating frequency | |
| • for WLAN in 2.4 GHz frequency band | 2.41 ... 2.48 GHz |
| • for WLAN in 5 GHz frequency band | 4.9 ... 5.8 GHz |
| **Product properties, functions, components general** | |
| Product function Access Point Mode | Yes |
| Product function Client Mode | Yes |
| Number of SSIDs | 1 |
| Product function | |
| • iPCF Access Point | No |
| • iPCF client | No |
| • iPCF-MC Access Point | No |
| • iPCF-MC client | No |
| **Product functions management, configuration** | |
| Number of manageable IP addresses in client | 4 |
| Product function | |
| • CLI | Yes |
| • web-based management | Yes |
| • MIB support | Yes |
| • TRAPs via email | Yes |
| • Configuration with STEP 7 | Yes |
| • configuration with STEP 7 in the TIA Portal | Yes |
| • operation with IWLAN controller | No |
| • operation with Enterasys WLAN controller | No |
| • forced roaming on IP down with IWLAN | Yes |
| • forced roaming on link down with IWLAN | Yes |
| • WDS | Yes |
| Protocol is supported | |
| • Address Resolution Protocol (ARP) | Yes |
| • ICMP | Yes |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |

| Article number | 6GK5761-1FC00-0AA0 |
|---|---|
| | 6GK5761-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W761-1 RJ45 |
| **Product functions Diagnosis** | |
| Product function | |
| • PROFINET IO diagnosis | No |
| • Link Check | No |
| • connection monitoring IP-Alive | No |
| • localization via Aeroscout | No |
| • SysLog | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| **Product functions VLAN** | |
| Product function | |
| • function VLAN with IWLAN | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • in Client Mode DHCP server via LAN | Yes |
| • DHCP Option 82 | Yes |
| **Product functions Redundancy** | |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • MSTP | Yes |
| • RSTP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - MAC-based | Yes |
| • Management security, ACL-IP based | Yes |
| • IEEE 802.1x (radius) | Yes |
| • NAT/NAPT | No |
| • access protection according to IEEE802.11i | Yes |
| • WPA/WPA2 | Yes |
| • TKIP/AES | Yes |
| Protocol is supported | |
| • SSH | Yes |
| • RADIUS | Yes |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| • SNTP | Yes |
| • SIMATIC Time | Yes |

[1]  Wireless approval in the USA

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

### ■ Technical specifications  (continued)

| Article number | 6GK5761-1FC00-0AA0 |
|---|---|
| | 6GK5761-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W761-1 RJ45 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4 |
| • for hazardous zone | EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • for safety from CSA and UL | UL 60950-1 CSA C22.2 No. 60950-1 |
| Certificate of suitability | |
| • EC declaration of conformity | Yes |
| • CE marking | Yes |
| • C-Tick | Yes |
| • CCC | No |
| • E1 approval | No |
| • Railway application in accordance with EN 50155 | No |
| • NEMA TS2 | No |
| • IEC 61375 | No |
| • IEC 61850-3 | No |
| • NEMA4X | No |
| • Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af | No |
| • Power-over-Ethernet according to IEEE802.3at for type 2 | No |

| Article number | 6GK5761-1FC00-0AA0 |
|---|---|
| | 6GK5761-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W761-1 RJ45 |
| Standard for wireless communication | |
| • IEEE 802.11a | Yes |
| • IEEE 802.11b | Yes |
| • IEEE 802.11e | Yes |
| • IEEE 802.11g | Yes |
| • IEEE 802.11h | Yes |
| • IEEE 802.11i | Yes |
| • IEEE 802.11n | Yes |
| Wireless approval | You will find the current list of countries at: www.siemens.com/ wireless-approvals |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | No |
| • Bureau Veritas (BV) | No |
| • DNV GL | No |
| • Lloyds Register of Shipping (LRS) | No |
| • Nippon Kaiji Kyokai (NK) | No |
| • Polski Rejestr Statkow (PRS) | No |
| • Royal Institution of Naval Architects (RINA) | No |
| **Accessories** | |
| accessories | 24 V DC screw terminal included in scope of delivery |

[1]  Wireless approval in the USA

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SCALANCE W761 Access Points** | | **Accessories** | |
| IWLAN Access Point with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES; IP20 degree of protection (0 °C to +55 °C); scope of delivery: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD-ROM; German/English | | **IE FC RJ45 Plug 180 2 x 2** | |
| | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| **SCALANCE W761-1 RJ45** | | • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 |
| IWLAN Access Point with one built-in wireless interface | | • 1 pack = 10 units | 6GK1901-1BB10-2AB0 |
| • National approvals for operation outside the USA | 6GK5761-1FC00-0AA0 | • 1 pack = 50 units | 6GK1901-1BB10-2AE0 |
| • National approvals for operation within the USA [2] | 6GK5761-1FC00-0AB0 | **IE FC Standard Cable GP 2 x 2** | 6XV1840-2AH10 |
| | | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m | |
| | | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| | | **Antennas and miscellaneous IWLAN accessories** | See Catalog IK PI or Industry Mall |

[2]  Please note national approvals under http://www.siemens.com/wireless-approvals

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## Overview



- Low-cost Client Module, suitable for applications where the device is to be mounted in the control cabinet
- Equipped with iFeatures
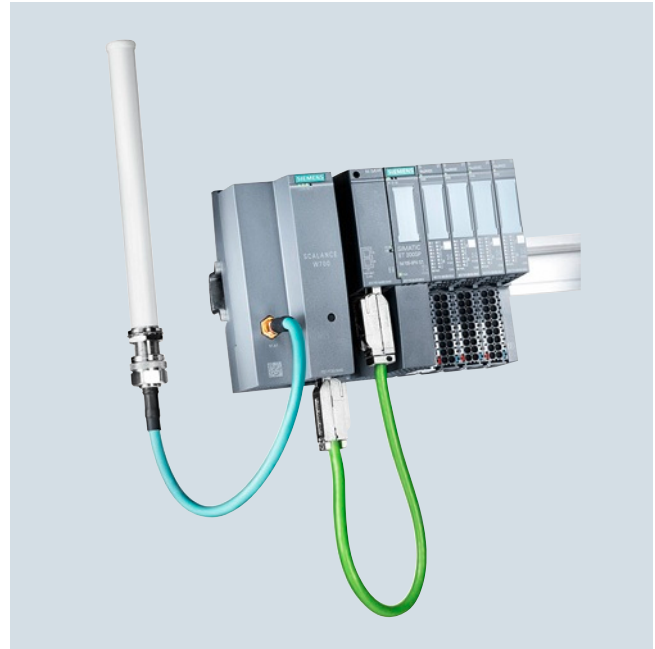
ET 200SP station with SCALANCE W722 RJ45

## Technical specifications

| Article number | 6GK5722-1FC00-0AA0 |
|---|---|
| | 6GK5722-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W722-1 RJ45 |
| **Transmission rate** | |
| • Transfer rate with WLAN maximum | 150 Mbit/s |
| • Transfer rate for Industrial Ethernet | 10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 1 |
| • for power supply | 1 |
| • for redundant voltage supply | 0 |
| Type of electrical connection | |
| • for network components or terminal equipment | RJ45 socket |
| • for power supply | 3-pole screw terminal |
| design of the removable storage | |
| • C-PLUG | No |
| • KEY-PLUG | No |
| **Interfaces wireless** | |
| Number of radio cards permanently installed | 1 |
| Number of electrical connections for external antenna(s) | 1 |
| Type of electrical connection for external antenna(s) | R-SMA (socket) |
| Product feature external antenna can be mounted directly on device | Yes |

| Article number | 6GK5722-1FC00-0AA0 |
|---|---|
| | 6GK5722-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W722-1 RJ45 |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 | |
| • from terminal block | 19.2 V |
| Supply voltage 2 | |
| • from terminal block | 28.8 V |
| Consumed current | |
| • at DC at 24 V typical | 0.15 A |
| Power loss [W] | |
| • at DC at 24 V typical | 3.6 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 55 °C |
| • during storage | -40 ... +85 °C |
| • during transport | -40 ... +85 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Ambient condition for operation | When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529. |
| Protection class IP | IP20 |

[1] Wireless approval in the USA

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > SCALANCE W722 RJ45 for the control cabinet**

■ **Technical specifications** (continued)

| Article number | 6GK5722-1FC00-0AA0 | Article number | 6GK5722-1FC00-0AA0 |
|---|---|---|---|
| | 6GK5722-1FC00-0AB0 [1] | | 6GK5722-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W722-1 RJ45 | Product type designation | SCALANCE W722-1 RJ45 |
| **Design, dimensions and weight** | | **Product functions Diagnosis** | |
| Width | 50 mm | Product function | |
| Height | 114 mm | • PROFINET IO diagnosis | Yes |
| Depth | 74 mm | • Link Check | No |
| Width of the enclosure without antenna | 50 mm | • connection monitoring IP-Alive | No |
| | | • SysLog | Yes |
| Height of the enclosure without antenna | 114 mm | Protocol is supported | |
| | | • SNMP v1 | Yes |
| Depth of the enclosure without antenna | 74 mm | • SNMP v2 | Yes |
| Net weight | 0.13 kg | • SNMP v3 | Yes |
| Mounting type | | **Product functions VLAN** | |
| • S7-300 rail mounting | No | Product function | |
| • S7-1500 rail mounting | No | • function VLAN with IWLAN | No |
| • 35 mm DIN rail mounting | Yes | **Product functions DHCP** | |
| • wall mounting | No | Product function | |
| **Wireless frequencies** | | • DHCP client | Yes |
| Operating frequency | | • in Client Mode DHCP server via LAN | Yes |
| • for WLAN in 2.4 GHz frequency band | 2.41 ... 2.48 GHz | • DHCP Option 82 | Yes |
| • for WLAN in 5 GHz frequency band | 4.9 ... 5.8 GHz | **Product functions Redundancy** | |
| **Product properties, functions, components general** | | Protocol is supported | |
| Product function Access Point Mode | No | • STP/RSTP | Yes |
| Product function Client Mode | Yes | • MSTP | Yes |
| Product function | | • RSTP | Yes |
| • iPCF client | Yes | **Product functions Security** | |
| • iPCF-MC Access Point | No | Product function | |
| • iPCF-MC client | Yes | • ACL - MAC-based | Yes |
| Number of iPCF-capable radio modules | 1 | • Management security, ACL-IP based | Yes |
| **Product functions management, configuration** | | • IEEE 802.1x (radius) | Yes |
| Number of manageable IP addresses in client | 4 | • NAT/NAPT | Yes |
| Product function | | • access protection according to IEEE802.11i | Yes |
| • CLI | Yes | • WPA/WPA2 | Yes |
| • web-based management | Yes | • TKIP/AES | Yes |
| • MIB support | Yes | Protocol is supported | |
| • TRAPs via email | Yes | • SSH | Yes |
| • Configuration with STEP 7 | Yes | • RADIUS | Yes |
| • configuration with STEP 7 in the TIA Portal | Yes | **Product functions Time** | |
| • WDS | No | Protocol is supported | |
| Protocol is supported | | • NTP | Yes |
| • Address Resolution Protocol (ARP) | Yes | • SNTP | Yes |
| • ICMP | Yes | • SIMATIC Time | Yes |
| • Telnet | Yes | | |
| • HTTP | Yes | | |
| • HTTPS | Yes | | |
| • TFTP | Yes | | |
| • DCP | Yes | | |
| • LLDP | No | | |
| Identification & maintenance function | | | |
| • I&M0 - device-specific information | Yes | | |
| • I&M1 – higher-level designation/ location designation | Yes | | |

[1] Wireless approval in the USA

## Technical specifications  (continued)

| Article number | 6GK5722-1FC00-0AA0 |
|---|---|
| | 6GK5722-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W722-1 RJ45 |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4 |
| • for hazardous zone | EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • for safety from CSA and UL | UL 60950-1 CSA C22.2 No. 60950-1 |
| Certificate of suitability | |
| • EC declaration of conformity | Yes |
| • CE marking | Yes |
| • C-Tick | Yes |
| • CCC | No |
| • E1 approval | No |
| • Railway application in accordance with EN 50155 | No |
| • NEMA TS2 | No |
| • IEC 61375 | No |
| • IEC 61850-3 | No |
| • NEMA4X | No |
| • Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af | No |
| • Power-over-Ethernet according to IEEE802.3at for type 2 | No |

| Article number | 6GK5722-1FC00-0AA0 |
|---|---|
| | 6GK5722-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W722-1 RJ45 |
| Standard for wireless communication | |
| • IEEE 802.11a | Yes |
| • IEEE 802.11b | Yes |
| • IEEE 802.11e | Yes |
| • IEEE 802.11g | Yes |
| • IEEE 802.11h | Yes |
| • IEEE 802.11i | Yes |
| • IEEE 802.11n | Yes |
| Wireless approval | You will find the current list of countries at: www.siemens.com/ wireless-approvals |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | No |
| • Bureau Veritas (BV) | No |
| • DNV GL | No |
| • Lloyds Register of Shipping (LRS) | No |
| • Nippon Kaiji Kyokai (NK) | No |
| • Polski Rejestr Statkow (PRS) | No |
| • Royal Institution of Naval Architects (RINA) | No |
| **Accessories** | |
| accessories | 24 V DC screw terminal included in scope of delivery |

[1]  Wireless approval in the USA

## Ordering data

| | Article No. |
|---|---|
| **SCALANCE W722 Client Modules** | |
| IWLAN Ethernet Client Modules with iFeatures support and built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES; IP20 degree of protection (0 °C to +55 °C); scope of delivery: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD-ROM; German/English | |
| **SCALANCE W722-1 RJ45** | |
| For administration of the wireless connection with iFeatures from a connected device with Industrial Ethernet connection | |
| • National approvals for operation outside the USA | 6GK5722-1FC00-0AA0 |
| • National approvals for operation within the USA [2] | 6GK5722-1FC00-0AB0 |

| | Article No. |
|---|---|
| **Accessories** | |
| **IE FC RJ45 Plug 180 2 x 2** | |
| RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | 6GK1901-1BB10-2AA0 |
| • 1 pack = 10 units | 6GK1901-1BB10-2AB0 |
| • 1 pack = 50 units | 6GK1901-1BB10-2AE0 |
| **IE FC Standard Cable GP 2 x 2** | 6XV1840-2AH10 |
| 4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; Sold by the meter max. quantity 1000 m minimum order quantity 20 m | |
| **IE FC Stripping Tool** | 6GK1901-1GA00 |
| Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| **Antennas and miscellaneous IWLAN accessories** | See Catalog IK PI or Industry Mall |

[2]  Please note national approvals under http://www.siemens.com/wireless-approvals

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules   > Communication   > SCALANCE W721 RJ45 for the control cabinet**

## ■ Overview



- Low-cost Client Module, suitable for applications where the device is to be mounted in the control cabinet

## ■ Technical specifications

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| **Transmission rate** | |
| | |
| • Transfer rate with WLAN maximum | 150 Mbit/s |
| • Transfer rate for Industrial Ethernet | 10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • for network components or terminal equipment | 1 |
| • for power supply | 1 |
| • for redundant voltage supply | 0 |
| Type of electrical connection | |
| • for network components or terminal equipment | RJ45 socket |
| • for power supply | 3-pole screw terminal |
| design of the removable storage | |
| • C-PLUG | No |
| • KEY-PLUG | No |
| **Interfaces wireless** | |
| Number of radio cards permanently installed | 1 |
| Number of electrical connections for external antenna(s) | 1 |
| Type of electrical connection for external antenna(s) | R-SMA (socket) |
| Product feature external antenna can be mounted directly on device | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Supply voltage 1 | |
| • from terminal block | 19.2 V |
| Supply voltage 2 | |
| • from terminal block | 28.8 V |
| Consumed current | |
| • at DC at 24 V typical | 0.15 A |
| Power loss [W] | |
| • at DC at 24 V typical | 3.6 W |

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 55 °C |
| • during storage | -40 ... +85 °C |
| • during transport | -40 ... +85 °C |
| Relative humidity at 25 °C without condensation during operation maximum | 95 % |
| Ambient condition for operation | When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529. |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Width | 50 mm |
| Height | 114 mm |
| Depth | 74 mm |
| Width of the enclosure without antenna | 50 mm |
| Height of the enclosure without antenna | 114 mm |
| Depth of the enclosure without antenna | 74 mm |
| Net weight | 0.13 kg |
| Mounting type | |
| • S7-300 rail mounting | No |
| • S7-1500 rail mounting | No |
| • 35 mm DIN rail mounting | Yes |
| • wall mounting | No |

[1]  Wireless approval in the USA

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■ **Technical specifications** (continued)

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| **Wireless frequencies** | |
| Operating frequency | |
| • for WLAN in 2.4 GHz frequency band | 2.41 ... 2.48 GHz |
| • for WLAN in 5 GHz frequency band | 4.9 ... 5.8 GHz |
| **Product properties, functions, components general** | |
| Product function Access Point Mode | No |
| Product function Client Mode | Yes |
| Product function | |
| • iPCF client | No |
| • iPCF-MC client | No |
| **Product functions management, configuration** | |
| Number of manageable IP addresses in client | 4 |
| Product function | |
| • CLI | Yes |
| • web-based management | Yes |
| • MIB support | Yes |
| • TRAPs via email | Yes |
| • Configuration with STEP 7 | Yes |
| • configuration with STEP 7 in the TIA Portal | Yes |
| • WDS | No |
| Protocol is supported | |
| • Address Resolution Protocol (ARP) | Yes |
| • ICMP | Yes |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • DCP | Yes |
| • LLDP | No |
| Identification & maintenance function | |
| • I&M0 - device-specific information | Yes |
| • I&M1 – higher-level designation/ location designation | Yes |
| **Product functions Diagnosis** | |
| Product function | |
| • PROFINET IO diagnosis | No |
| • Link Check | No |
| • connection monitoring IP-Alive | No |
| • SysLog | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| **Product functions VLAN** | |
| Product function | |
| • function VLAN with IWLAN | No |

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • in Client Mode DHCP server via LAN | Yes |
| • DHCP Option 82 | Yes |
| **Product functions Redundancy** | |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • MSTP | Yes |
| • RSTP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - MAC-based | Yes |
| • Management security, ACL-IP based | Yes |
| • IEEE 802.1x (radius) | Yes |
| • NAT/NAPT | No |
| • access protection according to IEEE802.11i | Yes |
| • WPA/WPA2 | Yes |
| • TKIP/AES | Yes |
| Protocol is supported | |
| • SSH | Yes |
| • RADIUS | Yes |
| **Product functions Time** | |
| Protocol is supported | |
| • NTP | Yes |
| • SNTP | Yes |
| • SIMATIC Time | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • for FM | FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4 |
| • for hazardous zone | EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • for safety from CSA and UL | UL 60950-1 CSA C22.2 No. 60950-1 |
| Certificate of suitability | |
| • EC declaration of conformity | Yes |
| • CE marking | Yes |
| • C-Tick | Yes |
| • CCC | No |
| • E1 approval | No |
| • Railway application in accordance with EN 50155 | No |
| • NEMA TS2 | No |
| • IEC 61375 | No |
| • IEC 61850-3 | No |
| • NEMA4X | No |
| • Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af | No |
| • Power-over-Ethernet according to IEEE802.3at for type 2 | No |

[1] Wireless approval in the USA

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules > Communication > SCALANCE W721 RJ45 for the control cabinet**

## ■ Technical specifications (continued)

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| Standard for wireless communication | |
| • IEEE 802.11a | Yes |
| • IEEE 802.11b | Yes |
| • IEEE 802.11e | Yes |
| • IEEE 802.11g | Yes |
| • IEEE 802.11h | Yes |
| • IEEE 802.11i | Yes |
| • IEEE 802.11n | Yes |
| Wireless approval | You will find the current list of countries at: www.siemens.com/wireless-approvals |

| Article number | 6GK5721-1FC00-0AA0 |
|---|---|
| | 6GK5721-1FC00-0AB0 [1] |
| Product type designation | SCALANCE W721-1 RJ45 |
| Marine classification association | |
| • American Bureau of Shipping Europe Ltd. (ABS) | No |
| • Bureau Veritas (BV) | No |
| • DNV GL | No |
| • Lloyds Register of Shipping (LRS) | No |
| • Nippon Kaiji Kyokai (NK) | No |
| • Polski Rejestr Statkow (PRS) | No |
| • Royal Institution of Naval Architects (RINA) | No |
| **Accessories** | |
| accessories | 24 V DC screw terminal included in scope of delivery |

[1] Wireless approval in the USA

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SCALANCE W721 Client Modules** | | **Accessories** | |
| IWLAN Ethernet Client Modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES; IP20 degree of protection (0 °C to +55 °C); scope of delivery: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD-ROM; German/English | | **IE FC RJ45 Plug 180 2 x 2** | |
| | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| **SCALANCE W721-1 RJ45** | | • 1 pack = 1 unit | **6GK1901-1BB10-2AA0** |
| | | • 1 pack = 10 units | **6GK1901-1BB10-2AB0** |
| For administration of the wireless connection from a connected device with Industrial Ethernet connection | | • 1 pack = 50 units | **6GK1901-1BB10-2AE0** |
| • National approvals for operation outside the USA | **6GK5721-1FC00-0AA0** | **IE FC Standard Cable GP 2 x 2** | **6XV1840-2AH10** |
| • National approvals for operation within the USA [2] | **6GK5721-1FC00-0AB0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m | |
| | | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| | | **Antennas and miscellaneous IWLAN accessories** | See Catalog IK PI or Industry Mall |

[2] Please note national approvals under http://www.siemens.com/wireless-approvals

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## Overview



- PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps
- Expands the ET 200SP CPUs 1510SP-1 PN / 1512SP-1 PN by one PROFIBUS connection
- For communication with lower-level PROFIBUS devices at bandwidths of 9.6 Kbps to 12 Mbps
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication:
    This makes it possible to establish communication between the ET 200SP CPU and other devices, for example those from the SIMATIC S7-300/400/1500 range.
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Data set routing

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| | |
|---|---|
| Article number | **6AG1545-5DA00-2AB0** |
| Based on | **6ES7545-5DA00-0AB0** |
| | SIPLUS ET 200SP CM DP |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • horizontal installation, max. | 60 °C; = Tmax |
| • vertical installation, min. | -40 °C; = Tmin; Startup @ -25 °C |
| • vertical installation, max. | 50 °C; = Tmax |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Ordering data | Article No. |
|---|---|
| **SIPLUS CM DP for ET 200SP CPU** (Extended temperature range and exposure to media) PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps | **6AG1545-5DA00-2AB0** |
| **Accessories** | see SIMATIC CM DP, page 9/93 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## ■ Overview



Digital fail-safe input module:
F-DI 8x24 V DC High Feature for BU type A0, color code CC01

Other properties:
- 8-channel digital fail-safe input module for the ET 200SP
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 8 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs

## ■ Technical specifications

| Article number | **6ES7136-6BA00-0CA0** |
|---|---|
| | ET 200SP, EL-MOD., F-DI 8X24VDC HF |
| **General information** | |
| Product type designation | F-DI 8x24VDC HF |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Encoder supply** | |
| Number of outputs | 8 |
| Short-circuit protection | Yes; Electronic (response threshold 0.7 A to 1.8 A) |
| **Output current** | |
| • up to 60 °C, max. | 0.3 A |
| **24 V encoder supply** | |
| • 24 V | Yes; min. L+ (-1.5 V) |
| • Short-circuit protection | Yes |
| • Output current, max. | 800 mA; Total current of all encoders |

| Article number | **6ES7136-6BA00-0CA0** |
|---|---|
| | ET 200SP, EL-MOD., F-DI 8X24VDC HF |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Source/sink input | Yes; P-reading |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -30 to +5V |
| • for signal "1" | +15 to +30V |
| **Input current** | |
| • for signal "1", typ. | 3.7 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - parameterizable | Yes |
| **for counter/technological functions** | |
| - parameterizable | No |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 500 m |

## Technical specifications (continued)

| Article number | 6ES7136-6BA00-0CA0 |
|---|---|
| | ET 200SP, EL-MOD., F-DI 8X24VDC HF |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes, "Alarms/diagnostic messages" section in the manual |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | No |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |

| Article number | 6ES7136-6BA00-0CA0 |
|---|---|
| | ET 200SP, EL-MOD., F-DI 8X24VDC HF |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 1/h |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Dimensions** | |
| Width | 15 mm |
| **Weights** | |
| Weight, approx. | 49 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital F input modules** | | **BU15-P16+A10+2B** | |
| F-DI 8x24 V DC High Feature, BU type A0, color code CC01 | **6ES7136-6BA00-0CA0** | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| **Usable BaseUnits** | | | |
| **BU15-P16+A0+2D** | | • 1 unit | **6ES7193-6BP20-0BA0** |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | • 10 units | **6ES7193-6BP20-2BA0** |
| | | **Accessories** | |
| • 1 unit | **6ES7193-6BP00-0DA0** | **S7 Distributed Safety programming tool V5.4** | |
| • 10 units | **6ES7193-6BP00-2DA0** | Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco | |
| **BU15-P16+A0+2B** | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | Requirement: STEP 7 V5.3 SP3 and higher | |
| • 1 unit | **6ES7193-6BP00-0BA0** | Floating license for 1 user | **6ES7833-1FC02-0YA5** |
| • 10 units | **6ES7193-6BP00-2BA0** | Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **BU15-P16+A10+2D** | | | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | | |
| • 1 unit | **6ES7193-6BP20-0DA0** | | |
| • 10 units | **6ES7193-6BP20-2DA0** | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**Fail-safe I/O modules  > Digital F input modules**

## Ordering data

| | Article No. |
|---|---|
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| **Reference identification label** | 6ES7193-6LF30-0AW0 |
| 10 sheets of 16 labels | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 |

| | Article No. |
|---|---|
| **BU cover** | |
| for covering empty slots (gaps); 5 units | |
| • 15 mm wide | 6ES7133-6CV15-1AM0 |
| • 20 mm wide | 6ES7133-6CV20-1AM0 |
| **Shield connection** | 6ES7193-6SC00-1AM0 |
| 5 shield supports and 5 shield terminals | |
| **Color-coding plates** | |
| • Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP01-2MA0 |
| • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | 6ES7193-6CP71-2AA0 |
| • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | 6ES7193-6CP72-2AA0 |
| • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | 6ES7193-6CP73-2AA0 |
| **E-coding element type F** | 6ES7193-6EF00-1AA0 |
| 5 units, spare part | |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

## ■ Overview



Digital fail-safe output module:
F-DQ 4x24 V DC High Feature, BU type A0, color code CC01

Other properties:
- 4-channel digital fail-safe output module for the ET 200SP
- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

## ■ Technical specifications

| Article number | **6ES7136-6DB00-0CA0** | Article number | **6ES7136-6DB00-0CA0** |
|---|---|---|---|
| | ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A | | ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A |
| **General information** | | **Switching capacity of the outputs** | |
| Product type designation | F-DQ 4x 24 V DC/2 A PM HF | • with resistive load, max. | 2 A |
| **Product function** | | • on lamp load, max. | 10 W |
| • I&M data | Yes; I&M0 to I&M3 | **Load resistance range** | |
| **Engineering with** | | • lower limit | 12 Ω |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 | • upper limit | 2 000 Ω |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | **Output voltage** | |
| | | • Type of output voltage | DC |
| • PROFINET as of GSD version/ GSD revision | V2.31 | • for signal "1", min. | 24 V; L+ (-0.5 V) |
| **Supply voltage** | | **Output current** | |
| Type of supply voltage | 24 V DC | • for signal "1" rated value | 2 A |
| Rated value (DC) | 24 V | • for signal "0" residual current, max. | 0.5 mA |
| Reverse polarity protection | Yes | **Switching frequency** | |
| **Digital outputs** | | • with resistive load, max. | 30 Hz; Symmetrical |
| Number of digital outputs | 4 | • with inductive load, max. | 0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical |
| Digital outputs, parameterizable | Yes | • on lamp load, max. | 10 Hz; Symmetrical |
| Short-circuit protection | Yes | **Total current of the outputs** | |
| Open-circuit detection | Yes | • Current per channel, max. | 2 A; Note derating data in the manual |
| Overload protection | Yes | • Current per module, max. | 6 A; Note derating data in the manual |
| Limitation of inductive shutdown voltage to | typ. 2*47V | **Cable length** | |
| | | • shielded, max. | 1 000 m |
| | | • unshielded, max. | 500 m |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**Fail-safe I/O modules > Digital F output modules**

■ **Technical specifications** (continued)

| Article number | 6ES7136-6DB00-0CA0 |
|---|---|
| | ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes, "Alarms/diagnostic messages" section in the manual |
| Substitute values connectable | No |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |

| Article number | 6ES7136-6DB00-0CA0 |
|---|---|
| | ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 1/h |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Dimensions** | |
| Width | 15 mm |
| **Weights** | |
| Weight, approx. | 57 g |

■ **Ordering data** — Article No.

| | Article No. |
|---|---|
| **Digital F output modules** | |
| F-DQ 4x24 V DC High Feature, BU type A0, color code CC01 | **6ES7136-6DB00-0CA0** |
| **Usable BaseUnits** | |
| **BU15-P16+A0+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP00-0DA0** |
| • 10 units | **6ES7193-6BP00-2DA0** |
| **BU15-P16+A0+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | |
| • 1 unit | **6ES7193-6BP00-0BA0** |
| • 10 units | **6ES7193-6BP00-2BA0** |
| **BU15-P16+A10+2D** | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | |
| • 1 unit | **6ES7193-6BP20-0DA0** |
| • 10 units | **6ES7193-6BP20-2DA0** |
| **BU15-P16+A10+2B** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| • 1 unit | **6ES7193-6BP20-0BA0** |
| • 10 units | **6ES7193-6BP20-2BA0** |

| | Article No. |
|---|---|
| **BU20-P12+A4+0B** | **6ES7193-6BP20-0BB0** |
| BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group | |
| **Accessories** | |
| **S7 Distributed Safety programming tool V5.4** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license for 1 user | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **STEP 7 Safety Advanced V14 SP1** | | **BU cover** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O | | for covering empty slots (gaps); 5 units | |
| | | • 15 mm wide | 6ES7133-6CV15-1AM0 |
| | | • 20 mm wide | 6ES7133-6CV20-1AM0 |
| Requirement: STEP 7 Professional V14 SP1 | | **Shield connection** | 6ES7193-6SC00-1AM0 |
| | | 5 shield supports and 5 shield terminals | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 | **Color-coding plates** | |
| | | • Color code CC02, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP02-2MA0 |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 | • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | 6ES7193-6CP71-2AA0 |
| **Reference identification label** | 6ES7193-6LF30-0AW0 | • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | 6ES7193-6CP72-2AA0 |
| 10 sheets of 16 labels | | | |
| **Labeling strips** | | • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | 6ES7193-6CP73-2AA0 |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AA0 | **E-coding element type F** | 6ES7193-6EF00-1AA0 |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | 6ES7193-6LR10-0AG0 | 5 units, spare part | |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | 6ES7193-6LA10-0AA0 | | |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | 6ES7193-6LA10-0AG0 | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**Fail-safe I/O modules   > Digital F output module relay**

## ■ Overview

The digital F electronic module relay 1 F-RQ 24 V DC/
24...230 V AC/5 A has the following characteristics:

- 1 relay output (2 NO contacts)
- Total output current 5 A
- Rated load voltage 24 V DC and 24...230 V AC
- The control circuit of the two safety relays must be routed from the outside to the respective terminals

The attainable safety integrity level is SIL 3 (IEC 61508) when the control of the F-RQ module is implemented via a fail-safe output (e.g. ET 200SP 4F-DQ 24 V DC/2 A PROFIsafe).

## ■ Technical specifications

| Article number | 6ES7136-6RA00-0BF0 |
|---|---|
| | ET 200SP, F-RQ 1X24VDC/ 24..230VAC/5A ST |
| **General information** | |
| Product type designation | F-RQ 1x24VDC/24 ... 230VAC/5A |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 and higher |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V; Coil voltage |
| **Digital outputs** | |
| Number of digital outputs | 1 |
| Limitation of inductive shutdown voltage to | No |
| Controlling a digital input | Yes |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 5 A |
| • on lamp load, max. | 25 W |
| **Switching frequency** | |
| • with resistive load, max. | 2 Hz |
| • with inductive load, max. | 0.1 Hz; See data in manual |
| • with inductive load (acc. to IEC 60947-5-1, DC13), max. | 0.1 Hz |
| • with inductive load (acc. to IEC 60947-5-1, AC15), max. | 2 Hz |
| **Total current of the outputs (per module)** | |
| **horizontal installation** | |
| - up to 40 °C, max. | 5 A; Note derating data in the manual |
| - up to 50 °C, max. | 4 A; Note derating data in the manual |
| - up to 60 °C, max. | 3 A; Note derating data in the manual |
| **vertical installation** | |
| - up to 50 °C, max. | 3 A; Note derating data in the manual |
| **Relay outputs** | |
| • Number of relay outputs | 1; 2 NO contacts |
| • Rated supply voltage of relay coil L+ (DC) | 24 V |
| • Current consumption of relays (coil current of all relays), max. | 70 mA |
| • external protection for relay outputs | yes; 6 A, see data in manual |
| • Relay approved acc. to UL 508 | Yes; Pilot Duty B300, R300 |

| Article number | 6ES7136-6RA00-0BF0 |
|---|---|
| | ET 200SP, F-RQ 1X24VDC/ 24..230VAC/5A ST |
| **Switching capacity of contacts** | |
| - with inductive load, max. | see additional description in the manual |
| - with resistive load, max. | see additional description in the manual |
| - Thermal continuous current, max. | 5 A |
| - Switching current, min. | 1 mA |
| - Switching current after exceeding 300 mA, min. | 10 mA |
| - Switching current after exceeding 300 mA, max. | 5 A |
| - Rated switching voltage (DC) | 24 V |
| - Rated switching voltage (AC) | 230 V |
| **Cable length** | |
| • shielded, max. | 500 m; for load contacts |
| • unshielded, max. | 300 m; for load contacts |
| • Control cable (input), max. | 10 m |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | yes, firmware update |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; green/red DIAG LED |
| • Channel status display | Yes; Green LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 2 545 V DC/2 s (routine test) |
| Overvoltage category | III |
| **tested with** | |
| • between channels and backplane bus/supply voltage | DC 2545 V 2 s (routine test), impulse voltage test DC 7200 V / 5 positive and 5 negative pulses (type test) |
| • between backplane bus and supply voltage | 707 V DC (type test) |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • Category according to ISO 13849-1 | 4 |
| • SIL acc. to IEC 61508 | SIL 3 |

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## ■ Technical specifications  (continued)

| Article number | 6ES7136-6RA00-0BF0 |
|---|---|
| | ET 200SP, F-RQ 1X24VDC/24..230VAC/5A ST |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL2 | < 1.00E-04, function test 1x per year |
| - Low demand mode: PFDavg in accordance with SIL3 | < 1.00E-05, function test 1x per month |
| - High demand/continuous mode: PFH in accordance with SIL2 | < 1.00E-08 1/h, function test 1x per year |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 6.00E-09 1/h, function test 1x per month |

| Article number | 6ES7136-6RA00-0BF0 |
|---|---|
| | ET 200SP, F-RQ 1X24VDC/24..230VAC/5A ST |
| **Dimensions** | |
| Width | 20 mm |
| **Weights** | |
| Weight, approx. | 56 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **Digital F output module relay 1 F-RQ** | |
| BU type F0, relay output (2 NO contacts), total output current 5 A, load voltages 24 V DC and 24...230 V AC; can be used up to SIL3/Cat.4/PLe if controlled via F-DQ | 6ES7136-6RA00-0BF0 |
| **Usable BaseUnits** | |
| **BU20-P8+A4+0B** | 6ES7193-6BP20-0BF0 |
| BU type F0; BaseUnit (dark) with 8 process terminals to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group | |
| **Accessories** | |
| **S7 Distributed Safety programming tool V5.4** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license for 1 user | 6ES7833-1FC02-0YA5 |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | 6ES7833-1FC02-0YH5 |

| | Article No. |
|---|---|
| **STEP 7 Safety Advanced V14 SP1** | |
| Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 | |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 |
| Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery | 6ES7833-1FA14-0YH5 |
| **Reference identification label** | 6ES7193-6LF30-0AW0 |
| 10 sheets of 16 labels | |
| **Labeling strips** | |
| 500 labeling strips on roll, light gray | 6ES7193-6LR10-0AA0 |
| 500 labeling strips on roll, yellow | 6ES7193-6LR10-0AG0 |
| 1000 labeling strips DIN A4, light gray | 6ES7193-6LA10-0AA0 |
| 1000 labeling strips DIN A4, yellow | 6ES7193-6LA10-0AG0 |
| **BU cover** | 6ES7133-6CV15-1AM0 |
| for covering empty slots (gaps); 5 units • 20 mm wide | |
| **Shield connection** | 6ES7193-6SC00-1AM0 |
| 5 shield supports and 5 shield terminals | |
| **Color-coded labels** • Color code CC42, module-specific; for BaseUnit type F0; 10 units | 6ES7193-6CP42-2MB0 |

[1] For up-to-date information and download availability see:
http://www.siemens.com/tia-online-software-delivery

**9**

# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**Fail-safe I/O modules   > Fail-safe special modules**

■ **Overview**



Digital fail-safe power module:
F-PM-E PPM 24 V DC/8 A for BU type C0, color code
CC52

Other properties:
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard
  (ppm switching, up to 2 A, up to SIL 3/PL e)

- Fail-safe digital output and potential supply pp or pm switching can be parameterized
- Parameterizable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC 61508) (up to 8 A)
- Can be plugged onto type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations.  They can be used with all fail-safe SIMATIC S7 CPUs

■ **Technical specifications**

| Article number | **6ES7136-6PA00-0BC0** | Article number | **6ES7136-6PA00-0BC0** |
|---|---|---|---|
| | ET 200SP, POWERMOD. F-PM-E PPM, DC24V | | ET 200SP, POWERMOD. F-PM-E PPM, DC24V |
| **General information** | | **Digital inputs** | |
| Product type designation | F-PM-E PPM 24VDC | Number of digital inputs | 2 |
| **Product function** | | Source/sink input | Yes; P-reading |
| • I&M data | Yes; I&M0 to I&M3 | Input characteristic curve in accordance with IEC 61131, type 1 | Yes |
| **Engineering with** | | **Input voltage** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V12 | • Type of input voltage | DC |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | • Rated value (DC) | 24 V |
| • PROFIBUS as of GSD version/ GSD revision | V2.3 | • for signal "0" | -30 to +5V |
| • PROFINET as of GSD version/ GSD revision | V2.31 | • for signal "1" | +15 to +30V |
| **Supply voltage** | | **Input current** | |
| Type of supply voltage | 24 V DC | • for signal "1", typ. | 3.7 mA |
| Rated value (DC) | 24 V | **Input delay (for rated value of input voltage)** | |
| Reverse polarity protection | Yes | **for standard inputs** | |
| **Output voltage** | | - parameterizable | Yes |
| Type of output voltage | DC | **for counter/technological functions** | |
| **Encoder supply** | | - parameterizable | No |
| Number of outputs | 2 | **Cable length** | |
| Short-circuit protection | Yes; Electronic (response threshold 0.7 A to 2.1 A) | • shielded, max. | 1 000 m |
| | | • unshielded, max. | 500 m |
| **Output current** | | **Digital outputs** | |
| • up to 60 °C, max. | 0.3 A | Number of digital outputs | 1 |
| **24 V encoder supply** | | Digital outputs, parameterizable | Yes |
| • 24 V | Yes; min. L+ (-1.5 V) | Short-circuit protection | Yes |
| • Short-circuit protection | Yes | Open-circuit detection | Yes |
| • Output current, max. | 600 mA; Total current of all encoders | Overload protection | Yes |
| | | Limitation of inductive shutdown voltage to | max. 1.5 V |

## Technical specifications (continued)

| Article number | 6ES7136-6PA00-0BC0 |
|---|---|
| | ET 200SP, POWERMOD. F-PM-E PPM, DC24V |
| **Switching capacity of the outputs** | |
| • with resistive load, max. | 8 A |
| • on lamp load, max. | 100 W |
| **Load resistance range** | |
| • lower limit | 3 Ω |
| • upper limit | 2 000 Ω |
| **Output voltage** | |
| • for signal "1", min. | 24 V; L+ (-0.5 V) |
| **Output current** | |
| • for signal "1" rated value | 8 A |
| • for signal "0" residual current, max. | 1.5 mA; PP-switching: max. 1.5 mA; PM-switching: max. 1 mA |
| **Switching frequency** | |
| • with resistive load, max. | 10 Hz; Symmetrical |
| • with inductive load, max. | 0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical |
| • on lamp load, max. | 4 Hz; Symmetrical |
| **Total current of the outputs** | |
| • Current per channel, max. | 8 A; Note derating data in the manual |
| • Current per module, max. | 8 A; Note derating data in the manual |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 500 m |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics function | Yes, "Alarms/diagnostic messages" section in the manual |
| Substitute values connectable | No |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | No |

| Article number | 6ES7136-6PA00-0BC0 |
|---|---|
| | ET 200SP, POWERMOD. F-PM-E PPM, DC24V |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| • Channel status display | Yes; Green LED |
| • for channel diagnostics | Yes; Red LED |
| • for module diagnostics | Yes; green/red DIAG LED |
| **Potential separation** | |
| **Potential separation channels** | |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Probability of failure (for service life of 20 years and repair time of 100 hours)** | |
| - Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 1/h |
| - High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C |
| **Dimensions** | |
| Width | 20 mm |
| Height | 72 mm |
| Depth | 55 mm |
| **Weights** | |
| Weight, approx. | 70 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital F power module F-PM-E 24 V DC/8 A PPM Standard** | **6ES7136-6PA00-0BC0** | **BU cover** | |
| BU type C0, color code CC52. 2 inputs, 1 output, SIL3/Cat.4/PLe | | for covering empty slots (gaps); 5 units | |
| | | • 20 mm wide | **6ES7133-6CV20-1AM0** |
| **Type C0 BaseUnits** | | **Shield connection** | **6ES7193-6SC00-1AM0** |
| **BU20-P6+A2+4D** | **6ES7193-6BP20-0DC0** | 5 shield supports and 5 shield terminals | |
| BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group | | **Color-coding plates** | |
| | | • Color code CC52, module-specific, for 8 push-in terminals; 10 units | **6ES7193-6CP52-2MC0** |
| **Accessories** | | | |
| **Reference identification label** | **6ES7193-6LF30-0AW0** | **E-coding element type F** | **6ES7193-6EF00-1AA0** |
| 10 sheets of 16 labels | | 5 units, spare part | |
| **Labeling strips** | | | |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** | | |

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**Fail-safe I/O modules   > SIPLUS digital F input modules**

## Overview



Digital fail-safe input module:
F-DI 8x24 V DC High Feature for BU type A0, color code CC01

Other properties:

• 8-channel digital fail-safe input module for the ET 200SP
• For fail-safe reading of sensor information (1 or 2 channels)
• Provides integral discrepancy evaluation for 2-out-of-2 signals
• 8 internal sensor supplies (incl. test function) onboard
• Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

• Can be plugged onto type A0 BaseUnits (BU) with automatic coding
• LED display for error, operation, supply voltage and status
• Clear labeling on front of module
    - Plain text identification of the module type and function class
    - 2D matrix code (order and serial number)
    - Connection diagram
    - Color coding of the DI module type: white
    - Hardware and firmware version
    - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
    - Complete Article No.
• Optional labeling accessories
    - Labeling strips
    - Reference identification label
• Optional module-specific color identification of the terminals according to the color code (CC)
• Optional system-integrated shield connection
• The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## Technical specifications

| Article number | 6AG1136-6BA00-2CA0 |
|---|---|
| Based on | 6ES7136-6BA00-0CA0 |
| | SIPLUS ET 200SP F-DI 4/8x24VDC HF |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 50 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | 6AG1136-6BA00-2CA0 |
|---|---|
| Based on | 6ES7136-6BA00-0CA0 |
| | SIPLUS ET 200SP F-DI 4/8x24VDC HF |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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### ◼ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS digital fail-safe input modules**<br><br>(Extended temperature range and exposure to media)<br><br>F-DI 8x24 V DC High Feature, BU type A0, color code CC01 | **6AG1136-6BA00-2CA0** | **BU15-P16+A10+2D**<br><br>(Extended temperature range and exposure to media)<br><br>BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | **6AG1193-6BP20-7DA0** |
| **Usable BaseUnits** | | | |
| **BU15-P16+A0+2D**<br><br>(Extended temperature range and exposure to media)<br><br>BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | **6AG1193-6BP00-7DA0** | **BU15-P16+A10+2B**<br><br>(Extended temperature range and exposure to media)<br><br>BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | **6AG1193-6BP20-7BA0** |
| **BU15-P16+A0+2B**<br><br>(Extended temperature range and exposure to media)<br><br>BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | **6AG1193-6BP00-7BA0** | **Accessories** | See SIMATIC ET 200SP, digital fail-safe input modules, page 9/115 |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**Fail-safe I/O modules   > SIPLUS digital F output modules**

### ■ Overview

Digital fail-safe output module:
F-DQ 4x24VDC High Feature, BU type A0, color code CC01

Other properties:

• 4-channel digital fail-safe output module for the ET 200SP
• Fail-safe 2-channel activation (sink/source output) by actuators
• Actuators can be controlled up to 2 A
• Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

• Can be plugged onto type A0 BaseUnits (BU) with automatic coding
• LED display for error, operation, supply voltage and status
• Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
• Optional labeling accessories
  - Labeling strips
  - Reference identification label
• Optional module-specific color identification of the terminals according to the color code (CC)
• Optional system-integrated shield connection
• The modules support PROFIsafe in both PROFIBUS and PROFINET configurations
• They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

### ■ Technical specifications

| Article number | **6AG1136-6DB00-2CA0** |
|---|---|
| Based on | **6ES7136-6DB00-0CA0** |
| | SIPLUS ET 200SP F-DQ 4x24VDC/2A PM HF |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 50 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | **6AG1136-6DB00-2CA0** |
|---|---|
| Based on | **6ES7136-6DB00-0CA0** |
| | SIPLUS ET 200SP F-DQ 4x24VDC/2A PM HF |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Ordering data

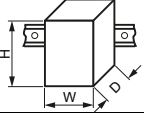| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS digital fail-safe output modules** | | **BU15-P16+A10+2B** | **6AG1193-6BP20-7BA0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| F-DQ 4x24VDC High Feature, BU type A0, color code CC01 | **6AG1136-6DB00-2CA0** | BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | |
| **Usable BaseUnits** | | | |
| **BU15-P16+A0+2D** | **6AG1193-6BP00-7DA0** | **BU20-P12+A4+0B** | **6AG1193-6BP20-7BB0** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit | |
| **BU15-P16+A0+2B** | **6AG1193-6BP00-7BA0** | **Accessories** | See SIMATIC ET 200SP, digital F output modules, page 9/118 |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |
| **BU15-P16+A10+2D** | **6AG1193-6BP20-7DA0** | | |
| (Extended temperature range and exposure to media) | | | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | | |

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# IO systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**Fail-safe I/O modules   > SIPLUS fail-safe special modules**

### ■ Overview



Digital fail-safe power module:
F-PM-E PPM 24VDC/8A for BU type C0,
color code CC52

Other properties:
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard (ppm switching, up to 2 A, up to SIL 3/PL e)
- Fail-safe digital output and potential supply pp or pm switching can be configured
- Configurable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC 61508) (up to 8 A)
- Can be plugged onto type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: white
  - Hardware and firmware version
  - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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## Technische Daten

| Article number | **6AG1136-6PA00-2BC0** |
|---|---|
| Based on | **6ES7136-6PA00-0BC0** |
| | SIPLUS ET 200SP F-PM-E 24VDC/8A PPM |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 50 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS digital F power module F-PM-E 24 V DC/8 A PPM Standard** | **6AG1136-6PA00-2BC0** |
| (Extended temperature range and exposure to media) | |
| BU type C0, color code CC52. 2 inputs, 1 output, SIL3/Cat.4/PLe | |
| **Type C0 BaseUnits** | |
| **BU20-P6+A2+4D** | **6AG1193-6BP20-7DC0** |
| (Extended temperature range and exposure to media) | |
| BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group | |
| **Accessories** | See SIMATIC ET 200SP, fail-safe special modules, page 9/123 |

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

■ **Overview**



The F-CM AS-i Safety ST fail-safe communication module supplements an AS-Interface network without additional wiring to produce a safety-related AS-i network.

Important features:

- Fail-safe communication module for the ET 200SP
  - 31 fail-safe input channels in the process image
  - 16 fail-safe output channels in the process image
  - Certified up to SIL 3 (IEC 61508/EN 62061),
    PL e (EN ISO 13849-1)
  - Parameterization conforms with other fail-safe I/O modules of the ET 200SP
- The communication module supports PROFIsafe in PROFINET and PROFIBUS configurations. It can be used with fail-safe SIMATIC S7-300F/S7-416F CPUs and S7-1500F CPUs and also the fail-safe versions of the ET 200SP station with ET 200SP F-CPU 1510SP F / 1512SP F (firmware V1.8 or higher) or 1515SP PC F
- For reading up to 31 fail-safe AS-i input slaves
  - Two sensor inputs/signals for each fail-safe AS-i input slave
  - Adjustable evaluation of sensor signals: 2-channel or 2 x 1-channel
  - Integrated discrepancy evaluation in the case of 2-channel signals
  - Integrated AND operation in the case of 2 x 1-channel signals
  - Input delay can be parameterized
  - Start-up test can be set
  - Sequence monitoring can be activated
- For control of up to 16 fail-safe AS-i output circuit groups
  - The output circuit groups are controlled independently of one another
  - One output circuit group can act on one or more actuators (e.g. to switch drives simultaneously)
  - An actuator (e.g. a contactor) is interfaced via an AS-i safety output module (e.g. SlimLine S45F safety module, Article No. 3RK1405-1SE15-0AA2; see Catalog IC 10, Chapter 2 "Industrial Communication" → "ASIsafe" → "Fail-safe AS-Interface modules").
  - Simple fault acknowledgment via the process image
- Simple module replacement thanks to automatic importing of the safety parameters from the coding element
- Comprehensive diagnostic options
- Can be plugged onto type C1 or type C0 BaseUnits (BU)
- Informative automatic alarm indications (firmware V1.0.1 or higher)

- Supply via AS-Interface voltage
- Eight LED indicators for diagnostics, operating state, fault indication and supply voltage
- Informative front-side module inscription
  - Plain text marking of the module type and function class
  - 2D matrix code (Article No. and serial number)
  - Connection diagram
  - Color coding of the CM module type: light gray
  - Hardware and firmware version
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label

***Design***

The fail-safe F-CM AS-i Safety ST module has an ET 200SP module enclosure with a width of 20 mm.

One AS-i master according to the AS-i Specification V3.0, as well as fail-safe AS-i input slaves and/or AS-i safety output modules are needed for operation. The CM AS-i Master ST communication module (Article no. 3RK7137-6SA00-0BC1) is recommended as the AS-i master for the ET 200SP, .

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station results in a powerful, safety-oriented router between PROFINET (or PROFIBUS) and AS-Interface, which can be expanded further in a modular fashion.



Combination of an ET 200SP interface module, CM AS-i Master ST and F-CM AS-i Safety ST

With the digital and analog I/O modules of the ET 200SP, additional local inputs and outputs can be realized so as to ensure that the modular AS-i router complies precisely with customer requirements. Expansion variants for almost every application are possible thanks to the selection of standard and fail-safe I/O modules.

Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without fail-safe functionality.

## Overview (continued)

### Supported BaseUnits

With the combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules, the CM module is plugged onto a light type C0 BaseUnit and, directly to the right of it, the F-CM module is plugged onto a dark type C1 BaseUnit. The AS-i cable is connected only on the light BaseUnit of the CM module.

### Notes on safety

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

For more information on the topic of Industrial Security, see http://www.siemens.com/industrialsecurity.

### *Configuration*

The following software is required for configuration of the F-CM AS-i Safety ST module:

- STEP 7 (classic), V5.5 SP3 HF4 or higher with HSP 2093[1] and Distributed Safety V5.4 SP5 or F-Configuration Pack SP11

or

- STEP 7 (TIA Portal) V13 and higher with HSP 0070 [2] and Safety Advanced V13.
  For connection to S7-1500F you require STEP 7 V13 SP1. When configuring with STEP 7 V13 SP1, the latest version of HSP 0070 V2.0 (or higher) is an essential prerequisite. STEP 7 Safety V13 SP1 Update 4 and the new version of HSP 0070 V3.0 (or higher) is needed for configuration of the F-CM AS-i Safety ST module in an ET 200SP station with ET 200SP F-CPU 1510SP F/1512SP F (firmware V1.8 or higher) or 1515SP PC F.

Configuration and programming are done entirely in the STEP 7 user interface. No additional configuration software is needed for commissioning.

Data management – together with all other configuration data of the SIMATIC – is realized completely in the S7 project.

The input and output channels are assigned to the process image automatically and manual linking via configuration function blocks is not necessary.

If the F-CM AS-i Safety ST module is replaced, all necessary settings are automatically imported into the new module.

The F-CM AS-i Safety ST module occupies 16 input bytes and 8 output bytes in the I/O data of the ET 200SP station.

For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see https://support.industry.siemens.com/cs/ww/en/view/109479103.

[1] HSP 2093; see https://support.industry.siemens.com/cs/ww/en/view/23183356.

[2] HSP 0070, see https://support.industry.siemens.com/cs/ww/en/view/72341852.

## Ordering data

| | Article No. |
|---|---|
| **F-CM AS-i Safety ST communication module** <br>• Fail-safe module for SIMATIC ET 200SP, can be plugged onto BaseUnit type C1 (alternatively type C0) <br>• Operation requires an AS-i master, e.g. CM AS-i Master ST <br>• Can be used up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1) <br>• Coding element type H (included in scope of supply) <br>• Dimensions (W x H x D / mm): 20 x 73 x 58 | **3RK7136-6SC00-0BC1** |
| **Accessories** | |
| **BaseUnit BU20-P6+A2+4B** <br>• BaseUnit (dark), BU type C1 <br>• Suitable for the F-CM AS-i Safety ST fail-safe module <br>• Continuation of an AS-i network, connection with the AS-i voltage of the left-hand module | **6ES7193-6BP20-0BC1** |
| **Coding element type H (spare part)** <br>• For the ET 200SP modules F-CM AS-i Safety ST, CM 4xIO-Link <br>• Packing unit 5 items | **6ES7193-6EH00-1AA0** |
| **More accessories** | See CM AS-i Master ST communication modules |
| **More information** | |
| For the Manual "F-CM AS-i Safety ST for SIMATIC ET 200SP", see htps://support.industry.siemens.com/cs/ww/en/view/90265988. <br><br>Released combinations of the AS-i modules for ET 200SP, see https://support.industry.siemens.com/cs/ww/en/view/103624653. | |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

### ■ Overview
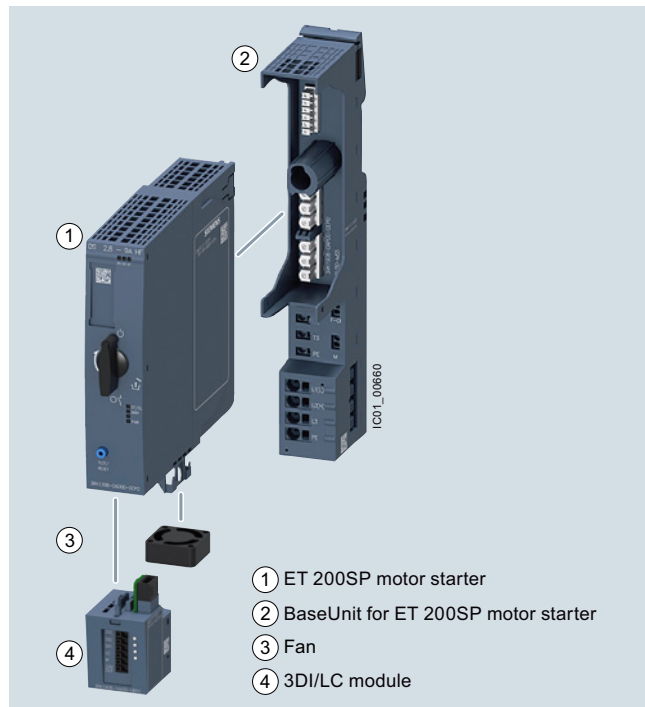


Motor starter, BaseUnit and 3DI/LC control module

① ET 200SP motor starter
② BaseUnit for ET 200SP motor starter
③ Fan
④ 3DI/LC module



① ET 200SP interface module
② ET 200SP digital input
③ ET 200SP digital output
④ ET 200SP analog input
⑤ Dummy module consisting of BaseUnit + BU cover, 15 mm
⑥ ET 200SP motor starter and ET 200SP fail-safe motor starter
⑦ Dummy module consisting of BaseUnit + BU cover, 30 mm
⑧ 3DI/LC module
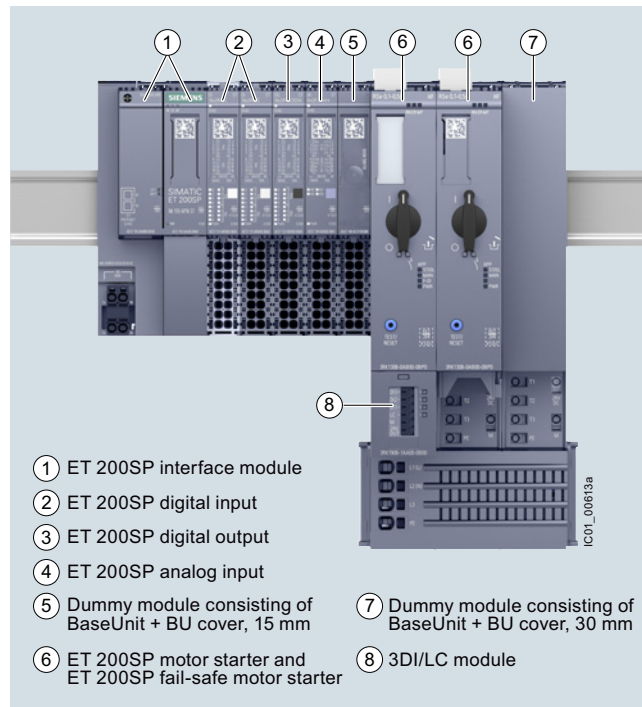
3RK1308 motor starter in the ET 200SP I/O system

| More information | |
|---|---|
| Home page see http://www.siemens.com/ET200SP-motorstarter | Further components in the ET 200SP distributed I/O system see Industry Mall, https://mall.industry.siemens.com/mall/en/de/Catalog/Products/10144488?tree=CatalogTree |

### *ET 200SP motor starters*

ET 200SP is a scalable, highly flexible and modular I/O system with IP20 degree of protection.

As I/O modules, the ET 200SP motor starters are an integral part of this I/O system. They are switching and protection devices for single and three-phase loads and are available as direct-on-line or reversing starters.

#### Basic functionality

All versions of the ET 200SP motor starters have the following functionality:

- Fully pre-wired motor starters for switching and protecting any AC loads up to 5.5 kW from 48 V AC to 500 V AC
- Disconnection possible via fail-safe motor starters up to SIL 3 and PL e Cat. 4
- With self-assembling 32 A power bus, i.e. the load voltage is only fed in once for a group of motor starters
- All control supply voltages connected only once, i.e. when modules are added they are automatically connected to the next module
- Hot swapping is permissible
- Digital inputs can be used optionally via a 3DI/LC module
- Control of the motor starter from the control system and extensive diagnostics status via the cyclic process image
- Diagnostics capability for active monitoring of the switching and protection functions
- The signal states in the process image of the motor starter provide information about protective devices (short circuit or overload), the switching states of the motor starter, and system faults.

#### Designing interference-free motor starters

For interference-free operation of the ET 200SP station in accordance with the IEC 60947-4-2 standard, use a dummy module before the first motor starter. The dummy module consists of the 6ES7193-6BP00-0BA0 or 6ES7193-6BP00-0DA0 BaseUnit and the 6ES7133-6CV15-1AM0 BU cover 15 mm.

The 15 mm BU cover protects the plug contacts of the BaseUnit against dirt.

Both can be ordered as accessories, see also page 9/141.

■ **Overview** (continued)

Article No. scheme

| Product versions | | Article number | | |
|---|---|---|---|---|
| **Motor starters** | | **3RK1308 – 0 ☐ ☐ 0 0 – 0 C P 0** | | |
| Product function | Direct-on-line starters | | **A** | for motor standard output 0.12 ... 5.5 kW[1] |
| | Reversing starters | | **B** | for motor standard output 0.12 ... 5.5 kW[1] |
| | Fail-safe direct-on-line starters | | **C** | for motor standard output 0.12 ... 5.5 kW[1] |
| | Fail-safe reversing starters | | **D** | for motor standard output 0.12 ... 5.5 kW[1] |
| Current range | 0.3 ... 1 A | | **B** | |
| | 0.9 ... 3 A | | **C** | |
| | 2.8 ... 9 A | | **D** | |
| | 4 ... 12 A | | **E** | |
| Example | | **3RK1308 – 0 A D 0 0 – 0 C P 0** | | |

[1] For standard motors: Single- or three-phase asynchronous motors, single-phase AC motors, single-phase asynchronous motors, at 400 V AC and 500 V AC; the actual startup characteristics of the motor as well as its rated data are important factors here.

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

*BaseUnits for motor starters*

BaseUnits are components for accommodating the ET 200SP I/O modules. The self-assembling voltage buses integrated into the BaseUnits reduce wiring outlay to the single infeed (both of auxiliary and load voltage).

All modules following on the right are automatically supplied upon plugging the BaseUnits together, if BaseUnits are inserted

with routing. The rugged design and keyed connection technology enables use in harsh industrial conditions.

The BaseUnits are available with various infeeds for the motor starters.

Article No. scheme

| Product versions | | Article number | | |
|---|---|---|---|---|
| **BaseUnit** | | **3RK1908 – 0 A P 0 0 – 0 ☐ P 0** | | |
| BaseUnit infeed | 24 V and 500 V DC | | **A** | |
| | 24 V DC | | **B** | |
| | 500 V AC | | **C** | |
| | without infeed | | **D** | |
| | 500 V AC | | **E** | with F-DI for fail-safe motor starters |
| | without infeed | | **F** | with F-DI for fail-safe motor starters |
| Example | | **3RK1908 – 0 A P 0 0 – 0 A P 0** | | |

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

*3DI/LC control module*

This is a digital input module with three inputs for local motor starter functions such as "manual local control", "implementation of fast inputs" or "end position disconnection".

For a list of all the functions permitted by the 3DI/LC module, see Manual "ET 200SP motor starters", "Function overview" section
https://support.industry.siemens.com/cs/ww/en/view/109479973

The module is plugged onto the front of the motor starter from which it is supplied with a 24 V DC operating voltage.

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

**I/O modules   > ET 200SP motor starters**

### Benefits

#### Product advantages

The ET 200SP motor starters offer a number of benefits:

- Fully integrated into the ET 200SP I/O system (including TIA Selection Tool and TIA Portal)
- High degree of flexibility when it comes to safety applications via SIMATIC F-CPU or SIRIUS 3SK safety relays up to SIL 3 and PL e Cat. 4.
- Simple, integrated current value transmission
- Extensive parameterization by means of TIA Portal
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Longer service life and reduced heat losses thanks to hybrid technology
- Less space required in the control cabinet (20 to 80%) as a result of greater functional density (direct-on-line and reversing starters in same width)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs via 3DI/LC control module
- Less wiring and testing required as a result of integrating several functions into a single device
- Lower overheads for stock keeping and configuration as a result of the wide setting range of the electronic overload release (up to 1:3)
- Lower technology-reduced inherent power loss as speed-controlled drive systems, also enabling lower cooling requirements (and enabling a more compact design)

The ET 200SP motor starters can be used with highly energy-efficient IE3/IE4 motors.

For more information on IE3/IE4 ready see Catalog IC 10, Preface or https://www.siemens.com/ie3ready

### Standards and approvals

- IEC/EN 60947-4-2
- UL 60947-4-2
- CSA
- ATEX
- IEC 61508-1: SIL 3
- ISO 13849: PL e
- CCC approval for China

### Application

The ET 200SP motor starters are suitable for the following applications:

- Switching and monitoring of
  - 3-phase motors with overload and short-circuit protection (e.g. 400 V asynchronous motors for secondary drives in conveyor systems)
  - 1-phase motors with overload and short-circuit protection (e.g. 250 V motors for pump applications)
  - Resistive loads by means of current value and diagnosis via the maintenance function (e.g. for heaters)
- Plant monitoring and energy management in conveyor systems:
  By means of phase asymmetry and zero current detection, for example, it is possible to monitor drive belts and blocking
- Track switching and lifting table control in conveyor systems Track switches can be implemented by means of the quick stop function and lifting table controls by means of the "immediate end position disconnection" function without any laborious programming
- Safe isolation of drive from main power supply: The isolating functions in accordance with IEC 60947-1 offer protection against inadvertent activation during plant mainte-nance

### Technical specifications
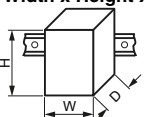
| More information | |
|---|---|
| Industry Mall, see www.siemens.com/product?3RK1308 | FAQs, see https://support.industry.siemens.com/cs/de/en/ps/21800/faq |
| Maunal, see https://support.industry.siemens.com/cs/ww/en/view/109479973 | |
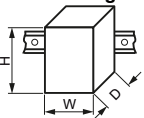
#### ET 200SP motor starters

| Article number | | 3RK1308-0AB00-0CP0 | 3RK1308-0AC00-0CP0 | 3RK1308-0AD00-0CP0 | 3RK1308-0AE00-0CP0 |
|---|---|---|---|---|---|
| | | 3RK1308-0BB00-0CP0 | 3RK1308-0BC00-0CP0 | 3RK1308-0BD00-0CP0 | 3RK1308-0BE00-0CP0 |
| **Product designation** | | Motor starters | | | |
| **General technical data** | | | | | |
| **Width x Height x Depth** | mm | 30 × 142 × 150 | | | |
| **Design of the switching contact** | | Hybrid | | | |
| **Type of the motor protection** | | solid-state | | | |
| **Installation altitude at height above sea level maximum** | m | 4 000 | | | |
| **Mounting position** | | Vertical, horizontal, flat (observe derating) | | | |
| **Mounting type** | | pluggable in BaseUnit | | | |
| **Ambient temperature** | | | | | |
| • during operation | °C | -25 ... +60 | | | |
| • during transport | °C | -40 ... +70 | | | |
| • during storage | °C | -40 ... +70 | | | |

| Article number | | 3RK1308-0AB00-0CP0 3RK1308-0BB00-0CP0 | 3RK1308-0AC00-0CP0 3RK1308-0BC00-0CP0 | 3RK1308-0AD00-0CP0 3RK1308-0BD00-0CP0 | 3RK1308-0AE00-0CP0 3RK1308-0BE00-0CP0 |
|---|---|---|---|---|---|
| Relative humidity during operation | % | 10 ... 95 | | | |
| Vibration resistance | | 15 mm to 6 Hz; 2g to 500 Hz | | | |
| Shock resistance | | 6 $g$ / 11 ms | | | |
| Protection class IP | | IP20 | | | |
| Type of assignment | | 1 | | | |
| **Electrical data** | | | | | |
| Supply voltage at DC rated value | V | 24 | | | |
| Operating power at AC-53a at 400 V rated value | kW | 0.25 | 1.1 | 4 | 5.5 |
| Operating frequency rated value | Hz | 50 ... 60 | | | |
| Maximum short-circuit current breaking capacity ($I_{cu}$) • at 400 V rated value • at 500 V rated value | kA kA | 55 55 | | | |
| Adjustable pick-up value current of the current-dependent overload release | A | 0.3 ... 1 | 0.9 ... 3 | 2.8 ... 9 | 4 ... 12 |
| Current-carrying capacity at startup maximum | A | 10 | 30 | 90 | 100 |
| maximum permissible voltage for safe isolation between main and auxiliary circuit | V | 500 | | | |
| Insulation voltage rated value | V | 500 | | | |
| Trip class | | CLASS 5 and 10 adjustable | | | |

| Article number | | 3RK1308-0CB00-0CP0 3RK1308-0DB00-0CP0 | 3RK1308-0CC00-0CP0 3RK1308-0DC00-0CP0 | 3RK1308-0CD00-0CP0 3RK1308-0DD00-0CP0 | 3RK1308-0CE00-0CP0 3RK1308-0DE00-0CP0 |
|---|---|---|---|---|---|
| Product designation | | **Fail-safe motor starter** | | | |
| **General technical data** | | | | | |
| Width x Height x Depth | mm | 30 × 142 × 150 | | | |
| Design of the switching contact | | Hybrid | | | |
| Type of the motor protection | | Solid-state | | | |
| Installation altitude at height above sea level maximum | m | 2 000 | | | |
| Mounting position | | Vertical, horizontal, flat (observe derating) | | | |
| Mounting type | | Pluggable in BaseUnit | | | |
| Ambient temperature • during operation • during transport • during storage | °C °C °C | -25 ... +60 -40 ... +70 -40 ... +70 | | | |
| Relative humidity during operation | % | 10 ... 95 | | | |
| Vibration resistance | | 15 mm bis 6 Hz; 2 $g$ bis 500 Hz | | | |
| Shock resistance | | 6 $g$ / 11 ms | | | |
| Protection class IP | | IP20 | | | |
| Type of assignment | | 1 | | | |
| **Electrical data** | | | | | |
| Supply voltage at DC rated value | V | 24 | | | |
| Operating power at AC-53a at 400 V rated value | kW | 0.25 | 1.1 | 4 | 5.5 |
| Operating frequency rated value | Hz | 50 ... 60 | | | |
| Maximum short-circuit current breaking capacity ($I_{cu}$) • at 400 V rated value • at 500 V rated value | kA kA | 55 55 | | | |
| Adjustable pick-up value current of the current-dependent overload release | A | 0.3 ... 1 | 0.9 ... 3 | 2.8 ... 9 | 4 ... 12 |
| Current-carrying capacity at startup maximum | A | 10 | 30 | 90 | 100 |
| maximum permissible voltage for safe isolation between main and auxiliary circuit | V | 500 | | | |
| Insulation voltage rated value | V | 500 | | | |
| Trip class | | CLASS 5 and 10 adjustable | | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules   > ET 200SP motor starters**

*BaseUnits for motor starters*

| Article number | | 3RK1908-0AP00-0AP0 | 3RK1908-0AP00-0BP0 | 3RK1908-0AP00-0CP0 | 3RK1908-0AP00-0DP0 | 3RK1908-0AP00-0EP0 | 3RK1908-0AP00-0FP0 |
|---|---|---|---|---|---|---|---|
| **Product designation** | | **BaseUnit** | | | | | |
| **General technical data** | | | | | | | |
| **Width x Height x Depth** | mm | $30 \times 215 \times 75$ | | | | | |
| **Ambient temperature** | | | | | | | |
| • during operation | °C | -25 ... +60 | | | | | |
| • during transport | °C | -40 ... +70 | | | | | |
| • during storage | °C | -40 ... +70 | | | | | |
| **Protection class IP** | | IP20 | | | | | |
| **Protection against electrical shock** | | finger-safe | | | | | |
| **Connections/Terminals** | | | | | | | |
| **Type of connectable conductor cross-sections** | | | | | | | |
| • at the inputs for supply voltage | | | | | | | |
| - solid | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | -- | | | |
| - finely stranded with core end processing | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | -- | | | |
| - finely stranded without core end processing | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | -- | | | |
| - at AWG conductors solid | | $1 \times 20 ... 12$ | | -- | | | |
| • for supply | | | | | | | |
| - solid | | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- |
| - finely stranded with core end processing | | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- |
| - finely stranded without core end processing | | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- | $1 \times 1 ... 6 \text{ mm}^2$ | -- |
| - at AWG conductors solid | | $1 \times 18 ... 10$ | -- | $1 \times 18 ... 10$ | -- | $1 \times 18 ... 10$ | -- |
| • for load-side outgoing feeder | | | | | | | |
| - solid | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | | | | |
| - finely stranded with core end processing | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | | | | |
| - finely stranded without core end processing | | $1 \times 0.5 ... 2.5 \text{ mm}^2$ | | | | | |
| - at AWG conductors solid | | $1 \times 20 ... 12$ | | | | | |
| **Type of electrical connection for auxiliary and control current circuit** | | PUSH-IN connection (spring-loaded connection) | | | | | |
| **Miscellaneous** | | | | | | | |
| **Shape of the screwdriver tip** | | Slot | | | | | |
| **Size of the screwdriver tip** | | Standard screwdriver 0.6 mm x 3.5 mm | | | | | |

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### 3DI/LC control module

| Article number | 3RK1908-1AA00-0BP0 |
|---|---|
| **Product designation** | **3DI/LC control module** |
| **General technical data** | |
| **Width x Height x Depth** mm | 30 × 54.5 × 42.3 |
| **Design of the product** | Accessories |
| **Number of digital inputs** | 4 |
| **Installation altitude at height above sea level maximum** m | 2 000 |
| **Mounting position** | vertical, horizontal, flat |
| **Mounting type** | Can be plugged onto motor starters |
| **Ambient temperature** <br>• during operation °C <br>• during transport °C <br>• during storage °C | <br>-25 ... +60 <br>-40 ... +70 <br>-40 ... +70 |
| **Connections/Terminals** | |
| **Connectable conductor cross-section for auxiliary contacts** <br>• single or multi-stranded mm² <br>• finely stranded with core end processing mm² <br>• finely stranded without core end processing mm² | <br>0.2 ... 1.5 <br>0.25 ... 1.5 <br>0.2 ... 1.5 |
| **AWG number as coded connectable conductor cross section for auxiliary contacts** | 24 ... 16 |
| **Type of electrical connection for auxiliary and control current circuit** | PUSH-IN connection (spring-loaded connection) |
| **Electrical data** | |
| **Type of voltage of the control supply voltage** | DC |
| **Control supply voltage at DC rated value** V | 20.4 ... 28.8 |
| **Miscellaneous** | |
| **Shape of the screwdriver tip** | Slot |
| **Size of the screwdriver tip** | Standard screwdriver 0.6 mm x 3.5 mm |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

**I/O modules  > ET 200SP motor starters**   *IE3/IE4* **ready**

■ **Selection and ordering data**

| | Adjustable current response value of the inverse-time delayed overload release | Current-carrying capacity at startup maximum | Article No. | |
|---|---|---|---|---|
| | A | A | | |
| **Motor starters** | | | | |
| **Direct-online starter** | | | | |
| 3RK1308-0AB00-0CP0 | 0.3 ... 1<br>0.9 ... 3<br>2.8 ... 9<br>4 ... 12 | 10<br>30<br>90<br>100     *NEW* | 3RK1308-0AB00-0CP0<br>3RK1308-0AC00-0CP0<br>3RK1308-0AD00-0CP0<br>3RK1308-0AE00-0CP0 | |
| **Reversing starter** | | | | |
| 3RK1308-0BB00-0CP0 | 0.3 ... 1<br>0.9 ... 3<br>2.8 ... 9<br>4 ... 12 | 10<br>30<br>90<br>100     *NEW* | 3RK1308-0BB00-0CP0<br>3RK1308-0BC00-0CP0<br>3RK1308-0BD00-0CP0<br>3RK1308-0BE00-0CP0 | |
| **Fail-safe direct-online starter** | | | | |
| 3RK1308-0CE00-0CP0 | 0.3 ... 1     *NEW*<br>0.9 ... 3     *NEW*<br>2.8 ... 9     *NEW*<br>4 ... 12     *NEW* | 10<br>30<br>90<br>100 | 3RK1308-0CB00-0CP0<br>3RK1308-0CC00-0CP0<br>3RK1308-0CD00-0CP0<br>3RK1308-0CE00-0CP0 | |
| **Fail-safe reversing starter** | | | | |
| 3RK1308-0DE00-0CP0 | 0.3 ... 1     *NEW*<br>0.9 ... 3     *NEW*<br>2.8 ... 9     *NEW*<br>4 ... 12     *NEW* | 10<br>30<br>90<br>100 | 3RK1308-0DB00-0CP0<br>3RK1308-0DC00-0CP0<br>3RK1308-0DD00-0CP0<br>3RK1308-0DE00-0CP0 | |

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**IE3/IE4 ready**     I/O modules  > ET 200SP motor starters

| Design of the product | Operating voltage of AC supply | Supply voltage of DC supply | | Spring-loaded connection (push-in) |
|---|---|---|---|---|
| | V | V | | Article No. |
| **BaseUnit[1]** | | | | |
| For AC/DC feed in | 500 | 24 | | **3RK1908-0AP00-0AP0** |
| For AC feed in | -- | 24 | | **3RK1908-0AP00-0BP0** |
| For DC feed in | 500 | -- | | **3RK1908-0AP00-0CP0** |
| Without feed in | -- | -- | | **3RK1908-0AP00-0DP0** |
| For AC infeed, F-DI | 500 | -- | *NEW* | **3RK1908-0AP00-0EP0** |
| Without infeed, F-DI | -- | -- | *NEW* | **3RK1908-0AP00-0FP0** |

3RK1908-0AP00-0AP0

[1] The voltage is looped-through from BaseUnits with infeed to subsequent BaseUnits.

| Control supply voltage at DC rated value | Product function | | Spring-loaded connection (push-in) |
|---|---|---|---|
| | on-site operation | digital inputs parameterizable | Article No. |
| V | | | |
| **3DI/LC control module** | | | |
| 20.4 ... 28.8 | Yes | Yes | **3RK1908-1AA00-0BP0** |

3RK1908-1AA00-0BP0

| Product designation | Article No. |
|---|---|
| **Accessories** | |
| **BaseUnit cover** | **3RK1908-1CA00-0BP0** |
| **Infeed bus cover** | **3RK1908-1DA00-2BP0** |
| **Mechanical bracket** | **3RK1908-1EA00-1BP0** |
| **Fan** | **3RW4928-8VB00** |
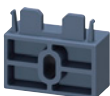
3RK1908-1CA00-0BP0

3RK1908-1DA00-2BP0

3RK1908-1EA00-1BP0

3RW4928-8VB00

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## BaseUnits

### ■ Overview



With the BaseUnits, the ET 200SP offers a rugged and service-friendly design with permanent wiring:

- No tools needed for one-handed wiring using push-in terminals
- Actuation of the spring NC contacts with a standard screwdriver, with a blade width up to 3.5 mm
- Outstanding access due to arrangement of measuring tap, spring NC contacts and cable entry in columns, while at the same time reducing the space required by 64%
- Fault-proof color coding of the spring NC contacts for better orientation in the terminal panel

- Replacement of I/O modules during operation without affecting the wiring
- Operation with module gaps (gaps without I/O module)
- Automatic coding of the I/O modules prevents destruction of the electronics if a module is accidentally inserted in the wrong slot during replacement
- High EMC interference immunity:
  - self-assembling shielded backplane bus
  - multi-layer conductor plate with shield levels for interference-free signal transmission from the terminal to the I/O module
  - system-integrated, space-saving shield connection for quick installation
- Self-assembling potential groups without external wiring or jumpers
- Replaceable terminal box
- Side-by-side latching of the BUs for high mechanical and EMC loads
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional equipment marking using slide-in equipment labeling plates

An ET 200SP station can be expanded via one BU-Send BaseUnit with a BA-Send BusAdapter plugged onto it with up to 16 modules from the ET 200AL series of I/O devices with IP67 protection.

### ■ Technical specifications

| Article number | 6ES7193-6BP20-0DA0 | 6ES7193-6BP00-0DA0 | 6ES7193-6BP20-0BA0 | 6ES7193-6BP00-0BA0 |
|---|---|---|---|---|
| | BASEUNIT TYPE A0, BU15-P16+A10+2D | BASEUNIT TYPE A0, BU15-P16+A0+2D | BASEUNIT TYPE A0, BU15-P16+A10+2B | BASEUNIT TYPE A0, BU15-P16+A0+2B |
| **General information** | | | | |
| Product type designation | ET 200SP, BaseUnit BU type A0, BU15-P16+A10+2D, PU 1 | BU Type A0, BU15-P16+A0+2D, PU 1 | ET 200SP, BaseUnit BU type A0, BU15-P16+A10+2B, PU 1 | BU Type A0, BU15-P16+A0+2B, PU 1 |
| **Dimensions** | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 141 mm | 117 mm | 141 mm | 117 mm |
| Depth | 35 mm | 35 mm | 35 mm | 35 mm |
| **Weights** | | | | |
| Weight, approx. | 50 g | 40 g | 50 g | 40 g |

| Article number | 6ES7193-6BP20-0BB0 | 6ES7193-6BP20-0BB1 | 6ES7193-6BP20-0DC0 | 6ES7193-6BP00-0BD0 | 6ES7193-6BP20-0BF0 |
|---|---|---|---|---|---|
| | BASEUNIT TYP B0, BU20-P12+A4+0B | BASEUNIT TYPE B1, BU20-P12+A0+4B | BASEUNIT TYP C0, BU20-P6+A2+4D | BASEUNIT TYPE D0, BU20-P12+A0+0B | BASEUNIT TYPE F0, BU20-P8+A4+0B |
| **General information** | | | | | |
| Product type designation | ET 200SP, BaseUnit BU-Typ B0, PU 1 | ET 200SP, BaseUnit BU type B1, BU20-P12+A0+4B, PU 1 | ET 200SP, BaseUnit type C0, BU20-P6+A2+4D, PU 1 | ET 200SP, BaseUnit BU type D0, PU 1 | ET 200SP, BaseUnit BU type F0, BU20-P8+A4+0B, PU 1 |
| **Dimensions** | | | | | |
| Width | 20 mm | 20 mm | 20 mm | 20 mm | 20 mm |
| Height | 117 mm | 117 mm | 117 mm | 117 mm | 117 mm |
| Depth | 35 mm | 35 mm | 35 mm | 35 mm | 35 mm |
| **Weights** | | | | | |
| Weight, approx. | 48 g | 48 g | 47 g | 47 g | 48 g |

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## ■ Technical specifications (continued)

| Article number | **6ES7193-6BP40-0DA1** | **6ES7193-6BP00-0DA1** | **6ES7193-6BP40-0BA1** | **6ES7193-6BP00-0BA1** |
|---|---|---|---|---|
| | BASEUNIT TYPE A1, BU15-P16+A0+12D/T | BASEUNIT TYPE A1, BU15-P16+A0+2D/T | BASEUNIT TYPE A1, BU15-P16+A0+12B/T | BASEUNIT TYPE A1, BU15-P16+A0+2B/T |
| **General information** | | | | |
| Product type designation | ET 200SP, BaseUnit BU type A1, BU15-P16+A0+12D/T, PU 1 | ET 200SP, BaseUnit BU type A1, BU15-P16+A0+2D/T, PU 1 | ET 200SP, BaseUnit BU type A1, BU15-P16+A0+12B/T, PU 1 | BU type A1, BU15-P16+A0+2B/T, PU 1 |
| **Dimensions** | | | | |
| Width | 15 mm | 15 mm | 15 mm | 15 mm |
| Height | 141 mm | 117 mm | 141 mm | 117 mm |
| Depth | 35 mm | 35 mm | 35 mm | 35 mm |
| **Weights** | | | | |
| Weight, approx. | 50 g | 40 g | 50 g | 40 g |

| Article number | **6ES7193-6BN00-0NE0** |
|---|---|
| | ET 200SP, BASEUNIT BU-SEND |
| **General information** | |
| Product type designation | BaseUnit BU-Send |
| **Dimensions** | |
| Width | 20 mm |
| Height | 117 mm |
| Depth | 35 mm |
| **Weights** | |
| Weight, approx. | 30 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Type A0 BaseUnits** | | **Type B0 BaseUnits** | |
| **BU15-P16+A10+2D** | | **BU20-P12+A4+0B** | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) | | BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit | |
| • 1 unit | **6ES7193-6BP20-0DA0** | • 1 unit | **6ES7193-6BP20-0BB0** |
| • 10 units | **6ES7193-6BP20-2DA0** | • 10 units | **6ES7193-6BP20-2BB0** |
| **BU15-P16+A0+2D** | | **Type B1 BaseUnits** | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | **BU20-P12+A0+4B** | **6ES7193-6BP20-0BB1** |
| • 1 unit | **6ES7193-6BP00-0DA0** | BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit | |
| • 10 units | **6ES7193-6BP00-2DA0** | | |
| **BU15-P16+A10+2B** | | **Type C0 BaseUnits** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group | | **BU20-P6+A2+4D** | **6ES7193-6BP20-0DC0** |
| | | BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group | |
| • 1 unit | **6ES7193-6BP20-0BA0** | **Type D0 BaseUnits** | |
| • 10 units | **6ES7193-6BP20-2BA0** | **BU20-P12+A0+0B** | **6ES7193-6BP00-0BD0** |
| **BU15-P16+A0+2B** | | BU type D0; BaseUnit (dark) with 12 push-in terminals, without AUX terminals, bridged to the left | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | | |
| • 1 unit | **6ES7193-6BP00-0BA0** | | |
| • 10 units | **6ES7193-6BP00-2BA0** | | |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

### BaseUnits

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Type A1 BaseUnits** **(with temperature detection)** | | **Accessories** | |
| **BU15-P16+A0+12D/T** | 6ES7193-6BP40-0DA1 | **Equipment labeling plate** | 6ES7193-6LF30-0AW0 |
| BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | | 10 sheets of 16 labels | |
| | | **BU cover** | |
| | | for covering empty slots (gaps); 5 units | |
| **BU15-P16+A0+2D/T** | 6ES7193-6BP00-0DA1 | • 15 mm wide | 6ES7133-6CV15-1AM0 |
| BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | • 20 mm wide | 6ES7133-6CV20-1AM0 |
| | | **Shield connection** | 6ES7193-6SC00-1AM0 |
| | | 5 shield supports and 5 shield terminals | |
| **BU15-P16+A0+12B/T** | 6ES7193-6BP40-0BA1 | **Color-coded labels** | |
| BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | | • Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP01-2MA0 |
| | | • Color code CC02, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP02-2MA0 |
| **BU15-P16+A0+2B/T** | 6ES7193-6BP00-0BA1 | • Color code CC03, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP03-2MA0 |
| BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | • Color code CC04, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units | 6ES7193-6CP04-2MA0 |
| **Type F0 BaseUnits** | | • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units | 6ES7193-6CP71-2AA0 |
| **BU20-P8+A4+0B** | 6ES7193-6BP20-0BF0 | • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units | 6ES7193-6CP72-2AA0 |
| BU type F0; BaseUnit (dark) with 8 process terminals to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group | | • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units | 6ES7193-6CP73-2AA0 |
| **Station expansion with** **IP67 I/O system ET 200AL** | | • Color code CC74, for 2x5 additional terminals, 5 x red, 5 x blue, for BU type A1, with push-in terminals; 10 units | 6ES7193-6CP74-2AA0 |
| **BaseUnit BU-Send** | 6ES7193-6BN00-0NE0 | • Color code CC81, for 4 AUX terminals 1 A to 4 A, yellow/green, for BaseUnit type B0; 10 units | 6ES7193-6CP81-2AB0 |
| **ET 200SP** **BA-Send 1 x FC BusAdapter** | 6ES7193-6AS00-0AA0 | • Color code CC82, for 4 AUX terminals 1 A to 4 A, red, for BaseUnit type B0; 10 units | 6ES7193-6CP82-2AB0 |
| | | • Color code CC83, for 4 AUX terminals 1 A to 4 A, blue, for BaseUnit type B0; 10 units | 6ES7193-6CP83-2AB0 |
| | | • Color code CC41, module-specific, for 12 push-in terminals; for BaseUnit type B1; 10 units | 6ES7193-6CP41-2MB0 |
| | | • Color code CC84, for 2 AUX terminals 1 A to 2 A, yellow/green, for BaseUnit type C0; 10 units | 6ES7193-6CP84-2AC0 |
| | | • Color code CC85, for 2 AUX terminals 1 A to 2 A, red, for BaseUnit type C0; 10 units | 6ES7193-6CP85-2AC0 |
| | | • Color code CC86, for 2 AUX terminals 1 A to 2 A, blue, for BaseUnit type C0; 10 units | 6ES7193-6CP86-2AC0 |

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## ■ Overview



With the BaseUnits, the ET 200SP offers a rugged and service-friendly design with permanent wiring:

- No tools needed for one-handed wiring using push-in terminals
- Outstanding access due to arrangement of measuring tap, spring NC contacts and cable entry in columns, while at the same time reducing the space required by 64%
- Fault-proof color coding of the spring NC contacts for better orientation in the terminal panel
- Replacement of I/O modules during operation without affecting the wiring

- Operation with module gaps (missing I/O module)
- Automatic coding of the I/O modules prevents destruction of the electronics if a module is accidentally inserted in the wrong slot during replacement
- High immunity to electromagnetic interference due to
  - self-assembling shielded backplane bus
  - multi-layer conductor plate with shield levels for interference-free signal transmission from the terminal to the I/O module
  - system-integrated, space-saving shield connection for quick installation
- Self-assembling potential groups without external wiring or jumpers
- Replaceable terminal box
- Side-by-side latching of the BUs for high mechanical load capacity
- Optional module-specific color identification of the terminals according to the color code (CC)
- Actuation of the spring NC contacts with a standard screwdriver, with a blade width up to 3.5 mm

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| Article number | 6AG1193-6BP00-7BA0 | 6AG1193-6BP00-7DA0 | 6AG1193-6BP20-7BA0 | 6AG1193-6BP20-7DA0 |
|---|---|---|---|---|
| Baesd on | 6ES7193-6BP00-0BA0 | 6ES7193-6BP00-0DA0 | 6ES7193-6BP20-0BA0 | 6ES7193-6BP20-0DA0 |
| | SIPLUS ET 200SP BU15-P16+A0+2B | SIPLUS ET 200SP BU15-P16+A0+2D | SIPLUS ET 200SP BU15-P16+A10+2B | SIPLUS ET 200SP BU15-P16+A10+2D |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200SP

### SIPLUS BaseUnits

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■ **Technical specifications** (continued)

| Article number | **6AG1193-6BP00-7BA0** | **6AG1193-6BP00-7DA0** | **6AG1193-6BP20-7BA0** | **6AG1193-6BP20-7DA0** |
|---|---|---|---|---|
| Baesd on | **6ES7193-6BP00-0BA0** | **6ES7193-6BP00-0DA0** | **6ES7193-6BP20-0BA0** | **6ES7193-6BP20-0DA0** |
| | SIPLUS ET 200SP BU15-P16+A0+2B | SIPLUS ET 200SP BU15-P16+A0+2D | SIPLUS ET 200SP BU15-P16+A10+2B | SIPLUS ET 200SP BU15-P16+A10+2D |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Article number | **6AG1193-6BP00-7BA1** | **6AG1193-6BP00-7DA1** | **6AG1193-6BP40-7BA1** | **6AG1193-6BP40-7DA1** |
|---|---|---|---|---|
| Based on | **6ES7193-6BP00-0BA1** | **6ES7193-6BP00-0DA1** | **6ES7193-6BP40-0BA1** | **6ES7193-6BP40-0DA1** |
| | SIPLUS ET 200SP BU15-P16+A0+2B/T | SIPLUS ET 200SP BU15-P16+A0+2D/T | SIPLUS ET 200SP BU15-P16+A0+12B/T | SIPLUS ET 200SP BU15-P16+A0+12D/T |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Technical specifications (continued)

| Article number | **6AG1193-6BP20-7BB0** | **6AG1193-6BP20-7BB1** | **6AG1193-6BP20-7DC0** | **6AG1193-6BP00-7BD0** |
|---|---|---|---|---|
| Based on | **6ES7193-6BP20-0BB0** | **6ES7193-6BP20-0BB1** | **6ES7193-6BP20-0DC0** | **6ES7193-6BP00-0BD0** |
| | SIPLUS ET 200SP BU20-P12+A4+0B | SIPLUS ET 200SP BU20-P12+A0+4B TYP B1 | SIPLUS ET 200SP BU20-P6+A2+4D | SIPLUS ET 200SP BU20-P12+A0+0B |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • horizontal installation, min. | -40 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C | -25 °C; = Tmin | -40 °C; = Tmin |
| • horizontal installation, max. | 70 °C; = Tmax | 70 °C; = Tmax | 60 °C; = Tmax | 70 °C; = Tmax |
| • vertical installation, min. | -40 °C | | -25 °C | -40 °C |
| • vertical installation, max. | 50 °C | | 50 °C | 50 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## SIPLUS BaseUnits

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS BaseUnits type A0** | | **BU15-P16+A0+12D/T** | **6AG1193-6BP40-7DA1** |
| **BU15-P16+A0+2D** | **6AG1193-6BP00-7DA0** | (Extended temperature range and exposure to media) | |
| (Extended temperature range and exposure to media) | | BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A) | |
| BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) | | | |
| **BU15-P16+A0+2B** | **6AG1193-6BP00-7BA0** | **BU15-P16+A0+12B/T** | **6AG1193-6BP40-7BA1** |
| (Extended temperature range and exposure to media) | | (Extended temperature range and exposure to media) | |
| BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group | |
| **BU15-P16+A10+2D** | **6AG1193-6BP20-7DA0** | | |
| (Extended temperature range and exposure to media) | | **SIPLUS BaseUnits type B0** | |
| BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10A); for starting a new load group (max. 10 A) | | **BU20-P12+A4+0B** | **6AG1193-6BP20-7BB0** |
| | | (Extended temperature range and exposure to media) | |
| | | BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit | |
| **BU15-P16+A10+2B** | **6AG1193-6BP20-7BA0** | | |
| (Extended temperature range and exposure to media) | | **SIPLUS BaseUnits type B1** | |
| BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10A); for continuing the load group | | **BU20-P12+A0+4B** | **6AG1193-6BP20-7BB1** |
| | | (Extended temperature range and exposure to media) | |
| **SIPLUS BaseUnits type A1 (with temperature detection)** | | BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit | |
| **BU15-P16+A0+2D/T** | **6AG1193-6BP00-7DA1** | **SIPLUS BaseUnits type C0** | |
| (Extended temperature range and exposure to media) | | **BU20-P6+A2+4D** | **6AG1193-6BP20-7DC0** |
| BU type A1; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A) | | (Extended temperature range and exposure to media) | |
| | | BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group | |
| **BU15-P16+A0+2B/T** | **6AG1193-6BP00-7BA1** | | |
| (Extended temperature range and exposure to media) | | **SIPLUS BaseUnits type D0** | |
| BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group | | **BU20-P12+A0+0B** | **6AG1193-6BP00-7BD0** |
| | | (Extended temperature range and exposure to media) | |
| | | BU type D0; BaseUnit (dark) with 12 push-in terminals, without AUX terminals, bridged to the left | |
| | | **Accessories** | See SIMATIC ET 200SP BaseUnits, page 9/142 |

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## Overview



SIMATIC BA 2xFC BusAdapter for direct laying of the PROFINET cable via FastConnect connection



ET 200SP BA-Send BusAdapter for expansion of an ET 200SP station with ET 200AL modules

For the SIMATIC ET 200SP, two types of BusAdapter (BA) are available for selection:

- ET 200SP BA-Send BusAdapter
  for expansion of an ET 200SP station with up to 16 modules from the ET 200AL I/O series with IP67 protection via an ET connection

- SIMATIC BusAdapter
  for the free selection of the connection system (pluggable or direct connection) and physical PROFINET connection (copper, POF, HCS or glass fiber) to devices with a SIMATIC BusAdapter interface.
  One further advantage of the SIMATIC BusAdapter: only the adapter needs to be replaced for subsequent conversion to the rugged FastConnect technology or a fiber-optic connection, or to repair defective RJ45 sockets



SIMATIC BA LC/RJ45 BusAdapter for use as a system-integrated media converter from copper (RJ45) to glass fiber (LC)

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## BusAdapters

### Technical specifications

| Article number | **6ES7193-6AR00-0AA0** | **6ES7193-6AF00-0AA0** | **6ES7193-6AP00-0AA0** | **6ES7193-6AP20-0AA0** |
|---|---|---|---|---|
| | ET 200SP, BA 2XRJ45 BUSADAPTER | ET 200SP, BA 2XFC BUSADAPTER | ET 200SP, BA 2XSCRJ BUSADAPTER | ET 200SP, BA SCRJ/RJ45 BUSADAPTER |
| **General information** | | | | |
| Product type designation | SIMATIC BusAdapter BA 2x RJ45 | SIMATIC BusAdapter BA 2x FC | SIMATIC BusAdapter BA 2x SCRJ | SIMATIC BusAdapter BA SCRJ / RJ45 |
| **Interfaces** | | | | |
| Number of PROFINET interfaces | 1 | 1 | 1; 2 ports (switch) SCRJ FO | 1; 2 ports (SCRJ + RJ45) |
| **PROFINET IO** | | | | |
| • RJ 45 | Yes; 2 x | | No | Yes; 1x |
| • FC (FastConnect) | No | Yes; 2 x | No | No |
| • Number of SCRJ ports | 0 | | 2 | 1 |
| • Number of LC ports | 0 | | 0 | 0 |
| **Cable length** | | | | |
| - PCF | | | 100 m | 100 m |
| - Plastic FOC (POF) | | | 50 m | 50 m |
| - PCF-GI | | | 250 m | 250 m |
| - Cu conductors | 100 m | 100 m | | 100 m |
| **Dimensions** | | | | |
| Width | 20 mm | 20 mm | 20 mm | 20 mm |
| Height | 69.5 mm | 69.5 mm | 69.5 mm | |
| Depth | 59 mm | 59 mm | 59 mm | |
| **Weights** | | | | |
| Weight, approx. | 46 g | 53 g | 50 g | 50 g |

| Article number | **6ES7193-6AP40-0AA0** | **6ES7193-6AG00-0AA0** | **6ES7193-6AG20-0AA0** | **6ES7193-6AG40-0AA0** |
|---|---|---|---|---|
| | ET 200SP, BA 2XSCRJ/FC BUSADAPTER | SIMATIC BA 2XLC BUSADAPTER | SIMATIC BA LC/RJ45 BUSADAPTER | SIMATIC BA 2XLC/FC BUSADAPTER |
| **General information** | | | | |
| Product type designation | SIMATIC BusAdapter BA SCRJ / FC | SIMATIC BusAdapter BA 2x LC | SIMATIC BusAdapter BA LC / RJ45 | SIMATIC BusAdapter BA LC / FC |
| **Interfaces** | | | | |
| Number of PROFINET interfaces | 1; 2 ports (SCRJ + FC) | 1; 2 ports (switch) LC Multimode Glass Fibre | 1; 2 ports (switch) LC / RJ45 | 1 |
| **PROFINET IO** | | | | |
| • RJ 45 | No | No | Yes; 1x | No |
| • FC (FastConnect) | Yes; 1x | No | No | Yes; 1x |
| • Number of SCRJ ports | 1 | 0 | 0 | 0 |
| • Number of LC ports | 0 | 2 | 1 | 1 |
| **Cable length** | | | | |
| - PCF | 100 m | | | |
| - Plastic FOC (POF) | 50 m | | | |
| - PCF-GI | 250 m | | | |
| - Cu conductors | 100 m | | 100 m | 100 m |
| - Multimode graded-index fiber 50/125 µm | | 3 km | 3 km | 3 km |
| - Multimode graded-index fiber 62.5/125 µm | | 3 km | 3 km | 3 km |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | | 0 °C | 0 °C | 0 °C |
| • max. | | 60 °C | 60 °C | 60 °C |
| **Dimensions** | | | | |
| Width | 20 mm | 20 mm | 20 mm | 20 mm |
| Height | 69.5 mm | 69.5 mm | 69.5 mm | 69.5 mm |
| Depth | 59 mm | 59 mm | 59 mm | 59 mm |
| **Weights** | | | | |
| Weight, approx. | 50 g | 40 g | 32 g | 50 g |

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## Technical specifications (continued)

| Article number | **6ES7193-6AS00-0AA0** |
|---|---|
| | ET 200SP, BA-SEND BA1XFC BUSADAPTER |
| **General information** | |
| Product type designation | BusAdapter BA-Send 1x FC |
| **Interfaces** | |
| **PROFINET IO** | |
| **Cable length** | |
| - Cu conductors | 15 m; from IM firmware V3.3: between BA-send and the first ET-CONNECTION bus node and between all other bus nodes |
| **ET-Connection** | |
| • Number of interfaces ET connection | 1 |
| • FC (FastConnect) | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Dimensions** | |
| Width | 20 mm |
| **Weights** | |
| Weight, approx. | 44 g |

## Ordering data

| | Article No. |
|---|---|
| **BA 2xRJ45 BusAdapter** | **6ES7193-6AR00-0AA0** |
| For IM 155-6PN ST, HF | |
| **BA 2xFC BusAdapter** | **6ES7193-6AF00-0AA0** |
| For IM 155-6PN ST, HF; for increased resistance to vibration and EMC loads | |
| **BA 2xSCRJ BusAdapter** | **6ES7193-6AP00-0AA0** |
| For IM 155-6PN HF; fiber-optic connection for POF or PCF cables up to 250 m, with monitoring of damping | |
| **BA SCRJ/RJ45 BusAdapter** | **6ES7193-6AP20-0AA0** |
| For IM 155-6PN HF; with media converter FOC-Cu; 1 x SCRJ FO connection, 1 x RJ45 connection | |
| **BA SCRJ/FC BusAdapter** | **6ES7193-6AP40-0AA0** |
| For IM 155-6PN HF; with media converter FOC-Cu; 1 x SCRJ FO connection, 1 x FastConnect connection | |
| **BA 2XLC BusAdapter** | **6ES7193-6AG00-0AA0** |
| For IM 155-6PN HF; 2 glass FO connections | |
| **BA LC/RJ45 BusAdapter** | **6ES7193-6AG20-0AA0** |
| For IM 155-6PN HF; with media converter glass FO - copper; 1 x LC connection, 1 x RJ45 connection | |
| **BA LC/FC BusAdapter** | **6ES7193-6AG40-0AA0** |
| For IM 155-6PN HF; with media converter glass FO - copper; 1 x LC connection, 1 x FastConnect connection | |
| **Station expansion with IP67 I/O system ET 200AL** | |
| **ET 200SP BA-Send 1 x FC BusAdapter** | **6ES7193-6AS00-0AA0** |
| **BaseUnit BU-Send** | **6ES7193-6BN00-0NE0** |
| **Accessories** | |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** |
| 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## SIPLUS BusAdapters

### ■ Overview

ET 200SP BusAdapter (RJ45)

BA 2xFC BusAdapter

Some interface modules of the SIPLUS ET 200SP have a universal PROFINET interface for BusAdapters. With the appropriate BusAdapter, the type of connection can be adapted to the requirements of the respective application:

- For standard applications with a moderate mechanical and EMC load, the BA 2xRJ45 BusAdapter is used. It offers two sockets for standard RJ45 plugs.
- For machines and systems in which higher mechanical and/or EMC loads act on the devices, the BA 2xFC BusAdapter is recommended. In this case, the bus cables are connected directly by means of FastConnect terminals – similar to the PROFIBUS connector, proven in millions of applications. The technology is extremely quick to assemble and achieves 5 times better vibration resistance and also 5 times greater resistance to electromagnetic interference, when compared to RJ45 plug connectors.
- BusAdapters with connections for fiber-optic cables can be used to cover high potential differences between two stations and/or high EMC loads.

Another advantage of the BusAdapters: In order to repair defective RJ45 sockets or for subsequent conversion to the rugged FastConnect technology or a fiber-optic connection, only the adapter needs to be replaced.

The following interface modules offer a PROFINET connection via BusAdapter:

- SIPLUS IM 155-6PN Standard
- SIPLUS IM 155-6PN High Feature

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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■ **Technical specifications**

| Article number | **6AG1193-6AR00-7AA0** | **6AG1193-6AF00-7AA0** | **6AG1193-6AP00-2AA0** |
|---|---|---|---|
| Based on | **6ES7193-6AR00-0AA0** | **6ES7193-6AF00-0AA0** | **6ES7193-6AP00-0AA0** |
| | SIPLUS ET 200SP BA 2xRJ45 | SIPLUS ET 200SP BA 2XFC PN | SIPLUS ET 200SP BA 2XSCRJ PN |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax | 70 °C; = Tmax | 60 °C; = Tmax |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS BA 2xRJ45 BusAdapter** (Extended temperature range and exposure to media) for IM 155-6PN ST, HF | **6AG1193-6AR00-7AA0** | **SIPLUS BA 2xSCRJ BusAdapter** (Extended temperature range and exposure to media) for IM 155-6PN HF; fiber-optic connection for POF or PCF cables up to 250 m, with monitoring of damping | **6AG1193-6AP00-2AA0** |
| **SIPLUS BA 2xFC BusAdapter** (Extended temperature range and exposure to media) for IM 155-6PN ST, HF; for increased resistance to vibration and EMC loads | **6AG1193-6AF00-7AA0** | **Reference identification label** 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter | **6ES7193-6LF30-0AW0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

## Accessories

### Overview Labeling strips

The head-end stations and I/O modules can optionally be equipped with labeling strips (13 x 31 mm) for system-specific marking. The labeling strips can be inscribed mechanically. Labeling strips are available in two versions in the colors light gray and yellow:

• 500 strips on the roll, for printing on thermal transfer printers. Core diameter 40 mm, external diameter 70 mm, width 62 mm

• 10 DIN A4 sheets with 100 strips each, 180 g/sm card, perforated, for printing using a laser printer direct from TIA Portal or via print templates

### Overview Reference identification labels



Optionally, one equipment labeling plate each can be plugged onto head-end stations, BusAdapters, BaseUnits, and I/O modules. Equipment labeling plates are supplied in packs of 10 sheets with 16 labels each. The labels can be printed with thermal transfer card printers or plotters, or stickers can be attached to them. Advantages compared to labels that are attached directly:

• The inscription on the front is not covered
• Simple label replacement when replacing a module
• No parallax errors when marking the BaseUnits on the mounting plate

The size of the labels is 14.8 x 10.5 mm (W x H)

### Overview BU cover

The ET 200SP system can be operated with any number of slot gaps (BU slot without inserted I/O module). Applications for this include:

• Partial commissioning
• Prewired but unequipped options

To protect against damage, such slot gaps must be covered by a BU cover.

Within the BU cover, an equipment labeling plate for identification of the I/O module planned for this slot can be stored.

Versions:

• For BaseUnits with a width of 15 mm
  (pack containing 5 BU covers)
• For BaseUnits with a width of 20 mm
  (pack containing 5 BU covers)

### Overview Shield connection

The shield connection permits the low-cost connection of cable shields. Compared to external shield supports, the system offers the following advantages:

• Quick installation without tools by plugging the shield connection element onto the BaseUnit
• Automatic low-impedance connection to the functional ground (DIN rail)
• Optimized EMC properties by separating the signal lines from the voltage supply lines
• Short unshielded cable lengths
• Requires little space

### Overview Color-coded labels

The I/O modules that are plugged onto the BaseUnits determine the potentials connected at the process terminals. The +/- potentials can optionally be identified using module-specific color-coded labels. The potentials of the AUX and add-on terminals can also be marked using color-coded labels. Advantages of the color-coded labels:

• Quick installation (one label for marking 16 terminals)
• Printed terminal numbers
• Avoidance of wiring errors
• Simple detection of potentials during servicing

### Overview Server module

The server module is included in the scope of delivery of all head-end stations (interface module, CPU, Open Controller). It concludes the setup of an ET 200SP station.

### Overview e-coding elements

The operation of selected modules requires an electronic coding element that is always included in the scope of delivery of the I/O module. Apart from the mechanical coding function, this contains a re-writable memory for the redundant storage of module-specific configuration data (e.g. F target address for fail-safe modules or parameter data in the case of the IO-Link master). In this way, this data is automatically backed up during a module replacement. This saves the user from having to set addresses manually or back up data when replacing modules.

At present, there are two types of electronic coding element:

• e-coding element (Type H), which can be used in the I/O modules:
  - CM IO-Link master
  - F-CM AS-i Safety

• e-coding element (Type F), which can be used in the I/O modules:
  - F-DI 8x24VDC HF
  - F-DQ 4x24VDC/2A PM HF
  - F-PM-E 24VDC/8A PPM ST

## Ordering data

| | Article No. |
|---|---|
| **Labeling strips** | |
| 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AA0** |
| 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer | **6ES7193-6LR10-0AG0** |
| 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer | **6ES7193-6LA10-0AA0** |
| 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer | **6ES7193-6LA10-0AG0** |
| **Equipment labeling plate** | **6ES7193-6LF30-0AW0** |
| 10 sheets of 16 labels | |
| **BU cover** | |
| For covering empty slots (gaps); 5 units | |
| • 15 mm wide | **6ES7133-6CV15-1AM0** |
| • 20 mm wide | **6ES7133-6CV20-1AM0** |
| **Shield connection** | **6ES7193-6SC00-1AM0** |
| 5 shield supports and 5 shield terminals each for plugging onto BaseUnits with automatic low-impedance connection to functional ground | |
| **Module-specific color-coded labels** | |
| (pack containing 10 labels) | |
| Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16) | **6ES7193-6CP00-2MA0** |
| Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16) | **6ES7193-6CP01-2MA0** |
| Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16) | **6ES7193-6CP02-2MA0** |
| Color code CC03, for 16 process terminals, for BU type A0, A1 gray (terminals 1 to 8), red (terminals 9 to 12), gray (terminals 13 to 16) | **6ES7193-6CP03-2MA0** |
| Color code CC04, for 16 process terminals, BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 12), blue (terminals 13 to 16) | **6ES7193-6CP04-2MA0** |
| Color code CC05, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 12), red (terminals 13 to 14), blue (terminals 15 to 16) | **6ES7193-6CP05-2MA0** |
| Color code CC41, for 16 process terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12) | **6ES7193-6CP41-2MB0** |

| | Article No. |
|---|---|
| Color code CC42, for 12 process terminals, BU type F0, gray (terminals 1 to 8), red (terminals 9 to 10), blue (terminals 11 to 12) | **6ES7193-6CP42-2MB0** |
| Color code CC51, for 6 process terminals, for BU type C0, C1, gray (terminals 1 to 4), red (terminal 5), blue (terminal 6) | **6ES7193-6CP51-2MC0** |
| Color code CC51, for 6 process terminals, for BU type C0, gray (terminals 1, 2 and 5), red (terminals 3 and 4), blue (terminal 6) | **6ES7193-6CP52-2MC0** |
| **Color-coded labels for additional terminals** | |
| (pack containing 10 labels) | |
| Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A) | **6ES7193-6CP71-2AA0** |
| Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A) | **6ES7193-6CP72-2AA0** |
| Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A) | **6ES7193-6CP73-2AA0** |
| Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C) | **6ES7193-6CP74-2AA0** |
| Color code CC81, for 4 AUX terminals, BU type B0, yellow/green (terminals 1 A to 4 A) | **6ES7193-6CP81-2AB0** |
| Color code CC82, for 4 AUX terminals, BU type B0, red (terminals 1 A to 4 A) | **6ES7193-6CP82-2AB0** |
| Color code CC83, for 4 AUX terminals, BU type B0, blue (terminals 1 A to 4 A) | **6ES7193-6CP83-2AB0** |
| Color code CC84, for 2 AUX terminals, BU type C0, C1, yellow/green (1 A to 2 A) | **6ES7193-6CP84-2AC0** |
| Color code CC85, for 2 AUX terminals, BU type C0, C1, red (1 A to 2 A) | **6ES7193-6CP85-2AC0** |
| Color code CC86, for 2 AUX terminals, BU type C0, C1, blue (1 A to 2 A | **6ES7193-6CP86-2AC0** |
| **Server module** | **6ES7193-6PA00-0AA0** |
| Spare parts | |
| **e-coding element** | |
| Type H; pack containing 5 e-coding elements | **6ES7193-6EH00-1AA0** |
| Type F; pack containing 5 e-coding elements | **6ES7193-6EF00-1AA0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet

## SIMATIC ET 200MP

### Overview
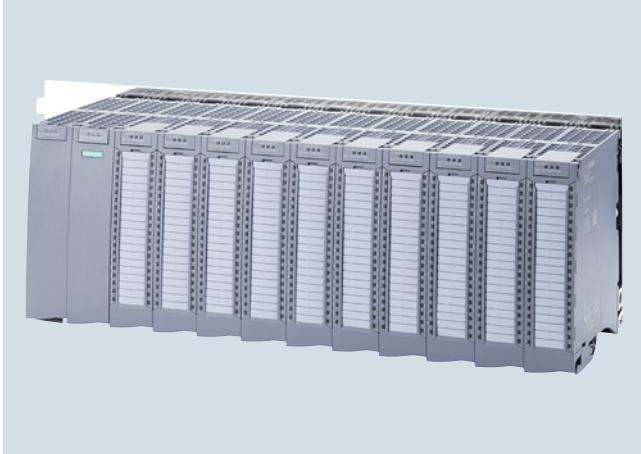


The SIMATIC ET 200MP is a modular and scalable I/O system with IP20 degree of protection for universal use, and offers the same system advantages as the S7-1500. The SIMATIC ET 200MP permits extremely short bus cycles and very fast response times, even with large quantity structures.

SIMATIC ET 200MP consists of the following components:

- Interface module for connecting S7-1500 I/O modules to PROFINET; up to 30 modules can be connected to one interface module

- Interface module for connecting S7-1500 I/O modules to PROFIBUS; up to 12 modules can be connected to one interface module

The SIMATIC ET 200MP distributed I/O system is particularly easy to install, wire, and commission.

### Highlights:

- Modular I/O system with IP20 protection for PROFINET or alternatively for PROFIBUS

- Compact dimensions

- High degree of user-friendliness due to the following design features:
  - Uniform 40-pin front connector simplifies ordering, logistics, and warehousing
  - Uniform pin assignment per module type simplifies wiring and helps avoid errors
  - Integrated potential bridges simplify wiring and allow flexible subsequent modification
  - The cable storage space grows along with the requirements and allows a uniform appearance even with insulated conductors with a large cross-section and/or thick insulation
  - The pre-wiring position for the front connector allows convenient wiring both when commissioning and making changes during operation

- The top hat rail integrated in the S7-1500 DIN rail allows snapping-on of many standard components such as additional terminals, miniature circuit breakers or small relays
- The 1:1 allocation of channel status and diagnostics LED, terminal and inscription allows fast location and elimination of errors. Assistance is provided by the wiring diagram printed on the inside of the front panels
- The integrated shielding concept for analog and technology modules allows reliable and rugged operation, in particular with high-speed applications. Installation does not require any tools
- Particularly space-saving and simple design with slim 25 mm modules;
  the maximum possible station configuration with power supply (PS), interface module (IM) and 30 I/O modules can be accommodated on a 830-mm-wide S7-1500 DIN rail

- Comprehensive product portfolio comprising digital and analog input or output modules, technology modules, and communication modules for point-to-point communication; further modules, e.g. F modules, will be available soon

- Extensive system functions
  - Integrated system diagnostics when operated with an S7-1500 and the TIA portal
  - Increased communication availability by using Media Redundancy Protocol (MRP) on the PROFINET; in addition, the IM 155-5 PN HF High Feature interface module can be operated on an S7-400H. Configuration is carried out with STEP 7 V5.5 SP3 and a GSDML file. The IM 155-5 PN HF also supports operation on an S7-400H CPU (system redundancy)
  - Consistent use of identification and maintenance data IM0 to IM3 for fast electronic and unambiguous identification of individual modules (Article No., serial number, etc.)
  - Uniform firmware update for the interface module and all I/O modules for subsequent expansion of functions (investment security)
  - Bus cycle time ≥ 250 μs and coupling to the isochronous task permit implementation of applications with high performance requirements with PROFINET
  - Up to 30 I/O modules (PROFINET) or 12 I/O modules (PROFIBUS) within a station save on interface modules and installation time
  - MMC not required with PROFINET; automatic address assignment via LLDP or manually via TIA portal or PST tool
  - Shared device on up to two (IM 155-5 PN BA and IM 155-5 PN ST) or four (IM 155-5 PN HF) IO controllers
  - Module shared input / module shared output as system function for all S7-1500 I/O modules

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## Overview

- Interface modules for linking the ET 200MP to PROFINET
- These handle data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology

IM 155-5 PN BA
- Max. 30 I/O modules
- Shortest bus cycle time 1 ms
- Media redundancy (MRP)
- Shared device on up to 2 IO controllers
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP

IM 155-5 PN ST, IM 155-5 PN HF
- Interface modules for linking the ET 200MP to PROFINET
- These handle data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs
- Linking to the isochronous task of the CPU
- Prioritized fast startup (FSU) with max. 12 I/O modules
- Media Redundancy Protocol (MRP)
- Shared device on up to two I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP
- Operation of F modules and PROFIsafe

Starting from FW version V2.0.0, the IM155-5 PN ST interface module supports the following new functions:
- Submodule-granular shared device with up to two I/O controllers
- Configuration control (option handling)
- Module shared input and module shared output (MSI/MSO), i.e. the inputs or outputs of a module can be made available simultaneously to up to two I/O controllers

The IM155-5 PN HF interface module has the following additional functions:
- Shared device on up to 4 IO controllers
- Module-internal shared input and output (MSI/MSO) on up to four IO controllers
- Operation on a highly available SIMATIC S7-400H
- Support for the MRPD function (media redundancy with planned duplication)

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200MP

**Interface modules   > IM 155-5 PN**

■ **Overview** (continued)

| | IM 155-5 PN BA | IM 155-5 PN ST | IM 155-5 PN HF |
|---|---|---|---|
| Article No. | 6ES7155-5AA00-0AA0 | 6ES7155-5AA00-0AB0 | 6ES7155-5AA00-0AC0 |
| **Specifications** | | | |
| I/O modules | All except PROFIsafe | All | All |
| Max. number I/O modules / IM | 12 | 30 | 30 |
| Max. number of bytes / slot | 64 inputs<br>64 outputs | 256 inputs<br>256 outputs | 256 inputs<br>256 outputs |
| Max. number bytes / station | 64 inputs<br>64 outputs | 512 inputs<br>512 outputs | 512 inputs<br>512 outputs |
| Update time | 1 ms | 250 µs | 250 µs |
| **Configuration** | | | |
| GSDML | Yes | Yes | Yes |
| STEP 7 | GSDML | GSDML | GSDML |
| TIA Portal | Yes | Yes | Yes |
| PCS 7 | No | No | No |
| **General functions** | | | |
| Reset to factory settings | TIA Portal | TIA Portal | TIA Portal |
| Device replacement:<br>without PG | LLDP | LLDP | LLDP |
| Configuration management<br>(option handling) | No | Yes | Yes |
| I&M data | IM 0 … 3 | IM 0 … 3 | IM 0 … 3 |
| Isochronous mode | No | Yes | Yes |
| PROFIsafe | No | Yes | Yes |
| **PROFINET functions** | | | |
| RT | Yes | Yes | Yes |
| IRT | No | Yes | Yes |
| MRP | Yes | Yes | Yes |
| MRPD | No | No | No |
| S2 redundancy | No | No | Yes |
| Fast Startup | No | Yes | Yes |
| Shared device | Yes; up to 2 ctrl. | Yes; up to 2 ctrl. | Yes; up to 4 ctrl. |
| MSI / MSO | Yes | Yes | Yes |
| Submodules | Yes | Yes | Yes |

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■ **Technical specifications**

| Article number | 6ES7155-5AA00-0AA0 | 6ES7155-5AA00-0AB0 | 6ES7155-5AA00-0AC0 |
|---|---|---|---|
| | ET 200MP, IM 155-5 PN BA | ET 200MP, IM 155-5 PN ST | ET 200MP, IM 155-5 PN HF |
| **General information** | | | |
| Product type designation | IM 155-5 PN BA | IM 155-5 PN ST | IM 155-5 PN HF |
| **Product function** | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V14 with HSP 0187 | V13 / V13 | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - | V5.5 SP3 / - | V5.5 SP3 / - |
| • PROFINET as of GSD version/ GSD revision | V2.3 / - | V2.3 / - | V2.3 / - |
| **Supply voltage** | | | |
| Type of supply voltage | DC | DC | DC |
| Rated value (DC) | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes |
| Short-circuit protection | Yes | Yes | Yes |
| **Mains buffering** | | | |
| • Mains/voltage failure stored energy time | 5 ms | 5 ms | 5 ms |
| **Hardware configuration** | | | |
| Integrated power supply | Yes | Yes | Yes |
| **Rack** | | | |
| • Modules per rack, max. | 12; I/O modules | 30; I/O modules | 30; I/O modules |
| **Submodules** | | | |
| • Number of submodules per station, max. | 108; 9 submodules / I/O modules | | |
| **Interfaces** | | | |
| Number of PROFINET interfaces | 1; 2 ports (switch) RJ45 | 1 | 1 |
| **1. Interface** | | | |
| **Interface types** | | | |
| • Number of ports | 2 | 2 | 2 |
| • integrated switch | Yes | Yes | Yes |
| • RJ 45 (Ethernet) | Yes | Yes | Yes |
| • BusAdapter (PROFINET) | No | | |
| **Functionality** | | | |
| • PROFINET IO Device | Yes | Yes | Yes |
| • Media redundancy | Yes | Yes; PROFINET MRP | Yes; PROFINET MRP |
| **Interface types** | | | |
| **RJ 45 (Ethernet)** | | | |
| • Transmission procedure | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) | PROFINET with 100 Mbit/s full duplex (100BASE-TX) |
| • 100 Mbps | Yes | Yes | Yes |
| • Autonegotiation | Yes | Yes | Yes |
| • Autocrossing | Yes | Yes | Yes |
| **PROFINET IO Device** | | | |
| **Services** | | | |
| - Isochronous mode | No | Yes | Yes |
| - Open IE communication | Yes | | |
| - IRT | No | Yes | Yes |
| - MRP | Yes | Yes | Yes |
| - MRPD | No | No | No |
| - PROFINET system redundancy | No | No | Yes |
| - PROFIenergy | No | No | No |
| - Prioritized startup | No | Yes | Yes |
| - Shared device | Yes | Yes | Yes |
| - Number of IO Controllers with shared device, max. | 2 | 2 | 4 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200MP

**Interface modules   > IM 155-5 PN**

## ■ Technical specifications (continued)

| Article number | 6ES7155-5AA00-0AA0 | 6ES7155-5AA00-0AB0 | 6ES7155-5AA00-0AC0 |
|---|---|---|---|
| | ET 200MP, IM 155-5 PN BA | ET 200MP, IM 155-5 PN ST | ET 200MP, IM 155-5 PN HF |
| **Open IE communication** | | | |
| • TCP/IP | Yes | Yes | Yes |
| • SNMP | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | No | Yes | Yes |
| Equidistance | No | Yes | Yes |
| shortest clock pulse | | 250 µs | 250 µs |
| max. cycle | | 4 ms | 4 ms |
| **Interrupts/diagnostics/ status information** | | | |
| Status indicator | Yes | Yes | Yes |
| Alarms | Yes | Yes | Yes |
| Diagnostic functions | Yes | Yes | Yes |
| **Diagnostics indication LED** | | | |
| • RUN LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED | Yes; Red LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED | Yes; yellow LED | Yes; yellow LED |
| • Connection display LINK TX/RX | Yes; 2x green-yellow LEDs | Yes; yellow LED | Yes; yellow LED |
| **Isolation** | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Standards, approvals, certificates** | | | |
| Network loading class | 2 | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 60 °C | 60 °C | 60 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 40 °C | 40 °C | 40 °C |
| **Dimensions** | | | |
| Width | 35 mm | 35 mm | 35 mm |
| Height | 147 mm | 147 mm | 147 mm |
| Depth | 129 mm | 129 mm | 129 mm |
| **Weights** | | | |
| Weight, approx. | 236 g | 310 g | 350 g |

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 155-5 PN interface module** | | **IE FC RJ45 plugs** | |
| IP 20 degree of protection, module width 35 mm, installation on S7-1500 DIN rail | | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables | |
| IM 155-5 PN BA, Basic version | **6ES7155-5AA00-0AA0** | | |
| IM 155-5 PN ST, Standard version | **6ES7155-5AA00-0AB0** | | |
| IM 155-5 PN HF, High Feature version with additional functions | **6ES7155-5AA00-0AC0** | **IE FC RJ45 Plug 180** | |
| **Accessories** | | 180° cable outlet | |
| **Front flap for IM 155-5 PN (spare part), 5 units** | **6ES7528-0AA70-7AA0** | 1 unit | **6GK1901-1BB10-2AA0** |
| | | 10 units | **6GK1901-1BB10-2AB0** |
| **SIMATIC S7-1500 DIN rail** | | 50 units | **6GK1901-1BB10-2AE0** |
| Fixed lengths, with grounding elements | | **IE FC TP Standard Cable GP 2x2** | **6XV1840-2AH10** |
| • 160 mm | **6ES7590-1AB60-0AA0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; | |
| • 245 mm | **6ES7590-1AC40-0AA0** | | |
| • 482 mm | **6ES7590-1AE80-0AA0** | | |
| • 530 mm | **6ES7590-1AF30-0AA0** | | |
| • 830 mm | **6ES7590-1AJ30-0AA0** | Sold by the meter, max. length 1000 m; minimum order quantity 20 m | |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | | | |
| • 2000 mm | **6ES7590-1BC00-0AA0** | **IE FC TP Trailing Cable 2 x 2 (Type C)** | **6XV1840-3AH10** |
| **PE connection element for DIN rail 2000 mm** | **6ES7590-5AA00-0AA0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug 180/90 for trailing cable use; PROFINET-compatible; with UL approval; | |
| 20 units | | | |
| **Power supply** | | Sold by the meter, max. length 1000 m; minimum order quantity 20 m | |
| For supplying the backplane bus of the S7-1500 | | | |
| 24 V DC input voltage, power 25 W | **6ES7505-0KA00-0AB0** | **IE FC TP Marine Cable 2 x 2 (Type B)** | **6XV1840-4AH10** |
| 24/48/60 V DC input voltage, power 60 W | **6ES7505-0RA00-0AB0** | 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 marine certified; | |
| 24/48/60 V DC input voltage, power 60 W, buffering functionality | **6ES7505-0RB00-0AB0** | | |
| 120/230 V AC input voltage, power 60 W | **6ES7507-0RA00-0AB0** | Sold by the meter, max. length 1000 m; minimum order quantity 20 m | |
| **Power connector** | **6ES7590-8AA00-0AA0** | **IE FC Stripping Tool** | **6GK1901-1GA00** |
| With coding element for power supply module; spare part, 10 units | | Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | |
| **Load power supply** | | | |
| 24 V DC/3 A | **6EP1332-4BA00** | | |
| 24 V DC/8 A | **6EP1333-4BA00** | | |
| **Power supply connector** | | | |
| Spare part; for connecting the 24 V DC supply voltage | | | |
| • with push-in terminals | **6ES7193-4JB00-0AA0** | | |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200MP

**Interface modules > IM 155-5 DP**

### ■ Overview

- Interface module for linking the ET 200MP to PROFIBUS
- Handles data exchange with the PROFIBUS master in the PLC
- Max. 12 I/O modules
- Automatic detection of baud rate 9.6 kBd ... 12 MBd
- PROFIBUS addresses 1 ... 125; adjustable using DIP switches
- Identification and maintenance data IM0 ... IM3

### ■ Technical specifications

| Article number | 6ES7155-5BA00-0AB0 |
|---|---|
| | ET 200MP, IM155-5 DP ST |
| **General information** | |
| Product type designation | IM 155-5 DP ST |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | V13 / V13 |
| • STEP 7 configurable/integrated as of version | V5.5 SP3 / - |
| • PROFIBUS as of GSD version/ GSD revision | V1.0 / V5.1 |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| Short-circuit protection | Yes |
| **Mains buffering** | |
| • Mains/voltage failure stored energy time | 5 ms |
| **Hardware configuration** | |
| Integrated power supply | Yes |
| **Rack** | |
| • Modules per rack, max. | 12; I/O modules |
| **Interfaces** | |
| Number of PROFIBUS interfaces | 1 |
| **1. Interface** | |
| **Interface types** | |
| • RS 485 | Yes |
| **Functionality** | |
| • PROFIBUS DP slave | Yes |
| **RS 485** | |
| • Transmission rate, max. | 12 Mbit/s |

| Article number | 6ES7155-5BA00-0AB0 |
|---|---|
| | ET 200MP, IM155-5 DP ST |
| **PROFIBUS** | |
| **Services** | |
| - SYNC capability | Yes |
| - FREEZE capability | Yes |
| - DPV1 | Yes |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | No |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Connection display DP | Yes; Green LED |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 40 °C |
| **Dimensions** | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| **Weights** | |
| Weight, approx. | 360 g |

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## ▪ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 155-5 DP ST interface module** | 6ES7155-5BA00-0AB0 | **FC robust cable** | 6XV1830-0JH10 |
| IP 20 degree of protection, module width 35 mm, installation on S7-1500 DIN rail | | Bus cable with PUR sheath for use under conditions of extreme mechanical stress or aggressive chemicals, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m | |
| **Accessories** | | **FC flexible cable** | 6XV1831-2K |
| **Front flap for IM 155-5 PN (spare part), 5 units** | 6ES7528-0AA70-7AA0 | PROFIBUS bus cable, flexible, with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | |
| **SIMATIC S7-1500 DIN rail** | | **FC trailing cable** | 6XV1830-3EH10 |
| Fixed lengths, with grounding elements | | PROFIBUS trailing cable, at least 3 million bending cycles, min. bending radius approx. 120 mm, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | |
| • 160 mm | 6ES7590-1AB60-0AA0 | | |
| • 245 mm | 6ES7590-1AC40-0AA0 | | |
| • 482 mm | 6ES7590-1AE80-0AA0 | | |
| • 530 mm | 6ES7590-1AF30-0AA0 | **FC bus cable** | 6XV1830-0GH10 |
| • 830 mm | 6ES7590-1AJ30-0AA0 | PROFIBUS Food bus cable with PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m | |
| For cutting to length by customer, without drill holes; grounding elements must be ordered separately | | | |
| • 2000 mm | 6ES7590-1BC00-0AA0 | | |
| **PE connection element for DIN rail 2000 mm** | 6ES7590-5AA00-0AA0 | **FC underground cable** | 6XV1830-3FH10 |
| 20 units | | PROFIBUS underground cable, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m | |
| **Load power supply** | | | |
| 24 V DC/3 A | 6EP1332-4BA00 | | |
| 24 V DC/8 A | 6EP1333-4BA00 | **FC FRNC cable** | 6XV1830-0LH10 |
| **Power supply connector** | | PROFIBUS bus cable, flame-retardant and halogen-free, with copolymer sheath FRNC, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | |
| Spare part; for connecting the 24 V DC supply voltage | | | |
| • with push-in terminals | 6ES7193-4JB00-0AA0 | | |
| **PROFIBUS connector** | | **FC trailing cable** | 6XV1831-2L |
| • Connector for PROFIBUS, up to 12 Mbps, 90° cable outlet, insulation displacement system, without PG socket | 6ES7972-0BA70-0XA0 | PROFIBUS trailing cable, at least 3 million bending cycles, min. bending radius approx. 120 mm, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | |
| • Connector for PROFIBUS, up to 12 Mbps, 90° cable outlet, insulation displacement system, with PG socket | 6ES7972-0BB70-0XA0 | | |
| **PROFIBUS Stripping Tool** | 6GK1905-6AA00 | **IE FC Stripping Tool** | 6GK1901-1GA00 |
| Stripping tool for fast stripping of the PROFIBUS | | Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables | |
| **PROFIBUS FastConnect bus cable** | | | |
| • Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | 6XV1830-0EH10 | | |
| • 20 m | 6XV1830-0EN20 | | |
| • 50 m | 6XV1830-0EN50 | | |
| • 100 m | 6XV1830-0ET10 | | |
| • 200 m | 6XV1830-0ET20 | | |
| • 500 m | 6XV1830-0ET50 | | |
| • 1000 m | 6XV1830-0EU10 | | |

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200MP

**Interface modules   > SIPLUS IM 155-5 PN**

## ■ Overview

- Interface module for linking the ET 200MP to PROFINET
- Handles data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs
- Linking to the isochronous task of the CPU
- Prioritized fast startup (FSU) with 500 ms (max. 12 I/O modules)
- Media Redundancy Protocol (MRP)
- Shared device on up to two I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

## ■ Technical specifications

| | |
|---|---|
| Article number | **6AG1155-5AA00-7AB0** |
| Based on | **6ES7155-5AA00-0AB0** |
| | SIPLUS ET 200MP IM 155-5 PN ST |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS IM 155-5 PN interface module** | **6AG1155-5AA00-7AB0** |
| (Extended temperature range and exposure to media) | |
| IP 20 degree of protection, module width 35 mm, installation on S7-1500 rail | |
| **Accessories** | See SIMATIC ET 200MP, IM 155-5 PN interface module, page 9/159 |

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## Overview

I/O modules constitute the interface of the SIMATIC ET 200MP to the process:

- Digital and analog modules provide exactly the inputs/outputs required for each task
- Technology modules for SIMATIC S7-1500 and ET 200MP
  - With integrated functions for high-speed counting and position detection
  - With integrated inputs and outputs for tasks at the process level and short response times
- Communication modules for SIMATIC S7-1500 and ET 200MP
  - For data exchange using point-to-point coupling
  - For connecting to PROFIBUS
  - For connecting to Industrial Ethernet
- Connection system for user-friendly, low-overhead wiring of the S7-1500 and ET 200MP modules

For further information, see SIMATIC S7-1500, chapter 4.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet

**SIMATIC ET 200M**

## ■ Overview
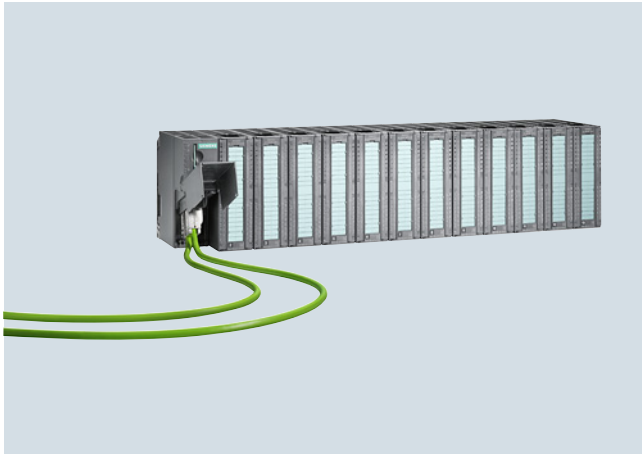


- Modular I/O system with IP20 degree of protection, particularly suitable for user-specific and complex automation tasks
- Consists of a PROFIBUS DP or PROFINET interface module IM 153, up to 8 or 12 I/O modules of the S7-300 automation system (structure with bus connection or with active bus modules), and a power supply if applicable
- Can be expanded with S7-300 automation system signal, communication and function modules
- Applicable Ex analog input or output modules with HART optimize the ET 200M for use in process engineering
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Transmission rates up to 12 Mbps
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100a
- Fail-safe digital inputs/outputs as well as analog inputs for safety-oriented signal processing in accordance with PROFIsafe
- Supports modules with expanded user data, e.g. HART modules with HART minor variables

## ■ Technical specifications

| General technical data ET 200M | |
|---|---|
| Cables and connections | Screw and spring-loaded connections in permanent wiring |
| Degree of protection | IP20 |
| Ambient temperature on vertical wall (preferred mounting position) | |
| • with horizontal assembly | 0 to +60 °C |
| • with other assembly | 0 to +40 °C |
| Relative humidity | 5 to 95% (RH stress level 2 according to IEC 1131-2) |
| Atmospheric pressure | 795 to 1080 hPa |
| Mechanical stress | |
| • Vibrations | IEC 68, parts 2 – 6: 10 - 57 Hz (const.amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g) |
| • Shock | IEC 68, parts 2 – 27 half-sine, 15 g, 11 ms |

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## Overview

The ET 200M system with various interface modules is available for the distributed use of S7-300 I/O modules. Depending on the application purpose, the best suited IM in terms of costs and functions can be selected:

### IM153-1 Standard

The IM153-1 is one reasonably priced variant that is excellently suited for most applications in the manufacturing environment. It permits the use of up to 8 S7-300 I/O modules.

### IM153-2 High Feature

For higher requirements in manufacturing technology, such as the use of F technology or the highest performance in conjunction with clock synchronization, the IM153-2 High Feature is available. This IM is also designed for use with the PCS 7 in the field of process-oriented applications. This IM can be redundantly used and supports typical functions as they are required in the control field. These include, for example, clock synchronization or time stamping with an accuracy of up to 1 ms.

## Technical specifications

| Article number | 6ES7153-1AA03-0XB0 | 6ES7153-2BA10-0XB0 | 6ES7153-2BA70-0XB0 |
|---|---|---|---|
| | ET 200M, INTERFACE MODULE IM153-1 | ET 200M, INTERFACE IM153-2 HF | ET 200M, INTERFACE IM153-2 HF OUTDOOR |
| **General information** | | | |
| Product type designation | IM 153-1 DP ST | IM 153-2 DP HF | |
| **Supply voltage** | | | |
| Rated value (DC) | 24 V | 24 V | |
| • 24 V DC | Yes | Yes | Yes |
| permissible range (ripple included), lower limit (DC) | 20.4 V | 20.4 V | 20.4 V |
| permissible range (ripple included), upper limit (DC) | 28.8 V | 28.8 V | 28.8 V |
| external protection for power supply lines (recommendation) | not necessary | 2,5 A | 2,5 A |
| **Mains buffering** | | | |
| • Mains/voltage failure stored energy time | 5 ms | 5 ms | 5 ms |
| **Input current** | | | |
| Current consumption, max. | 350 mA; at 24 V DC | 650 mA; with 24 V DC supply | 650 mA |
| Inrush current, typ. | 2.5 A | 3 A | 3 A |
| I²t | 0.1 A²·s | 0.1 A²·s | 0.1 A²·s |
| **Output voltage** | | | |
| Rated value (DC) | 5 V | | |
| **Output current** | | | |
| for backplane bus (5 V DC), max. | 1 A | 1.5 A | 1.5 A |
| **Power loss** | | | |
| Power loss, typ. | 3 W | 5.5 W | 5.5 W |
| **Address area** | | | |
| **Addressing volume** | | | |
| • Inputs | 128 byte | 244 byte | 244 byte |
| • Outputs | 128 byte | 244 byte | 244 byte |
| **Hardware configuration** | | | |
| Number of modules per DP slave interface, max. | 8 | 12 | 12 |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200M

**Interface modules   > IM 153-1/153-2**

■ **Technical specifications** (continued)

| Article number | 6ES7153-1AA03-0XB0 | 6ES7153-2BA10-0XB0 | 6ES7153-2BA70-0XB0 |
|---|---|---|---|
| | ET 200M, INTERFACE MODULE IM153-1 | ET 200M, INTERFACE IM153-2 HF | ET 200M, INTERFACE IM153-2 HF OUTDOOR |
| **Time stamping** | | | |
| Accuracy | | 1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules | 1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules |
| Number of message buffers | | 15 | 15 |
| Messages per message buffer | | 20 | 20 |
| Number of stampable digital inputs, max. | | 128; Max. 128 signals/station; max. 32 signals/slot | 128; Max. 128 signals/station; max. 32 signals/slot |
| Time format | | RFC 1119 | RFC 1119 |
| Time resolution | | 0.466 ns | 0.466 ns |
| Time interval for transmitting the message buffer if a message is present | | 1 000 ms | 1 000 ms |
| Time stamp on signal change | | rising / falling edge as signal entering or exiting | rising / falling edge as signal entering or exiting |
| **Interfaces** | | | |
| Interface physics, RS 485 | Yes | Yes | Yes |
| Interface physics, FOC | No | No | No |
| **PROFIBUS DP** | | | |
| • Node addresses | 1 to 125 permitted | 1 to 125 permitted | 1 to 125 permitted |
| • automatic detection of transmission rate | Yes | Yes | Yes |
| • Output current, max. | 90 mA | 70 mA | 70 mA |
| • Transmission rate, max. | 12 Mbit/s | 12 Mbit/s | 12 Mbit/s |
| • Transmission procedure | RS 485 | RS 485 | RS 485 |
| • SYNC capability | Yes | Yes | Yes |
| • FREEZE capability | Yes | Yes | Yes |
| • Direct data exchange (slave-to-slave communication) | Yes; Sender | Yes; as publisher with all IO, as subscriber with F-IO only | Yes; as publisher with all IO, as subscriber with F-IO only |
| • Connector type | 9-pin sub D socket | 9-pin sub D | 9-pin sub D |
| **1. Interface** | | | |
| **DP slave** | | | |
| • GSD file | (for DPV1) SIEM801D.GSD; SI01801D.GSG | SI05801E.GSG | SI05801E.GSG |
| • automatic baud rate search | Yes | Yes | Yes |
| **Protocols** | | | |
| Bus protocol/transmission protocol | PROFIBUS DP to EN 50170 | PROFIBUS DP to EN 50170 | PROFIBUS DP to EN 50170 |
| **Isolation** | | | |
| Isolation tested with | Isolation voltage 500 V | Isolation voltage 500 V | Isolation voltage 500 V |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP20 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | 0 °C | |
| • max. | 60 °C | 60 °C | |
| **Air pressure acc. to IEC 60068-2-13** | | | |
| • Installation altitude above sea level, max. | 3 000 m | 3 000 m | 3 000 m |
| **Configuration** | | | |
| **Configuration software** | | | |
| • STEP 7 | STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file | Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file | Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file |
| **Dimensions** | | | |
| Width | 40 mm | 40 mm | 40 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 117 mm | 117 mm | 117 mm |
| **Weights** | | | |
| Weight, approx. | 360 g | 360 g | 360 g |

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■ **Technical specifications** (continued)

| Article number | 6ES7195-7HD10-0XA0 | | |
|---|---|---|---|
| | ET 200M, BUS UNIT F. 2 IM 153-2 RED. | | |
| **Accessories** | | | |
| belongs to product | ET 200M | | |
| **Dimensions** | | | |
| Width | 97 mm | | |
| Height | 92 mm | | |
| Depth | 30 mm | | |
| **Weights** | | | |
| Weight, approx. | 133 g | | |

| Article number | 6ES7195-7HA00-0XA0 | 6ES7195-7HB00-0XA0 | 6ES7195-7HC00-0XA0 |
|---|---|---|---|
| | ET 200M, BUS UNIT F. PS AND IM 153 | ET 200M, BUS UNIT F. 2 40MM I/O MODULES | ET 200M, BUS UNIT F. 1 80MM I/O MODULE |
| **Accessories** | | | |
| belongs to product | ET 200M | ET 200M | ET 200M |
| **Dimensions** | | | |
| Width | 97 mm | 97 mm; 80 mm when installed | 97 mm; 80 mm when installed |
| Height | 92 mm | 92 mm | 92 mm |
| Depth | 30 mm | 30 mm | 30 mm |
| **Weights** | | | |
| Weight, approx. | 111 g | 140 g | 127 g |

■ **Ordering data** | **Article No.** | | **Article No.**

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 153-1 interface module** | | **SIMATIC S7-300 DIN rail** | |
| Slave interface for connecting an ET 200M to PROFIBUS DP | | • Length: 160 mm | 6ES7390-1AB60-0AA0 |
| • Standard temperature range | 6ES7153-1AA03-0XB0 | • Length: 480 mm (19") | 6ES7390-1AE80-0AA0 |
| | | • Length: 530 mm | 6ES7390-1AF30-0AA0 |
| **IM 153-2 interface module** | | • Length: 830 mm | 6ES7390-1AJ30-0AA0 |
| Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems | | • Length: 2000 mm | 6ES7390-1BC00-0AA0 |
| • High Feature | 6ES7153-2BA10-0XB0 | **PROFIBUS bus connector** | |
| • High Feature with extended temperature range | 6ES7153-2BA70-0XB0 | 90° outgoing cable, terminating resistor with disconnecting function, up to 12 Mbps, FastConnect | |
| **Active IM 153/IM 153 bus module** | 6ES7195-7HD10-0XA0 | Without PG interface | |
| For two IM 153-2 High Feature modules for designing redundant systems | | • 1 unit | 6ES7972-0BA52-0XA0 |
| | | • 100 units | 6ES7972-0BA52-0XB0 |
| **Bus module for ET 200M** | | With PG interface | |
| • For accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover | 6ES7195-7HA00-0XA0 | • 1 unit | 6ES7972-0BB52-0XA0 |
| | | • 100 units | 6ES7972-0BB52-0XB0 |
| • For accommodating two 40-mm-wide I/O modules for the hot-swapping function | 6ES7195-7HB00-0XA0 | **S7 Manual Collection** | 6ES7998-8XC01-8YE0 |
| • For accommodating one 80-mm-wide I/O module for the hot-swapping function | 6ES7195-7HC00-0XA0 | Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| **ET 200M redundancy bundle** | 6ES7153-2AR04-0XA0 | | |
| Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module | | **S7 Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| **Accessories** | | Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | |
| **SIMATIC DP DIN rail for ET 200M** | | | |
| Accommodates up to 5 bus modules; for hot-swapping function | | | |
| • Length: 483 mm (19") | 6ES7195-1GA00-0XA0 | | |
| • Length: 530 mm | 6ES7195-1GF30-0XA0 | | |
| • Length: 620 mm | 6ES7195-1GG30-0XA0 | | |
| • Length: 2000 mm | 6ES7195-1GC00-0XA0 | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**Interface modules   > IM 153-4 PN**

## Overview

- For connecting ET 200M to PROFINET IO (via copper line, RJ45) as an IO device
- 2 versions:
  - IM 153-4 PN Standard
  - IM 153-4 PN High Feature:
    supports, in contrast to the STANDARD version, the operation of PROFIsafe F and HART modules. The operation of an S7-400H (system redundancy) is likewise possible
- Integrated 2-port switch
- 12 modules per station
- Usable I/O capacity: 192 bytes each
- Active bus backplane to hot-swap modules available as an option
- Baud rate 10 Mbps / 100 Mbps (autonegotiation / full duplex)
- I&M functions according to PNO Guideline Order No. 3.502, Version V1.1

Note:

Micro Memory Card with at least 64 KB required if not all the stations in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

## Technical specifications

| Article number | 6ES7153-4AA01-0XB0 | 6ES7153-4BA00-0XB0 |
|---|---|---|
| | IM153-4 PN IO FOR 12 MODULES S7-300 | IM153-4 PN IO HF FOR 12 MODULES S7-300 |
| **General information** | | |
| Product type designation | IM 153-4 PN ST | IM 153-4 PN HF |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| • 24 V DC | Yes | Yes |
| permissible range (ripple included), lower limit (DC) | 20.4 V | 18.5 V |
| permissible range (ripple included), upper limit (DC) | 28.8 V | 30.2 V |
| external protection for power supply lines (recommendation) | In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A) | In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A) |
| **Mains buffering** | | |
| • Mains/voltage failure stored energy time | 5 ms | 5 ms |
| **Input current** | | |
| Current consumption, max. | 600 mA; with 24 V DC supply | 600 mA; with 24 V DC supply |
| Inrush current, typ. | 4 A | 4 A |
| I²t | 0.09 A²·s | 0.09 A²·s |
| **Output voltage** | | |
| Rated value (DC) | 5 V | 5 V |
| **Output current** | | |
| for backplane bus (5 V DC), max. | 1.5 A | 1.5 A |
| **Power loss** | | |
| Power loss, typ. | 6 W | 6 W |
| **Address area** | | |
| **Addressing volume** | | |
| • Inputs | 192 byte | 672 byte; Extended HART user data |
| • Outputs | 192 byte | 192 byte |
| **Hardware configuration** | | |
| Number of modules per DP slave interface, max. | 12 | 12 |

■ **Technical specifications** (continued)

| Article number | 6ES7153-4AA01-0XB0 | 6ES7153-4BA00-0XB0 |
|---|---|---|
| | IM153-4 PN IO FOR 12 MODULES S7-300 | IM153-4 PN IO HF FOR 12 MODULES S7-300 |
| **Protocols** | | |
| Bus protocol/transmission protocol | PROFINET IO | PROFINET IO |
| **Interrupts/diagnostics/ status information** | | |
| **Diagnostics indication LED** | | |
| • Connection to network LINK (green) | Yes | Yes |
| • Transmit/receive RX/TX (yellow) | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 500 V DC | Between PROFINET and 24 V supply: 1 500 V AC, between functional grounding and 24 V supply: 500 V DC |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP20 | Yes | Yes |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | 0 °C |
| • max. | 60 °C | 60 °C |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • Installation altitude above sea level, max. | 2 000 m | 2 000 m |
| **Dimensions** | | |
| Width | 40 mm | 40 mm |
| Height | 125 mm | 125 mm |
| Depth | 118 mm | 118 mm |
| **Weights** | | |
| Weight, approx. | 215 g | 215 g |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200M

**Interface modules   > IM 153-4 PN**

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 153-4 PN interface module** | | **S7 Manual Collection** | 6ES7998-8XC01-8YE0 |
| I/O device to connect an ET 200M to PROFINET | | Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| Standard | 6ES7153-4AA01-0XB0 | | |
| High Feature | 6ES7153-4BA00-0XB0 | | |
| **Accessories** | | | |
| **Bus modules for ET 200M** | | | |
| • For accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover | 6ES7195-7HA00-0XA0 | **S7 Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| • For accommodating two 40-mm-wide I/O modules for the hot-swapping function | 6ES7195-7HB00-0XA0 | Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | |
| • For accommodating one 80-mm-wide I/O module for the hot-swapping function | 6ES7195-7HC00-0XA0 | **Industrial Ethernet FC RJ45 Plug 180** | |
| **SIMATIC Micro Memory Card** | | RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet | |
| 64 KB[1] | 6ES7953-8LF31-0AA0 | | |
| **SIMATIC DP DIN rail for ET 200M** | | | |
| Accommodates bus modules; for hot-swapping function | | | |
| • Length: 483 mm (19") | 6ES7195-1GA00-0XA0 | 1 unit | 6GK1901-1BB10-2AA0 |
| • Length: 530 mm | 6ES7195-1GF30-0XA0 | 10 units | 6GK1901-1BB10-2AB0 |
| • Length: 620 mm | 6ES7195-1GG30-0XA0 | 50 units | 6GK1901-1BB10-2AE0 |
| • Length: 2000 mm | 6ES7195-1GC00-0XA0 | **Industrial Ethernet FastConnect installation cables** | |
| **SIMATIC S7-300 DIN rail** | | • FastConnect standard cable | 6XV1840-2AH10 |
| Length: 160 mm | 6ES7390-1AB60-0AA0 | • FastConnect trailing cable | 6XV1840-3AH10 |
| Length: 480 mm (19") | 6ES7390-1AE80-0AA0 | • FastConnect marine cable | 6XV1840-4AH10 |
| Length: 530 mm | 6ES7390-1AF30-0AA0 | **Industrial Ethernet FastConnect** | |
| Length: 830 mm | 6ES7390-1AJ30-0AA0 | Stripping tool | 6GK1901-1GA00 |
| Length: 2000 mm | 6ES7390-1BC00-0AA0 | | |
| **Power supply connector** | | | |
| For connection of the 24 V DC power supply; spare part, 1 pack containing 10 units | | | |
| Spring-loaded connections | 6ES7193-4JB00-0AA0 | | |
| Screw terminal connections | 6ES7193-4JB50-0AA0 | | |

[1] To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

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## Overview

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Technical specifications

| Article number | 6AG1153-1AA03-2XB0 | 6AG1153-2BA10-2XY0 | 6AG1153-2BA10-7XB0 |
|---|---|---|---|
| Based on | 6ES7153-1AA03-0XB0 | 6ES7153-2BA10-0XB0 | 6ES7153-2BA10-0XB0 |
| | SIPLUS IM153-1 | SIPLUS ET 200M IM153-2 EN50155 | SIPLUS ET 200M IM153-2 HF |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -40 °C; = Tmin | -25 °C; = Tmin | -40 °C; = Tmin; Startup @ -25 °C |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155 | 70 °C; = Tmax |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| • At cold restart, min. | -25 °C | -25 °C | -25 °C |
| **Relative humidity** | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**Interface modules > SIPLUS ET 200M IM 153-1/153-2**

## Technical specifications (continued)

| Article number | **6AG1195-7HA00-2XA0** | **6AG1195-7HB00-7XA0** | **6AG1195-7HC00-2XA0** | **6AG1195-7HD10-2XA0** |
|---|---|---|---|---|
| Based on | **6ES7195-7HA00-0XA0** | **6ES7195-7HB00-0XA0** | **6ES7195-7HC00-0XA0** | **6ES7195-7HD10-0XA0** |
| | SIPLUS ET 200M DP Busmodul | SIPLUS DP Busmodul ET 200M 2X40 | SIPLUS ET 200M Busmodul | SIPLUS ET 200M DP Busmodul |
| **Ambient conditions** | | | | |
| **Ambient temperature during operation** | | | | |
| • min. | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin | -40 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | | -40 °C | -40 °C | -40 °C |
| • max. | | 70 °C | 70 °C | 70 °C |
| **Extended ambient conditions** | | | | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | | | | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | | | | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**SIPLUS ET 200M IM 153-1**

Slave interface for connecting an ET 200M to PROFIBUS DP for a maximum of 8 S7-300 modules
• Extended temperature range and exposure to media

**6AG1153-1AA03-2XB0**

**SIPLUS ET 200M IM 153-2 High Feature**

Slave interface for connecting an ET 200M to PROFIBUS DP for a maximum of 12 S7-300 modules; also for use in redundant systems
• Extended temperature range and exposure to media
• Conforms to EN 50155

**6AG1153-2BA10-7XB0**

**6AG1153-2BA10-2XY0**

**Bus module for SIPLUS ET 200M**

Bus module for accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover
• Extended temperature range and exposure to media

**6AG1195-7HA00-2XA0**

Bus module for accommodating two 40-mm-wide I/O modules for the hot-swapping function
• Extended temperature range and exposure to media

**6AG1195-7HB00-7XA0**

Bus module for accommodating one 80-mm-wide I/O module for the hot-swapping function
• Extended temperature range and exposure to media

**6AG1195-7HC00-2XA0**

Bus module for accommodating two IM 153 modules for the hot-swapping function; for setting up redundant systems
• Extended temperature range and exposure to media

**6AG1195-7HD10-2XA0**

**RS 485 bus connector with 90° cable outlet**

Max. transfer rate 12 Mbps

Extended temperature range and exposure to media
• without PG interface
• with PG interface

**6AG1972-0BA12-2XA0**
**6AG1972-0BB12-2XA0**

**Additional accessories**

see SIMATIC ET 200M IM 153-1/153-2, page 9/167

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200M

## ■ Overview

- For connection of ET 200M as an IO device to PROFINET IO (copper, RJ45)
- 2 versions:
  - IM 153-4 PN STANDARD
  - IM 153-4 PN HIGH FEATURE:
    compared to the STANDARD version,
    also allows operation of PROFIsafe F and HART modules
- Integrated 2-port switch
- 12 modules per station
- Usable I/O quantity structure: 192 bytes each
- Active backplane bus for hot swapping of modules optionally available
- Baud rate 10 Mbps / 100 Mbps (Autonegotiation/Full Duplex)
- I&M functions according to PNO-Guideline Order-No. 3.502, Version V1.1

Notes:

Micro Memory Card with min. 64 KB required if not all partici-pants in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respec-tive standard products. SIPLUS extreme-specific information was added.

Technical documentation on SIPLUS can be found here:
http://www.siemens.com/siplus-extreme

## ■ Technical specifications

| | |
|---|---|
| Article number | **6AG1153-4AA01-7XB0** |
| Based on | **6ES7153-4AA01-0XB0** |
| | SIPLUS ET 200M IM 153-4 PN IO |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under conden-sation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS ET 200M IM 153-4 PN** | |
| Slave interface for connecting an ET 200M to PROFINET for a maximum of 12 S7-300 modules | |
| • Extended temperature range and exposure to media | **6AG1153-4AA01-7XB0** |
| **Accessories** | |
| **IE FC RJ45 Plug 180** | **6AG1901-1BB10-7AA0** |
| 180° cable outlet; 1 unit | |
| **Additional accessories** | See SIMATIC ET 200M IM 153-4 PN interface module, page 9/170 |

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### Overview Digital modules



- Digital inputs and outputs
- For flexible adaptation of the controller to the respective task
- For connecting digital sensors and actuators

For further information, see SIMATIC S7-300, chapter 5.

### Overview Analog modules



- Analog inputs and outputs
- For solving even complex tasks with analog process signals
- For connecting analog actuators and sensors without additional measuring amplifiers

For further information, see SIMATIC S7-300, chapter 5.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules > Analog modules with HART > Analog input module with HART**

## Overview



- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundancy switching
- Firmware update
- HART minor variables

## Technical specifications

| Article number | 6ES7331-7TF01-0AB0 |
|---|---|
| | SM331, 8AI, 0/4-20MA HART |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| from load voltage L+ (without load), max. | 20 mA |
| from backplane bus 5 V DC, max. | 120 mA |
| **Output voltage** | |
| **Power supply to the transmitters** | |
| • present | Yes |
| • Rated value (DC) | 24 V |
| • short-circuit proof | Yes |
| **Power loss** | |
| Power loss, typ. | 1.5 W |
| **Analog inputs** | |
| Number of analog inputs | 8 |
| permissible input current for current input (destruction limit), max. | 40 mA |
| **Input ranges** | |
| • Current | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • Input resistance (0 to 20 mA) | 140 Ω |
| • Input resistance (-20 mA to +20 mA) | 140 Ω |
| • Input resistance (4 mA to 20 mA) | 140 Ω |
| **Cable length** | |
| • shielded, max. | 800 m |

| Article number | 6ES7331-7TF01-0AB0 |
|---|---|
| | SM331, 8AI, 0/4-20MA HART |
| **Analog value generation for the inputs** | |
| Measurement principle | Sigma Delta |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit |
| • Integration time, parameterizable | Yes |
| • Integration time (ms) | 20 ms at 50 Hz; 16.6 ms at 60 Hz; 100 ms at 100 Hz |
| • Basic conversion time, including integration time (ms) | 55 ms @ 60 Hz, 65 ms @ 50 Hz, 305 ms @ 100 Hz |
| • Interference voltage suppression for interference frequency f1 in Hz | 10 / 50 / 60 Hz |
| **Encoder** | |
| **Connection of signal encoders** | |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |
| **Errors/accuracies** | |
| Linearity error (relative to input range), (+/-) | 0.01 % |
| Temperature error (relative to input range), (+/-) | 0.001 %/K |
| Crosstalk between the inputs, min. | 70 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.1 % |
| **Operational error limit in overall temperature range** | |
| • Current, relative to input range, (+/-) | 0.15 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to input range, (+/-) | 0.1 % |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB |
| • Common mode interference, min. | 100 dB |

## ■ Technical specifications (continued)

| Article number | 6ES7331-7TF01-0AB0 |
|---|---|
| | SM331, 8AI, 0/4-20MA HART |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | No |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Limit value alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Channel fault indicator F (red) | Yes |

| Article number | 6ES7331-7TF01-0AB0 |
|---|---|
| | SM331, 8AI, 0/4-20MA HART |
| **Potential separation** | |
| **Potential separation analog inputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 500 V DC |
| **Connection method** | |
| required front connector | 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 117 mm |
| **Weights** | |
| Weight, approx. | 205 g |

## ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SM 331 HART analog input module** | 6ES7331-7TF01-0AB0 | | **Label cover** | 6ES7392-2XY00-0AA0 |
| 8 inputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 interface module | | | (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |
| **Accessories** | | | **Labeling strips** | 6ES7392-2XX00-0AA0 |
| **Front connectors** | | | (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |
| • 20-pin, with screw terminals | | | **Labeling sheets for machine printing** | |
|   - 1 unit | 6ES7392-1AJ00-0AA0 | | For modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
|   - 100 units | 6ES7392-1AJ00-1AB0 | | | |
| • 20-pin, with spring-loaded terminals | | | petrol | 6ES7392-2AX00-0AA0 |
|   - 1 unit | 6ES7392-1BJ00-0AA0 | | light beige | 6ES7392-2BX00-0AA0 |
|   - 100 units | 6ES7392-1BJ00-1AB0 | | yellow | 6ES7392-2CX00-0AA0 |
| **LK 393 cable guide** | 6ES7393-4AA00-0AA0 | | red | 6ES7392-2DX00-0AA0 |
| Mandatory for operation in hazardous areas | | | | |
| **SIMATIC DP DIN rail for ET 200M** | | | | |
| For mounting of up to 5 bus modules for | | | | |
| • Length: 483 mm (19") | 6ES7195-1GA00-0XA0 | | | |
| • Length: 530 mm | 6ES7195-1GF30-0XA0 | | | |
| **SIMATIC S7-300 DIN rail** | | | | |
| • Length: 160 mm | 6ES7390-1AB60-0AA0 | | | |
| • Length: 480 mm (19") | 6ES7390-1AE80-0AA0 | | | |
| • Length: 530 mm | 6ES7390-1AF30-0AA0 | | | |
| • Length: 830 mm | 6ES7390-1AJ30-0AA0 | | | |
| • Length: 2000 mm | 6ES7390-1BC00-0AA0 | | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules > Analog modules with HART > Analog output module with HART**

## Overview



- For plugging into ET 200M exclusively with IM 153-2 and IM 153-2 FO
- 8 AO HART
- Redundancy switching
- Firmware update
- HART minor variables

## Technical specifications

| Article number | 6ES7332-8TF01-0AB0 |
|---|---|
| | SM332, 8AO, 0/4 - 20MA HART |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| from load voltage L+ (without load), max. | 350 mA |
| from backplane bus 5 V DC, max. | 110 mA |
| **Power loss** | |
| Power loss, typ. | 6 W |
| **Analog outputs** | |
| Number of analog outputs | 8 |
| Current output, no-load voltage, max. | 24 V |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • -20 mA to +20 mA | No |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with current outputs, max. | 750 Ω |
| • with current outputs, inductive load, max. | 10 mH |
| **Destruction limits against externally applied voltages and currents** | |
| • Voltages at the outputs towards MANA | +60/-0.5 V |
| **Cable length** | |
| • shielded, max. | 800 m |

| Article number | 6ES7332-8TF01-0AB0 |
|---|---|
| | SM332, 8AO, 0/4 - 20MA HART |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit |
| **Settling time** | |
| • for resistive load | 0.1 ms |
| • for inductive load | 0.5 ms |
| **Errors/accuracies** | |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) | 0.02 % |
| Linearity error (relative to output range), (+/-) | 0.01 % |
| Temperature error (relative to output range), (+/-) | 0.002 %/K |
| Crosstalk between the outputs, min. | 70 dB |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.05 % |
| **Operational error limit in overall temperature range** | |
| • Current, relative to output range, (+/-) | 0.2 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to output range, (+/-) | 0.1 % |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | No |

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## ■ Technical specifications (continued)

| Article number | 6ES7332-8TF01-0AB0 |
|---|---|
| | SM332, 8AO, 0/4 - 20MA HART |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| **Potential separation** | |
| **Potential separation analog outputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | Yes |

| Article number | 6ES7332-8TF01-0AB0 |
|---|---|
| | SM332, 8AO, 0/4 - 20MA HART |
| **Isolation** | |
| Isolation tested with | 500 V DC |
| **Connection method** | |
| required front connector | 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 117 mm |
| **Weights** | |
| Weight, approx. | 220 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SM 332 HART analog output module** <br><br> HART analog output, 8 outputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 | **6ES7332-8TF01-0AB0** | **Labeling strips** <br><br> (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | **6ES7392-2XX00-0AA0** |
| **Accessories** | | **S7 Manual Collection** <br><br> Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | **6ES7998-8XC01-8YE0** |
| **Front connector** (1 unit) <br><br> 20-pin, with screw contacts | **6ES7392-1AJ00-0AA0** | | |
| **LK 393 cable guide** <br><br> Mandatory for operation in hazardous areas | **6ES7393-4AA00-0AA0** | | |
| **SIMATIC DP DIN rail for ET 200M** <br><br> For mounting of up to 5 bus modules for | | **S7 Manual Collection update service for 1 year** <br><br> Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | **6ES7998-8XC01-8YE2** |
| • Length: 483 mm | **6ES7195-1GA00-0XA0** | | |
| • Length: 530 mm | **6ES7195-1GF30-0XA0** | | |
| **SIMATIC S7-300 DIN rail** | | **Labeling sheets for machine printing** <br><br> for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| • Length: 160 mm | **6ES7390-1AB60-0AA0** | | |
| • Length: 480 mm (19") | **6ES7390-1AE80-0AA0** | | |
| • Length: 530 mm | **6ES7390-1AF30-0AA0** | | |
| • Length: 830 mm | **6ES7390-1AJ30-0AA0** | petrol | **6ES7392-2AX00-0AA0** |
| • Length: 2000 mm | **6ES7390-1BC00-0AA0** | light beige | **6ES7392-2BX00-0AA0** |
| **Label cover** <br><br> (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | **6ES7392-2XY00-0AA0** | yellow | **6ES7392-2CX00-0AA0** |
| | | red | **6ES7392-2DX00-0AA0** |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200M

**I/O modules  > Analog modules with HART   > Ex analog input module with HART**

## ■ Overview



- For connecting HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable

## ■ Technical specifications

| Article number | **6ES7331-7TB10-0AB0** |
|---|---|
| | SIMATIC DP, HART ANALOG INPUT M |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| from load voltage L+ (without load), max. | 180 mA |
| from backplane bus 5 V DC, max. | 100 mA |
| **Output voltage** | |
| **Power supply to the transmitters** | |
| • present | Yes |
| • Rated value (DC) | 15 V; at 22 mA |
| • short-circuit proof | Yes; approx. 30 mA |
| • No-load voltage (DC) | 29.6 V |
| **Power loss** | |
| Power loss, typ. | 4.5 W |
| **Analog inputs** | |
| Number of analog inputs | 2 |
| permissible input current for current input (destruction limit), max. | 40 mA |
| **Input ranges** | |
| • Current | Yes |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • Input resistance (0 to 20 mA) | 50 Ω |
| • 4 mA to 20 mA | Yes |
| • Input resistance (4 mA to 20 mA) | 50 Ω |
| **Cable length** | |
| • shielded, max. | 400 m |
| **Analog value generation for the inputs** | |
| Measurement principle | Sigma Delta |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit; 10 bit to 15 bit + sign |
| • Integration time, parameterizable | Yes |
| • Integration time (ms) | 2,5 / 16,67 / 20 / 100 ms |
| • Basic conversion time, including integration time (ms) | 2.5 / 16.67 / 20 / 100 (1 channel enabled); 7.5 / 50 / 60 / 300 (2 channels enabled) |
| • Interference voltage suppression for interference frequency f1 in Hz | 10 / 50 / 60 / 400 Hz |

| Article number | **6ES7331-7TB10-0AB0** |
|---|---|
| | SIMATIC DP, HART ANALOG INPUT M |
| **Encoder** | |
| **Connection of signal encoders** | |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |
| **Errors/accuracies** | |
| Linearity error (relative to input range), (+/-) | 0.01 % |
| Temperature error (relative to input range), (+/-) | 0.01 %/K |
| Crosstalk between the inputs, min. | 130 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.05 % |
| **Operational error limit in overall temperature range** | |
| • Current, relative to input range, (+/-) | 0.45 %; From 0/4 to 20 mA |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to input range, (+/-) | 0.1 %; From 0/4 to 20 mA |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 60 dB |
| • Common mode interference, min. | 130 dB |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes; Parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Limit value alarm | Yes; Parameterizable, channels 0 and 1 |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes; possible |
| • Overrange | Yes; Red LED, signal |
| • Wire-break in signal transmitter cable | Yes; Red LED, signal |
| • Short-circuit of the signal encoder cable | Yes; Red LED, signal |
| • HART communication active | Yes; green LED (H) |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Channel fault indicator F (red) | Yes |

## Technical specifications (continued)

| Article number | 6ES7331-7TB10-0AB0<br>SIMATIC DP,<br>HART ANALOG INPUT M |
|---|---|
| **Ex(i) characteristics** | |
| Module for Ex(i) protection | Yes |
| **Maximum values of input circuits (per channel)** | |
| • Co (permissible external capacity), max. | 62 nF |
| • Io (short-circuit current), max. | 96.1 mA |
| • Lo (permissible external inductivity), max. | 3 mH |
| • Po (power of load), max. | 511 mW |
| • Uo (output no-load voltage), max. | 26 V |
| • Um (fault voltage), max. | 250 V; DC |
| • Ta (permissible ambient temperature), max. | 60 °C |
| **Potential separation** | |
| **Potential separation analog inputs** | |
| • between the channels | Yes |
| • between the channels and backplane bus | Yes |
| **Permissible potential difference** | |
| between the inputs (UCM) | 60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas |
| **Isolation** | |
| **tested with** | |
| • Channels against backplane bus and load voltage L+ | 2500 V DC |
| • Channels among one another | 2500 V DC |
| • Load voltage L+ against backplane bus | 500 V DC |

| Article number | 6ES7331-7TB10-0AB0<br>SIMATIC DP,<br>HART ANALOG INPUT M |
|---|---|
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| UL approval | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| EAC (formerly Gost-R) | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4 |
| • Type of protection acc. to KEMA | II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc |
| • Test number KEMA | DEKRA 14 ATEX 0052X |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Connection method** | |
| required front connector | 1x 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 260 g |

## Ordering data

| | Article No. |
|---|---|
| **SM 331 HART analog input module** | |
| 2 inputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 interface module | |
| For HART protocol V5.0 and higher | **6ES7331-7TB10-0AB0** |
| **Accessories** | |
| **Front connector[1]** | |
| 20-pin, with screw contacts | |
| • 1 unit | **6ES7392-1AJ00-0AA0** |
| • 100 units | **6ES7392-1AJ00-1AB0** |
| **LK 393 cable guide** | **6ES7393-4AA00-0AA0** |
| Mandatory for operation in hazardous areas | |
| **SIMATIC DP DIN rail for ET 200M** | |
| For mounting of up to 5 bus modules for | |
| • Length: 483 mm | **6ES7195-1GA00-0XA0** |
| • Length: 530 mm | **6ES7195-1GF30-0XA0** |
| **SIMATIC S7-300 DIN rail** | |
| • Length: 160 mm | **6ES7390-1AB60-0AA0** |
| • Length: 480 mm (19") | **6ES7390-1AE80-0AA0** |
| • Length: 530 mm | **6ES7390-1AF30-0AA0** |
| • Length: 830 mm | **6ES7390-1AJ30-0AA0** |
| • Length: 2000 mm | **6ES7390-1BC00-0AA0** |

| | Article No. |
|---|---|
| **Label cover** | **6ES7392-2XY00-0AA0** |
| (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |
| **Labeling sheets for machine printing** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| petrol | **6ES7392-2AX00-0AA0** |
| light beige | **6ES7392-2BX00-0AA0** |
| yellow | **6ES7392-2CX00-0AA0** |
| red | **6ES7392-2DX00-0AA0** |

[1] A connector with spring-loaded terminals cannot be used if the cable guide is used.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules > Analog modules with HART > Ex analog output module with HART**

## Overview



- For using HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AO HART, Ex
- 2 current outputs in 2 channel groups (single-channel isolation)
- Output type and range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable
- Read-back capability of the analog outputs

## Technical specifications

| Article number | 6ES7332-5TB10-0AB0 |
|---|---|
| | SIMATIC DP, HART ANALOG OUTPUT |
| **Supply voltage** | |
| **Load voltage L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| from load voltage L+ (without load), max. | 150 mA |
| from backplane bus 5 V DC, max. | 100 mA |
| **Power loss** | |
| Power loss, typ. | 3.5 W |
| **Analog outputs** | |
| Number of analog outputs | 2 |
| Current output, no-load voltage, max. | 19 V |
| Cycle time (all channels) max. | 5 ms |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • -20 mA to +20 mA | No |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with current outputs, max. | 650 Ω |
| • with current outputs, inductive load, max. | 7.5 mH |
| **Destruction limits against externally applied voltages and currents** | |
| • Voltages at the outputs towards MANA | max. 17 V / -0.5 V |
| • Current, max. | 60 mA / -1 A |
| **Cable length** | |
| • shielded, max. | 400 m |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 12 bit; + sign |
| • Conversion time (per channel) | 40 ms |

| Article number | 6ES7332-5TB10-0AB0 |
|---|---|
| | SIMATIC DP, HART ANALOG OUTPUT |
| **Settling time** | |
| • for resistive load | 2.5 ms |
| • for capacitive load | 4 ms |
| • for inductive load | 2.5 ms |
| **Errors/accuracies** | |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) | 0.02 % |
| Linearity error (relative to output range), (+/-) | 0.03 % |
| Temperature error (relative to output range), (+/-) | 0.01 %/K |
| Crosstalk between the outputs, min. | 130 dB |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.005 % |
| **Operational error limit in overall temperature range** | |
| • Current, relative to output range, (+/-) | 0.55 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to output range, (+/-) | 0.15 % |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes; Parameterizable |
| Substitute values connectable | Yes; Parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes; possible |
| • Overrange | Yes |
| • Wire-break | Yes; as of output value > 0.5 mA |
| • HART communication active | Yes; green LED (H) |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes; Red LED |
| • Channel fault indicator F (red) | Yes; per channel |
| **Ex(i) characteristics** | |
| Module for Ex(i) protection | Yes |

## ◼ Technical specifications (continued)

| Article number | 6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT |
|---|---|
| **Maximum values of output circuits (per channel)** | |
| • Co (permissible external capacity), max. | 230 nF |
| • Io (short-circuit current), max. | 66 mA |
| • Lo (permissible external inductivity), max. | 7.5 mH |
| • Po (power of load), max. | 506 mW |
| • Uo (output no-load voltage), max. | 19 V |
| • Um (fault voltage), max. | 60 V; DC |
| • Ta (permissible ambient temperature), max. | 60 °C |
| **Potential separation** | |
| **Potential separation analog outputs** | |
| • between the channels | Yes |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | Yes |
| **Permissible potential difference** | |
| between the outputs (UCM) | 60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas |

| Article number | 6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT |
|---|---|
| **Isolation** | |
| **tested with** | |
| • Channels against backplane bus and load voltage L+ | 2500 V DC |
| • Channels among one another | 2500 V DC |
| • Load voltage L+ against backplane bus | 500 V DC |
| **Standards, approvals, certificates** | |
| FM approval | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4 |
| • Type of protection acc. to KEMA | II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc |
| • Test number KEMA | DEKRA 14 ATEX 0053X |
| **Connection method** | |
| required front connector | 20-pin |
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| **Weights** | |
| Weight, approx. | 290 g |

## ◼ Ordering data

| | Article No. |
|---|---|
| **SM 332 HART analog output module** | |
| HART analog output, 8 outputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 | |
| For HART protocol V5.0 and higher | **6ES7332-5TB10-0AB0** |
| **Accessories** | |
| **Front connectors** | |
| 20-pin, with screw contacts • 1 unit • 100 units | **6ES7392-1AJ00-0AA0** **6ES7392-1AJ00-1AB0** |
| **LK 393 cable guide** | **6ES7393-4AA00-0AA0** |
| Mandatory for operation in hazardous areas | |
| **SIMATIC DP DIN rail for ET 200M** | |
| For mounting of up to 5 bus modules for • Length: 483 mm (19") • Length: 530 mm | **6ES7195-1GA00-0XA0** **6ES7195-1GF30-0XA0** |
| **SIMATIC S7-300 DIN rail** | |
| • Length: 160 mm • Length: 480 mm (19") • Length: 530 mm • Length: 830 mm • Length: 2000 mm | **6ES7390-1AB60-0AA0** **6ES7390-1AE80-0AA0** **6ES7390-1AF30-0AA0** **6ES7390-1AJ30-0AA0** **6ES7390-1BC00-0AA0** |
| **Label cover** | **6ES7392-2XY00-0AA0** |
| (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |

| | Article No. |
|---|---|
| **Labeling strips** | **6ES7392-2XX00-0AA0** |
| (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM | |
| Software for machine labeling of modules directly from the STEP 7 project | |
| **Labeling sheets for machine printing** | |
| for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units | |
| petrol | **6ES7392-2AX00-0AA0** |
| light beige | **6ES7392-2BX00-0AA0** |
| yellow | **6ES7392-2CX00-0AA0** |
| red | **6ES7392-2DX00-0AA0** |
| **S7 Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| **S7 Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules  > Analog modules with HART   > SIPLUS S7-300 analog input module with HART**

## Overview

- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Technical specifications

| | |
|---|---|
| Article number | **6AG1331-7TF01-7AB0** |
| Based on | **6ES7331-7TF01-0AB0** |
| | SIPLUS SM331 AI 8 x 0/4...20mA HART |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL use |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS SM 331 analog input module with HART** | |
| 8 inputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 interface module | |
| Extended temperature range and exposure to media | 6AG1331-7TF01-7AB0 |
| **Accessories** | See SIMATIC ET 200M analog input module with HART, page 9/177 |

## Overview



- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AO HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Technical specifications

| | |
|---|---|
| Article number | **6AG1332-8TF01-2AB0** |
| Based on | **6ES7332-8TF01-0AB0** |
| | SIPLUS SM332 8AO HART |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 60 °C; = Tmax |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

| Ordering data | Article No. |
|---|---|
| **SIPLUS SM 332 analog output module with HART** | |
| 8 outputs, 0/4...20 mA HART, for ET 200M with IM 153-2 interface module | |
| Extended temperature range and exposure to media | **6AG1332-8TF01-2AB0** |
| **Accessories** | See SIMATIC SM 332 analog output modules with HART, page 9/179 |

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# I/O systems

SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules > Analog modules with HART > SIPLUS S7-300 Ex analog input module with HART**

## Overview

- For connecting HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Programmable diagnostics and diagnostic interrupt

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Technical specifications

| | |
|---|---|
| Article number | **6AG1331-7TB00-7AB0** |
| Based on | **6ES7331-7TB00-0AB0** |
| | SIPLUS S7-300 SM331 2AE HART |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C; = Tmin |
| • max. | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

## Ordering data | Article No.

| | |
|---|---|
| **SIPLUS SM 331 Ex analog input module with HART** | |
| 2 inputs, 0/4 ... 20 mA, HART for ET 200M with IM 153-2 interface module | |
| Extended temperature range and exposure to media | **6AG1331-7TB00-7AB0** |
| **Accessories** | See SIMATIC ET 200M Ex analog input module with HART, page 9/181 |

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## Overview

The fail-safe CPUs of SIMATIC S7 and the fail-safe signal modules of SIMATIC ET 200S, ET 200pro, ET 200eco and ET 200M have been specially developed for distributed safety-related applications in production engineering. Thanks to the discreetly modular structure of the fail-safe I/Os, safety technology is only applied where actually required. The new system replaces conventional electromechanical components, such as:

- Freely programmable, safe linking of sensors to actuators
- Selective safe shutdown of actuators
- Mixed configuration of fail-safe modules and standard modules in a station
- Single-bus concept;
  fail-safe signals and standard signals are transferred over a single bus medium (PROFIBUS DP, PROFINET)

### Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation which provides total integration of safety automation and standard automation (SIMATIC S7).

Where standard automation (classical PLC) and safety automation (electromechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation technology in which safety engineering is part of standard automation and system-wide integration exists.

For further information, see SIMATIC S7-300, chapter 5.

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200M

**I/O modules   > Function modules**

■ **Overview**



Function modules unburden the CPU of work-intensive tasks such as counting, positioning and controlling

Module spectrum

- Counter modules
- Positioning modules for rapid traverse and creep speed drives
- Positioning modules for stepper motors
- Positioning and continuous path modules
- SSI position detection modules
- Electronic cam controllers
- High-speed Boolean processor
- Control modules

| Function modules | |
| --- | --- |
| Counting | FM 350-1 counter module |
| | FM 350-2 counter module |
| Positioning<br>• of rapid traverse and creep speed drives | FM 351 positioning module |
| • of stepper motors | FM 353 positioning module |
| Position and path control | FM 357-2 path and position control module[1] |
| SSI position detection | SM 338 POS input modules |
| Electronic cam control | FM 352 electronic cam controller |
| High speed logic operation | FM 352-5 high-speed Boolean processor |
| Controlling | FM 355 controller module |
| | FM 355-2 temperature controller module |
| Weighing and proportioning electronics | SIWAREX |

[1] Not for ET 200M

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■ **Overview** (continued)

*Applicability with ET 200M distributed I/O device*

Almost all function modules can be used in the ET 200M
distributed I/O device. In doing so, the following details must be
observed:

| Module | Article No. | For plugging in behind IM 153-1 (6ES7 153-1AA03-0XB0) | | For plugging in behind IM 153-2 (6ES7 153-2BA02-0XB0) | | For plugging in behind IM 153-2 FO (6ES7 153-2BB00-0XB0) | | For plugging in behind IM 153-4 PN (6ES7 153-4AA00-0XB0) |
|---|---|---|---|---|---|---|---|---|
| | | configurable with | | | | | | |
| | | STEP 7[1] | GSD[2] | STEP 7[1] | GSD[2] | STEP 7[1] | GSD[2] | STEP 7[1] |
| FM 350-1 counter module | 6ES7 350-1AH03-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 350-2 counter module | 6ES7 350-2AH01-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 351 positioning module | 6ES7 351-1AH01-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 352 cam controller | 6ES7 352-1AH02-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 352-5 high-speed Boolean processor | 6ES7 352-5AH00-0AE0 | ❏ [3] | ❏ | ❏ [3] | ❏ | ❏ [3] | ❏ | ❏ |
| FM 352-5 high-speed Boolean processor | 6ES7 352-5AH10-0AE0 | ❏ [3] | ❏ | ❏ [3] | ❏ | ❏ [3] | ❏ | ❏ |
| FM 353 positioning module | 6ES7 353-1AH01-0AE0 | -- | -- | ❏ | -- | ❏ | -- | -- |
| FM 355 C controller module | 6ES7 355-0VH10-0AE0 | -- | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 355 S controller module | 6ES7 355-1VH10-0AE0 | -- | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 355-2 C temperature controller module | 6ES7 355-2CH00-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| FM 355-2 S temperature controller module | 6ES7 355-2SH00-0AE0 | ❏ | -- | ❏ | -- | ❏ | -- | ❏ |
| SM 338 POS input module | 6ES7 338-4BC01-0AB0 | ❏ | ❏ | ❏ | ❏ | ❏ | ❏ | ❏ |

❏: configurable
--: not configurable

[1] Configuration using the meta-knowledge integrated into STEP 7 (in Hardware Catalog under PROFIBUS DP > ET 200M > IM 153-1 / IM 153-2 or PROFINET IO > I/O > ET 200M > IM153-4 PN).

[2] Configuration using GSD file (after installation of the GSD file configurable from the Hardware Catalog under PROFIBUS DP > Additional field devices > I/O > ET 200M). During configuration on the CP 342-5 as DP master, S5 (IM 308C) as DP master or external masters, the GSD file must be configured.

[3] Visible and configurable only with the corresponding configuration package in STEP 7.

Note:

Position measurement systems and prefabricated connecting
cables for counter and positioning function are offered under
SIMODRIVE Sensor and Motion Connect 500.

http://www.siemens.com/simatic-technology

For further information, see SIMATIC S7-300, chapter 5.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200M

**I/O modules   > Communication**

## ■ Overview Special modules



Special modules provide the user with diagnostic and commissioning functions.

For further information, see SIMATIC S7-300, chapter 5.

## ■ Overview Communication



- Communication boards for data exchange using point-to-point coupling
- Communication board for the connection of identification systems

For further information, see SIMATIC S7-300, chapter 5.

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■ **Overview**

- Load current supplies for S7-300/ET 200M
- For converting the line voltage to the required operating voltage (24 V DC)
- Output current 2 A, 5 A or 10 A

For further information, see SIMATIC S7-300, chapter 5.

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet

**SIMATIC ET 200iSP**

■ **Overview**



The ET 200iSP is a modular, intrinsically safe I/O system with IP30 degree of protection which can be operated in gas and dust atmospheres at ambient temperatures from -20 to +70 °C. It is optimized for use with SIMATIC PCS 7 and SIMATIC S7, but can also be integrated in other systems such as SIMATIC S5 per GSD file.

In accordance with ATEX directive 94/9/EC, the ET 200iSP remote I/O stations can be installed directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

The modular design of the ET 200iSP makes it possible to optimally adapt the remote I/O stations to the respective automation task through individual configuration and flexible expansion. To increase plant availability, the pressure-encapsulated power supply and the intrinsically safe PROFIBUS DP connection (RS 485-iS) of the stations can also be of redundant design.

The modern architecture with hardwiring and automatic slot coding supports pre-wiring without the electronics modules, simple and reliable hot swapping of individual modules without a fire certificate as well as configuration in run (CiR).

In addition to analog and digital I/O modules for the automation of the technological functions of the process (Basic Process Control), the range of electronics modules also includes safety-related F-I/O modules for implementing safety applications. The various types of electronics module can be arranged mixed within a station. Comprehensive diagnostic options facilitate commissioning and troubleshooting.

■ **Technical specifications**

| ET 200iSP – general | | |
|---|---|---|
| Degree of protection | IP30 | |
| Ambient temperature<br>• Horizontal mounting position<br>• Other mounting positions | <br>-20 … +70 °C<br>-20 … +50 °C | |
| Loading of media | According to ISA-S71.04 severity level G1; G2; G3 (except for NH3, only level G2 in this case) | |
| EMC | Electromagnetic compatibility according to NE21 | |
| Vibration resistance | 0.5 g continuously, 1 g periodically | |
| **Approvals, standards** | | |
| • ATEX | II 2 G (1) GD<br>I M2 | Ex de [ia/ib] IIC T4<br>Ex de [ia/ib] I |
| • IECEx | Zone 1 | Ex de [ia/ib] IIC T4 |
| • INMETRO | Zone 1 | BR-Ex de [ia/ib] IIC T4 |
| • cFMus | Class I, II, III | NI Division 2,<br>Groups A, B, C, D, E, F, G T4<br>AIS Division 1,<br>Groups A, B, C, D, E, F, G |
| | Class I | Zone 1, AEx de [ia/ib] IIC T4 |
| • cULus | Class I, II, III | Division 2,<br>Groups A, B, C, D, E, F, G T4<br>providing int. safe circuits for Division 1,<br>Groups A, B, C, D, E, F, G |
| | Class I | Zone 1, AEx de [ia/ib] IIC T4 |
| • NEPSI | Ex de ib[ia] IIC T4<br>Ex de [ia/ib] IIC T4 | |
| • PROFIBUS | EN 50170, Volume 2 | |
| • IEC | IEC 61131, Part 2 | |
| • CE | According to 94/9/EC (previously ATEX 100a), 2004/108/EC and 2006/95/EC | |
| • KCC | Korea Certification | |
| • Marine approval | Classification companies<br>• ABS (American Bureau of Shipping)<br>• BV (Bureau Veritas)<br>• DNV (Det Norske Veritas)<br>• GL (Germanischer Lloyd)<br>• LRS (Lloyds Register of Shipping)<br>• Class NK (Nippon Kaiji Kyokai) | |

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## Overview

An ET 200iSP power supply unit consists of a TM-PS terminal module (A or B) and a PS power supply module which is plugged onto this. Terminal modules and power supply modules can be ordered separately.

The power supply modules are suitable for both individual operation (standard) and redundant operation. Depending on the operating mode, they must be combined with the terminal modules as follows:

- Standard: 1 x PS on TM-PS-A
- Redundancy: 1 x PS on TM-PS-A (left) plus 1 x PS on TM-PS-B (right)

Power supply modules are available for supplies of 24 V DC and 120/230 V AC.

The operating state of the power supply modules is indicated by two LEDs on the IM 152 interface module (one for each module).

## Technical specifications

| Article number | 6ES7138-7EA01-0AA0 | 6ES7138-7EC00-0AA0 |
|---|---|---|
| | ET 200ISP, POWER SUPPLY MODULE | ET 200ISP, POWER SUPPLY MOD. 120/230 V AC |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | |
| Rated value (AC) | | 230 V; 120/230V AC |
| Reverse polarity protection | Yes | |
| **Line frequency** | | |
| • permissible range, lower limit | | 47 Hz |
| • permissible range, upper limit | | 63 Hz |
| **Input current** | | |
| from supply voltage L+, max. | 4 A | |
| from supply voltage L1, max. | | 1.04 A; at rated voltage 230 VAC:0.45A at rated voltage 120 VAC:0.75A |
| **Power loss** | | |
| Power loss, typ. | 20 W | 5 W; 5 W + 1.2 x total power loss of the electronics modules |
| Power loss, max. | | 21.3 W |
| **Interrupts/diagnostics/ status information** | | |
| Status indicator | Yes | Yes |
| Alarms | No | No |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes; via IM 152 | Yes; via IM 152 |
| **Diagnostics indication LED** | | |
| • Group error SF (red) | No | No |
| **Ex(i) characteristics** | | |
| **Maximum values of input circuits (per channel)** | | |
| • Um (fault voltage), max. | 250 V; DC | 264 V; AC/DC |
| **Potential separation** | | |
| primary/secondary | Yes | Yes |
| between supply voltage and electronics | Yes | No |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Power supply unit

### ■ Technical specifications  (continued)

| Article number | 6ES7138-7EA01-0AA0 | 6ES7138-7EC00-0AA0 |
|---|---|---|
| | ET 200ISP, POWER SUPPLY MODULE | ET 200ISP, POWER SUPPLY MOD. 120/230 V AC |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| **Use in hazardous areas** | | |
| • Type of protection acc. to EN 50020 (CENELEC) | Ex de [ib]IIC T4 | Ex de [ib]IIC T4 |
| • Type of protection acc. to KEMA | 04 ATEX 2263 | 09 ATEX 0156 |
| **Dimensions** | | |
| Width | 60 mm | 60 mm |
| Height | 190 mm | 190 mm |
| Depth | 136.5 mm | 136.5 mm |
| **Weights** | | |
| Weight, approx. | 2 700 g | 2 700 g |

| Article number | 6ES7193-7DA20-0AA0 | 6ES7193-7DB20-0AA0 |
|---|---|---|
| | ET 200ISP, TERM.-MOD. TM-PS-A UC | ET 200ISP, TERM.-MOD. TM-PS-B UC |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | Yes |
| **Use in hazardous areas** | | |
| • Type of protection acc. to EN 50020 (CENELEC) | see ET200iSP system | see ET200iSP system |
| • Test number KEMA | 04 ATEX 2242 | 04 ATEX 2242 |
| **Dimensions** | | |
| Width | 60 mm | 60 mm |
| Height | 190 mm | 190 mm |
| Depth | 52 mm | 52 mm |
| **Weights** | | |
| Weight, approx. | 230 g | 230 g |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **PS 24 V DC power supply module for ET 200iSP** | 6ES7138-7EA01-0AA0 | **TM-PS-A UC terminal module** <br> For standard operation | 6ES7193-7DA20-0AA0 |
| **PS 120/230 V AC power supply module for ET 200iSP** | 6ES7138-7EC00-0AA0 | **TM-PS-B UC terminal module** <br> Additional terminal module <br> for redundant operation | 6ES7193-7DB20-0AA0 |

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## Overview

The IM 152 interface module connects the ET 200iSP to the PROFIBUS DP with intrinsically safe RS 485-iS transmission technology with transmission rates up to 1.5 Mbps. A redundant connection is also possible. In this case the ET 200iSP is connected via two interface modules to two redundant PROFIBUS DP segments of a fault-tolerant automation system.

The IM 152 is plugged onto a special terminal module (to be ordered separately). The following terminal modules are available:

- TM-IM/IM terminal module for two interface modules (for redundant PROFIBUS DP connection)
- TM-IM/EM60 terminal module for one interface module and one watchdog, reserve or electronics module (except 2 DO relay)
  - with blue screw-type or spring-loaded terminals for hazardous environments
  - with black screw-type terminals for non-hazardous environments

### *Tasks of the IM 152 interface module*

- Connection of ET 200iSP to the intrinsically safe PROFIBUS DP
- Autonomous communication with the host automation system
- Preparation of data for the fitted electronics modules
- Saving of parameters of the electronics modules
- Time stamping of digital process signals with an accuracy of 20 ms

The maximum address space of the interface module is 244 bytes for inputs and 244 bytes for outputs.

## Technical specifications

| Article number | **6ES7152-1AA00-0AB0** |
|---|---|
| | ET 200ISP, IM152-1 INTERFACE MODULE |
| **Input current** | |
| from supply voltage L+, max. | 30 mA |
| **Power loss** | |
| Power loss, typ. | 0.5 W |
| **Time stamping** | |
| Description | for each digital input, digital input module, total ET 200iS |
| Accuracy | 20 ms |
| Number of stampable digital inputs, max. | 64; for accuracy class 20 ms |
| Time format | RFC 1119 Internet (ISP) |
| Time resolution | 1 ms |
| Time interval for transmitting the message buffer if a message is present | 1 000 ms |
| Time stamp on signal change | rising / falling edge as signal entering or exiting |
| **Interfaces** | |
| Interface physics, RS 485 | Yes; intrinsically safe |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 1.5 Mbit/s; 9,6 / 19,2 / 45,45 / 93,75 / 187,5 / 500 kbit/s |
| • SYNC capability | Yes |
| • FREEZE capability | Yes |
| • Direct data exchange (slave-to-slave communication) | Yes; Slave to slave as publisher |
| **Protocols** | |
| PROFIBUS DP | Yes |
| **Protocols (Ethernet)** | |
| • TCP/IP | No |

| Article number | **6ES7152-1AA00-0AB0** |
|---|---|
| | ET 200ISP, IM152-1 INTERFACE MODULE |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | No |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Alarms** | |
| • acyclic function, interrupts | Yes |
| • acyclic function, parameters | Yes |
| **Diagnostics indication LED** | |
| • Bus fault BF (red) | Yes |
| • Group error SF (red) | Yes |
| • Monitoring 24 V voltage supply ON (green) | Yes |
| **Potential separation** | |
| between supply voltage and electronics | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G Ex ib IIC T4 and I M2 Ex ib I |
| • Type of protection acc. to KEMA | 04 ATEX 1243 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 245 g |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200iSP

**Interface module**

### ■ Technical specifications (continued)

| Article number | 6ES7193-7AA00-0AA0 | 6ES7193-7AA10-0AA0 | 6ES7193-7AA20-0AA0 | 6ES7193-7AB00-0AA0 |
|---|---|---|---|---|
| | ET 200ISP, TERM.-MOD. TM-IM/EM60S, SCREW | ET 200ISP, TERM.-MOD. TM-IM/EM60C ,SPRING | ET 200ISP, TERM.-MOD. TM-IM/EM60S | ET 200ISP, TERM.-MOD. TM-IM/IM F. TWO IM |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| **Use in hazardous areas** | | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | see ET200iSP system | see ET200iSP system | No | see ET200iSP system |
| • Test number KEMA | 04 ATEX 2242 | 04 ATEX 2242 | | 04 ATEX 2242 |
| **Dimensions** | | | | |
| Width | 60 mm | 60 mm | 60 mm | 60 mm |
| Height | 190 mm | 190 mm | 190 mm | 190 mm |
| Depth | 52 mm | 52 mm | 52 mm | 52 mm |
| **Weights** | | | | |
| Weight, approx. | 235 g | 235 g | 235 g | 195 g |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **ET 200iSP interface module IM 152-1** | **6ES7152-1AA00-0AB0** | **Labeling sheet** DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 152 | |
| **ET 200iSP terminal module TM-IM/EM60** For an IM 152 and a watchdog, reserve or electronics module (except 2 DO relay), including terminating module | | • petrol | **6ES7193-7BH00-0AA0** |
| • For hazardous environments | | • yellow | **6ES7193-7BB00-0AA0** |
| - TM-IM/EM60S (blue screw-type terminals) | **6ES7193-7AA00-0AA0** | **Labels, inscribed** For slot numbering, label size H × W (in mm): 5 × 7 | |
| - TM-IM/EM60C (blue spring-loaded terminals) | **6ES7193-7AA10-0AA0** | • 204 labels, for slots 1 to 20 | **8WA8361-0AB** |
| • For non-hazardous environments | | • 204 labels, for slots 1 to 40 | **8WA8361-0AC** |
| - TM-IM/EM60S (black screw-type terminals) | **6ES7193-7AA20-0AA0** | • 136 labels, inscription in plain text | **8WA8348-0XA** |
| **ET 200iSP terminal module TM-IM/IM** For two IM 152 modules (redundant operation), including terminating module | **6ES7193-7AB00-0AA0** | **Labels, blank** 136 labels for slot numbering, label size H × W (in mm): 5 × 7 | **8WA8348-2AY** |
| **Accessories** | | **S7-300 DIN rails** | |
| **PROFIBUS connector with selectable terminating resistor** For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology | **6ES7972-0DA60-0XA0** | • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box | **6ES7390-1AF85-0AA0** |
| **RS 485-iS coupler** Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies | **6ES7972-0AC80-0XA0** | • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box | **6ES7390-1AJ85-0AA0** |

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## Overview



### Digital input modules

- 8-channel digital input module DI NAMUR EEx i, for evaluation of NAMUR sensors, connected and non-connected contacts, as well as for use as counter or frequency meter
  Parameterizable connections:
  - NAMUR sensor on/off
  - NAMUR changeover contact
  - Single contact connected (mechanical NO contact)
  - Changeover contact connected (mechanical changeover contact)
  - Single contact non-connected (mechanical NO contact with single contact)
  - Changeover contact non-connected (mechanical changeover contact)
  - Counting function: optional use of 2 channels for recording counter pulses or for frequency measurement
  - Short-circuit and wire break monitoring

### Digital output modules

- 4-channel digital output modules DO EEx i, 23.1 V DC/20 mA, 17.4 V DC/27 mA, 17.4 V DC/40 mA or 25.5 V DC/22 mA, with external actuator switch-off via High or Low signal (H/L switch-off)
  - Load-free switching of outputs via external intrinsically safe signal
  - Power boosting through parallel connection of two outputs for one actuator with 4 DO 17.4 V DC/27 mA or 4 DO 17.4 V DC/40 mA
  - Short-circuit and wire break monitoring
- 2-channel digital output module DO Relay EEx e, e.g. for switching solenoid valves, DC contactors or signaling lamps
  - Can be plugged onto TM-RM/RM terminal module
  - Output current up to 2 A with 60 V UC for each of the two relay outputs
  - Installation up to Ex zone 1
  - Intrinsically-safe and non-intrinsically safe signals can be mixed in a station

### Extra functions

Actuator shutdown function of the 4 DO EEx i modules

The 4 DO EEx i modules are equipped with a shutdown function. This permits implementation of an external switch-off independent of the automation system (controller).

As soon as the intrinsically safe switch-off signal (High or Low) is present at the actuator switch-off input of the electronics module, its outputs are deactivated.

You can also combine several DO modules into a switch-off group. The intrinsically safe power supply for the switch-off device is either via the watchdog module or a separate intrinsically safe source.

## Technical specifications

| Article number | 6ES7131-7RF00-0AB0 |
|---|---|
| | ET 200ISP, EL-MOD., 8DI, NAMUR |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Number of NAMUR inputs | 8 |
| **Input voltage** | |
| • Type of input voltage | DC |
| **Input delay** **(for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", min. | 2.8 ms |
| - at "0" to "1", max. | 3.5 ms |
| - at "1" to "0", min. | 2.8 ms |
| - at "1" to "0", max. | 3.5 ms |
| **Cable length** | |
| • shielded, max. | 500 m |
| **Encoder** | |
| Number of connectable encoders, max. | 8 |
| **Connectable encoders** | |
| • NAMUR encoder | Yes |
| **NAMUR encoder** | |
| • Input current for signal "0", max. | 1.2 mA |
| • Input current for signal "1", min. | 2.1 mA |

| Article number | 6ES7131-7RF00-0AB0 |
|---|---|
| | ET 200ISP, EL-MOD., 8DI, NAMUR |
| **Interrupts/diagnostics/** **status information** | |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Hardware interrupt | No |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Short-circuit | Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234 |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Status indicator digital input (green) | Yes |
| **Integrated Functions** | |
| Frequency measurement | Yes; (Gate time) 50 ms; 200 ms; 1 s |
| Number of frequency meters | 2 |
| **Counter** | |
| Number of counter inputs | 2; normal and periodic count function |
| Input frequency, max. | 5 kHz; with a cable length of 20 m: 5 kHz; with a cable length of 100 m: 1 kHz; with a cable length of 200 m: 500 Hz |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Digital electronics modules

### ▪ **Technical specifications** (continued)

| Article number | 6ES7131-7RF00-0AB0 |
|---|---|
| | ET 200ISP, EL-MOD., 8DI, NAMUR |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Permissible potential difference** | |
| between different circuits | 60 V DC/30 V AC |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I |
| • Type of protection acc. to KEMA | 04 ATEX 1248 |

| Article number | 6ES7131-7RF00-0AB0 |
|---|---|
| | ET 200ISP, EL-MOD., 8DI, NAMUR |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 255 g |

| Article number | 6ES7132-7RD01-0AB0 | 6ES7132-7RD11-0AB0 | 6ES7132-7RD22-0AB0 |
|---|---|---|---|
| | ET 200ISP, EL-MOD., 4DO, DC 23,1V, 20MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 27MA | ET 200ISP, EL-MOD., 4DO, DC 17.4V, 40MA |
| **Input current** | | | |
| from load voltage L+ (without load), max. | 340 mA; with actuator supply | 300 mA | 400 mA |
| from backplane bus 3.3 V DC, max. | 10 mA | 10 mA | |
| **Power loss** | | | |
| Power loss, typ. | 2.5 W | 2.1 W | 2.8 W |
| **Address area** | | | |
| **Address space per module** | | | |
| • without packing | 2 byte | 2 byte | 2 byte |
| **Digital outputs** | | | |
| Number of digital outputs | 4; additionally 1 intrinsically-safe input for H shutdown | 4; additionally 1 intrinsically-safe input for H shutdown | 4; additionally 1 intrinsically-safe input for H shutdown |
| Short-circuit protection | Yes | Yes | Yes |
| No-load voltage Uao (DC) | 23.1 V | 17.4 V | 17.4 V |
| Internal resistor Ri | 275 Ω | 150 Ω | 167 Ω |
| **Trend key points E** | | | |
| • Voltage Ue (DC) | 17.6 V | 13.3 V | 10.7 V |
| • Current Ie | 20 mA | 27 mA | 40 mA; 80 mA when outputs connected in parallel |
| **Output current** | | | |
| • for signal "1" rated value | 0.02 A | 0.027 A | 0.04 A |
| **Output delay with resistive load** | | | |
| • "0" to "1", max. | 2 ms | 2 ms | 2 ms |
| • "1" to "0", max. | 1.5 ms | 1.5 ms | 1.5 ms |
| **Parallel switching of two outputs** | | | |
| • for uprating | No; for Ex reasons not possible; nor for predecessor | Yes | Yes |
| **Switching frequency** | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 2 Hz | 2 Hz | 2 Hz |
| **Cable length** | | | |
| • shielded, max. | 500 m | 500 m | 500 m |
| • unshielded, max. | 500 m | 500 m | 500 m |

■ **Technical specifications** (continued)

| Article number | **6ES7132-7RD01-0AB0** | **6ES7132-7RD11-0AB0** | **6ES7132-7RD22-0AB0** |
|---|---|---|---|
| | ET 200ISP, EL-MOD., 4DO, DC 23,1V, 20MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 27MA | ET 200ISP, EL-MOD., 4DO, DC 17.4V, 40MA |
| **Interrupts/diagnostics/ status information** | | | |
| Status indicator | Yes | Yes | Yes |
| Alarms | | No | |
| Diagnostic functions | Yes | Yes | |
| **Alarms** | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | |
| • Diagnostic information readable | Yes | Yes | Yes |
| • Wire-break | Yes; R > 10 kohms, I < 100 µA | Yes | Yes; R > 10 kohms, I < 100 µA |
| • Short-circuit | Yes; R< 800 ohms (one output), R< 40 ohms (outputs connected in parallel) | Yes | Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel) |
| **Diagnostics indication LED** | | | |
| • Group error SF (red) | Yes | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes | Yes; Per channel |
| **Parameter** | | | |
| Remark | | 14 byte | |
| Diagnostics wire break | Yes | Yes | Yes |
| Diagnostics short-circuit | Yes | Yes | Yes |
| Response to CPU/master STOP | Substitute a value/keep last value | Substitute a value/keep last value | Substitute a value/keep last value |
| **Ex(i) characteristics** | | | |
| **Maximum values of output circuits (per channel)** | | | |
| • Co (permissible external capacity), max. | | | 241 nF; For IIC, 1507 nF for IIB |
| • Io (short-circuit current), max. | | | 118 mA |
| • Lo (permissible external inductivity), max. | | | 1.7 mH; For IIC, 10.4 mH for IIB |
| • Po (power of load), max. | | | 572 mW |
| • Uo (output no-load voltage), max. | | | 19.4 V |
| • Ta (permissible ambient temperature), max. | 70 °C | 70 °C | |
| **Potential separation** | | | |
| **Potential separation digital outputs** | | | |
| • between the channels | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes |
| • Between the channels and load voltage L+ | Yes | Yes | Yes |
| **Permissible potential difference** | | | |
| between different circuits | | | 60 V DC/30 V AC |
| **Standards, approvals, certificates** | | | |
| CE mark | | | Yes |
| **Highest safety class achievable in safety mode** | | | |
| • SIL acc. to IEC 61508 | No | | No |
| **Use in hazardous areas** | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I |
| • Type of protection acc. to KEMA | 04 ATEX 1249 | 04 ATEX 1249 | 04 ATEX 1249 |
| **Dimensions** | | | |
| Width | 30 mm | 30 mm | 30 mm |
| Height | 129 mm | 129 mm | 129 mm |
| Depth | 136.5 mm | 136.5 mm | 136.5 mm |
| **Weights** | | | |
| Weight, approx. | 255 g | 255 g | 255 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Digital electronics modules

### ■ Technical specifications (continued)

| Article number | 6ES7132-7GD00-0AB0 | 6ES7132-7GD10-0AB0 | 6ES7132-7GD21-0AB0 | 6ES7132-7GD30-0AB0 |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4DO, DC 23,1V, 20MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 27MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 40MA | ET 200ISP, EL-MOD., 4DO, DC 25.5V, 22MA |
| **Input current** | | | | |
| from load voltage L+ (without load), max. | 340 mA; with actuator supply | 300 mA; with actuator supply | 400 mA | 400 mA |
| from backplane bus 3.3 V DC, max. | 10 mA | 10 mA | | |
| **Power loss** | | | | |
| Power loss, typ. | 2.5 W | 2.1 W | 2.8 W | 2.8 W |
| **Address area** | | | | |
| **Address space per module** | | | | |
| • without packing | 2 byte | 2 byte | 2 byte | 2 byte |
| **Digital outputs** | | | | |
| Number of digital outputs | 4; additionally 1 intrinsically-safe input for L shutdown | 4; additionally 1 intrinsically-safe input for L shutdown | 4; additionally 1 intrinsically-safe input for L shutdown | 4; additionally 1 intrinsically-safe input for L shutdown |
| Short-circuit protection | Yes | Yes | Yes | Yes |
| No-load voltage Uao (DC) | 23.1 V | 17.4 V | 17.4 V | 25.5 V |
| Internal resistor Ri | 275 Ω | 150 Ω | 167 Ω | 260 Ω |
| **Trend key points E** | | | | |
| • Voltage Ue (DC) | 17.6 V | 13.3 V | 10.7 V | 19.8 V |
| • Current Ie | 20 mA | 27 mA; 54 mA when outputs connected in parallel | 40 mA | 22 mA |
| **Output current** | | | | |
| • for signal "1" rated value | 0.02 A | 0.027 A | 0.04 A | 0.022 A |
| **Output delay with resistive load** | | | | |
| • "0" to "1", max. | 2 ms | 2 ms | 2 ms | 2 ms |
| • "1" to "0", max. | 1.5 ms | 1.5 ms | 1.5 ms | 1.5 ms |
| **Parallel switching of two outputs** | | | | |
| • for uprating | No; for Ex reasons not possible; nor for prede-cessor | Yes | Yes | No |
| **Switching frequency** | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 2 Hz | 2 Hz | 2 Hz | 2 Hz |
| **Cable length** | | | | |
| • shielded, max. | 500 m | 500 m | 500 m | 500 m |
| • unshielded, max. | 500 m | 500 m | 500 m | 500 m |
| **Interrupts/diagnostics/status information** | | | | |
| Status indicator | Yes | Yes | Yes | Yes |
| Diagnostic functions | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; R > 10 kohms, I < 100 µA | Yes; R > 10 kohms, I < 100 µA | Yes; R > 10 kohms, I < 100 µA | Yes; R > 10 kohms, I < 100 µA |
| • Short-circuit | Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel) | Yes; R< 800 ohms (one output), R< 40 ohms (outputs connected in parallel) | Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel) | Yes; R < 80 ohms |
| **Diagnostics indication LED** | | | | |
| • Group error SF (red) | Yes | Yes | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes | Yes; Per channel | Yes; Per channel |

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## ■ Technical specifications (continued)

| Article number | 6ES7132-7GD00-0AB0 | 6ES7132-7GD10-0AB0 | 6ES7132-7GD21-0AB0 | 6ES7132-7GD30-0AB0 |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4DO, DC 23,1V, 20MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 27MA | ET 200ISP, EL-MOD., 4DO, DC 17,4V, 40MA | ET 200ISP, EL-MOD., 4DO, DC 25.5V, 22MA |
| **Parameter** | | | | |
| Remark | 14 byte | 14 byte | | |
| Diagnostics wire break | Yes | Yes | Yes | Yes |
| Diagnostics short-circuit | Yes | Yes | Yes | Yes |
| Response to CPU/master STOP | Substitute a value/keep last value | Substitute a value/keep last value | Substitute a value/keep last value | Substitute a value/keep last value |
| **Ex(i) characteristics** | | | | |
| **Maximum values of output circuits (per channel)** | | | | |
| • Co (permissible external capacity), max. | | | 241 nF; For IIC, 1507 nF for IIB | 81 nF; For IIC, 651 nF for IIB |
| • Io (short-circuit current), max. | | | 118 mA | 110 mA |
| • Lo (permissible external inductivity), max. | | | 1.7 mH; For IIC, 10.4 mH for IIB | 1.7 mH; For IIC, 11.5 mH for IIB |
| • Po (power of load), max. | | | 572 mW | 764 mW |
| • Uo (output no-load voltage), max. | | | 19.4 V | 27.9 V |
| • Ta (permissible ambient temperature), max. | 70 °C | 70 °C | | |
| **Potential separation** | | | | |
| **Potential separation digital outputs** | | | | |
| • between the channels | No | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| • Between the channels and load voltage L+ | Yes | Yes | Yes | Yes |
| **Permissible potential difference** | | | | |
| between different circuits | | | 60 V DC/30 V AC | 60 V DC/30 V AC |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| **Highest safety class achievable in safety mode** | | | | |
| • SIL acc. to IEC 61508 | No | No | No | No |
| **Use in hazardous areas** | | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I | II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I |
| • Type of protection acc. to KEMA | 04 ATEX 1249 | 04 ATEX 1249 | 04 ATEX 1249 | 04 ATEX 1249 |
| **Dimensions** | | | | |
| Width | 30 mm | 30 mm | 30 mm | 30 mm |
| Height | 129 mm | 129 mm | 129 mm | 129 mm |
| Depth | 136.5 mm | 136.5 mm | 136.5 mm | 136.5 mm |
| **Weights** | | | | |
| Weight, approx. | 255 g | 255 g | 255 g | 255 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Digital electronics modules

### ▪ Technical specifications (continued)

| Article number | 6ES7132-7HB00-0AB0 |
|---|---|
| | ET 200ISP, RELAY-MOD., 2DO, UC60V, 2A |
| **Input current** | |
| from load voltage L+ (without load), max. | 120 mA |
| **Power loss** | |
| Power loss, typ. | 1.1 W |
| **Digital outputs** | |
| Number of digital outputs | 2 |
| Short-circuit protection | No |
| **Output current** | |
| • for signal "1" rated value | 2 A |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 8 ms |
| • "1" to "0", max. | 3 ms |
| **Parallel switching of two outputs** | |
| • for uprating | No |
| • for redundant control of a load | No |
| **Switching frequency** | |
| • with resistive load, max. | 0.5 Hz; See data in manual |
| • with inductive load, max. | 0.2 Hz; See data in manual |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - with resistive load, up to 60 °C, max. | 2 A; See data in manual |
| - Thermal continuous current, max. | 2 A; See data in manual |
| **Cable length** | |
| • shielded, max. | 500 m |
| • unshielded, max. | 500 m |
| **Interrupts/diagnostics /status information** | |
| Status indicator | Yes |
| Alarms | No |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Hardware interrupt | No |

| Article number | 6ES7132-7HB00-0AB0 |
|---|---|
| | ET 200ISP, RELAY-MOD., 2DO, UC60V, 2A |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | No; Cannot be determined in contact power circuit |
| • Short-circuit | No; Cannot be determined in contact power circuit |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Status indicator digital output (green) | Yes; Per channel |
| **Ex(i) characteristics** | |
| **Maximum values of output circuits (per channel)** | |
| • Uo (output no-load voltage), max. | 60 V |
| • Um (fault voltage), max. | 250 V |
| • Ta (permissible ambient temperature), max. | 70 °C |
| **Potential separation** | |
| **Potential separation digital outputs** | |
| • between the channels | Yes |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | Yes; Channels and power bus |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Highest safety class achievable in safety mode** | |
| • SIL acc. to IEC 61508 | No |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II 2 G and I M2 Ex eibmb IIC T4; Ex eibmb I |
| • Type of protection acc. to KEMA | 07 ATEX 0180 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 255 g |

| Article number | 6ES7193-7CA00-0AA0 | 6ES7193-7CA10-0AA0 | 6ES7193-7CA20-0AA0 | 6ES7193-7CB00-0AA0 |
|---|---|---|---|---|
| | ET 200ISP, TERM.-MOD. TM-EM/EM60S F. EM | ET 200ISP, TERM.-MOD. TM-EM/EM60C F. EM | ET 200ISP, TERM.-MOD. TM-EM/EM60S F. EM | ET 200ISP, TERM.-MOD. TM-RM/RM |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| **Use in hazardous areas** | | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | see ET200iSP system | see ET200iSP system | No | see ET200iSP system |
| • Test number KEMA | 04 ATEX 2242 | 04 ATEX 2242 | | 07 ATEX 0205 |
| **Dimensions** | | | | |
| Width | 60 mm | 60 mm | 60 mm | 60 mm |
| Height | 190 mm | 190 mm | 190 mm | 190 mm |
| Depth | 52 mm | 52 mm | 52 mm | 52 mm |
| **Weights** | | | | |
| Weight, approx. | 275 g | 275 g | 235 g | 340 g |

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## Technical specifications (continued)

| Article number | 6ES7138-7AA00-0AA0 |
| --- | --- |
| | ET 200ISP, RESERVE MODULE |
| **Digital inputs** | |
| Number of digital inputs | 0 |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G EEx ib IIC T4 |
| • Test number KEMA | 04 ATEX 1251 |

| Article number | 6ES7138-7AA00-0AA0 |
| --- | --- |
| | ET 200ISP, RESERVE MODULE |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 180 g |

## Ordering data

| | Article No. | | Article No. |
| --- | --- | --- | --- |
| **Digital input modules** | | **4 DO DC 17.4 V/40 mA**<br>• 4 channels with 40 mA each or<br>• 2 outputs connected in parallel with 80 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7RD22-0AB0 |
| Digital input modules EEx i | | | |
| **8 DI NAMUR**<br>For evaluation of NAMUR sensors, connected/non-connected contacts, as well as for recording counter pulses or measuring frequencies<br>• 8 × NAMUR (NAMUR sensor on/off, NAMUR changeover contact) or connected/non-connected inputs (single/changeover contact)<br>• 2 channels optionally usable as counters (max. 5 kHz) or frequency meters (1 Hz ... 5 kHz)<br>• Time tagging 20 ms, rising or falling edge<br>• Wire break monitoring<br>• Short-circuit monitoring<br>• Sensor power supply monitoring<br>• Flutter monitoring | 6ES7131-7RF00-0AB0 | Digital output modules EEx i<br>with L-switch-off<br>(external actuator switch-off via L-signal);<br>for switching of solenoid valves, DC relays, signal lamps, actuators | |
| | | **4 DO DC 23.1 V/20 mA**<br>• 4 channels with 20 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7GD00-0AB0 |
| **Digital output modules** | | | |
| Digital output modules EEx i<br>with H-switch-off<br>(external actuator switch-off via H-signal);<br>for switching of solenoid valves, DC relays, signal lamps, actuators | | **4 DO DC 17.4 V/27 mA**<br>• 4 channels with 27 mA each or<br>• 2 outputs connected in parallel with 54 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7GD10-0AB0 |
| **4 DO DC 23.1 V/20 mA**<br>• 4 channels with 20 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7RD01-0AB0 | | |
| **4 DO DC 17.4 V/27 mA**<br>• 4 channels with 27 mA each or<br>• 2 outputs connected in parallel with 54 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7RD11-0AB0 | **4 DO DC 17.4 V/40 mA**<br>• 4 channels with 40 mA each or<br>• 2 outputs connected in parallel with 80 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | 6ES7132-7GD21-0AB0 |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

**Digital electronics modules**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input modules (continued)** | | **Accessories** | |
| **4 DO DC 25.5 V/22 mA[1]**<br>• 4 channels with 22 mA each<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Configurable connection of substitute value in the event of CPU failure<br>• Load-free switching of outputs via external intrinsically safe signal | **6ES7132-7GD30-0AB0** | **Reserve module**<br>For any electronics module | **6ES7138-7AA00-0AA0** |
| Digital output modules EEx e<br>For switching of solenoid valves, DC contactors or indicator lights | | **Labeling sheet**<br>DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 | |
| **2 DO Relay, 60 V UC, 2 A**<br>• Can be plugged onto TM-RM/RM terminal module<br>• Output current up to 2 A with 60 V UC for each of the two relay outputs<br>• Installation up to Ex zone 1<br>• Configurable connection of substitute value in the event of CPU failure | **6ES7132-7HB00-0AB0** | • petrol<br>• yellow | **6ES7193-7BH00-0AA0**<br>**6ES7193-7BB00-0AA0** |
| | | **Labels, inscribed**<br>for slot numbering,<br>label size H × W (in mm): 5 × 7<br>• 204 labels, for slots 1 to 20<br>• 204 labels, for slots 1 to 40 | **8WA8361-0AB**<br>**8WA8361-0AC** |
| **Terminal modules** | | **Labels, blank**<br>136 labels for slot numbering,<br>label size H × W (in mm): 5 × 7 | **8WA8348-2AY** |
| **ET 200iSP terminal module TM-EM/EM60**<br>For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in)<br>• For hazardous environments | | **S7-300 rails**<br>• 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box<br>• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box | **6ES7390-1AF85-0AA0**<br><br>**6ES7390-1AJ85-0AA0** |
|   - TM-EM/EM60S<br>    (blue screw-type terminals) | **6ES7193-7CA00-0AA0** | | |
|   - TM-EM/EM60C<br>    (blue spring-loaded terminals) | **6ES7193-7CA10-0AA0** | | |
| • For non-hazardous environments | | | |
|   - TM-EM/EM60S<br>    (black screw-type terminals) | **6ES7193-7CA20-0AA0** | | |
| **ET 200iSP terminal module TM-RM/RM 60**<br>For two modules (electronics module 2 DO Relay and reserve module can be plugged in)<br>• TM-RM/RM60S<br>  (screw-type terminals) | **6ES7193-7CB00-0AA0** | | |

[1] Can be used with SIMATIC PCS 7 V7.1+SP2 or higher

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## ■ Overview



### *Analog input modules*

- 4-channel analog input module AI 2 WIRE HART EEx i for current measurement in the range 4 to 20 mA, suitable for connection of two-wire transmitters (with/without HART functionality)
  - Resolution 12 bit + sign
  - Max. load of transmitter 750 $\Omega$
  - Short-circuit and wire break monitoring

- 4-channel analog input module AI 4 WIRE HART EEx i for current measurement in the range 0/4 to 20 mA, suitable for connection of 4-wire transmitters (with/without HART functionality)
  - Resolution 12 bit + sign
  - Max. load of transmitter 750 $\Omega$
  - Wire break monitoring

- 4-channel analog input module AI RTD EEx i for resistance measurement and for temperature measurement per Pt100/Ni100 resistance thermometer
  - Resolution 15 bit + sign
  - 2, 3 or 4-wire connection possible
  - Resistance measurements 600 $\Omega$ absolute and 1 000 $\Omega$ absolute
  - Wire break monitoring

- 4-channel analog input module AI TC EEx i for thermoelectric EMF measurements and for temperature measurement per thermocouple, type B, E, N, J, K, L, S, R, T, U
  - Resolution 15 bit + sign
  - Internal temperature compensation possible using TC sensor module (included in scope of delivery of module)
  - External temperature compensation by means of a temperature value acquired at an analog module of the same ET 200iSP station
  - Wire break monitoring

### *Analog output modules*

- 4-channel analog output module AO I HART EEx i for output of current signals in the range 0/4 to 20 mA to field devices (with/without HART functionality)
  - Resolution 14 bit
  - Parameterizable substitute value in case of CPU failure
  - Short-circuit and wire break monitoring

### *Extra functions*

Temperature compensation

A TC sensor module for internal temperature compensation is provided with the 4 AI TC module, and is fitted on the corresponding terminals of the associated terminal module.

External temperature compensation is possible via a Pt100 on a 4 AI RTD module.

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

**Analog electronics modules**

## ■ Technical specifications

| Article number | 6ES7134-7SD00-0AB0 | 6ES7134-7SD51-0AB0 | 6ES7134-7TD00-0AB0 | 6ES7134-7TD50-0AB0 |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4 AI TC | ET 200ISP, EL-MOD., 4 AI RTD, PT100/NI100 | ET 200ISP, EL-MOD., 4 AI, HART, 2-WIRE | ET 200ISP, EL-MOD., 4 AI, HART, 4-WIRE |
| **Input current** | | | | |
| from supply voltage L+, max. | 30 mA | 22 mA | 320 mA | 30 mA |
| **Output voltage** | | | | |
| **Power supply to the transmitters** | | | | |
| • short-circuit proof | | | Yes | |
| • Supply current, max. | | | 23 mA; per channel | |
| **Power loss** | | | | |
| Power loss, typ. | 0.4 W | 0.4 W | 2.7 W | 0.4 W |
| **Analog inputs** | | | | |
| Number of analog inputs | 4 | 4 | 4 | 4 |
| permissible input current for current input (destruction limit), max. | | | 90 mA | 50 mA |
| Cycle time (all channels) max. | 320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz | 320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz | 120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression | 120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression |
| Technical unit for temperature measurement adjustable | Yes | Yes | Yes | Yes |
| **Input ranges** | | | | |
| • Voltage | Yes | No | No | No |
| • Current | No | No | Yes | Yes |
| • Thermocouple | Yes | No | No | No |
| • Resistance thermometer | No | Yes | No | No |
| • Resistance | No | Yes | No | No |
| **Input ranges (rated values), voltages** | | | | |
| • -80 mV to +80 mV | Yes | | | |
| • Input resistance (-80 mV to +80 mV) | 1 000 kΩ | | | |
| **Input ranges (rated values), currents** | | | | |
| • 4 mA to 20 mA | | | Yes | Yes |
| • Input resistance (4 mA to 20 mA) | | | | 295 Ω |
| **Input ranges (rated values), thermocouples** | | | | |
| • Type B | Yes | | | |
| • Input resistance (Type B) | 1 000 kΩ | | | |
| • Type C | Yes | | | |
| • Input resistance (Type C) | 1 000 kΩ | | | |
| • Type E | Yes | | | |
| • Input resistance (Type E) | 1 000 kΩ | | | |
| • Type J | Yes | | | |
| • Input resistance (type J) | 1 000 kΩ | | | |
| • Type K | Yes | | | |
| • Input resistance (Type K) | 1 000 kΩ | | | |
| • Type L | Yes | | | |
| • Input resistance (Type L) | 1 000 kΩ | | | |
| • Type N | Yes | | | |
| • Input resistance (Type N) | 1 000 kΩ | | | |
| • Type R | Yes | | | |
| • Input resistance (Type R) | 1 000 kΩ | | | |
| • Type S | Yes | | | |
| • Input resistance (Type S) | 1 000 kΩ | | | |
| • Type T | Yes | | | |
| • Input resistance (Type T) | 1 000 kΩ | | | |
| • Type U | Yes | | | |
| • Input resistance (Type U) | 1 000 kΩ | | | |

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■ **Technical specifications** (continued)

| Article number | 6ES7134-7SD00-0AB0 | 6ES7134-7SD51-0AB0 | 6ES7134-7TD00-0AB0 | 6ES7134-7TD50-0AB0 |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4 AI TC | ET 200ISP, EL-MOD., 4 AI RTD, PT100/NI100 | ET 200ISP, EL-MOD., 4 AI, HART, 2-WIRE | ET 200ISP, EL-MOD., 4 AI, HART, 4-WIRE |
| **Input ranges (rated values), resistance thermometer** | | | | |
| • Ni 100 | | Yes | | |
| • Input resistance (Ni 100) | | 2 000 kΩ | | |
| • Pt 100 | | Yes | | |
| • Input resistance (Pt 100) | | 2 000 kΩ | | |
| **Input ranges (rated values), resistors** | | | | |
| • 0 to 600 ohms | | Yes; Also 1000 ohms | | |
| • Input resistance (0 to 600 ohms) | | 1 000 kΩ | | |
| **Thermocouple (TC)** | | | | |
| **Temperature compensation** | | | | |
| - internal temperature compensation | Yes; via supplied TC sensor module | | | |
| - external temperature compensation with compensations socket | Yes; via temperature value, acquired by an analog module of the same ET 200iSP station | | | |
| **Characteristic linearization** | | | | |
| • parameterizable | Yes | Yes | | |
| - for thermocouples | Yes | | | |
| - for resistance thermometer | | Yes | | |
| **Cable length** | | | | |
| • shielded, max. | 50 m | 500 m | 500 m | 500 m |
| **Analog value generation for the inputs** | | | | |
| Measurement principle | integrating (Sigma-Delta) | integrating (Sigma-Delta) | integrating (Sigma-Delta) | integrating (Sigma-Delta) |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 16 bit | 16 bit | 13 bit | 12 bit; + sign |
| • Integration time, parameterizable | Yes | Yes | No | Yes |
| • Basic conversion time, including integration time (ms) | 80 ms at 50 Hz; 66 ms at 60 Hz | 80 ms at 50 Hz; 66 ms at 60 Hz | | 30 ms |
| - additional conversion time for wire-break monitoring | 5 ms | 5 ms | | |
| • Interference voltage suppression for interference frequency f1 in Hz | 50 / 60 Hz | 50 / 60 Hz | 50 / 60 Hz | 50 / 60 Hz |
| **Smoothing of measured values** | | | | |
| • parameterizable | Yes; in 4 stages | Yes; in 4 stages | Yes; in 4 stages | Yes; in 4 stages |
| • Step: None | Yes; 1 x cycle time | Yes; 1 x cycle time | Yes; 1 x cycle time | Yes; 1 x cycle time |
| • Step: low | Yes; 4 x cycle time | Yes; 4 x cycle time | Yes; 4 x cycle time | Yes; 4 x cycle time |
| • Step: Medium | Yes; 32 x cycle time | Yes; 32 x cycle time | Yes; 32 x cycle time | Yes; 32 x cycle time |
| • Step: High | Yes; 64 x cycle time | Yes; 64 x cycle time | Yes; 64 x cycle time | Yes; 64 x cycle time |
| **Encoder** | | | | |
| **Connection of signal encoders** | | | | |
| • for current measurement as 2-wire transducer | | | Yes | |
| - Burden of 2-wire transmitter, max. | | | 750 Ω | |
| • for current measurement as 4-wire transducer | | | | Yes |
| • for resistance measurement with two-wire connection | | Yes | | |
| • for resistance measurement with three-wire connection | | Yes | | |
| • for resistance measurement with four-wire connection | | Yes | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

**Analog electronics modules**

### Technical specifications (continued)

| Article number | 6ES7134-7SD00-0AB0 | 6ES7134-7SD51-0AB0 | 6ES7134-7TD00-0AB0 | 6ES7134-7TD50-0AB0 |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4 AI TC | ET 200ISP, EL-MOD., 4 AI RTD, PT100/NI100 | ET 200ISP, EL-MOD., 4 AI, HART, 2-WIRE | ET 200ISP, EL-MOD., 4 AI, HART, 4-WIRE |
| **Errors/accuracies** | | | | |
| Linearity error (relative to input range), (+/-) | 0.015 % | 0.015 % | 0.015 % | 0.015 % |
| Temperature error ( relative to input range), (+/-) | 0.02 %/K | 0.02 %/K | 0.005 %/K | 0.005 %/K |
| Crosstalk between the inputs, min. | -50 dB | -50 dB | -50 dB | -50 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.01 % | 0.01 % | 0.01 % | 0.01 % |
| **Operational error limit in overall temperature range** | | | | |
| • Voltage, relative to input range, (+/-) | 0.15 % | | | |
| • Current, relative to input range, (+/-) | | | 0.15 % | 0.15 % |
| • Resistance thermometer, relative to input range, (+/-) | | 0.15 %; Applies to resistances standard ±0.8 K, climatic ±0.3 K | | |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to input range, (+/-) | 0.1 % | | | |
| • Current, relative to input range, (+/-) | | | 0.1 % | 0.1 % |
| • Resistance thermometer, relative to input range, (+/-) | | 0.1 %; Applies to resistances standard ±0.5 K, climatic ±0.2 K | | |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 70 dB | 70 dB | 70 dB | 70 dB |
| • Common mode interference, min. | 90 dB | 90 dB | | |
| **Interrupts/diagnostics/ status information** | | | | |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes | Yes; Parameterizable | Yes; Parameterizable |
| • Limit value alarm | Yes; Parameterizable | Yes | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes |
| • Wire-break | | Yes | Yes | Yes |
| • Short-circuit | | Yes | Yes | |
| • Group error | | Yes | | |
| **Diagnostics indication LED** | | | | |
| • Group error SF (red) | Yes | Yes | Yes | Yes |
| **Potential separation** | | | | |
| **Potential separation analog inputs** | | | | |
| • between the channels | Yes | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| • Between the channels and load voltage L+ | | Yes; Channels and power bus | | |

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## ■ Technical specifications (continued)

| Article number | **6ES7134-7SD00-0AB0** | **6ES7134-7SD51-0AB0** | **6ES7134-7TD00-0AB0** | **6ES7134-7TD50-0AB0** |
|---|---|---|---|---|
| | ET 200ISP, EL-MOD., 4 AI TC | ET 200ISP, EL-MOD., 4 AI RTD, PT100/NI100 | ET 200ISP, EL-MOD., 4 AI, HART, 2-WIRE | ET 200ISP, EL-MOD., 4 AI, HART, 4-WIRE |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| **Highest safety class achievable in safety mode** | | | | |
| • Performance level according to ISO 13849-1 | none | none | none | none |
| • SIL acc. to IEC 61508 | No | No | No | No |
| **Use in hazardous areas** | | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I |
| • Type of protection acc. to KEMA | 04 ATEX 1246 | 04 ATEX 1247 | 04 ATEX 1244 | 04 ATEX 1245 |
| **Dimensions** | | | | |
| Width | 30 mm | 30 mm | 30 mm | 30 mm |
| Height | 129 mm | 129 mm | 129 mm | 129 mm |
| Depth | 136.5 mm | 136.5 mm | 136.5 mm | 136.5 mm |
| **Weights** | | | | |
| Weight, approx. | 230 g | 230 g | 230 g | 230 g |

| Article number | **6ES7135-7TD00-0AB0** |
|---|---|
| | ET 200ISP, EL-MOD., 4 AO, 4-20MA, HART |
| **Input current** | |
| from load voltage L+ (without load), max. | 330 mA |
| **Power loss** | |
| Power loss, typ. | 2.7 W |
| **Analog outputs** | |
| Number of analog outputs | 4 |
| Cycle time (all channels) max. | 3.6 ms |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with current outputs, max. | 750 Ω |
| **Cable length** | |
| • shielded, max. | 500 m |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 14 bit |
| **Settling time** | |
| • for resistive load | 4 ms |
| • for capacitive load | 40 ms |
| • for inductive load | 40 ms |
| **Errors/accuracies** | |
| Linearity error (relative to output range), (+/-) | 0.015 % |
| Temperature error (relative to output range), (+/-) | 0.005 %/K |
| Crosstalk between the outputs, min. | -50 dB |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.01 % |
| **Operational error limit in overall temperature range** | |
| • Current, relative to output range, (+/-) | 0.15 % |

| Article number | **6ES7135-7TD00-0AB0** |
|---|---|
| | ET 200ISP, EL-MOD., 4 AO, 4-20MA, HART |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to output range, (+/-) | 0.1 % |
| **Interrupts/diagnostics/ status information** | |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| **Potential separation** | |
| **Potential separation analog outputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I |
| • Type of protection acc. to KEMA | 04 ATEX 1250 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 265 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Analog electronics modules

### Technical specifications (continued)

| Article number | 6ES7193-7CA00-0AA0 | 6ES7193-7CA10-0AA0 | 6ES7193-7CA20-0AA0 | 6ES7193-7CB00-0AA0 |
|---|---|---|---|---|
| | ET 200ISP, TERM.-MOD. TM-EM/EM60S F. EM | ET 200ISP, TERM.-MOD. TM-EM/EM60C F. EM | ET 200ISP, TERM.-MOD. TM-EM/EM60S F. EM | ET 200ISP, TERM.-MOD. TM-RM/RM |
| **Standards, approvals, certificates** | | | | |
| CE mark | Yes | Yes | Yes | Yes |
| **Use in hazardous areas** | | | | |
| • Type of protection acc. to EN 50020 (CENELEC) | see ET200iSP system | see ET200iSP system | No | see ET200iSP system |
| • Test number KEMA | 04 ATEX 2242 | 04 ATEX 2242 | | 07 ATEX 0205 |
| **Dimensions** | | | | |
| Width | 60 mm | 60 mm | 60 mm | 60 mm |
| Height | 190 mm | 190 mm | 190 mm | 190 mm |
| Depth | 52 mm | 52 mm | 52 mm | 52 mm |
| **Weights** | | | | |
| Weight, approx. | 275 g | 275 g | 235 g | 340 g |

| Article number | 6ES7138-7AA00-0AA0 |
|---|---|
| | ET 200ISP, RESERVE MODULE |
| **Digital inputs** | |
| Number of digital inputs | 0 |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G EEx ib IIC T4 |
| • Test number KEMA | 04 ATEX 1251 |

| Article number | 6ES7138-7AA00-0AA0 |
|---|---|
| | ET 200ISP, RESERVE MODULE |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 180 g |

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Analog input modules** | | **4 AI TC** | 6ES7134-7SD00-0AB0 |
| Analog input modules EEx i | | For measuring thermal e.m.f. as well as for temperature measurements with thermocouples | |
| **4 AI I 2 WIRE HART** | 6ES7134-7TD00-0AB0 | • 4 × TC (thermocouples) | |

**4 AI I 2 WIRE HART**
For measuring currents with 2-wire transmitters with/without HART functionality
• 4 × 4 ... 20 mA, HART, 2-wire transmitter
• Transmitter load: max. 750 Ω
• Resolution 12 bit + sign
• Short-circuit monitoring
• Wire break monitoring

**4 AI I 4 WIRE HART** — 6ES7134-7TD50-0AB0
For measuring currents with 4-wire transmitters with/without HART functionality
• 4 × 0/4 ... 20 mA, HART, 4-wire transmitter
• Transmitter load: max. 750 Ω
• Resolution 12 bit + sign
• Wire break monitoring

**4 AI RTD** — 6ES7134-7SD51-0AB0
For measuring resistances as well as for temperature measurements with resistance thermometers
• 4 × RTD, resistance thermometer Pt100/Ni100
• 2, 3, 4-wire
• Resolution 15 bit + sign
• Short-circuit monitoring
• Wire break monitoring

**4 AI TC** — 6ES7134-7SD00-0AB0
For measuring thermal e.m.f. as well as for temperature measurements with thermocouples
• 4 × TC (thermocouples)
• Type B [PtRh-PtRh]
• Type N [NiCrSi-NiSi]
• Type E [NiCr-CuNi]
• Type R [PtRh-Pt]
• Type S [PtPh-Pt]
• Type J [Fe-CuNi]
• Type L [Fe-CuNi]
• Type T [Cu-CuNi]
• Type K [NiCr-Ni]
• Type U [Cu-CuNi]
• Resolution 15 bit + sign
• Internal compensation of cold junction temperature possible using TC sensor module (included in scope of delivery of module)
• External temperature compensation via Pt100, connected to RTD module of same ET 200iSP station
• Wire break monitoring

## Ordering data

| Analog output modules | Article No. |
|---|---|
| *Analog output modules EEx i* | |
| **4 AO I HART**<br>For output of currents to field devices with/without HART functionality<br>• 4 × 0/4 ... 20 mA, HART (max. load 750 Ω)<br>• Resolution 14-bit<br>• Short-circuit monitoring<br>• Wire break monitoring<br>• Parameterizable substitute value in case of CPU failure | **6ES7135-7TD00-0AB0** |

| Terminal modules | |
|---|---|
| **ET 200iSP terminal module TM-EM/EM60**<br>For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in)<br>• For hazardous environments | |
|   - TM-EM/EM60S (blue screw-type terminals) | **6ES7193-7CA00-0AA0** |
|   - TM-EM/EM60C (blue spring-loaded terminals) | **6ES7193-7CA10-0AA0** |
| • For non-hazardous environments | |
|   - TM-EM/EM60S (black screw-type terminals) | **6ES7193-7CA20-0AA0** |

| Accessories | Article No. |
|---|---|
| **Reserve module**<br>For any electronics module | **6ES7138-7AA00-0AA0** |
| **Labeling sheet**<br>DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 | |
| • petrol | **6ES7193-7BH00-0AA0** |
| • yellow | **6ES7193-7BB00-0AA0** |
| **Labels, inscribed**<br>for slot numbering,<br>label size H × W (in mm): 5 × 7 | |
| • 204 labels, for slots 1 to 20 | **8WA8361-0AB** |
| • 204 labels, for slots 1 to 40 | **8WA8361-0AC** |
| **Labels, blank**<br>136 labels for slot numbering,<br>label size H × W (in mm): 5 × 7 | **8WA8348-2AY** |
| **S7-300 DIN rails** | |
| • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box | **6ES7390-1AF85-0AA0** |
| • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box | **6ES7390-1AJ85-0AA0** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

**Safety-related electronics modules**

■ **Overview**

The electronics modules of the SIMATIC ET 200iSP distributed
I/O system equipped with safety functions can be used together
with the safety-related automation systems (controllers) for the
implementation of safety applications. The input modules record
the process signals, evaluate them, and prepare them for
additional processing by the automation system. The output
modules convert the safety-related signals output by the
automation systems so that they are suitable for controlling
the connected actuators.

### F digital input modules

- 8 F-DI Ex NAMUR
  Safety-related digital input module for evaluating the signals
  from IEC 60947-5-6/NAMUR sensors and connected/
  non-connected mechanical contacts in hazardous and
  non-hazardous areas
  - SIL 3/Cat. 3/PL e with 8 inputs (1-channel/1oo1 evaluation)
    or 4 inputs (2-channel/1oo2 evaluation)
  - 8 short-circuit-proof sensor supplies (8 V DC) for 1 channel
    each
  - Inputs and sensor supplies electrically isolated from power
    bus and backplane bus
  - Diagnostics evaluation (deactivated for non-connected
    mechanical contacts)
  - Internal diagnostics buffer
  - Programmable diagnostics interrupt
  - Supports time stamping
  - Channel-selective passivation
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors and channel
    status/fault

### F digital output modules

- 4 F-DO Ex DC 17.4 V/40 mA
  Safety-related digital output module for controlling actuators in
  hazardous and non-hazardous areas, e.g. solenoid valves,
  DC current relays or indicator lamps
  - SIL 3/Cat. 3/PL e with 4 outputs, P/P-switching
  - Electrical isolation from power bus and backplane bus
  - Rated load voltage 17.4 V DC
  - Max. output current 40 mA
  - Performance enhancement through parallel connection
    of two digital outputs for one actuator
  - Short-circuit, overload and wire-break monitoring
  - Configurable diagnostics
  - Internal diagnostics buffer
  - Programmable diagnostics interrupt
  - Channel-selective passivation
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors and channel
    status/fault

### F analog input modules

- 4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA)
  Safety-related digital input module for evaluating the signals
  from current sensors in hazardous and non-hazardous areas,
  e.g. 2-wire transmitters and HART field devices
  - SIL 3/Cat. 3/PL e with 4 inputs of one module
    (1-channel/1oo1 evaluation) or 4 inputs of two modules
    (2-channel/1oo2 evaluation)
  - Measuring ranges: 0 ... 20 mA or 4 ... 20 mA
  - Resolution 15 bit + sign
  - HART communication in measuring range 4 ... 20 mA
  - 4 short-circuit-proof sensor supplies
    (min. 12 V DC; max. 26 V DC) for 1 channel each
  - Inputs and sensor supplies electrically isolated from
    backplane bus
  - Configurable diagnostics
  - Programmable diagnostics interrupt
  - Internal diagnostics buffer
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors, channel faults
    and HART status per channel

## ■ Technical specifications

| Article number | **6ES7138-7FN00-0AB0** |
|---|---|
| | ET 200ISP, 8F-DI NAMUR EX, FAIL-SAFE |
| **Input current** | |
| from supply voltage L+, max. | 150 mA; int. Powerbus |
| **Encoder supply** | |
| Number of outputs | 8 |
| Type of output voltage | 8 V DC |
| **Power loss** | |
| Power loss, typ. | 1.4 W |
| **Address area** | |
| **Occupied address area** | |
| • Inputs | 6 byte |
| • Outputs | 4 byte |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Number of NAMUR inputs | 8 |
| **Input voltage** | |
| • Type of input voltage | DC |
| **Input current** | |
| • for signal "1", typ. | 9.5 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", min. | 0.7 ms |
| - at "0" to "1", max. | 16 ms; Parameterizable |
| - at "1" to "0", min. | 0.7 ms |
| - at "1" to "0", max. | 16 ms; Parameterizable |
| **Cable length** | |
| • shielded, max. | 500 m |
| • unshielded, max. | 200 m |
| **Encoder** | |
| Number of connectable encoders, max. | 8 |
| **Connectable encoders** | |
| • NAMUR encoder | Yes |
| **NAMUR encoder** | |
| • Input current for signal "0", max. | 1.2 mA |
| • Input current for signal "1", min. | 2.1 mA |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Hardware interrupt | No |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor |
| • Short-circuit | Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234 |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |

| Article number | **6ES7138-7FN00-0AB0** |
|---|---|
| | ET 200ISP, 8F-DI NAMUR EX, FAIL-SAFE |
| **Parameter** | |
| Diagnostics wire break | channel by channel |
| Diagnostics short-circuit | channel by channel |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| **Permissible potential difference** | |
| between different circuits | 60 V DC/30 V AC |
| **Isolation** | |
| Isolation tested with | 350 V AC/1 min between the shield and backplane bus connection 350 V AC/1 min between the shield and I/O 2830 V AC/1 min between backplane bus connection and I/O |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb |
| • Type of protection acc. to KEMA | 10 ATEX 0056 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 288 g |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Safety-related electronics modules

### ▪ Technical specifications (continued)

| Article number | 6ES7138-7FD00-0AB0 |
|---|---|
| | ET 200ISP, 4F-DO 40MA EX, FAIL-SAFE |
| **Input current** | |
| from load voltage L+ (without load), max. | 510 mA; int. Powerbus |
| **Power loss** | |
| Power loss, typ. | 5.3 W; max. |
| **Digital outputs** | |
| Number of digital outputs | 4 |
| Short-circuit protection | Yes |
| • Response threshold, typ. | Depending on the "short-circuit level" parameter |
| Controlling a digital input | No |
| No-load voltage Uao (DC) | 17.4 V |
| Internal resistor Ri | 167 Ω |
| **Load resistance range** | |
| • lower limit | 270 Ω |
| • upper limit | 18 kΩ |
| **Trend key points E** | |
| • Voltage Ue (DC) | 10.7 V |
| • Current Ie | 40 mA |
| **Output voltage** | |
| • for signal "1", min. | max. 17.4 V |
| **Output current** | |
| • for signal "0" residual current, max. | 10 µA |
| **Parallel switching of two outputs** | |
| • for uprating | Yes |
| • for redundant control of a load | No |
| **Switching frequency** | |
| • with resistive load, max. | 30 Hz |
| • with inductive load, max. | 2 Hz |
| **Cable length** | |
| • shielded, max. | 500 m |
| • unshielded, max. | 500 m |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Status indicator digital output (green) | Yes |

| Article number | 6ES7138-7FD00-0AB0 |
|---|---|
| | ET 200ISP, 4F-DO 40MA EX, FAIL-SAFE |
| **Parameter** | |
| Diagnostics wire break | Yes |
| Diagnostics short-circuit | Yes |
| **Potential separation** | |
| **Potential separation digital outputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | Yes |
| **Permissible potential difference** | |
| between different circuits | 60 V DC/30 V AC |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb |
| • Type of protection acc. to KEMA | 10 ATEX 0057 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 285 g |

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## ■ Technical specifications (continued)

| Article number | 6ES7138-7FA00-0AB0 |
|---|---|
| | ET 200ISP, 4F-AI HART EX, FAIL-SAFE |
| **Input current** | |
| from supply voltage L+, max. | 490 mA; int. Powerbus |
| **Output voltage** | |
| **Power supply to the transmitters** | |
| • short-circuit proof | Yes |
| • Supply current, max. | 25 mA; Plus 4 mA per channel |
| **Power loss** | |
| Power loss, max. | 5.4 W |
| **Address area** | |
| **Address space per module** | |
| • Address space per module, max. | 16 byte; 12 bytes in the I area / 4 bytes in the O area |
| **Analog inputs** | |
| Number of analog inputs | 4 |
| Cycle time (all channels) max. | See data in manual |
| **Input ranges** | |
| • Voltage | No |
| • Current | Yes |
| • Thermocouple | No |
| • Resistance thermometer | No |
| • Resistance | No |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Cable length** | |
| • shielded, max. | 500 m |
| **Analog value generation for the inputs** | |
| Measurement principle | integrating (Sigma-Delta) |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit |
| • Integration time, parameterizable | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 50 / 60 Hz |
| **Smoothing of measured values** | |
| • parameterizable | Yes; in 4 stages |
| • Step: None | Yes; 1 x cycle time |
| • Step: low | Yes; 4 x cycle time |
| • Step: Medium | Yes; 16 x cycle time |
| • Step: High | Yes; 64 x cycle time |
| **Encoder** | |
| **Connection of signal encoders** | |
| • for current measurement as 2-wire transducer | Yes |
|   - Burden of 2-wire transmitter, max. | 750 Ω |
| **Errors/accuracies** | |
| Linearity error (relative to input range), (+/-) | 0.015 % |
| Temperature error (relative to input range), (+/-) | 0.005 %/K |
| Crosstalk between the inputs, min. | -50 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.015 % |

| Article number | 6ES7138-7FA00-0AB0 |
|---|---|
| | ET 200ISP, 4F-AI HART EX, FAIL-SAFE |
| **Operational error limit in overall temperature range** | |
| • Current, relative to input range, (+/-) | 0.35 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Current, relative to input range, (+/-) | 0.1 % |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB |
| • Common mode interference, min. | 50 dB |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| **Potential separation** | |
| **Potential separation analog inputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • Between the channels and load voltage L+ | Yes; Power bus |
| **Permissible potential difference** | |
| between different circuits | 60 V DC/30 V AC |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| **Use in hazardous areas** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb |
| • Type of protection acc. to KEMA | 10 ATEX 0058 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |
| **Weights** | |
| Weight, approx. | 299 g |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200iSP

**Safety-related electronics modules**

### ■ Technical specifications  (continued)

| Article number | 6ES7138-7AA00-0AA0 | Article number | 6ES7138-7AA00-0AA0 |
|---|---|---|---|
| | ET 200ISP, RESERVE MODULE | | ET 200ISP, RESERVE MODULE |
| **Digital inputs** | | **Dimensions** | |
| Number of digital inputs | 0 | Width | 30 mm |
| **Standards, approvals, certificates** | | Height | 129 mm |
| CE mark | Yes | Depth | 136.5 mm |
| **Use in hazardous areas** | | **Weights** | |
| • Type of protection acc. to EN 50020 (CENELEC) | II2 G EEx ib IIC T4 | Weight, approx. | 180 g |
| • Test number KEMA | 04 ATEX 1251 | | |

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Safety-related electronics modules** | | **Terminal modules** | |
| *F digital input modules* | | **ET 200iSP terminal module TM-EM/EM60** For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) | |
| **8 F-DI Ex NAMUR** For evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas • SIL3/Cat.3/PLe with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation) | 6ES7138-7FN00-0AB0 | • For hazardous environments | |
| | | - TM-EM/EM60S (blue screw-type terminals) | 6ES7193-7CA00-0AA0 |
| | | - TM-EM/EM60C (blue spring-loaded terminals) | 6ES7193-7CA10-0AA0 |
| | | • For non-hazardous environments | |
| *F digital output modules* | | - TM-EM/EM60S (black screw-type terminals) | 6ES7193-7CA20-0AA0 |
| **4 F-DO Ex 17.4 V DC/40 mA** For controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps • SIL 3/Cat. 3/PLe with 4 outputs, P/P-switching | 6ES7138-7FD00-0AB0 | **Accessories** | |
| | | **Reserve module** For any electronics module | 6ES7138-7AA00-0AA0 |
| *F analog input modules* | | **Labeling sheet** DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 | |
| **4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA)** For evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices • SIL 3/Cat. 3/PLe with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation) • Resolution 15 bit + sign • HART communication in measuring range 4 ... 20 mA | 6ES7138-7FA00-0AB0 | • petrol | 6ES7193-7BH00-0AA0 |
| | | • yellow | 6ES7193-7BB00-0AA0 |
| | | **Labels, inscribed** for slot numbering, label size H × W (in mm): 5 × 7 | |
| | | • 204 labels, for slots 1 to 20 | 8WA8361-0AB |
| | | • 204 labels, for slots 1 to 40 | 8WA8361-0AC |
| | | **Labels, blank** 136 labels for slot numbering, label size H × W (in mm): 5 × 7 | 8WA8348-2AY |
| | | **S7-300 DIN rails** | |
| | | • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box | 6ES7390-1AF85-0AA0 |
| | | • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box | 6ES7390-1AJ85-0AA0 |

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## Overview

The watchdog module has two fundamental functions:

- Monitoring of the ET 200iSP remote I/O station for hardware failures (hardware lifebeat); external, applicative failure monitoring is also possible via an I/O address area of the module
- Intrinsically-safe power supply for external actuator switch-off

The watchdog module must be plugged onto a terminal module (order separately). The following terminal modules are suitable for this:

- TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, Interface module section)
- TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics modules (except 2 DO relay):
  - with blue screw-type or spring-loaded terminals for hazardous environments
  - with black screw-type terminals for non-hazardous environments

The first slot directly next to the interface module is provided for the watchdog module.

## Technical specifications

| Article number | **6ES7138-7BB00-0AB0** |
|---|---|
| | ET 200ISP, WATCHDOG MOD. |
| **Digital inputs** | |
| Number of digital inputs | 0 |
| **Dimensions** | |
| Width | 30 mm |
| Height | 129 mm |
| Depth | 136.5 mm |

## Ordering data

| | Article No. |
|---|---|
| **Watchdog module** For failure monitoring and for the intrinsically safe power supply of an external actuator switch-off | **6ES7138-7BB00-0AB0** |
| **Terminal modules** | |
| **ET 200iSP terminal module TM-EM/EM60** For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) | |
| • For hazardous environments | |
| - TM-EM/EM60S (blue screw-type terminals) | **6ES7193-7CA00-0AA0** |
| - TM-EM/EM60C (blue spring-loaded terminals) | **6ES7193-7CA10-0AA0** |
| • For non-hazardous environments | |
| - TM-EM/EM60S (black screw-type terminals) | **6ES7193-7CA20-0AA0** |
| **Accessories** | |
| **Labeling sheet** DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 | |
| • petrol | **6ES7193-7BH00-0AA0** |
| • yellow | **6ES7193-7BB00-0AA0** |
| **Labels, inscribed** for slot numbering, label size H × W (in mm): 5 × 7 | |
| • 204 labels, for slots 1 to 20 | **8WA8361-0AB** |
| • 204 labels, for slots 1 to 40 | **8WA8361-0AC** |
| **Labels, blank** 136 labels for slot numbering, label size H × W (in mm): 5 × 7 | **8WA8348-2AY** |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200iSP

**RS 485-iS coupler**

■ **Overview**



*Tasks of the RS 485-iS coupler*

- Conversion of the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbps
- Required to connect intrinsically safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection
- Acts as a safety barrier
- Additional use as a repeater in the hazardous area
- Passive bus station (no configuration necessary)
- Certified according to ATEX 100a

■ **Technical specifications**

| Technical data RS 485-iS coupler | |
|---|---|
| **Dimensions and weight** | |
| Dimensions W x H x D (mm) | 80 x 125 x 130 |
| Weight | Approx. 500 g |
| **Technical data - General** | |
| Degree of protection | IP20 |
| Ambient temperature | - 20 °C to + 60 °C |
| **Standards and approvals** | |
| • PROFIBUS | IEC 61784-1:2002 Ed1 CP 3/1 |
| • EU directive | 94/9/EG (ATEX 100a) |
| • CENELEC | II 3 (2) G EEx nA[ib] IIC T4 |
| • UL and CSA | Class I, Division2, Group A, B, C, D T4<br>Class I Zone 2, Group IIC T4<br>AIS Class I, Divison 1, Group A, B, C, D<br>[Aexib] IIC, Class I, Zone1, 2, Group IIC |
| • FM | Class I, Division2, Group A, B, C, D T4<br>Class I Zone 2, Group IIC T4<br>AIS Class I, Divison 1, Group A, B, C, D<br>[Aexib] IIC, Class I, Zone1, 2, Group IIC |
| • IEC | IEC61131-2, Part 2 |
| • CE | Conforming with 89/336/EWG<br>Conforming with 73/23/EWG |
| • Ship-building certification | Classification companies |
| | • ABS (American Bureau of Shipping) |
| | • BV (Bureau Veritas) |
| | • DNV (Det Norske Veritas) |
| | • GL (Germanischer Lloyd) |
| | • LRD (Lloyds Register of Shipping) |
| | • Class NK (Nippon Kaiji Kyokai) |
| **Module-Specific Specifications** | |
| Transfer rate on PROFIBUS DP, PROFIBUS RS 485-IS | 9.6; 19.2; 45.45; 93.75; 187.5; 500 Kbps<br>1.5 Mbps |
| Bus-Protocol | PROFIBUS DP |

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## ■ Technical specifications (continued)

| Technical data RS 485-iS coupler | | |
|---|---|---|
| **Voltages, Currents, Potentials** | | |
| Nominal supply voltage for RS 485-iS coupler | 24 V DC (20.4 to 28.8 V) | |
| • Polarity reversal protection | Yes | |
| • Voltage drop bypass | Min. 5 ms | |
| Potential isolation for 24 V power supply | | |
| • to PROFIBUS DP | Yes | |
|   - tested with | 500 V DC | |
| • to PROFIBUS RS 485-IS | Yes | |
|   - tested with | AC 500 V | |
| Current consumption RS 485-iS coupler (24 V DC), max. | 150 mA | |
| Power loss of the module, typically | 3 Watts | |
| **Status, alarms, diagnostics** | | |
| Status display | no | |
| Alarms | None | |
| Diagnostic functions | Yes | |
| • Bus monitoring PROFIBUS DP (primary) | Yellow LED "DP1" | |
| • Bus monitoring PROFIBUS RS 485-IS (secondary) | Yellow LED "DP2" | |
| • Monitoring 24 V power supply | Green LED "ON" | |
| **Technical safety notice** | | |
| $V_{DC}$ | ±4.2 V | |
| $I_{SC}$ | ±93 mA | |
| $P_0$ | 0.1 Watts | |
| $V_{max}$ | ±4.2 V | |
| $L_I$ | 0 | |
| $C_i$ | 0 | |
| $U_m$ | AC 250 V | |
| $T_a$ | −25 ... +60 °C | |
| **RS 485-IS segment** | | |
| permitted cable length on a single line | RS 485–IS | DP Ex i |
| • 9.6 to 187.5 Kbps | 1,000 m | 200 m |
| • 500 Kbps | 400 m | 200 m |
| • 1.5 Mbps | 200 m | 200 m |
| Number of PROFIBUS DP nodes that can be connected, max. | 31 | 16 |
| PROFIBUS RS 485-IS bus termination switch | integrated, can be added | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **RS 485-iS coupler** <br> Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies | **6ES7972-0AC80-0XA0** | **S7-300 rails** <br> Lengths: | |
| | | • 160 mm | **6ES7390-1AB60-0AA0** |
| **Accessories** | | • 482 mm | **6ES7390-1AE80-0AA0** |
| **PROFIBUS connector with selectable terminating resistor** <br> For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology | **6ES7972-0DA60-0XA0** | • 530 mm | **6ES7390-1AF30-0AA0** |
| | | • 830 mm | **6ES7390-1AJ30-0AA0** |
| | | • 2 000 mm | **6ES7390-1BC00-0AA0** |
| | | **PROFIBUS FastConnect bus cable** <br> Standard type with special design for fast mounting, 2-core, shielded, cut-to-length; max. delivery unit 1 000 m, minimum order quantity 20 m | **6XV1830-0EH10** |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

**Stainless steel wall enclosure**

## ■ Design
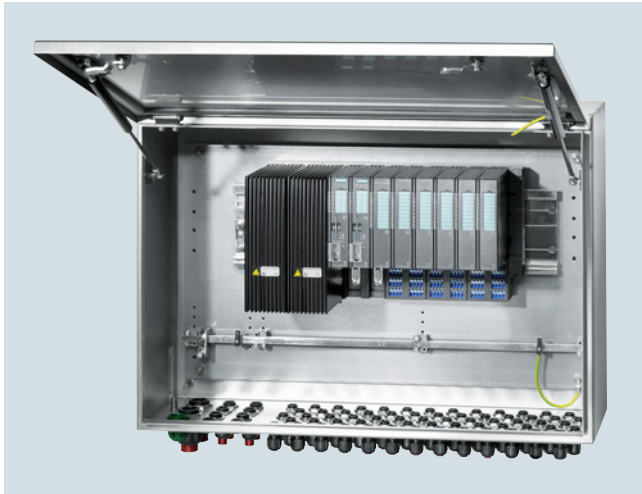


ET 200iSP modules can also be installed in stainless steel wall enclosures designed to meet more exacting protection requirements. The enclosures are available in various sizes. They comply with IP65 degree of protection and can be used in Ex zones 1 and 21.

Delivery is possible as an empty enclosure (6DL2804-0….) or including components (6DL2804-1…. or 6DL2804-2….), depending on the order. Please send your requests to:

Siemens AG
PD PA AE SO
(please insert project name here)
Östl. Rheinbrückenstr. 50
76187 Karlsruhe, Germany

Email: cabinets.industry@siemens.com

## ■ Ordering data

| | Article No. |
|---|---|
| **Stainless steel enclosure IP65, protection class Ex e, suitable for Ex zones 1 and 21** | |
| **Empty enclosure without installation of modules, for use in gas area (zones 1 and 2), IP65** | |
| **Enclosure with hinged cover 650 × 450 × 230** For the installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | **6DL2804-0AD30** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C | **6DL2804-0AD31** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | **6DL2804-0AD32** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | **6DL2804-0AD42** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic | **6DL2804-0AD50** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 … +70 °C | **6DL2804-0AD51** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | **6DL2804-0AD52** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | **6DL2804-0AD62** |

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■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Enclosure with hinged cover 950 × 450 × 230** For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | | **Empty enclosure without installation of modules, for use in dust area (zones 21 and 22), IP65** | |
| | | **Enclosure with hinged cover 650 × 450 × 230** For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-0AE30 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-0DD30 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C | 6DL2804-0AE31 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0DD32 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0AE32 | • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0DD42 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0AE42 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-0DD50 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-0AE50 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0DD52 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 … +70 °C | 6DL2804-0AE51 | • 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0DD62 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0AE52 | | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0AE62 | | |

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# I/O systems
## SIMATIC ET 200 systems for the control cabinet
## SIMATIC ET 200iSP

**Stainless steel wall enclosure**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Enclosure with hinged cover 950 × 450 × 230**<br>For the installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | | **Enclosure with installation of ET 200iSP modules, for use in gas area (zones 1 and 2), IP65** | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-0DE30 | **Enclosure with hinged cover 650 × 450 × 230**<br>For installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0DE32 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-1AD30 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0DE42 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AD31 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-0DE50 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1AD32 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-0DE52 | • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1AD42 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-0DE62 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-1AD50 |
| **Empty enclosure without installation of modules, for use in mining (Cat. M2), IP65** | | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AD51 |
| **Enclosure with hinged cover 650 × 450 × 230**<br>For the installation of max. 15 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets: | | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1AD52 |
| • 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal | 6DL2804-0MD16 | • 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1AD62 |
| • 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal | 6DL2804-0MD26 | | |
| **Enclosure with hinged cover 950 × 450 × 230**<br>For the installation of max. 25 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets: | | | |
| • 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal | 6DL2804-0ME16 | | |
| • 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal | 6DL2804-0ME26 | | |

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| ■ **Ordering data** | **Article No.** | | **Article No.** |
|---|---|---|---|
| **Enclosure with hinged cover**<br>**950 × 450 × 230**<br>For the installation of max.<br>25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | | **Enclosure with installation of ET 200iSP modules, for use in dust area (zones 21 and 22), IP65** | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-1AE30 | **Enclosure with hinged cover**<br>**650 × 450 × 230**<br>For the installation of max.<br>15 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AE31 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | 6DL2804-1DD30 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1AE32 | • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1DD32 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AE41 | • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1DD42 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1AE42 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-1DD50 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic | 6DL2804-1AE50 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1DD51 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AE51 | • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1DD52 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic | 6DL2804-1AE52 | • 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1DD62 |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) | 6DL2804-1AE61 | | |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic | 6DL2804-1AE62 | | |

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# I/O systems
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200iSP

## Stainless steel wall enclosure

| Ordering data | Article No. | | Article No. |
|---|---|---|---|

**Enclosure with hinged cover 950 × 450 × 230**
For the installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic — **6DL2804-1DE30**

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DE32**

- 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DE42**

- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic — **6DL2804-1DE50**

- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DE52**

- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DE62**

**Enclosure with installation of ET 200iSP modules, for use in mining (Cat. M2), IP65**

**Enclosure with hinged cover 650 × 450 × 230**
For the installation of max. 15 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:

- 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal — **6DL2804-1MD16**

- 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal — **6DL2804-1MD26**

**Enclosure with hinged cover 950 × 450 × 230**
For the installation of max. 25 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:

- 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal — **6DL2804-1ME16**

- 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal — **6DL2804-1ME26**

**Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in gas area (zones 1 and 2), IP65**

**Enclosure with hinged cover 650 × 450 × 230**
For the installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic — **6DL2804-2AD30**

- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic — **6DL2804-2AD50**

- 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-2AD62**

**Enclosure with hinged cover 950 × 450 × 230**
For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic — **6DL2804-2AE30**

- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic — **6DL2804-2AE50**

- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-2AE62**

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in dust area (zones 21 and 22), IP65[1]** | | **Enclosure with hinged cover 950 × 450 × 230** For installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets: | |
| **Enclosure with hinged cover 650 × 450 × 230** For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets: | **6DL2804-2DD40** | • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | **6DL2804-2DE40** |
| • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic | | • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic | **6DL2804-2DE50** |
| | | **Special configurations** | For individual configurations that deviate from the standard configurations, we would be happy to prepare an offer tailored to your needs. Please direct your request to cabinets.industry@siemens.com |

[1] The AirLINE Ex components (see catalog "Add-ons for SIMATIC PCS 7") must be ordered separately.

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

### SIMATIC ET 200pro

■ **Overview**
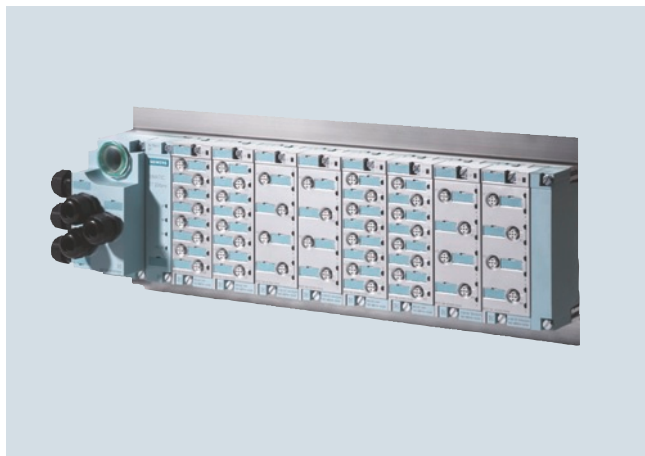


- SIMATIC ET 200pro distributed I/O system with IP65/67 degree of protection for cabinet-free use at the machine
- Small, multifunctional complete solution: Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.
- Communication over PROFIBUS or PROFINET
- Mixed arrangement of fail-safe and standard modules in the same station
- Freely selectable connection technique: direct, ECOFAST or M12 7/8"
- Power module for easy implementation of load groups
- Module replacement during operation (hot swapping)
- Easy installation as well as permanent wiring
- Transmission rate for PROFIBUS DP up to 12 Mbps
- Extensive diagnostics: module-specific or channel-specific
- Intelligent motor starters for starting and protection of motors and loads up to 5.5 kW
  - Versions: direct and reversing starters - Standard and High Feature
- Fail-safe motor starters
- Fail-safe modules with safety-related signal processing according to PROFIsafe
- Frequency converters
- RFID communication modules
- Pneumatic interface modules

■ **Technical specifications**

| General technical specifications | |
|---|---|
| Electronic modules | • Digital inputs/outputs |
| | • Analog inputs |
| | • Analog outputs |
| Connections | M12 and M8 round connector with standard assignment for actuator/sensor |
| Transmission rate, max. | 12 Mbit/s (PROFIBUS DP), 100 Mbit/s (PROFINET IO) |
| Supply voltage | 24 V DC |
| Current consumption of one ET 200pro (internal and encoder supply, non-switched voltage), up to 55 °C, max. | ≤ 5 A |
| Load current for ET 200pro per incoming supply (IM, PM, switched voltage), up to 55 °C, max. | 10 A |
| For overall configuration with looping through (multiple ET 200pros), up to 55 °C, max. | 16 A (with connecting module, directly) |
| Degree of protection | IP65/66/IP67 for interface, digital and analog modules |
| Material | Thermoplastic (reinforced with glass fiber) |

| Environmental conditions | |
|---|---|
| Temperature | From -25 °C/0 °C to +55 °C |
| Relative humidity | From 5 to 100% |
| Air pressure | From 795 to 1080 hPa |
| **Mechanical stress** | |
| • Vibration | Vibration test according to IEC 60068, Part 2-6 (sinusoidal) |
| | • Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules |
| | • 2 g motor starters |
| • Shock | • Shock test according to IEC 680068 Part 2-27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules |
| | • 15 g, 11 ms duration for motor starters |
| Approvals | UL, CSA or cULus |

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## Overview



Interface modules for handling communication between the ET 200pro and the higher-level master over PROFIBUS DP.

## Technical specifications

| Article number | 6ES7154-1AA01-0AB0 | 6ES7154-2AA01-0AB0 |
|---|---|---|
| | ET 200PRO, IM 154-1 DP | ET 200PRO, IM154-2 DP HF |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes; against destruction | Yes; against destruction |
| Short-circuit protection | Yes; over exchangeable fuses | Yes; over exchangeable fuses |
| **Load voltage 2L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Reverse polarity protection | Yes; against destruction | Yes; against destruction |
| **Input current** | | |
| from supply voltage 1L+, max. | 200 mA | 200 mA |
| **Power loss** | | |
| Power loss, typ. | 5 W | 5 W |
| **Address area** | | |
| **Addressing volume** | | |
| • Inputs | 244 byte | 244 byte |
| • Outputs | 244 byte | 244 byte |
| **Interfaces** | | |
| Interfaces/bus type | PROFIBUS DP | PROFIBUS DP |
| Interface physics, RS 485 | Yes | Yes |
| **PROFIBUS DP** | | |
| • automatic detection of transmission rate | Yes | Yes |
| • Transmission rate, min. | 9.6 kbit/s | 9.6 kbit/s |
| • Transmission rate, max. | 12 Mbit/s | 12 Mbit/s |
| • SYNC capability | Yes | Yes |
| • FREEZE capability | Yes | Yes |
| • Direct data exchange (slave-to-slave communication) | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | |
| **Alarms** | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable |
| • Hardware interrupt | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostics indication LED** | | |
| • Bus fault BF (red) | Yes | Yes |
| • Group error SF (red) | Yes | Yes |
| • Monitoring 24 V voltage supply ON (green) | Yes | Yes |
| • Load voltage monitoring 24 V DC (green) | Yes | Yes |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**Interface modules   > IM 154-1 and IM 154-2**

### Technical specifications (continued)

| Article number | 6ES7154-1AA01-0AB0 | 6ES7154-2AA01-0AB0 |
|---|---|---|
| | ET 200PRO, IM 154-1 DP | ET 200PRO, IM154-2 DP HF |
| **Parameter** | | |
| DPV1 operation | possible | possible |
| Swapping interrupt | Parameterizable | Parameterizable |
| Startup if setpoint not equal to actual configuration | Parameterizable | Parameterizable |
| **Potential separation** | | |
| between supply voltage and electronics | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP67 | Yes | Yes |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C | -25 °C |
| • max. | 55 °C | 55 °C |
| **Ambient temperature during storage/transportation** | | |
| • min. | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C |
| **Dimensions** | | |
| Width | 90 mm | 90 mm |
| Height | 130 mm | 130 mm |
| Depth | 59.3 mm | 59.3 mm |
| **Weights** | | |
| Weight, approx. | 375 g | 375 g |

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## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM154-1 interface module** | **6ES7154-1AA01-0AB0** | **PROFIBUS ECOFAST hybrid cable, non-assembled** | |
| For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP. | | Trailing-type cable with 2 x CU 0.64 mm$^2$ and 4 x Cu 1.5 mm$^2$, in various lengths: | |
| **IM154-2 DP High Feature interface module** | **6ES7154-2AA01-0AB0** | 50 m | **6XV1830-7AN50** |
| | | 100 m | **6XV1830-7AT10** |
| For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP; supports PROFIsafe. | | **PROFIBUS ECOFAST hybrid connector 180** | |
| **Accessories** | | ECOFAST Cu, 2 x Cu, 4 x 1.5 mm$^2$·, HANBRID connector | |
| **CM IM DP ECOFAST connection module** | **6ES7194-4AA00-0AA0** | • With male insert, 5-pack | **6GK1905-0CA00** |
| | | • With female insert, 5-pack | **6GK1905-0CB00** |
| For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections. | | **PROFIBUS ECOFAST hybrid connector angular** | |
| | | ECOFAST Cu, 2 x Cu, 4 x 1.5 mm$^2$·, HANBRID connector | |
| **CM IM DP direct connection module** | **6ES7194-4AC00-0AA0** | • With male insert, 5-pack | **6GK1905-0CC00** |
| | | • With female insert, 5-pack | **6GK1905-0CD00** |
| For connecting PROFIBUS DP and the 24 V power supply directly to PROFIBUS interface modules, up to six M20 cable glands. | | **Accessories for CM IM DP direct** | |
| | | **PROFIBUS trailing cable** | **6XV1830-3EH10** |
| **CM IM DP M12, 7/8" connection module** | **6ES7194-4AD00-0AA0** | Max. acceleration 4 m/s$^2$, at least 3 million bending cycles, bending radius at least 60 mm, 2-core shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | |
| For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8". | | **PROFIBUS FC Food bus cable** | **6XV1830-0GH10** |
| **Accessories for CM IM DP ECOFAST** | | With PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | |
| **PROFIBUS ECOFAST hybrid cable, pre-assembled** | | **PROFIBUS FC Robust bus cable** | **6XV1830-0JH10** |
| With 2 ECOFAST connectors, trailing-type cable with 2 x Cu 0.64 mm$^2$ and 4 x Cu 1.5 mm$^2$, in various lengths: | | With PUR sheath for use in environments subject to harsh chemicals and extreme mechanical stress, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | |
| 1.5 m | **6XV1830-7BH15** | | |
| 3.0 m | **6XV1830-7BH30** | **Power line** | **6XV1830-8AH10** |
| 5.0 m | **6XV1830-7BH50** | 5-core, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | |
| 10 m | **6XV1830-7BN10** | | |
| 15 m | **6XV1830-7BN15** | | |
| 20 m | **6XV1830-7BN20** | | |
| **PROFIBUS ECOFAST hybrid cable GP, pre-assembled** | | | |
| With 2 ECOFAST connectors, trailing-type cable with 2 x Cu 0.64 mm$^2$ and 4 x Cu 1.5 mm$^2$, in various lengths: | | | |
| 1.5 m | **6XV1860-3PH15** | | |
| 3.0 m | **6XV1860-3PH30** | | |
| 5.0 m | **6XV1860-3PH50** | | |
| 10 m | **6XV1860-3PN10** | | |
| 15 m | **6XV1860-3PN15** | | |
| 20 m | **6XV1860-3PN20** | | |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**Interface modules > IM 154-1 and IM 154-2**

## Ordering data

| | Article No. |
|---|---|
| **Accessories for CM IM DP M12, 7/8"** | |
| **PROFIBUS M12 connecting cable** | |
| Pre-assembled with two M12 connectors, 5-pin, in various lengths: | |
| 1.5 m | 6XV1830-3DH15 |
| 2.0 m | 6XV1830-3DH20 |
| 3.0 m | 6XV1830-3DH30 |
| 5.0 m | 6XV1830-3DH50 |
| 10 m | 6XV1830-3DN10 |
| 15 m | 6XV1830-3DN15 |
| **7/8" connecting cable to power supply** | |
| 5-core, 5 x 1.5 mm$^2$, trailing type, pre-assembled with two 7/8" connectors, 5-pin, in various lengths: | |
| 1.5 m | 6XV1822-5BH15 |
| 2.0 m | 6XV1822-5BH20 |
| 3.0 m | 6XV1822-5BH30 |
| 5.0 m | 6XV1822-5BH50 |
| 10 m | 6XV1822-5BN10 |
| 15 m | 6XV1822-5BN15 |
| **M12 cable connector** | |
| For ET 200eco, with axial cable outlet. | |
| • With male insert, 5-pack | 6GK1905-0EA00 |
| • With female insert, 5-pack | 6GK1905-0EB00 |
| **PROFIBUS M12 bus termination connector** | 6GK1905-0EC00 |
| With male insert. | |
| **7/8" cable connector** | |
| For ET 200eco, with axial cable outlet. | |
| • With male insert, 5-pack | 6GK1905-0FA00 |
| • With female insert, 5-pack | 6GK1905-0FB00 |
| **M12 sealing cap** | 3RX9802-0AA00 |
| For protection of unused M12 connections with ET 200pro. | |
| **Sealing cap 7/8"** | 6ES7194-3JA00-0AA0 |
| For protection of unused 7/8" connections with ET 200pro; 10 units per pack. | |

| | Article No. |
|---|---|
| **General accessories** | |
| **ET 200pro rack** | |
| • Narrow, for interface, electronics and power modules | |
| - 500 mm | 6ES7194-4GA00-0AA0 |
| - 1000 mm | 6ES7194-4GA60-0AA0 |
| - 2000 mm, can be cut to length | 6ES7194-4GA20-0AA0 |
| • Compact, for interface, electronics and power modules | |
| - 500 mm | 6ES7194-4GC70-0AA0 |
| - 1000 mm | 6ES7194-4GC60-0AA0 |
| - 2000 mm, can be cut to length | 6ES7194-4GC20-0AA0 |
| • Wide, for interface, electronics, power modules and motor starters | |
| - 500 mm | 6ES7194-4GB00-0AA0 |
| - 1000 mm | 6ES7194-4GB60-0AA0 |
| - 2000 mm, can be cut to length | 6ES7194-4GB20-0AA0 |
| • Wide, for I/O modules and motor starters | |
| - 500 mm | 6ES7194-4GD00-0AA0 |
| - 1000 mm | 6ES7194-4GD10-0AA0 |
| - 2000 mm | 6ES7194-4GD20-0AA0 |
| **Spare fuse** | 6ES7194-4HB00-0AA0 |
| 12.5 A fast-blow, for interface and power modules, 10 units per pack. | |
| **PROFIBUS FastConnect bus cable** | 6XV1830-0EH10 |
| Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum order quantity 20 m. | |
| **PROFIBUS Hybrid Standard Cable GP** | 6XV1860-2R |
| Standard PROFIBUS hybrid cable with 2 energy cables (1.5 mm$^2$) for supplying data and energy for ET 200pro. | |
| **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication). | |
| **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates. | |

## ■ Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

## ■ Technical specifications

| Article number | **6ES7154-4AB10-0AB0** |
|---|---|
| | ET 200PRO, IM 154-4 PN HF |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes; against destruction |
| Short-circuit protection | Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| from supply voltage 1L+, max. | 400 mA; Dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage |
| **Power loss** | |
| Power loss, typ. | 6 W; Dependent on terminal module, typ. maximum value for CU connection method, full load on RWB, for FO the value is approx. 0.7 W higher |
| **Memory** | |
| Micro Memory Card | No; Internal memory medium |
| **Address area** | |
| **Addressing volume** | |
| • Inputs | 256 byte |
| • Outputs | 256 byte |
| **Interfaces** | |
| **PROFINET IO** | |
| • automatic detection of transmission rate | Yes |
| • Transmission rate, max. | 100 Mbit/s |
| • Services | ARP, PING, SNMP |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Hardware interrupt | Yes; Parameterizable |

| Article number | **6ES7154-4AB10-0AB0** |
|---|---|
| | ET 200PRO, IM 154-4 PN HF |
| **Diagnostics indication LED** | |
| • Bus fault BF (red) | Yes; Additional LEDs (MAINT, P1/2 LINK, P1/2 RX/TX) available |
| • Group error SF (red) | Yes |
| • Monitoring 24 V voltage supply ON (green) | Yes |
| • Load voltage monitoring 24 V DC (green) | Yes |
| **Parameter** | |
| Swapping interrupt | 1 |
| Startup if setpoint not equal to actual configuration | 1 |
| Hot swapping of modules | 1 |
| **Potential separation** | |
| between backplane bus and electronics | No |
| between supply voltage and electronics | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP66 | Yes |
| • IP67 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Dimensions** | |
| Width | 135 mm |
| Height | 130 mm |
| Depth | 59.3 mm |
| **Weights** | |
| Weight, approx. | 490 g |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 154-4 PN High Feature interface module**<br>For communication between ET 200pro and higher-level controllers over PROFINET IO; Supports PROFIsafe. | 6ES7 154-4AB10-0AB0 | **7/8" connecting cable to power supply**<br>5-core, 5 x 1.5 mm², trailing type, pre-assembled with two 7/8" connectors, 5-pin, up to 50 m, in various lengths: | |
| **Accessories** | | 1.5 m | 6XV1 822-5BH15 |
| **CM IM PN connection module M12, 7/8"**<br>For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8". | 6ES7 194-4AJ00-0AA0 | 2.0 m | 6XV1 822-5BH20 |
| | | 3.0 m | 6XV1 822-5BH30 |
| | | 5.0 m | 6XV1 822-5BH50 |
| | | 10 m | 6XV1 822-5BN10 |
| **CM IM PN connection module 2xRJ45**<br>For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector. | 6ES7 194-4AF00-0AA0 | 15 m | 6XV1 822-5BN15 |
| | | Other special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 |
| **CM IM PN 2xSCRJ FO connection module**<br>For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector. | 6ES7 194-4AG00-0AA0 | **Power line**<br>5-core, 5 x 1.5 mm², trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m. | 6XV1 830-8AH10 |
| | | **7/8" cable connector**<br>For ET 200eco, with axial cable outlet.<br>• With male insert, 5-pack<br>• With female insert, 5-pack | <br><br><br>6GK1 905-0FA00<br>6GK1 905-0FB00 |
| **M12 sealing cap**<br>For protection of unused M12 connections with ET 200pro. | 3RX9 802-0AA00 | **Industrial Ethernet FastConnect installation cables**<br>• IE FC TP Standard Cable GP 2 x 2; Sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. | 6XV1 840-2AH10 |
| **IE M12 connecting cables**<br>Pre-assembled with two M12 connectors, up to 85 m, in various lengths: | | • IE FC TP Trailing Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; minimum order quantity 20 m. | 6XV1 840-3AH10 |
| 0.3 m | 6XV1 870-8AE30 | • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. | 6XV1 870-2D |
| 0.5 m | 6XV1 870-8AE50 | | |
| 1.0 m | 6XV1 870-8AH10 | • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. | 6XV1 870-2F |
| 1.5 m | 6XV1 870-8AH15 | | |
| 2.0 m | 6XV1 870-8AH20 | • IE FC TP Marine Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; minimum order quantity 20 m. | 6XV1 840-4AH10 |
| 3.0 m | 6XV1 870-8AH30 | | |
| 5.0 m | 6XV1 870-8AH50 | | |
| 10 m | 6XV1 870-8AN10 | | |
| 15 m | 6XV1 870-8AN15 | | |
| Other special lengths with 90° or 180° cable outlet. | See http://support.automation.siemens.com/WW/view/en/26999294 | | |
| **7/8" sealing caps**<br>1 pack = 10 units | 6ES7 194-3JA00-0AA0 | | |

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■ **Ordering data** | Article No. | | | Article No. |

| | |
|---|---|
| **IE RJ45 Plug PRO** | |
| RJ45 plug in IP65/67-rated design for on-site assembly, plastic housing, insulation/displacement connection system, for SCALANCE X-200 IRT PRO and ET 200pro: 1 pack = 1 unit. | **6GK1901-1BB10-6AA0** |
| **IE SC RJ POF Plug PRO** | |
| SC RJ plug for POF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO and ET 200pro 1 pack = 1 unit | **6GK1900-0MB00-6AA0** |
| **IE SC RJ PCF Plug PRO** | |
| SC RJ plug for PCF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO 1 pack = 1 unit. | **6GK1900-0NB00-6AA0** |
| **Power Plug PRO** | |
| 5-pole power plug for 2 x 24 V power supply in IP65/67-rated design, for on-site assembly, plastic housing, for SCALANCE X-200IRT and ET 200 pro 1 pack = 1 unit. | **6GK1907-0AB10-6AA0** |
| **IE panel feed-through** | |
| Control cabinet feedthrough for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20) <br> • 1 pack = 5 units | **6GK1901-0DM20-2AA5** |
| **Push-pull cable connector** | **6GK1907-0AB10-6AA0** |
| For 1L+/ 2L+, unassembled | |
| **Cover caps for push-pull RJ45 female connectors** | **6ES7194-4JD50-0AA0** |
| 5 items per pack | |

| | |
|---|---|
| **General accessories** | |
| **ET 200pro rack** | |
| • Narrow, for interface, electronics and power modules | |
|   - 500 mm | **6ES7194-4GA00-0AA0** |
|   - 1000 mm | **6ES7194-4GA60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7194-4GA20-0AA0** |
| • Compact, for interface, electronics and power modules | |
|   - 500 mm | **6ES7194-4GC70-0AA0** |
|   - 1000 mm | **6ES7194-4GC60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7194-4GC20-0AA0** |
| • Wide, for interface, electronics, power modules and motor starters | |
|   - 500 mm | **6ES7194-4GB00-0AA0** |
|   - 1000 mm | **6ES7194-4GB60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7194-4GB20-0AA0** |
| • Wide, for I/O modules and motor starters | |
|   - 500 mm | **6ES7194-4GD00-0AA0** |
|   - 1000 mm | **6ES7194-4GD10-0AA0** |
|   - 2000 mm | **6ES7194-4GD20-0AA0** |
| **Spare fuse** | **6ES7194-4HB00-0AA0** |
| 12.5 A fast-blow, for interface and power modules, 10 units per pack | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules > Digital expansion modules**

## Overview

- Expansion modules with digital inputs/outputs for connection of actuators/sensors
- With scalable diagnostics
  - Standard modules with module-specific diagnostics
  - High-feature module with channel-specific diagnostics and parameterizable input delay or hardware interrupts
- Double or single assignment can be implemented for each M12 in the case of the 8 DI and 8 DO module by selecting CM IO 4 x M12 or CM IO 8 x M12
- IO connection modules are available in metal and plastic versions

## Technical specifications

| Article number | 6ES7141-4BF00-0AA0 | 6ES7141-4BF00-0AB0 | 6ES7141-4BH00-0AA0 |
|---|---|---|---|
| | ET 200PRO, EM 8DI 24 V DC | ET 200PRO, EM 8DI 24 V DC HF | ET 200PRO, EM 16DI DC 24 V |
| **Supply voltage** | | | |
| Rated value (DC) | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes; Against destruction; encoder power supply outputs applied with reversed polarity | Yes; against destruction; load increasing | Yes; Against destruction; encoder power supply outputs applied with reversed polarity |
| **Input current** | | | |
| from supply voltage 1L+, max. | 20 mA | 40 mA | 30 mA |
| from backplane bus 3.3 V DC, max. | 20 mA | 20 mA | 20 mA |
| **Encoder supply** | | | |
| Number of outputs | 8 | 8 | 8 |
| Short-circuit protection | Yes; per module, electronic | Yes; per channel, electronic | Yes; per module, electronic |
| **Output current** | | | |
| • up to 55 °C, max. | 1 A | 1 A | 1 A |
| **Power loss** | | | |
| Power loss, typ. | 2.5 W | 2.5 W | 3 W |
| **Address area** | | | |
| **Occupied address area** | | | |
| • Inputs | 1 byte | 1 byte | 2 byte |
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 8 | 16 |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes | No | Yes |
| Input characteristic curve in accordance with IEC 61131, type 2 | No | Yes | |
| **Number of simultaneously controllable inputs** | | | |
| **all mounting positions** | | | |
| - up to 55 °C, max. | 8 | 8 | 16 |
| **Input voltage** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V | -3 to +5V |
| • for signal "1" | 13 to 30V | +11 to +30V | +11 to +30V |
| **Input current** | | | |
| • for signal "1", typ. | 7 mA | 7 mA | 4 mA |
| **Input delay (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - parameterizable | No | Yes | No |
| - at "0" to "1", min. | 1.2 ms | 0.5 ms; 0.5 ms/ 3ms/ 15 ms/ 20 ms | 1.2 ms |
| - at "0" to "1", max. | 4.8 ms | 20 ms | 4.8 ms |
| - at "1" to "0", min. | 1.2 ms | 0.5 ms; 0.5 ms/ 3ms/ 15 ms/ 20 ms | 0.7 ms |
| - at "1" to "0", max. | 4.8 ms | 20 ms | 3 ms |

■ **Technical specifications** (continued)

| Article number | 6ES7141-4BF00-0AA0 | 6ES7141-4BF00-0AB0 | 6ES7141-4BH00-0AA0 |
|---|---|---|---|
| | ET 200PRO, EM 8DI 24 V DC | ET 200PRO, EM 8DI 24 V DC HF | ET 200PRO, EM 16DI DC 24 V |
| **Cable length** | | | |
| • shielded, max. | 30 m | 30 m | 30 m |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA |
| **Isochronous mode** | | | |
| Isochronous operation (application synchronized up to terminal) | No | No | No |
| **Interrupts/diagnostics/ status information** | | | |
| Diagnostic functions | Yes | Yes; channel by channel, parameterizable | Yes |
| **Alarms** | | | |
| • Diagnostic alarm | Yes | Yes | Yes |
| **Diagnostic messages** | | | |
| • Diagnostic information readable | Yes | Yes | Yes |
| • Wire-break | | Yes; Monitoring, I < 0.3 mA | |
| • Short-circuit | Yes; Sensor supply to M; module by module | Yes | Yes; Sensor supply to M; module by module |
| **Diagnostics indication LED** | | | |
| • Group error SF (red) | Yes | Yes | Yes |
| • Status indicator digital input (green) | Yes; Per channel | Yes; Per channel | Yes; Per channel |
| **Parameter** | | | |
| Diagnostics wire break | | channel by channel | |
| Diagnostics short-circuit | Sensor supply to M; module by module | channel by channel | |
| **Potential separation** | | | |
| between backplane bus and all other circuit components | Yes | Yes | Yes |
| **Potential separation digital inputs** | | | |
| • between the channels | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes |
| **Isolation** | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | | |
| Width | 45 mm | 45 mm | 45 mm |
| Height | 130 mm | 130 mm | 130 mm |
| Depth | 35 mm | 35 mm; without terminal module | 35 mm |
| **Weights** | | | |
| Weight, approx. | 140 g | 140 g | 140 g |

| Article number | 6ES7142-4BD00-0AA0 | 6ES7142-4BD00-0AB0 | 6ES7142-4BF00-0AA0 |
|---|---|---|---|
| | ET 200PRO, EM 4DO 24V DC/2.0A | ET 200PRO, EM 4DO 24VDC/2.0A HF | ET 200PRO, EM 8DO DC24V/0.5A |
| **Supply voltage** | | | |
| **Load voltage 2L+** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • Short-circuit protection | Yes; per channel, electronic | Yes; per channel, electronic | Yes; per channel, electronic |
| • Reverse polarity protection | Yes; against destruction; load increasing | Yes; against destruction; load increasing | Yes; against destruction; load increasing |
| **Input current** | | | |
| from load voltage 2L+ (without load), max. | 20 mA | 40 mA | 30 mA |
| from backplane bus 3.3 V DC, max. | 20 mA | 30 mA | 30 mA |
| **Power loss** | | | |
| Power loss, typ. | 2 W | 2.5 W | 2 W |
| **Address area** | | | |
| **Address space per module** | | | |
| • with packing | 4 bit | 4 bit | 8 bit |
| • without packing | 1 byte | 1 byte | 1 byte |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules   > Digital expansion modules**

## ■ Technical specifications (continued)

| Article number | 6ES7142-4BD00-0AA0 | 6ES7142-4BD00-0AB0 | 6ES7142-4BF00-0AA0 |
|---|---|---|---|
| | ET 200PRO, EM 4DO 24V DC/2.0A | ET 200PRO, EM 4DO 24VDC/2.0A HF | ET 200PRO, EM 8DO DC24V/0.5A |
| **Digital outputs** | | | |
| Number of digital outputs | 4 | 4 | 8 |
| Short-circuit protection | Yes | Yes | Yes |
| • Response threshold, typ. | 2.8 A | 2.8 A | 0.7 A |
| Limitation of inductive shutdown voltage to | 2L+ (-47 V) | 2L+ (-47 V) | 2L+ (-47 V) |
| Controlling a digital input | Yes | Yes | Yes; Isolation between 1L+ and 2L+ is no longer provided, as 1M and 2M are jumpered |
| **Switching capacity of the outputs** | | | |
| • on lamp load, max. | 10 W | 10 W | 5 W |
| **Load resistance range** | | | |
| • lower limit | 12 Ω | 12 Ω | 48 Ω |
| • upper limit | 4 kΩ | 4 kΩ | 4 kΩ |
| **Output voltage** | | | |
| • for signal "1", min. | 2L+ (-0,8 V) | 2L+ (-0,8 V) | 2L+ (-0,8 V) |
| **Output current** | | | |
| • for signal "1" rated value | 2 A | 2 A | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA | 0.5 mA |
| **Parallel switching of two outputs** | | | |
| • for uprating | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes |
| **Switching frequency** | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 1 Hz | 1 Hz |
| **Total current of the outputs (per group)** | | | |
| **all mounting positions** | | | |
| - up to 55 °C, max. | 4 A | 4 A | 4 A |
| **Cable length** | | | |
| • shielded, max. | 30 m | 30 m | 30 m |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Interrupts/diagnostics/status information** | | | |
| Diagnostic functions | Yes | Yes | Yes |
| Substitute values connectable | | Yes | |
| **Alarms** | | | |
| • Diagnostic alarm | Yes | Yes | Yes |
| **Diagnostic messages** | | | |
| • Diagnostic information readable | Yes | Yes | Yes |
| • Wire-break | | Yes | |
| • Short-circuit | Yes; Short-circuit of outputs to ground; module by module | Yes | Yes; Short-circuit of outputs to ground; module by module |
| **Diagnostics indication LED** | | | |
| • Group error SF (red) | Yes | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes | Yes |
| • Channel fault indicator F (red) | | Yes | |

## Technical specifications (continued)

| Article number | 6ES7142-4BD00-0AA0 | 6ES7142-4BD00-0AB0 | 6ES7142-4BF00-0AA0 |
|---|---|---|---|
| | ET 200PRO, EM 4DO 24V DC/2.0A | ET 200PRO, EM 4DO 24VDC/2.0A HF | ET 200PRO, EM 8DO DC24V/0.5A |
| **Parameter** | | | |
| Diagnostics wire break | | channel by channel | |
| Diagnostics short-circuit | | channel by channel | |
| **Potential separation** | | | |
| between backplane bus and all other circuit components | Yes | Yes | Yes |
| **Potential separation digital outputs** | | | |
| • between the channels | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes |
| **Isolation** | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | | |
| Width | 45 mm | 45 mm | 45 mm |
| Height | 130 mm | 130 mm | 130 mm |
| Depth | 35 mm | 35 mm; without terminal module | 35 mm |
| **Weights** | | | |
| Weight, approx. | 140 g | 140 g | 140 g |

| Article number | 6ES7143-4BF50-0AA0 | 6ES7143-4BF00-0AA0 |
|---|---|---|
| | ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A | ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A |
| **Supply voltage** | | |
| Rated value (DC) | | 24 V |
| Reverse polarity protection | | Yes; Against destruction; encoder power supply outputs applied with reversed polarity |
| **Load voltage 2L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Short-circuit protection | Yes | Yes |
| • Reverse polarity protection | Yes | Yes; against destruction; load increasing |
| **Input current** | | |
| from supply voltage 1L+, max. | | 20 mA |
| from load voltage 2L+ (without load), max. | 20 mA | 20 mA |
| from backplane bus 3.3 V DC, max. | 20 mA | 30 mA |
| **Encoder supply** | | |
| Number of outputs | 4 | 4 |
| Short-circuit protection | Yes; per module, electronic | Yes; per module, electronic |
| **Output current** | | |
| • up to 55 °C, max. | 1 A | 1 A |
| **Power loss** | | |
| Power loss, typ. | 2 W | 3 W |
| **Digital inputs** | | |
| Number of digital inputs | 4 | 4; 4 DIOs can be parameterized |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes |
| **Number of simultaneously controllable inputs** | | |
| **all mounting positions** | | |
| - up to 55 °C, max. | | 4 |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V |
| **Input current** | | |
| • for signal "1", typ. | 7 mA | 7 mA |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules   > Digital expansion modules**

■ **Technical specifications** (continued)

| Article number | 6ES7143-4BF50-0AA0 | 6ES7143-4BF00-0AA0 |
|---|---|---|
| | ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A | ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A |
| **Input delay** **(for rated value of input voltage)** | | |
| **for standard inputs** | | |
|   - at "0" to "1", min. | | 1.2 ms |
|   - at "0" to "1", max. | 3 ms | 4.8 ms |
|   - at "1" to "0", min. | | 1.2 ms |
|   - at "1" to "0", max. | 3 ms | 4.8 ms |
| **Cable length** | | |
| • shielded, max. | 30 m | 30 m |
| • unshielded, max. | 30 m | 30 m |
| **Digital outputs** | | |
| Number of digital outputs | 4 | 8; 4 DO fixed, 4 DIO parameterizable |
| • in groups of | | 4; 2 load groups for 4 outputs each |
| Short-circuit protection | Yes; per channel, electronic | Yes; per channel, electronic |
| • Response threshold, typ. | 0.7 A | 0.7 A |
| Limitation of inductive shutdown voltage to | Typ. (2L+) -47 V | Typ. (L1+, L2+) -47 V |
| Controlling a digital input | Yes | Yes |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | 5 W | 5 W |
| **Load resistance range** | | |
| • lower limit | 48 Ω | 48 Ω |
| • upper limit | 4 kΩ | 4 kΩ |
| **Output voltage** | | |
| • for signal "1", min. | | 2L+ (-0,8 V) |
| **Output current** | | |
| • for signal "1" rated value | 0.5 A | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA |
| **Parallel switching of two outputs** | | |
| • for uprating | No | No |
| • for redundant control of a load | Yes | Yes |
| **Switching frequency** | | |
| • with resistive load, max. | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 1 Hz |
| **Total current of the outputs** **(per group)** | | |
| **all mounting positions** | | |
|   - up to 55 °C, max. | 2 A | 2 A |
| **Cable length** | | |
| • shielded, max. | 30 m | 30 m |
| • unshielded, max. | 30 m | 30 m |
| **Encoder** | | |
| **Connectable encoders** | | |
| • 2-wire sensor | Yes | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA |
| **Interrupts/diagnostics/** **status information** | | |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |

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■ **Technical specifications** (continued)

| Article number | 6ES7143-4BF50-0AA0 | 6ES7143-4BF00-0AA0 |
|---|---|---|
| | ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A | ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Short-circuit | Yes; Short-circuit of outputs to ground; module by module | Yes; Short-circuit of outputs to ground; module by module |
| **Diagnostics indication LED** | | |
| • Group error SF (red) | | Yes |
| • Status indicator digital input (green) | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes |
| **Potential separation** | | |
| between backplane bus and all other circuit components | Yes | Yes |
| **Potential separation digital inputs** | | |
| • between the channels | No | No |
| • between the channels and backplane bus | Yes | Yes |
| **Potential separation digital outputs** | | |
| • between the channels | No | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | |
| Width | 45 mm | 45 mm |
| Height | 130 mm | 130 mm |
| Depth | 35 mm | 35 mm |
| **Weights** | | |
| Weight, approx. | 140 g | 140 g |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules > Digital expansion modules**

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **8 DI digital input module** 24 V DC, with module-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7141-4BF00-0AA0 | **CM IO 8 x M12 connection module** 8 M12 sockets for connecting digital sensors or actuators to ET 200pro | 6ES7194-4CB00-0AA0 |
| **8 DI High Feature digital input module** 24 V DC, with channel-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7141-4BF00-0AB0 | **CM IO 8 x M12 P connection module** 8 M12 sockets for connecting digital sensors or actuators to ET 200pro; plastic version | 6ES7194-4CB10-0AA0 |
| **16 DI digital input module** 24 V DC, with module-specific diagnostics, including bus module. Connection module 6ES7194-4CB50-0AA0 must be ordered separately | 6ES7141-4BH00-0AA0 | **CM IO 8 x M12D connection module** 8 M12 sockets for connecting digital sensors or actuators to ET 200pro | 6ES7194-4CB50-0AA0 |
| **4 DO digital output module** 24 V DC, 2 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7142-4BD00-0AA0 | **CM IO 8 x M8 connection module** 8 sockets M8 for connection of digital sensors or actuators to ET 200pro | 6ES7194-4EB00-0AA0 |
| **4 DO High Feature digital output module** 24 V DC, 2 A, with channel-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7142-4BD00-0AB0 | **CM IO 2 x M12 connection module** 2 M12 8-pin sockets; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A | 6ES7194-4FB00-0AA0 |
| **8 DO digital output module** 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7142-4BF00-0AA0 | **CM IO 1 x M23 connection module** 1 M23 socket; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A | 6ES7194-4FA00-0AA0 |
| **4 DI/4 DO digital input and output module** 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7143-4BF50-0AA0 | **Module identification labels** For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each | 6ES7194-4HA00-0AA0 |
| **Digital input and output module 4 DIO / 4 DO** 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately | 6ES7143-4BF00-0AA0 | **M12 sealing cap** For protection of unused M12 connections with ET 200pro | 3RX9802-0AA00 |
| **Accessories** | | **Labels** 20 x 7, pale turquoise, 340 items per pack | 3RT1900-1SB20 |
| **CM IO 4 x M12 connection module** 4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro | 6ES7194-4CA00-0AA0 | **M12 Y circular connector** For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8 | 6ES7194-1KA01-0XA0 |
| **CM IO 4 x M12 inverse connection module** 4 M12 sockets for connection of digital actuators to ET 200pro (4 DO and 4 DO HF); 2 x M12 single assignment, 2 x M12 double assignment | 6ES7194-4CA50-0AA0 | **M12 Y cable** For double connection of I/O by means of a single cable on ET 200, 5-pole | 6ES7194-6KA00-0XA0 |
| **CM IO 4 x M12 P connection module** 4 M12 sockets for connecting digital sensors or actuators to ET 200pro; plastic version | 6ES7194-4CA10-0AA0 | **M8 sealing cap** For IP67 modules | 3RK1901-1PN00 |

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## Overview

- Expansion modules with analog inputs and outputs for connecting sensors or actuators
- With diagnostics functionality, limit values and substitute values

## Technical specifications

| Article number | 6ES7144-4FF01-0AB0 | 6ES7144-4GF01-0AB0 | 6ES7144-4JF00-0AB0 | 6ES7144-4PF00-0AB0 |
|---|---|---|---|---|
| | ET 200PRO, EM 4AI-U HF | ET 200PRO, EM 4AI-I HF | ET 200PRO, EM 4 AI-RTD HF | ET 200PRO, EM 4 AI-TC HF |
| **Supply voltage** | | | | |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes; against destruction | Yes; against destruction | Yes; against destruction | Yes; against destruction |
| **Input current** | | | | |
| from supply voltage 1L+, max. | 40 mA; Typical | 40 mA; Typical | 27 mA; Typical | 34 mA; Typical |
| from backplane bus 3.3 V DC, max. | 12 mA; Typical | 12 mA; Typical | 10 mA; Typical | 20 mA; Typical |
| **Encoder supply** | | | | |
| Number of outputs | 4 | 4 | | |
| Short-circuit protection | Yes; per module, electronic to frame | Yes; per module, electronic to frame | | |
| **Output current** | | | | |
| • up to 55 °C, max. | 1 A | 1 A | | |
| **Power loss** | | | | |
| Power loss, typ. | 1.1 W | 1.1 W | 0.7 W | 0.7 W |
| **Address area** | | | | |
| **Address space per module** | | | | |
| • Address space per module, max. | 8 byte | 8 byte | 8 byte | 8 byte |
| **Analog inputs** | | | | |
| Number of analog inputs | 4 | 4 | 4 | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 35 V | | | 20 V |
| permissible input current for current input (destruction limit), max. | | 40 mA | | |
| Constant measurement current for resistance-type transmitter, typ. | | | 1.25 mA; 1.25 / 0.5 mA depending on measuring range | |
| Cycle time (all channels) max. | 5 ms | 10 ms | 83 ms; 83 ms at 50 Hz; 69 ms at 60 Hz | Number of active channels per module x basic conversion time |
| Technical unit for temperature measurement adjustable | | | Yes; Degrees Celsius/ degrees Fahrenheit | Yes; °C/°F/K |
| **Input ranges** | | | | |
| • Voltage | Yes | No | No | Yes |
| • Current | No | Yes | No | No |
| • Thermocouple | No | No | No | Yes |
| • Resistance thermometer | No | No | Yes | No |
| • Resistance | No | No | Yes | No |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules > Analog expansion modules**

### ■ Technical specifications (continued)

| Article number | 6ES7144-4FF01-0AB0 | 6ES7144-4GF01-0AB0 | 6ES7144-4JF00-0AB0 | 6ES7144-4PF00-0AB0 |
|---|---|---|---|---|
| | ET 200PRO, EM 4AI-U HF | ET 200PRO, EM 4AI-I HF | ET 200PRO, EM 4 AI-RTD HF | ET 200PRO, EM 4 AI-TC HF |
| **Input ranges (rated values), voltages** | | | | |
| • 0 to +10 V | Yes | | | |
| • 1 V to 5 V | Yes | | | |
| • -10 V to +10 V | Yes | | | |
| • -5 V to +5 V | Yes | | | |
| • -80 mV to +80 mV | | | | Yes |
| • Input resistance (-80 mV to +80 mV) | | | | 10 MΩ |
| **Input ranges (rated values), currents** | | | | |
| • 0 to 20 mA | | Yes | | |
| • Input resistance (0 to 20 mA) | | 50 Ω | | |
| • -20 mA to +20 mA | | Yes | | |
| • Input resistance (-20 mA to +20 mA) | | 50 Ω | | |
| • 4 mA to 20 mA | | Yes | | |
| • Input resistance (4 mA to 20 mA) | | 50 Ω | | |
| **Input ranges (rated values), thermocouples** | | | | |
| • Type B | | | | Yes |
| • Input resistance (Type B) | | | | 10 MΩ |
| • Type E | | | | Yes |
| • Input resistance (Type E) | | | | 10 MΩ |
| • Type J | | | | Yes |
| • Input resistance (type J) | | | | 10 MΩ |
| • Type K | | | | Yes |
| • Input resistance (Type K) | | | | 10 MΩ |
| • Type L | | | | Yes |
| • Input resistance (Type L) | | | | 10 MΩ |
| • Type N | | | | Yes |
| • Input resistance (Type N) | | | | 10 MΩ |
| • Type R | | | | Yes |
| • Input resistance (Type R) | | | | 10 MΩ |
| • Type S | | | | Yes |
| • Input resistance (Type S) | | | | 10 MΩ |
| • Type T | | | | Yes |
| • Input resistance (Type T) | | | | 10 MΩ |
| **Input ranges (rated values), resistance thermometer** | | | | |
| • Cu 10 | | | No | |
| • Ni 100 | | | Yes | |
| • Input resistance (Ni 100) | | | 10 000 kΩ | |
| • Ni 1000 | | | Yes | |
| • Input resistance (Ni 1000) | | | 10 000 kΩ | |
| • Ni 120 | | | Yes | |
| • Input resistance (Ni 120) | | | 10 000 kΩ | |
| • Ni 200 | | | Yes | |
| • Input resistance (Ni 200) | | | 10 000 kΩ | |
| • Ni 500 | | | Yes | |
| • Input resistance (Ni 500) | | | 10 000 kΩ | |
| • Pt 100 | | | Yes | |
| • Input resistance (Pt 100) | | | 10 000 kΩ | |
| • Pt 1000 | | | Yes | |
| • Input resistance (Pt 1000) | | | 10 000 kΩ | |
| • Pt 200 | | | Yes | |
| • Input resistance (Pt 200) | | | 10 000 kΩ | |
| • Pt 500 | | | Yes | |
| • Input resistance (Pt 500) | | | 10 000 kΩ | |

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## ▪ **Technical specifications** (continued)

| Article number | 6ES7144-4FF01-0AB0 | 6ES7144-4GF01-0AB0 | 6ES7144-4JF00-0AB0 | 6ES7144-4PF00-0AB0 |
|---|---|---|---|---|
| | ET 200PRO, EM 4AI-U HF | ET 200PRO, EM 4AI-I HF | ET 200PRO, EM 4 AI-RTD HF | ET 200PRO, EM 4 AI-TC HF |
| **Input ranges (rated values), resistors** | | | | |
| • 0 to 150 ohms | | | Yes | |
| • Input resistance (0 to 150 ohms) | | | 10 000 kΩ | |
| • 0 to 300 ohms | | | Yes | |
| • Input resistance (0 to 300 ohms) | | | 10 000 kΩ | |
| • 0 to 600 ohms | | | Yes | |
| • Input resistance (0 to 600 ohms) | | | 10 000 kΩ | |
| • 0 to 3000 ohms | | | Yes | |
| • Input resistance (0 to 3000 ohms) | | | 10 000 kΩ | |
| **Thermocouple (TC)** | | | | |
| **Temperature compensation** | | | | |
| - internal temperature compensation | | | | Yes |
| - external temperature compensation with compensations socket | | | | Yes |
| **Characteristic linearization** | | | | |
| • parameterizable | | | Yes | |
| - for resistance thermometer | | | Ptxxx, Nixxx | |
| **Cable length** | | | | |
| • shielded, max. | 30 m | 30 m | 30 m | 30 m |
| **Analog value generation for the inputs** | | | | |
| Measurement principle | integrating | integrating | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | | | |
| • Resolution with overrange (bit including sign), max. | 15 bit; 15 bits + sign at ±10 V, at ±5 V; 15 bits at 0 V to 10 V, at 1 V to 5 V | 15 bit; 15 bits + sign at ±10 V, at ±5 V; 15 bits at 0 V to 10 V, at 1 V to 5 V | 15 bit; at 150, 300, 600 und 3000 ohms; otherwise 15 bits + sign | 15 bit; + sign |
| • Integration time (ms) | 0,3 / 16,7 / 20 / 60 | 0,3 / 16,7 / 20 / 60 | 20 / 16,667 | 2,5 / 16,67 / 20 / 100 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 16,67 / 50 / 60 / 3 600 | 16,67 / 50 / 60 / 3 600 | 50 / 60 Hz | 10 / 50 / 60 / 400 Hz |
| • Conversion time (per channel) | 1.1 ms | 1.1 ms | 20.625 ms; 20.625 ms at 50 Hz; 17.25 ms at 60 Hz | 4.7/19/22/102 ms |
| **Smoothing of measured values** | | | | |
| • parameterizable | Yes | Yes | Yes | Yes |
| • Step: None | Yes; 1 x cycle time | Yes; 1 x cycle time | Yes; 1 x cycle time | Yes; 1 x cycle time |
| • Step: low | Yes; 4 x cycle time | Yes; 4 x cycle time | Yes; 4 x cycle time | Yes; 4 x cycle time |
| • Step: Medium | Yes; 16 x cycle time | Yes; 16 x cycle time | Yes; 16 x cycle time | Yes; 16 x cycle time |
| • Step: High | Yes; 64 x cycle time | Yes; 64 x cycle time | Yes; 64 x cycle time | Yes; 64 x cycle time |
| **Encoder** | | | | |
| **Connection of signal encoders** | | | | |
| • for voltage measurement | Yes | | | Yes |
| • for current measurement as 2-wire transducer | | Yes | | |
| • for current measurement as 4-wire transducer | | Yes | | |
| • for resistance measurement with two-wire connection | | | Yes; Line resistances are also measured | |
| • for resistance measurement with three-wire connection | | | Yes | |
| • for resistance measurement with four-wire connection | | | Yes | |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules > Analog expansion modules**

■ **Technical specifications** (continued)

| Article number | 6ES7144-4FF01-0AB0 | 6ES7144-4GF01-0AB0 | 6ES7144-4JF00-0AB0 | 6ES7144-4PF00-0AB0 |
|---|---|---|---|---|
| | ET 200PRO, EM 4AI-U HF | ET 200PRO, EM 4AI-I HF | ET 200PRO, EM 4 AI-RTD HF | ET 200PRO, EM 4 AI-TC HF |
| **Errors/accuracies** | | | | |
| Linearity error (relative to input range), (+/-) | 0.0075 % | 0.0075 % | 0.05 % | 0.01 % |
| Temperature error (relative to input range), (+/-) | 0.00075 %/K | 0.00075 %/K | 0.002 %/K | 0.0004 %/K; Positive temperature |
| Crosstalk between the inputs, min. | -70 dB | -70 dB | -50 dB | -90 dB; max. |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.004 % | 0.004 % | 0.015 % | 0.01 % |
| **Operational error limit in overall temperature range** | | | | |
| • Voltage, relative to input range, (+/-) | 0.1 % | | | 0.12 %; Positive temperature |
| • Current, relative to input range, (+/-) | | 0.1 % | | |
| • Resistance thermometer, relative to input range, (+/-) | | | 0.175 % | |
| **Basic error limit (operational limit at 25 °C)** | | | | |
| • Voltage, relative to input range, (+/-) | 0.075 % | | | 0.1 % |
| • Current, relative to input range, (+/-) | | 0.075 % | | |
| • Resistance thermometer, relative to input range, (+/-) | | | 0.125 % | |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | | | 50 dB | 42 dB |
| • Common mode interference (USS < 2.5 V) , min. | | | 70 dB; Interference voltage < 5 V | 85 dB; Interference voltage < 10 V |
| **Interference voltage suppression for f = n x (f1 +/- 0.5 %), f1 = interference frequency** | | | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 60 dB | 60 dB | | |
| • Common mode interference (USS < 2.5 V) , min. | 80 dB; Interference voltage < 10 V | 80 dB; Interference voltage < 5 V | | |
| **Interrupts/diagnostics/ status information** | | | | |
| Diagnostic functions | Yes | Yes | Yes | Yes |
| **Alarms** | | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| • Hardware interrupt | Yes; (limit value alarm), can be parameterized for channel 0 | Yes; (limit value alarm), can be parameterized for channel 0 | No | No |
| **Diagnostic messages** | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes |
| • Wire-break | Yes; at 1 to 5 V | Yes; at 4 to 20 mA | Yes | Yes |
| • Short-circuit | Yes; at 1 to 5 V | Yes; at 4 to 20 mA | | |
| • Overflow/underflow | | | Yes | Yes |
| **Diagnostics indication LED** | | | | |
| • Group error SF (red) | Yes | Yes | Yes | Yes |

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## ■ Technical specifications (continued)

| Article number | 6ES7144-4FF01-0AB0 | 6ES7144-4GF01-0AB0 | 6ES7144-4JF00-0AB0 | 6ES7144-4PF00-0AB0 |
|---|---|---|---|---|
| | ET 200PRO, EM 4AI-U HF | ET 200PRO, EM 4AI-I HF | ET 200PRO, EM 4 AI-RTD HF | ET 200PRO, EM 4 AI-TC HF |
| **Parameter** | | | | |
| Diagnostics wire break | | | Yes | Yes |
| Measurement type/range | | | R4L / R3L / R2L/ TR4L / TR3L / TR2L | Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type N (NiCrSi-NiSi)/ TC-EL Typ E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC-EL Type L (Fe-CuNi) |
| Comparison point | | | | None/internal/RTD(0)/dyn. ref. temp./fix. ref. temp. |
| **Potential separation** | | | | |
| **Potential separation analog inputs** | | | | |
| • between the channels | No | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes | Yes |
| **Isolation** | | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | | | |
| Width | 45 mm | 45 mm | 45 mm | 45 mm |
| Height | 130 mm | 130 mm | 130 mm | 130 mm |
| Depth | 35 mm | 35 mm | 35 mm | 35 mm |
| **Weights** | | | | |
| Weight, approx. | 150 g | 150 g | 150 g | 150 g |

| Article number | 6ES7145-4FF00-0AB0 | 6ES7145-4GF00-0AB0 |
|---|---|---|
| | ET 200PRO, EM 4AO-U HF | ET 200PRO, EM 4 AO-I HF |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes; against destruction | Yes; against destruction |
| **Input current** | | |
| from supply voltage 1L+, max. | 65 mA | 110 mA |
| from backplane bus 3.3 V DC, max. | 10 mA | 10 mA |
| **Actuator supply** | | |
| Number of outputs | 4 | 4 |
| Short-circuit protection | Yes; per module | Yes; per module |
| **Output current** | | |
| • up to 55 °C, max. | 1 A | 1 A |
| **Power loss** | | |
| Power loss, typ. | 1.7 W | 2.3 W |
| **Address area** | | |
| **Address space per module** | | |
| • Address space per module, max. | 8 byte | 8 byte |
| **Analog outputs** | | |
| Number of analog outputs | 4 | 4 |
| Voltage output, short-circuit protection | Yes; per channel, electronic to chassis | Yes; per module, electronic to frame |
| Voltage output, short-circuit current, max. | 50 mA | |
| Current output, no-load voltage, max. | | 16 V |
| Cycle time (all channels) max. | 3 ms | 3 ms |
| **Output ranges, voltage** | | |
| • 0 to 10 V | Yes | |
| • 1 V to 5 V | Yes | |
| • -10 V to +10 V | Yes | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules > Analog expansion modules**

### ◼ Technical specifications (continued)

| Article number | 6ES7145-4FF00-0AB0 | 6ES7145-4GF00-0AB0 |
|---|---|---|
| | ET 200PRO, EM 4AO-U HF | ET 200PRO, EM 4 AO-I HF |
| **Output ranges, current** | | |
| • 0 to 20 mA | | Yes |
| • -20 mA to +20 mA | | Yes |
| • 4 mA to 20 mA | | Yes |
| **Connection of actuators** | | |
| • for voltage output two-wire connection | Yes | |
| • for voltage output four-wire connection | Yes | |
| • for current output two-wire connection | | Yes |
| • for current output four-wire connection | | Yes |
| **Load impedance (in rated range of output)** | | |
| • with voltage outputs, min. | 1 000 Ω | |
| • with voltage outputs, capacitive load, max. | 1 μF | |
| • with current outputs, max. | | 600 Ω |
| • with current outputs, inductive load, max. | | 1 mH |
| **Destruction limits against externally applied voltages and currents** | | |
| • Voltages at the outputs towards MANA | 16 V; Permanent | |
| • Current, max. | | 100 mA |
| **Cable length** | | |
| • shielded, max. | 30 m | 30 m |
| **Analog value generation for the outputs** | | |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution with overrange (bit including sign), max. | 15 bit; at -10 to +10 V; 14 bits at 1 to 5 V; 15 bits at 0 to 10 V | 15 bit; at +/- 20 mA; 14 bits at 0 to 20 mA; 15 bits at 4 to 20 mA |
| • Conversion time (per channel) | 0.7 ms | 0.7 ms |
| **Settling time** | | |
| • for resistive load | 0.1 ms | 0.1 ms |
| • for capacitive load | 6 ms | |
| • for inductive load | | 1 ms |
| **Errors/accuracies** | | |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) | 0.02 % | 0.02 % |
| Linearity error (relative to output range), (+/-) | 0.1 % | 0.1 % |
| Temperature error (relative to output range), (+/-) | 0.01 %/K | 0.01 %/K |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.05 % | 0.05 % |
| **Operational error limit in overall temperature range** | | |
| • Voltage, relative to output range, (+/-) | 0.2 % | |
| • Current, relative to output range, (+/-) | | 0.2 % |
| **Basic error limit (operational limit at 25 °C)** | | |
| • Voltage, relative to output range, (+/-) | 0.15 % | |
| • Current, relative to output range, (+/-) | | 0.15 % |

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## ◼ Technical specifications  (continued)

| Article number | 6ES7145-4FF00-0AB0 | 6ES7145-4GF00-0AB0 |
|---|---|---|
| | ET 200PRO, EM 4AO-U HF | ET 200PRO, EM 4 AO-I HF |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostic functions | | Yes |
| Substitute values connectable | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable |
| • Hardware interrupt | No | No |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Wire-break | No | Yes; per channel, not in zero range |
| • Short-circuit | Yes; per channel, not in zero range | No |
| **Diagnostics indication LED** | | |
| • Group error SF (red) | Yes | Yes |
| **Parameter** | | |
| Diagnostics short-circuit | Outputs; sensor supply to M | Encoder supply to M |
| **Potential separation** | | |
| **Potential separation analog outputs** | | |
| • between the channels | No | No |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | |
| Width | 45 mm | 45 mm |
| Height | 130 mm | 130 mm |
| Depth | 35 mm | 35 mm |
| **Weights** | | |
| Weight, approx. | 150 g | 150 g |

## ◼ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **4AI U analog input module** | **6ES7144-4FF01-0AB0** | **4AO I analog output module** | **6ES7145-4GF00-0AB0** |
| High Feature, ±10 V; ±5 V; 0 to 10 V; 1 to 5 V, channel-specific diagnostics, including bus module. Connection module must be ordered separately | | High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel-specific diagnostics, including bus module. Connection module must be ordered separately | |
| **4AI I analog input module** | **6ES7144-4GF01-0AB0** | **Accessories** | |
| High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel-specific diagnostics, including bus module. Connection module must be ordered separately | | **CM IO 4 x M12 connection module** | **6ES7194-4CA00-0AA0** |
| | | 4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro | |
| **4AI RTD analog input module** | **6ES7144-4JF00-0AB0** | **M12 compensation connectors** | **6ES7194-4AB00-0AA0** |
| High Feature; resistances: 150, 300, 600 and 3000 Ohm; resistance thermometer: Pt100, 200, 500, 1000, Ni100, 120, 200, 500 and 1000; channel-discrete diagnostics, incl. bus module. Connection module must be ordered separately | | With integral Pt100 for reference point compensation when connecting thermocouples | |
| | | **Module identification labels** | **6ES7194-4HA00-0AA0** |
| **Analog input module 4AI TC** | **6ES7144-4PF00-0AB0** | For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each | |
| High Feature; thermocouples: Type B, E, J, K, L, N, R, S, T; voltage measurement: ±80 mV; channel diagnostics, including bus module. Connection module must be ordered separately | | **M12 sealing cap** | **3RX9802-0AA00** |
| | | For protection of unused M12 connections with ET 200pro | |
| **4AO U analog output module** | **6ES7145-4FF00-0AB0** | | |
| High Feature, ±10 V; 0 to 10 V; 1 to 5 V, channel-specific diagnostics, including bus module. Connection module must be ordered separately | | | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules  > Communication   > IO-Link master modules**

## ■ Overview

- 45 mm-wide 4 IO-LINK HF electronic module
- 4 IO-Link ports according to IO-Link specification V1.1
- Port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (S7-PCT), version V3.4 and higher

## ■ Technical specifications

| Article number | **6ES7147-4JD00-0AB0** |
|---|---|
| | ET 200pro, EM 4 IO-Link HF |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Short-circuit protection | Yes |
| • Reverse polarity protection | Yes; against destruction; load increasing |
| **Input current** | |
| from supply voltage 1L+, max. | 40 mA |
| from load voltage 2L+ (without load), max. | 20 mA |
| from backplane bus 3.3 V DC, max. | 20 mA |
| **Encoder supply** | |
| Number of outputs | 4 |
| Short-circuit protection | Yes; per module, electronic |
| **Output current** | |
| • up to 55 °C, max. | 2 A |
| **Power loss** | |
| Power loss, typ. | 2.6 W |
| **IO-Link** | |
| Number of ports | 4 |
| • of which simultaneously controllable | 4 |
| IO-Link protocol 1.0 | Yes |
| IO-Link protocol 1.1 | Yes |
| Transmission rate | 4.8 kBaud (COM1); 38.4 kBaud (COM2), 230.4 kBaud (COM3) |
| Size of process data, input per port | 32 byte |
| Size of process data, input per module | 32 byte |
| Size of process data, output per port | 32 byte |
| Size of process data, output per module | 32 byte |
| Memory size for device parameter | 2 kbyte; for each port |
| Master backup | Possible with function block IO_LINK_MASTER |
| Cable length unshielded, max. | 20 m |
| **Operating modes** | |
| • IO-Link | Yes |
| • DI | Yes |
| • DQ | Yes; max. 100 mA |
| **Connection of IO-Link devices** | |
| • Port type A | Yes; via 3-core cable |
| • Port type B | Yes; Additional device supply: for X1 and X2 max. 2 A in total, for X3 and X4 max. 2 A in total |

| Article number | **6ES7147-4JD00-0AB0** |
|---|---|
| | ET 200pro, EM 4 IO-Link HF |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Channel status display | Yes; One green LED for channel status Qn (SIO mode) and port status IO-Ln (IO-Link mode) |
| • Group error SF (red) | Yes |
| • Channel fault indicator F (red) | Yes; combined with the IO-Link port status |
| **Parameter** | |
| Diagnostics wire break | channel by channel |
| Diagnostics short-circuit | channel by channel |
| **Potential separation** | |
| between the load voltages | Yes |
| between backplane bus and all other circuit components | Yes |
| **Potential separation channels** | |
| • between the channels | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Dimensions** | |
| Width | 45 mm |
| Height | 130 mm |
| Depth | 35 mm |
| **Weights** | |
| Weight, approx. | 150 g |

## ■ Ordering data

| | Article No. |
|---|---|
| **4 IO-LINK HF electronic module** | **6ES7147-4JD00-0AB0** |
| 4 IO-Link ports according to IO-Link Specification V1.1, port Class B; High Feature, channel diagnostics, including bus module. Connection module must be ordered separately | |
| **Accessories** | |
| **CM IO-Link 4 x M12 P connection module** | **6ES7194-4CA20-0AA0** |
| 4 M12 sockets for connecting IO-Link devices to ET 200pro electronic module 4 IO-LINK HF | |
| **Module identification labels** | **6ES7194-4HA00-0AA0** |
| For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each | |
| **M12 sealing cap** | **3RX9802-0AA00** |
| For protection of unused M12 connections with ET 200pro | |

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## Overview
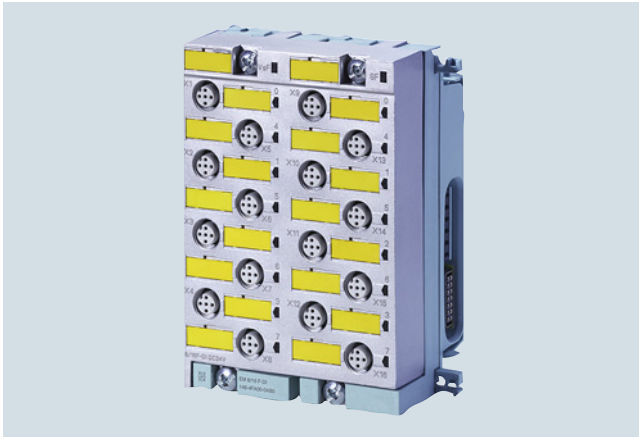
Fail-safe digital inputs/outputs with IP65/66/67 degree of protection for application on the machine level without control cabinet

Fail-safe digital inputs

- For fail-safe reading of sensor information (1 or 2 channels)
- Provide integral discrepancy evaluation for 2-out-of-2 signals
- Internal sensor supplies (incl. test function) available

Fail-safe digital outputs

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A

All modules are certified up to SIL 3 (IEC 61508) and feature detailed diagnostics.

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with IM151-7 F-CPU, CPU31xF-2 DP, CPU31xF-2 PN/DP and CPU416F-2.

## Technical specifications

| Article number | **6ES7148-4FA00-0AB0** |
|---|---|
| | ET 200PRO, EL-MOD., 8/16 F-DI 24V DC |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Power loss** | |
| Power loss, typ. | 4.5 W |
| **Digital inputs** | |
| Number of digital inputs | 16 |
| **Input current** | |
| • for signal "1", typ. | 3.7 mA |
| **Dimensions** | |
| Width | 90 mm |
| Height | 130 mm |
| Depth | 65 mm |

| Article number | **6ES7148-4FC00-0AB0** | **6ES7148-4FS00-0AB0** |
|---|---|---|
| | ET 200PRO,EL-MOD,4/8 F-DI/4 F-DO 24VDC/2A | ET 200PRO,EL-MOD, F-SWITCH PROFISAFE |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| **Power loss** | | |
| Power loss, typ. | 5.8 W | 3 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | 2 |
| **Input current** | | |
| • for signal "1", typ. | 3.7 mA | 3.5 mA |
| **Digital outputs** | | |
| Number of digital outputs | 4 | 3 |
| Short-circuit protection | Yes | Yes |
| **Output current** | | |
| • for signal "1" rated value | 2 A | |
| **Dimensions** | | |
| Width | 90 mm | 45 mm |
| Height | 130 mm | 130 mm |
| Depth | 65 mm | 65 mm |

# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**I/O modules > Fail-safe expansion modules   > Fail-safe digital expansion modules**

■ **Ordering data**      **Article No.**      **Article No.**

| | Article No. | | Article No. |
|---|---|---|---|
| **Fail-safe digital input module 8/16 F-DI PROFIsafe**<br><br>24 V DC, including bus module. Connection module must be ordered separately | 6ES7148-4FA00-0AB0 | **Accessories** | |
| | | **Connection module**<br><br>For the fail-safe electronic module F-Switch PROFIsafe | 6ES7194-4DA00-0AA0 |
| **Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A**<br><br>24 V DC, including bus module. Connection module must be ordered separately | 6ES7148-4FC00-0AB0 | **Connection module**<br><br>For the fail-safe electronic module 4/8 F-DI/4 F-DO, 24 V DC/2 A | 6ES7194-4DC00-0AA0 |
| **Fail-safe electronic module F-Switch PROFIsafe**<br><br>Three fail-safe PP-switching outputs for safe switching of the rear panel busbar (2L+, F0, F1); two fail-safe digital inputs, 45 mm; usable up to SIL3 (IEC 61508) | 6ES7148-4FS00-0AB0 | **Connection module**<br><br>For the fail-safe electronic module 8/16 F-DI, 24 V DC | 6ES7194-4DD00-0AA0 |
| | | **PROFIBUS DP interface module IM154-2**<br><br>Including termination module | 6ES7154-2AA01-0AB0 |
| | | **PROFINET interface module IM154-4 PN**<br><br>Including termination module | 6ES7154-4AB10-0AB0 |
| | | **M12 sealing cap**<br><br>For protection of unused M12 connections with ET 200pro | 3RX9802-0AA00 |

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## Overview



- PM-E 24 V DC power module

## Technical specifications

| Article number | **6ES7148-4CA00-0AA0** |
|---|---|
| | ET 200PRO, PM-E 24V DC |
| **Supply voltage** | |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Short-circuit protection | Yes; via an exchangeable fuse in the power module |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| from load voltage 2L+, max. | 3 mA |
| **Current carrying capacity** | |
| max. | 10 A; up to 55 °C (on the internal busbars of the ET 200pro) |
| **Power loss** | |
| Power loss, typ. | 0.1 W |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • missing load voltage | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Load voltage monitoring 24 V DC (green) | Yes |

| Article number | **6ES7148-4CA00-0AA0** |
|---|---|
| | ET 200PRO, PM-E 24V DC |
| **Parameter** | |
| Missing load voltage | Potential group of the power module |
| **Potential separation** | |
| between load voltage and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP66 | Yes |
| • IP67 | Yes |
| **Dimensions** | |
| Width | 45 mm |
| Height | 130 mm |
| Depth | 35 mm |
| **Weights** | |
| Weight, approx. | 140 g |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules   > PM-E power module**

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **PM-E 24 V DC power module** | 6ES7148-4CA00-0AA0 | **PROFIBUS ECOFAST hybrid cable, GP** | |
| For backfeed and group formation of the 24 V DC load supply for electronic modules within an ET 200pro station | | Trailing-type cable with 4 x copper cores and 2 x copper cores, shielded, with UL approval | |
| **Accessories** | | Pre-assembled with ECOFAST male and female connector | |
| **CM PM-E ECOFAST connecting module** | 6ES7194-4BA00-0AA0 | • 1.5 m | 6XV1860-3PH15 |
| | | • 3 m | 6XV1860-3PH30 |
| For supplying of 24 V load voltage, 1 ECOFAST Cu connection | | • 5 m | 6XV1860-3PH50 |
| **CM PM-E direct connecting module** | 6ES7194-4BC00-0AA0 | • 10 m | 6XV1860-3PN10 |
| | | • 15 m | 6XV1860-3PN15 |
| For backfeed of 24 V load voltage, up to 2 M20 screwed cable glands | | • 20 m | 6XV1860-3PN20 |
| **CM PM-E 7/8" connecting module** | 6ES7194-4BD00-0AA0 | **ECOFAST cable connector, for user assembly** | 6GK1905-0CB00 |
| For backfeed of 24 V load voltage, 1 x 7/8" | | Female connector; ordering unit 5 items | |
| **CM PM-E PP connection module** | 6ES7194-4BE00-0AA0 | **PROFIBUS ECOFAST hybrid plug, angled** | 6GK1905-0CD00 |
| For supplying 24 V load voltage, 2 x push-pull, with spare fuse | | With 2 x shielded copper cores and 4 x 1.5 mm$^2$ copper cores; 5 items; with assembly instructions; female insert | |
| **Spare fuse** | 6ES7194-4HB00-0AA0 | **Push-pull cable connector** | 6GK1907-0AB10-6AA0 |
| 12.5 A quick-response, for interface and power modules, 10 items per package unit | | For 1L+/ 2L+, unassembled | |
| **PROFIBUS ECOFAST hybrid cable, copper** | | **Cover caps for push-pull female connectors** | 6ES7194-4JA50-0AA0 |
| | | 5 units | |
| Trailing-type cable (PUR casing) with two shielded copper cables for PROFIBUS DP and four copper cores of 1.5 mm$^2$ in cross-section | | **Accessories for CM PM-E direct** | |
| | | **Power line** | 6XV1830-8AH10 |
| Unassembled | | 5-core, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1,000 m | |
| • 50 m | 6XV1830-7AN50 | | |
| • 100 m | 6XV1830-7AT10 | **Accessories for CM PM-E 7/8"** | |
| Pre-assembled with ECOFAST male and female connector, fixed length | | **7/8" connecting cable to power supply** | |
| • 1.5 m | 6XV1830-7BH15 | 5-core, 5 x 1.5 mm$^2$, trailing type, pre-assembled with two 7/8" connectors, 5-pin | |
| • 3 m | 6XV1830-7BH30 | • 1.5 m long | 6XV1822-5BH15 |
| • 5 m | 6XV1830-7BH50 | • 2.0 m long | 6XV1822-5BH20 |
| • 10 m | 6XV1830-7BN10 | • 3.0 m long | 6XV1822-5BH30 |
| • 15 m | 6XV1830-7BN15 | • 5.0 m long | 6XV1822-5BH50 |
| • 20 m | 6XV1830-7BN20 | • 10 m long | 6XV1822-5BN10 |
| | | • 15 m long | 6XV1822-5BN15 |
| | | **7/8" cable connector** | |
| | | With axial cable outlet | |
| | | • with female insert, 5 per pack | 6GK1905-0FB00 |

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## Overview



PM-O 2 x 24 V DC power module with CM PM-O PP

• PM-O 2x 24 V DC power module

## Technical specifications

| Article number | **6ES7148-4CA60-0AA0** |
|---|---|
| | ET 200PRO, PM-O DC 2X24V |
| **Supply voltage** | |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Short-circuit protection | Yes |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| from load voltage 2L+, max. | 3 mA |
| **Current carrying capacity** | |
| max. | 10 A; up to 55 °C (on the internal busbars of the ET 200pro) |
| **Power loss** | |
| Power loss, typ. | 1.1 W |
| **Interrupts/diagnostics/ status information** | |
| Diagnostic functions | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • missing load voltage | No |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |
| • Load voltage monitoring 24 V DC (green) | No; Signalled in IM or in PM |

| Article number | **6ES7148-4CA60-0AA0** |
|---|---|
| | ET 200PRO, PM-O DC 2X24V |
| **Parameter** | |
| Diagnostics short-circuit | Diagnosis short circuit implemented after M for 1L+ |
| **Potential separation** | |
| between load voltage and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP66 | Yes |
| • IP67 | Yes |
| **Dimensions** | |
| Width | 45 mm |
| Height | 130 mm |
| Depth | 35 mm |
| **Weights** | |
| Weight, approx. | 150 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **PM-O 2 x 24 V DC power module** | **6ES7148-4CA60-0AA0** | **Push-pull cable connector** | **6GK1907-0AB10-6AA0** |
| For drawing the 24 V load voltage 2L+ and electronic/encoder supply voltage 1L+ within an ET 200pro station | | For 1L+/ 2L+, unassembled | |
| **Accessories** | | **Cover caps for push-pull female connectors** | **6ES7194-4JA50-0AA0** |
| **CM PM-O PP connection module** | **6ES7194-4BH00-0AA0** | 5 units | |
| For drawing the 24 V load voltage and electronic/encoder supply voltage, 2 x push-pull connector | | | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules   > ET 200pro pneumatic interface**

### ■ Overview
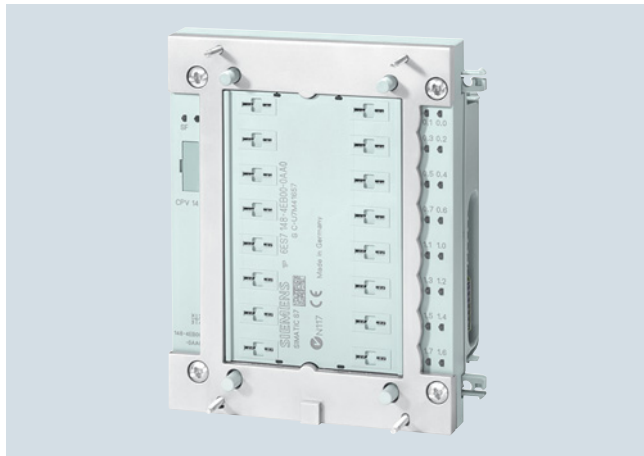


- Interface for holding an original FESTO CPV 10 or CPV 14 compact performance valve terminal
- For using the ET 200pro in applications with flexible pneumatics
- Highly flexible pneumatics due to a variety of valve functions and choice of flow rates

### ■ Technical specifications

| Article number | 6ES7148-4EA00-0AA0 | 6ES7148-4EB00-0AA0 |
|---|---|---|
| | ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV10 | ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV14 |
| **Supply voltage** | | |
| **Load voltage 2L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Short-circuit protection | Yes | Yes |
| • Reverse polarity protection | Yes | Yes |
| **Input current** | | |
| from load voltage 2L+, max. | 300 mA | 370 mA |
| from backplane bus 3.3 V DC, max. | 25 mA | 25 mA |
| **Power loss** | | |
| Power loss, typ. | 2.6 W | 3.7 W |
| **Address area** | | |
| **Address space per module** | | |
| • without packing | 2 byte | 2 byte |
| **Digital outputs** | | |
| Number of digital outputs | 16 | 16 |
| **Load resistance range** | | |
| • lower limit | 500 Ω | 500 Ω |
| • upper limit | 2 500 Ω | 2 500 Ω |
| **Output current** | | |
| • for signal "1" rated value | 12 mA | 16 mA |
| **Switching frequency** | | |
| • with inductive load, max. | 25 Hz | 20 Hz |
| **Total current of the outputs (per group)** | | |
| **all mounting positions** | | |
| - up to 55 °C, max. | 250 mA; only up to 50 °C, limited by valves | 330 mA; only up to 50 °C, limited by valves |
| **Interrupts/diagnostics/ status information** | | |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| **Diagnostics indication LED** | | |
| • Group error SF (red) | Yes | Yes |
| • Status indicator digital output (green) | Yes | Yes |

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■ **Technical specifications**  (continued)

| Article number | 6ES7148-4EA00-0AA0 | 6ES7148-4EB00-0AA0 |
|---|---|---|
| | ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV10 | ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV14 |
| **Pneumatics** | | |
| permissible working pressure, min. | 3 bar | 3 bar |
| permissible working pressure, max. | 8 bar | 8 bar |
| Rated flow rate | 400 l/min | 800 l/min |
| Number of connectable valves, max. | 16 | 16 |
| **Parameter** | | |
| Remark | Diagnosis load voltage 2L+ | Diagnosis load voltage 2L+ |
| Response to CPU/master STOP | No | |
| **Potential separation** | | |
| between backplane bus and all other circuit components | Yes | Yes |
| **Potential separation digital outputs** | | |
| • between the channels and backplane bus | Yes | Yes |
| **Isolation** | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) |
| **Dimensions** | | |
| Width | 90 mm | 120 mm |
| Height | 130 mm | 152 mm |
| Depth | 47 mm | 47 mm |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **EM 148-P pneumatic interface** | | FESTO CPV 10 valve terminal | available from FESTO |
| DO 16 x P/CPV 10 for direct accommodation of FESTO valve terminal CPV 10 16 DO x P | **6ES7148-4EA00-0AA0** | FESTO CPV 14 valve terminal | available from FESTO |
| DO 16 x P/CPV 14 for direct accommodation of FESTO valve terminal CPV 14 16 DO x P | **6ES7148-4EB00-0AA0** | | FESTO AG & Co Ruiterstr. 82 D-73732 Esslingen |
| | | | More addresses on the Internet at: http://www.festo.de |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**I/O modules   > RF170C**

## ■ Overview

The SIMATIC RF170C is a communication module for connecting the SIMATIC identification systems to the ET 200pro distributed I/O system. The readers (SLGs) of all RFID systems as well as the MV400 optical reader devices and MV300 optical handheld readers can be operated on the RF170C. In addition, the RF170C provides a universal RS 232/RS 422 interface for connecting devices using the Freeport protocol.

Thanks to the high degree of protection and ruggedness, ET 200pro is particularly suitable for machine-level use. The modular structure with PROFIBUS and PROFINET connection systems allows it to be used in all applications. The uniform plug-in connection system ensures rapid commissioning.

## ■ Technical specifications

| Article number | 6GT2002-0HD01 |
|---|---|
| Product type designation | RF170C communication module |
| Suitability for operation | Dezentrale Peripherie ET 200pro together with RF200/300/600, MV300/400, MOBY D/E/I/U and RS232 devices |
| **Transmission rate** | |
| Transfer rate at the point-to-point connection serial maximum | 115.2 kbit/s |
| **Interfaces** | |
| Design of the interface for point-to-point connection | RS422/RS232 via connection block |
| Number of readers connectable | 2 |
| Type of electrical connection | |
| • of the backplane bus | ET 200pro backplane bus |
| • of the PROFIBUS interface | (according to the head module) |
| • of Industrial Ethernet interface | (according to the head module) |
| • for supply voltage | ET 200pro backplane bus |
| Design of the interface to the reader for communication | Internal plug to the connection block |
| **Mechanical data** | |
| Material | Thermoplastic (Valox 467, fiberglass reinforced) |
| Color | IP Basic 714 |
| Tightening torque of the screw for securing the equipment maximum | 1.5 N·m |
| **Supply voltage, current consumption, power loss** | |
| Supply voltage | |
| • at DC Rated value | 24 V |
| • at DC | 20 ... 30 V |
| Consumed current at DC at 24 V | |
| • without connected devices typical | 0.13 A |
| • with connected devices maximum | 1 A |

| Article number | 6GT2002-0HD01 |
|---|---|
| Product type designation | RF170C communication module |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | -25 ... +55 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Protection class IP | IP67 |
| Shock resistance | According to IEC 61131-2 |
| Shock acceleration | 300 m/s² |
| Vibrational acceleration | 100 m/s² |
| **Design, dimensions and weight** | |
| Width | 90 mm |
| Height | 130 mm |
| Depth | 35 mm |
| Net weight | 0.27 kg |
| Mounting type | ET 200pro rack |
| Cable length for RS 422 interface maximum | 1 000 m |
| **Product properties, functions, components general** | |
| Display version | (see connection block) |
| Product function transponder file handler can be addressed | No |
| Protocol is supported | |
| • S7 communication | Yes |
| Type of parameterization | HSP |
| Type of programming | FB 45, FB 55, ident profile, (FC 45/55 with limited functionality) |
| Type of computer-mediated communication | acyclic communication |
| **Standards, specifications, approvals** | |
| Certificate of suitability | CE, FCC, cULus |
| MTBF | 77 y |
| **Accessories** | |
| accessories | Connection block for RF170C |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC RF170C communication module** | 6GT2002-0HD01 | **MOBY D reader cable** | 6GT2691-4FH20 |
| For connecting to the ET 200pro distributed I/O system | | PUR material, CMG approval, suitable for cable carriers, 2 m | |
| **Accessories** | | **Reader cable for MV300 handheld readers** | |
| **Connection block for SIMATIC RF170C** | 6GT2002-1HD01 | Coiled cable with usable length of 1.6 m to 4 m for MV320, material: PUR | 6GT2191-0BH50 |
| For connecting 2 readers or other RS 422/RS 432 devices via an M12 connector | | Coiled cable with usable length of 1.6 m to 4 m for MV340, material: PUR | 6GT2191-0AH50 |
| **Reader cable for SIMATIC RF200 / RF300 / RF600 / MV440** Or MOBY D extension cable and SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers | | **Connector for connection of other RS 422/RS232 devices** | 6GT2090-0BE00 |
| | | 8-pin M12 connector, male, screw contacts for wires up to 0.5 mm$^2$. Order quantity 1 pack with 5 units | |
| 2 m, straight connector | 6GT2891-4FH20 | **M12 sealing caps for unused reader connections** | 3RX9802-0AA00 |
| 5 m, straight connector | 6GT2891-4FH50 | Minimum order quantity 10 units, price per 100 units | |
| 10 m, straight connector | 6GT2891-4FN10 | **DVD "RFID Systems Software & Documentation"** | 6GT2080-2AA20 |
| 20 m, straight connector | 6GT2891-4FN20 | | |
| 50 m, straight connector | 6GT2891-4FN50 | | |
| 2 m, plug angled at reader | 6GT2891-4JH20 | | |
| 5 m, plug angled at reader | 6GT2891-4JH50 | | |
| 10 m, plug angled at reader | 6GT2891-4JN10 | | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**Power supplies > 3-phase, 24 V DC (ET 200pro PS, IP67)**

### ■ Overview



*Power supply for ET 200pro:*

- 3-phase, 24 V DC/8 A

The SIMATIC ET 200pro PS power supply unit with degree of protection IP67 is used as the electronics/encoder supply and load voltage supply of the new SIMATIC ET 200pro distributed I/O system for use close to the machine without a cabinet. With a signaling contact for "24 V OK" and "Overtemperature", as well as a second plug connector for input voltage loop-through.

### ■ Technical specifications

| Article number | 6ES7148-4PC00-0HA0 |
|---|---|
| Product | SIMATIC ET 200pro PS |
| Power supply, type | 24 V/8 A |
| **Input** | |
| Input | 3-phase AC |
| Rated voltage value $V_{in\,rated}$ | 400 ... 480 V |
| Voltage range AC | 340 ... 550 V |
| • Note | 320 ... 340 V for max. 1 min |
| Wide-range input | Yes |
| Overvoltage resistance | Implemented internally with varistors |
| Mains buffering at Iout rated, min. | 15 ms; at $V_{in}$ = 400 V |
| Rated line frequency 1 | 50 Hz |
| Rated line frequency 2 | 60 Hz |
| Rated line range | 45 ... 66 Hz |
| Input current | |
| • at rated input voltage 400 V | 0.5 A |
| Switch-on current limiting (+25 °C), max. | 40 A |
| I²t, max. | 3.5 A²·s |
| Built-in incoming fuse | T 4 A |
| Protection in the mains power input (IEC 898) | Required: Circuit breaker 3RV2011-1DA10 or 3RV2711-1DD10 (UL 489) |
| **Output** | |
| Output | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 24 V |
| Total tolerance, static ± | 3 % |
| Static mains compensation, approx. | 0.5 % |
| Static load balancing, approx. | 0.5 % |
| Residual ripple peak-peak, max. | 200 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 250 mV |
| Product function Output voltage adjustable | No |
| Output voltage setting | - |
| Status display | Green LED for 24 V OK |
| Signaling | max. 30 V, 10 mA; Power-Good (High-Pegel 1L+ for Vout in range 21.3 ... 29 V); Overtemperature warning at least 30 s before switch-off (high level 1L+ when the max. internal temperature is exceeded) |

| Article number | 6ES7148-4PC00-0HA0 |
|---|---|
| Product | SIMATIC ET 200pro PS |
| Power supply, type | 24 V/8 A |
| On/off behavior | Overshoot of $V_{out}$ < 2 % |
| Startup delay, max. | 1.5 s |
| Voltage rise, typ. | 40 ms |
| Rated current value Iout rated | 8 A |
| Current range | 0 ... 8 A |
| Supplied active power typical | 192 W |
| Short-term overload current | |
| • on short-circuiting during the start-up typical | 50 A |
| • at short-circuit during operation typical | 50 A |
| Duration of overloading capability for excess current | |
| • on short-circuiting during the start-up | 100 ms |
| • at short-circuit during operation | 100 ms |
| Parallel switching for enhanced performance | No |
| **Efficiency** | |
| Efficiency at $V_{out\,rated}$, $I_{out\,rated}$, approx. | 88 % |
| Power loss at $V_{out\,rated}$, $I_{out\,rated}$, approx. | 25 W |
| **Closed-loop control** | |
| Dynamic mains compensation ($V_{in}$ rated ±15 %), max. | 0.5 % |
| Dynamic load smoothing ($I_{out}$: 50/100/50 %), $U_{out}$ ± typ. | 1 % |
| Setting time maximum | 2 ms |
| **Protection and monitoring** | |
| Output overvoltage protection | < 33 V |
| Current limitation, typ. | 9.4 A |
| Property of the output Short-circuit proof | Yes |
| Short-circuit protection | Electronic shutdown, automatic restart |
| Enduring short circuit current RMS value | |
| • maximum | 10 A |
| Overload/short-circuit indicator | - |

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## Technical specifications (continued)

| Article number | 6ES7148-4PC00-0HA0 |
|---|---|
| Product | SIMATIC ET 200pro PS |
| Power supply, type | 24 V/8 A |
| **Safety** | |
| Primary/secondary isolation | Yes |
| Galvanic isolation | Protective extra low output voltage Vout according to EN 60950-1 and EN 50178 |
| Protection class | Class I |
| Leakage current | |
| • maximum | 3.5 mA |
| • typical | 0.4 mA |
| CE mark | Yes |
| UL/cUL (CSA) approval | UL-Listed (UL 508) according to NFPA compatibility (National Fire Protection Association), see operating instructions |
| Explosion protection | No |
| FM approval | - |
| CB approval | Yes |
| Marine approval | No |
| Degree of protection (EN 60529) | IP67, enclosure type 5 indoor |
| **EMC** | |
| Emitted interference | EN 55022 Class A |
| Supply harmonics limitation | - |
| Noise immunity | EN 61000-6-2 |
| **Operating data** | |
| Ambient temperature | |
| • during operation | -25 ... +55 °C |
|   - Note | with natural convection |
| • during transport | -40 ... +70 °C |
| • during storage | -40 ... +70 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation |

| Article number | 6ES7148-4PC00-0HA0 |
|---|---|
| Product | SIMATIC ET 200pro PS |
| Power supply, type | 24 V/8 A |
| **Mechanics** | |
| Connection technology | screw-type terminals |
| Connections | |
| • Supply input | L1, L2, L3, PE: Plug connector HAN Q4/2 (counterpart see "Electrical accessories") |
| • Output | L+, M: 2 x 1.5 mm² each (4-pole cable for +/- with open, labeled ends, 4 x 1.5 mm²) |
| • Auxiliary | Alarm signals: M12 plug-in connector 5-pin |
| Width of the enclosure | 310 mm |
| Height of the enclosure | 135 mm |
| Depth of the enclosure | 90 mm |
| Weight, approx. | 2.8 kg |
| Product feature of the enclosure housing for side-by-side mounting | No |
| Installation | Can be mounted onto ET200pro DIN rail |
| Electrical accessories | Power connector (Input: 3RK1911-2BE30 (6 mm²)) (Output: 3RK1911-2BF10 (4 mm²)) |
| MTBF at 40 °C | 196 354 h |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC ET 200pro PS** <br> Stabilized power supply in distributed I/O system design, permitting the loop-through of energy to further modules; with IP67 degree of protection; Input: 400-480 V 3 AC Output: 24 V DC/8 A | **6ES7148-4PC00-0HA0** | **National Fire Protection Association compatible** <br> These devices are only approved for installation in industrial machinery according to the NFPA79 Electrical Standard for Industrial Machinery. | |
| **Accessories** | | • for X1 SIMATIC ET 200pro PS 61 88 201 1003.xx (AWG10)* <br> • for X1 SITOP PSU 300P 61 88 201 1000.xx / 61 88 201 1002.xx (AWG14)* <br> • for X2 SIMATIC ET 200pro PS 61 88 202 1010.xx (AWG10)* | |
| **Power connector** <br> For connecting to the distributed I/O system <br> • For X1 (6 mm²) <br> • For X2 (4 mm²) | **3RK1911-2BE30** <br> **3RK1911-2BF10** |    supplied blanking cap for X2 <br> • for X3 Phoenix Contact SAC-5P-M12-M12FS <br><br>    supplied blanking cap for X3 | * http://www.harting.com/startseite <br><br> **3RK1902-0CK00** |
| | | **Sealing cap** <br> For 9-pole power sockets <br> • X2 (1 unit) <br> • X2 (10 units) | **3RK1902-0CK00** <br> **3RK1902-0CJ00** |

### Overview

#### ET 200pro motor starters in the ET 200pro I/O system

SIMATIC ET 200pro is the modular I/O system with high IP65/66/67 degree of protection for local, cabinet-free use. The ET 200pro motor starters with the IP65 high degree of protection are an integral part of ET 200pro.

ET 200pro motor starter: Isolator module, Standard starter and High Feature starter mounted on a wide module rack

#### ET 200pro motor starters

- Only two variants up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Support for PROFIenergy
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- EMERGENCY START function on overload
- Current value transmission by bus
- Current limit monitoring
- Fully supports of acyclic services
- Direct-on-line or reversing starters
- Power bus connection can be plugged in using Han Q4/2 plug connectors
- Motor feeder with Han Q8/0 connector
- Conductor cross-section up to 6 x 4 mm²
- 25 A per segment (power looped through using jumper plug)
- In Standard and High Feature versions (with 4 DI on board)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated soft starter function
- Supplied with 400 V AC brake contact as an option
- Temperature sensor can be connected (Thermoclick or PTC type A)
- Provision of the motor current in PROFIenergy format to higher-level systems, motor current shutdown in dead times using PROFIenergy

#### ET 200pro isolator modules (see page 9/267)

The isolator module with switch disconnector function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

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**More information**

Home page, see www.siemens.com/ET200pro

Industry Mall, see www.siemens.com/product?3RK1304

Further components in the ET 200pro distributed I/O system:
- Catalog ST 70, see www.siemens.com/industry/infocenter
- Industry Mall, see www.siemens.com/product?ET200pro

#### Safety applications

Safety Solution local (see page 9/268)

With the Safety modules local
- Safety local isolator module and
- 400 V disconnecting module
and an appropriate connection, safety level PL e (according to ISO 13849-1) can be reached.

Safety Solution PROFIsafe (see page 9/271)

With the Safety modules PROFIsafe
- F-Switch and
- 400 V disconnecting module
and an appropriate connection, safety levels SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) can also be reached.

#### Functionality

With the ET 200pro motor starters, any three-phase loads can be protected and switched.

The ET 200pro motor starters are available with mechanical and also electronic contacts.

The ET 200pro electromechanical starters are offered as direct-on-line starters (DSe) and reversing starters (RSe) as **Standard** and **High Feature** versions. There are device versions with or without control for externally fed brakes with 400 V AC.

Compared with the Standard motor starters, the **High Feature mechanical** motor starter also has:
- Four digital inputs
- Advanced parameterization options

The ET 200pro electronic starters are offered as direct-on-line starters (sDSSte/sDSte) and reversing starters (sRSSte/sRSte) in the High Feature version:

Compared with the High Feature mechanical motor starters, the **High Feature electronic** motor starter also has:
- Soft starting and smooth ramp-down function
- Deactivated soft start function as an electronic starter for applications with a high switching frequency
- Advanced parameterization options

As a result of the protection concept with solid-state overload evaluation and the use of SIRIUS switching devices, size S00, additional advantages are realized on the Standard and High Feature motor starters – advantages that soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:
- Configuration is made easier by the fine modular structure with ET 200pro. When using ET 200pro motor starters, the parts list per load feeder is reduced to two main items: the bus module and the motor starter. This makes the ET 200pro ideal for modular machine concepts or solutions for conveying systems and machine-tool building.

- Expansions are easily possible through the subsequent adding of modules. The innovative plug-in technology also does away with the wiring needed up to now. Through the hot-swapping function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary, without having to shut down the ET 200pro station and with it the process in the plant. The motor starters are therefore recommendable in particular for applications with special demands on availability. Storage costs are also optimized by the low level of variance (two units up to 5.5 kW).

With four locally acting inputs available on the High Feature motor starter, it is possible to realize autonomous special functions that work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.

### Article No. scheme

| Product versions | | Article number | | | | |
|---|---|---|---|---|---|---|
| **Motor starters** | | **3RK1304 – 5 □ S □ 0 – □ A A □** | | | | |
| Setting range | 0.15 ... 2.0 A | **K** | | | | |
| | 1.5 ... 12 A | **L** | | | | |
| Product function | Direct-on-line starters DSe | | **4** | **4** | | Standard |
| | Reversing starters RSe | | **4** | **5** | | Standard |
| | Direct-on-line starters DSe | | **4** | **2** | | High Feature |
| | Reversing starters RSe | | **4** | **3** | | High Feature |
| | Direct-on-line starters sDSSSte/sDSte | | **7** | **2** | | High Feature |
| | Reversing starters sDSSSte/sDSte | | **7** | **3** | | High Feature |
| Inputs/outputs | Without brake output | | | | **0** | |
| | With brake output | | | | **3** | 400 V AC, with High Feature + 4 inputs |
| Example | | **3RK1304 – 5 K S 4 0 – 4 A A 0** | | | | |

| Product versions | | Article number | | |
|---|---|---|---|---|
| **Modules** | | **3RK1304 – 0 H S 0 0 – □ A A 0** | | |
| Product function | Isolator modules | | **6** | |
| | Isolator modules | | **7** | Safety modules local |
| | 400 V disconnecting modules | | **8** | Safety modules local/PROFIsafe |
| Example | | **3RK1304 – 0 H S 0 0 – 6 A A 0** | | |

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders please use the article numbers quoted in the selection and ordering data.

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**ET 200pro motor starters   > General data**

| Type<br>Technology designation[1] | | Standard motor starters<br>DSe, RSe | High Feature motor starters<br>DSe, RSe | sDSSte, sDSte,<br>sRSSte, sRSte |
|---|---|---|---|---|
| **Device functions (firmware features)** | | | | |
| **Parameterizable rated operational current** | | ✓ | | |
| **Integrated short-circuit protection** | | ✓ | | |
| **Parameterizable current limit values** | | -- | ✓ 2 limit values | |
| **Parameterizable response in case of current limit violation** | | -- | ✓ | |
| **Zero current monitoring** | | ✓ | | |
| **Parameterizable response in case of zero current violation** | | ✓ | | |
| **Parameterizable current unbalance limit** | % | -- Fixed limit value (30 x $I_e$) | ✓ 30 ... 60 x $I_e$ | |
| **Parameterizable response in case of unbalance limit violation** | | ✓ | | |
| **Motor blocking monitoring** | | -- | ✓ | |
| **Parameterizable blocking current limit** | % | -- | ✓ 150 ... 1 000 x $I_e$ | |
| **Parameterizable blocking time limit** | s | -- | ✓ 1 ... 5 | |
| **Current value transmission** | | ✓ | | |
| **Group warning diagnostics** | | -- | ✓ Parameterizable | |
| **Group diagnostics** | | ✓ Parameterizable | | |
| **EMERGENCY START** | | ✓ | | |
| **Digital inputs**<br>• Parameterizable input signal<br>• Parameterizable input level<br>• Parameterizable input signal delay<br>• Parameterizable input signal extension<br>• Parameterizable input control actions | <br><br><br>ms<br>ms<br> | --<br>--<br>--<br>--<br>--<br>-- | ✓ 4 inputs<br>✓ Latching/non-latching<br>✓ NC/NO<br>✓ 10 ... 80<br>✓ 0 ... 200<br>✓ 12 different actions | |
| **Brake output (400 V AC)** | | ✓ Order option | | |
| **Parameterizable brake enabling delay** | s | ✓ -2.5 ... +2.5 | | |
| **Parameterizable holding time of the brake during stopping** | s | ✓ 0 ... 25 | | |
| **Parameterizable start-up type** | | -- | | ✓ |
| **Parameterizable ramp-down time** | | -- | | ✓ |
| **Parameterizable starting voltage** | | -- | | ✓ |
| **Parameterizable stopping voltage** | | -- | | ✓ |
| **Local device interface** | | ✓ | | |
| **Firmware update** | | ✓ By specialists | | |
| **Thermal motor model** | | ✓ | | |
| **Parameterizable trip class** | | -- CLASS 10 fixed | ✓ CLASS 5, 10, 15, 20 | |
| **Parameterizable response in case of overload of thermal motor model** | | -- | ✓ 3 possible states | |
| **Advance warning limit for motor heating** | % | -- | ✓ Parameterizable 0 ... 95 | |
| **Advance warning limit for time-related trip reserve** | s | -- | ✓ Parameterizable 0 ... 500 | |
| **Parameterizable recovery time** | min | -- | ✓ 1 ... 30 | |
| **Parameterizable protection against voltage failure** | | -- Permanently integrated | ✓ | |
| **Reversing start function** | | ✓ Order option | | |
| **Parameterizable interlock time for reversing starters** | | -- 150 ms fixed | ✓ 0 ... 60 s | |
| **Integrated logbook functions** | | ✓ 3 device logbooks | | |
| **Integrated statistics data memory** | | ✓ | | |
| **Parameterizable response in case of CPU/master stop** | | ✓ | | |
| **PROFIenergy profile support**<br>• Disconnection of the motor current during idle times<br>• Measured motor current values | | <br>✓<br>✓ | | |
| **Device indications**<br>• Group fault<br>• Switching state<br>• Device status<br>• Digital inputs | | <br>SF LED (red)<br>STATE LED (red, yellow, green)<br>DEVICE LED (red, yellow, green)<br>-- | <br><br><br><br>IN 1 ... IN 4, LED | |

✓ Function available

-- Function not available

[1]  DS ....        Direct-on-line starters
    RS ....        Reversing starters
    DSS ..        Direct-on-line soft starters
    RSS ..        Reversing soft starters
    e .......        Electronic motor protection
    te ......        Full motor protection (thermal + electronic)
    s .......        Electronic switching with semiconductor.

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## Benefits

### *Advantages through energy efficiency*
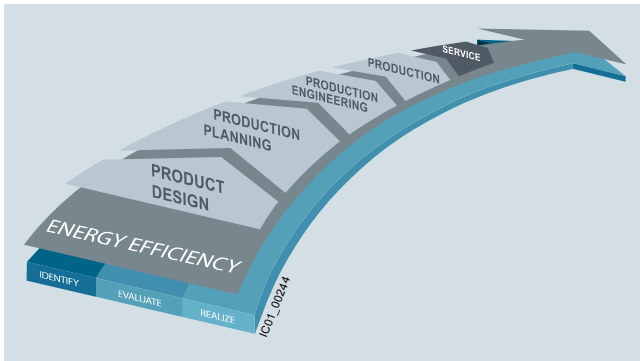


Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

SIMATIC ET 200pro motor starters contribute to energy efficiency as follows:

- Energy management:
  Provision of energy data (current) by bus to higher-level systems using PROFIenergy
- Elimination of energy consumption in dead times through disconnection using PROFIenergy
- Current management:
  Avoidance of current peaks with the electronic soft starter, thus reducing the load on the grid and the mechanical system
- Depending on technology, lower intrinsic power loss than speed-controlled drive systems
- Solid-state modules equipped with soft start technology with bypass contactor, resulting in lower power losses than with conventional soft starters after start-up

### *Product advantages*

ET 200pro motor starters provide the following advantages:

- High flexibility thanks to a modular and compact design
- Little variance among all motor starter versions (two units up to 5.5 kW)
- Extensive parameterization using STEP 7 HW Config
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs for on-site control functions (High Feature)
- Cabinet-free design thanks to IP65 high degree of protection

## Application

The SIMATIC ET 200pro motor starters are ideal for the use of several spatially concentrated distributed drive solutions in which several motors or digital or analog sensors and actuators are addressed from a distributed station. They are perfectly suited for protecting and switching any AC loads.

### *Use of ET 200pro motor starters in conjunction with IE3/IE4 motors*

Note:

For the use of ET 200pro motor starters in conjunction with highly energy-efficient IE3/IE4 motors, please observe the information on dimensioning and configuring; see "Application manual - Controls with IE3/IE4 motors", https://support.industry.siemens.com/cs/ww/en/view/94770820.

For more information, see Catalog IC 10.

### *Application areas*

The SIMATIC ET 200pro motor starters are suitable for numerous sectors of industry, e.g. machinery and plant engineering or conveying applications.

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**ET 200pro motor starters > General data**

## ◼ Technical specifications

| More information | |
|---|---|
| "AS-Interface Basic" manual, see https://support.industry.siemens.com/cs/ww/en/view/35016496<br><br>"AS-Interface Standard" manual, see https://support.industry.siemens.com/cs/ww/en/view/38722160 | Note on security:<br>For plant networking, suitable protective measures (including IT security, e. g. network segmentation) must be taken to ensure safe operation of the plant. For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity. |

| Type | | Standard motor starters | High Feature motor starters | |
|---|---|---|---|---|
| | | Mechanically switching without inputs | Mechanically switching with inputs | Mechanically switching with inputs and soft starter function |
| Technology designation[1] | | DSe, RSe | DSe, RSe | sDSSte, sDSte, sRSSte, sRSte |
| **Mechanics and environment** | | | | |
| Motor starters or modules that can be connected to ET 200pro with 110 mm width | | max. 8 | | |
| **Mounting dimensions (W x H x D)** | | | | |
| • Direct-on-line starters and reversing starters | mm | 110 x 230 x 150 | | 110 x 230 x 160 |
| **Permissible ambient temperature** | | | | |
| • During operation | °C | -25 ... +55, from +40 with derating | | |
| • During storage | °C | -40 ... +70 | | |
| Permissible mounting position | | Vertical, horizontal | | |
| Vibration resistance acc. to IEC 60068, Part 2-6 | $g$ | 2 | | |
| Shock resistance acc. to IEC 60068, Part 2-27 | $g$/ms | Half-sine 15/11 | | |
| Degree of protection | | IP65 | | |
| Pollution degree | | 3, IEC 60664 (IEC 61131) | | |
| **Electrical specifications** | | | | |
| **Current consumption at 24 V DC** | | | | |
| • From auxiliary circuit L+/M (U1) | mA | Approx. 40 | | |
| • From auxiliary circuit A1/A2 (U2) | mA | Approx. 200 | | |
| Rated operational current $I_e$ for power bus | A | 25 | | |
| **Rated operational voltage $U_e$** | V AC | 400 (50/60 Hz) | | |
| • Approval according to EN 60947-1, Appendix N | V AC | Up to 400 (50/60 Hz) | | Up to 400 (50/60 Hz) |
| • Approval according to CSA and UL | V AC | Up to 600 (50/60 Hz) | | Up to 480 (50/60 Hz) |
| **Approval** | | | | |
| • DIN VDE 0106, Part 101 | V | Up to 400 | | Up to 480 |
| • CSA and UL approval | V | Up to 600 | | Up to 480 |
| **Conductor cross-sections** | | | | |
| • Incoming power supply | mm² | max. 6 x 4 | | |
| Touch protection | | Finger-safe | | |
| Rated impulse withstand voltage U$_{imp}$ | kV | 6 | | |
| Rated insulation voltage $U_i$ | V | 400 | | |
| **Rated operational current for starters $I_e$** | | | | |
| • AC-1/2/3 at 40 °C | | | | |
| - At 400 V | A | 0.15 ... 2.0/1.5 ... 12.0 | | 0.15 ... 2.0/1.5 ... 12.0[2] |
| - At 500 V | A | 0.15 ... 2.0/1.5 ... 9.0 | | |
| • AC-4 at 40 °C | | | | |
| - At 400 V | A | 0.15 ... 2.0/1.5 ... 4.0 | | |
| Rated short-circuit breaking capacity | kA | 100 at 400 V | | |
| Type of coordination acc. to IEC 60947-4-1 | | 1 | | |
| Power of three-phase motors at 400 V | kW | Max. 5.5 | | Max. 5.5/4[3] |
| Utilization categories | | AC-1, AC-2, AC-3, AC-4 | | AC-53a[4] (max. 9 A with deactivated soft start function up to CLASS 10) |
| Protective separation between main and auxiliary circuits | V | 400, acc. to EN 60947-1, Appendix N | | |
| **Endurance of contactor** | | | | |
| • Mechanical | Operating cycles | 30 million | | -- |
| • Electrical | Operating cycles | Up to 10 million; depending on the current loading (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388) | | -- |
| Permissible switching frequency | | Depending on the current load, motor starting time, and relative ON period (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388) | | |
| **Switching times at 0.85 ... 1.1 x $U_e$** | | | | |
| • Closing delay | ms | 11 ... 50 | | -- |
| • Opening delay | ms | 5 ... 45 | | -- |

[1] DS .... Direct-on-line starters
RS .... Reversing starters
DSS .. Direct-on-line soft starters
RSS ... Reversing soft starters
e ....... Electronic motor protection
te ....... Full motor protection (thermal + electronic)

s ....... Electronic switching with semiconductor.

[2] If the soft starter control function is deactivated, the permissible rated operational current is reduced to 9 A up to CLASS 10.

[3] With parameterization as electronic starter max. 4 kW.

[4] 8-hour operation.

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■ **Overview**

The functionality, device functions, and technical specifications of the Standard motor starter are described in "ET 200pro motor starters, General Data" .

■ **Selection and ordering data**

| Version | Article No. | |
|---|---|---|
| **Standard motor starters, mechanical** **Motor protection: thermal model** | | |
| **Direct-on-line starters DSe[1)]** | | |
| • Without brake output | **3RK1304-5□S40-4AA0** | |
| • With brake output 400 V AC | **3RK1304-5□S40-4AA3** | |
| **Reversing starters RSe[1)]** | | |
| • Without brake output | **3RK1304-5□S40-5AA0** | |
| • With brake output 400 V AC | **3RK1304-5□S40-5AA3** | |
| Setting range Rated operational current | | |
| • 0.15 ... 2.0 A | **K** | |
| • 1.5 ... 12.0 A | **L** | |

DSe Standard

[1)] Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately .

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# I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**ET 200pro motor starters  > High Feature motor starters**    `IE3/IE4 ready`

## ■ Overview

The functionality, device functions, and technical specifications of the High Feature motor starter are described in "ET 200pro motor starters, General Data" (see from page 9/260).

The High Feature motor starter differs from the Standard motor starter in having more parameters and four integrated, freely-parameterizable digital inputs.

## ■ Selection and ordering data

| | Version | Article No. | |
|---|---|---|---|
| **High Feature motor starters, mechanical** **Motor protection: thermal model** | | | |
| | **Direct-on-line starters DSe[1]** | | |
| | • Without brake output and with 4 inputs | 3RK1304-5☐S40-2AA0 | |
| | • With brake output 400 V AC and 4 inputs | 3RK1304-5☐S40-2AA3 | |
| | **Reversing starters RSe[1]** | | |
| | • Without brake output and with 4 inputs | 3RK1304-5☐S40-3AA0 | |
| | • With brake output 400 V AC and 4 inputs | 3RK1304-5☐S40-3AA3 | |
| RSe High Feature | Setting range Rated operational current | | |
| | • 0.15 ... 2.0 A | **K** | |
| | • 1.5 ... 12.0 A | **L** | |
| **High Feature motor starters[2], electronic** **Full motor protection, comprising thermal motor protection and thermistor motor protection** | | | |
| | **Direct-on-line starters sDSSte/sDSte[1][2]** | | |
| | • Without brake output and with 4 inputs | 3RK1304-5☐S70-2AA0 | |
| | • With brake output 400 V AC and 4 inputs | 3RK1304-5☐S70-2AA3 | |
| | **Reversing starters sRSSte/sRSte[1][2]** | | |
| | • Without brake output and with 4 inputs | 3RK1304-5☐S70-3AA0 | |
| | • With brake output 400 V AC and 4 inputs | 3RK1304-5☐S70-3AA3 | |
| sRSSte High Feature | Setting range Rated operational current | | |
| | • 0.15 ... 2.0 A | **K** | |
| | • 1.5 ... 12.0 A | **L** | |

[1] Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters" on page 9/276).

[2] The solid-state motor starters can be used not only as solid-state motor starters with a high level of switching frequency but also as fully fledged soft starters for soft starting and stopping. The changeover from motor starter to soft starter takes place through reparameterization in HW Config. Depending on the setting, this results in the following current ranges:
- Parameterization as solid-state motor starter: 0.15 to 2 A and 1.5 to 9 A (4 kW)
- Parameterization as soft starter: 0.15 to 2 A and 1.5 to 12 A (5.5 kW).

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## Overview

The isolator module with integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters) and switch disconnector function is used for safe disconnection of the 400 V operational voltage in the plant.

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

The following properties apply to the isolator module:
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Cabinet-free design thanks to IP65 high degree of protection

The isolator module is also available in a safety version (see page 9/268, "Safety local isolator module").

## Technical specifications

| Type | | Isolator modules |
|---|---|---|
| **General data** | | |
| **Mounting dimensions (W x H x D)** | | |
| • Direct-on-line starters and reversing starters | mm | 110 x 230 x 170 |
| **Permissible ambient temperature** | | |
| • During operation | °C | -25 ... +55 |
| • During storage | °C | -40 ... +70 |
| **Permissible mounting position** | | Any |
| **Vibration resistance acc. to IEC 60068 Part 2-6** | $g$ | 2 |
| **Shock resistance acc. to IEC 60068 Part 2-27** | $g$/ms | Half-sine 15/11 |
| **Power consumption** | | |
| • From auxiliary circuit L+/M (U1) | mA | Approx. 20 |
| • From auxiliary circuit A1/A2 (U2) | | -- |
| **Rated operational current $I_e$ for power bus** | A | 25 |
| **Rated operational voltage $U_e$** | V | 400 |
| **Approvals according to** | | |
| • DIN VDE 0106, Part 101 | V | Up to 500 |
| • CSA and UL | V | Up to 600 |
| **Conductor cross-sections** | | |
| • Incoming power supply | mm$^2$ | max. 6 x 4 |

| Type | | Isolator modules |
|---|---|---|
| **Degree of protection** | | IP65 |
| **Touch protection** | | Finger-safe |
| **Pollution degree** | | 3, IEC 60664 (IEC 61131) |
| **Rated impulse withstand voltage $U_{imp}$** | kV | 6 |
| **Rated insulation voltage $U_i$** | V | 400 |
| **Rated operational current for starters $I_e$** | | |
| • AC-1/2/3 at 40 °C | | |
|   - At 400 V | A | 25 |
|   - At 500 V | A | 25 |
| **Rated short-circuit breaking capacity** | kA | 50 at 400 V |
| **Type of coordination acc. to IEC 60947-4-1** | | 2 |
| **Protective separation between main and auxiliary circuits** | V | 400, Acc. to DIN VDE 0106 Part 101 |
| **Device functions** | | |
| • Group diagnostics | | Yes, parameterizable |
| **Device indications** | | |
| • Group fault | | SF LED (red) |

## Selection and ordering data

| Version | | Article No. |
|---|---|---|
| **ET 200pro isolator modules, mechanical** | | |
| | **Isolator modules**[1] Rated operational current 25 A | **3RK1304-0HS00-6AA0** |


3RK1304-0HS00-6AA0

[1] Only functions when used together with the corresponding 110 mm backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 9/276, "Accessories for ET 200pro motor starters").

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

### ■ Overview

#### *Safety Solution local*

With the Safety local modules
• Safety local isolator module and
• 400 V disconnecting module
and an appropriate connection, safety level PL e
(according to ISO 13849-1) can be reached.



ET 200pro motor starter (Safety Solution local):
Safety local isolator module, disconnecting module, Standard starter
and High Feature starter mounted on a wide module rack

#### *Safety local isolator module*

The Safety local isolator module is a repair switch with integrated
safety evaluation functions that can be parameterized using
DIP switches.

It is used for
• Connection of a 1 or 2-channel EMERGENCY STOP circuit
  up to PL e (protective door or EMERGENCY STOP
  pushbuttons) and parameterizable start behavior
• For controlling the 400 V disconnecting module by means of a
  safety rail signal

#### *400 V disconnecting module*

The 400 V disconnecting module enables the safe disconnec-
tion of an operational voltage of 400 V up to PL e. For operation
in a Safety Solution local application, it functions only in combi-
nation with the Safety local isolator module.

For operation in a Safety PROFIsafe application, it functions only
in combination with the F-Switch.

#### *Functionality*

Safety local isolator module

The Safety local isolator module features the same functions as
a standard isolator module with an additional local safety
function.

The Safety local isolator module contains a 3TK2841 module
and is equipped with M12 terminals for the connection of
external safety components.

Terminals 1 and 2 can be used to connect either 1-channel or
2-channel EMERGENCY STOP circuits or protective door
circuits (IN 1, IN 2).

For monitored starts, an external START switch can be
connected to terminal 3.

The required safety functions can be set using two slide
switches located under the left M12 opening.

In the event of an EMERGENCY STOP, the Safety local isolator
module trips the downstream 400 V disconnecting module. This
safely separates the 400 V circuit up to PL e.

In combination with the 400 V disconnecting module, the
Safety local isolator module can be used for safety applications
up to PL e.

400 V disconnecting module

The 400 V disconnecting module can be used together with the
Safety local isolator module for local safety applications and to-
gether with the F-Switch for PROFIsafe safety applications.

It contains two contactors connected in series for safety-related
disconnection of the main circuit.

The auxiliary circuit supply of the device is over a safety power
rail in the backplane bus module.

The 400 V disconnecting module can be used in conjunction
with the Safety local isolator module or with the F-Switch for
safety applications up to PL e.

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## Technical specifications

| Type | | Safety local isolator module | 400 V disconnecting module |
|---|---|---|---|
| **General data** | | | |
| **Mounting dimensions (W x H x D) in mm** • Direct-on-line starters and reversing starters | mm | 110 x 230 x 170 | 110 x 230 x 150 |
| **Permissible ambient temperature** • During operation • During storage | °C °C | -25 ... +55 -40 ... +70 | |
| **Permissible mounting position** | | Any | |
| **Vibration resistance acc. to IEC 60068, Part 2-6** | | 2 g | |
| **Shock resistance acc. to IEC 60068, Part 2-27** | | Half-sine 15 g/11 ms | |
| **Power consumption** • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2) | mA | Approx. 20 -- | |
| **Rated operational current $I_e$ for power bus** | A | 25 | |
| **Rated operational voltage $U_e$** | V | 400 (50/60 Hz) | |
| **Approval DIN VDE 0106, Part 101** | V | Up to 500 | |
| **CSA and UL approval** | V | Up to 600 | |
| **Conductor cross-sections** Incoming power supply | mm² | max. 6 x 4 | |
| **Degree of protection** | | IP65 | |
| **Touch protection** | | Finger-safe | |
| **Pollution degree** | | 3, IEC 60664 (IEC 61131) | |
| **Rated impulse withstand voltage $U_{imp}$** | kV | 6 | |
| **Rated insulation voltage $U_i$** | V | 400 | |
| **Rated operational current $I_e$ for starters** • AC-1/2/3 at 40 °C  - At 400 V  - At 500 V | A A | 16 16 | 25 25 |
| **Rated short-circuit breaking capacity** | kA | 50 at 400 V | |
| **Type of coordination acc. to IEC 60947-4-1** | | 2 | |
| **Protective separation between main and auxiliary circuits** | V | 400, Acc. to DIN VDE 0106 Part 101 | |
| **Switching times at 0.85 ... 1.1 x $U_e$** • Closing delay • Opening delay | ms ms | -- -- | 25 ... 100 7 ... 10 |
| **Device functions** • Group diagnostics | | Yes, parameterizable | |
| **Device indications** • Group fault | | SF LED (red) | |

# I/O systems

## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200pro

**ET 200pro Safety motor starters Solutions local/PROFIsafe   > Safety modules local    IE3/IE4 ready**

### ■ Selection and ordering data

| | Version | Article No. | |
|---|---|---|---|
| **Safety modules local** | | | |
| 3RK1304-0HS00-7AA0 | **Safety local isolator module[1][2]**<br>Rated operational current 16 A | **3RK1304-0HS00-7AA0** | |
| 3RK1304-0HS00-8AA0 | **400 V disconnecting module[3][4]**<br>Rated operational current 25 A | **3RK1304-0HS00-8AA0** | |

[1] The Safety local isolator module only functions when used together with the 400 V disconnecting module.

[2] Only in combination with the special backplane bus module for the Safety local isolator module (see page 9/276, "Accessories for ET 200pro motor starters").

[3] The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.

[4] The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 9/276, "Accessories for ET 200pro motor starters").

■ **Overview**

### Safety Solution PROFIsafe

With the Safety modules PROFIsafe
• F-Switch and
• 400 V disconnecting module
and an appropriate connection, safety levels SIL 3
(according to IEC 62061) and PL e (according to ISO 13849-1)
can be reached.

### F-Switch PROFIsafe

Fail-safe digital inputs/outputs in degrees of protection IP65 to
IP67 for machine-level, cabinet-free use.

Fail-safe digital inputs

• For fail-safe reading in of sensor information (1/2-channel)
• Including integrated discrepancy evaluation
  for 2-out-of-2 signals
• Internal sensor supplies (incl. testing) available

Fail-safe digital outputs

• Three fail-safe PP-switching outputs for safe switching of the
  backplane busbars

The F-Switch is certified up to SIL 3/PL e and has detailed
diagnostics.

It supports PROFIsafe in PROFIBUS configurations as well as in
PROFINET configurations.

Note:

For safety characteristics, see Catalog IC 10 2017 → Chapter 16
"Appendix" → "Standards and approvals" → "Overview".

### 400 V disconnecting module

See "Safety modules local", Overview, on page 9/268 and
Technical specifications, page 9/269.

### Functionality

The PROFIsafe F-Switch is a fail-safe electronic module for
PROFIsafe safety applications. It has two fail-safe inputs and
outputs for safe switching of the 24 V supply over backplane
busbars. In combination with the 400 V disconnecting module,
fail-safe disconnection of ET 200pro motor starters is possible in
PROFIsafe applications up to SIL 3/PL e.

■ **Selection and ordering data**

| Version | Article No. | |
|---|---|---|
| **ET 200pro safety modules** | | |
| **400 V disconnecting module[1)2)]**<br>Rated operational current 25 A | **3RK1304-0HS00-8AA0** | |
| **F-Switch PROFIsafe**<br>24 V DC, including bus module<br>Connection module must be ordered separately | **6ES7148-4FS00-0AB0** | |
| **Connection modules for F-Switch**<br>24 V DC | **6ES7194-4DA00-0AA0** | |

3RK1304-0HS00-8AA0

6ES7148-4FS00-0AB0

[1)] The 400 V disconnecting module functions only when used together with
the Safety local isolator module or with the F-Switch.

[2)] The 400 V disconnecting module functions only when used together with
the backplane bus module and the wide module rack. The backplane bus
module and the wide module rack must be ordered separately
(see page 9/276, "Accessories for ET 200pro motor starters").

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

## ■ Overview



1 Power feeder plug
2 Power connection plug
3 Power jumper plug
4 Motor connection plug
5 Motor plug
6 Motor plug with EMC suppressor circuit
7 Power loop-through plug
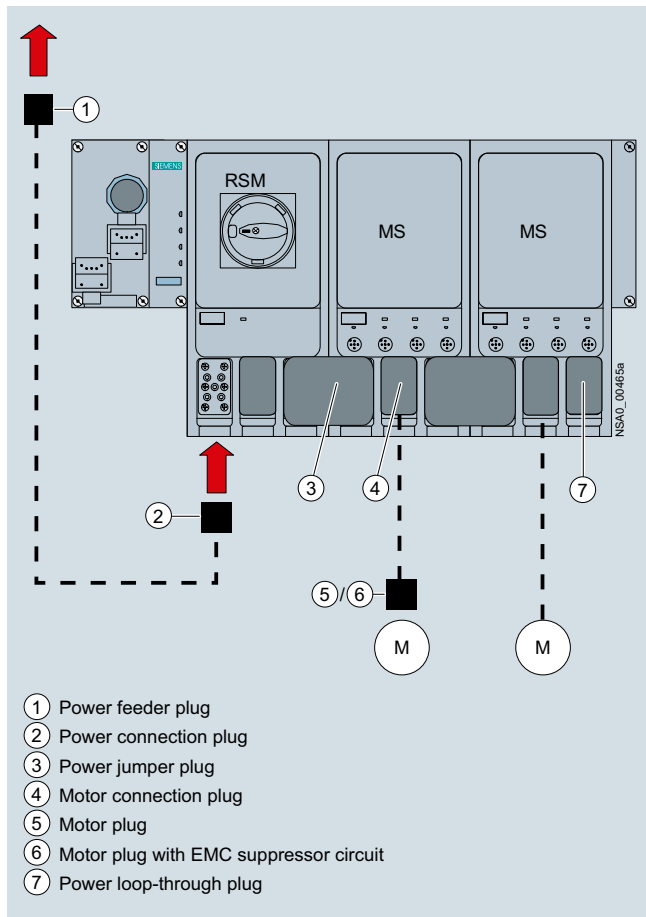
Basic design of an ET 200pro version with (from the left) connection module for IM, interface module for communication (IM), RSM isolator module, two ET 200pro motor starters (MS), and connections for power



Infeed on isolator module

9 Power connection cable for isolator module
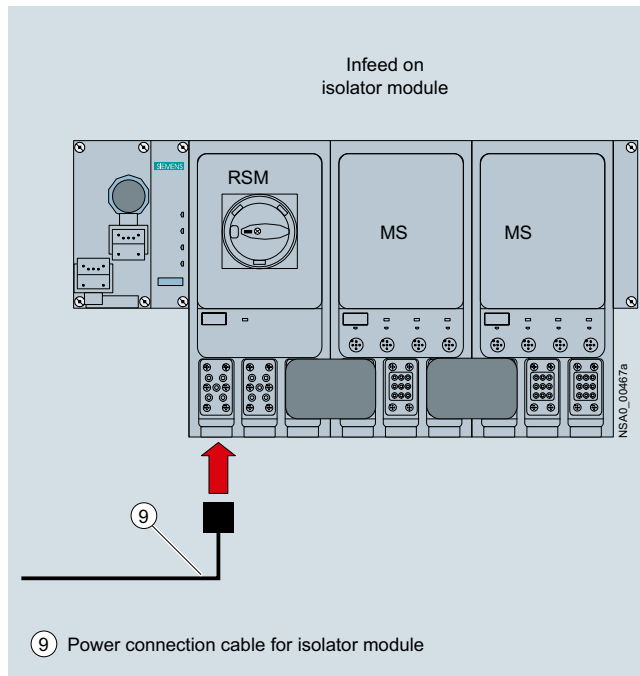
Infeed on the RSM isolator module

Legend:
1 Power feeder plug (see page 9/274)
2 Power connection plug (see page 9/274)
3 Power jumper plug (see page 9/274)
4 Motor connection plug (see page 9/274)
5 Motor plug (see page 9/274)
6 Motor plug with EMC suppressor circuit (see page 9/274)
7 Power loop-through plug (see page 9/274)
8 Power connection cable (see page 9/274)
9 Power connection cable for isolator modules (see page 9/274)
10 Motor cable (see page 9/275)



Infeed on ET 200pro motor starter

8 Power connection cable
10 Motor cable
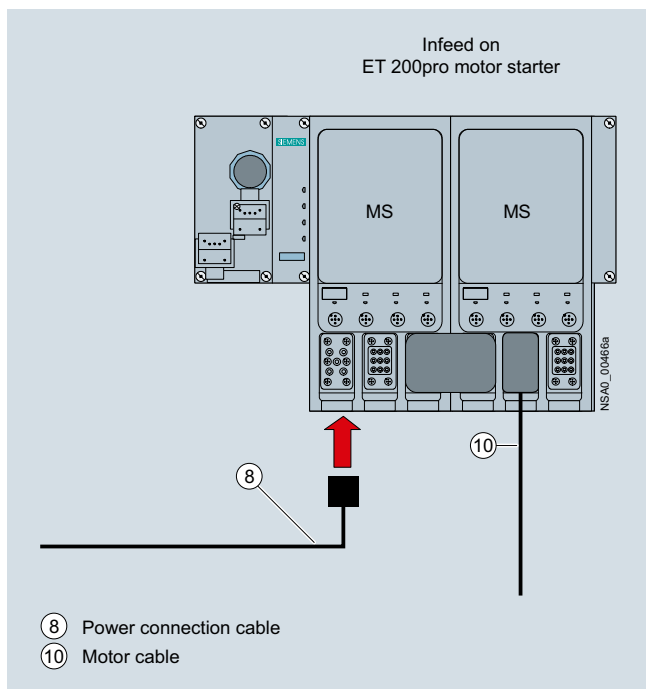
Infeed on the ET 200pro motor starter

### Power bus

The power supply to the field devices (ET 200pro motor starters, M200D motor starters) is provided via the power bus, in which the power T terminal connectors or power double-T terminal connectors are connected by power bus cables.

### Feeders

From the terminal connectors, spur lines with Han Q4/2 plugs lead to the field devices, from which the motors are supplied with power via motor connection cables.

### Interruption-free thanks to power terminal connectors

In finger-safe connection technology the power T terminal connectors and power double-T terminal connectors connect the components of a feeder to the power bus. They ensure interruption-free operation, i.e. the power bus is not interrupted when the components are plugged in.



- ⑪ Power bus line (sold by the meter)
- ⑫ Power T terminal connector
- ⑬ Power double-T terminal connector
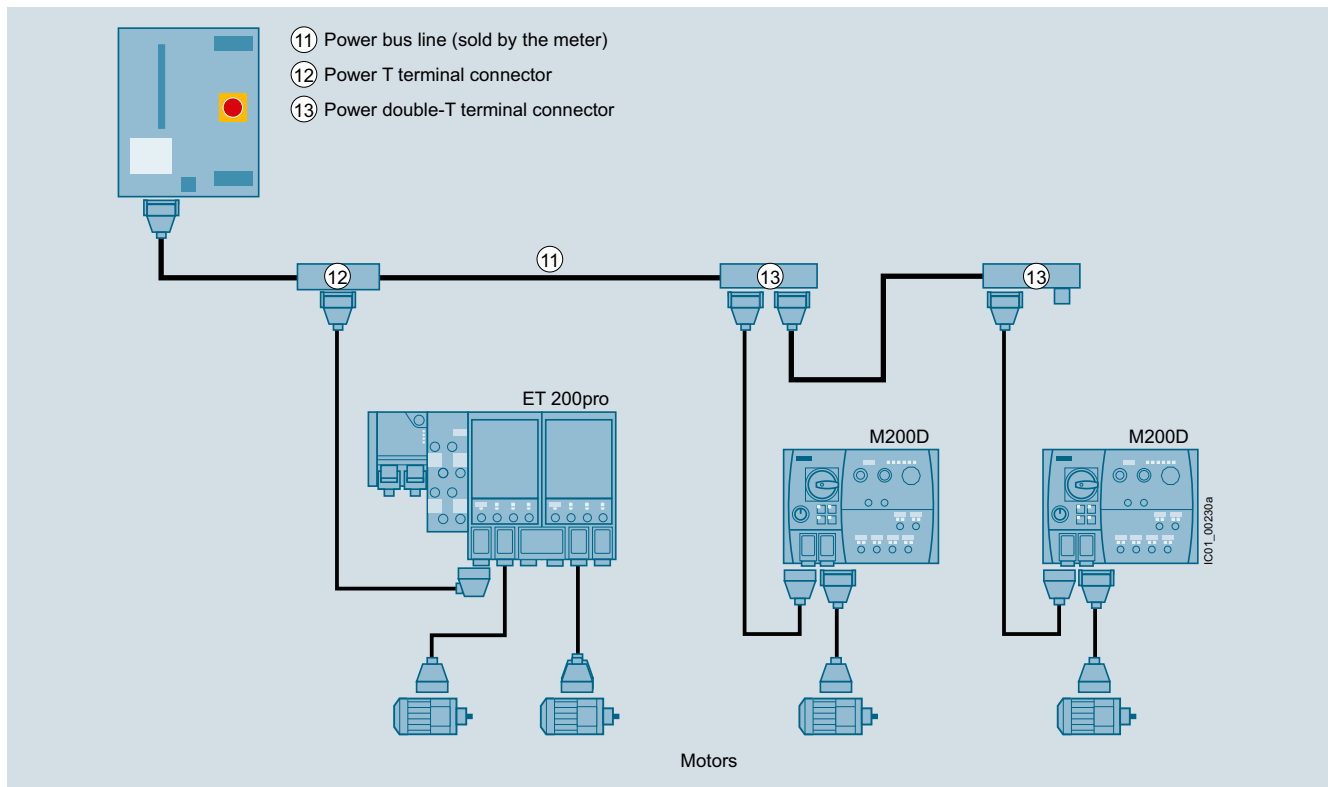
Power supply to the motors via the power bus with power T and double-T terminal connectors linked by power bus cables, spur lines to the field devices (motor starters), and power loop-through connections to the motors via motor connection cables

### Motor control via PROFIBUS

The interface modules (IM) for PROFIBUS can be combined with three different connection modules for connecting PROFIBUS DP and the power supply:

- Direct connection with cable glands
- ECOFAST connection with hybrid fieldbus cables (with two copper cores for data transfer with PROFIBUS DP, and four copper cores for the power supply) and ECOFAST connectors (HanBrid)[1]
- M12, 7/8" connection
  - with M12 connecting cable and M12 plugs for data transmission with PROFIBUS DP
  - with 7/8" connecting cable and 7/8" plugs for the power supply[2]

For the connection modules with the associated accessories, see Accessories ET 200pro interface modules IM 154-1 and IM 154-2, page 9/230.

[1] Hybrid fieldbus connections with HanBrid sockets designed as cabinet bushings transmit data and energy from the control cabinet (IP20) to the field (IP65). They are the interface for jointly routing PROFIBUS DP and the auxiliary voltages into the hybrid fieldbus cable.

[2] On the control cabinet bushings with two M12 sockets for the PROFIBUS M12 connecting cables, the 24 V supply of the motor starters is implemented via separate 7/8" connecting cables.

### Motor control via PROFINET

For the connection modules with the associated accessories, see "Accessories ET 200pro interface module IM 154-4, page 9/232.

# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

**ET 200pro Safety motor starters Solutions local/PROFIsafe   > Accessories for ET 200pro motor starters**

## ■ Selection and ordering data

| Version | Article No. | |
|---|---|---|
| **Incoming power supply** | | |
| ① **Power feeder plugs**<br>Connector set for energy supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for HAN Q4/2, incl. gland | | |
| • 5 male contacts, 2.5 mm$^2$ | **3RK1911-2BS60** | |
| • 5 male contacts, 4 mm$^2$ | **3RK1911-2BS20** | |
| • 5 male contacts, 6 mm$^2$ | **3RK1911-2BS40** | |
| ② **Power connection plugs**<br>Connector set for energy supply for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, female insert for HAN Q4/2, incl. gland | | |
| • 5 female contacts, 2.5 mm$^2$ | **3RK1911-2BE50** | |
| • 5 female contacts, 4 mm$^2$ | **3RK1911-2BE10** | |
| • 5 female contacts, 6 mm$^2$ | **3RK1911-2BE30** | |
| ⑧ **Power connection cables, assembled at one end**<br>Power connection cable for ET 200pro motor starters, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm$^2$ | | |
| • Length 1.5 m | **3RK1911-0DB13** | |
| • Length 5.0 m | **3RK1911-0DB33** | |
| ⑨ **Power connection cables for isolator module, assembled at one end**<br>Power connection cable for ET 200pro isolator modules, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm$^2$ | | |
| • Length 1.5 m | **3RK1911-0DF13** | |
| • Length 5.0 m | **3RK1911-0DF33** | |
| **Power loop-through on the field device** | | |
| ③ **Power jumper plugs** | **3RK1922-2BQ00** | |
| ⑦ **Power loop-through plugs**<br>Connector set for power loop-through for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, male insert for HAN Q4/2, incl. gland | | |
| • 4 male contacts, 2.5 mm$^2$ | **3RK1911-2BF50** | |
| • 4 male contacts, 4 mm$^2$ | **3RK1911-2BF10** | |
| **Motor cables** | | |
| ④ **Motor connection plugs**<br>Connector set for motor cable for connection to ET 200pro motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q8/0, incl. gland | | |
| • 8 male contacts, 1.5 mm$^2$ | **3RK1902-0CE00** | |
| • 6 male contacts, 2.5 mm$^2$ | **3RK1902-0CC00** | |
| ⑤ **Motor plugs**<br>Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e, incl. star jumper, incl. gland | | |
| • 7 female contacts, 1.5 mm$^2$ | **3RK1911-2BM21** | |
| • 7 female contacts, 2.5 mm$^2$ | **3RK1911-2BM22** | |
| ⑥ **Motor plugs with EMC suppressor circuit**<br>Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e with EMC suppressor circuit, incl. star jumper, incl. gland | | |
| • 7 female contacts, 1.5 mm$^2$ | **3RK1911-2BL21** | |
| • 7 female contacts, 2.5 mm$^2$ | **3RK1911-2BL22** | |

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**ET 200pro Safety motor starters Solutions local/PROFIsafe   > Accessories for ET 200pro motor starters**

| Version | Article No. | |
|---|---|---|
| **Motor cables** (continued) | | |
| ⑩ **Motor cables, assembled at one end** | | |
| Open at one end, HAN Q8, angular, length 5 m | | |
| • Motor cable for motor without brake for ET 200pro, 4 x 1.5 mm$^2$ | **3RK1911-0EB31** | |
| • Motor cable for motor with brake for ET 200pro, 6 x 1.5 mm$^2$ | **3RK1911-0ED31** | |
| • Motor cables for motor without brake with thermistor for ET 200pro, 6 x 1.5 mm$^2$ | **3RK1911-0EF31** | |
| • Motor cables for motor with brake with thermistor for ET 200pro, 8 x 1.5 mm$^2$ | **3RK1911-0EG31** | |
| **Power bus** | | |
| ⑫ **Power T terminal connectors** | | |
| For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with pre-assembled bus segments | | |
| • 2.5 mm$^2$ / 4 mm$^2$ | **3RK1911-2BF01** | |
| • 4 mm$^2$ / 6 mm$^2$ | **3RK1911-2BF02** | |
| ⑬ **Power double-T terminal connectors** | | |
| For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with pre-assembled bus segments, connection of two motor starters possible | | |
| • 4 mm$^2$ / 6 mm$^2$ | **3RK1911-2BG02** | |
| **Sealing set (comprising 2 seals)** | | |
| For power T/power double-T terminal connectors | | |
| • For power cables with Ø 10 ... 13 mm | **3RK1911-5BA00** | |
| • For power cables with Ø 13 ... 16 mm | **3RK1911-5BA10** | |
| • For power cables with Ø 16 ... 19 mm | **3RK1911-5BA20** | |
| • For power cables with Ø 19 ... 22 mm | **3RK1911-5BA30** | |
| • Blanking plugs | **3RK1911-5BA50** | |
| **Further accessories for power connections** | | |
| **Crimping tool** | **3RK1902-0CW00** | |
| For pins/sockets, 4 mm$^2$ and 6 mm$^2$ | | |
| **Dismantling tools** | | |
| • For male and female contacts for 9-pole HAN Q4/2 inserts | **3RK1902-0AB00** | |
| • For male and female contacts for 9-pole HAN Q8 inserts | **3RK1902-0AJ00** | |
| **Sealing caps** | | |
| For 9-pole power socket connectors | | |
| • 1 unit per pack | **3RK1902-0CK00** | |
| • 10 units per pack | **3RK1902-0CJ00** | |

3RK1902-0CW00

3RK1902-0CK00

For more connection technology products,
see "Siemens Solution Partners Automation"
under the "Distributed Field Installation System" technology:
www.siemens.com/partnerfinder.

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| Version | Article No. | |
|---|---|---|
| **Further accessories** | | |
| **Module racks, wide[1)]** • Length 500 mm • Length 1 000 mm • Length 2 000 mm | 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 | |
| **Module racks, wide, compact[1)]** • Length 500 mm • Length 1 000 mm • Length 2 000 mm | 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0 | |
| **Backplane bus modules 110 mm[2)]** | 3RK1922-2BA00 | |
| **Backplane bus module for Safety local isolator modules** | 3RK1922-2BA01 | |
| **Hand-held devices** For ET 200pro motor starters (or for ET 200S High Feature and M200D motor starters) for local operation. The motor-starter-specific serial interface cables must be ordered separately. The RS 232 interface cable 3RK1922-2BP00 is used for the MS ET 200pro. | 3RK1922-3BA00 | |
| **RS 232 interface cable** Serial data connection between ET 200pro (or M200D) motor starters and the RS 232 interface of a PC/PG/laptop (with the Motor Starter ES software) or the handheld device 3RK1922-3BA00. | 3RK1922-2BP00 | |
| **USB interface cables, 2.5 m** Serial data connection between ET 200pro (or M200D) motor starters and the USB interface of a PC/PG/laptop (with the Motor Starter ES software). | 6SL3555-0PA00-2AA0 | |
| **M12 sealing caps** For sealing unused M12 input or output sockets (one set contains ten sealing caps). | 3RK1901-1KA00 | |
| **Motor control with PROFIBUS** | | |
| See page 9/227 | | |
| **Motor control with PROFINET** | | |
| See page 9/231 | | |
| **SIMATIC ET 200pro motor starters manual** | | |
| See https://support.industry.siemens.com/cs/ww/en/view/22332388 | | |

3RK1922-3BA00

3RK1901-1KA00

[1)] The wide module rack can accommodate all ET 200pro motor starters and any optional modules (isolator module, Safety local isolator module and 400 V disconnecting module).

[2)] The backplane bus module is a prerequisite for operation of the ET 200pro motor starter and the optional module.

## Overview



SIMATIC ET 200pro FC-2 frequency converter

The SIMATIC ET 200pro FC-2 frequency converter has the design of a SIMATIC ET 200pro module. It supplements the SIMATIC ET 200pro system range with distributed, speed-controlled drives. It is suitable for the open-loop and closed-loop control of induction motors in a wide range of industrial applications. It is predestined for conveyor technology applications using drives networked via PROFIBUS and PROFINET, in particular in distributed designs without control cabinet with high degree of protection (IP65), when combining several drives. The modular, service-friendly concept is ideally suited to manufacturing processes with high plant standstill costs.

### Reasons for using distributed drive systems

• Modular drive solutions – therefore standardized mechatronic elements that can be individually tested
• A control cabinet is not required, resulting in a smaller space requirement and lower cooling requirements
• Long motor cables between converter and motor are not required
  - Less power losses
  - Reduced noise radiation
  - Reduced costs for shielded cables
  - No additional filters

• Distributed configurations offer considerable benefits for conveyor systems with their extensive coverage (e.g. in the automotive and logistics industries)

### Siemens family of distributed drives

Siemens offers an innovative portfolio of frequency converters to optimally implement distributed drive solutions. The strengths of the individual members of the drive family permit simple adaptation to the widest range of application demands:

• Identical connection systems
• Standard commissioning and engineering tools for the family of distributed drives:
  - SINAMICS G110M frequency inverters
  - SINAMICS G110D frequency inverters
  - SINAMICS G120D frequency inverters
  - SIMATIC ET 200pro FC-2 frequency converters
  - SIRIUS M200D motor starters

### Safety Integrated

The distributed SIMATIC ET 200pro FC-2 frequency converters are already equipped with the integrated STO (Safe Torque Off) safety function, certified in accordance with IEC 61508 SIL 2 as well as EN ISO 13849-1 PL d and Category 3. This can be activated by means of PROFIsafe.

### STARTER commissioning tool

The STARTER commissioning tool (V4.4 and higher) plus the corresponding SINAMICS Support Package (SSP) supports the commissioning and maintenance of SIMATIC ET 200pro FC-2 frequency converters.

The operator guidance combined with comprehensive, user-friendly functions for the relevant drive solution allow you to commission the device quickly and easily.

### STEP 7 classic engineering framework (V5.5 and higher)

Hardware Support Packages (HSP) are available for integrating SIMATIC ET 200pro FC-2 in STEP 7 classic.

### TIA Portal engineering framework (V13 SP1 and higher)

TIA Portal is a powerful engineering framework providing full access to the whole digitized automation.

Hardware Support Packages (HSP) are available for integrating SIMATIC ET 200pro FC-2 in TIA Portal.

## Technical specifications

| Distributed frequency converter | SIMATIC ET 200pro FC-2 |
|---|---|
| **Selection features** | |
| **Integrated safety functions**<br>**acc. to IEC 61508 SIL 2 and EN ISO 13849-1 PL d and Category 3** | • Safe Torque Off (STO)<br>• Control of the integrated safety function via the Safety Local isolator module F-RSM or via F-Switch PROFIsafe |
| **Electrical data** | |
| **Line voltage** | 380 ... 480 V 3 AC ±10 % |
| **Power**<br>• With an ambient temperature of 0 ... 55° C<br>• With an ambient temperature of 0 ... 45° C | <br>1.1 kW<br>1.5 kW |
| **Rated input current / output current**<br>• With an ambient temperature of 0 ... 55° C<br>• With an ambient temperature of 0 ... 45° C | <br>2 A/3.5 A<br>2.5 A/3.9 A |

# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

## SIMATIC ET 200pro FC-2 frequency converter

### Technical specifications (continued)

| Distributed frequency converter | SIMATIC ET 200pro FC-2 | | | |
|---|---|---|---|---|
| Line frequency | 47 ... 63 Hz | | | |
| Overload capability | • Overload current 1.5 x rated output current (i.e. 150 % overload) for 60 s, cycle time 300 s<br>• Overload current 2 x rated output current (i.e. 200 % overload) for 3 s, cycle time 300 s | | | |
| Output frequency | 0 ... 550 Hz | | | |
| Pulse frequency | 4 kHz (standard)<br>4 ... 16 kHz (in 2 kHz increments) | | | |
| Standard SCCR (**S**hort **C**ircuit **C**urrent **R**ating) | 10 kA | | | |
| Skipped frequency range | 1, programmable | | | |
| Converter efficiency | 95 ... 97 % | | | |
| Interfaces | • Connection to PROFIBUS and PROFINET over the SIMATIC ET 200pro backplane bus<br>• Mini USB interface for commissioning via PC (as from STARTER V4.4 plus SSP)<br>• Optical interface for commissioning via the IOP Handheld<br>• Slot for an optional memory card (SD) to upload or download parameter settings<br>• PTC, bimetal, KTY84, Pt1000 interface for motor temperature monitoring | | | |
| Functions | | | | |
| Open-loop/closed-loop control techniques | • V/f control – linear ($M \sim n$) with/without flux current control (FCC), quadratic ($M \sim n^2$) or parameterizable<br>• Vector control – sensorless<br>• Closed-loop torque control | | | |
| Operating functions | • Jogging<br>• BICO technology<br>• Automatic restart following interruptions in operation due to a power failure<br>• Smooth connection of converter to rotating motor | | | |
| Braking functions | • Integrated regenerative feedback functionality<br>• Control of an electromagnetic holding brake | | | |
| | Integrated brake control supplies DC power supply to the brake | | | |
| | Line voltage | 380 V AC | 400 V AC | 440 V AC | 480 V AC |
| | Rectified brake voltage | 171 V DC | 180 V DC | 198 V DC | 216 V DC |
| | Recommended brake coil voltage for Siemens motors | 170 ... 200 V DC | 170 ... 200 V DC<br>184 ... 218 V DC | 184 ... 218 V DC | 184 ... 218 V DC |
| | Disconnection on the DC side permits "fast" braking. | | | |
| Protective functions | • Undervoltage<br>• Overvoltage<br>• Ground fault<br>• Short-circuit<br>• Stall protection<br>• Thermal motor protection ($I^2t$ or sensor)<br>• Converter overtemperature<br>• Motor blocking protection<br>• Phase failure detection | | | |
| Connectable motors | • Low-voltage induction motors<br>• Motor cable lengths: max. 15 m (shielded) | | | |
| Mechanical data | | | | |
| Degree of protection | IP65 | | | |
| Operating temperature | 0 ... +55 °C (32 ... +131 °F) | | | |
| Mounting position | Vertical wall mounting (vertical alignment of the cooling fins) | | | |
| Dimensions (W × H × D) | 155 mm × 246 mm × 248 mm | | | |
| Weight, approx. | 4 kg | | | |
| Standards | | | | |
| Certificates of suitability | UL508C, cUL, CE, Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU | | | |

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## Ordering data

| | Article No. |
|---|---|
| **SIMATIC ET 200pro FC-2 frequency converter** | **6SL3514-1KE13-5AE0** |
| Wth integrated safety function STO (Safe Torque Off) | |
| **Backplane bus module** | **6SL3260-2TA00-0AA0** |
| For mounting the frequency converter (absolutely essential for operation of the converter) | |
| **Accessories** | |
| **IOP Handheld** | **6SL3255-0AA00-4HA0** |
| For use with SINAMICS G120, SINAMICS G120C, SINAMICS G120P, SINAMICS G110D, SINAMICS G120D, SINAMICS G110M, SINAMICS S110 and SIMATIC ET 200pro FC-2 | |
| Included in the scope of delivery: | |
| • Intelligent Operator Panel IOP | |
| • Handheld housing | |
| • Rechargeable batteries (4 × AA) | |
| • Charging unit (international) | |
| • RS232 connecting cable (3 m long, for use with SINAMICS G120, SINAMICS G120C, SINAMICS G120P and SINAMICS S110) | |
| • USB cable (1 m long) | |
| **RS232 interface cable** | **3RK1922-2BP00** |
| With optical interface to connect the SINAMICS G110D, SINAMICS G120D, SINAMICS G110M or SIMATIC ET 200pro FC-2 converters to the IOP Handheld (2.5 m long) | |
| **SINAMICS Memory Card (SD card)** | **6SL3054-4AG00-2AA0** |
| **STARTER commissioning tool** [1] on DVD-ROM | **6SL3072-0AA00-0AG0** |

| | Article No. |
|---|---|
| **PC inverter connection kit 2** | **6SL3255-0AA00-2CA0** |
| Mini USB interface cable for communication with a PC, 3 m long | |
| **Connecting cable pre-assembled at one end** Power supply cable, open at one end, for HAN Q4/2, angled, 4 × 4 mm$^2$ | |
| • Length 1.5 m | **3RK1911-0DB13** |
| • Length 5 m | **3RK1911-0DB33** |
| **Connector set for the power supply** HAN Q4/2 | |
| • 2.5 mm$^2$ | **3RK1911-2BE50** |
| • 4 mm$^2$ | **3RK1911-2BE10** |
| • 6 mm$^2$ | **3RK1911-2BE30** |
| **Motor cables pre-assembled at one end** | (HTG: supplied by Harting) (ZKT: supplied by KnorrTec) |
| For motors with brake and temperature sensor with HAN Q8 connector, shielded | |
| Cross-section | 4 × 1.5 mm$^2$ 2 × (2 × 0.75 mm$^2$) |
| • Length 1.5 m | **HTG: 61 88 201 0288** **ZKT: 70020501000150** |
| • Length 3 m | **HTG: 61 88 201 0289** **ZKT: 70020501000300** |
| • Length 5 m | **HTG: 61 88 201 0290** **ZKT: 70020501000500** |
| • Length 10 m | **HTG: 61 88 201 0299** **ZKT: 70020501001000** |
| **Connector set for motor cable** HAN Q8, shielded | **HTG: 61 83 401 0131** **ZKT: 10032001** |
| **Power jumper connector** | **3RK1922-2BQ00** |

[1] The STARTER commissioning tool is also available on the Internet at www.siemens.com/starter

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## ET 200pro

**ET 200pro software   > Motor Starter ES**

### ■ Overview
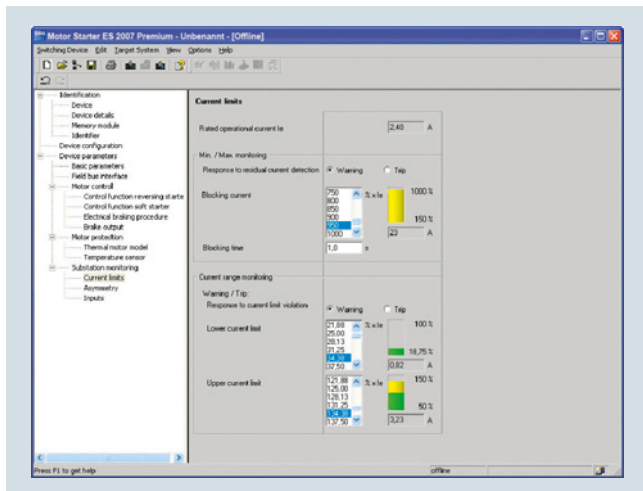


Motor Starter ES for parameterization, monitoring, diagnostics and testing of motor starters

| More information |
|---|
| Home page see www.siemens.com/sirius |
| Industry Mall see https://mall.industry.siemens.com/mall/en/de/Catalog/Products/10026777?tree=CatalogTree |
| Technical specifications and system requirements, see https://support.industry.siemens.com/cs/ww/en/ps/16713/td |

Motor Starter ES is used for the start-up, parameterization, diagnostics, documentation and preventive maintenance of SIMATIC ET 200S, ET 200pro, ECOFAST and M200D motor starters.

Interfacing is performed

• Through the local interface on the device
• With PROFIBUS DP-V1-capable motor starters from any point in PROFIBUS or in PROFINET
  (applies to ET 200S DP V1/ET 200pro/ECOFAST/M200D)
• With PROFINET-capable motor starters from any point in PROFINET or in PROFIBUS
  (applies to ET 200S DP V1/ ET 200pro/M200D)

Using Motor Starter ES, the communication-capable motor starters are easily parameterized during start-up, monitored during normal operation and successfully diagnosed for service purposes. Preventive maintenance is supported by a function for reading out diverse statistical data (e.g. operating hours, operating cycles, cut-off currents, etc.). The user is supported during these procedures with comprehensive Help functions and plain text displays.

Motor Starter ES can either be used as a stand-alone program or it can be integrated into STEP 7 via an Object Manager.

### Efficient engineering with three program versions

The Motor Starter ES software program is available in three versions which differ in their user-friendliness, scope of functions and price.

| Motor Starter ES | Basic | Standard | Premium |
|---|---|---|---|
| ET 200S High Feature PROFIBUS IM | ✓ | ✓ | ✓ |
| ET 200S High Feature PROFINET IM | ✓ | ✓ | ✓ |
| ECOFAST AS-Interface High Feature | ✓ | ✓ | -- |
| ECOFAST PROFIBUS | ✓ | ✓ | ✓ |
| ET 200pro PROFIBUS IM | ✓ | ✓ | ✓ |
| ET 200pro PROFINET IM | ✓ | ✓ | ✓ |
| M200D AS-Interface Standard | ✓ | ✓ | (✓) |
| M200D PROFIBUS | ✓ | ✓ | ✓ |
| M200D PROFINET | ✓ | ✓ | ✓ |

✓ Function available, (✓) Available with restricted functionality

-- Function not available

| Motor Starter ES | Basic | Standard | Premium |
|---|---|---|---|
| Access through the local interface on the device | ✓ | ✓ | ✓ |
| Parameter assignment | ✓ | ✓ | ✓ |
| Operating | ✓ | ✓ | ✓ |
| Diagnostics | -- | ✓ | ✓ |
| Creation of typicals | -- | ✓ | ✓ |
| Comparison functions | -- | ✓ | ✓ |
| Standard-compliant printout according to EN ISO 7200 | -- | ✓ | ✓ |
| Service data (maximum pointers, statistical data) | -- | ✓ | ✓ |
| Access through PROFIBUS | -- | -- | ✓ |
| Access through PROFINET | -- | -- | ✓ |
| S7 routing | -- | -- | ✓ |
| Teleservice through MPI | -- | -- | ✓ |
| STEP 7 Object Manager | -- | -- | ✓ |
| Trace function | -- | ✓ | ✓ |

✓ Function available

-- Function not available

### Additional functions

Standard-compliant printouts

The software tool greatly simplifies machine documentation. It enables parameterization printouts according to EN ISO 7200. The elements to be printed are easy to select and group as required.

Easy creation of typicals

Typicals can be created for devices and applications with only minimum differences in their parameters. These typicals contain all the parameters which are needed for parameterization. In addition it is possible to specify which of these parameters are fixed and which can be adapted, e.g. by the startup engineer.

Teleservice through MPI

The Motor Starter ES Premium version supports the use of MPI Teleservice (comprising the Teleservice software and various Teleservice adapters) for remote diagnostics of the devices. This facilitates diagnostics and maintenance, as well as shortening response times for service purposes.

## Benefits

- Fast, error-free configuration and startup of motor starters even without extensive previous knowledge
- Transparent setting of the device functions and their parameters – online and offline
- Effective diagnostics functions on the soft starter and display of the most important measured values

- Trace function (oscilloscope function) for recording measured values and events (included in the Motor Starter ES Standard and Premium software version for M200D PROFIBUS and PROFINET).

## Selection and ordering data

### Parameterization, start-up and diagnostics software Motor Starter ES 2007

For ECOFAST Motor Starter, SIMATIC ET 200S High Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-Interface Standard, PROFIBUS, PROFINET)

- Delivered without PC cable

| Version | Article No. |
|---|---|
| **Motor Starter ES 2007 Basic** | |
| **Floating license for one user** | |
| Engineering software in limited-function version for diagnostics purposes, software and documentation on CD, 3 languages (English/German/French), communication via system interface | |
| • License key on USB flash drive, Class A, including CD | **3ZS1310-4CC10-0YA5** |
| • License key download, Class A, without CD | **3ZS1310-4CE10-0YB5** |
| 3ZS1310-4CC10-0YA5 | |
| **Motor Starter ES 2007 Standard** | |
| **Floating license for one user** | |
| Engineering software, Software and documentation on CD, 3 languages (English/German/French), communication via system interface | |
| • License key on USB flash drive, Class A, including CD | **3ZS1310-5CC10-0YA5** |
| • License key download, Class A, without CD | **3ZS1310-5CE10-0YB5** |
| **Powerpack for Motor Starter ES 2007 Basic** | **3ZS1310-5CC10-0YD5** |
| Floating license for one user, engineering software, license key on USB flash drive, Class A 3 languages (English/German/French), communication via system interface | |
| 3ZS1310-5CC10-0YA5 | |
| **Software Update Service** | **3ZS1310-5CC10-0YL5** |
| For 1 year with automatic extension, requires the current software version, engineering software, Software and documentation on CD, communication via system interface | |

Notes:

Please order PC cable separately; .

For a description of the software versions, .

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## ET 200pro

**ET 200pro software   > Motor Starter ES**

| | Version | Article No. | |
|---|---|---|---|
| **Motor Starter ES 2007 Premium** | | | |
| | **Floating license for one user** | | |
| | Engineering software, Software and documentation on CD, 3 languages (English/German/French), communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager | | |
| | • License key on USB flash drive, Class A, including CD | **3ZS1310-6CC10-0YA5** | |
| | • License key download, Class A, without CD | **3ZS1310-6CE10-0YB5** | |
| | **Powerpack for Motor Starter ES 2007 Standard** | **3ZS1310-6CC10-0YD5** | |
| | Floating license for one user, engineering software, license key on USB flash drive, Class A 3 languages (English/German/French), communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager | | |
| | **Software Update Service** | **3ZS1310-6CC10-0YL5** | |
| | For 1 year with automatic extension, requires the current software version, engineering software, Software and documentation on CD, communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager | | |

3ZS1310-6CC10-0YA5

Notes:

Please order PC cable separately; see Accessories.

For a description of the software versions, .

## ■ Accessories

| | Version | Article No. | |
|---|---|---|---|
| **Optional accessories** | | | |
| | **RS 232 interface cable** | **3RK1922-2BP00** | |
| | Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS | | |
| | **USB interface cable** | **6SL3555-0PA00-2AA0** | |
| | Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS | | |
| | **USB/serial adapter** | **3UF7946-0AA00-0** | |
| | For connecting an RS 232 PC cable to the USB interface of a PC, recommended for use in conjunction with ET 200S/ECOFAST/ET 200pro motor starters | | |

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## Overview

An interface module (EtherNet/IP adapter) is provided for operating the ET 200pro on EtherNet/IP. It can be used together with system and IO components of the ET 200pro distributed I/O system.

## Technical specifications

| Article number | ZNX:EIP200PRO |
|---|---|
| | ETHERNET/IP HEAD ASSEMBLY FOR ET 200PRO |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| **Input current** | |
| from supply voltage 1L+, max. | 400 mA |
| **Power loss** | |
| Power loss, typ. | 6 W |
| **Address area** | |
| **Addressing volume** | |
| • Inputs | 255 byte |
| • Outputs | 255 byte |
| **Interfaces** | |
| **PROFINET IO** | |
| • automatic detection of transmission rate | Yes |
| • Transmission rate, max. | 100 Mbit/s |
| • Services | See manual |
| **Diagnostics indication LED** | |
| • Bus fault BF (red) | Yes |
| • Group error SF (red) | Yes |
| • Monitoring 24 V voltage supply ON (green) | Yes |
| • Load voltage monitoring 24 V DC (green) | Yes |
| **Potential separation** | |
| between backplane bus and electronics | Yes |
| between supply voltage and electronics | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |

| Article number | ZNX:EIP200PRO |
|---|---|
| | ETHERNET/IP HEAD ASSEMBLY FOR ET 200PRO |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP66 | Yes |
| • IP67 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Dimensions** | |
| Width | 135 mm |
| Height | 130 mm |
| Depth | 59.3 mm |
| **Weights** | |
| Weight, approx. | 490 g |

| Article number | ZNX:EIP200PROCM1 |
|---|---|
| | ET 200PRO, CM IM DP M12 / 7/8" |
| **Input current** | |
| from supply voltage 1L+, max. | No current input, only infeed current, max. 8 A |
| from load voltage 2L+ (without load), max. | No current input, only infeed current, max. 8 A |
| **Weights** | |
| Weight, approx. | 540 g |

## Ordering data

| | Article No. |
|---|---|
| **SIMATIC ET 200pro interface module for EtherNet/IP** | ZNX:EIP200PRO |
| Including: | |
| • Bus termination module for ET 200pro | |
| • Companion disk with the manuals and the configuration tool | |
| **Connecting module for EtherNet/IP** | ZNX:EIP200PROCM1 |
| For connecting the interface module to EtherNet/IP | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200AL**

### ■ Overview
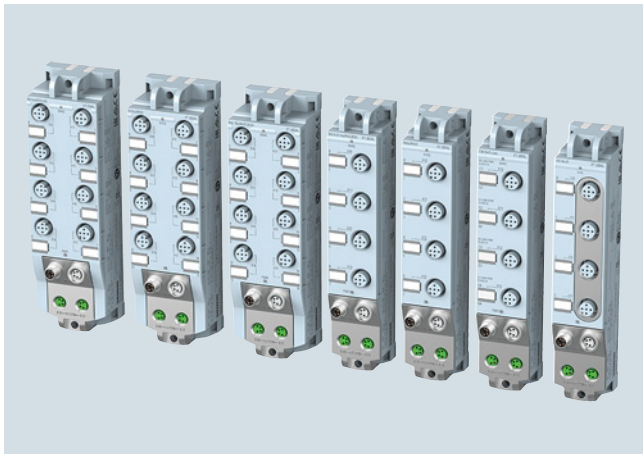


- Modular, distributed I/O system with compact I/O modules in IP65/67
- Especially easy and flexible installation, even in extremely confined spaces
- Easy wiring
- Easy commissioning
- SIMATIC ET 200AL consists of the following components:
  - Interface module for communication with IO controllers on PROFINET
  - Interface module for communication with all masters on the PROFIBUS
  - BusAdapters for connection to the ET 200SP I/O system
  - Various I/O modules, 30 mm and 45 mm-wide
- Maximum configuration of an ET 200AL station:
  - Up to 32 I/O modules with PROFINET or PROFIBUS in any combination
  - Up to 16 I/O modules at the ET 200SP in any combination
- Connection of the modules via an internal backplane bus established using bus cables (ET connection)

*Highlights*
- Compact dimensions
- Low weight
- Safety-oriented collective shutdown of the outputs (available soon)
- High degree of user-friendliness due to the following design features:
  - Flexible mounting in all positions possible due to screw fastening through the front or side
  - Direct installation on even surfaces or aluminum DIN rails
  - Labels for the identification of channels, modules and slots
  - Integrated cable tie opening
  - Clear and CAx-compliant interface designations
  - Uniform coloring of the system interfaces and system cables
  - 1:1 assignment of channel status LED, I/O socket and label
  - Pin assignment on the side
- I/O module portfolio comprising digital and analog modules as well as IO-Link communication module
- Ambient temperature range from -25 °C to +55 °C
- Extensive system functions
  - All interface and I/O modules support firmware update
  - Configuration control (option handling) via user software
  - System supports PROFIenergy for power saving purposes
  - Consistent use of identification and maintenance data IM0 to IM3/4 (electronic rating plate) for fast electronic and unambiguous identification of individual modules (Article No., serial number, etc.)

## Overview



- Interface module for linking the ET 200AL to PROFIBUS
- As DP-V1 slave it handles the data exchange with the PROFIBUS master in the PLC
- Max. 32 I/O modules can be connected
- Max. data volume of 244 bytes, for input and output data respectively
- Automatic detection of baud rate 9.6 kBd ... 12 MBd
- PROFIBUS addresses 1 ... 99; can be set by means of rotary switch
- Identification and maintenance data IM0 ... IM3
- Firmware update
- Configuration management (option handling)

## Technical specifications

| Article number | **6ES7157-1AA00-0AB0** |
|---|---|
| | ET 200AL, IM 157-1 DP |
| **General information** | |
| Product type designation | IM 157-1 DP |
| HW functional status | E01 |
| Firmware version | V1.0.x |
| Vendor identification (VendorID) | 81A9H |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption (rated value) | 50 mA |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Power loss** | |
| Power loss, typ. | 1.7 W |
| **Address area** | |
| **Address space per station** | |
| • Address space per station, max. | 244 byte |
| **Interfaces** | |
| Number of PROFIBUS interfaces | 1 |

| Article number | **6ES7157-1AA00-0AB0** |
|---|---|
| | ET 200AL, IM 157-1 DP |
| **1. Interface** | |
| Interface type | PROFIBUS DP |
| **Interface types** | |
| • RS 485 | Yes |
| • M12 port | Yes; 2x M12 b-coded |
| **Functionality** | |
| • PROFIBUS DP slave | Yes |
| **Interface types** | |
| **RS 485** | |
| • Transmission rate, max. | 12 Mbit/s |
| **PROFIBUS** | |
| **Services** | |
| - SYNC capability | Yes |
| - FREEZE capability | Yes |
| - Direct data exchange (slave-to-slave communication) | Yes |
| - DPV0 | Yes |
| - DPV1 | Yes |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Connection display DP | Yes; Green LED |
| **Potential separation** | |
| between the load voltages | Yes |
| between PROFIBUS DP and all other circuit components | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**Interface modules   > IM 157-1 DP**

## ■ Technical specifications (continued)

| Article number | 6ES7157-1AA00-0AB0 |
|---|---|
| | ET 200AL, IM 157-1 DP |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP67 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |

| Article number | 6ES7157-1AA00-0AB0 |
|---|---|
| | ET 200AL, IM 157-1 DP |
| **Connection method** | |
| Power supply | M8, 4-pole |
| **ET-Connection** | |
| • ET-Connection | M8, 4-pin, shielded |
| **Dimensions** | |
| Width | 45 mm |
| Height | 159 mm |
| Depth | 46 mm |
| **Weights** | |
| Weight, approx. | 211 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 157-1 DP interface module** | **6ES7157-1AA00-0AB0** | **M8 power cable** | |
| For connecting ET 200AL to PROFIBUS | | 4-pin | |
| **Accessories** | | Pre-assembled at both ends, M8 connector and M8 socket | |
| **Bus cable for backplane bus (ET connection)** | | 0.19 m | **6ES7194-2LH02-1AA0** |
| 4-pin, shielded | | 0.3 m | **6ES7194-2LH03-1AA0** |
| Pre-assembled at both ends, 2 M8 connectors | | 1 m | **6ES7194-2LH10-1AA0** |
| 0.19 m | **6ES7194-2LH02-0AA0** | 2 m | **6ES7194-2LH20-1AA0** |
| 0.3 m | **6ES7194-2LH03-0AA0** | 5 m | **6ES7194-2LH50-1AA0** |
| 1 m | **6ES7194-2LH10-0AA0** | 10 m | **6ES7194-2LN10-1AA0** |
| 2 m | **6ES7194-2LH20-0AA0** | 15 m | **6ES7194-2LN15-1AA0** |
| 5 m | **6ES7194-2LH50-0AA0** | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 10 m | **6ES7194-2LN10-0AA0** | | |
| 15 m | **6ES7194-2LN15-0AA0** | 0.3 m | **6ES7194-2LH03-1AB0** |
| Pre-assembled at both ends, 2 M8 connectors, angled | | 1 m | **6ES7194-2LH10-1AB0** |
| | | 2 m | **6ES7194-2LH20-1AB0** |
| 0.3 m | **6ES7194-2LH03-0AB0** | 5 m | **6ES7194-2LH50-1AB0** |
| 1 m | **6ES7194-2LH10-0AB0** | 10 m | **6ES7194-2LN10-1AB0** |
| 2 m | **6ES7194-2LH20-0AB0** | 15 m | **6ES7194-2LN15-1AB0** |
| 5 m | **6ES7194-2LH50-0AB0** | Pre-assembled at one end, M8 socket | |
| 10 m | **6ES7194-2LN10-0AB0** | | |
| 15 m | **6ES7194-2LN15-0AB0** | 2 m | **6ES7194-2LH20-1AC0** |
| Pre-assembled at one end, 1 M8 connector | | 5 m | **6ES7194-2LH50-1AC0** |
| | | 10 m | **6ES7194-2LN10-1AC0** |
| 2 m | **6ES7194-2LH20-0AC0** | 15 m | **6ES7194-2LN15-1AC0** |
| 5 m | **6ES7194-2LH50-0AC0** | **M8 connector for ET connection** | **6ES7194-2AB00-0AA0** |
| 10 m | **6ES7194-2LN10-0AC0** | 4-pin, shielded | |
| 15 m | **6ES7194-2LN15-0AC0** | **M8 power connector** | |
| | | Male contact insert, 4-pin | **6ES7194-2AA00-0AA0** |
| | | Female contact insert, 4-pin | **6ES7194-2AC00-0AA0** |
| | | **ET connection FastConnect stripping tool** | **6ES7194-2KA00-0AA0** |
| | | Stripping tool for stripping the ET connection bus cable | |
| | | **Labels** | **6ES7194-2BA00-0AA0** |
| | | 10 x 5 mm, RAL 9016; 5 frames with 40 labels each | |

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## ■ Overview

- Interface module for linking the ET 200AL to PROFINET
- Handles data exchange with the PROFINET IO controller in the PLC
- Max. 32 I/O modules can be connected
- Max. data volume of 1430 bytes, for input and output data respectively
- Shortest bus cycle 250 µs
- Automatic power-up by means of topology recognition
- Autocrossover
- Shared device on up to 4 IO controllers
- Support for the MRP (media redundancy protocol) and MRPD (media redundancy with planned duplication) functions
- Identification and maintenance data IM0 ... IM4
- Firmware update
- Configuration management (option handling)
- PROFIenergy

## ■ Technical specifications

| Article number | **6ES7157-1AB00-0AB0** |
|---|---|
| | ET 200AL, IM 157-1 PN |
| **General information** | |
| Product type designation | IM 157-1 PN |
| HW functional status | E01 |
| Firmware version | V1.0.x |
| Vendor identification (VendorID) | 002AH |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M4 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption (rated value) | 100 mA |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Power loss** | |
| Power loss, typ. | 2.9 W |
| **Address area** | |
| **Address space per station** | |
| • Address space per station, max. | 1 430 byte |
| **Interfaces** | |
| Number of PROFINET interfaces | 1 |

| Article number | **6ES7157-1AB00-0AB0** |
|---|---|
| | ET 200AL, IM 157-1 PN |
| **1. Interface** | |
| Interface type | PROFINET |
| **Interface types** | |
| • integrated switch | Yes |
| • M12 port | Yes; 2x M12 d-coded |
| **Functionality** | |
| • PROFINET IO Device | Yes |
| **M12 port** | |
| • Transmission procedure | PROFINET with 100 Mbit/s full duplex (100BASE-TX) |
| • 10 Mbps | Yes; for Ethernet services |
| • 100 Mbps | Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) |
| • Autonegotiation | Yes |
| • Autocrossing | Yes |
| **Protocols** | |
| **PROFINET IO Device** | |
| **Services** | |
| - Open IE communication | Yes |
| - IRT | Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms |
| - MRP | Yes |
| - MRPD | No |
| - PROFIenergy | Yes |
| - Shared device | Yes |
| - Number of IO Controllers with shared device, max. | 4 |
| **Open IE communication** | |
| • TCP/IP | Yes |
| • SNMP | Yes |
| • LLDP | Yes |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| Diagnostic functions | Yes |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**Interface modules   > IM 157-1 PN**

■ **Technical specifications**  (continued)

| Article number | 6ES7157-1AB00-0AB0 |
|---|---|
| | ET 200AL, IM 157-1 PN |
| **Diagnostics indication LED** | |
| • RUN LED | Yes; Green LED |
| • ERROR LED | Yes; Red LED |
| • MAINT LED | Yes; yellow LED |
| • Connection display LINK TX/RX | Yes; 2x green LED |
| **Potential separation** | |
| between the load voltages | Yes |
| between PROFINET and all other circuits | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP67 | Yes |

| Article number | 6ES7157-1AB00-0AB0 |
|---|---|
| | ET 200AL, IM 157-1 PN |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Connection method** | |
| Power supply | M8, 4-pole |
| **ET-Connection** | |
| • ET-Connection | M8, 4-pin, shielded |
| **Dimensions** | |
| Width | 45 mm |
| Height | 159 mm |
| Depth | 40 mm |
| **Weights** | |
| Weight, approx. | 263 g |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **IM 157-1 PN interface module** | 6ES7157-1AB00-0AB0 | **M8 power cable** | |
| For connecting ET 200AL to PROFINET | | 4-pin | |
| **Accessories** | | Pre-assembled at both ends, M8 connector and M8 socket | |
| **Bus cable for backplane bus (ET connection)** | | 0.19 m | 6ES7194-2LH02-1AA0 |
| 4-pin, shielded | | 0.3 m | 6ES7194-2LH03-1AA0 |
| Pre-assembled at both ends, 2 M8 connectors | | 1 m | 6ES7194-2LH10-1AA0 |
| 0.19 m | 6ES7194-2LH02-0AA0 | 2 m | 6ES7194-2LH20-1AA0 |
| 0.3 m | 6ES7194-2LH03-0AA0 | 5 m | 6ES7194-2LH50-1AA0 |
| 1 m | 6ES7194-2LH10-0AA0 | 10 m | 6ES7194-2LN10-1AA0 |
| 2 m | 6ES7194-2LH20-0AA0 | 15 m | 6ES7194-2LN15-1AA0 |
| 5 m | 6ES7194-2LH50-0AA0 | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 10 m | 6ES7194-2LN10-0AA0 | | |
| 15 m | 6ES7194-2LN15-0AA0 | 0.3 m | 6ES7194-2LH03-1AB0 |
| Pre-assembled at both ends, 2 M8 connectors, angled | | 1 m | 6ES7194-2LH10-1AB0 |
| 0.3 m | 6ES7194-2LH03-0AB0 | 2 m | 6ES7194-2LH20-1AB0 |
| 1 m | 6ES7194-2LH10-0AB0 | 5 m | 6ES7194-2LH50-1AB0 |
| 2 m | 6ES7194-2LH20-0AB0 | 10 m | 6ES7194-2LN10-1AB0 |
| 5 m | 6ES7194-2LH50-0AB0 | 15 m | 6ES7194-2LN15-1AB0 |
| 10 m | 6ES7194-2LN10-0AB0 | Pre-assembled at one end, M8 socket | |
| 15 m | 6ES7194-2LN15-0AB0 | 2 m | 6ES7194-2LH20-1AC0 |
| Pre-assembled at one end, 1 M8 connector | | 5 m | 6ES7194-2LH50-1AC0 |
| 2 m | 6ES7194-2LH20-0AC0 | 10 m | 6ES7194-2LN10-1AC0 |
| 5 m | 6ES7194-2LH50-0AC0 | 15 m | 6ES7194-2LN15-1AC0 |
| 10 m | 6ES7194-2LN10-0AC0 | **M8 connector for ET connection** | 6ES7194-2AB00-0AA0 |
| 15 m | 6ES7194-2LN15-0AC0 | 4-pin, shielded | |
| | | **M8 power connector** | |
| | | Male contact insert, 4-pin | 6ES7194-2AA00-0AA0 |
| | | Female contact insert, 4-pin | 6ES7194-2AC00-0AA0 |
| | | **ET connection FastConnect stripping tool** | 6ES7194-2KA00-0AA0 |
| | | Stripping tool for stripping the ET connection bus cable | |
| | | **Labels** | 6ES7194-2BA00-0AA0 |
| | | 10 x 5 mm, RAL 9016; 5 frames with 40 labels each | |

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## Overview



- 30 and 45 mm-wide modules with parameters and diagnostic functions
- 8-channel digital input module with M8 or M12 connection
- 16-channel digital input module with M12 connection
- 8-channel digital input/output module with M8 or M12 connection
- 16-channel digital input/output module with M12 connection
- 8-channel digital output module 2 A with M12 connection

## Technical specifications

| Article number | 6ES7141-5BF00-0BA0 | 6ES7141-5AF00-0BA0 | 6ES7141-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DI 8X24VDC, 8XM8 | ET 200AL, DI 8X24VDC, 4XM12 | ET 200AL, DI 16X24VDC, 8XM12 |
| **General information** | | | |
| Product type designation | DI 8x24VDC, 8xM8 | DI 8x24VDC, 4xM12 | DI 16X24VDC, 8XM12 |
| HW functional status | E01 | E01 | E01 |
| Firmware version | V1.0.x | V1.0.x | V1.0.x |
| **Product function** | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher | STEP 7 V13 SP1 or higher | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 | V5.5 SP4 Hotfix 7 or higher | V5.5 SP4 Hotfix 7 or higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 | GSD as of Revision 5 | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 | GSDML V2.3.1 | GSDML V2.3.1 |
| **Supply voltage** | | | |
| **Load voltage 1L+** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes; Against destruction; encoder power supply outputs applied with reversed polarity | Yes; Against destruction; encoder power supply outputs applied with reversed polarity | Yes; Against destruction; encoder power supply outputs applied with reversed polarity |
| **Input current** | | | |
| Current consumption (rated value) | 25 mA; without load | 25 mA; without load | 30 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value | 4 A; Maximum value | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value | 4 A; Maximum value | 4 A; Maximum value |
| **Encoder supply** | | | |
| Number of outputs | 8 | 4 | 8 |
| **24 V encoder supply** | | | |
| • Short-circuit protection | Yes; per module, electronic | Yes; per module, electronic | Yes; per module, electronic |
| • Output current, max. | 0.7 A; Total current of all encoders | 0.7 A; Total current of all encoders | 1.4 A; Total current of all encoders |
| **Power loss** | | | |
| Power loss, typ. | 1.9 W | 1.9 W | 2.7 W |
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 8 | 16 |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes | Yes |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**I/O modules > Digital I/O modules**

■ **Technical specifications** (continued)

| Article number | 6ES7141-5BF00-0BA0 | 6ES7141-5AF00-0BA0 | 6ES7141-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DI 8X24VDC, 8XM8 | ET 200AL, DI 8X24VDC, 4XM12 | ET 200AL, DI 16X24VDC, 8XM12 |
| **Number of simultaneously controllable inputs** | | | |
| **all mounting positions** | | | |
| - up to 55 °C, max. | 8 | 8 | 16 |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • for signal "0" | -30 to +5V | -30 to +5V | -30 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V | +11 to +30V |
| **Input current** | | | |
| • for signal "1", typ. | 3.2 mA | 3.2 mA | 3.2 mA |
| **Input delay** (for rated value of input voltage) | | | |
| **for standard inputs** | | | |
| - at "0" to "1", min. | 1.2 ms | 1.2 ms | 1.2 ms |
| - at "0" to "1", max. | 4.8 ms | 4.8 ms | 4.8 ms |
| - at "1" to "0", min. | 1.2 ms | 1.2 ms | 1.2 ms |
| - at "1" to "0", max. | 4.8 ms | 4.8 ms | 4.8 ms |
| **Cable length** | | | |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA |
| **Interrupts/diagnostics/ status information** | | | |
| **Alarms** | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | |
| • Short-circuit | Yes; Sensor supply to M; module by module | Yes; Sensor supply to M; module by module | Yes; Sensor supply to M; module by module |
| **Diagnostics indication LED** | | | |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED | Yes; Green/red LED | Yes; Green/red LED |
| **Potential separation** | | | |
| between the load voltages | Yes | Yes | Yes |
| **Potential separation channels** | | | |
| • between the channels | No | No | No |
| • between the channels and backplane bus | Yes | Yes | Yes |
| • between the channels and the power supply of the electronics | No | No | No |
| **Isolation** | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C | -25 °C | -25 °C |
| • max. | 55 °C | 55 °C | 55 °C |
| **Connection method** | | | |
| Design of electrical connection for the inputs and outputs | M8, 3-pole | M12, 5-pole | M12, 5-pole |
| Power supply | M8, 4-pole | M8, 4-pole | M8, 4-pole |
| **ET-Connection** | | | |
| • ET-Connection | M8, 4-pin, shielded | M8, 4-pin, shielded | M8, 4-pin, shielded |

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■ **Technical specifications** (continued)

| Article number | 6ES7141-5BF00-0BA0 | 6ES7141-5AF00-0BA0 | 6ES7141-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DI 8X24VDC, 8XM8 | ET 200AL, DI 8X24VDC, 4XM12 | ET 200AL, DI 16X24VDC, 8XM12 |
| **Dimensions** | | | |
| Width | 30 mm | 30 mm | 45 mm |
| Height | 159 mm | 159 mm | 159 mm |
| Depth | 40 mm | 40 mm | 40 mm |
| **Weights** | | | |
| Weight, approx. | 145 g | 145 g | 184 g |

| Article number | 6ES7142-5AF00-0BA0 |
|---|---|
| | ET 200AL, DQ 8X24VDC/2A, 8XM12 |
| **General information** | |
| Product type designation | DQ 8X24VDC/2A, 8XM12 |
| HW functional status | E01 |
| Firmware version | V1.0.x |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 Hotfix 7 or higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction; load increasing |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction; load increasing |
| **Input current** | |
| Current consumption (rated value) | 40 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Power loss** | |
| Power loss, typ. | 4 W |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| • in groups of | 4; 2 load groups for 4 outputs each |
| Short-circuit protection | Yes; per channel, electronic |
| • Response threshold, typ. | 2.8 A |
| Limitation of inductive shutdown voltage to | 2L+ (-47 V) |
| **Switching capacity of the outputs** | |
| • on lamp load, max. | 10 W |

| Article number | 6ES7142-5AF00-0BA0 |
|---|---|
| | ET 200AL, DQ 8X24VDC/2A, 8XM12 |
| **Load resistance range** | |
| • lower limit | 12 Ω |
| • upper limit | 4 kΩ |
| **Output voltage** | |
| • for signal "1", min. | L+ (-0.8 V) |
| **Output current** | |
| • for signal "1" rated value | 2 A |
| • for signal "1" permissible range, max. | 2 A; with inductive load to IEC 60947-5-1, DC-13 / AC-15 |
| • for signal "0" residual current, max. | 0.5 mA |
| **Switching frequency** | |
| • with resistive load, max. | 100 Hz |
| • with inductive load, max. | 0.1 Hz; 0.25 Hz at 25 °C |
| • on lamp load, max. | 1 Hz |
| **Total current of the outputs** | |
| • Current per group, max. | 4 A; For inductive load max. 2 channels per group |
| **Cable length** | |
| • unshielded, max. | 30 m |
| **Interrupts/diagnostics/ status information** | |
| Substitute values connectable | Yes; channel by channel, parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Short-circuit | Yes; Outputs to ground; module by module |
| **Diagnostics indication LED** | |
| • Channel status display | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED |
| • For load voltage monitoring | Yes; Green LED |
| **Potential separation** | |
| between the load voltages | Yes |
| **Potential separation channels** | |
| • between the channels, in groups of | 4 |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | No; 4 channels are non-isolated and 4 channels are isolated from supply voltage 1L+ |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP67 | Yes |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**I/O modules   > Digital I/O modules**

■ **Technical specifications** (continued)

| Article number | 6ES7142-5AF00-0BA0 |
|---|---|
| | ET 200AL, DQ 8X24VDC/2A, 8XM12 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Connection method** | |
| Design of electrical connection for the inputs and outputs | M12, 5-pole |
| Power supply | M8, 4-pole |
| **ET-Connection** | |
| • ET-Connection | M8, 4-pin, shielded |

| Article number | 6ES7142-5AF00-0BA0 |
|---|---|
| | ET 200AL, DQ 8X24VDC/2A, 8XM12 |
| **Dimensions** | |
| Width | 45 mm |
| Height | 159 mm |
| Depth | 40 mm |
| **Weights** | |
| Weight, approx. | 192 g |

| Article number | 6ES7143-5BF00-0BA0 | 6ES7143-5AF00-0BA0 | 6ES7143-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8 | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12 | ET 200AL, DIQ 16x24VDC/0.5A, 8xM12 |
| **General information** | | | |
| Product type designation | DIQ 4+DQ 4X24VDC/0.5A, 8xM8 | DIQ 4+DQ 4X24VDC/0.5 A, 4XM12 | DIQ 16X24VDC/0.5A, 8XM12 |
| HW functional status | E01 | E01 | E01 |
| Firmware version | V1.0.x | V1.0.x | V1.0.x |
| **Product function** | | | |
| • I&M data | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 | Yes; I&M0 to I&M3 |
| **Engineering with** | | | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher | STEP 7 V13 SP1 or higher | STEP 7 V14 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 | V5.5 SP4 Hotfix 7 or higher | V5.5 SP4 Hotfix 7 or higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 | GSD as of Revision 5 | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 | GSDML V2.3.1 | GSDML V2.3.1 |
| **Operating mode** | | | |
| • DI | | | Yes |
| • Counter | | | Yes |
| • DQ | | | Yes |
| **Supply voltage** | | | |
| **Load voltage 1L+** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up | Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up | Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up |
| **Load voltage 2L+** | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes; against destruction; load increasing | Yes; against destruction; load increasing | Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up |
| **Input current** | | | |
| Current consumption (rated value) | 40 mA; without load | 40 mA; without load | 75 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value | 4 A; Maximum value | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value | 4 A; Maximum value | 4 A; Maximum value |
| **Encoder supply** | | | |
| Number of outputs | 4 | 4 | 8 |
| **24 V encoder supply** | | | |
| • Short-circuit protection | Yes; per module, electronic | Yes; per module, electronic | Yes; Per load voltage, electronic |
| • Output current, max. | 0.7 A; Total current of all encoders | 0.7 A; Total current of all encoders | 1.4 A; Total current of all encoders, max. 0.7 A per load voltage |

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■ **Technical specifications** (continued)

| Article number | 6ES7143-5BF00-0BA0 | 6ES7143-5AF00-0BA0 | 6ES7143-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8 | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12 | ET 200AL, DIQ 16x24VDC/0.5A, 8xM12 |
| **Power loss** | | | |
| Power loss, typ. | 2.5 W | 2.5 W | 4 W |
| **Digital inputs** | | | |
| Number of digital inputs | 4; Parameterizable as DIQ | 4; Parameterizable as DIQ | 16; Parameterizable as DIQ |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes | Yes |
| **Number of simultaneously controllable inputs** | | | |
| **all mounting positions** | | | |
| - up to 55 °C, max. | 4 | 4 | 16 |
| **Digital input functions, parameterizable** | | | |
| • Freely usable digital input | | | Yes |
| • Counter | | | Yes |
| - Number, max. | | | 4 |
| - Counting frequency, max. | | | 2 kHz |
| - Counting width | | | 32 bit; Incl. sign |
| - Counting direction up/down | | | Yes |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V | -3 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V | +11 to +30V |
| **Input current** | | | |
| • for signal "1", typ. | 3.2 mA | 3.2 mA | 3 mA |
| **Input dela y (for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
| - parameterizable | | | Yes |
| - at "0" to "1", min. | 1.2 ms | 1.2 ms | 0.05 ms; 1.6 ms for channels 8 through 15 |
| - at "0" to "1", max. | 4.8 ms | 4.8 ms | 20 ms |
| - at "1" to "0", min. | 1.2 ms | 1.2 ms | 0.05 ms; 1.6 ms for channels 8 through 15 |
| - at "1" to "0", max. | 4.8 ms | 4.8 ms | 20 ms |
| **for counter/technological functions** | | | |
| - parameterizable | | | Yes |
| **Cable length** | | | |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Digital outputs** | | | |
| Number of digital outputs | 8; 4 DQ fixed, 4 DIQ parameterizable | 8; 4 DQ fixed, 4 DIQ parameterizable | 16; Parameterizable as DIQ |
| • in groups of | 4; 2 load groups for 4 outputs each | 4; 2 load groups for 4 outputs each | 8; 2 load groups for 8 outputs each |
| Short-circuit protection | Yes; per channel, electronic | Yes; per channel, electronic | Yes; per channel, electronic |
| • Response threshold, typ. | 0.7 A | 0.7 A | 0.7 A |
| Limitation of inductive shutdown voltage to | 2L+ (-47 V) | 2L+ (-47 V) | L+ (-53 V) |
| **Digital output functions, parameterizable** | | | |
| • Switching tripped by comparison values | | | Yes |
| • Freely usable digital output | | | Yes |
| **Switching capacity of the outputs** | | | |
| • on lamp load, max. | 5 W | 5 W | 5 W |
| **Load resistance range** | | | |
| • lower limit | 48 Ω | 48 Ω | 48 Ω |
| • upper limit | 4 kΩ | 4 kΩ | 4 kΩ |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

**I/O modules   > Digital I/O modules**

■ **Technical specifications** (continued)

| Article number | 6ES7143-5BF00-0BA0 | 6ES7143-5AF00-0BA0 | 6ES7143-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8 | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12 | ET 200AL, DIQ 16x24VDC/0.5A, 8xM12 |
| **Output voltage** | | | |
| • for signal "1", min. | L+ (-0.8 V) | L+ (-0.8 V) | L+ (-0.8 V) |
| **Output current** | | | |
| • for signal "1" rated value | 0.5 A | 0.5 A | 0.5 A |
| • for signal "0" residual current, max. | 0.5 mA | 0.5 mA | 0.5 mA |
| **Switching frequency** | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 1 Hz | 1 Hz |
| **Total current of the outputs** | | | |
| • Current per group, max. | 2 A | 2 A | 4 A |
| **Cable length** | | | |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA |
| **Interrupts/diagnostics/ status information** | | | |
| Substitute values connectable | Yes; channel by channel, parameterizable | Yes; channel by channel, parameterizable | Yes; channel by channel, parameterizable |
| **Alarms** | | | |
| • Diagnostic alarm | Yes; Parameterizable | Yes; Parameterizable | Yes; Parameterizable |
| **Diagnostic messages** | | | |
| • Short-circuit | Yes; Outputs to M; encoder supply to M; module by module | Yes; Outputs to M; encoder supply to M; module by module | Yes; Outputs to M; encoder supply to M; module by module |
| **Diagnostics indication LED** | | | |
| • Channel status display | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED | Yes; Green/red LED | Yes; Green/red LED |
| • For load voltage monitoring | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| **Potential separation** | | | |
| between the load voltages | Yes | Yes | Yes |
| **Potential separation channels** | | | |
| • between the channels, in groups of | 4; DIQ channels are isolated from DQ channels | 4; DIQ channels are isolated from DQ channels | 8 |
| • between the channels and backplane bus | Yes | Yes | Yes |
| • between the channels and the power supply of the electronics | No; DIQ channels are non-isolated and DQ channels are isolated from supply voltage 1L+ | No; DIQ channels are non-isolated and DQ channels are isolated from supply voltage 1L+ | No; 8 channels are non-isolated and 8 channels are isolated from supply voltage 1L+ |
| **Isolation** | | | |
| Isolation tested with | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C | -25 °C | -25 °C |
| • max. | 55 °C | 55 °C | 55 °C |

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## ■ Technical specifications (continued)

| Article number | 6ES7143-5BF00-0BA0 | 6ES7143-5AF00-0BA0 | 6ES7143-5AH00-0BA0 |
|---|---|---|---|
| | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8 | ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12 | ET 200AL, DIQ 16x24VDC/0.5A, 8xM12 |
| **Connection method** | | | |
| Design of electrical connection for the inputs and outputs | M8, 3-pole | M12, 5-pole | M12, 5-pole |
| Power supply | M8, 4-pole | M8, 4-pole | M8, 4-pole |
| **ET-Connection** | | | |
| • ET-Connection | M8, 4-pin, shielded | M8, 4-pin, shielded | M8, 4-pin, shielded |
| **Dimensions** | | | |
| Width | 30 mm | 30 mm | 45 mm |
| Height | 159 mm | 159 mm | 159 mm |
| Depth | 40 mm | 40 mm | 40 mm |
| **Weights** | | | |
| Weight, approx. | 145 g | 145 g | 195 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Digital input modules** | | **M8 power cable** | |
| DI 8X24VDC, 8XM8 | **6ES7141-5BF00-0BA0** | 4-pin | |
| DI 8X24VDC, 4XM12 | **6ES7141-5AF00-0BA0** | Pre-assembled at both ends, M8 connector and M8 socket | |
| DI 16X24VDC, 8XM12 | **6ES7141-5AH00-0BA0** | 0.19 m | **6ES7194-2LH02-1AA0** |
| **Digital output modules** | | 0.3 m | **6ES7194-2LH03-1AA0** |
| DQ 8X24VDC/2A, 8XM12 | **6ES7142-5AF00-0BA0** | 1 m | **6ES7194-2LH10-1AA0** |
| **Digital input/output modules** | | 2 m | **6ES7194-2LH20-1AA0** |
| 4 DIO / 4 DO, 24 V DC, 0.5 A | **6ES7143-5BF00-0BA0** | 5 m | **6ES7194-2LH50-1AA0** |
| DIQ 4+DQ 4X24VDC/0.5A, 4XM12 | **6ES7143-5AF00-0BA0** | 10 m | **6ES7194-2LN10-1AA0** |
| DIQ 16X24VDC/0.5A, 8XM12 | **6ES7143-5AH00-0BA0** | 15 m | **6ES7194-2LN15-1AA0** |
| **Accessories** | | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| **Bus cable for backplane bus (ET connection)** | | 0.3 m | **6ES7194-2LH03-1AB0** |
| 4-pin, shielded | | 1 m | **6ES7194-2LH10-1AB0** |
| Pre-assembled at both ends, 2 M8 connectors | | 2 m | **6ES7194-2LH20-1AB0** |
| 0.19 m | **6ES7194-2LH02-0AA0** | 5 m | **6ES7194-2LH50-1AB0** |
| 0.3 m | **6ES7194-2LH03-0AA0** | 10 m | **6ES7194-2LN10-1AB0** |
| 1 m | **6ES7194-2LH10-0AA0** | 15 m | **6ES7194-2LN15-1AB0** |
| 2 m | **6ES7194-2LH20-0AA0** | Pre-assembled at one end, M8 socket | |
| 5 m | **6ES7194-2LH50-0AA0** | 2 m | **6ES7194-2LH20-1AC0** |
| 10 m | **6ES7194-2LN10-0AA0** | 5 m | **6ES7194-2LH50-1AC0** |
| 15 m | **6ES7194-2LN15-0AA0** | 10 m | **6ES7194-2LN10-1AC0** |
| Pre-assembled at both ends, two M8 connectors, angled | | 15 m | **6ES7194-2LN15-1AC0** |
| 0.3 m | **6ES7194-2LH03-0AB0** | **M8 connector for ET connection** | **6ES7194-2AB00-0AA0** |
| 1 m | **6ES7194-2LH10-0AB0** | 4-pin, shielded | |
| 2 m | **6ES7194-2LH20-0AB0** | **M8 power connector** | |
| 5 m | **6ES7194-2LH50-0AB0** | Male contact insert, 4-pin | **6ES7194-2AA00-0AA0** |
| 10 m | **6ES7194-2LN10-0AB0** | Female contact insert, 4-pin | **6ES7194-2AC00-0AA0** |
| 15 m | **6ES7194-2LN15-0AB0** | **ET connection FastConnect stripping tool** | **6ES7194-2KA00-0AA0** |
| Pre-assembled at one end, one M8 connector | | Stripping tool for stripping the ET connection bus cable | |
| 2 m | **6ES7194-2LH20-0AC0** | **Labels** | **6ES7194-2BA00-0AA0** |
| 5 m | **6ES7194-2LH50-0AC0** | 10 x 5 mm, RAL 9016; 5 frames with 40 labels each | |
| 10 m | **6ES7194-2LN10-0AC0** | | |
| 15 m | **6ES7194-2LN15-0AC0** | | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

## Overview



- 30-mm-wide module with parameters and diagnostic functions
- For connecting analog actuators and sensors without additional amplifiers
- 4-channel analog input module with M12 connection
- 4-channel analog output module with M12 connection

## Technical specifications

| Article number | 6ES7144-5KD00-0BA0 |
|---|---|
| | ET 200AL, AI 4XU/I/RTD, 4XM12 |
| **General information** | |
| Product type designation | AI 4xU/I/RTD, 4xM12 |
| HW functional status | E02 |
| Firmware version | V1.0.x |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption (rated value) | 35 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Encoder supply** | |
| Number of outputs | 4 |
| **24 V encoder supply** | |
| • Short-circuit protection | Yes; per channel, electronic |
| • Output current, max. | 0.5 A; per channel, total current of all channels max. 1 A |
| **Power loss** | |
| Power loss, typ. | 1.5 W |

| Article number | 6ES7144-5KD00-0BA0 |
|---|---|
| | ET 200AL, AI 4XU/I/RTD, 4XM12 |
| **Analog inputs** | |
| Number of analog inputs | 4 |
| • For current measurement | 4 |
| • For voltage measurement | 4 |
| • For resistance/resistance thermometer measurement | 4 |
| permissible input voltage for voltage input (destruction limit), max. | 30 V |
| permissible input current for current input (destruction limit), max. | 50 mA |
| Cycle time (all channels), min. | 8 ms |
| Technical unit for temperature measurement adjustable | Yes; Degrees Celsius / degrees Fahrenheit / Kelvin |
| **Input ranges (rated values), voltages** | |
| • 0 to +10 V | Yes |
| • Input resistance (0 to 10 V) | 10 MΩ |
| • 1 V to 5 V | Yes |
| • Input resistance (1 V to 5 V) | 10 MΩ |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| • Input resistance (0 to 20 mA) | 50 Ω |
| • 4 mA to 20 mA | Yes |
| • Input resistance (4 mA to 20 mA) | 50 Ω |
| **Input ranges (rated values), resistance thermometer** | |
| • Ni 100 | Yes; Standard/climate |
| • Input resistance (Ni 100) | 10 MΩ |
| • Pt 100 | Yes; Standard/climate |
| • Input resistance (Pt 100) | 10 MΩ |
| **Input ranges (rated values), resistors** | |
| • 0 to 150 ohms | Yes |
| • Input resistance (0 to 150 ohms) | 10 MΩ |
| • 0 to 300 ohms | Yes |
| • Input resistance (0 to 300 ohms) | 10 MΩ |

■ **Technical specifications** (continued)

| Article number | **6ES7144-5KD00-0BA0** |
|---|---|
| | ET 200AL, AI 4XU/I/RTD, 4XM12 |
| **Cable length** | |
| • shielded, max. | 30 m |
| **Analog value generation for the inputs** | |
| Measurement principle | integrating |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 16 bit |
| • Integration time, parameterizable | Yes; channel by channel |
| • Integration time (ms) | 0,3 / 16,7 / 20 / 60 |
| • Interference voltage suppression for interference frequency f1 in Hz | 16.7 / 50 / 60 / 3 600 |
| • Conversion time (per channel) | 2 / 18 / 21 / 61 ms |
| **Smoothing of measured values** | |
| • parameterizable | Yes |
| • Step: None | Yes; 1 x cycle time |
| • Step: low | Yes; 4 x cycle time |
| • Step: Medium | Yes; 16 x cycle time |
| • Step: High | Yes; 32 x cycle time |
| **Encoder** | |
| **Connection of signal encoders** | |
| • for voltage measurement | Yes |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |
| • for resistance measurement with two-wire connection | Yes |
| • for resistance measurement with three-wire connection | Yes |
| **Errors/accuracies** | |
| Linearity error (relative to input range), (+/-) | 0.025 % |
| Temperature error (relative to input range), (+/-) | 0.01 %/K |
| Crosstalk between the inputs, max. | -70 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.01 % |
| **Operational error limit in overall temperature range** | |
| • Voltage, relative to input range, (+/-) | 0.35 % |
| • Current, relative to input range, (+/-) | 0.45 % |
| • Resistance, relative to input range, (+/-) | 0.25 % |
| • Resistance thermometer, relative to input range, (+/-) | 0.25 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Voltage, relative to input range, (+/-) | 0.25 % |
| • Current, relative to input range, (+/-) | 0.25 % |
| • Resistance, relative to input range, (+/-) | 0.15 % |
| • Resistance thermometer, relative to input range, (+/-) | 0.15 % |

| Article number | **6ES7144-5KD00-0BA0** |
|---|---|
| | ET 200AL, AI 4XU/I/RTD, 4XM12 |
| **Interference voltage suppression for f = n x (f1 +/- 0.5 %), f1 = interference frequency** | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 40 dB |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| • Limit value alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Wire-break | Yes; at 4 mA to 20 mA and 1 V to 5 V |
| • Short-circuit | Yes; Encoder supply to M, channel by channel |
| • Overflow/underflow | Yes |
| **Diagnostics indication LED** | |
| • Channel status display | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED |
| **Potential separation** | |
| between the load voltages | Yes |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP67 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Connection method** | |
| Design of electrical connection for the inputs and outputs | M12, 5-pole |
| Power supply | M8, 4-pole |
| **ET-Connection** | |
| • ET-Connection | M8, 4-pin, shielded |
| **Dimensions** | |
| Width | 30 mm |
| Height | 159 mm |
| Depth | 40 mm |
| **Weights** | |
| Weight, approx. | 168 g |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

■ **Technical specifications** (continued)

| Article number | 6ES7145-5ND00-0BA0 |
|---|---|
| | ET 200AL, AQ 4xU/I, 4xM12 |
| **General information** | |
| Product type designation | AQ 4XU/I, 4XM12 |
| HW functional status | E01 |
| Firmware version | V1.0.x |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V14 or higher |
| • STEP 7 configurable/integrated as of version | V5.5 SP4 Hotfix 7 or higher |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; Against destruction; actuator power supply outputs applied with reversed polarity |
| **Input current** | |
| Current consumption (rated value) | 110 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Actuator supply** | |
| Number of outputs | 4 |
| Short-circuit protection | Yes; per module, electronic |
| **Output current** | |
| • Rated value | Total current 1 A up to 45 °C; 0.5 A up to 55 °C |
| **Power loss** | |
| Power loss, typ. | 2.6 W |
| **Analog outputs** | |
| Number of analog outputs | 4 |
| Voltage output, short-circuit protection | Yes |
| Voltage output, short-circuit current, max. | 24 mA |
| Current output, no-load voltage, max. | 15 V |
| Cycle time (all channels) max. | 1 ms |
| **Output ranges, voltage** | |
| • 0 to 10 V | Yes; 15 bit |
| • 1 V to 5 V | Yes; 14 bit |
| • -10 V to +10 V | Yes; 16 bit incl. sign |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes; 15 bit |
| • -20 mA to +20 mA | Yes; 16 bit incl. sign |
| • 4 mA to 20 mA | Yes; 14 bit |
| **Connection of actuators** | |
| • for voltage output two-wire connection | Yes |
| • for voltage output four-wire connection | Yes |
| • for current output two-wire connection | Yes |
| • for current output four-wire connection | Yes |

| Article number | 6ES7145-5ND00-0BA0 |
|---|---|
| | ET 200AL, AQ 4xU/I, 4xM12 |
| **Load impedance (in rated range of output)** | |
| • with voltage outputs, min. | 1 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF |
| • with current outputs, max. | 500 Ω |
| • with current outputs, inductive load, max. | 1 mH |
| **Destruction limits against externally applied voltages and currents** | |
| • Voltages at the outputs towards MANA | 16 V |
| **Cable length** | |
| • shielded, max. | 30 m |
| **Settling time** | |
| • for resistive load | 1 ms |
| • for capacitive load | 1 ms |
| • for inductive load | 1 ms |
| **Errors/accuracies** | |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) | 0.02 % |
| Linearity error (relative to output range), (+/-) | 0.1 % |
| Temperature error (relative to output range), (+/-) | 0.005 %/K |
| Crosstalk between the outputs, max. | -70 dB |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.03 % |
| **Operational error limit in overall temperature range** | |
| • Voltage, relative to output range, (+/-) | 0.25 % |
| • Current, relative to output range, (+/-) | 0.25 % |
| **Basic error limit (operational limit at 25 °C)** | |
| • Voltage, relative to output range, (+/-) | 0.15 % |
| • Current, relative to output range, (+/-) | 0.15 % |
| **Interrupts/diagnostics/ status information** | |
| Substitute values connectable | Yes; channel by channel, parameterizable |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Wire-break | Yes; channel-by-channel, only for output type "current" |
| • Short-circuit | Yes; Actuator supply module by module; channel by channel for output type "voltage" |
| **Diagnostics indication LED** | |
| • Channel status display | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED |
| **Potential separation** | |
| between the load voltages | Yes |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | No |

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## ■ Technical specifications (continued)

| Article number | 6ES7145-5ND00-0BA0 | Article number | 6ES7145-5ND00-0BA0 |
|---|---|---|---|
| | ET 200AL, AQ 4xU/I, 4xM12 | | ET 200AL, AQ 4xU/I, 4xM12 |
| **Isolation** | | **Connection method** | |
| Isolation tested with | 707 V DC (type test) | Design of electrical connection for the inputs and outputs | M12, 5-pole |
| **Degree and class of protection** | | Power supply | M8, 4-pole |
| Degree of protection acc. to EN 60529 | | **ET-Connection** | |
| • IP65 | Yes | • ET-Connection | M8, 4-pin, shielded |
| • IP67 | Yes | **Dimensions** | |
| **Ambient conditions** | | Width | 30 mm |
| **Ambient temperature during operation** | | Height | 159 mm |
| • min. | -25 °C | Depth | 40 mm |
| • max. | 55 °C | **Weights** | |
| | | Weight, approx. | 175 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Analog input modules** | | **M8 power cable** | |
| AI 4xU/I/RTD, 4XM12 | **6ES7144-5KD00-0BA0** | 4-pin | |
| AQ 4xU/I, 4xM12 | **6ES7145-5ND00-0BA0** | Pre-assembled at both ends, M8 connector and M8 socket | |
| **Accessories** | | 0.19 m | **6ES7194-2LH02-1AA0** |
| **Bus cable for backplane bus (ET connection)** | | 0.3 m | **6ES7194-2LH03-1AA0** |
| 4-pin, shielded | | 1 m | **6ES7194-2LH10-1AA0** |
| Pre-assembled at both ends, 2 M8 connectors | | 2 m | **6ES7194-2LH20-1AA0** |
| 0.19 m | **6ES7194-2LH02-0AA0** | 5 m | **6ES7194-2LH50-1AA0** |
| 0.3 m | **6ES7194-2LH03-0AA0** | 10 m | **6ES7194-2LN10-1AA0** |
| 1 m | **6ES7194-2LH10-0AA0** | 15 m | **6ES7194-2LN15-1AA0** |
| 2 m | **6ES7194-2LH20-0AA0** | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 5 m | **6ES7194-2LH50-0AA0** | | |
| 10 m | **6ES7194-2LN10-0AA0** | 0.3 m | **6ES7194-2LH03-1AB0** |
| 15 m | **6ES7194-2LN15-0AA0** | 1 m | **6ES7194-2LH10-1AB0** |
| Pre-assembled at both ends, 2 M8 connectors, angled | | 2 m | **6ES7194-2LH20-1AB0** |
| 0.3 m | **6ES7194-2LH03-0AB0** | 5 m | **6ES7194-2LH50-1AB0** |
| 1 m | **6ES7194-2LH10-0AB0** | 10 m | **6ES7194-2LN10-1AB0** |
| 2 m | **6ES7194-2LH20-0AB0** | 15 m | **6ES7194-2LN15-1AB0** |
| 5 m | **6ES7194-2LH50-0AB0** | Pre-assembled at one end, M8 socket | |
| 10 m | **6ES7194-2LN10-0AB0** | 2 m | **6ES7194-2LH20-1AC0** |
| 15 m | **6ES7194-2LN15-0AB0** | 5 m | **6ES7194-2LH50-1AC0** |
| Pre-assembled at one end, 1 M8 connector | | 10 m | **6ES7194-2LN10-1AC0** |
| 2 m | **6ES7194-2LH20-0AC0** | 15 m | **6ES7194-2LN15-1AC0** |
| 5 m | **6ES7194-2LH50-0AC0** | **M8 connector for ET connection** | **6ES7194-2AB00-0AA0** |
| 10 m | **6ES7194-2LN10-0AC0** | 4-pin, shielded | |
| 15 m | **6ES7194-2LN15-0AC0** | **M8 power connector** | |
| | | Male contact insert, 4-pin | **6ES7194-2AA00-0AA0** |
| | | Female contact insert, 4-pin | **6ES7194-2AC00-0AA0** |
| | | **ET connection FastConnect stripping tool** | **6ES7194-2KA00-0AA0** |
| | | Stripping tool for stripping the ET connection bus cable | |
| | | **Labels** | **6ES7194-2BA00-0AA0** |
| | | 10 x 5 mm, RAL 9016; 5 frames with 40 labels each | |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

**I/O modules  > Communication   > CM IO-Link**

## ■ Overview



- 30-mm-wide CM IO-Link communication module
- For the connection of up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.2 and higher

## ■ Technical specifications

| Article number | 6ES7147-5JD00-0BA0 |
|---|---|
| | ET 200AL, CM 4X IO-LINK, 4XM12 |
| **General information** | |
| Product type designation | CM 4x IO-LINK, 4xM12 |
| HW functional status | E03 |
| Firmware version | V1.0.x |
| **Product function** | |
| • I&M data | Yes; I&M0 to I&M3 |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V13 SP1 or higher |
| • STEP 7 configurable/integrated as of version | From V5.5 SP4 Hotfix 3 |
| • PROFIBUS as of GSD version/ GSD revision | GSD as of Revision 5 |
| • PROFINET as of GSD version/ GSD revision | GSDML V2.3.1 |
| **Supply voltage** | |
| **Load voltage 1L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes; against destruction; load increasing |

| Article number | 6ES7147-5JD00-0BA0 |
|---|---|
| | ET 200AL, CM 4X IO-LINK, 4XM12 |
| **Input current** | |
| Current consumption (rated value) | 40 mA; without load |
| from load voltage 1L+ (unswitched voltage) | 4 A; Maximum value |
| from load voltage 2L+, max. | 4 A; Maximum value |
| **Encoder supply** | |
| Number of outputs | 4 |
| **24 V encoder supply** | |
| • Short-circuit protection | Yes; per module, electronic |
| • Output current, max. | 1.4 A; Total current of all ports |
| **Power loss** | |
| Power loss, typ. | 2.6 W |
| **IO-Link** | |
| Number of ports | 4 |
| • of which simultaneously controllable | 4 |
| IO-Link protocol 1.0 | Yes |
| IO-Link protocol 1.1 | Yes |
| Transmission rate | 4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3) |
| Size of process data, input per port | 32 byte |
| Size of process data, input per module | 32 byte |
| Size of process data, output per port | 32 byte |
| Size of process data, output per module | 32 byte |
| Memory size for device parameter | 2 kbyte; for each port |
| Cable length unshielded, max. | 20 m |
| **Operating modes** | |
| • IO-Link | Yes |
| • DI | Yes |
| • DQ | Yes; max. 100 mA |
| **Connection of IO-Link devices** | |
| • Port type A | Yes; via 3-core cable |
| • Port type B | Yes; Additional device supply: 1.6 A total current of all ports |

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■ **Technical specifications** (continued)

| Article number | **6ES7147-5JD00-0BA0** |
| --- | --- |
| | ET 200AL, CM 4X IO-LINK, 4XM12 |
| **Interrupts/diagnostics/ status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes; Parameterizable |
| **Diagnostic messages** | |
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |
| • Short-circuit | Yes |
| **Diagnostics indication LED** | |
| • Channel status display | Yes; Green LED |
| • for module diagnostics | Yes; Green/red LED |
| • For load voltage monitoring | Yes; Green LED |
| **Potential separation** | |
| between the load voltages | Yes |
| **Potential separation channels** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | No |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP65 | Yes |
| • IP67 | Yes |
| **Standards, approvals, certificates** | |
| Suitable for safety-oriented group deactivation | Yes |
| **Highest safety class achievable in safety mode** | |
| • Performance level according to ISO 13849-1 | PL d |
| • SIL acc. to IEC 61508 | SIL 2 |

| Article number | **6ES7147-5JD00-0BA0** |
| --- | --- |
| | ET 200AL, CM 4X IO-LINK, 4XM12 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 55 °C |
| **Connection method** | |
| Design of electrical connection for the inputs and outputs | M12, 5-pole |
| Power supply | M8, 4-pole |
| **ET-Connection** | |
| • ET-Connection | M8, 4-pin, shielded |
| **Dimensions** | |
| Width | 30 mm |
| Height | 159 mm |
| Depth | 40 mm |
| **Weights** | |
| Weight, approx. | 145 g |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **CM IO-Link** | | **M8 power cable** | |
| CM 4X IO-Link, 4XM12; for the connection of up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B | **6ES7147-5JD00-0BA0** | 4-pin | |
| | | Pre-assembled at both ends, M8 connector and M8 socket | |
| | | 0.19 m | **6ES7194-2LH02-1AA0** |
| **Accessories** | | 0.3 m | **6ES7194-2LH03-1AA0** |
| **Bus cable for backplane bus (ET connection)** | | 1 m | **6ES7194-2LH10-1AA0** |
| 4-pin, shielded | | 2 m | **6ES7194-2LH20-1AA0** |
| Pre-assembled at both ends, 2 M8 connectors | | 5 m | **6ES7194-2LH50-1AA0** |
| | | 10 m | **6ES7194-2LN10-1AA0** |
| 0.19 m | **6ES7194-2LH02-0AA0** | 15 m | **6ES7194-2LN15-1AA0** |
| 0.3 m | **6ES7194-2LH03-0AA0** | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 1 m | **6ES7194-2LH10-0AA0** | | |
| 2 m | **6ES7194-2LH20-0AA0** | 0.3 m | **6ES7194-2LH03-1AB0** |
| 5 m | **6ES7194-2LH50-0AA0** | 1 m | **6ES7194-2LH10-1AB0** |
| 10 m | **6ES7194-2LN10-0AA0** | 2 m | **6ES7194-2LH20-1AB0** |
| 15 m | **6ES7194-2LN15-0AA0** | 5 m | **6ES7194-2LH50-1AB0** |
| Pre-assembled at both ends, 2 M8 connectors, angled | | 10 m | **6ES7194-2LN10-1AB0** |
| | | 15 m | **6ES7194-2LN15-1AB0** |
| 0.3 m | **6ES7194-2LH03-0AB0** | Pre-assembled at one end, M8 socket | |
| 1 m | **6ES7194-2LH10-0AB0** | | |
| 2 m | **6ES7194-2LH20-0AB0** | 2 m | **6ES7194-2LH20-1AC0** |
| 5 m | **6ES7194-2LH50-0AB0** | 5 m | **6ES7194-2LH50-1AC0** |
| 10 m | **6ES7194-2LN10-0AB0** | 10 m | **6ES7194-2LN10-1AC0** |
| 15 m | **6ES7194-2LN15-0AB0** | 15 m | **6ES7194-2LN15-1AC0** |
| Pre-assembled at one end, 1 M8 connector | | **M8 connector for ET connection** | **6ES7194-2AB00-0AA0** |
| | | 4-pin, shielded | |
| 2 m | **6ES7194-2LH20-0AC0** | **M8 power connector** | |
| 5 m | **6ES7194-2LH50-0AC0** | Male contact insert, 4-pin | **6ES7194-2AA00-0AA0** |
| 10 m | **6ES7194-2LN10-0AC0** | Female contact insert, 4-pin | **6ES7194-2AC00-0AA0** |
| 15 m | **6ES7194-2LN15-0AC0** | **ET connection FastConnect stripping tool** | **6ES7194-2KA00-0AA0** |
| | | Stripping tool for stripping the ET connection bus cable | |
| | | **Labels** | **6ES7194-2BA00-0AA0** |
| | | 10 x 5 mm, RAL 9016; 5 frames with 40 labels each | |

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## Overview

- Pre-assembled cables in various designs and lengths:
  - For connecting the interface modules and I/O modules via the internal backplane bus (ET connection)
  - For power supply.

## Technical specifications

| Article number | **6ES7194-2LH02-0AA0** | **6ES7194-2LH03-0AA0** | **6ES7194-2LH10-0AA0** | **6ES7194-2LH20-0AA0** |
|---|---|---|---|---|
| | CONNECTING CABLE ET-CONNECTION, 0.19M | CONNECTING CABLE ET-CONNECTION, 0.3M | CONNECTING CABLE ET-CONNECTION, 1.0M | CONNECTING CABLE ET-CONNECTION, 2.0M |
| **General information** | | | | |
| Product type designation | BUS CABLE ET CONNECTION, 0.19M | BUS CABLE ET-CONNECTION, 0.3M | BUS CABLE ET-CONNECTION, 1.0M | BUS CABLE ET-CONNECTION, 2.0M |
| Product description | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded |
| Suitability for use | for connecting ET-CONNECTION node (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP65 | Yes | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Cables** | | | | |
| Cable designation | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN |
| Design of shield | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires |
| Cable length | 0.19 m | 0.3 m | 1 m | 2 m |
| Number of electrical cores | 4 | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.5 mm | 0.5 mm | 0.5 mm | 0.5 mm |
| Outer diameter of core insulation | 1 mm | 1 mm | 1 mm | 1 mm |
| Outer diameter of cable sheath | 5 mm | 5 mm | 5 mm | 5 mm |
| Number of bending cycles | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ |
| Permissible bending radius, single bend, min. | 20 mm | 20 mm | 20 mm | 20 mm |
| Permissible bending radius, multiple bends, min. | 40 mm | 40 mm | 40 mm | 40 mm |
| Bending radius for continuous bending | 100 mm | 100 mm | 100 mm | 100 mm |
| Color of cable sheath | Green | Green | Green | Green |
| Color of core insulation of data cores | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange |
| Weight per length | 34 kg/km | 34 kg/km | 34 kg/km | 34 kg/km |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

■ **Technical specifications** (continued)

| Article number | 6ES7194-2LH02-0AA0 | 6ES7194-2LH03-0AA0 | 6ES7194-2LH10-0AA0 | 6ES7194-2LH20-0AA0 |
|---|---|---|---|---|
| | CONNECTING CABLE ET-CONNECTION, 0.19M | CONNECTING CABLE ET-CONNECTION, 0.3M | CONNECTING CABLE ET-CONNECTION, 1.0M | CONNECTING CABLE ET-CONNECTION, 2.0M |
| **Mechanics/material** | | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | metal | metal | metal | metal |
| Material of cable sheath | PVC | PVC | PVC | PVC |
| Material of core insulation | PE | PE | PE | PE |

| Article number | 6ES7194-2LH50-0AA0 | 6ES7194-2LN10-0AA0 | 6ES7194-2LN15-0AA0 |
|---|---|---|---|
| | CONNECTING CABLE ET-CONNECTION, 5.0M | BUS CABLE ET-CONNECTION, 10M | BUS CABLE ET-CONNECTION, 15M |
| **General information** | | | |
| Product type designation | BUS CABLE ET-CONNECTION, 5.0M | BUS CABLE ET-CONNECTION, 10M | BUS CABLE ET CONNECTION, 15M |
| Product description | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded |
| Suitability for use | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN |
| Design of shield | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires |
| Cable length | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.5 mm | 0.5 mm | 0.5 mm |
| Outer diameter of core insulation | 1 mm | 1 mm | 1 mm |
| Outer diameter of cable sheath | 5 mm | 5 mm | 5 mm |
| Number of bending cycles | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | |
| Permissible bending radius, single bend, min. | 20 mm | 20 mm | 20 mm |
| Permissible bending radius, multiple bends, min. | 40 mm | 40 mm | 40 mm |
| Bending radius for continuous bending | 100 mm | 100 mm | 100 mm |
| Color of cable sheath | Green | Green | Green |
| Color of core insulation of data cores | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange |
| Weight per length | 34 kg/km | 34 kg/km | 34 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | metal | metal | metal |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PE | PE | PE |

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■ **Technical specifications** (continued)

| Article number | 6ES7194-2LH03-0AB0 | 6ES7194-2LH10-0AB0 | 6ES7194-2LH20-0AB0 |
|---|---|---|---|
| | CONNECTING CABLE ET-CON., ANGLED, 0.3M | CONNECTING CABLE ET-CON., ANGLED, 1.0M | CONNECTING CABLE ET-CON., ANGLED, 2.0M |
| **General information** | | | |
| Product type designation | BUS CABLE ET-CONNECTION, ANGLED, 0.3M | BUS CABLE ET-CONNECTION, ANGLED, 1.0M | BUS CABLE ET-CONNECTION, ANGLED, 2.0M |
| Product description | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded |
| Suitability for use | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN |
| Design of shield | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires |
| Cable length | 0.3 m | 1 m | 2 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.5 mm | 0.5 mm | 0.5 mm |
| Outer diameter of core insulation | 1 mm | 1 mm | 1 mm |
| Outer diameter of cable sheath | 5 mm | 5 mm | 5 mm |
| Number of bending cycles | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ |
| Permissible bending radius, single bend, min. | 20 mm | 20 mm | 20 mm |
| Permissible bending radius, multiple bends, min. | 40 mm | 40 mm | 40 mm |
| Bending radius for continuous bending | 100 mm | 100 mm | 100 mm |
| Color of cable sheath | Green | Green | Green |
| Color of core insulation of data cores | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange |
| Weight per length | 34 kg/km | 34 kg/km | 34 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 90 degree cable outlet | 90 degree cable outlet | 90 degree cable outlet |
| Material of housing | metal | metal | metal |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PE | PE | PE |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**Accessories > Cables and connectors**

### ■ Technical specifications (continued)

| Article number | 6ES7194-2LH50-0AB0 | 6ES7194-2LN10-0AB0 | 6ES7194-2LN15-0AB0 |
|---|---|---|---|
| | CONNECTING CABLE ET-CON., ANGLED, 5.0M | BUS CABLE ET-CONNECTION, ANGLED, 10M | BUS CABLE ET-CONNECTION, ANGLED, 15M |
| **General information** | | | |
| Product type designation | BUS CABLE ET-CONNECTION, ANGLED, 5.0M | BUS CABLE ET-CONNECTION, ANGLED, 10M | BUS CABLE ET CONNECTION, ANGLED, 15M |
| Product description | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded | Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded |
| Suitability for use | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN |
| Design of shield | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires |
| Cable length | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.5 mm | 0.5 mm | 0.5 mm |
| Outer diameter of core insulation | 1 mm | 1 mm | 1 mm |
| Outer diameter of cable sheath | 5 mm | 5 mm | 5 mm |
| Number of bending cycles | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | |
| Permissible bending radius, single bend, min. | 20 mm | 20 mm | 20 mm |
| Permissible bending radius, multiple bends, min. | 40 mm | 40 mm | 40 mm |
| Bending radius for continuous bending | 100 mm | 100 mm | 100 mm |
| Color of cable sheath | Green | Green | Green |
| Color of core insulation of data cores | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange |
| Weight per length | 34 kg/km | 34 kg/km | 34 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 90 degree cable outlet | 90 degree cable outlet | 90 degree cable outlet |
| Material of housing | metal | metal | metal |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PE | PE | PE |

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■ **Technical specifications** (continued)

| Article number | **6ES7194-2LH20-0AC0** | **6ES7194-2LH50-0AC0** | **6ES7194-2LN10-0AC0** | **6ES7194-2LN15-0AC0** |
|---|---|---|---|---|
| | CONNECTING CABLE ET-CONNECTION, 2.0M | CONNECTING CABLE ET-CONNECTION, 5.0M | BUS CABLE ET-CONNECTION, 10M | BUS CABLE ET-CONNECTION, 15M |
| **General information** | | | | |
| Product type designation | BUS CABLE ET-CONNECTION, 2.0M | BUS CABLE ET-CONNECTION, 5.0M | BUS CABLE ET-CONNECTION, 10M | BUS CABLE ET CONNECTION, 15M |
| Product description | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded |
| Suitability for use | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP65 | Yes | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Cables** | | | | |
| Cable designation | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN | 2Y(ST)CY 1x4x0.5/1.0-100-GN |
| Design of shield | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires | Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires |
| Cable length | 2 m | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.5 mm | 0.5 mm | 0.5 mm | 0.5 mm |
| Outer diameter of core insulation | 1 mm | 1 mm | 1 mm | 1 mm |
| Outer diameter of cable sheath | 5 mm | 5 mm | 5 mm | 5 mm |
| Number of bending cycles | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | 1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s$^2$ | |
| Permissible bending radius, single bend, min. | 20 mm | 20 mm | 20 mm | 20 mm |
| Permissible bending radius, multiple bends, min. | 40 mm | 40 mm | 40 mm | 40 mm |
| Bending radius for continuous bending | 100 mm | 100 mm | 100 mm | 100 mm |
| Color of cable sheath | Green | Green | Green | Green |
| Color of core insulation of data cores | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange | white / yellow / blue / orange |
| Weight per length | 34 kg/km | 34 kg/km | 34 kg/km | 34 kg/km |
| **Mechanics/material** | | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | metal | metal | metal | metal |
| Material of cable sheath | PVC | PVC | PVC | PVC |
| Material of core insulation | PE | PE | PE | PE |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

**Accessories > Cables and connectors**

## ▮ Technical specifications (continued)

| Article number | **6ES7194-2LH02-1AA0** | **6ES7194-2LH03-1AA0** | **6ES7194-2LH10-1AA0** | **6ES7194-2LH20-1AA0** |
|---|---|---|---|---|
| | POWER CABLE M8, 0.19M | POWER CABLE M8, 0.3M | POWER CABLE M8, 1.0M | POWER CABLE M8, 2.0M |
| **General information** | | | | |
| Product type designation | Power cable M8, 0.19M | POWER CABLE M8, 0.3M | POWER CABLE M8, 1.0M | POWER CABLE M8, 2.0M |
| Product description | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP65 | Yes | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Cables** | | | | |
| Cable designation | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y |
| Cable length | 0.19 m | 0.3 m | 1 m | 2 m |
| Number of electrical cores | 4 | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.8 mm | 0.8 mm | 0.8 mm | 0.8 mm |
| Outer diameter of core insulation | 1.46 mm | 1.46 mm | 1.46 mm | 1.46 mm |
| Outer diameter of cable sheath | 5.2 mm | 5.2 mm | 5.2 mm | 5.2 mm |
| Number of bending cycles | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² |
| Permissible bending radius, single bend, min. | 26 mm | 26 mm | 26 mm | 26 mm |
| Permissible bending radius, multiple bends, min. | 52 mm | 52 mm | 52 mm | 52 mm |
| Bending radius for continuous bending | 52 mm | 52 mm | 52 mm | 52 mm |
| Color of cable sheath | gray | gray | gray | gray |
| Color of core insulation of energy core | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black |
| Weight per length | 44 kg/km | 44 kg/km | 44 kg/km | 44 kg/km |
| **Mechanics/material** | | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | plastic | plastic | plastic | plastic |
| Material of cable sheath | PVC | PVC | PVC | PVC |
| Material of core insulation | PP | PP | PP | PP |

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■ **Technical specifications** (continued)

| Article number | 6ES7194-2LH50-1AA0 | 6ES7194-2LN10-1AA0 | 6ES7194-2LN15-1AA0 |
|---|---|---|---|
| | POWER CABLE M8, 5.0M | POWER CABLE M8, 10M | POWER CABLE M8, 15M |
| **General information** | | | |
| Product type designation | POWER CABLE M8, 5.0M | POWER CABLE M8, 10M | POWER CABLE M8, 15M |
| Product description | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y |
| Cable length | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.8 mm | 0.8 mm | 0.8 mm |
| Outer diameter of core insulation | 1.46 mm | 1.46 mm | 1.46 mm |
| Outer diameter of cable sheath | 5.2 mm | 5.2 mm | 5.2 mm |
| Number of bending cycles | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² |
| Permissible bending radius, single bend, min. | 26 mm | 26 mm | 26 mm |
| Permissible bending radius, multiple bends, min. | 52 mm | 52 mm | 52 mm |
| Bending radius for continuous bending | 52 mm | 52 mm | 52 mm |
| Color of cable sheath | gray | gray | gray |
| Color of core insulation of energy core | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black |
| Weight per length | 44 kg/km | 44 kg/km | 44 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | plastic | plastic | plastic |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PP | PP | PP |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

**Accessories  > Cables and connectors**

■ **Technical specifications** (continued)

| Article number | 6ES7194-2LH03-1AB0 | 6ES7194-2LH10-1AB0 | 6ES7194-2LH20-1AB0 |
|---|---|---|---|
| | POWER CABLE M8, ANGLED, 0.3M | POWER CABLE M8, ANGLED, 1.0M | POWER CABLE M8, ANGLED, 2.0M |
| **General information** | | | |
| Product type designation | POWER CABLE M8, ANGLED, 0.3M | POWER CABLE M8, ANGLED, 1.0M | POWER CABLE M8, ANGLED, 2.0M |
| Product description | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y |
| Cable length | 0.3 m | 1 m | 2 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.8 mm | 0.8 mm | 0.8 mm |
| Outer diameter of core insulation | 1.46 mm | 1.46 mm | 1.46 mm |
| Outer diameter of cable sheath | 5.2 mm | 5.2 mm | 5.2 mm |
| Number of bending cycles | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² |
| Permissible bending radius, single bend, min. | 26 mm | 26 mm | 26 mm |
| Permissible bending radius, multiple bends, min. | 52 mm | 52 mm | 52 mm |
| Bending radius for continuous bending | 52 mm | 52 mm | 52 mm |
| Color of cable sheath | gray | gray | gray |
| Color of core insulation of energy core | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black |
| Weight per length | 44 kg/km | 44 kg/km | 44 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 90 degree cable outlet | 90 degree cable outlet | 90 degree cable outlet |
| Material of housing | plastic | plastic | plastic |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PP | PP | PP |

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## ■ Technical specifications (continued)

| Article number | 6ES7194-2LH50-1AB0 | 6ES7194-2LN10-1AB0 | 6ES7194-2LN15-1AB0 |
|---|---|---|---|
| | POWER CABLE M8, ANGLED, 5.0M | POWER CABLE M8, ANGLED, 10M | POWER CABLE M8, ANGLED, 15M |
| **General information** | | | |
| Product type designation | POWER CABLE M8, ANGLED, 5.0M | POWER CABLE M8, ANGLED 10M | POWER CABLE M8, ANGLED, 15M |
| Product description | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled | Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | | |
| Degree of protection acc. to EN 60529 | | | |
| • IP65 | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes |
| **Ambient conditions** | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C |
| **Cables** | | | |
| Cable designation | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y |
| Cable length | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.8 mm | 0.8 mm | 0.8 mm |
| Outer diameter of core insulation | 1.46 mm | 1.46 mm | 1.46 mm |
| Outer diameter of cable sheath | 5.2 mm | 5.2 mm | 5.2 mm |
| Number of bending cycles | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² |
| Permissible bending radius, single bend, min. | 26 mm | 26 mm | 26 mm |
| Permissible bending radius, multiple bends, min. | 52 mm | 52 mm | 52 mm |
| Bending radius for continuous bending | 52 mm | 52 mm | 52 mm |
| Color of cable sheath | gray | gray | gray |
| Color of core insulation of energy core | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black |
| Weight per length | 44 kg/km | 44 kg/km | 44 kg/km |
| **Mechanics/material** | | | |
| Type of cable outlet | 90 degree cable outlet | 90 degree cable outlet | 90 degree cable outlet |
| Material of housing | plastic | plastic | plastic |
| Material of cable sheath | PVC | PVC | PVC |
| Material of core insulation | PP | PP | PP |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet
## SIMATIC ET 200AL

## ■ Technical specifications (continued)

| Article number | 6ES7194-2LH20-1AC0 | 6ES7194-2LH50-1AC0 | 6ES7194-2LN10-1AC0 | 6ES7194-2LN15-1AC0 |
|---|---|---|---|---|
| | POWER CABLE M8, 2.0M | POWER CABLE M8, 5.0M | POWER CABLE M8, 10M | POWER CABLE M8, 15M |
| **General information** | | | | |
| Product type designation | POWER CABLE M8, 2.0M | POWER CABLE M8, 5.0M | POWER CABLE M8, 10M | POWER CABLE M8, 15M |
| Product description | Flexible cable (4-core), preassembled at one end with 1x M8 female connector | Flexible cable (4-core), preassembled at one end with 1x M8 female connector | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded | Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | | | |
| Degree of protection acc. to EN 60529 | | | | |
| • IP65 | Yes | Yes | Yes | Yes |
| • IP67 | Yes | Yes | Yes | Yes |
| **Ambient conditions** | | | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Ambient temperature during storage/transportation** | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 80 °C | 80 °C | 80 °C | 80 °C |
| **Cables** | | | | |
| Cable designation | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y | 4 Li9Y 0.50 mm² Y |
| Cable length | 2 m | 5 m | 10 m | 15 m |
| Number of electrical cores | 4 | 4 | 4 | 4 |
| Outer diameter of inner conductor | 0.8 mm | 0.8 mm | 0.8 mm | 0.8 mm |
| Outer diameter of core insulation | 1.46 mm | 1.46 mm | 1.46 mm | 1.46 mm |
| Outer diameter of cable sheath | 5.2 mm | 5.2 mm | 5.2 mm | 5.2 mm |
| Number of bending cycles | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² | 2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s² |
| Permissible bending radius, single bend, min. | 26 mm | 26 mm | 26 mm | 26 mm |
| Permissible bending radius, multiple bends, min. | 52 mm | 52 mm | 52 mm | 52 mm |
| Bending radius for continuous bending | 52 mm | 52 mm | 52 mm | 52 mm |
| Color of cable sheath | gray | gray | gray | gray |
| Color of core insulation of energy core | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black | white / brown / blue / black |
| Weight per length | 44 kg/km | 44 kg/km | 44 kg/km | 44 kg/km |
| **Mechanics/material** | | | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | plastic | plastic | plastic | plastic |
| Material of cable sheath | PVC | PVC | PVC | PVC |
| Material of core insulation | PP | PP | PP | PP |

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## Technical specifications  (continued)

| Article number | **6ES7194-2AA00-0AA0** | **6ES7194-2AC00-0AA0** |
|---|---|---|
| | M8 POWER CONNECTOR | M8 POWER CONNECTOR, SOCKET |
| **General information** | | |
| Product type designation | M8 POWER CONNECTOR | POWER CONNECTOR M8, SOCKET |
| Product description | M8 plug connector with high degree of protection, 4-pin, plastic version | M8 plug connector with high degree of protection, socket insert, 4-pin, plastic version |
| Suitability for use | For connection to ET 200AL for 24 V DC power supply | For connection to ET 200AL for 24 V DC power supply |
| **Degree and class of protection** | | |
| Degree of protection acc. to EN 60529 | | |
| • IP65 | Yes | Yes |
| • IP67 | Yes | Yes |
| **Ambient conditions** | | |
| Ambient temperature during assembly, min. | -30 °C | -30 °C |
| Ambient temperature during assembly, max. | 85 °C | 85 °C |
| **Ambient temperature during storage/transportation** | | |
| • min. | -40 °C | -40 °C |
| • max. | 85 °C | 85 °C |
| **Mechanics/material** | | |
| Type of cable outlet | 180 degree cable outlet | 180 degree cable outlet |
| Material of housing | plastic | plastic |
| **Dimensions** | | |
| Width | 14 mm | 14 mm |
| Depth | 47 mm | 47 mm |

| Article number | **6ES7194-2AB00-0AA0** | | Article number | **6ES7194-2AB00-0AA0** |
|---|---|---|---|---|
| | M8 CONNECTOR ET-CONNECTION | | | M8 CONNECTOR ET-CONNECTION |
| **General information** | | | **Ambient temperature during storage/transportation** | |
| Product type designation | M8 PLUG ET-CONNECTION | | • min. | -40 °C |
| Product description | M8 plug connector with high degree of protection, 4-pin, metal version | | • max. | 80 °C |
| | | | **Mechanics/material** | |
| Suitability for use | for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67 | | Type of cable outlet | 180 degree cable outlet |
| | | | Material of housing | metal |
| **Degree and class of protection** | | | **Dimensions** | |
| Degree of protection acc. to EN 60529 | | | Width | 14 mm |
| • IP65 | Yes | | Depth | 47 mm |
| • IP67 | Yes | | | |
| **Ambient conditions** | | | | |
| Ambient temperature during assembly, min. | -30 °C | | | |
| Ambient temperature during assembly, max. | 80 °C | | | |

## Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **Bus cable for backplane bus (ET connection)** | | | PUR line, pre-assembled at both ends, 2 M8 connectors | |
| 4-pin, shielded | | | 0.19 m | **6ES7194-2MH02-0AA0** |
| Pre-assembled at both ends, 2 M8 connectors | | | 0.3 m | **6ES7194-2MH03-0AA0** |
| 0.19 m | **6ES7194-2LH02-0AA0** | | 1 m | **6ES7194-2MH10-0AA0** |
| 0.3 m | **6ES7194-2LH03-0AA0** | | 2 m | **6ES7194-2MH20-0AA0** |
| 1 m | **6ES7194-2LH10-0AA0** | | 5 m | **6ES7194-2MH50-0AA0** |
| 2 m | **6ES7194-2LH20-0AA0** | | 10 m | **6ES7194-2MN10-0AA0** |
| 5 m | **6ES7194-2LH50-0AA0** | | 15 m | **6ES7194-2MN15-0AA0** |
| 10 m | **6ES7194-2LN10-0AA0** | | | |
| 15 m | **6ES7194-2LN15-0AA0** | | | |

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# I/O systems
SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

**Accessories > Cables and connectors**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **Bus cable for backplane bus (ET connection) (continued)** | | PUR line, pre-assembled at both ends, M8 connector and M8 socket | |
| Pre-assembled at both ends, 2 M8 connectors, angled | | 0.19 m | 6ES7194-2MH02-1AA0 |
| 0.3 m | 6ES7194-2LH03-0AB0 | 0.3 m | 6ES7194-2MH03-1AA0 |
| 1 m | 6ES7194-2LH10-0AB0 | 1 m | 6ES7194-2MH10-1AA0 |
| 2 m | 6ES7194-2LH20-0AB0 | 2 m | 6ES7194-2MH20-1AA0 |
| 5 m | 6ES7194-2LH50-0AB0 | 5 m | 6ES7194-2MH50-1AA0 |
| 10 m | 6ES7194-2LN10-0AB0 | 10 m | 6ES7194-2MN10-1AA0 |
| 15 m | 6ES7194-2LN15-0AB0 | 15 m | 6ES7194-2MN15-1AA0 |
| PUR line, pre-assembled at both ends, 2 M8 connectors, angled | | Pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 0.3 m | 6ES7194-2MH03-0AB0 | 0.3 m | 6ES7194-2LH03-1AB0 |
| 1 m | 6ES7194-2MH10-0AB0 | 1 m | 6ES7194-2LH10-1AB0 |
| 2 m | 6ES7194-2MH20-0AB0 | 2 m | 6ES7194-2LH20-1AB0 |
| 5 m | 6ES7194-2MH50-0AB0 | 5 m | 6ES7194-2LH50-1AB0 |
| 10 m | 6ES7194-2MN10-0AB0 | 10 m | 6ES7194-2LN10-1AB0 |
| 15 m | 6ES7194-2MN15-0AB0 | 15 m | 6ES7194-2LN15-1AB0 |
| Pre-assembled at one end, 1 M8 connector | | PUR line, pre-assembled at both ends, angled M8 connector and angled M8 socket | |
| 2 m | 6ES7194-2LH20-0AC0 | 0.3 m | 6ES7194-2MH03-1AB0 |
| 5 m | 6ES7194-2LH50-0AC0 | 1 m | 6ES7194-2MH10-1AB0 |
| 10 m | 6ES7194-2LN10-0AC0 | 2 m | 6ES7194-2MH20-1AB0 |
| 15 m | 6ES7194-2LN15-0AC0 | 5 m | 6ES7194-2MH50-1AB0 |
| PUR line, pre-assembled at one end, 1 M8 connector | | 10 m | 6ES7194-2MN10-1AB0 |
| 2 m | 6ES7194-2MH20-0AC0 | 15 m | 6ES7194-2MN15-1AB0 |
| 5 m | 6ES7194-2MH50-0AC0 | Pre-assembled at one end, M8 socket | |
| 10 m | 6ES7194-2MN10-0AC0 | 2 m | 6ES7194-2LH20-1AC0 |
| 15 m | 6ES7194-2MN15-0AC0 | 5 m | 6ES7194-2LH50-1AC0 |
| **Connecting cable for bus cable for backplane bus (ET connection)** | | 10 m | 6ES7194-2LN10-1AC0 |
| | | 15 m | 6ES7194-2LN15-1AC0 |
| 4-pin, shielded | | PUR line, pre-assembled at one end, M8 socket | |
| Pre-assembled at both ends, 2 M8 connectors, 0.2 m | 6ES7194-2LH02-0AD0 | 2 m | 6ES7194-2MH20-1AC0 |
| PUR line, pre-assembled at both ends, 2 M8 connectors, 0.2 m | 6ES7194-2MH02-0AD0 | 5 m | 6ES7194-2MH50-1AC0 |
| **M8 power cable** | | 10 m | 6ES7194-2MN10-1AC0 |
| 4-pin | | 15 m | 6ES7194-2MN15-1AC0 |
| Pre-assembled at both ends, M8 connector and M8 socket | | **M8 connector for ET connection** | 6ES7194-2AB00-0AA0 |
| 0.19 m | 6ES7194-2LH02-1AA0 | 4-pin, shielded | |
| 0.3 m | 6ES7194-2LH03-1AA0 | **M8 power connector** | |
| 1 m | 6ES7194-2LH10-1AA0 | Male contact insert, 4-pin | 6ES7194-2AA00-0AA0 |
| 2 m | 6ES7194-2LH20-1AA0 | Female contact insert, 4-pin | 6ES7194-2AC00-0AA0 |
| 5 m | 6ES7194-2LH50-1AA0 | **ET connection FastConnect stripping tool** | 6ES7194-2KA00-0AA0 |
| 10 m | 6ES7194-2LN10-1AA0 | Stripping tool for stripping the ET connection bus cable | |
| 15 m | 6ES7194-2LN15-1AA0 | | |

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■ **Overview**

- Labels for the identification of channels, modules and slots of ET 200AL components
- Can be used for interface modules and I/O modules

■ **Ordering data**　　　　　　　　**Article No.**

| Labels | 6ES7194-2BA00-0AA0 |
|---|---|
| 10 x 5 mm, RAL 9016;<br>5 frames with 40 labels each | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### Overview



- Compact block I/O for processing digital, analog and IO-Link signals for connecting to the PROFINET bus system
- Cabinet-free design in IP65/66/67 degree of protection with M12 connections
- Extremely rugged and resistant metal enclosure and casting

- Compact module in two types of enclosures:
  - 30 mm x 200 mm x 37 mm (W x H x D, long and narrow enclosure), with 4 x M12 for digital signals
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure), with 8 x M12 for digital signals and IO-Link
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 4 x M12 or 8 x M12 for analog signals
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- Data transmission rate 100 Mbps
- LLDP proximity detection without PG and fast startup (boot up within approx. 0.5 seconds)
- Supply and load voltage connection: 2 x M12
- Module variance:
  - 8 DI
  - 16 DI
  - 8 DO (2 A)
  - 8 DO (1.3 A)
  - 8 DO (0.5 A)
  - 16 DO (1.3 A)
  - 8 DI/DO (1.3 A)
  - 8 AI (U, I, TC, RTD)
  - 8 AI (TC, RTD)
  - 4 AO (U, I)
  - 4 IO-Link
  - 4 IO-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnostics
- Ambient temperature range -40 °C to 60 °C

### Technical specifications

| Article number | 6ES7141-6BF00-0AB0 | 6ES7141-6BG00-0AB0 | 6ES7141-6BH00-0AB0 |
|---|---|---|---|
| | ET 200ECO PN, 8DI, DC24V, 4XM12 | ET 200ECO PN, 8DI, DC24V, 8XM12 | ET 200ECO PN, 16DI, DC24V, 8XM12 |
| **General information** | | | |
| Vendor identification (VendorID) | 002AH | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H | 0306H |
| **Supply voltage** | | | |
| Rated value (DC) | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes |
| **Input current** | | | |
| Current consumption, typ. | 100 mA | 100 mA | 100 mA |
| **Encoder supply** | | | |
| Number of outputs | 4 | 8 | 8 |
| Short-circuit protection | Yes; Electronic | Yes; Electronic | Yes; Electronic |
| **Output current** | | | |
| • Rated value | 100 mA; per output | 100 mA; per output | 100 mA; per output |
| **Power loss** | | | |
| Power loss, typ. | 5.5 W | 4.5 W | 6.5 W |
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 8 | 16 |
| • in groups of | 2 | 1 | 2 |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | Yes | Yes |
| **Number of simultaneously controllable inputs** | | | |
| **all mounting positions** | | | |
| - up to 60 °C, max. | 8 | 8 | 16 |

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## ■ Technical specifications (continued)

| Article number | 6ES7141-6BF00-0AB0 | 6ES7141-6BG00-0AB0 | 6ES7141-6BH00-0AB0 |
|---|---|---|---|
| | ET 200ECO PN, 8DI, DC24V, 4XM12 | ET 200ECO PN, 8DI, DC24V, 8XM12 | ET 200ECO PN, 16DI, DC24V, 8XM12 |
| **Input voltage** | | | |
| • Type of input voltage | DC | DC | DC |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • for signal "0" | -3 to +5V | -3 to +5V | -3 to +5V |
| • for signal "1" | +11 to +30V | +11 to +30V | +11 to +30V |
| **Input current** | | | |
| • for signal "1", typ. | 7 mA | 7 mA | 7 mA |
| **Input delay** **(for rated value of input voltage)** | | | |
| **for standard inputs** | | | |
|   - at "0" to "1", max. | typically 3 ms | typically 3 ms | typically 3 ms |
|   - at "1" to "0", max. | typically 3 ms | typically 3 ms | typically 3 ms |
| **Cable length** | | | |
| • unshielded, max. | 30 m | 30 m | 30 m |
| **Encoder** | | | |
| **Connectable encoders** | | | |
| • 2-wire sensor | Yes | Yes | Yes |
|   - permissible quiescent current (2-wire sensor), max. | 1.5 mA | 1.5 mA | 1.5 mA |
| **Interfaces** | | | |
| Transmission procedure | 100BASE-TX | 100BASE-TX | 100BASE-TX |
| Number of PROFINET interfaces | 1 | 1 | 1 |
| **PROFINET IO** | | | |
| • Autocrossing | Yes | Yes | Yes |
| • automatic detection of transmission rate | Yes | Yes | Yes |
| • Transmission rate, max. | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| • integrated switch | Yes | Yes | Yes |
| **PROFINET IO Device** | | | |
|   - IRT with the option "high flexibility" | Yes | Yes | Yes |
|   - Prioritized startup | Yes | Yes | Yes |
| **Protocols** | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes |
| PROFINET CBA | No | No | No |
| PROFIsafe | No | No | No |
| **Protocols (Ethernet)** | | | |
| • TCP/IP | No | No | No |
| • SNMP | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes |
| • ping | Yes | Yes | Yes |
| • ARP | Yes | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | | |
| Status indicator | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| Diagnostic functions | Yes | Yes | Yes |
| **Alarms** | | | |
| • Diagnostic alarm | Yes | Yes | Yes |
| **Diagnostic messages** | | | |
| • Diagnostic information readable | Yes | Yes | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire-break in signal transmitter cable | Yes | Yes | Yes |
| • Short-circuit encoder supply | Yes; Per channel group | Yes; Per channel group | Yes; Per channel group |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### ■ Technical specifications (continued)

| Article number | 6ES7141-6BF00-0AB0 | 6ES7141-6BG00-0AB0 | 6ES7141-6BH00-0AB0 |
|---|---|---|---|
| | ET 200ECO PN, 8DI, DC24V, 4XM12 | ET 200ECO PN, 8DI, DC24V, 8XM12 | ET 200ECO PN, 16DI, DC24V, 8XM12 |
| **Potential separation** | | | |
| between the load voltages | Yes | Yes | Yes |
| between load voltage and all other switching components | No | No | No |
| between Ethernet and electronics | Yes | Yes | Yes |
| **Potential separation digital inputs** | | | |
| • between the channels | No | No | No |
| **Isolation** | | | |
| **tested with** | | | |
| • 24 V DC circuits | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | | | |
| IP degree of protection | IP65/67 | IP67 | IP67 |
| **Connection method** | | | |
| Design of electrical connection | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors |
| **Dimensions** | | | |
| Width | 30 mm | 60 mm | 60 mm |
| Height | 200 mm | 175 mm | 175 mm |
| Depth | 49 mm | 49 mm | 49 mm |
| **Weights** | | | |
| Weight (without packaging) | 550 g | 910 g | 910 g |

| Article number | 6ES7142-6BF50-0AB0 | 6ES7142-6BF00-0AB0 | 6ES7142-6BG00-0AB0 | 6ES7142-6BR00-0AB0 | 6ES7142-6BH00-0AB0 |
|---|---|---|---|---|---|
| | ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12 | ET 200ECO PN, 8 DO, DC24V/2A, 8XM12 | ET 200ECO PN, 16DO DC24V/1.3A, 8XM12 |
| **General information** | | | | | |
| Vendor identification (VendorID) | 002AH | 002AH | 002AH | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H | 0306H | 0306H | 0306H |
| **Supply voltage** | | | | | |
| Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |
| **Load voltage 2L+** | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |
| **Input current** | | | | | |
| Current consumption, typ. | 100 mA | 100 mA | 100 mA | 100 mA | 100 mA |
| from supply voltage 1L+, max. | 4 A | 4 A | 4 A | 4 A | 4 A |
| from load voltage 2L+, max. | 4 A | 4 A | 4 A | 4 A | 4 A |
| **Power loss** | | | | | |
| Power loss, typ. | 3 W | 5.5 W | 5.5 W | 5 W | 5.5 W |
| **Digital outputs** | | | | | |
| Number of digital outputs | 8 | 8 | 8 | 8 | 16 |
| • in groups of | 8 | 4 | 4 | 4 | 8 |
| Short-circuit protection | Yes | Yes | Yes | Yes | Yes |
| • Response threshold, typ. | 0.7 A | 1.8 A | 1.8 A | 2.8 A | 1.8 A |
| Limitation of inductive shutdown voltage to | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V |
| Controlling a digital input | Yes | Yes | Yes | Yes | Yes |
| **Switching capacity of the outputs** | | | | | |
| • on lamp load, max. | 5 W | 5 W | 5 W | 10 W | 5 W |
| **Output current** | | | | | |
| • for signal "1" rated value | 0.5 A | 1.3 A; Maximum | 1.3 A; Maximum | 2 A | 1.3 A; Maximum |
| • for signal "0" residual current, max. | 1.5 mA | 1.5 mA | 1.5 mA | 1.5 mA | 1.5 mA |

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■ **Technical specifications** (continued)

| Article number | 6ES7142-6BF50-0AB0 | 6ES7142-6BF00-0AB0 | 6ES7142-6BG00-0AB0 | 6ES7142-6BR00-0AB0 | 6ES7142-6BH00-0AB0 |
|---|---|---|---|---|---|
| | ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12 | ET 200ECO PN, 8 DO, DC24V/2A, 8XM12 | ET 200ECO PN, 16DO DC24V/1.3A, 8XM12 |
| **Parallel switching of two outputs** | | | | | |
| • for uprating | No | No | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes | Yes | Yes |
| **Switching frequency** | | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 1 Hz | 1 Hz | 1 Hz | 1 Hz |
| **Total current of the outputs (per group)** | | | | | |
| **all mounting positions** | | | | | |
|   - up to 55 °C, max. | | 3.9 A | | | |
|   - up to 60 °C, max. | 4 A | 2.6 A | 3.9 A | 3.9 A | 3.9 A |
| **Cable length** | | | | | |
| • unshielded, max. | 30 m | 30 m | 30 m | 30 m | 30 m |
| **Interfaces** | | | | | |
| Transmission procedure | 100BASE-TX | 100BASE-TX | 100BASE-TX | 100BASE-TX | 100BASE-TX |
| Number of PROFINET interfaces | 1 | 1 | 1 | 1 | 1 |
| **PROFINET IO** | | | | | |
| • Autocrossing | Yes | Yes | Yes | Yes | Yes |
| • automatic detection of transmission rate | Yes | Yes | Yes | Yes | Yes |
| • Transmission rate, max. | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| • integrated switch | Yes | Yes | Yes | Yes | Yes |
| **PROFINET IO Device** | | | | | |
|   - IRT with the option "high flexibility" | Yes | Yes | Yes | Yes | Yes |
|   - Prioritized startup | Yes | Yes | Yes | Yes | Yes |
| **Protocols** | | | | | |
| Supports protocol for PROFINET IO | Yes | Yes | Yes | Yes | Yes |
| PROFINET CBA | No | No | No | No | No |
| PROFIsafe | No | No | No | No | No |
| **Protocols (Ethernet)** | | | | | |
| • TCP/IP | No | No | No | No | No |
| • SNMP | Yes | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes | Yes |
| • ping | Yes | Yes | Yes | Yes | Yes |
| • ARP | Yes | Yes | Yes | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | | | | |
| Status indicator | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| Diagnostic functions | Yes | Yes | Yes | Yes | Yes |
| **Alarms** | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| **Diagnostic messages** | | | | | |
| • Diagnostic information readable | Yes | Yes | Yes | Yes | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire-break in actuator cable | Yes | Yes | Yes | Yes | Yes |
| • Short-circuit | Yes | Yes | Yes | Yes | Yes |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### ■ Technical specifications (continued)

| Article number | 6ES7142-6BF50-0AB0 | 6ES7142-6BF00-0AB0 | 6ES7142-6BG00-0AB0 | 6ES7142-6BR00-0AB0 | 6ES7142-6BH00-0AB0 |
|---|---|---|---|---|---|
| | ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12 | ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12 | ET 200ECO PN, 8 DO, DC24V/2A, 8XM12 | ET 200ECO PN, 16DO DC24V/1.3A, 8XM12 |
| **Potential separation** | | | | | |
| between the load voltages | Yes | Yes | Yes | Yes | Yes |
| between load voltage and all other switching components | No | No | No | No | No |
| between Ethernet and electronics | Yes | Yes | Yes | Yes | Yes |
| **Potential separation digital outputs** | | | | | |
| • between the channels | No | No | No | No | No |
| **Isolation** | | | | | |
| **tested with** | | | | | |
| • 24 V DC circuits | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | | | | | |
| IP degree of protection | IP67 | IP65/67 | IP67 | IP67 | IP67 |
| **Connection method** | | | | | |
| Design of electrical connection | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors |
| **Dimensions** | | | | | |
| Width | 30 mm | 30 mm | 60 mm | 60 mm | 60 mm |
| Height | 200 mm | 200 mm | 175 mm | 175 mm | 175 mm |
| Depth | 49 mm | 49 mm | 49 mm | 49 mm | 49 mm |
| **Weights** | | | | | |
| Weight (without packaging) | 550 g | 550 g | 910 g | 910 g | 910 g |

| Article number | 6ES7147-6BG00-0AB0 |
|---|---|
| | ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12 |
| **General information** | |
| Vendor identification (VendorID) | 002AH |
| Device identifier (DeviceID) | 0306H |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Load voltage 2L+** | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, typ. | 100 mA |
| from supply voltage 1L+, max. | 4 A |
| from load voltage 2L+, max. | 4 A |
| **Encoder supply** | |
| Number of outputs | 8 |
| Short-circuit protection | Yes; Electronic |
| **Output current** | |
| • Rated value | 100 mA; per output |
| **Power loss** | |
| Power loss, typ. | 6.5 W |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| • in groups of | 4 |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Number of simultaneously controllable inputs** | |
| **all mounting positions** | |
| - up to 60 °C, max. | 8 |

| Article number | 6ES7147-6BG00-0AB0 |
|---|---|
| | ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12 |
| **Input voltage** | |
| • Type of input voltage | DC |
| • Rated value (DC) | 24 V |
| • for signal "0" | -3 to +5V |
| • for signal "1" | +11 to +30V |
| **Input current** | |
| • for signal "1", typ. | 7 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", max. | typically 3 ms |
| - at "1" to "0", max. | typically 3 ms |
| **Cable length** | |
| • unshielded, max. | 30 m |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| • in groups of | 4 |
| Short-circuit protection | Yes; Electronic |
| • Response threshold, typ. | 1.8 A |
| Limitation of inductive shutdown voltage to | Typ. (L1+, L2+) -47 V |
| Controlling a digital input | Yes |
| **Switching capacity of the outputs** | |
| • on lamp load, max. | 5 W |
| **Output current** | |
| • for signal "1" rated value | 1.3 A; Maximum |
| • for signal "0" residual current, max. | 1.5 mA |

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■ **Technical specifications** (continued)

| Article number | 6ES7147-6BG00-0AB0 |
| --- | --- |
| | ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12 |
| **Parallel switching of two outputs** | |
| • for uprating | No |
| • for redundant control of a load | Yes |
| **Switching frequency** | |
| • with resistive load, max. | 100 Hz |
| • with inductive load, max. | 0.5 Hz |
| • on lamp load, max. | 1 Hz |
| **Total current of the outputs (per group)** | |
| **all mounting positions** | |
| - up to 60 °C, max. | 3.9 A |
| **Cable length** | |
| • unshielded, max. | 30 m |
| **Encoder** | |
| **Connectable encoders** | |
| • 2-wire sensor | Yes |
| - permissible quiescent current (2-wire sensor), max. | 1.5 mA |
| **Interfaces** | |
| Transmission procedure | 100BASE-TX |
| Number of PROFINET interfaces | 1 |
| **PROFINET IO** | |
| • Autocrossing | Yes |
| • automatic detection of transmission rate | Yes |
| • Transmission rate, max. | 100 Mbit/s |
| • integrated switch | Yes |
| **PROFINET IO Device** | |
| - IRT with the option "high flexibility" | Yes |
| - Prioritized startup | Yes |
| **Protocols** | |
| Supports protocol for PROFINET IO | Yes |
| PROFINET CBA | No |
| PROFIsafe | No |
| **Protocols (Ethernet)** | |
| • TCP/IP | No |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • ARP | Yes |

| Article number | 6ES7147-6BG00-0AB0 |
| --- | --- |
| | ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12 |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes; Green LED |
| Diagnostic functions | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED |
| • Wire-break in actuator cable | Yes |
| • Wire-break in signal transmitter cable | Yes |
| • Short-circuit | Yes |
| • Short-circuit encoder supply | Yes |
| • Group error | Yes; Red/yellow "SF/MT" LED |
| **Potential separation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| **Potential separation digital inputs** | |
| • between the channels | No |
| **Potential separation digital outputs** | |
| • between the channels | No |
| **Isolation** | |
| **tested with** | |
| • 24 V DC circuits | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | |
| IP degree of protection | IP65/67 |
| **Connection method** | |
| Design of electrical connection | 4/5-pin M12 circular connectors |
| **Dimensions** | |
| Width | 60 mm |
| Height | 175 mm |
| Depth | 49 mm |
| **Weights** | |
| Weight (without packaging) | 910 g |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### Technical specifications (continued)

| Article number | 6ES7144-6KD00-0AB0 | 6ES7144-6KD50-0AB0 |
| --- | --- | --- |
| | ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12 | ET 200ECO PN, 8AI RTD/TC 8XM12 |
| **General information** | | |
| Vendor identification (VendorID) | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes; against destruction |
| **Input current** | | |
| Current consumption, typ. | 110 mA | 110 mA |
| **Encoder supply** | | |
| Number of outputs | 4 | |
| Short-circuit protection | Yes; Electronic at 1.4 A | |
| **Output current** | | |
| • Rated value | 1 A; Maximum | |
| **Power loss** | | |
| Power loss, typ. | 2.8 W | 2.8 W |
| **Analog inputs** | | |
| Number of analog inputs | 8 | 8 |
| • For voltage/current measurement | 4 | |
| • For resistance/resistance thermometer measurement | 4 | 8 |
| permissible input voltage for voltage input (destruction limit), max. | 28.8 V permanent, 35 V for max. 500 ms | |
| **Input ranges (rated values), voltages** | | |
| • 0 to +10 V | Yes | |
| • 1 V to 5 V | Yes | |
| • -10 V to +10 V | Yes | |
| • -80 mV to +80 mV | Yes | Yes |
| **Input ranges (rated values), currents** | | |
| • 0 to 20 mA | Yes | |
| • -20 mA to +20 mA | Yes | |
| • 4 mA to 20 mA | Yes | |
| **Input ranges (rated values), thermocouples** | | |
| • Type E | Yes | Yes |
| • Type J | Yes | Yes |
| • Type K | Yes | Yes |
| • Type N | Yes | Yes |
| **Input ranges (rated values), resistance thermometer** | | |
| • Ni 100 | Yes | Yes |
| • Ni 1000 | Yes | Yes |
| • Ni 120 | Yes | Yes |
| • Ni 200 | Yes | Yes |
| • Ni 500 | Yes | Yes |
| • Pt 100 | Yes | Yes |
| • Pt 1000 | Yes | Yes |
| • Pt 200 | Yes | Yes |
| • Pt 500 | Yes | Yes |
| **Input ranges (rated values), resistors** | | |
| • 0 to 150 ohms | Yes | Yes |
| • 0 to 300 ohms | Yes | Yes |
| • 0 to 600 ohms | Yes | Yes |
| • 0 to 3000 ohms | Yes | Yes |

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## ▪ Technical specifications (continued)

| Article number | 6ES7144-6KD00-0AB0 | 6ES7144-6KD50-0AB0 |
|---|---|---|
| | ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12 | ET 200ECO PN, 8AI RTD/TC 8XM12 |
| **Thermocouple (TC)** | | |
| **Temperature compensation** | | |
| - parameterizable | Yes | Yes |
| - internal temperature compensation | Yes | Yes |
| - external temperature compensation with compensations socket | Yes | Yes |
| - external temperature compensation with Pt100 | | Yes |
| - dynamic reference temperature value | | Yes |
| - for definable comparison point temperature | | Yes |
| **Cable length** | | |
| • shielded, max. | 30 m | 30 m |
| **Analog value generation for the inputs** | | |
| Analog value display | SIMATIC S7 format | SIMATIC S7 format |
| Measurement principle | integrating | integrating |
| **Integration and conversion time/ resolution per channel** | | |
| • Resolution (incl. overrange) | 15 bit + sign | 15 bit + sign |
| • Integration time, parameterizable | Yes | Yes |
| • Integration time (ms) | 2/16.67/20/100 ms | 2/16.67/20/100 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 500 / 60 / 50 / 10 Hz | 500 / 60 / 50 / 10 Hz |
| • Conversion time (per channel) | 4 / 19 / 22 / 102 ms | 4 / 19 / 22 / 102 ms |
| **Smoothing of measured values** | | |
| • parameterizable | Yes | Yes |
| • Step: None | Yes; 1 x cycle time | Yes; 1 x cycle time |
| • Step: low | Yes; 4 x cycle time | Yes; 4 x cycle time |
| • Step: Medium | Yes; 16 x cycle time | Yes; 16 x cycle time |
| • Step: High | Yes; 64 x cycle time | Yes; 64 x cycle time |
| **Encoder** | | |
| Number of connectable encoders, max. | 8 | 8 |
| **Connection of signal encoders** | | |
| • for voltage measurement | Yes | |
| • for current measurement as 2-wire transducer | Yes | |
| • for current measurement as 4-wire transducer | Yes | |
| • for resistance measurement with two-wire connection | Yes | Yes |
| • for resistance measurement with three-wire connection | Yes | Yes |
| • for resistance measurement with four-wire connection | Yes | Yes |
| **Errors/accuracies** | | |
| Linearity error (relative to input range), (+/-) | 0.01 % | 0.01 % |
| Temperature error (relative to input range), (+/-) | U: 0.0035%/°C; I:0.006%/°C; RTD: 0.0005%/°C; TC: 0.0035%/°C | RTD: 0.0005%/°C; TC: 0.0035%/°C |
| Crosstalk between the inputs, min. | 85 dB | -85 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.008 % | 0.008 % |
| **Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency** | | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 46 dB | 46 dB |
| • Common mode interference, min. | 70 dB | 70 dB |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

■ **Technical specifications** (continued)

| Article number | 6ES7144-6KD00-0AB0 | 6ES7144-6KD50-0AB0 |
|---|---|---|
| | ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12 | ET 200ECO PN, 8AI RTD/TC 8XM12 |
| **Interfaces** | | |
| Transmission procedure | 100BASE-TX | 100BASE-TX |
| Number of PROFINET interfaces | 1 | 1 |
| **PROFINET IO** | | |
| • Autocrossing | Yes | Yes |
| • automatic detection of transmission rate | Yes | Yes |
| • Transmission rate, max. | 100 Mbit/s | 100 Mbit/s |
| • integrated switch | Yes | Yes |
| **PROFINET IO Device** | | |
| - IRT with the option "high flexibility" | Yes | |
| - Prioritized startup | Yes | Yes |
| **Protocols** | | |
| Supports protocol for PROFINET IO | Yes | Yes |
| PROFINET CBA | No | No |
| PROFIsafe | No | No |
| **Protocols (Ethernet)** | | |
| • TCP/IP | No | No |
| • SNMP | Yes | Yes |
| • DCP | Yes | Yes |
| • LLDP | Yes | Yes |
| • ping | Yes | Yes |
| • ARP | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | |
| Status indicator | Yes | |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Short-circuit encoder supply | Yes; per module | |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |
| • Overflow/underflow | Yes | Yes |
| **Potential separation** | | |
| between the load voltages | Yes | Yes |
| between load voltage and all other switching components | No | No |
| between Ethernet and electronics | Yes | Yes |
| **Potential separation analog inputs** | | |
| • between the channels | No | No |
| **Permissible potential difference** | | |
| Between the inputs and MANA (UCM) | 10 Vpp AC | 10 Vpp AC |
| **Isolation** | | |
| **tested with** | | |
| • 24 V DC circuits | 707 V DC (type test) | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | | |
| IP degree of protection | IP65/67 | IP65/67 |
| **Connection method** | | |
| Design of electrical connection | 4/5-pin M12 circular connectors | 4/5-pin M12 circular connectors |
| **Dimensions** | | |
| Width | 60 mm | 60 mm |
| Height | 175 mm | 175 mm |
| Depth | 49 mm | 49 mm |
| **Weights** | | |
| Weight (without packaging) | 930 g | 930 g |

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## ■ Technical specifications (continued)

| Article number | 6ES7145-6HD00-0AB0 |
|---|---|
| | ET 200ECO PN, 4AO U/I 4XM12 |
| **General information** | |
| Vendor identification (VendorID) | 002AH |
| Device identifier (DeviceID) | 0306H |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Reverse polarity protection | Yes |
| **Input current** | |
| Current consumption, typ. | 280 mA |
| **Actuator supply** | |
| Number of outputs | 4 |
| Short-circuit protection | Yes; Electronic at 1.4 A |
| **Output current** | |
| • Rated value | 1 A; Maximum |
| **Power loss** | |
| Power loss, typ. | 5.5 W |
| **Analog outputs** | |
| Number of analog outputs | 4 |
| Voltage output, short-circuit protection | Yes |
| Voltage output, short-circuit current, max. | 30 mA |
| Current output, no-load voltage, max. | 20 V |
| **Output ranges, voltage** | |
| • 0 to 10 V | Yes |
| • 1 V to 5 V | Yes |
| • -10 V to +10 V | Yes |
| **Output ranges, current** | |
| • 0 to 20 mA | Yes |
| • -20 mA to +20 mA | Yes |
| • 4 mA to 20 mA | Yes |
| **Connection of actuators** | |
| • for voltage output two-wire connection | Yes |
| • for current output two-wire connection | Yes |
| **Load impedance (in rated range of output)** | |
| • with voltage outputs, min. | 1 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF |
| • with current outputs, max. | 600 Ω |
| • with current outputs, inductive load, max. | 1 mH |
| **Destruction limits against externally applied voltages and currents** | |
| • Voltages at the outputs towards MANA | 28.8 V permanent, 35 V for max. 500 ms |
| **Cable length** | |
| • shielded, max. | 30 m |
| **Analog value generation for the outputs** | |
| Analog value display | SIMATIC S7 format |
| Conversion principle | Resistor network |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution (incl. overrange) | 15 bit + sign |
| • Conversion time (per channel) | 1 ms |

| Article number | 6ES7145-6HD00-0AB0 |
|---|---|
| | ET 200ECO PN, 4AO U/I 4XM12 |
| **Settling time** | |
| • for resistive load | 2 ms |
| • for capacitive load | 1.8 ms |
| • for inductive load | 2 ms |
| **Errors/accuracies** | |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) | U: ±0.6 mVrms; I: ±0.4 nArms |
| Linearity error (relative to output range), (+/-) | 0.02 % |
| Temperature error (relative to output range), (+/-) | U: 0.001%/°C; I: 0.0025%/°C |
| Crosstalk between the outputs, min. | 70 dB |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.008 % |
| **Interfaces** | |
| Transmission procedure | 100BASE-TX |
| Number of PROFINET interfaces | 1 |
| **PROFINET IO** | |
| • Autocrossing | Yes |
| • automatic detection of transmission rate | Yes |
| • Transmission rate, max. | 100 Mbit/s |
| • integrated switch | Yes |
| **PROFINET IO Device** | |
| - IRT with the option "high flexibility" | Yes |
| - Prioritized startup | Yes |
| **Protocols** | |
| Supports protocol for PROFINET IO | Yes |
| PROFINET CBA | No |
| PROFIsafe | No |
| **Protocols (Ethernet)** | |
| • TCP/IP | No |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • ARP | Yes |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Diagnostic functions | Yes |
| Substitute values connectable | Yes |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED |
| • Wire-break | Yes; Channel-by-channel with current output |
| • Short-circuit | Yes; Channel-by-channel with voltage output |
| • Group error | Yes; Red/yellow "SF/MT" LED |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### ■ Technical specifications (continued)

| Article number | **6ES7145-6HD00-0AB0** |
|---|---|
| | ET 200ECO PN, 4AO  U/I  4XM12 |
| **Potential separation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| **Potential separation analog outputs** | |
| • between the channels | No |
| **Permissible potential difference** | |
| between M internally and the outputs | 10 Vpp AC |

| Article number | **6ES7145-6HD00-0AB0** |
|---|---|
| | ET 200ECO PN, 4AO  U/I  4XM12 |
| **Isolation** | |
| **tested with** | |
| • 24 V DC circuits | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | |
| IP degree of protection | IP65/67 |
| **Connection method** | |
| Design of electrical connection | 4/5-pin M12 circular connectors |
| **Dimensions** | |
| Width | 60 mm |
| Height | 175 mm |
| Depth | 49 mm |
| **Weights** | |
| Weight (without packaging) | 930 g |

| Article number | **6ES7148-6JA00-0AB0** | **6ES7148-6JD00-0AB0** |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **General information** | | |
| Vendor identification (VendorID) | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes |
| **Load voltage 2L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes; against destruction; load increasing |
| **Input current** | | |
| Current consumption, typ. | 200 mA | 100 mA |
| from supply voltage 1L+, max. | 4 A | 4 A |
| from load voltage 2L+, max. | 4 A | 4 A |
| **Encoder supply** | | |
| Number of outputs | 6 | 4 |
| Short-circuit protection | Yes | Yes; per channel, electronic |
| **Output current** | | |
| • Rated value | 200 mA; 100 mA per output to X5-X6 | 500 mA; Per channel |
| **Power loss** | | |
| Power loss, typ. | 8 W | 4.8 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | |
| **Number of simultaneously controllable inputs** | | |
| **all mounting positions** | | |
| - up to 60 °C, max. | 8 | |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | |
| • for signal "0" | -3 to +5V | |
| • for signal "1" | +11 to +30V | |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA | |
| • for signal "1", typ. | 7 mA | |

■ **Technical specifications** (continued)

| Article number | 6ES7148-6JA00-0AB0 | 6ES7148-6JD00-0AB0 |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **Input delay** <br> **(for rated value of input voltage)** | | |
| **for standard inputs** | | |
|   - at "0" to "1", max. | typically 3 ms | |
|   - at "1" to "0", max. | typically 3 ms | |
| **Cable length** | | |
| • unshielded, max. | 30 m | |
| **Digital outputs** | | |
| Number of digital outputs | 4 | |
| Short-circuit protection | Yes; Electronic | |
| • Response threshold, typ. | 1.8 A | |
| Limitation of inductive shutdown voltage to | Typ. (L1+, L2+) -47 V | |
| Controlling a digital input | Yes | |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | 5 W | |
| **Output current** | | |
| • for signal "1" rated value | 1.3 A; Maximum | |
| • for signal "0" residual current, max. | 1.5 mA | |
| **Parallel switching of two outputs** | | |
| • for uprating | No | |
| • for redundant control of a load | Yes | |
| **Switching frequency** | | |
| • with resistive load, max. | 100 Hz | |
| • with inductive load, max. | 0.5 Hz | |
| • on lamp load, max. | 1 Hz | |
| **Total current of the outputs** <br> **(per group)** | | |
| **all mounting positions** | | |
|   - up to 60 °C, max. | 3.9 A | |
| **Cable length** | | |
| • unshielded, max. | 30 m | |
| **IO-Link** | | |
| Number of ports | 4 | 4 |
| • of which simultaneously controllable | 4 | 4 |
| IO-Link protocol 1.0 | Yes | Yes |
| IO-Link protocol 1.1 | | Yes |
| Transmission rate | 4.8 kBd (COM1); 38.4 kBd (COM2) | 4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3) |
| Size of process data, input per port | 32 byte | 32 byte |
| Size of process data, input per module | 32 byte | 128 bytes + 4 bytes PQI |
| Size of process data, output per port | 32 byte | 32 byte |
| Size of process data, output per module | 32 byte | 128 byte |
| Memory size for device parameter | | 2 kbyte; for each port |
| Master backup | | Possible with function block IO_LINK_MASTER |
| Configuration without S7-PCT | | Possible; autostart function |
| Cable length unshielded, max. | 20 m | 20 m |
| **Operating modes** | | |
| • IO-Link | Yes | Yes |
| • DI | Yes | Yes |
| • DQ | Yes | Yes; max. 100 mA |
| **Connection of IO-Link devices** | | |
| • Port type A | Yes | Yes; via 3-core cable |
| • Port type B | | Yes; Additional device supply: max. 2 A per port, max. 4 A per module |
| • via three-wire connection | Yes | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**SIMATIC ET 200eco PN**

### ▪ Technical specifications (continued)

| Article number | 6ES7148-6JA00-0AB0 | 6ES7148-6JD00-0AB0 |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **Interfaces** | | |
| Transmission procedure | 100BASE-TX | 100BASE-TX |
| Number of PROFINET interfaces | 1 | 1 |
| **PROFINET IO** | | |
| • Autocrossing | Yes | Yes |
| • automatic detection of transmission rate | Yes | Yes |
| • Transmission rate, max. | 100 Mbit/s | 100 Mbit/s |
| • integrated switch | Yes | Yes |
| **PROFINET IO Device** | | |
| - IRT with the option "high flexibility" | Yes | Yes |
| **Protocols** | | |
| Supports protocol for PROFINET IO | Yes | Yes |
| PROFINET CBA | No | No |
| PROFIsafe | No | No |
| **Protocols (Ethernet)** | | |
| • SNMP | Yes | Yes |
| • DCP | Yes | Yes |
| • LLDP | Yes | Yes |
| • ping | Yes | Yes |
| • ARP | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | |
| Status indicator | Yes; Green LED | Yes; Green LED |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire-break in actuator cable | Yes | |
| • Wire-break in signal transmitter cable | Yes | |
| • Short-circuit | Yes | Yes; Device supply to M |
| • Short-circuit encoder supply | Yes | |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |
| **Potential separation** | | |
| between the load voltages | Yes | Yes |
| between load voltage and all other switching components | No | No |
| between Ethernet and electronics | Yes | Yes |
| **Potential separation digital inputs** | | |
| • between the channels | No | |
| **Potential separation digital outputs** | | |
| • between the channels | No | |
| **Isolation** | | |
| **tested with** | | |
| • 24 V DC circuits | 707 V DC (type test) | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | | |
| IP degree of protection | IP65/67 | IP65/67 |
| **Connection method** | | |
| Design of electrical connection | | 3/5-pin M12 round connectors |
| **Dimensions** | | |
| Width | 60 mm | 30 mm |
| Height | 175 mm | 200 mm |
| Depth | 49 mm | 49 mm |
| **Weights** | | |
| Weight (without packaging) | 910 g | 550 g |

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■ **Ordering data**

| | Article No. |
|---|---|
| **ET 200eco PN digital input modules** | |
| • 8 DI 24 V DC; 4 x M12, dual assignment, IP67 degree of protection | 6ES7141-6BF00-0AB0 |
| • 8 DI 24 V DC; 8 x M12, IP67 degree of protection | 6ES7141-6BG00-0AB0 |
| • 16 DI 24 V DC; 8 x M12, dual assignment, IP67 degree of protection | 6ES7141-6BH00-0AB0 |
| **ET 200eco PN digital output modules** | |
| • 8 DO 24 V DC/0.5 A; 4 x M12, dual assignment, 1 load voltage supply DO; IP67 degree of protection | 6ES7142-6BF50-0AB0 |
| • 8 DO 24 V DC/1.3 A; 4 x M12, dual assignment, IP67 degree of protection | 6ES7142-6BF00-0AB0 |
| • 8 DO 24 V DC/1.3 A; 8 x M12, IP67 degree of protection | 6ES7142-6BG00-0AB0 |
| • 8 DO 24 V DC/2 A; 8 x M12, IP67 degree of protection | 6ES7142-6BR00-0AB0 |
| • 16 DO 24 V DC/1.3 A; 8 x M12, dual assignment, IP67 degree of protection | 6ES7142-6BH00-0AB0 |
| **ET 200eco PN digital input/output modules** | |
| • 8 DI/DO 24 V DC/1.3 A; 8 x M12, IP67 degree of protection | 6ES7147-6BG00-0AB0 |
| **ET 200eco PN analog input modules** | |
| • 8 AI 4 U/I + 4 RTD/TC; 8 x M12, IP67 degree of protection | 6ES7144-6KD00-0AB0 |
| • 8 AI RTD/TC; 8 x M12, IP67 degree of protection | 6ES7144-6KD50-0AB0 |
| **ET 200eco PN analog output modules** | |
| • 4 AO U/I; 4 x M12, IP67 degree of protection | 6ES7145-6HD00-0AB0 |
| **ET 200eco PN IO-Link master modules** | |
| • 4 IO-L + 8 DI + 4 DO, 24 V DC/1.3 A; 8 x M12, IP67 degree of protection, enclosure width 60 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and port Class A as well as 8 digital inputs and 4 digital outputs | 6ES7148-6JA00-0AB0 |
| • 4 IO-L; 4 x M12, IP67 degree of protection, enclosure width 30 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B | 6ES7148-6JD00-0AB0 |
| **Accessories** | |
| • PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12 | 6ES7148-6CB00-0AA0 |
| • Terminal block for ET 200eco PN, 10 A insulation displacement terminals | 6ES7194-6CA00-0AA0 |
| • Spare fuses for terminal block, 10 units | 6ES7194-6HB00-0AA0 |
| • DIN rail 0.5 m | 6ES7194-6GA00-0AA0 |
| • Profile screw for DIN rail, 50 units | 6ES7194-6MA00-0AA0 |
| • M12 sealing cap for IP67 modules, 10 units | 3RX9802-0AA00 |
| • Labels 10 × 7 mm, pastel turquoise, 816 units | 3RT1900-1SB10 |

| | Article No. |
|---|---|
| **PROFINET M12 connector, for user assembly** | |
| IE FC M12 PRO connector, for user assembly | |
| • 1 unit | 6GK1901-0DB20-6AA0 |
| • 8 units | 6GK1901-0DB20-6AA8 |
| **PROFINET M12 connecting cables** | |
| Pre-assembled connecting cables with 2 M12 connectors (D-coded) in various lengths: | |
| 0.3 m | 6XV1870-8AE30 |
| 0.5 m | 6XV1870-8AE50 |
| 1.0 m | 6XV1870-8AH10 |
| 1.5 m | 6XV1870-8AH15 |
| 2.0 m | 6XV1870-8AH20 |
| 3.0 m | 6XV1870-8AH30 |
| 5.0 m | 6XV1870-8AH50 |
| 10.0 m | 6XV1870-8AN10 |
| 15.0 m | 6XV1870-8AN15 |
| **M12 connector for 24 V DC load power supply** | |
| Connection socket for 24 V DC incoming supply; 4-pin, A-coded, 3 units | 6GK1907-0DC10-6AA3 |
| Connector for loop-through of 24 V DC; 4-pin, A-coded, 3 units | 6GK1907-0DB10-6AA3 |
| **M12 plug-in power cables** | |
| Pre-assembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm$^2$, in various lengths: | |
| 0.3 m | 6XV1801-5DE30 |
| 0.5 m | 6XV1801-5DE50 |
| 1.0 m | 6XV1801-5DH10 |
| 1.5 m | 6XV1801-5DH15 |
| 2.0 m | 6XV1801-5DH20 |
| 3.0 m | 6XV1801-5DH30 |
| 5.0 m | 6XV1801-5DH50 |
| 10.0 m | 6XV1801-5DN10 |
| 15.0 m | 6XV1801-5DN15 |
| **M12 coupler plug** | |
| Can be assembled, for connecting actuators or sensors, 5-pin | 3RK1902-4BA00-5AA0 |
| **M12 Y cable** | |
| For double connection of I/O by means of single cable to ET 200, 5-pin | 6ES7194-6KA00-0XA0 |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**ET 200eco PN IO-Link master**

### ■ Overview



The ET 200eco PN IO-Link master module is part of the ET 200eco PN compact block I/O range and is characterized by:

- Compact block I/O for connection to IO-Link devices and the PROFINET bus system
- Cabinet-free installation in IP67 degree of protection with M12 connection system
- Extremely rugged and resistant metal enclosure and casting
- Compact module with enclosure width of 30 mm or 60 mm
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- 100 Mbps data transmission rate
- LLDP proximity detection without the need for a programming device
- Supply and load voltage connection: 2 x M12
- Channel-specific diagnostics

### ■ Technical specifications

| Article number | 6ES7148-6JA00-0AB0 | 6ES7148-6JD00-0AB0 |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **General information** | | |
| Vendor identification (VendorID) | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H |
| **Supply voltage** | | |
| Rated value (DC) | 24 V | 24 V |
| Reverse polarity protection | Yes | Yes |
| **Load voltage 2L+** | | |
| • Rated value (DC) | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes; against destruction; load increasing |
| **Input current** | | |
| Current consumption, typ. | 200 mA | 100 mA |
| from supply voltage 1L+, max. | 4 A | 4 A |
| from load voltage 2L+, max. | 4 A | 4 A |
| **Encoder supply** | | |
| Number of outputs | 6 | 4 |
| Short-circuit protection | Yes | Yes; per channel, electronic |
| **Output current** | | |
| • Rated value | 200 mA; 100 mA per output to X5-X6 | 500 mA; Per channel |
| **Power loss** | | |
| Power loss, typ. | 8 W | 4.8 W |
| **Digital inputs** | | |
| Number of digital inputs | 8 | |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes | |
| **Number of simultaneously controllable inputs** | | |
| **all mounting positions** | | |
| - up to 60 °C, max. | 8 | |
| **Input voltage** | | |
| • Rated value (DC) | 24 V | |
| • for signal "0" | -3 to +5V | |
| • for signal "1" | +11 to +30V | |
| **Input current** | | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA | |
| • for signal "1", typ. | 7 mA | |
| **Input delay (for rated value of input voltage)** | | |
| **for standard inputs** | | |
| - at "0" to "1", max. | typically 3 ms | |
| - at "1" to "0", max. | typically 3 ms | |

■ **Technical specifications** (continued)

| Article number | 6ES7148-6JA00-0AB0 | 6ES7148-6JD00-0AB0 |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **Cable length** | | |
| • unshielded, max. | 30 m | |
| **Digital outputs** | | |
| Number of digital outputs | 4 | |
| Short-circuit protection | Yes; Electronic | |
| • Response threshold, typ. | 1.8 A | |
| Limitation of inductive shutdown voltage to | Typ. (L1+, L2+) -47 V | |
| Controlling a digital input | Yes | |
| **Switching capacity of the outputs** | | |
| • on lamp load, max. | 5 W | |
| **Output current** | | |
| • for signal "1" rated value | 1.3 A; Maximum | |
| • for signal "0" residual current, max. | 1.5 mA | |
| **Parallel switching of two outputs** | | |
| • for uprating | No | |
| • for redundant control of a load | Yes | |
| **Switching frequency** | | |
| • with resistive load, max. | 100 Hz | |
| • with inductive load, max. | 0.5 Hz | |
| • on lamp load, max. | 1 Hz | |
| **Total current of the outputs (per group)** | | |
| **all mounting positions** | | |
| - up to 60 °C, max. | 3.9 A | |
| **Cable length** | | |
| • unshielded, max. | 30 m | |
| **IO-Link** | | |
| Number of ports | 4 | 4 |
| • of which simultaneously controllable | 4 | 4 |
| IO-Link protocol 1.0 | Yes | Yes |
| IO-Link protocol 1.1 | | Yes |
| Transmission rate | 4.8 kBd (COM1); 38.4 kBd (COM2) | 4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3) |
| Size of process data, input per port | 32 byte | 32 byte |
| Size of process data, input per module | 32 byte | 128 bytes + 4 bytes PQI |
| Size of process data, output per port | 32 byte | 32 byte |
| Size of process data, output per module | 32 byte | 128 byte |
| Memory size for device parameter | | 2 kbyte; for each port |
| Master backup | | Possible with function block IO_LINK_MASTER |
| Configuration without S7-PCT | | Possible; autostart function |
| Cable length unshielded, max. | 20 m | 20 m |
| **Operating modes** | | |
| • IO-Link | Yes | Yes |
| • DI | Yes | Yes |
| • DQ | Yes | Yes; max. 100 mA |
| **Connection of IO-Link devices** | | |
| • Port type A | Yes | Yes; via 3-core cable |
| • Port type B | | Yes; Additional device supply: max. 2 A per port, max. 4 A per module |
| • via three-wire connection | Yes | |

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# I/O systems
## SIMATIC ET 200 systems without control cabinet

**ET 200eco PN IO-Link master**

### Technical specifications (continued)

| Article number | 6ES7148-6JA00-0AB0 | 6ES7148-6JD00-0AB0 |
|---|---|---|
| | ET 200ECO PN: IO-LINK MASTER | ET 200eco PN: IO-Link master |
| **Interfaces** | | |
| Transmission procedure | 100BASE-TX | 100BASE-TX |
| Number of PROFINET interfaces | 1 | 1 |
| **PROFINET IO** | | |
| • Autocrossing | Yes | Yes |
| • automatic detection of transmission rate | Yes | Yes |
| • Transmission rate, max. | 100 Mbit/s | 100 Mbit/s |
| • integrated switch | Yes | Yes |
| **PROFINET IO Device** | | |
| - IRT with the option "high flexibility" | Yes | Yes |
| **Protocols** | | |
| Supports protocol for PROFINET IO | Yes | Yes |
| PROFINET CBA | No | No |
| PROFIsafe | No | No |
| **Protocols (Ethernet)** | | |
| • SNMP | Yes | Yes |
| • DCP | Yes | Yes |
| • LLDP | Yes | Yes |
| • ping | Yes | Yes |
| • ARP | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | |
| Status indicator | Yes; Green LED | Yes; Green LED |
| Diagnostic functions | Yes | Yes |
| **Alarms** | | |
| • Diagnostic alarm | Yes | Yes |
| **Diagnostic messages** | | |
| • Diagnostic information readable | Yes | Yes |
| • Monitoring the supply voltage | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire-break in actuator cable | Yes | |
| • Wire-break in signal transmitter cable | Yes | |
| • Short-circuit | Yes | Yes; Device supply to M |
| • Short-circuit encoder supply | Yes | |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |
| **Potential separation** | | |
| between the load voltages | Yes | Yes |
| between load voltage and all other switching components | No | No |
| between Ethernet and electronics | Yes | Yes |
| **Potential separation digital inputs** | | |
| • between the channels | No | |
| **Potential separation digital outputs** | | |
| • between the channels | No | |
| **Isolation** | | |
| **tested with** | | |
| • 24 V DC circuits | 707 V DC (type test) | 707 V DC (type test) |
| • Interface | 1 500 V; According to IEEE 802.3 | 1 500 V; According to IEEE 802.3 |
| **Degree and class of protection** | | |
| IP degree of protection | IP65/67 | IP65/67 |
| **Connection method** | | |
| Design of electrical connection | | 3/5-pin M12 round connectors |
| **Dimensions** | | |
| Width | 60 mm | 30 mm |
| Height | 175 mm | 200 mm |
| Depth | 49 mm | 49 mm |
| **Weights** | | |
| Weight (without packaging) | 910 g | 550 g |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **ET 200eco PN IO-Link master** | | **M12 connector for 24 V DC load power supply** | |
| • 4 IO-L + 8 DI + 4 DO, 24 V DC/1.3 A; 8 x M12, IP67 degree of protection, enclosure width 60 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and Port Class A as well as 8 digital inputs and 4 digital outputs | **6ES7148-6JA00-0AB0** | Connection socket for 24 V DC incoming supply; 4-pin, A-coded, 3 units | **6GK1907-0DC10-6AA3** |
| | | Connector for loop-through of 24 V DC; 4-pin, A-coded, 3 units | **6GK1907-0DB10-6AA3** |
| • 4 IO-L; 4 x M12, IP67 degree of protection, enclosure width 30 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B | **6ES7148-6JD00-0AB0** | **M12 plug-in power cables** | |
| | | Pre-assembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm$^2$, in various lengths: | |
| **Accessories** | | 0.3 m | **6XV1801-5DE30** |
| • PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12 | **6ES7148-6CB00-0AA0** | 0.5 m | **6XV1801-5DE50** |
| • Terminal block for ET 200eco PN, 10 A insulation displacement terminals | **6ES7194-6CA00-0AA0** | 1.0 m | **6XV1801-5DH10** |
| | | 1.5 m | **6XV1801-5DH15** |
| • Spare fuses for terminal block, 10 units | **6ES7194-6HB00-0AA0** | 2.0 m | **6XV1801-5DH20** |
| • DIN rail 0.5 m | **6ES7194-6GA00-0AA0** | 3.0 m | **6XV1801-5DH30** |
| • Profile screw for DIN rail, 50 units | **6ES7194-6MA00-0AA0** | 5.0 m | **6XV1801-5DH50** |
| • M12 sealing cap for IP67 modules, 10 units | **3RK1901-1KA00** | 10.0 m | **6XV1801-5DN10** |
| • Labels 10 × 7 mm, pastel turquoise, 816 units | **3RT1900-1SB10** | 15.0 m | **6XV1801-5DN15** |
| | | **M12 Y cable** | |
| **PROFINET M12 connector, for user assembly** | | For double connection of I/O by means of single cable to ET 200, 5-pin | **6ES7194-6KA00-0XA0** |
| IE FC M12 PRO connector, for user assembly | | | |
| • 1 unit | **6GK1901-0DB20-6AA0** | | |
| • 8 units | **6GK1901-0DB20-6AA8** | | |
| **PROFINET M12 connecting cables** | | | |
| Pre-assembled connecting cables with 2 M12 connectors (D-coded), in various lengths: | | | |
| 0.3 m | **6XV1870-8AE30** | | |
| 0.5 m | **6XV1870-8AE50** | | |
| 1.0 m | **6XV1870-8AH10** | | |
| 1.5 m | **6XV1870-8AH15** | | |
| 2.0 m | **6XV1870-8AH20** | | |
| 3.0 m | **6XV1870-8AH30** | | |
| 5.0 m | **6XV1870-8AH50** | | |
| 10.0 m | **6XV1870-8AN10** | | |
| 15.0 m | **6XV1870-8AN15** | | |

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# I/O systems
## I/O systems for heating units

■ **Overview**



***SIPLUS HCS heating control systems:***
***Industrial heating processes – maximum precision and***
***efficiency***

In manufacturing processes where temperature plays a crucial role, deviations of just a few degrees can cause enormous quality problems. To avoid this and to minimize rejection rates, high-precision and reliable, individual control of the electrical heating elements is essential.

Nearly all industrially manufactured products undergo heat treatment. Even small deviations in the heating process can result in enormous negative effects on product quality.

To increase the quality and quantity of a heat-treated product, it is important to be able to focus the energy required with the highest level of spatial and temporal precision. The SIPLUS HCS ensures utmost precision in the control of electric heating units such as infrared heaters.

Three heating control systems are available:
- With integrated power outputs – compact design
- With integrated power outputs – modular design
- Without integrated power outputs

The SIPLUS HCS family of heating control systems saves time, costs and resources when it comes to configuring, commissioning, operation and maintenance.

This is achieved by:
- Simple integration into existing automation systems such as SIMATIC and SIMOTION
- Lower wiring costs and user-friendly engineering
- Intelligent diagnostics options for swift fault detection
- Service-friendly design thanks to ready-to-use function and data blocks
- Reduced volume in the control cabinet with space savings of up to 50%

For more information, see http://www.siemens.com/siplus-hcs.

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# I/O systems
## I/O systems for heating units
with integrated power outputs – compact design

**SIPLUS HCS3200 heating control system**

## Overview



SIPLUS HCS3200 heating control system with fixing brackets

The SIPLUS HCS3200 heating control system was developed as a compact solution for controlling linear heat emitter arrays.

Thanks to the high IP65 degree of protection, it can be used independently of a control cabinet at a distributed location near the emitters.

There are two versions:

• HCS3200 fan: For controlling 9 emitters and 1 output for switching an external fan on/off
• HCS3200: With UL Recognized Component certification for controlling 9 emitters

## Technical specifications

| Article number | 6BK1932-0BA00-0AA0 | 6BK1932-0AA00-0AA0 |
|---|---|---|
| | SIPLUS HCS3200 Fan | SIPLUS HCS3200 |
| **General information** | | |
| Product brand name | SIPLUS | |
| Product designation | HCS3200 Fan | HCS3200 |
| Type of control of heat emitters | Half-wave control | |
| **Installation type/mounting** | | |
| Mounting type | screw fixing | |
| Mounting position | vertical | |
| Type of ventilation | Self-ventilation | |
| **Supply voltage** | | |
| Type of supply voltage | AC | |
| Rated value (AC) | 400 V | |
| Relative negative tolerance | 10 % | |
| Relative positive tolerance | 10 % | |
| **Line frequency** | | |
| • Rated value 1 | 50 Hz | |
| • Rated value 2 | 60 Hz | |
| • Relative symmetrical tolerance | 5 % | |
| **Resistance thermometer (RTD)** | | |
| • Design of electrical connection for supply voltage | Connector, 4-pole + PE | Connector, 2-pole + PE |
|   - Connectable conductor cross-sections, finely stranded with wire end processing | 3x (6 ... 25 mm²) and 1x PE (6 ... 16 mm²) | 2x (6 ... 25 mm²) and 1x PE (6 ... 16 mm²) |
|   - Connectable conductor cross-sections for AWG cables | 3x (8 ... 4) | 2x (8 ... 4) |
| **Power supply for the electronics** | | |
| Design of the power supply | external | |
| Type of voltage | DC | |
| Supply voltage for electronics | 24 V | |
| Relative symmetrical tolerance of the input voltage | 20 % | |
| **Input current** | | |
| Current consumption for the electronics, max. | 0.25 A | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – compact design

## SIPLUS HCS3200 heating control system

### Technical specifications (continued)

| Article number | 6BK1932-0BA00-0AA0 | 6BK1932-0AA00-0AA0 |
|---|---|---|
| | SIPLUS HCS3200 Fan | SIPLUS HCS3200 |
| **Power electronics** | | |
| Type of load | Ohmic load | |
| Power capacity, max. | 25.2 kW | |
| Switching capacity current per phase, max. | 63 A | |
| Breaking capacity maximum short-circuit current (Icu) at 400 V | 25 kA | |
| **Heating power** | | |
| • Number of digital outputs | 9 | |
| • Number of heat emitters per output, max. | 1 | |
| • Output voltage for heating power | 400 V | |
| • Power carrying capacity per output, min. | 200 W | |
| • Power carrying capacity per output, max. | 4 000 W | |
| • Output current for heating power | 10 A | |
| • Design of short-circuit protection per output | Fuse 16 A | Fuse 15 A |
| **Fan control** | | |
| • Output voltage for fan | 230 V | |
| • Power carrying capacity per output, min. | 60 W | |
| • Power carrying capacity per output, max. | 500 W | |
| • Design of short-circuit protection | Fuse 4 A | |
| **Integration and conversion time/ resolution per channel** | | |
| • Design of electrical connection at output for heating and fan | Connector, 20-pole + PE | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | 20x (1.5 ... 4 mm²), 1x PE (1.5 ... 16 mm²) | 18x (1.5 ... 4 mm²), 1x PE (1.5 ... 16 mm²) |
| - Connectable conductor cross-sections for AWG cables, stranded | 20x (18 ... 12) | 18x (18 ... 12) |
| **Interfaces** | | |
| Interfaces/bus type | PROFIBUS DP | |
| **PROFIBUS DP** | | |
| • Transmission rate, max. | 12 Mbit/s | |
| • Design of electrical connection of PROFIBUS interface | ECOFAST | |
| **Protocols** | | |
| PROFIBUS DP | Yes | |
| **Interrupts/diagnostics/ status information** | | |
| Number of status displays | 2 | |
| LED status display | LED green = status indicator, LED red = fault indicator | |
| Diagnostics function | Voltage diagnostics | |
| **Diagnostic messages** | | |
| • Wire-break | Yes | |
| • Fuse blown | Yes | |
| • Heat emitter defect | Yes | |
| **Integrated Functions** | | |
| **Monitoring functions** | | |
| • Temperature monitoring | Yes | |
| • Type of temperature monitoring | NTC thermistor | |
| **Measuring functions** | | |
| • Voltage measurement | Yes | |
| **Potential separation** | | |
| Design of electrical isolation | Optocoupler between main circuit and PELV | |
| between the outputs | No | |
| **Isolation** | | |
| Overvoltage category | III | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – compact design

**SIPLUS HCS3200 heating control system**

## Technical specifications  (continued)

| Article number | 6BK1932-0BA00-0AA0 | 6BK1932-0AA00-0AA0 |
|---|---|---|
| | SIPLUS HCS3200 Fan | SIPLUS HCS3200 |
| **EMC** | | |
| EMC interference emission | in accordance with IEC 61000-6-4:2007 + A1:2011 | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharge / 8 kV air discharge | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | |
| Conducted interference due to burst acc. to IEC 61000-4-4 | 2 kV power supply lines / 1 kV signal lines | |
| Conducted interference due to surge acc. to IEC 61000-4-5 | On supply lines: 1 kV symmetrical, 2 kV asymmetrical, (24 V DC supply only with external protective measure) for PROFIBUS cable : asymmetrical 1 kV | |
| Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6 | 10 V (0.15 ... 80 MHz) | |
| **Degree and class of protection** | | |
| IP degree of protection | IP65 | |
| **Standards, approvals, certificates** | | |
| Certificate of suitability | CE | CE, UL |
| Degree of pollution | 2 | |
| Device tag according to DIN EN 81346-2 | Q | |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | |
| • max. | 50 °C | |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -40 °C | |
| • Storage, max. | 70 °C | |
| • Transportation, min. | -40 °C | |
| • Transportation, max. | 70 °C | |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • Operation, min. | 860 hPa | |
| • Operation, max. | 1 080 hPa | |
| • Storage, min. | 660 hPa | |
| • Storage, max. | 1 080 hPa | |
| • Installation altitude above sea level, max. | 2 000 m | |
| **Relative humidity** | | |
| • at 25 °C, max. | 95 % | |
| • Operation at 50 ?, max. | 50 % | |
| **Vibrations** | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.15 mm, 58 ... 150 Hz / 1 g | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 9 Hz / 3.5 mm, 9 ... 500 Hz / 1 g | |
| **Shock testing** | | |
| • Shock resistance acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | |
| • Shock resistance acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | |
| **Dimensions** | | |
| Width | 300 mm | |
| Height | 380 mm | |
| Depth | 200 mm | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HCS3200 heating control system** | | **Accessories** | |
| SIPLUS HCS3200 fan | **6BK1932-0BA00-0AA0** | SIPLUS HCS3200 fan as spare part | **6BK1932-6AA00-0AA0** |
| SIPLUS HCS3200 UL-certified | **6BK1932-0AA00-0AA0** | Installation kit for wall mounting | **6BK1932-6BA00-0AA0** |

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# I/O systems

I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system**

■ **Overview**
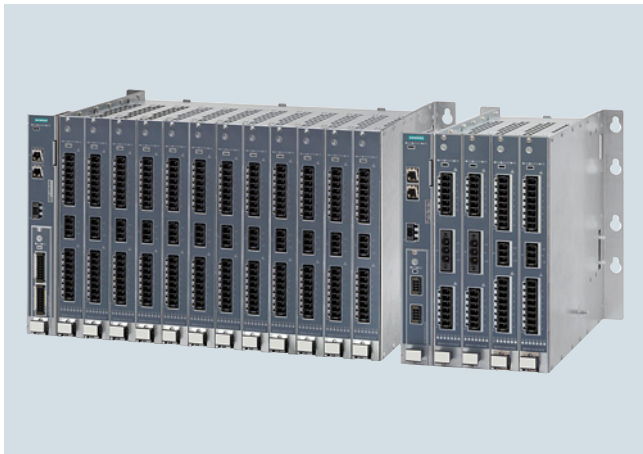


SIPLUS HCS4200 rack for 12/4 POMs

The SIPLUS HCS4200 heating control system controls and switches heat emitter arrays and other resistive loads in 230 V AC voltage supply systems in industrial environments.

Communication takes place via PROFINET, and together with the SIMATIC S7, SIMOTION or industrial PC, forms a modern and powerful automation system. The modular, compact and space-saving distributed I/O system can be adapted individually to suit the application.

# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system  > Rack**

## Overview



SIPLUS HCS4200 heating control system

The rack constitutes the basic mechanical structure of SIPLUS HCS4200.

## Technical specifications

| Article number | 6BK1942-0AA00-0AA0 | 6BK1942-0BA00-0AA0 |
|---|---|---|
| | HCS Rack4200 for 12 POM | HCS Rack4200 for 4 POM |
| **General information** | | |
| Product brand name | SIPLUS | |
| Product designation | Rack4200 for 12 POMs | RACK4200 for 4 POMs |
| **Installation type/mounting** | | |
| Mounting type | Control cabinet backplane | |
| Mounting position | Horizontal | |
| Type of ventilation | Self ventilation or forced ventilation | |
| **Hardware configuration** | | |
| Type of power output connectable | POM4220 | |
| Power capacity per rack with fan, max. | 193 kW | 64 kW |
| Power capacity per rack without fan, max. | 88 kW | 29 kW |
| **Slots** | | |
| • Number of slots | 12 | 4 |
| **Interfaces** | | |
| Interfaces/bus type | system interface | |
| **EMC** | | |
| EMC interference emission | Limit value in accordance with IEC 61000-6-4:2007 + A1:2011 | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharge / 8 kV air discharge | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | |
| **Standards, approvals, certificates** | | |
| Degree of pollution | 2 | |
| Device tag according to DIN EN 81346-2 | K | |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | |
| • max. | 55 °C | |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -25 °C | |
| • Storage, max. | 70 °C | |
| • Transportation, min. | -25 °C | |
| • Transportation, max. | 70 °C | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

## SIPLUS HCS4200 heating control system  > Rack

### ◾ Technical specifications  (continued)

| Article number | 6BK1942-0AA00-0AA0 | 6BK1942-0BA00-0AA0 |
|---|---|---|
| | HCS Rack4200 for 12 POM | HCS Rack4200 for 4 POM |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • Operation, min. | 860 Pa | |
| • Operation, max. | 1 080 Pa | |
| • Storage, min. | 660 Pa | |
| • Storage, max. | 1 080 Pa | |
| • Installation altitude above sea level, max. | 2 000 m | |
| **Relative humidity** | | |
| • Operation at 25 °C, max. | 95 % | |
| • Operation at 50 °C, max. | 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C | |
| **Vibrations** | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g | |
| **Shock testing** | | |
| • Shock resistance during operation acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | |
| • Shock resistance during storage acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | |
| **Dimensions** | | |
| Width | 488 mm | 204 mm |
| Height | 285 mm | |
| Depth | 293 mm | |

### ◾ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HCS4200 Rack for 12 POMs** | **6BK1942-0AA00-0AA0** | **Accessories** | |
| Rack for accommodating up to 12 POM4320 power output modules | | **SIPLUS HCS4200 Fan Module** | **6BK1942-4AA00-0AA0** |
| **SIPLUS HCS4200 Rack for 4 POMs** | **6BK1942-0BA00-0AA0** | Is attached to the top of the rack for accommodating up to 4 power output modules | |
| Rack for accommodating up to 4 POM4320 power output modules | | **Blanking cover (10 items)** | **6BK1942-6DA00-0AA0** |
| | | For covering unoccupied slots in the rack | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Central Interface Module (CIM)**

## Overview



The Central Interface Module (CIM) is the intelligent processor module of the SIPLUS HCS4200 heating control system.

## Technical specifications

| Article number | 6BK1942-1AA00-0AA0 | 6BK1942-1BA00-0AA0 | 6BK1942-1CA00-0AA0 |
|---|---|---|---|
| | HCS CIM4210 PROFINET | HCS CIM4210 PROFIBUS | HCS CIM4210 EtherNet/IP |
| **General information** | | | |
| Product brand name | SIPLUS | | |
| Product designation | CIM4210 PROFINET | CIM4210 PROFIBUS | CIM4210 EtherNet/IP |
| **Installation type/mounting** | | | |
| Mounting type | Screw mounting to rack | | |
| Mounting position | vertical | | |
| Type of ventilation | Forced ventilation | | |
| **Supply voltage** | | | |
| Type of supply voltage | DC | | |
| Rated value (DC) | 24 V | | |
| Relative negative tolerance | 20 % | | |
| Relative positive tolerance | 20 % | | |
| **Resistance thermometer (RTD)** | | | |
| • Design of electrical connection for supply voltage | Connector 2x 2-pin with tension spring connection | | |
| - Connectable conductor cross-sections, solid | 1x (0.2 ... 2.5 mm²) | | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | 1x (0.2 ... 2.5 mm²) | | |
| - Connectable conductor cross-sections for AWG cables | 1x (26 ... 12) | | |
| **Power** | | | |
| Active power input | 3 W | | |
| **Hardware configuration** | | | |
| Type of power output connectable | POM4220 | | |
| **Slots** | | | |
| • Number of slots | 1 | | |
| **Interfaces** | | | |
| Interfaces/bus type | PROFINET IO | PROFIBUS DP | EtherNet/IP |
| **PROFINET IO** | | | |
| • Transmission rate, max. | 100 Mbit/s | | |
| • Design of electrical connection of PROFINET interface | 2 x RJ45 | | |
| **PROFIBUS DP** | | | |
| • Transmission rate, max. | | 12 Mbit/s | |
| • Design of electrical connection of PROFIBUS interface | | 9-pin sub D socket | |
| **EtherNet/IP** | | | |
| • Transmission rate, max. | | | 100 Mbit/s |
| • Design of EtherNet/IP interface electrical connection | | | 2 x RJ45 |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Central Interface Module (CIM)**

## ■ Technical specifications (continued)

| Article number | 6BK1942-1AA00-0AA0 | 6BK1942-1BA00-0AA0 | 6BK1942-1CA00-0AA0 |
|---|---|---|---|
| | HCS CIM4210 PROFINET | HCS CIM4210 PROFIBUS | HCS CIM4210 EtherNet/IP |
| **Protocols** | | | |
| Supports protocol for PROFINET IO | Yes | No | |
| PROFIBUS DP | No | Yes | No |
| **Further protocols** | | | |
| • EtherNet/IP | No | | Yes |
| **Interrupts/diagnostics/ status information** | | | |
| Number of status displays | 3 | | |
| LED status display | LED green = ready, LED yellow = heating on/off, LED red = error display | | |
| **Isolation** | | | |
| Overvoltage category | III | | |
| **EMC** | | | |
| EMC interference emission | Limit value in accordance with IEC 61000-6-4:2007 + A1:2011 | | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharging, 8 kV air discharging | | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | | |
| Conducted interference due to burst acc. to IEC 61000-4-4 | 2 kV power supply lines, 2 kV PROFINET cables | 2 kV power supply lines / 2 kV PROFIBUS cables | 2 kV power supply lines, 2 kV PROFINET cables |
| Conducted interference due to surge acc. to IEC 61000-4-5 | DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric | DC supply lines: 0.5 kV symmetrical and asymmetrical, PROFIBUS lines: 1 kV asymmetrical | DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric |
| Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6 | 10 V (0.15 ... 80 MHz) | | |
| **Degree and class of protection** | | | |
| IP degree of protection | IP20 | | |
| **Standards, approvals, certificates** | | | |
| CE mark | Yes | | |
| UL approval | Yes | | |
| RCM (formerly C-TICK) | Yes | | |
| KC approval | Yes | | Yes |
| EAC (formerly Gost-R) | Yes | | |
| China RoHS compliance | Yes | | |
| Degree of pollution | 2 | | |
| Device tag according to DIN EN 81346-2 | K | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | | |
| • max. | 55 °C | | |
| **Ambient temperature during storage/transportation** | | | |
| • Storage, min. | -25 °C | | |
| • Storage, max. | 70 °C | | |
| • Transportation, min. | -25 °C | | |
| • Transportation, max. | 70 °C | | |
| **Air pressure acc. to IEC 60068-2-13** | | | |
| • Operation, min. | 860 hPa | | |
| • Operation, max. | 1 080 hPa | | |
| • Storage, min. | 660 hPa | | |
| • Storage, max. | 1 080 hPa | | |
| • Installation altitude above sea level, max. | 2 000 m | | |
| **Relative humidity** | | | |
| • Operation at 25 °C, max. | 95 % | | |
| • Operation at 50 °C, max. | 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C | | |

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# I/O systems
## I/O systems for heating units
## with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Central Interface Module (CIM)**

## ■ Technical specifications  (continued)

| Article number | 6BK1942-1AA00-0AA0 | 6BK1942-1BA00-0AA0 | 6BK1942-1CA00-0AA0 |
|---|---|---|---|
| | HCS CIM4210 PROFINET | HCS CIM4210 PROFIBUS | HCS CIM4210 EtherNet/IP |
| **Vibrations** | | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g | | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g | | |
| **Shock testing** | | | |
| • Shock resistance during operation acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | | |
| • Shock resistance during storage acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | | |
| **Dimensions** | | | |
| Width | 43 mm | | |
| Height | 285 mm | | |
| Depth | 136 mm | | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HCS4200 CIM4210 PROFINET** | **6BK1942-1AA00-0AA0** | **Accessories** | |
| Central Interface Module with PROFINET communication | | **SIPLUS HCS4200 connector set** | **6BK1942-6FA00-0AA0** |
| **SIPLUS HCS4200 CIM4210 PROFIBUS** | **6BK1942-1BA00-0AA0** | As spare part, consisting of 20 x 2-pole connectors (24 V DC power supply) | |
| Central Interface Module with PROFIBUS communication | | **SIPLUS HCS4000 temperature I/O module** | **6BK1900-0AA00-0AA0** |
| **SIPLUS HCS4200 CIM4210 Ethernet/IP** | **6BK1942-1CA00-0AA0** | For recording temperatures using temperature sensors, thermocouples and pyrometers | |
| Central Interface Module with EtherNet/IP | | **SIPLUS HCS4000 DI/DO I/O module** | **6BK1900-0BA00-0AA0** |
| | | With 8 digital outputs and 8 configurable inputs/outputs | |
| | | **SIPLUS HCS4000 U/I I/O module** | **6BK1900-0CA00-0AA0** |
| | | For current and voltage measurement (line voltage compensation) | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Power Output Module (POM)**

## Overview

The Power Output Modules (POMs) are an essential component of the SIPLUS HCS4200 heating control system.
Up to 24 power output modules can be operated on one CIM, split over two racks.

There are three power output module versions:
- POM4220 Low-end
- POM4220 Mid-range
- POM4220 Mid-range phase control

## Technical specifications

| Article number | 6BK1942-2AA00-0AA0 | 6BK1942-2CA00-0AA0 | 6BK1942-2CA00-0AA1 |
|---|---|---|---|
| **General information** | | | |
| Product brand name | SIPLUS | | |
| Product designation | POM4220 Lowend | POM4220 Midrange | POM4220 mid-range phase control |
| Type of control of heat emitters | Half-wave control | Half-wave control and soft start | Half-wave control, phase control and soft start |
| **Installation type/mounting** | | | |
| Mounting type | Screw mounting to rack | | |
| Mounting position | vertical | | |
| Type of ventilation | Self ventilation or forced ventilation | | |
| **Supply voltage** | | | |
| Type of supply voltage | AC | | |
| Rated value (AC) | 230 V | 277 V | |
| Relative negative tolerance | 10 % | 25 % | |
| Relative positive tolerance | 10 % | 8 % | |
| **Line frequency** | | | |
| • Rated value 1 | 50 Hz | | |
| • Rated value 2 | 60 Hz | | |
| • Relative symmetrical tolerance | 5 % | | |
| **Mains buffering** | | | |
| • Recovery time after power failure, typ. | 1 s | | |
| **Resistance thermometer (RTD)** | | | |
| • Design of electrical connection for supply voltage | Connector, 3-pole with spring-loaded connection | Connector, 3-pin | |
| - Connectable conductor cross-sections, solid | 1x (0.2 ... 10 mm²) | 1x (0.75 ... 16 mm²) | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | 1x (0.25 ... 6 mm²) | 1x (0.75 ... 16 mm²) | |
| - Connectable conductor cross-sections for AWG cables | 1x (24 ... 8) | 1x (18 ... 4) | |
| **Power supply for the electronics** | | | |
| Design of the power supply | Power supply via rack | | |
| **Power** | | | |
| Active power input, max. | 1 W | | |

**I/O systems**
I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system   > Power Output Module (POM)

## ▪ Technical specifications (continued)

| Article number | 6BK1942-2AA00-0AA0 | 6BK1942-2CA00-0AA0 | 6BK1942-2CA00-0AA1 |
|---|---|---|---|
| **Power electronics** | | | |
| Type of load | Ohmic load | | |
| Power capacity, max. | 16.1 kW | 27.7 kW | |
| • for star connection with fan at 40 °C, max. | 16.1 kW | 27.7 kW | |
| • for star connection without fan at 40 °C, max. | 7.3 kW | 9 kW | |
| Switching capacity current per phase, max. | 35 A | 50 A | |
| **Heating power** | | | |
| • Number of digital outputs | 16 | 12 | |
| • Number of heat emitters per output, max. | 1 | | |
| • Output voltage for heating power | 230 V | 277 V | |
| • Power carrying capacity per output, min. | 100 W | | |
| • Power carrying capacity per output, max. | 1 449 W | 3 324 W | 4 432 W |
| - for heating elements with high inrush current, max. | 750 W | 1 600 W | |
| • Output current for heating power | 6.3 A | 12 A | 16 A |
| • Melting I2t value | 57 A²·s | 68 A²·s | 120 A²·s |
| • Design of short-circuit protection per output | Safety fuse 6.3 A | Fuse 16 A | |
| • Design of overvoltage protection | Transil Diode | | |
| **Integration and conversion time/ resolution per channel** | | | |
| • Design of electrical connection at output for heating and fan | Connector, 8-pin with tension spring connection | Connector, 6-pole with spring-loaded connection | |
| - Connectable conductor cross-sections, solid | 1x (0.2 ... 10 mm²) | | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | 1x (0.25 ... 6 mm²) | | |
| - Connectable conductor cross-sections for AWG cables, stranded | 1x (24 ... 8) | | |
| **Interfaces** | | | |
| Interfaces/bus type | system interface | | |
| **Interrupts/diagnostics/ status information** | | | |
| Number of status displays | 19 | 15 | |
| LED status display | LED green = ready, LED yellow = heating on/off, LED red = error display, LED red = error for each channel | | |
| Diagnostics function | Voltage diagnostics | | |
| **Diagnostic messages** | | | |
| • Wire-break | Yes | | |
| • Fuse blown | Yes | | |
| • Heat emitter defect | Yes | | |
| **Integrated Functions** | | | |
| **Monitoring functions** | | | |
| • Temperature monitoring | Yes | | |
| • Type of temperature monitoring | NTC thermistor | | |
| **Potential separation** | | | |
| Design of electrical isolation | Optocoupler and/or protective impedance between main circuit and PELV | | |
| between the outputs | No | | |
| **Isolation** | | | |
| Overvoltage category | III | | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Power Output Module (POM)**

■ **Technical specifications** (continued)

| Article number | 6BK1942-2AA00-0AA0 | 6BK1942-2CA00-0AA0 | 6BK1942-2CA00-0AA1 |
|---|---|---|---|
| **EMC** | | | |
| EMC interference emission | Limit value in accordance with IEC 61000-6-4:2007 + A1:2011 | | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharge / 8 kV air discharge | | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | | |
| Conducted interference due to burst acc. to IEC 61000-4-4 | 2 kV power supply lines, 2 kV load lines | | |
| Conducted interference due to surge acc. to IEC 61000-4-5 | Supply and load lines: 1 kV symmetrical, 2 kV asymmetrical | | |
| Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6 | 10 V (0.15 ... 80 MHz) | | |
| **Degree and class of protection** | | | |
| IP degree of protection | IP20 | | |
| **Standards, approvals, certificates** | | | |
| Degree of pollution | 2 | | |
| Device tag according to DIN EN 81346-2 | Q | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | | |
| • max. | 55 °C | | |
| **Ambient temperature during storage/transportation** | | | |
| • Storage, min. | -25 °C | | |
| • Storage, max. | 70 °C | | |
| • Transportation, min. | -25 °C | | |
| • Transportation, max. | 70 °C | | |
| **Air pressure acc. to IEC 60068-2-13** | | | |
| • Operation, min. | 860 hPa | | |
| • Operation, max. | 1 080 hPa | | |
| • Storage, min. | 660 hPa | | |
| • Storage, max. | 1 080 hPa | | |
| • Installation altitude above sea level, max. | 2 000 m | | |
| **Relative humidity** | | | |
| • Operation at 25 ?, max. | 95 % | | |
| • Operation at 50 ?, max. | 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C | | |
| **Vibrations** | | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g | | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g | | |
| **Shock testing** | | | |
| • Shock resistance during operation acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | | |
| • Shock resistance during storage acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | | |
| **Dimensions** | | | |
| Width | 36 mm | | |
| Height | 285 mm | | |
| Depth | 281 mm | | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4200 heating control system   > Power Output Module (POM)**

## ■ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **SIPLUS HCS4200 POM4220 Low-end**<br><br>Power output module with 16 outputs for connecting resistive loads | **6BK1942-2AA00-0AA0** | | **Accessories** | |
| | | | **Spare fuse, 6.3 A/250 V, for POM4220 Low-end** | **6BK1942-6AA00-0AA0** |
| | | | **Spare fuse, 16 A/500 V, for the POM4220 Mid-range** | **6BK1942-6BA00-0AA0** |
| **SIPLUS HCS4200 POM4220 Mid-range**<br><br>Power output module with 12 outputs for connecting resistive loads | **6BK1942-2CA00-0AA0** | | **Spare fuse, 16 A/500 V, for the POM4220 Mid-range** | **6BK1942-6HA00-0AA0** |
| | | | **SIPLUS HCS4200 connector set**<br>As accessory, comprising 10 connectors, 3-pin, for incoming supply, POM4220 Low-end | **6BK1943-6AA00-0AA0** |
| **SIPLUS HCS4200 POM4220 Mid-range phase control**<br><br>Power output module with 12 outputs for connecting resistive loads | **6BK1942-2CA00-0AA1** | | **SIPLUS HCS4200 connector set**<br>As accessory, comprising 5 connectors, 8-pin, for power outputs, POM4220 Low-end | **6BK1942-6CA00-0AA0** |
| | | | **SIPLUS HCS4200 connector set**<br>As accessory, comprising 6 connectors, 3-pin, for incoming supply, POM4220 Mid-range | **6BK1942-6GA00-0AA0** |
| | | | **SIPLUS HCS4200 connector set**<br>As accessory, comprising 5 connectors, 6-pin, for power outputs, POM4220 Mid-range | **6BK1942-6EA00-0AA0** |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system**

■ **Overview**



SIPLUS HCS4300 heating control systems

The SIPLUS HCS4300 heating control system controls and switches heat emitter arrays and other resistive loads in 400 V/ 480 V voltage supply systems in industrial environments.

Communication takes place via PROFINET and provides, together with the SIMATIC S7, for example, a highly modern and powerful automation system.

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Central Interface Module (CIM)**

## ■ Overview

The Central Interface Module (CIM) is the intelligent processor module of the SIPLUS HCS4300 heating control system.

## ■ Technical specifications

| Article number | 6BK1943-1AA00-0AA0 | 6BK1943-1BA00-0AA0 | 6BK1943-1CA00-0AA0 |
|---|---|---|---|
| | HCS CIM4310 PROFINET | HCS CIM4310 PROFIBUS | HCS CIM4310 EtherNet/IP |
| **General information** | | | |
| Product brand name | SIPLUS | | |
| Product designation | CIM4310 PROFINET | CIM4310 PROFIBUS | |
| **Installation type/mounting** | | | |
| Mounting type | Screw mounting to POM | | |
| Mounting position | vertical | | |
| Type of ventilation | Forced ventilation | | |
| **Supply voltage** | | | |
| Type of supply voltage | DC | | |
| Rated value (DC) | 24 V | | |
| Relative negative tolerance | 20 % | | |
| Relative positive tolerance | 20 % | | |
| **Resistance thermometer (RTD)** | | | |
| • Design of electrical connection for supply voltage | Connector 2x 2-pin with tension spring connection | | |
|   - Connectable conductor cross-sections, solid | 1x (0.2 ... 2.5 mm$^2$) | | |
|   - Connectable conductor cross-sections, finely stranded with wire end processing | 1x (0.2 ... 2.5 mm$^2$) | | |
|   - Connectable conductor cross-sections for AWG cables | 1x (26 ... 12) | | |
| **Power** | | | |
| Active power input | 3 W | | |
| **Hardware configuration** | | | |
| Type of power output connectable | POM4320 | | |
| **Slots** | | | |
| • Number of slots | 1 | | |
| **Interfaces** | | | |
| Interfaces/bus type | PROFINET IO | PROFIBUS DP | EtherNet/IP |
| **PROFINET IO** | | | |
| • Transmission rate, max. | 100 Mbit/s | | |
| • Design of electrical connection of PROFINET interface | 2 x RJ45 | | |

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# I/O systems
## I/O systems for heating units
## with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Central Interface Module (CIM)**

■ **Technical specifications** (continued)

| Article number | 6BK1943-1AA00-0AA0 | 6BK1943-1BA00-0AA0 | 6BK1943-1CA00-0AA0 |
|---|---|---|---|
| | HCS CIM4310 PROFINET | HCS CIM4310 PROFIBUS | HCS CIM4310 EtherNet/IP |
| **PROFIBUS DP** | | | |
| • Transmission rate, max. | | 12 Mbit/s | |
| • Design of electrical connection of PROFIBUS interface | | 9-pin sub D socket | |
| **EtherNet/IP** | | | |
| • Transmission rate, max. | | | 100 Mbit/s |
| • Design of EtherNet/IP interface electrical connection | | | 2 x RJ45 |
| **Protocols** | | | |
| Supports protocol for PROFINET IO | Yes | No | |
| PROFIBUS DP | No | Yes | No |
| **Further protocols** | | | |
| • EtherNet/IP | | | Yes |
| **Interrupts/diagnostics/ status information** | | | |
| Number of status displays | 3 | | |
| LED status display | LED green = ready, LED yellow = heating on/off, LED red = error display | | |
| **Isolation** | | | |
| Overvoltage category | III | | |
| **EMC** | | | |
| EMC interference emission | Limit value in accordance with IEC 61000-6-4:2007 + A1:2011 | | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharge / 8 kV air discharge | | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | | |
| Conducted interference due to burst acc. to IEC 61000-4-4 | 2 kV power supply lines, 2 kV PROFINET cables | 2 kV power supply lines / 2 kV PROFIBUS cables | 2 kV power supply lines, 2 kV PROFINET cables |
| Conducted interference due to surge acc. to IEC 61000-4-5 | DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric | DC supply lines: 0.5 kV symmetrical and asymmetrical, PROFIBUS lines: 1 kV asymmetrical | DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric |
| Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6 | 10 V (0.15 ... 80 MHz) | | |
| **Degree and class of protection** | | | |
| IP degree of protection | IP20 | | |
| **Standards, approvals, certificates** | | | |
| Degree of pollution | 2 | | |
| Device tag according to DIN EN 81346-2 | K | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | 0 °C | | |
| • max. | 55 °C | | |
| **Ambient temperature during storage/transportation** | | | |
| • Storage, min. | -25 °C | | |
| • Storage, max. | 70 °C | | |
| • Transportation, min. | -25 °C | | |
| • Transportation, max. | 70 °C | | |
| **Air pressure acc. to IEC 60068-2-13** | | | |
| • Operation, min. | 860 hPa | | |
| • Operation, max. | 1 080 hPa | | |
| • Storage, min. | 660 hPa | | |
| • Storage, max. | 1 080 hPa | | |
| • Installation altitude above sea level, max. | 2 000 m | | |
| **Relative humidity** | | | |
| • Operation at 25 °C, max. | 95 % | | |
| • Operation at 50 °C, max. | 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C | | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Central Interface Module (CIM)**

## ▮ Technical specifications  (continued)

| Article number | **6BK1943-1AA00-0AA0** | **6BK1943-1BA00-0AA0** | **6BK1943-1CA00-0AA0** |
|---|---|---|---|
| | HCS CIM4310 PROFINET | HCS CIM4310 PROFIBUS | HCS CIM4310 EtherNet/IP |
| **Vibrations** | | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g | | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g | | |
| **Shock testing** | | | |
| • Shock resistance during operation acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | | |
| • Shock resistance during storage acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | | |
| **Dimensions** | | | |
| Width | 56 mm | | |
| Height | 285 mm | | |
| Depth | 136 mm | | |

## ▮ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS HCS4300 CIM4310** | | **SIPLUS HCS4000 temperature I/O module** | **6BK1900-0AA00-0AA0** |
| Central Interface Module with PROFINET communication | **6BK1943-1AA00-0AA0** | For recording temperatures using temperature sensors, thermocouples and pyrometers | |
| Central Interface Module with PROFIBUS communication | **6BK1943-1BA00-0AA0** | **SIPLUS HCS4000 DI/DO I/O module** | **6BK1900-0BA00-0AA0** |
| Central Interface module with EtherNet/IP | **6BK1943-1CA00-0AA0** | With 8 digital outputs and 8 configurable inputs/outputs | |
| **Accessories** | | **SIPLUS HCS4000 U/I I/O module** | **6BK1900-0CA00-0AA0** |
| **SIPLUS HCS4300 EM4315** | **6BK1943-1AA50-0AA0** | For current and voltage measurement (line voltage compensation) | |
| Expansion module for SIPLUS HCS4300, extends the configuration with 8 power output modules | | | |

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# I/O systems
## I/O systems for heating units
## with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Power Output Module (POM)**

### ■ Overview



- Module (encapsulated) in a metal enclosure
- 9 outputs for connecting resistive loads
- There are four versions:
  - POM4320 busbar mounting (IEC):
    a current of up to 16 A can be used per output
  - POM4320 busbar mounting (UL):
    a current of up to 15 A can be used per output
  - POM4320 rear panel mounting (IEC):
    a current of up to 16 A can be used per output
  - POM4320 rear panel mounting (UL):
    a current of up to 15 A can be used per output
- Connection of the phases via rear busbar adapter or connecting terminals
- Two-pole connection of heat emitters using mating connectors (mating connectors are included in the scope of supply!)
- Two fuses per output for supply and return line in a fuse module which can be plugged on and pulled off
- Heat dissipation by fan fitted to top of module
- Internal serial interface
- Three diagnostics LEDs for displaying module faults
- Nine diagnostics LEDs for displaying output errors

### ■ Technical specifications

| Article number | 6BK1943-2AA00-0AA0 | 6BK1943-2AA00-0AA2 | 6BK1943-2BA00-0AA0 | 6BK1943-2BA00-0AA2 | 6BK1943-2CA00-0AA0 | 6BK1943-2CA00-0AA2 | 6BK1943-2DA00-0AA0 | 6BK1943-2DA00-0AA2 |
|---|---|---|---|---|---|---|---|---|
| | HCS POM4320 BUSBAR MOUNTING (IEC) | HCS POM4320 busbar mounting (IEC) | HCS POM4320 BUSBAR MOUNTING (UL) | HCS POM4320 busbar mounting (UL) | HCS POM4320 PANEL MOUNTING (IEC) | HCS POM4320 panel mounting (IEC) | HCS POM4320 PANEL MOUNTING (UL) | HCS POM4320 panel mounting (UL) |
| **General information** | | | | | | | | |
| Product brand name | SIPLUS | | | | | | | |
| Product designation | POM4320 BUSBAR MOUNTING (IEC) | | POM4320 BUSBAR MOUNTING (UL) | | POM4320 rear panel mounting (IEC) | | POM4320 rear panel mounting (UL) | |
| Type of control of heat emitters | Half-wave control and soft start | | | | | | | |
| **Installation type/mounting** | | | | | | | | |
| Mounting type | Busbar mounting | | | | Backplane mounting | | | |
| Mounting position | vertical | | | | | | | |
| Type of ventilation | Self-ventilation | | | | | | | |
| **Supply voltage** | | | | | | | | |
| Type of supply voltage | AC | | | | | | | |
| Rated value (AC) | 400 V | | | | | | | |
| Relative negative tolerance | 10 % | | | | | | | |
| Relative positive tolerance | 30 % | | | | | | | |
| **Line frequency** | | | | | | | | |
| • Rated value 1 | 50 Hz | | | | | | | |
| • Rated value 2 | 60 Hz | | | | | | | |
| • Relative symmetrical tolerance | 5 % | | | | | | | |
| **Mains buffering** | | | | | | | | |
| • Recovery time after power failure, typ. | 1 s | | | | | | | |
| **Resistance thermometer (RTD)** | | | | | | | | |
| • Design of electrical connection for supply voltage | Busbar adapter, 3-pole + PE | | | | Terminal, 3-pin | | | |
| - Connectable conductor cross-sections, solid | | | | | 1x (1.5 ... 50 mm²) | | | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | | | | | 1x (1.5 ... 35 mm²) | | | |
| - Connectable conductor cross-sections for AWG cables | | | | | 1x (16 ... 1) | | | |
| **Power supply for the electronics** | | | | | | | | |
| Design of the power supply | Power supply via CIM | | | | | | | |
| **Power** | | | | | | | | |
| Active power input, max. | 8 W | | | | | | | |

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# I/O systems
## I/O systems for heating units
### with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Power Output Module (POM)**

## Technical specifications (continued)

| Article number | 6BK1943-2AA00-0AA0 | 6BK1943-2AA00-0AA2 | 6BK1943-2BA00-0AA0 | 6BK1943-2BA00-0AA2 | 6BK1943-2CA00-0AA0 | 6BK1943-2CA00-0AA2 | 6BK1943-2DA00-0AA0 | 6BK1943-2DA00-0AA2 |
|---|---|---|---|---|---|---|---|---|
| | HCS POM4320 BUSBAR MOUNTING (IEC) | HCS POM4320 busbar mounting (IEC) | HCS POM4320 BUSBAR MOUNTING (UL) | HCS POM4320 busbar mounting (UL) | HCS POM4320 PANEL MOUNTING (IEC) | HCS POM4320 panel mounting (IEC) | HCS POM4320 PANEL MOUNTING (UL) | HCS POM4320 panel mounting (UL) |
| **Power electronics** | | | | | | | | |
| Type of load | Ohmic load | | | | | | | |
| Power capacity, max. | 69.1 kW | | 51.8 kW | 64.8 kW | 69.1 kW | | 51.8 kW | 64.8 kW |
| • for delta connection with fan at 40 °C, max. | 69.1 kW | | 51.8 kW | 64.8 kW | 69.1 kW | | 51.8 kW | 64.8 kW |
| Switching capacity current per phase, max. | 83 A | | 63 A | 80 A | 83 A | | 63 A | 80 A |
| Short-time withstand current (SCCR) acc. to UL 508A | | | 50 kA | 100 kA | | | 50 kA | 100 kA |
| **Heating power** | | | | | | | | |
| • Number of digital outputs | 9 | | | | | | | |
| • Number of heat emitters per output, max. | 1 | | | | | | | |
| • Output voltage for heating power | 400 V | | | | | | | |
| • Power carrying capacity per output, min. | 200 W | | | | | | | |
| • Power carrying capacity per output, max. | 7 680 W | | 5 760 W | 7 200 W | 7 680 W | | 5 760 W | 7 200 W |
| - for heating elements with high inrush current, max. | 4 000 W | | 3 000 W | 4 000 W | | | 3 000 W | 4 000 W |
| • Output current for heating power | 16 A | | 12 A | 15 A | 16 A | | 12 A | 15 A |
| • Peak current | 150 A | | 100 A | 150 A | | | 100 A | 150 A |
| • Melting I2t value | 250 A²·s | | 225 A²·s | 400 A²·s | 250 A²·s | | 225 A²·s | 400 A²·s |
| • Design of short-circuit protection per output | Fuse 16 A | | Fuse 15 A | Melting fuse 20 A | Fuse 16 A | | Fuse 15 A | Melting fuse 20 A |
| • Design of overvoltage protection | Transil Diode | | | | | | | |
| **Integration and conversion time/ resolution per channel** | | | | | | | | |
| • Design of electrical connection at output for heating and fan | Connector, 3-pole with spring-loaded connection | | | | | | | |
| - Connectable conductor cross-sections, solid | 1x (0.2 ... 10 mm²) | | | | | | | |
| - Connectable conductor cross-sections, finely stranded with wire end processing | 1x (0.25 ... 6 mm²) | | | | | | | |
| - Connectable conductor cross-sections for AWG cables, stranded | 1x (24 ... 8) | | | | | | | |
| **Interfaces** | | | | | | | | |
| Interfaces/bus type | system interface | | | | | | | |
| **Interrupts/diagnostics/ status information** | | | | | | | | |
| Number of status displays | 12 | | | | | | | |
| LED status display | LED green = ready, LED yellow = heating on/off, LED red = error display, LED red = error for each channel | | | | | | | |
| Diagnostics function | Voltage diagnostics | | | | | | | |
| **Diagnostic messages** | | | | | | | | |
| • Wire-break | Yes | | | | | | | |
| • Fuse blown | Yes | | | | | | | |
| • Heat emitter defect | Yes | | | | | | | |
| **Integrated Functions** | | | | | | | | |
| **Monitoring functions** | | | | | | | | |
| • Temperature monitoring | Yes | | | | | | | |
| • Type of temperature monitoring | NTC thermistor | | | | | | | |
| **Measuring functions** | | | | | | | | |
| • Voltage measurement | Yes | | | | | | | |
| **Potential separation** | | | | | | | | |
| Design of electrical isolation | Optocoupler and/or protective impedance between main circuit and PELV | | | | | | | |
| between the outputs | No | | | | | | | |
| **Isolation** | | | | | | | | |
| Overvoltage category | III | | | | | | | |

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# I/O systems
I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Power Output Module (POM)**

## Technical specifications (continued)

| Article number | 6BK1943-2AA00-0AA0 | 6BK1943-2AA00-0AA2 | 6BK1943-2BA00-0AA0 | 6BK1943-2BA00-0AA2 | 6BK1943-2CA00-0AA0 | 6BK1943-2CA00-0AA2 | 6BK1943-2DA00-0AA0 | 6BK1943-2DA00-0AA2 |
|---|---|---|---|---|---|---|---|---|
| | HCS POM4320 BUSBAR MOUNTING (IEC) | HCS POM4320 busbar mounting (IEC) | HCS POM4320 BUSBAR MOUNTING (UL) | HCS POM4320 busbar mounting (UL) | HCS POM4320 PANEL MOUNTING (IEC) | HCS POM4320 panel mounting (IEC) | HCS POM4320 PANEL MOUNTING (UL) | HCS POM4320 panel mounting (UL) |
| **EMC** | | | | | | | | |
| EMC interference emission | Limit value in accordance with IEC 61000-6-4:2007 + A1:2011 | | | | | | | |
| Electrostatic discharge acc. to IEC 61000-4-2 | 4 kV contact discharge / 8 kV air discharge | | | | | | | |
| Field-related interference acc. to IEC 61000-4-3 | 10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz) | | | | | | | |
| Conducted interference due to burst acc. to IEC 61000-4-4 | 2 kV power supply lines, 2 kV load lines | | | | | | | |
| Conducted interference due to surge acc. to IEC 61000-4-5 | on supply and load lines: 1 kV symmetric, 2 kV unsymmetric | | | | | | | |
| Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6 | 10 V (0.15 ... 80 MHz) | | | | | | | |
| **Degree and class of protection** | | | | | | | | |
| IP degree of protection | IP20 | | | | | | | |
| **Standards, approvals, certificates** | | | | | | | | |
| Degree of pollution | 2 | | | | | | | |
| Device tag according to DIN EN 81346-2 | Q | | | | | | | |
| **Ambient conditions** | | | | | | | | |
| **Ambient temperature during operation** | | | | | | | | |
| • min. | 0 °C | | | | | | | |
| • max. | 55 °C | | | | | | | |
| **Ambient temperature during storage/transportation** | | | | | | | | |
| • Storage, min. | -25 °C | | | | | | | |
| • Storage, max. | 70 °C | | | | | | | |
| • Transportation, min. | -25 °C | | | | | | | |
| • Transportation, max. | 70 °C | | | | | | | |
| **Air pressure acc. to IEC 60068-2-13** | | | | | | | | |
| • Operation, min. | 860 hPa | | | | | | | |
| • Operation, max. | 1 080 hPa | | | | | | | |
| • Storage, min. | 660 hPa | | | | | | | |
| • Storage, max. | 1 080 hPa | | | | | | | |
| • Installation altitude above sea level, max. | 2 000 m | | | | | | | |
| **Relative humidity** | | | | | | | | |
| • Operation at 25 ?, max. | 95 % | | | | | | | |
| • Operation at 50 ?, max. | 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C | | | | | | | |
| **Vibrations** | | | | | | | | |
| • Vibration resistance during operation acc. to IEC 60068-2-6 | 10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g | | | | | | | |
| • Vibration resistance during storage acc. to IEC 60068-2-6 | 5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g | | | | | | | |
| **Shock testing** | | | | | | | | |
| • Shock resistance during operation acc. to IEC 60068-2-27 | 15 g / 11 ms / 3 shocks/axis | | | | | | | |
| • Shock resistance during storage acc. to IEC 60068-2-29 | 25 g / 6 ms / 1 000 shocks/axis | | | | | | | |
| **Dimensions** | | | | | | | | |
| Width | 104 mm | | | | | | | |
| Height | 340 mm | | | | 344 mm | | | |
| Depth | 250 mm | | | | 217 mm | | | |

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# I/O systems
## I/O systems for heating units
with integrated power outputs – modular design

**SIPLUS HCS4300 heating control system   > Power Output Module (POM)**

| ■ **Ordering data** | **Article No.** |
|---|---|
| **SIPLUS HCS4300 POM4320** | |
| Power Output Module with 9 outputs for connecting resistive loads | |
| IEC, busbar mounting | **6BK1943-2AA00-0AA0** |
| IEC, busbar mounting, redesign version with enhanced interference immunity | **6BK1943-2AA00-0AA2** |
| UL, busbar mounting | **6BK1943-2BA00-0AA0** |
| UL, busbar mounting, redesign version with enhanced interference immunity and 100 kA SCCR | **6BK1943-2BA00-0AA2** |
| IEC, real panel mounting | **6BK1943-2CA00-0AA0** |
| IEC, rear panel mounting, redesign version with enhanced interference immunity | **6BK1943-2CA00-0AA2** |
| UL, rear panel mounting | **6BK1943-2DA00-0AA0** |
| UL, rear panel mounting, redesign version with enhanced interference immunity and 100 kA SCCR | **6BK1943-2DA00-0AA2** |

| | **Article No.** |
|---|---|
| **Accessories** | |
| **SIPLUS HCS4300 connecting cable from POM to POM** | |
| • Consisting of 10 items, 10 cm long | **6BK1943-5AA00-0AA0** |
| • Consisting of 10 items, 25 cm long | **6BK1943-5BA00-0AA0** |
| **SIPLUS HCS4300 connector set** | **6BK1943-6AA00-0AA0** |
| • Consisting of 10 x 3-pole connectors | |
| **Spare fuse, 16 A/500 V, for POM4320** | **6BK1943-6BA00-0AA0** |
| **Fan as spare part** | **6BK1700-2GA00-0AA0** |

# I/O systems
## PROFIBUS components

**Power Rail Booster**

### Overview



- The device for low-cost PROFIBUS DP transfer over contact conductors and slip rings to IP20 degree of protection
- Permissible baud rates from 9600 bit/s to 500 Kbps, self-optimizing
- Permissible busbar length:
  From 25 m at 500 Kbps to 1200 m at 9600 bit/s
- Configuring with PRB Checker software
- Up to 125 nodes per segment
- Transparent for data communication:
  The Power Rail Booster does not reserve DP addresses
- Easy to install due to connection without terminating resistor and filter element
- Diagnostics LED for power supply, bus activity and group errors
- Isolated electronic changeover contact for external group error display or diagnostic alarm
- Uninterruptible communication beyond segment limits using the "PRB segment controller"

### Technical specifications

| Degree of protection | IP20 |
|---|---|
| Dimensions (W x H x D, with connector) in mm | 90 x 132 x 75 |
| Supply voltage | 24 V DC |
| Power consumption | max. 20 W |
| Data transmission rate, max. | 500 Kbps, self-adjusting |
| Cable length (depends on baud rate), max. | 1200 m |
| Shock-hazard protected voltage | Yes, to EN 61131-2 |
| Stations per PRB segment, max. | 125 |
| Operation without terminating resistance | Yes |
| Operation without filter | Yes |
| Wiring options: Line / star | Yes / Yes |

### Ordering data — Article No.

| | Article No. |
|---|---|
| **Power Rail Booster**<br>Signal amplifier for PROFIBUS DP transmission over contact cables, max. 500 Kbps | **6ES7972-4AA02-0XA0** |
| **PRB segment controller**<br>Automatic change over switch between PRB segments | **6ES7972-4AA50-0XA0** |

## Overview



- RS 485 repeater with online line diagnostics for PROFIBUS DP
- PROFIBUS DP standard slave (DP-V1)
- Automatic determination of fault types and locations
- Data transmission rate 9.6 Kbps to 12 Mbps
- Connection through FastConnect using IDC

## Technical specifications

| Article number | 6ES7972-0AB01-0XA0 |
|---|---|
| | SIMATIC S7, DIAGNOSIS-REPEATER |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 12 Mbit/s; 9.6 kbit/s to 12 Mbit/s |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |

| Article number | 6ES7972-0AB01-0XA0 |
|---|---|
| | SIMATIC S7, DIAGNOSIS-REPEATER |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Relative humidity** | |
| • Operation, max. | 95 %; at 25 °C |
| **Connection method** | |
| Power supply | Terminal block |
| Bus cables | FastConnect insulation displacement, 10 clamping cycles possible |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 67.5 mm |
| **Weights** | |
| Weight, approx. | 300 g |

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# I/O systems
## PROFIBUS components
## Diagnostics

**Diagnostics repeater for PROFIBUS DP**

■ **Ordering data**      Article No.      Article No.

| | Article No. |
|---|---|
| **RS 485 diagnostics repeater** | **6ES7972-0AB01-0XA0** |
| For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostics functions for monitoring the bus lines | |
| **Accessories** | |
| **RS 485 bus connector with 90° cable outlet** | |
| With screw terminals, max. transfer rate 12 Mbps | |
| • Without PG interface | **6ES7972-0BA12-0XA0** |
| • With PG interface | **6ES7972-0BB12-0XA0** |
| **PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet** | |
| With insulation displacement terminals, max. transfer rate 12 Mbps | |
| Without PG interface | |
| • 1 unit | **6ES7972-0BA52-0XA0** |
| • 100 units | **6ES7972-0BA52-0XB0** |
| With PG interface | |
| • 1 unit | **6ES7972-0BB52-0XA0** |
| • 100 units | **6ES7972-0BB52-0XB0** |
| without PG interface, grounding via control cabinet cover | |
| • 1 unit | **6ES7972-0BA70-0XA0** |
| with PG interface, grounding via control cabinet cover | |
| • 1 unit | **6ES7972-0BB70-0XA0** |
| **RS 485 bus connector with angled cable outlet (35°)** | |
| With screw terminals, max. transfer rate 12 Mbps | |
| • Without PG interface | **6ES7972-0BA42-0XA0** |
| • With PG interface | **6ES7972-0BB42-0XA0** |

| | Article No. |
|---|---|
| **PROFIBUS FastConnect RS 485 bus connector with angular cable outlet (35°)** | |
| With insulation displacement terminals, max. transfer rate 12 Mbps | |
| • Without PG interface | **6ES7972-0BA61-0XA0** |
| • With PG interface | **6ES7972-0BB61-0XA0** |
| **PROFIBUS FastConnect stripping tool** | **6GK1905-6AA00** |
| Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables | |
| **PROFIBUS FC standard cable** | **6XV1830-0EH10** |
| Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m | |
| **S7 Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| **S7 Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates | |
| **Connecting cable for PROFIBUS** | **6ES7901-4BD00-0XA0** |
| 12 Mbps, for PG connection to PROFIBUS DP, pre-assembled with 2 x 9-pin sub D plug, 3.0 m | |

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## ■ Overview



- RS 485 repeater with online line diagnostics for PROFIBUS DP
- PROFIBUS DP standard slave (DP-V1)
- Automatic determination of fault type and location
- Transmission rate from 9.6 Kbps to 12 Mbps
- Connection via FastConnect IDC

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS diagnostics repeater for PROFIBUS DP | |
|---|---|
| Article No. | **6AG1972-0AB01-4XA0** |
| BasedOn Article No. | **6ES7972-0AB01-0XA0** |
| Ambient temperature range | 0 °C ... +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components. |
| Technical specifications | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permissible. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080 ... 795 hPa (-1 000 ... +2 000m) See ambient temperature range |
| | 795 … 658 hPa (+2 000 ... +3 500m) Derating 10 K |
| | 658 ... 540 hPa (+3 500 ... +5 000 m) Derating 20 K |

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

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## ■ Technical specifications

| Article number | **6AG1972-0AB01-4XA0** |
|---|---|
| Based on | **6ES7972-0AB01-0XA0** |
| | SIPLUS diagnostics repeater for PROFIBUS |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 12 Mbit/s; 9.6 kbit/s to 12 Mbit/s |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |

| Article number | **6AG1972-0AB01-4XA0** |
|---|---|
| Based on | **6ES7972-0AB01-0XA0** |
| | SIPLUS diagnostics repeater for PROFIBUS |
| **Connection method** | |
| Power supply | Terminal block |
| Bus cables | FastConnect insulation displacement, 10 clamping cycles possible |
| **Dimensions** | |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 67.5 mm |
| **Weights** | |
| Weight, approx. | 300 g |

# I/O systems
PROFIBUS components
Diagnostics

## SIPLUS diagnostics repeater for PROFIBUS

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS RS 485 diagnostics repeater** | | **Accessories** | |
| To connect up to 2 segments to PROFIBUS DP, with online diagnostics functions for monitoring the bus lines | | **RS 485 bus connector with 90° cable outlet** | |
| Exposure to media | **6AG1972-0AB01-4XA0** | Max. transfer rate 12 Mbps | |
| | | Extended temperature range and exposure to media | |
| | | • without PG interface | **6AG1972-0BA12-2XA0** |
| | | • with PG interface | **6AG1972-0BB12-2XA0** |
| | | **RS 485 bus connector with angled cable outlet** | |
| | | (Extended temperature range -40 °C ... +70 °C and exposure to media) | |
| | | Max. transfer rate 12 Mbps | |
| | | • without PG interface | **6AG1972-0BA42-7XA0** |
| | | • with PG interface | **6AG1972-0BB42-7XA0** |
| | | **Additional accessories** | See SIMATIC RS 485 diagnostics repeater, page 9/358 |

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## Overview
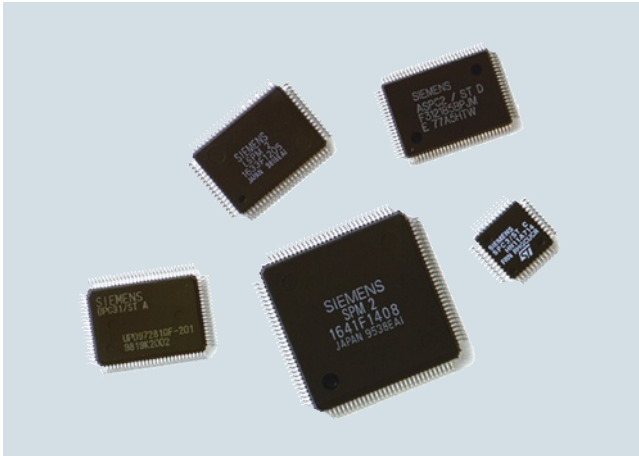


- Easy connection of field devices to PROFIBUS
- Integrated low-power management
- Different ASICs for the different functional requirements and application areas

## Technical specifications

| | LSPM 2 | SPC 3 | SPC 3LV | DPC 31 |
|---|---|---|---|---|
| Protocol | PROFIBUS DP | PROFIBUS DP | PROFIBUS DP | PROFIBUS DP, PROFIBUS PA |
| Application range | simple slave application | intelligent slave application | intelligent slave application | intelligent slave application |
| Transmission rate, max. | 12 Mbps | 12 Mbps | 12 Mbps | 12 Mbps |
| Bus access | in ASIC | in ASIC | in ASIC | in ASIC |
| Automatic determination of transmission rate | yes | yes | yes | yes |
| Microprocessor required | no | yes | yes | integrated |
| Scope of firmware | not required | 6 to 24 KB | 6 to 24 KB | approx. 38 KB |
| Message buffer | - | 1.5 KB | 1.5 KB | 6 KB |
| Power supply | 5 V DC | 5 V DC | 3.3 V DC | 3.3 V DC |
| Power loss, max. | 0.35 W | 0.5 W | <0.5 W | 0.2 W |
| Permissible ambient temperature | -40 °C … +75 °C | -40 °C … +85 °C | -40 °C … +85 °C | -40 °C … +85 °C |
| Housing | MQFP, 80-pin | PQFP, 44-pin | PQFP, 44-pin | PQFP, 100-pin |
| Frame size | 4 cm$^2$ | 2 cm$^2$ | 2 cm$^2$ | 4 cm$^2$ |
| Delivery quantities (pcs.) | 6/66/330/4950 | 6/96/750/960/4800 | 5/160/800/1000/4800 | STEP B: 6/60/300/5100 STEP C1: 6/66/660/4620 |

| | SPC 4-2 | ASPC 2 | SIM 1-2 | FOCSI |
|---|---|---|---|---|
| Protocol | PROFIBUS DP PROFIBUS FMS PROFIBUS PA | PROFIBUS DP PROFIBUS FMS PROFIBUS PA | PROFIBUS PA | - |
| Application range | Intelligent slave application | Master application | Medium Attachment | Medium Management Unit |
| Transmission rate, max. | 12 Mbps | 12 Mbps | 31.25 Kbps | 12 Mbps |
| Bus access | in ASIC | in ASIC | - | - |
| Automatic determination of transmission rate | yes | yes | - | - |
| Microprocessor required | yes | yes | - | - |
| Scope of firmware | 3 … 30 KB | 80 KB | not required | not required |
| Message buffer | 3 KB | 1 MB (external) | - | - |
| Voltage supply | 5 V DC, 3.3 V | 5 V DC | via bus | 3.3 V DC |
| Power loss, max. | 0.6 W at 5V 0.01 W at 3.3 V | 0.9 W | 0.05 W | 0.75 W |
| Permissible ambient temperature | -40 °C … +85 °C | -40 °C … +85 °C | -40 °C … +85 °C | -40 °C … +85 °C |
| Housing | TQFP, 44-pin | P-MQFP, 100-pin | MLPQ, 40-pin | TQFP, 44-pin |
| Frame size | 2 cm$^2$ | 4 cm$^2$ | 36 mm$^2$ | 2 cm$^2$ |
| Delivery quantities (pcs.) | 5/160 | 6/66/660/4620 | 30/60/1000 | 40 |

# I/O systems
## PROFIBUS components

**PROFIBUS DP ASICs**

■ **Ordering data** | Article No. | | Article No.
---|---|---|---

**ASIC ASPC 2**

For constructing master interfaces (quantity discount)
- 6 units (lead-free) — **6ES7195-0AA05-0XA0**
- 66 units (lead-free) — **6ES7195-0AA15-0XA0**
- 660 units (lead-free) — **6ES7195-0AA25-0XA0**
- 4620 units (lead-free) — **6ES7195-0AA35-0XA0**

**ASIC LSPM 2**

For constructing simple slave interfaces (quantity discount)
- 6 units (lead-free) — **6ES7195-0BA02-0XA0**
- 66 units (lead-free) — **6ES7195-0BA12-0XA0**
- 330 units (lead-free) — **6ES7195-0BA22-0XA0**
- 4950 units (lead-free) — **6ES7195-0BA32-0XA0**

**ASIC SPC 3**

For constructing intelligent DP slave interfaces (quantity discount)
- 6 units (lead-free) — **6ES7195-0BD04-0XA0**
- 96 units (lead-free) — **6ES7195-0BD14-0XA0**
- 960 units (lead-free) — **6ES7195-0BD24-0XA0**
- 4800 units (lead-free) — **6ES7195-0BD34-0XA0**
- 750 units (lead-free) (tape & reel) — **6ES7195-0BD44-0XA0**

**ASIC SPC 3LV**

For constructing intelligent DP slave interfaces (quantity discount)
- 5 units (lead-free) — **6ES7195-0BG00-0XA0**
- 160 units (lead-free) — **6ES7195-0BG10-0XA0**
- 800 units (lead-free) — **6ES7195-0BG20-0XA0**
- 4800 units (lead-free) — **6ES7195-0BG30-0XA0**
- 1000 units (lead-free) (tape & reel) — **6ES7195-0BG40-0XA0**

**ASIC DPC 31 STEP B**

For constructing intelligent DP slave interfaces (quantity discount)
- 6 units (lead-free) — **6ES7195-0BE02-0XA0**
- 60 units (lead-free) — **6ES7195-0BE12-0XA0**
- 300 units (lead-free) — **6ES7195-0BE22-0XA0**
- 5100 units (lead-free) — **6ES7195-0BE32-0XA0**

**ASIC DPC 31 STEP C1**

For constructing intelligent DP slave interfaces (quantity discount)
- 6 units (lead-free) — **6ES7195-0BF02-0XA0**
- 66 units (lead-free) — **6ES7195-0BF12-0XA0**
- 660 units (lead-free) — **6ES7195-0BF22-0XA0**
- 4620 units (lead-free) — **6ES7195-0BF32-0XA0**

**ASIC SPC 4-2**

For constructing intelligent DP slave interfaces (quantity discount)
- 5 units for laboratory development (lead-free) — **6GK1588-3AA00**
- 160 units (lead-free, 1 tray) — **6GK1588-3AA15**

**ASIC SIM 1-2**

For connection according to IEC H1 for PROFIBUS PA with a transmission rate of 31.25 Kbps
- 60 units (in tube) — **6GK1588-3BB02**
- 1000 units (tape & reel) — **6GK1588-3BB21**

**Accessories**

**Firmware for Siemens ASIC SPC 3**
- DP firmware — **6ES7195-2BA00-0XA0**
- DP-V1 firmware — **6ES7195-2BA01-0XA0**
- DP-V1 firmware upgrade — **6ES7195-2BA02-0XA0**

**Firmware for Siemens ASIC DPC 31**
- DP-V1 firmware — **6ES7195-2BB00-0XA0**

## Overview
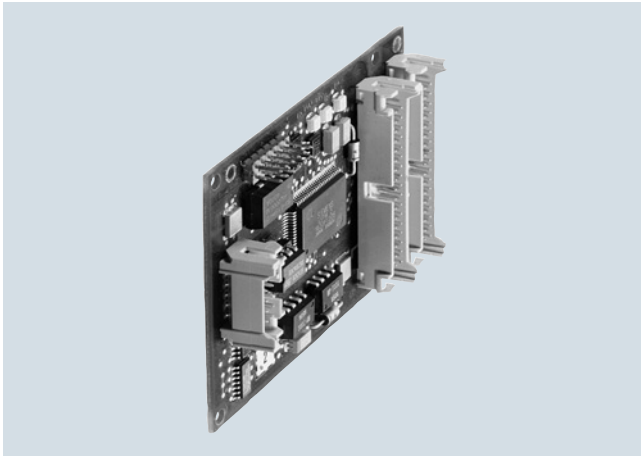
- IM 182-1 PC slave board for the connection of AT-compatible PCs as DP slaves

## Technical specifications

| Article number | **6ES7182-0AA01-0XA0** |
|---|---|
| | IM 182-1 PC SLAVE BOARD F. PROFIBUS DP |
| **General information** | |
| Suitability for use | Slave applications |
| ASIC | SPC 3 |
| • Scope of firmware | 4 to 24 KB (incl. test program) |
| **Supply voltage** | |
| Rated value (DC) | 5 V |
| **Input current** | |
| Current consumption, typ. | 250 mA |
| **Processor** | |
| Microprocessor type | Processor of the PG/PC |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 12 Mbit/s |

| Article number | **6ES7182-0AA01-0XA0** |
|---|---|
| | IM 182-1 PC SLAVE BOARD F. PROFIBUS DP |
| **Protocols** | |
| PROFIBUS DP | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Dimensions** | |
| Width | 168 mm |
| Height | 105 mm |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC S5/S7 IM 182-1 PC slave board** | **6ES7182-0AA01-0XA0** | **Accessories** | |
| For PROFIBUS DP, max. 12 Mbps | | **Firmware for Siemens ASIC SPC 3 and IM 182-1** | |
| | | • DP firmware | **6ES7195-2BA00-0XA0** |
| | | • DP-V1 firmware | **6ES7195-2BA01-0XA0** |
| | | • DP-V1 firmware upgrade | **6ES7195-2BA02-0XA0** |

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# I/O systems
## PROFIBUS components

### Development kits

■ **Overview**

#### Development kit

With the help of development kits, PROFIBUS hardware and software applications can be developed and tested using the PROFIBUS ASICs SPC 3.

The comprehensive, perfectly interacting hardware and software components considerably reduce the development costs for a PROFIBUS device.

The kits provide a fully functional hardware development environment which development engineers can build on with their special requirements for hardware and software. Documentation is supplied on CD in English and German.

The kits are in the form of a PC module and make our PROFIBUS know-how accessible to other users. The development team is available to provide advice to new users even with their own developments – this consultancy service is also a component part of the development kit.

Following completion of a development, devices can be certified by our experts in the PROFIBUS interface centers – we can help new users here, too.

#### PROFIBUS DP/PA development kit

The kit facilitates the set up of PROFIBUS slaves with a variety of PROFIBUS standards:
- PROFIBUS DP-V1 (RS 485)
- PROFIBUS PA (IEC 1158) and
- PROFIBUS based on fiber-optic cables

The development environment shows how applications are implemented using PROFIBUS ASIC SPC 3.

Hardware included:
- IM 182-1 (PC module with SPC 3 and ISA interface); without SW

Software to be ordered separately:
- FW for SPC 3 (IM 183-1: evaluation board and IM 182)

When developing PROFIBUS PA applications, you will need to order a PROFIBUS DP/PA coupler (6ES7 157-0AC80-0XA0) separately. The DP/PA coupler converts the PROFIBUS DP physical specifications into those of PROFIBUS PA. This module is not included in the development kit!

#### PROFIsafe starter kit V3.4

The PROFIsafe starter kit V3.4 is compatible with version 2.4 of the PROFIsafe profile, as specified in IEC 61784-3-3. It meets a series of user requirements such as multi-instance capability and variable process data lengths at runtime.

Along with all of the PI specifications required for development, the PROFIsafe starter kit contains the source files for the PROFIsafe driver software (PSD) and a comprehensive implementation manual in English and German. In addition, it includes various CRC calculation tools and tools for creating GSD files with security-related parameters.

Examples of adaptation of the PSD (PROFIsafe Driver) to current PROFIBUS and PROFINET stack interfaces provide assistance for adaptations that may be necessary. Special "slow-motion monitors" allow the PROFIsafe protocol processes to be monitored in slow motion. A new feature is support for the iPar server and the TCI interface.

Example applications are provided on the CD-ROM for both PROFIBUS and PROFINET. The hardware components supplied in the development kits offer the user step-by-step access to the PROFIsafe world.

The PROFIsafe starter kit consists of the following components:
- Current PROFIsafe specifications with current PROFIsafe certificate
- PROFIsafe driver software (as core component of the development kit)
- Example GSD file for STEP7 (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Example project for S7-319F (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- GSD tools (e.g. GSD editor and CRC calculation tool)
- iPar server software and instructions (FB24)
- Tool calling interface example and instructions
- F programming guidelines· Layer stacks (V1SL and PN IO)
- Example firmware (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Project for example development environment (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Slow-motion monitor (for PROFIBUS: PG-PC and CP5613, for PROFINET: PG-CP1616)
- Comprehensive documentation

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **PROFIBUS DP/PA development kit** | **6ES7182-0AA01-0XA0** | **Firmware with development environment for SPC 3** | **6ES7195-2BA00-0XA0** |
| Comprising IM 182-1 (PC module with SPC 3 and ISA interface); without SW, additional firmware required | | For IM 182-1 (ISA plug-in card) and IM 183-1 (evaluation board) | |
| | | **PROFIsafe starter kit V3.4** | **6ES7195-3BF02-0YA0** |

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## ■ Overview
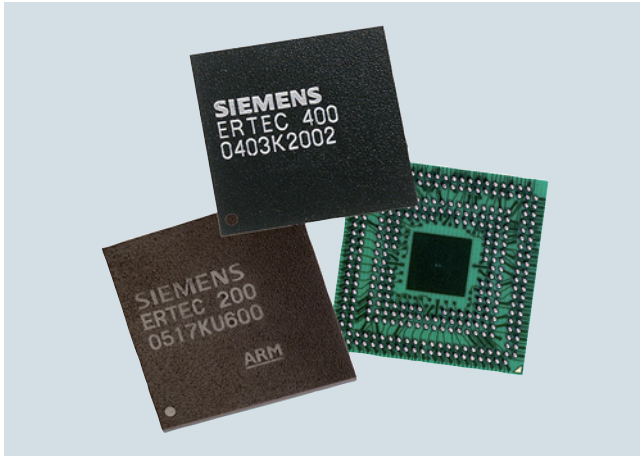
With the Industrial Ethernet ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controllers), devices and systems can be connected to PROFINET without great effort. The high-performance Ethernet controllers with 32-bit microprocessor as well as integral real-time switch for Real Time Ethernet have been specially developed for industrial use.

These Ethernet controllers handle all the data transmission for PROFINET with Real-Time (RT) and Isochronous Real-Time (IRT) and thus offload the application processor. Thanks to the integral 2-port switch (ERTEC 200 and ERTEC 200P) or 4-port switch (ERTEC 400), there are no costs for external switches. Flexible topologies such as star, tree and linear topologies can be implemented without any other external network components.

- ERTEC 200P
  with integral 2-port switch and maximum performance for compact and modular PROFINET field devices. The ERTEC 200P is designed for cycle times up to 31.25 µs. In conjunction with a high-speed ARM 926 CPU, it meets all the requirements for powerful PROFINET implementation.
- ERTEC 200
  with an integral 2-port switch for developing compact or modular PROFINET field devices.
- ERTEC 400
  with 4 integral ports and one integral PCI interface for developing network components and field devices with specific requirements regarding communication capabilities.

The EK-ERTEC 200P PN IO, DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO development kits enable the uncomplicated development of PROFINET field devices thanks to fast and simple integration of the PROFINET IO functionalities based on the ERTEC.

## ■ Technical specifications

|  | ERTEC 400 | ERTEC 200 | ERTEC 200P |
|---|---|---|---|
| Transmission rate | 10/100 Mbps | 10/100 Mbps | 100 Mbps |
| Interfaces |  |  |  |
| • Ethernet / PHY interface | 4 x PHY interface | 2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs) | 2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs) |
|   - In connection with the corresponding PHY types: | • Half/full duplex<br>Support for copper and fiber-optic cables;<br>autosensing;<br>autocrossover | • Half/full duplex<br>Support for copper and fiber-optic cables (PHY for copper integrated);<br>autosensing;<br>autocrossover | Half/full duplex<br>Support for copper and fiber-optic cables (PHY for copper integrated);<br>autosensing;<br>autocrossover |
| • Local Bus Unit (LBU) | Local bus master interface for connecting an external host with access to internal areas of the ERTEC;<br>16 bit data bit width | Local bus master interface for connecting an external host with access to internal areas of the ERTEC;<br>16 bit data bit width | XHIG (external host interface);<br>16/32 bit data bit width |
| • External memory interface (EMIF) |  |  |  |
|   - SDRAM controller | 128 MB/16 bit or 256 MB/32 bit | 64 MB/16 bit or 128 MB/32 bit | 128 MB/16 bit or 256 MB/32 bit |
|   - SRAM controller | 4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit) | 4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit) | 4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit) |
|   - Chip-select support | yes | yes | yes |
| • IO interfaces | 32 parameterizable I/O (GPIO);<br>multifunctional outputs | 45 parameterizable I/O (GPIO);<br>multifunctional outputs | up to 96 parameterizable I/O (GPIO);<br>multifunctional outputs |
| • Intelligent switching and PROFINET IRT prioritization/timing | yes | yes | yes |
| ARM processor |  |  |  |
| • Integral ARM946 processor | 32-bit ARM system | 32-bit ARM system | 32-bit ARM system |
|   - Adjustable operating frequency | 50/100/150 MHz | 50/100/150 MHz | 125/250 MHz |

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# I/O systems
## PROFINET components

### Enhanced Real-Time Ethernet Controllers ERTEC

■ **Technical specifications** (continued)

| | ERTEC 400 | ERTEC 200 | ERTEC 200P |
|---|---|---|---|
| **Supply voltage** | | | |
| • Core (VDD Core) | 1.5 V +/- 10 % | 1.5 V +/- 10 % | 1.2 V +5%/-0.1 V |
| • I/Os (VDD IO) | 3.3 V +/- 10 % | 3.3 V +/- 10 % | 3.3 V +5%/-10% |
| • External host interface (XHIF) | - | - | 1.8 V +5%/-10% |
| • PHY | - | - | 1.5 V +5%/-10% |
| • External host interface (XHIF) | - | - | 1.8 V/3.3 V +5%/-10% |
| **Perm. ambient conditions** | | | |
| • Operating temperature | -40 °C to +85 °C | -40 °C to +85 °C | -40 °C to +85 °C |
| • Transport/storage temperature | -40 °C to +85 °C | -40 °C to +85 °C | -40 °C to +85 °C |
| • Relative humidity | Max. 95 % at +25 °C | Max. 95 % at +25 °C | Max. 95 % at +25 °C |
| **Constructional design** | | | |
| • Housing | Plastic FBGA 304 Pin | Plastic FBGA 304 Pin | Plastic FBGA 400 Pin |
| • Pinning Ball Pitch | 0.8 mm | 0.8 mm | 0.8 mm |
| **Dimensions (W x H x D) in mm** <br> - ERTEC | 19 x 1 x 19 | 19 x 1 x 19 | 17 x 1 x 17 |
| **Supported communications protocols** | | | |
| • General Ethernet protocols | In accordance with the respective software implementation that uses the ERTEC as Ethernet controller | In accordance with the respective software implementation that uses the ERTEC as Ethernet controller | In accordance with the respective software implementation that uses the ERTEC as Ethernet controller |
| • PROFINET in combination with a PROFINET Software Stack | Real-Time communication (RT); Isochronous Real-Time communication (IRT) | Real-Time communication (RT); Isochronous Real-Time communication (IRT) | Real-Time communication (RT); Isochronous Real-Time communication (IRT) |

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **ERTEC 200P** <br><br> ASIC for connection to Switched Ethernet 100 Mbps, Ethernet controller with integral 2-port switch, ARM 926 processor and integral PHYs | | **ERTEC 200** <br><br> ASIC ERTEC 200 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integral 2-port switch, ARM 946 processor and integral PHYs | |
| • 10 units (evaluation pack) | **6ES7195-0BH00-0XA0** | • 70 units (single tray) | **6GK1182-0BB01-0AA1** |
| • 90 units (single tray) | **6ES7195-0BH10-0XA0** | • 350 units (drypack, 5 trays), | **6GK1182-0BB01-0AA2** |
| • 450 units (drypack, 5 trays) | **6ES7195-0BH20-0XA0** | • 3500 units (package, 10 dry-packs) | **6GK1182-0BB01-0AA3** |
| • 1 000 units (tape & reel) | **6ES7195-0BH30-0XA0** | | |
| **Evaluation Kit** <br> **EK-ERTEC 200P PN IO** | **6ES7195-3BE00-0YA0** | **ERTEC 400** <br><br> ASIC ERTEC 400 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integrated 4-port switch, ARM 946 processor and PCI interface (V2.2), data preparation for real-time and isochronous real-time for PROFINET IO | |
| | | • 70 units (single tray) | **6GK1184-0BB01-0AA1** |
| | | • 350 units (drypack, 5 trays) | **6GK1184-0BB01-0AA2** |

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## Overview

With the development packages for PROFINET, compact or modular PROFINET field devices can be developed quickly and with little effort. Depending on the application, different development packages are available.

The development packages for the ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controllers) are suitable for the development of field devices with an integrated IRT switch (Isochronous Real-Time). The demand for real-time capability, linear topology capability, and for IT integration is therefore met perfectly.

With the help of the development package for standard Ethernet controllers, PROFINET devices can be developed on the basis of a standard Ethernet controller. Devices with RT (Real-Time) can be implemented in the field device without special hardware.

The PROFIsafe starter kit permits the implementation of fail-safe devices. In so doing, the PROFIsafe stack applicatively builds on the PROFINET stack.

## Ordering data

| | Article No. |
|---|---|
| **ERTEC development kits / evaluation kits** | |
| Evaluation kit EK-ERTEC 200P PN IO | **6ES7195-3BE00-0YA0** |
| Development kit for standard Ethernet controllers | **6ES7195-3BC00-0YA0** |
| PROFIsafe starter kit V3.5 according to the PROFIsafe V2.6.1 profile | **6ES7195-3BF03-0YA0** |
| **ERTEC ASICs** | |
| **ERTEC 200P** | |
| ASIC for connection to Switched Ethernet 100 Mbps, Ethernet controller with integral 2-port switch, ARM 926 processor and integral PHYs | |
| • 10 units (evaluation pack) | **6ES7195-0BH00-0XA0** |
| • 90 units (single tray) | **6ES7195-0BH10-0XA0** |
| • 450 units (drypack, 5 trays) | **6ES7195-0BH20-0XA0** |

| | Article No. |
|---|---|
| **ERTEC 200** | |
| ASIC ERTEC 200 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integral 2-port switch, ARM 946 processor and integral PHYs | |
| • 70 units (single tray) | **6GK1182-0BB01-0AA1** |
| • 350 units (drypack, 5 trays) | **6GK1182-0BB01-0AA2** |
| • 3500 units (package, 10 drypacks) | **6GK1182-0BB01-0AA3** |
| • 1050 units (tape & reel) | **6GK1182-0BB01-0AA4** |
| **ERTEC 400** | |
| ASIC ERTEC 400 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integral 4-port switch, ARM 946 processor and PCI interface (V2.2) | |
| • 70 units (single tray) | **6GK1184-0BB01-0AA1** |
| • 350 units (drypack, 5 trays) | **6GK1184-0BB01-0AA2** |
| **Accessories** | |
| PROFINET IO product line license for one product line | **6ES7195-3BC10-0YA0** |

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# I/O systems
## PROFINET components

### PROFINET Driver

### ◼ Overview

- For connecting distributed I/O and drives to user-specific control applications via PROFINET
- Operation of the control software on a standard PC using the standard Ethernet interface of the PC
- Supplied as portable source code and can therefore be used with any operating system
- Sample application for Windows included in the scope of delivery; uses SIMATIC IPCs as example hardware

Note

You are provided with the source code of the PN driver V1.1, as well as the source code of the application examples. These codes are to be used for modifying and editing in conjunction with SIMATIC only. You are not permitted to use PN driver source codes or the application examples without SIMATIC, nor are you permitted to pass them on to third parties.

The application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventualities. The application examples do not represent customer-specific solutions. They are only intended to provide support for typical tasks. You are responsible for ensuring that the described products are used correctly. These application examples do not relieve you of your responsibility to use safe practices in application, installation, operation and maintenance processes. By using these application examples, you agree that we cannot be held liable for any damages/claims beyond the liability clause described. We reserve the right to make changes to these application examples at any time without prior notice. If there are any deviations between the recommendations provided in these application examples and other Siemens publications – e.g. Catalogs – the contents of the other documents have priority.

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Any form of duplication of these application examples or excerpts thereof is not permitted without the express consent of Siemens AG.

### ◼ Ordering data

| | Article No. |
|---|---|
| **PROFINET Driver** | |
| For connecting distributed I/O and drives to user-specific control applications via PROFINET | |
| Development license | **6ES7195-3AA00-0YA0** |
| Runtime licenses | |
| • 1 unit | **6ES7195-3AA05-0XA0** |
| • 10 units | **6ES7195-3AA10-0XA0** |
| • 50 units | **6ES7195-3AA20-0XA0** |
| • 200 units | **6ES7195-3AA30-0XA0** |
| • 500 units | **6ES7195-3AA40-0XA0** |

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## Overview



- Terminates bus segments at data transmission rates of 9.6 Kbps to 12 Mbps
- Power supply independent of bus stations

*Designed for Industry*

- Terminal-independent bus termination through onboard power supply

## Technical specifications

| Article number | 6ES7972-0DA00-0AA0 |
|---|---|
| | SIMATIC S7, RS 485 RESISTOR |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption, typ. | 30 mA |
| **Power loss** | |
| Power loss, max. | 0.72 W |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 12 Mbit/s; 9.6 kbit/s to 12 Mbit/s |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |

| Article number | 6ES7972-0DA00-0AA0 |
|---|---|
| | SIMATIC S7, RS 485 RESISTOR |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Relative humidity** | |
| • Operation, max. | 95 %; at +25 °C |
| **Connection method** | |
| Power supply | Screw terminal block |
| Bus cables | Screw terminal block |
| **Dimensions** | |
| Width | 60 mm |
| Height | 70 mm |
| Depth | 43 mm |
| **Weights** | |
| Weight, approx. | 95 g |

## Ordering data

| | Article No. |
|---|---|
| **Active RS 485 terminating element for PROFIBUS**<br><br>For terminating bus segments at transmission rates of 9.6 Kbps to 12 Mbps | **6ES7972-0DA00-0AA0** |

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# I/O systems
## Network components for PROFIBUS
## Electrical networks (RS 485)

### RS 485 repeater for PROFIBUS

### ■ Overview

- Automatic detection of transmission rates
- Transmission rates from 9.6 Kbps to 12 Mbps are possible, incl. 45.45 Kbps
- 24 V DC voltage display
- Indication of segment 1 and 2 bus activity
- The separation of segment 1 and segment 2 by means of switches is possible
- Separation of the right segment with an inserted terminating resistor
- Decoupling of segment 1 and segment 2 in the case of static interference

#### *Designed for Industry*
- For increasing the expansion
- Electrical isolation of segments
- Commissioning support
  - Switches for separation of segments
  - Bus activity display
  - Segment separation in the case of an incorrectly inserted terminating resistor

In this context, please also note the diagnostics repeater that provides extensive diagnostics functions for physical line diagnostics in addition to the normal repeater functionality. This is described on page 9/357.

### ■ Technical specifications

| Article number | 6ES7972-0AA02-0XA0 |
|---|---|
| | REPEATER RS 485 F. PROFIBUS/MPI |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption, max. | 100 mA; 1 00 mA without loads at PG/OP socket; 130 mA load at PG/OP socket (5 V/90 mA); 200 mA load at PG/OP socket (24 V/100 mA) |
| **Power loss** | |
| Power loss, typ. | 0.7 W |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Transmission rate, max. | 12 Mbit/s; 9.6 kbit/s to 12 Mbit/s |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |

| Article number | 6ES7972-0AA02-0XA0 |
|---|---|
| | REPEATER RS 485 F. PROFIBUS/MPI |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Relative humidity** | |
| • Operation, max. | 95 %; at 25 °C |
| **Connection method** | |
| Power supply | Terminal block |
| Bus cables | 2 terminal blocks |
| **Dimensions** | |
| Width | 45 mm |
| Height | 128 mm |
| Depth | 67 mm |
| **Weights** | |
| Weight, approx. | 350 g |

### ■ Ordering data | Article No. |

| **RS 485 repeater for PROFIBUS** | 6ES7972-0AA02-0XA0 |
|---|---|
| Transfer rate up to max. 12 Mbps, 24 V DC, IP20 enclosure | |

## Overview



- Used to terminate bus segments at rates of 9.6 Kbps to 12 Mbps
- Power supply independent of the bus participants

### *Designed for Industry*

- End-device – independent bus termination thanks to own power supply

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS active RS 485 terminating element | |
|---|---|
| **Article No.** | **6AG1972-0DA00-2AA0** |
| **BasedOn Article No.** | **6ES7972-0DA00-0AA0** |
| Ambient temperature range | -25 °C … +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components. |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 100%, condensation/frost permitted. No commissioning if condensation present. |
| Biologically active substances, compliance with EN 60721-3-3 | Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Chemically active substances, compliance with EN 60721-3-3 | Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation! |
| Mechanically active substances, compliance with EN 60721-3-3 | Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation! |
| Air pressure (depending on the highest positive temperature range specified) | 1 080...795 hPa (-1 000 ... +2 000 m) See ambient temperature range 795...658 hPa (+2 000 ... +3,500 m) Derating 10 K 658...540 hPa (+3 500 ... +5 000m) Derating 20K |

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

## Ordering data

| | Article No. |
|---|---|
| **SIPLUS active RS 485 terminating element for PROFIBUS** to complete bus segments at transmission rates of 9.6 Kbps to 12 Mbps | |
| Extended temperature range and exposure to media | **6AG1972-0DA00-2AA0** |

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# I/O systems
## Network components for PROFIBUS
## Electrical networks (RS 485)

**SIPLUS RS 485 repeater**

### ■ Overview



- Automatically detects transmission rate
- 45.45 Kbps transmission rate is possible
- 24 V DC voltage display
- Indication of segment 1 and 2 bus activity
- The separation of segment 1 and segment 2 by means of switches is possible
- Separation of the right segment with an inserted terminating resistor
- Decoupling of segment 1 and segment 2 in the case of static interference

**Designed for Industry**

- For increasing the number of participants and the expansion
- Electric isolation of segments
- Commissioning support
  - Switches for segment separation
  - Bus activity display
  - Segment separation in the case of an incorrectly inserted terminating resistor

In this context, please also note the diagnostics repeater that provides extensive diagnostics functions for physical line diagnostics in addition to the normal repeater functionality. This is described on page 9/359.

**Note:**

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

http://www.siemens.com/siplus-extreme

### ■ Technical specifications

| Article number | 6AG1972-0AA02-7XA0 |
| --- | --- |
| Based on | 6ES7972-0AA02-0XA0 |
| | SIPLUS DP RS 485-Repeater |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 70 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Extended ambient conditions** | |
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) |
| **Relative humidity** | |
| - With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |

| Article number | 6AG1972-0AA02-7XA0 |
| --- | --- |
| Based on | 6ES7972-0AA02-0XA0 |
| | SIPLUS DP RS 485-Repeater |
| **Resistance** | |
| - against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| - against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation! |
| - against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |
| **Connection method** | |
| Power supply | Terminal block |
| Bus cables | 2 terminal blocks |
| **Dimensions** | |
| Width | 45 mm |
| Height | 128 mm |
| Depth | 67 mm |
| **Weights** | |
| Weight, approx. | 350 g |

### ■ Ordering data

| | Article No. |
| --- | --- |
| **SIPLUS RS 485 repeater for PROFIBUS** | |
| Transfer rate up to max. 12 Mbps, 24 V DC, enclosure IP20 | |
| Extended temperature range and exposure to media | 6AG1972-0AA02-7XA0 |

## ■ Overview
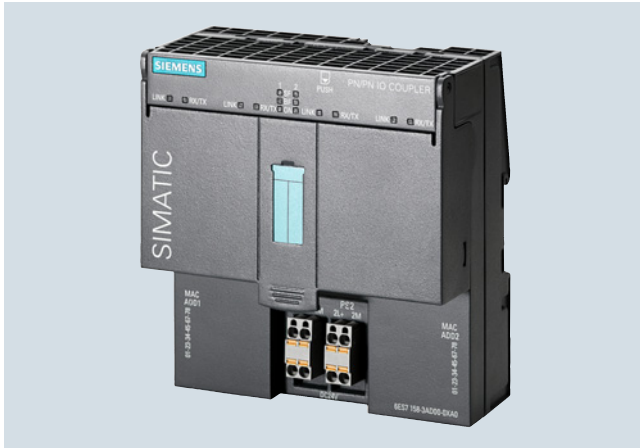


- Maximum data exchange of 256-byte input data and 256-byte output data between two PROFINET networks
- Maximum of 16 input/output ranges for the exchange of data
- Electrical isolation between the two PROFINET IO subnets
- Redundant power supply
- Supported Ethernet services
  - ping
  - arp
  - network diagnostics (SNMP/MIB-2)
- Diagnostic interrupts
- ReturnOfSubmodule interrupts

## ■ Technical specifications

| Article number | 6ES7158-3AD01-0XA0 |
|---|---|
| | PN/PN COUPLER |
| **General information** | |
| Product type designation | PN/PN coupler |
| **Installation type/mounting** | |
| Mounting | Mounting rail 7.5 mm and 15 mm |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| Reverse polarity protection | Yes |
| **Mains buffering** | |
| • Mains/voltage failure stored energy time | 20 ms |
| **Input current** | |
| from supply voltage 1L+, max. | 400 mA |
| **Power loss** | |
| Power loss, typ. | 6 W |
| **Address area** | |
| **Addressing volume** | |
| • Inputs | 1 024 byte; Total, including outputs |
| • Outputs | 1 024 byte; Total, including inputs |
| **Interfaces** | |
| **PROFINET IO** | |
| • automatic detection of transmission rate | Yes |
| • Transmission rate, max. | 100 Mbit/s |
| • Services | Network management functions, network diagnostics (SNMP, MIB-2), ping, arp, PROFINET V2.0 |
| • RJ 45 | Yes; 4 RJ45 female connectors, 2 for each side |
| **Protocols** | |
| Supports protocol for PROFINET IO | Yes |

| Article number | 6ES7158-3AD01-0XA0 |
|---|---|
| | PN/PN COUPLER |
| **Isochronous mode** | |
| Isochronous operation (application synchronized up to terminal) | No; For operation on isochronous bus |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • Bus fault BF (red) | Yes; for each side |
| • Group error SF (red) | Yes; for each side |
| • Monitoring 24 V voltage supply ON (green) | Yes; for each side |
| • Connection to network LINK (green) | Yes; for each port |
| **Potential separation** | |
| between supply voltage and electronics | Yes; to power input 2 |
| between Ethernet and electronics | Yes |
| **Permissible potential difference** | |
| between different circuits | 500 V DC |
| **Isolation** | |
| Isolation tested with | 500 V |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 60 °C |
| **Dimensions** | |
| Width | 120 mm; Minimized with good handling |
| Height | 119.5 mm |
| Depth | 75 mm; with mounting rail |
| **Weights** | |
| Weight, approx. | 283 g |

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# I/O systems
## Network transitions

| Ordering data | Article No. |
|---|---|
| **PN/PN coupler**<br>For connecting<br>two PROFINET networks | **6ES7158-3AD01-0XA0** |
| **Power supply connector**<br>Spare part;<br>for connecting the<br>24 V DC supply voltage<br>• with push-in terminals<br>• with screw-type terminals | <br><br><br><br>**6ES7193-4JB00-0AA0**<br>**6ES7193-4JB50-0AA0** |

## Overview

- For data exchange between PROFINET and CAN Bus 2.0A/B or CANopen Manager or Slave (according to CiA 301 & 302)
- CANopen features:
  - Node / lifeguarding
  - Heartbeat
  - SYNC (producer / consumer)
- Integrated in TIA via HSP, TIA Portal V14 or higher
- PROFINET switch and 9-pin sub D plug integrated for CAN
- Up to 126 CAN nodes
- 512 receiver/transmitter PDOs
- Electrical isolation between the two networks
- Diagnostic interrupts
- Controllers supported: S7-1200, S7-1500, ET 200SP, Open Controller

## Technical specifications

| Article number | 6BK1620-0AA00-0AA0 |
| --- | --- |
| | SIMATIC PN/CAN LINK |
| **General information** | |
| Product type designation | SIMATIC PN/CAN LINK |
| Firmware version | |
| • FW update possible | Yes |
| Vendor identification (VendorID) | ID 09 00 00 53h acc. to CiA |
| **Engineering with** | |
| • STEP 7 TIA Portal configurable/ integrated as of version | STEP 7 V14 or higher |
| **Installation type/mounting** | |
| Mounting | DIN rail, wall mounting, portrait mounting |
| Mounting position | Any |
| Recommended mounting position | Horizontal |
| **Supply voltage** | |
| Type of supply voltage | 24 V DC |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| Reverse polarity protection | Yes |
| Overvoltage protection | Yes |
| Short-circuit protection | Yes |
| **Mains buffering** | |
| • Mains/voltage failure stored energy time | 10 ms |
| **Input current** | |
| Current consumption (rated value) | 0.09 A |
| Current consumption, max. | 0.11 A |
| **Power loss** | |
| Power loss, typ. | 2.2 W |

| Article number | 6BK1620-0AA00-0AA0 |
| --- | --- |
| | SIMATIC PN/CAN LINK |
| **Interfaces** | |
| Interfaces/bus type | 2x Ethernet (RJ45), 1x Sub-D (9-pin) |
| **PROFINET IO** | |
| • automatic detection of transmission rate | No |
| • Transmission rate, max. | 100 Mbit/s |
| • Number of RJ45 ports | 2 |
| • Number of FC (FastConnect) connections | 2 |
| **PROFINET functions** | |
| • Assignment of the IP address, supported | Yes |
| • Assignment of the device name, supported | Yes |
| **Protocols** | |
| • CAN operating modes | CAN Standard CAN 2.0A/B; CANopen Manager / Slave acc. to CiA |
| • Specification acc. to CiA | CiA 301 & CiA 302 |
| • Transmission rate, min. | 50 kbit/s |
| • Transmission rate, max. | 1 000 kbit/s |
| • Number of slaves, max. | 126 |
| • Number of SDOs in parallel | 16; Parallel |
| • Number of PDOs | 512; Send / receive |
| **Type** | |
| - Node/life-guarding | Yes |
| - Heartbeat | Yes |
| - SYNC | Yes |

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# I/O systems
## Network transitions

**PN/CAN LINK**

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### ■ Technical specifications (continued)

| Article number | 6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK |
|---|---|
| **1. Interface** | |
| Interface type | CAN according to CiA 303-1 |
| Physics | 9-pin sub D socket |
| Isolated | Yes; 500 V AC or 707 V DC |
| **Interface types** | |
| • Number of ports | 1 |
| **2. Interface** | |
| Interface type | PROFINET |
| Physics | Ethernet, 2-port switch, 2*RJ45 |
| Isolated | Yes; 1 500 V AC or 2 250 V DC |
| **Interface types** | |
| • Number of ports | 2 |
| • integrated switch | Yes |
| **Functionality** | |
| • PROFINET IO Device | Yes |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Alarms | Yes |
| Diagnostic functions | Yes |
| **Diagnostics indication LED** | |
| • RUN LED | Yes |
| • ERROR LED | Yes |
| • MAINT LED | Yes |
| • LINK LED | Yes |
| • RX/TX LED | Yes |
| **Potential separation** | |
| Potential separation exists | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | IP20 |

| Article number | 6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK |
|---|---|
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| PNO certificate | Yes |
| RoHS conformity | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -25 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -25 °C |
| • vertical installation, max. | 55 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 85 °C |
| **Relative humidity** | |
| • Operation, max. | 95 % |
| **Dimensions** | |
| Width | 70 mm |
| Height | 112 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 212 g |

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### ■ Ordering data

| | Article No. |
|---|---|
| **SIMATIC PN/CAN LINK** PROFINET network transition according to CAN Bus 2.0A/B, CANopen Manager according to CiA301/302, CANopen Slave according to CiA301/302; IP20 | **6BK1620-0AA00-0AA0** |

## Overview

- For interconnecting two PROFIBUS DP networks
- The interchange of data between both DP networks takes place by internal copying in the coupler

## Technical specifications

| DP/DP transceiver | |
| --- | --- |
| PROFIBUS transmission rate | max. 12 Mbit/s |
| Interfaces | |
| • PROFIBUS DP | 9-pin Sub-D connector |
| Supply voltage | 24 V DC |
| Current consumption typ. | 150 mA |
| Mounting | Upright (DIP switches above) |
| Perm. environmental conditions | |
| • Operating temperature | |
|   - horizontal mounting | 0 °C … +60 °C |
|   - all other mounting positions | 0 °C … +40 °C |
| • Transport/storage temperature | -40 °C … +70 °C |
| • Relative humidity | 10-95 % at +25 °C |
| Design | |
| • Dimensions (W x H x D) in mm | 40 x 127 x 117 |
| • Weight | approx. 250 g |
| Degree of protection | IP20 |

## Ordering data          Article No.

| | |
| --- | --- |
| **DP/DP coupler** | **6ES7158-0AD01-0XA0** |

Note:

The manual is available free on the Internet.

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# I/O systems
## Network transitions

### IE/AS-i Link PN IO

■ **Overview**



IE/AS-i Link PN IO: Single master (left) and double master (right)

The IE/AS-i Link PN IO is a compact router between PROFINET and AS-Interface, with the following features:

- Single and double AS-Interface master
  (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and start-up by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply via AS-Interface cable or with 24 V DC
- Suitable for AS-i Power24V and AS-Interface with 30 V voltage
- Module exchange without entering the connection parameters (IP address, etc.) using C-PLUG (optional)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

Note

As an alternative to the IE/AS-i Link PN IO, a powerful network transition can be set up between PROFINET and AS-Interface by combining the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station (for safety-related applications), .

The IE/AS-i Link PN IO occupies the following address area:
- As a single master with full expansion: 62 bytes of input data and 62 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B slaves) of an AS-i line is stored
- Double the number of bytes as double master
- Optional additional I/O bytes for data from analog slaves

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the IO controller.

The IE/AS-i Link PN IO is configured as follows:
- With STEP 7 (classic) V5.4 or higher: When configuring in STEP 7, the AS-Interface configuration can be uploaded in STEP 7 V5.4 SP2 and higher. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- Alternatively, IE/AS-i Link PN IO can be integrated in the engineering tool by means of the PROFINET GSD file (e.g. for TIA Portal, for STEP 7 versions V5.4 SP2 and lower, or for non-Siemens engineering tools). Please observe the configuration notes in the TIA Portal, see https://support.industry.siemens.com/cs/ww/en/view/109483764.

Notes on safety

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

For more information on the topic of Industrial Security, see http://www.siemens.com/industrialsecurity.

***Single master***

The AS-i single master version of IE/AS-i Link PN IO is suitable for applications with typical volumes of data. The single master can operate up to 248 DI / 248 DO, using 62 A/B slaves with 4 DI / 4 DO each.

***Double master***

The AS-i double master version of IE/AS-i Link PN IO is suitable for applications with large volumes of data. In this case, twice the volume of project data can be used on two AS-i lines running independently of each other. The double master can operate up to 496 DI / 496 DO, using two AS-i networks each with 62 A/B slaves with 4 DI / 4 DO each.

## Overview (continued)
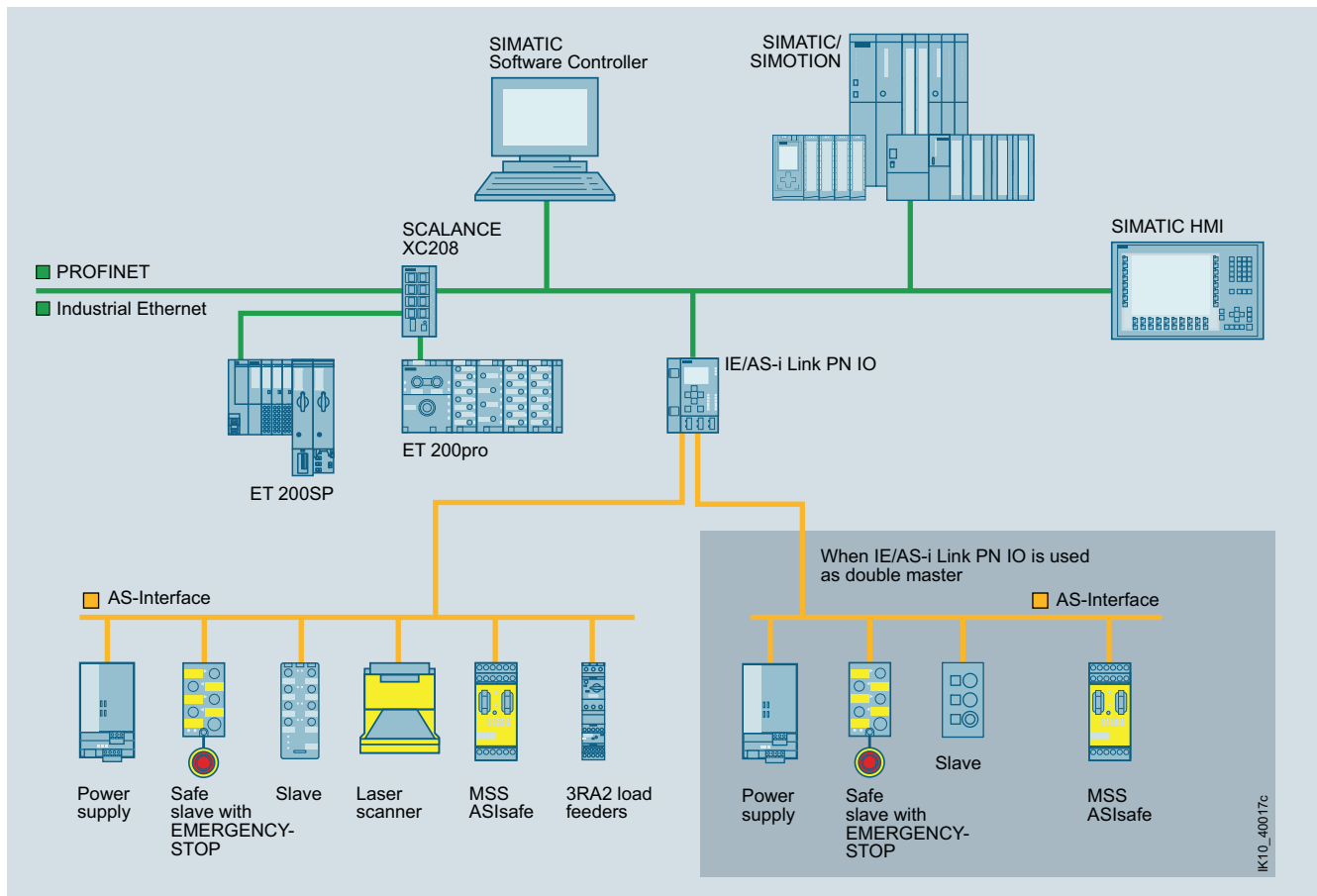


Integration of AS-Interface on PROFINET through IE/AS-i Link PN IO as single/double master

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **IE/AS-i Link PN IO** | | **Accessories** | |
| | | **C-PLUG** | |
| Router between PROFINET/Industrial Ethernet and AS-Interface in IP20 degree of protection; including COMBICON plug-in screw terminals for connecting an AS-Interface cable (two AS-Interface cables for a double master) and the optional 24 V supply; complies with AS-Interface Specification V3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5 | | Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot | 6GK1900-0AB00 |
| | | **IE FC RJ45 Plug 90** | |
| COMBICON connection | | RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder | |
| • Single master with display | 6GK1411-2AB10 | • 1 pack = 1 unit | 6GK1901-1BB20-2AA0 |
| • Double master with display | 6GK1411-2AB20 | • 1 pack = 10 units | 6GK1901-1BB20-2AB0 |
| | | • 1 pack = 50 units | 6GK1901-1BB20-2AE0 |
| | | **More information** | |
| | | For manuals, see https://support.industry.siemens.com/cs/ww/en/ps/15762/man. | |
| | | AS-Interface function block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog IC 10, Chapter 14, "Parameterization, Configuration and Visualization with SIRIUS". | |

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**I/O systems**

**Notes**

*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# SIMATIC control systems
FM 458-1 DP application module

### ◼ Overview



***SIMATIC FM 458-1 DP integrated in SIMATIC S7-400***

- Designed for high-performance and user-configurable closed-loop control tasks in the SIMATIC S7-400.
- Can be adapted to individual requirements as required, such as:
  Controlling, computing, closed-loop control as well as motion control. Can therefore be used flexibly for a wide variety of applications.
- Extensive library with approx. 300 function blocks:
  E.g. simple functions such as AND, ADD and OR through to complex GMC (general motion control) blocks as virtual master or gear functions.
- User-friendly graphical configuration with the SIMATIC engineering tool CFC (Continuous Function Chart) and the D7-SYS add-on software package:
  Optimum code generation by the compiler, therefore SCL is not required.
- PROFIBUS DP interface onboard.

SIMATIC FM 458-1 DP is based on more than 15 years experience with high-performance control systems and combines this know-how with the advantages of SIMATIC – the leading automation system for decades. In contrast to other function modules with static structures/functions, the FM 458-1 DP application module can be configured flexibly and adapted to individual requirements.

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## Overview



- Basic module for computing, closed-loop control and open-loop control tasks
- PROFIBUS DP interface for connection of distributed I/O and drives
- Modular design with expansion modules for I/O and communication

## Technical specifications

| | |
|---|---|
| Article number | **6DD1607-0AA2** |
| | FM458-1 DP APPLICATION MODULE |
| **Supply voltage** | |
| Rated value (DC) | |
| • 5 V DC | Yes |
| • 24 V DC | Yes |
| permissible range (ripple included), lower limit (DC) | 4.8 V |
| permissible range (ripple included), upper limit (DC) | 5.25 V |
| **Input current** | |
| Current consumption, typ. | 1.5 A |
| Current consumption, max. | 3 A |
| **Memory** | |
| **Backup** | |
| • present | Yes; SRAM |
| **Battery** | |
| **Backup battery** | |
| • Battery operation | Yes |
| • Backup current, max. | 15 µA |
| **Hardware configuration** | |
| **Slots** | |
| • required slots | 1 |
| **Time of day** | |
| **Clock** | |
| • Hardware clock (real-time) | Yes |
| • Resolution | 500 ms |
| **Digital inputs** | |
| Number of digital inputs | 8; Connector X2 |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -1 to +6V |
| • for signal "1" | 13.5 to 33V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 0 mA |
| • for signal "1", typ. | 3 mA; at 24 V |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", max. | 5 µs |
| **Interfaces** | |
| **PROFIBUS DP** | |
| • Equidistance | Yes; With connection to interrupt tasks |
| • Direct data exchange (slave-to-slave communication) | Yes |
| **Interrupts/diagnostics/ status information** | |
| Alarms | Yes |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | No; only via optional interface modules |
| **Weights** | |
| Weight, approx. | 1 000 g |

# SIMATIC control systems
## FM 458-1 DP application module

### FM 458-1 DP basic module

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **FM 458-1 DP application module**<br>Basic module for computing, closed-loop control and open-loop control tasks; with PROFIBUS DP interface | **6DD1607-0AA2** | **RS 485 bus connector with 90° cable outlet**<br>Max. transfer rate 12 Mbit/s | |
| | | Without PG interface | **6ES7972-0BA12-0XA0** |
| **Micro Memory Card** | | With PG interface | **6ES7972-0BB12-0XA0** |
| For FM 458-1 DP basic module | | **RS 485 bus connector with angled cable outlet** | |
| 2 MB | **6ES7953-8LL31-0AA0** | Max. transfer rate 12 Mbit/s | |
| 4 MB | **6ES7953-8LM31-0AA0** | Without PG interface | **6ES7972-0BA42-0XA0** |
| 8 MB | **6ES7953-8LP31-0AA0** | With PG interface | **6ES7972-0BB42-0XA0** |
| **FM 458-1 DP Know-How-Protect**<br>For protection of technological application modules against unauthorized copying | **6DD1607-0GA0** | **RS 485 bus connector with 90° cable outlet for FastConnect connection system**<br>Max. transfer rate 12 Mbit/s | |
| | | Without PG interface | |
| **SC 64 interface cable**<br>To connect FM 458-1 to the serial port of a programming device/ PC | **6DD1684-0GE0** | • 1 unit<br>• 100 units | **6ES7972-0BA52-0XA0**<br>**6ES7972-0BA52-0XB0** |
| | | With PG interface | |
| **SB10 interface module**<br>To connect 8 binary I/Os to FM 458-1 DP | **6DD1681-0AE2** | • 1 unit<br>• 100 units | **6ES7972-0BB52-0XA0**<br>**6ES7972-0BB52-0XB0** |
| **SB61 interface module**<br>To connect 8 binary I/Os to FM 458-1 DP, input voltage: 24/48 V DC | **6DD1681-0EB3** | **PROFIBUS FastConnect bus cable**<br>Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering quantity 20 m | **6XV1830-0EH10** |
| **SU12 interface module**<br>To connect 10 signals to FM 458-1 DP | **6DD1681-0AJ1** | Preferred lengths: | |
| | | 20 m | **6XV1830-0EN20** |
| | | 50 m | **6XV1830-0EN50** |
| | | 100 m | **6XV1830-0ET10** |

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## Overview



- Optional plug-in expansion module for the FM 458-1 DP basic module
- For input and output of time-critical signals
- With digital and analog inputs/outputs
- Incremental and absolute encoders can be connected
- 4 high-resolution analog outputs
- Fan-free operation up to 40 °C

## Technical specifications

| Article number | 6DD1607-0CA1 |
|---|---|
| | EXM 438-1 I/O EXPANSION |
| **Supply voltage** | |
| Rated value (DC) | |
| • 5 V DC | Yes |
| • 24 V DC | Yes; to be set up externally |
| **Input current** | |
| Current consumption, typ. | 1.5 A |
| **Encoder supply** | |
| Type of output voltage | about 14 V (non-isolated) |
| Short-circuit protection | Yes; Electronic |
| **Output current** | |
| • Rated value | 100 mA |
| **Power loss** | |
| Power loss, typ. | 7.5 W |
| **Hardware configuration** | |
| **Slots** | |
| • required slots | 1 |
| **Digital inputs** | |
| Number of digital inputs | 16 |
| **Input voltage** | |
| • Rated value (DC) | 24 V |
| • for signal "0" | -1 to +6 V or input open |
| • for signal "1" | +13 to +33V |
| **Input current** | |
| • for signal "0", max. (permissible quiescent current) | 0 mA |
| • for signal "1", typ. | 3 mA |
| **Input delay (for rated value of input voltage)** | |
| **for standard inputs** | |
| - at "0" to "1", max. | 200 µs |

| Article number | 6DD1607-0CA1 |
|---|---|
| | EXM 438-1 I/O EXPANSION |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| Short-circuit protection | Yes; electronic/thermal |
| • Response threshold, typ. | 250 mA |
| Limitation of inductive shutdown voltage to | Supply voltage +1 V |
| **Output voltage** | |
| • for signal "0", max. | 3 V |
| • for signal "1", max. | Supply voltage -2.5 V |
| **Output current** | |
| • for signal "1" rated value | 50 mA |
| • for signal "1" permissible range for 0 to 40 °C, min. | 100 mA |
| • for signal "0" residual current, max. | 20 µA |
| • Total switching current | 80% at 50 °C all outputs 50 mA |
| **Output delay with resistive load** | |
| • "0" to "1", max. | 15 µs |
| **Analog inputs** | |
| Number of analog inputs | 5; Differential inputs |
| **Input ranges (rated values), voltages** | |
| • -10 V to +10 V | Yes; -10 V: +/-4 LSB; to +10 V: +/-4 LSB (1 LSB = 4.88 mV) |
| • Input resistance (-10 V to +10 V) | 470 kΩ |
| **Analog outputs** | |
| Number of analog outputs | 8; 4 outputs 16 bit; 4 outputs12 bit |
| Voltage output, short-circuit protection | Yes; relative to frame |
| Voltage output, short-circuit current, max. | 16 bits: 27 mA; 12 bits: 100 mA |
| **Output ranges, voltage** | |
| • -10 V to +10 V | Yes |
| **Analog value generation for the inputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 12 bit |
| • Conversion time (per channel) | 45 µs |
| **Analog value generation for the outputs** | |
| **Integration and conversion time/ resolution per channel** | |
| • Resolution with overrange (bit including sign), max. | 4 AO: 16 bits, 4 AO: 12 bits |
| • Conversion time (per channel) | 4 AO (16 bits): 2 µs; 4 AO (12 bits): 4 µs |

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# SIMATIC control systems
## FM 458-1 DP application module

**EXM 438-1 input/output expansion**

### Technical specifications (continued)

| Article number | **6DD1607-0CA1** |
|---|---|
| | EXM 438-1 I/O EXPANSION |
| **Encoder** | |
| Number of connectable encoders, max. | 12; 8 incremental encoders (synchronizable), 4 absolute encoders |
| **Connectable encoders** | |
| • Incremental encoder (symmetrical) | Yes |
| • Incremental encoder (asymmetrical) | Yes |
| • Absolute encoder (SSI) | Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface |
| **Encoder signals, incremental encoder (symmetrical)** | |
| • Trace mark signals | 1) for tracks A and B (90° out of phase), poss. with zero pulse N; 2) for separate forward and backward track |
| • Input signal | With 0 signal: -5 to 0 V; with 1 signal: +3 to +5 V; permissible input voltage range: differential voltage -5 to +5 V; max. input current: 15 mA (important: not limited on module side!) |
| **Encoder signals, incremental encoder (asymmetrical)** | |
| • Trace mark signals | Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N |
| • Input voltage | with 0 signal: -30 to +4 V (at 15 mA load); with 1 signal: +8 to 30 V (at 15 mA load); permissible input voltage range: differential voltage -30 to +30 V |
| **Encoder signals, absolute encoder (SSI)** | |
| • Input signal | 5 V acc. to RS 422 |
| • Data signal | Dual-, Gray-, Gray-Excess-Code |
| • Clock frequency, max. | 2 MHz; 100 kHz to 2 MHz (depending on cable length) |
| **Errors/accuracies** | |
| Linearity error (relative to output range), (+/-) | (+/- 1 LSB ) |
| **Potential separation** | |
| **Potential separation digital inputs** | |
| • Potential separation digital inputs | No |
| **Potential separation digital outputs** | |
| • Potential separation digital outputs | No |
| **Potential separation analog inputs** | |
| • Potential separation analog inputs | No |
| **Potential separation analog outputs** | |
| • Potential separation analog outputs | No |
| **Weights** | |
| Weight, approx. | 1 kg |

### Ordering data — Article No.

| | Article No. |
|---|---|
| **EXM 438-1 input/output expansion** — For direct exchange of digital and analog signals between FM 458-1 DP and the plant | **6DD1607-0CA1** |
| **SB10 interface module** — To connect 8 binary inputs or outputs to FM 458-1 DP | **6DD1681-0AE2** |
| **SB61 interface module** — To connect 8 binary inputs to FM 458-1 DP, input voltage: 24/48 V DC | **6DD1681-0EB3** |
| **SB71 interface module** — To connect 8 binary outputs to FM 458-1 DP, output voltage: 24/48 V DC | **6DD1681-0DH1** |
| **SU12 interface module** — To connect 10 signals to FM 458-1 DP | **6DD1681-0AJ1** |
| **SU13 interface module** — To connect 50 signals to FM 458-1 DP | **6DD1681-0GK0** |
| **SC62 interface cable** — To connect EXM 438-1 with up to 5 SBxx or SU12 | **6DD1684-0GC0** |
| **SC63 interface cable** — To connect EXM 438-1 with an SU13 | **6DD1684-0GD0** |

## Overview



- Optional plug-in expansion module for the FM 458-1 DP basic module
- For high-speed communication over up to 2 SIMOLINK interfaces
- For coupling several FM 458-1 DP application modules in synchronism with the sampling time

## Technical specifications

| Article number | 6DD1607-0EA2 |
|---|---|
| | SIMATIC S7-400 EXM 448-2 COMM.-EXPANS. |
| **Supply voltage** | |
| Rated value (DC) | |
| • 5 V DC | Yes |
| **Input current** | |
| Current consumption, typ. | 0.6 A |
| **Hardware configuration** | |
| **Slots** | |
| • required slots | 1 |
| **Weights** | |
| Weight, approx. | 0.9 kg |

## Ordering data

| | Article No. |
|---|---|
| **EXM 448-2 universal communication expansion** | **6DD1607-0EA2** |
| For high-speed communication with drives; for establishing two SIMOLINK fiber optic connections | |

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# SIMATIC control systems
## FM 458-1 DP application module

### D7-SYS

## Overview



- Optional package for STEP 7 V5.5 for configuring closed-loop control and automation tasks with SIMATIC TDC, FM 458-1 DP and T400
- Extensive block library
- Generation of user libraries in ANSI C with D7-FB-GEN function block generator

## Ordering data | Article No.

| | |
|---|---|
| **SIMATIC D7-SYS V8.1** | |
| Reference hardware: SIMATIC TDC, FM 458-1 DP, T400 Requirement: MS Windows 7 Professional/ Enterprise/Ultimate + SP1 (32/64-bit); MS Windows XP Professional SP3 (32-bit); MS Windows Server 2003 R2 SP2 (32-bit) / 2008 R2 SP1 (64-bit); STEP 7 V5.5 SP4 or higher Type of delivery: on DVD, German, English, with electronic documentation | |
| Floating license | **6ES7852-0CC04-0YA5** |
| Upgrade license V7.x and higher | **6ES7852-0CC04-0YE5** |
| Software Update Service[1] | **6ES7852-0CC01-0YL5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the software update service, see page 11/2.

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## 10 | Accessories

## Overview

- Interface modules and interface cables for the FM 458-1 DP application modules

Note:

For information on interface cables SC62, SC63, SC64 and interface modules SB10, SB61, SB71, SU12 and SU13, see SIMATIC TDC multiprocessor control system, accessories, page 10/16.

## Overview



SIMATIC TDC (Technology and Drives Control) is a digital automation system featuring very high computing power and the ability to process very large programs. An extensive library with approx. 300 ready-made function blocks is available for fast engineering.

## Overview UR6021 rack



- UR6021 rack as the base component for SIMATIC TDC
- Integrated system power supply and system fan
- With high-performance 64-bit backplane bus for high-speed data exchange between the inserted modules
- Requirement for operating the CPU555

| Ordering data | Article No. |
|---|---|
| **UR6021 racks** | **6DD1682-0CH3** |
| Spare-part compatible successor of 6DD1682-0CH2 | |
| **Accessories** | |
| **Slot cover SR51** | **6DD1682-0DA1** |
| **Spare parts** | |
| **Backup battery** | **6ES7971-0BA00** |
| **Fan insert for UR6021** | **6DD1683-0CH3** |

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# SIMATIC control systems
## SIMATIC TDC multiprocessor control system

### CPU555, CPU551 processor module

■ **Overview CPU555 processor module**
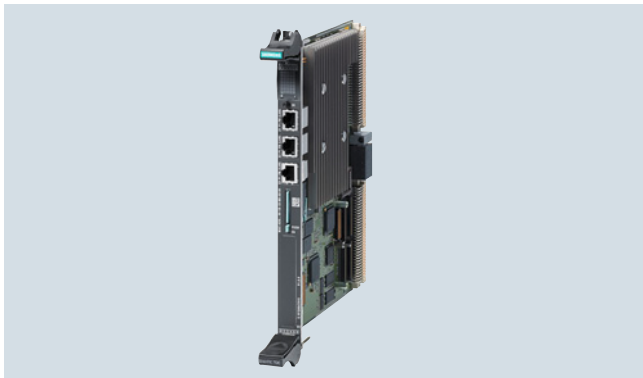


- Graphic freely configurable processor module
- For implementing highly dynamic open and closed-loop control functions

■ **Ordering data** | **Article No.**

| Ordering data | Article No. |
|---|---|
| **CPU555 processor module** | **6DD1600-0BB0** |
| **Accessories** | |
| **SIMATIC Micro Memory Card** | |
| 2 MB | **6ES7953-8LL31-0AA0** |
| 4 MB | **6ES7953-8LM31-0AA0** |
| 8 MB | **6ES7953-8LP31-0AA0** |
| **Crossed twisted pair cables 4x2 with RJ45 connectors** | |
| 0.5 m | **6XV1870-3RE50** |
| 1 m | **6XV1870-3RH10** |
| 2 m | **6XV1870-3RH20** |
| 6 m | **6XV1870-3RH60** |
| 10 m | **6XV1870-3RN10** |

■ **Overview CPU551 processor module**
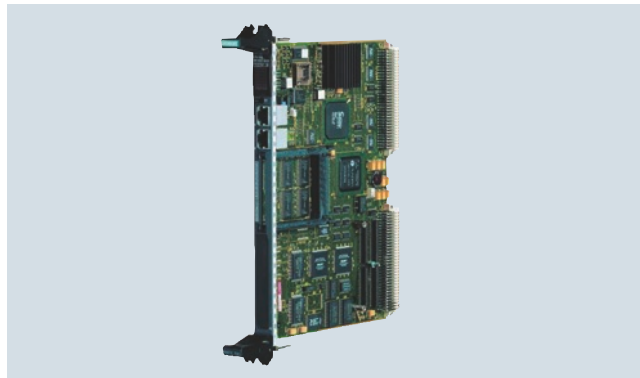


High-performance CPU module for open and closed-loop control and arithmetic tasks.

■ **Technical specifications**

| CPU551 | |
|---|---|
| Required space / width | 1 slot |
| Weight | 0.6 kg |
| Display | 5x7 LED |
| Local service interface | Serial RS232 interface |
| Sampling intervals | from 100 μs |
| SDRAM | 128 MB |
| Synchronous cache | 8 MB |
| Clock frequency | 500 MHz |
| CPU | 64 Bit RISC CPU with floating point unit |
| SRAM | 512 KB, battery buffered |
| **Power supply** | |
| Voltage / Power supply (at 250°C) | +3.3 V, 2.0 A typical<br>+5 V, 1.5 A typical<br>+12 V, 0.04 A typical<br>–12 V, 0.04 A typical |
| Buffer battery | 3.0 V, 3 μA typical |
| Power loss, typical | 15 W |
| **Digital inputs** | |
| Number | 8 inputs, 4 with alarm capability |
| Galvanic isolation | Only through optional interface modules |
| Input voltage<br>• Rated voltage<br>• For 0-signal<br>• For 1-signal | <br>24 V<br>-1 V ... +6 V<br>+13.5 V ... +33 V |
| Input power<br>• At 0-signal<br>• At 1-signal | <br>0 mA<br>3 mA |
| Delay time | 100 μs |
| Real-time clock, resolution | 0.1 ms |

■ **Ordering data** | **Article No.**

| Ordering data | Article No. |
|---|---|
| **CPU551 processor module** | **6DD1600-0BA3** |
| **Accessories** | |
| **MC500 memory module (4 MB)** | **6DD1610-0AH4** |
| **MC510 memory module (8 MB)** | **6DD1610-0AH6** |
| **MC521 memory module (2 MB)** | **6DD1610-0AH3** |

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### Overview MC5xx program memory module

Program memory module for the program designed with CFC.

### Ordering data

| | Article No. |
|---|---|
| **MC500 memory module (4 MB)** | **6DD1610-0AH4** |
| **MC510 memory module (8 MB)** | **6DD1610-0AH6** |
| **MC521 memory module (2 MB)** | **6DD1610-0AH3** |

### Overview CP50M1 communications module
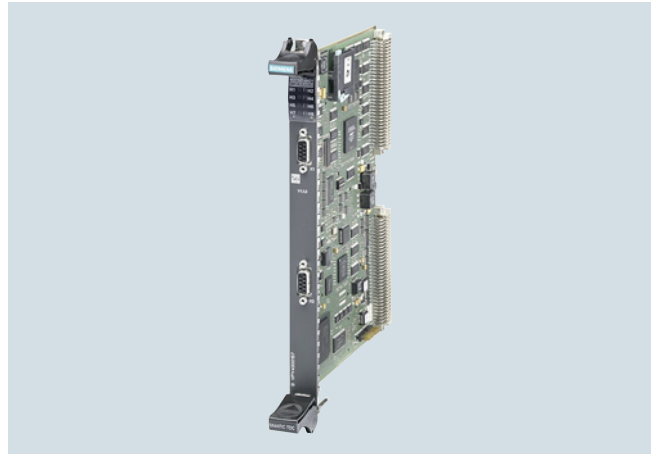


The CP50M1 communications module provides two PROFIBUS DP/MPI interfaces and an 8 MB interprocessor memory for inter-CPU communication. The interfaces can be used as PROFIBUS DP master, slave, as master and slave simultaneously or as MPI node.

### Technical specifications

| Power supply | |
|---|---|
| Voltage / Power supply | +5 V, 1.0 A typical |
| Power loss, typical | 5 W |
| Required space / width | 1 slot |
| Weight | 0.34 kg |

### Ordering data

| | Article No. |
|---|---|
| **CP50M1 communications module** | **6DD1661-0AD1** |

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# SIMATIC control systems
SIMATIC TDC multiprocessor control system

## CP51M1 communications module, CP53M0 coupling module

### ■ Overview CP51M1 communications module
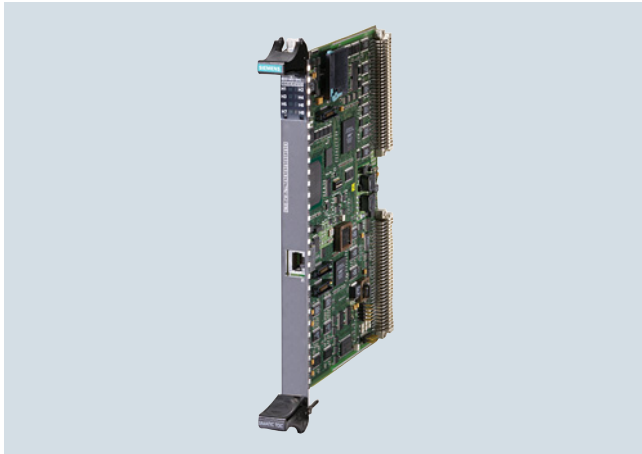


The CP51M1 communications module is an Industrial Ethernet interface for the SIMATIC TDC automation system.

### ■ Technical specifications

Up-to-date technical specifications can be taken from the user documentation provided at the start of delivery

| Required space / width | 1 slot |
| --- | --- |
| Weight | |
| Connection for Industrial Ethernet | RJ45 |
| Protocols | TCP/IP and/or UDP |
| Message frame lengths | can be larger than 2 KB |
| Modes of transfer | Refresh, Handshake, Multiple and Select |
| Autosensing | for 10 Mbit or 100 Mbit network |
| Default router | adjustable |

### ■ Ordering data | Article No. |
| --- | --- |
| CP51M1 communications module | 6DD1661-0AE1 |

### ■ Overview CP53M0 coupling module
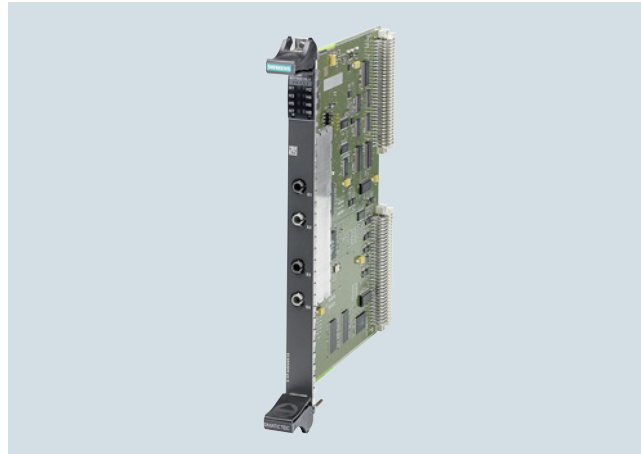


The CP53M0 coupling module allows coupling of a SIMATIC TDC system to a SIMADYN D system for fast data exchange, e.g. when expanding existing SIMADYN D systems.

### ■ Technical specifications

| CP53M0 coupling module | |
| --- | --- |
| **Memory** | |
| Communication memory | SRAM, 128 KB |
| Communications buffer | SDRAM, 8 MB |
| **FOC interface** | |
| Number | 2 (master mode) 1 (slave mode) |
| Data transfer rate | 96 Mbit/s |
| Coding | 5B/6B |
| **Voltage, currents** | |
| Voltages / currents | +5 V / 0.3 A 3.3 V / 0.5 A |
| **Power loss** | |
| Power loss, typical | 3.1 W |
| **Dimensions** | |
| Number of slots required in rack | 1 |
| Dimensions W x H x D (in mm) | 20 x 233 x 160 |
| Weight | 0.6 kg |

### ■ Ordering data | Article No. |
| --- | --- |
| CP53M0 coupling module | 6DD1660-0BJ0 |
| For connection of a SIMATIC TDC system to a SIMADYN D system or to two further SIMATIC TDC racks | |

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## ■ Overview
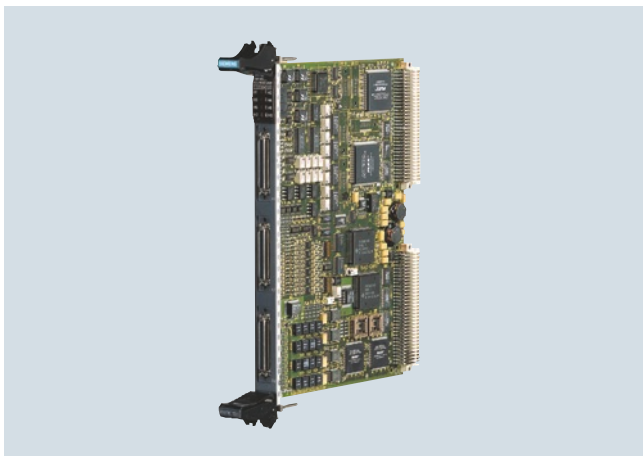


The SM500 I/O module provides analog and digital inputs/outputs as well as incremental and absolute value encoder connections.

## ■ Technical specifications

| Power supply | |
| --- | --- |
| Voltage / Power supply (at 25°C) | +5 V typically 1.0 A<br>+3.3 V typically 0.05 A<br>+12 V typically 0.3 A<br>−12 V typically 0.3 A |
| Typical power loss | 12.5 W |
| Required space / width | 1 slot |
| Weight | 0.7 kg |
| **Analog outputs** | |
| Number | 8 |
| Version | Output with associated ground |
| Galvanic isolation | No |
| Output voltage range | −10 V to +10 V |
| Output current | ±10 mA |
| Resolution | 12 bit |
| Typical conversion time per channel | 4 µs |
| Accuracy:<br>• Max. differential linearity error<br>• Max. amplification error<br>• Max. offset error | ± 1 LSB  (monotony guaranteed)<br>± 0.3 %<br>± 24 LSB |
| Slew rate | Approx. 3.5 V/µs |
| Voltage output:<br>• Short-circuit protection to ground<br>• Short-circuit current | yes<br>Approximately 100 mA |

| Analog inputs | |
| --- | --- |
| Number | 8 |
| Version | Differential inputs |
| Galvanic isolation | No |
| Input voltage range | -10 V to +10V |
| Resolution | 12 bit |
| Max. conversion time per channel | Approx. 20 µs |
| Accuracy:<br>• Max. differential linearity error<br>• Max. amplification error<br>• Max. offset error | ± 1 LSB (no missing code)<br>± 0.3 %<br>± 5 LSB |
| Input resistance | 20 kΩ |
| Input filter | 34 kHz |
| Reverse polarity protection | Yes, as differential inputs are used |
| **Integrating analog inputs (V/f)** | |
| Number | 4 |
| Version | Differential inputs |
| Galvanic isolation | No |
| Input voltage range | -10 V to +10 V |
| Resolution | Depending on the integration time, e.g. 15 bits for a 4 ms integration time. |
| Max. integration time per channel | Configurable |
| Accuracy:<br>• Max. amplification error<br>• Max. integral linearity error<br>• Max. offset error | 0.05 %<br>1 %<br>± 2 LSB (software adjustment) |
| Input resistance | 470 kΩ |
| Input filter | 2 kHz |
| Reverse polarity protection | Yes, as differential inputs are used |
| **Digital outputs** | |
| Number | 16 |
| Galvanic isolation | Only through optional interface modules |
| External power supply:<br>• Nominal voltage<br>• Permissible range<br>• Short-term<br>• Max. current consumption, without load | 24 V<br>20 to 30<br>35 V for max. 0.5 s<br>40mA |
| Output voltage range:<br>• With 0 signal, max.<br>• With 1 signal, min. | 3 V<br>ext. supply voltage -2.5 V |
| Output current:<br>• With 0 signal, min.<br>• With 1 signal<br> - Rated value<br> - Permissible range, max. | - 20 µA<br><br>50 mA<br>100 mA |
| Delay time | 100µs |
| Max. switching frequency of the outputs under resistive load | 6 kHz |
| Short-circuit protection to<br>• Mass<br>• Ext. power supply | yes<br>No |
| Max. short-circuit current | 250 mA |
| Total current of outputs (up to 60°C) | 16 x 50mA |
| Limiting of inductive cut-off voltage. | External power supply +1 V |

# SIMATIC control systems
SIMATIC TDC multiprocessor control system

## SM500 I/O module

### ■ Technical specifications (continued)

#### Digital inputs

| | |
|---|---|
| Number | 16 |
| Electrical isolation | Only through optional interface modules |
| Input voltage:<br>• Nominal voltage<br>• For 0-signal<br>• For 1-signal | 24 V<br>-1 V to +6 V<br>+13.5 V to +33 V |
| Input current:<br>• With 0 signal<br>• With 1 signal | 0 mA<br>3 mA |
| Delay time | 100 µs |

#### Incremental encoder

| | |
|---|---|
| Number | 4 |
| Connectable types | Incremental encoders with 90 degree track phase offset |
| Version | Differential inputs, switchable between 15 V (HTL) and 5 V (TTL) encoder signals |
| Track signals | Tracks A, B with or without zero pulse |
| Min. phase difference of the track signals | 200 ns |
| Max. pulse frequency (track frequency) | 1 MHz |
| Input voltage:<br>• 15 V encoder<br>  - Permissible range<br>  - With 0 signal<br>  - With 1 signal<br>• 5 V encoder<br>  - Permissible range<br>  - With 0 signal<br>  - With 1 signal | <br><br>- 30 V to + 30 V<br>- 30 V to + 4 V<br>+ 8 V to +30 V<br><br>- 7 V to + 7 V<br>- 7 V to - 0.7 V<br>+1.5 V to + 7 V |
| Input current<br>• With 15 V encoder (typical, absolute)<br>• With 5 V encoder (typical, absolute) | <br>5.0 mA<br>1.5 mA |
| Monitoring output | Not available |
| Monitoring input | Specification as for digital input |
| Interrupt reset output<br>• Short-circuit protection against ground<br>  - Ext. power supply<br>  - Max. short-circuit current | <br>yes<br><br>No<br>20 mA |
| Alarm input:<br>• Input voltage (permissible range)<br>  - 0 signal, max.<br>  - 1 signal, min.<br>• Input current<br>  - 0 signal<br>  - 1 signal | <br>0 V to 5 V<br>< 0.5 V<br>> 2.0 V<br><br>- 2.8 mA<br>1.6 mA |

#### Sensor supply voltage

| | |
|---|---|
| Number | 1 |
| Electrical isolation | No |
| Typical output voltage | 13.5 V |
| Max. output current | 150 mA, short-circuit-proof against ground, short-circuit current approx. 250 mA |

#### Absolute encoder inputs

| | |
|---|---|
| Number | 4 |
| Version | Differential inputs, RS485 signal level |
| Connectable types | Single or multiturn encoder |
| Protocols | SSI, EnDat |
| Data formats | Gray code, binary |
| Data direction<br>• Unidirectional<br>• Bi-directional | <br>SSI<br>EnDat |
| Data bits | SSI: 13+Parity, 25+Parity<br>EnDat: variable |
| Max. pulse frequency | 2 MHz, depending on cable length |
| Input voltage<br>• Permissible range | <br>RS485 signal level |

### ■ Ordering data

| | Article No. |
|---|---|
| **SM500 I/O module** | **6DD1640-0AH0** |

## ■ Overview
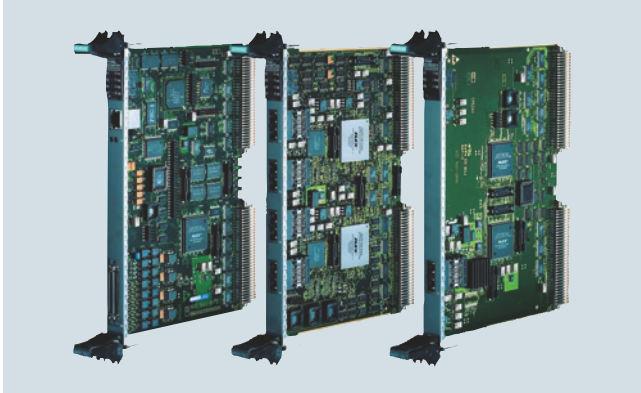


*GlobalDataMemory*

Data can be exchanged between all of the CPU modules in the system, over all of the networked subracks, using the memory in the GlobalDataMemory (GDM).

Up to 44 subracks can be coupled in synchronism through the central memory. This means that a maximum of 836 CPU modules can be used.

## ■ Technical specifications

| CP52M0 | |
|---|---|
| **Power supply** | |
| Voltage/current supply (at 25 °C) | +5 V typ. 0.4 A<br>+3.3 V typ. 0.7 A<br>+12 V typ. 0.01 A<br>−12 V typ. 0.01 A |
| Power loss, typical | 4.5 W |
| Space requirement / width | 1 slot |
| Weight | 0.6 kg |
| **Digital outputs** | |
| Number | 16 |
| Electrical isolation | No |
| External power supply voltage<br>• Rated value<br>• Permissible range<br>• Briefly<br>• Max. current drain (without load) | <br>24 V<br>20 to 30<br>35 V, for max. 0.5 s<br>40 mA |
| Output voltage range<br>• For a 0-signal, max.<br>• For a 1-signal min<br>• Output current<br>• For a 0-signal, min.<br>• For a 1-signal<br>  - Nominal value<br>  - Permissible range, max. | <br>3 V<br>External power supply -2.5 V<br><br>-20 µA<br><br>50 mA<br>100 mA |
| Delay time | 100 µs |
| Max. switching frequency of the outputs for an ohmic load | 6 kHz |
| Short-circuit protection with respect to<br>• Ground<br>• Ext. power supply | <br>Yes<br>No |
| Max. short-circuit current | 250 mA |
| Summed current of the outputs (up to 60 °C) | 16 x 50 mA |
| Limiting, of inductive switch-off voltages | External power supply voltage + 1 V |

| CP52IO | |
|---|---|
| **Power supply** | |
| Voltage/current supply (at 25 °C) | +5 V typ. 3 A<br>+3.3 V typ. 0.8 A |
| Power loss, typical | 18 W |
| Space requirement / width | 1 slot |
| Weight | 0.6 kg |

| CP52A0 | |
|---|---|
| **Power supply** | |
| Voltage/current supply (at 25 °C) | +5 V typ. 1.5 A<br>+3,3 V typ. 0.4 A |
| Power loss, typical | 9 W |
| Space requirement / width | 1 slot |
| Weight | 0.6 kg |

## ■ Ordering data

| | Article No. |
|---|---|
| **CP52M0 memory module** | **6DD1660-0BF0** |
| **CP52IO interface module** | **6DD1660-0BG0** |
| **CP52A0 access module** | **6DD1660-0BH0** |

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# SIMATIC control systems
## SIMATIC TDC multiprocessor control system

**Accessories**

### ■ Overview SB10 interface module



Similar to figure.

The interface module is used to connect 8 digital inputs or outputs.

### ■ Overview SB60 interface module



Interface module for connecting 8 digital inputs with 120 V DC/AC to 24 V DC conversion.

### ■ Overview SB61 interface module



It is used to connect 8 digital inputs with conversion from 24/48 V DC to 24 V DC.

### ■ Overview SB70 interface module



The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 120 V DC/AC on the plant side using relays.

### ■ Overview SB71 interface module



The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 24/48 V DC/AC on the plant side using transistors.

### ■ Overview SC62 interface cable



This cable is used to connect the SIMATIC TDC SM500 I/O module or the SIMATIC S7-400 EXM 438-1 expansion module to up to 5 interface modules SB10, SB60, SB70, SB61 SB71 and/ or SU12.

**10**

### ■ Overview SC63 interface cable



This cable is used to connect the SIMATIC TDC SM500 I/O module module or the SIMATIC S7-400 EXM 438-1 expansion module to a SU13 interface module.

### ■ Overview SC64 interface cable



(Similar to figure)

Interface cable for FM 458-1 DP basic module and SB10, SB60, SB61 and SU12 interface modules.

### ■ Overview SC66 interface cable



Interface cable for the SIMATIC TDC CPU551 processor module and the SB10, SB60, SB61 and SU12 interface modules

### ■ Overview SU12 interface module



The interface module is used to connect 10 signals; there is no electronic conversion.

### ■ Overview SC67 service cable



Service cable for the SIMATIC TDC CPU551 module and a local configuration / service PC.

### ■ Overview SU13 interface module



This interface module can be used to connect 50 signals; there is no electronic conversion.

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# SIMATIC control systems
SIMATIC TDC multiprocessor control system

## Accessories

### ■ Technical specifications

**Technical data for interface module SB 10**

| | |
|---|---|
| Number of digital inputs/outputs | 8 |
| Galvanic isolation | No |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.3 kg |

**Technical data for interface module SB 60**

| | |
|---|---|
| Number of digital inputs<br>• Input voltage | 8<br>120 V DC/AC |
| Insulation voltage | • Safe isolation assured between inputs and outputs<br>• Galvanic isolation assured between input circuits<br>• 1125 V AC test voltage |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.31 kg |

**Technical data for interface module SB 61**

| | |
|---|---|
| Number of digital inputs<br>• Input voltage | 8<br>24/48 V DC |
| Galvanic isolation | Yes, via optocoupler |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.32 kg |

**Technical data for interface module SB 70**

| | |
|---|---|
| Number of digital outputs<br>• Output voltage, max. | 8<br>120 V DC/AC |
| Relay switching current<br>• At 120 V AC<br>• At 120 V DC | <br>2 A<br>0.2 A |
| Galvanic isolation | via relay |
| Insulation voltage | • Safe isolation assured between inputs and outputs<br>• Galvanic isolation assured between input circuits<br>• 1125 V AC test voltage |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.32 kg |

**Technical data for interface module SB 71**

| | |
|---|---|
| Number of digital outputs<br>• Output voltage, max. | 8<br>24/48 V DC |
| Output current, max. | 40 mA, short-circuit proof |
| Galvanic isolation | Yes, via optocoupler |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.32 kg |

**Technical data for interface module SU 12**

| | |
|---|---|
| Number of connectable signal lines | 10 |
| Signal strength per signal, max. | 60 V, 0.5 A |
| Galvanic isolation | No |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.28 kg |

**Technical data for interface module SU 13**

| | |
|---|---|
| Number of connectable signal lines | 50 |
| Signal strength per signal, max. | 60 V, 0.5 A |
| Galvanic isolation | No |
| Connectable conductor cross-section | 1.5 mm² |
| Dimensions (W x H x D) in mm | 45 x 130 x 156 |
| Weight | 0.3 kg |

### ■ Ordering data

| | Article No. |
|---|---|
| **SB10 interface module**<br>8 digital inputs/outputs, 24 V DC | **6DD1681-0AE2** |
| **SB60 interface module**<br>8 digital inputs, 120 V AC | **6DD1681-0AF4** |
| **SB61 interface module**<br>8 digital inputs, 24/48 V DC | **6DD1681-0EB3** |
| **SB70 interface module**<br>8 digital outputs with relays | **6DD1681-0AG2** |
| **SB71 interface module**<br>8 digital outputs with transistors, 24/48 V DC | **6DD1681-0DH1** |
| **SC62 interface cable**<br>between SM500 or EXM 438-1 module and max. 5 SB10, SB60, SB70, SB61, SB71 and/or SU12 interface modules, 2 m long | **6DD1684-0GC0** |
| **SC63 interface cable**<br>between SM500 or EXM 438-1 module and SU13 interface module, 2 m long | **6DD1684-0GD0** |
| **SC64 interface cable**<br>between FM 458-1 DP (X2) module with SBxx or SU12 interface module, 2 m long | **6DD1684-0GE0** |
| **SC66 interface cable**<br>between CPU551 and interface module SB10, SB60, SB61 or SU12, 2 m long | **6DD1684-0GG0** |
| **SC67 service cable**<br>between CPU551 and PG/PC, 7 m long | **6DD1684-0GH0** |
| **SU12 interface module**<br>with plug-in connector, 10-pole | **6DD1681-0AJ1** |
| **SU13 interface module**<br>with screw-type plug-in connector | **6DD1681-0GK0** |

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***Brochures***

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

## Software for SIMATIC Controllers
Introduction

**Information on software licensing, Software Update Service**

### ▪ Overview Licensing

Siemens Digital Factory offers various types of software license.

For more information, see catalog section 16, page 16/16.

### ▪ Overview Software Update Service

- Service for automatic dispatch of all new software versions during contract lifetime
- Reduced logistics effort thanks to automatic contract extension
- Reduced costs as updates are provided free of charge

*Ordering*

- The Software Update Service is ordered in the same way as any other product. The corresponding order number is given in the ordering information of the software product in question.
- You must own the current version of the software.
- One Software Update Service is ordered for each software license installed.
- The Software Update Service runs for 1 year from date of order.
- It is extended automatically by a further year in each case, as long as it is not canceled 3 months before it expires.
- An annual lump sum is invoiced per license.

### ▪ Application

SIMATIC software is continuously enhanced and improved. The **Software Update Service** is the easiest way to regularly take advantage of these improvements. This service automatically sends new software updates when they are released so you always have the latest version.

The Software Update Service

- Saves time and effort:
  Once it is ordered, the Software Update Service is automatically renewed every year.
- Lowers costs:
  The service pays for itself after the first update as it costs less than an individually ordered update.
- Makes budgeting easier:
  Software expenditures can be accounted for early in the budgeting process and they are easier to write off.

### ▪ Design

*Scope of delivery*

- All software versions released after ordering the Software Update Service (usually several consignments per year)
- SIMATIC Customer Support Knowledge Base CD-ROM with FAQs, tips & tricks and downloads (several issues per year)

## ■ Overview
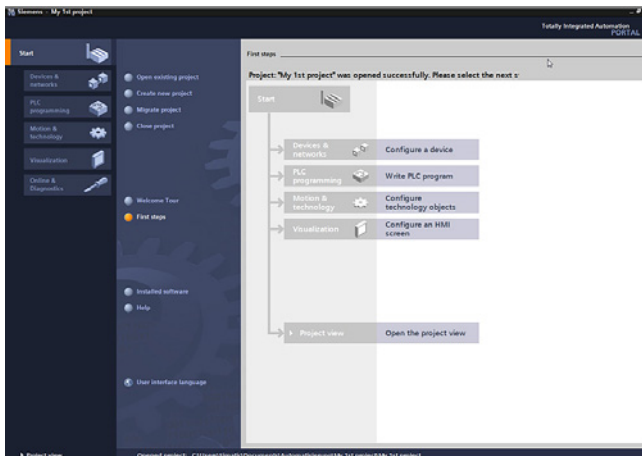


STEP 7 Basic V14 SP1 (TIA Portal), portal view
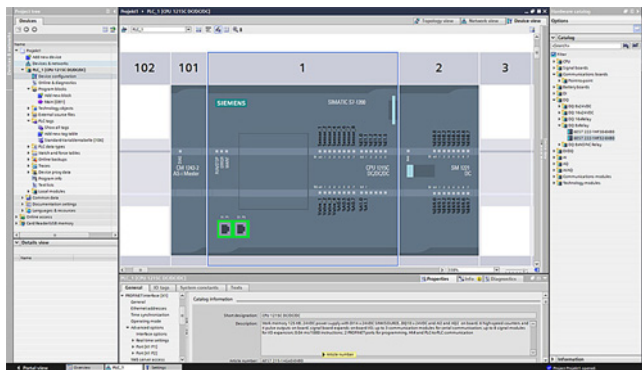


STEP 7 Basic V14 SP1 (TIA Portal), device view: configuring and parameterizing in realistic photo-quality representation

***Intuitive, efficient and future-oriented - the engineering software for programming SIMATIC controllers***

SIMATIC STEP 7 Basic V14 is the engineering system for the S7-1200.

STEP 7 Basic V14 is based on the Totally Integrated Automation Portal (TIA Portal) central engineering framework which offers users a uniform, efficient and intuitive solution to all automation tasks.

### New with V14

- Useful function extensions in the language editors for LAD/FBD and SCL
- Systematic further development of language elements for programming (Array[*], Array of multi-instances, etc.)
- Higher-level measurement with Trace
- New configuring of toolbar in the DB Editor
- New system functions, e.g. global search and extended cross-reference information
- Multiple usability expansions for efficient engineering

### New with V14 SP1

- Further useful function expansions of the language editors (e.g. password-based block write-protection)
- Function expansions in the Devices and Networks Editor (e.g. simplified renaming of PROFINET I/O devices)
- New functions, e.g. Polyline, SCATTER, GATHER
- Individual commenting by UDT instances and array members
- Simplified upgrading of types (blocks, PLC data types) in an existing project library
- Import and export of CAx data by means of the AutomationML format
- Modification of the hardware configuration via the TIA Portal Openness API

## ■ Technical specifications

| | STEP 7 Basic V14 (TIA Portal) |
|---|---|
| Type of license | Floating license |
| Software class | A |
| Current version | V14 SP1 |
| Target system | SIMATIC S7-1200 |
| **Minimum software and hardware requirements** | |
| Processor | Intel Core i3-6100M 2.30 GHz or higher |
| RAM | 4 GB |
| Hard disk | SATA with at least 8 GB storage space |
| Network | 100 Mbit or more |
| Screen resolution | 1024 x 768 |
| Operating systems | Windows 7 (64-bit)<br>• Windows 7 Home Premium SP1<br>• Windows 7 Professional SP1<br>• Windows 7 Enterprise SP1<br>• Windows 7 Ultimate SP1<br><br>Windows 8.1 (64-bit)<br>• Windows 8.1<br>• Windows 8.1 Professional<br>• Windows 8.1 Enterprise<br><br>Windows 10 (64-bit)<br>• Windows 10 Home Version 1607<br>• Windows 10 Professional Version 1607<br>• Windows 10 Enterprise Version 1607<br>• Windows 10 Enterprise 2016 LTSB<br>• Windows 10 Enterprise 2015 LTSB<br><br>Windows Server (64-bit)<br>• Windows Server 2008 R2 StdE SP1 (full installation)<br>• Windows Server 2012 R2 StdE (full installation)<br>• Windows Server 2016 Standard (full installation) |
| **Recommended PC hardware** | |
| Computer | SIMATIC Field PG M5 Advanced or higher (or comparable PC) |
| Processor | Intel Core i5-6440EQ (up to 3.4 GHz) |
| RAM | 16 GB or more (32 GB for large projects) |
| Hard disk | SSD with at least 50 GB storage space available |
| Network | 1 Gbit (for multi-user) |
| Screen | 15.6" full HD display (1920 x 1080 or higher) |

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# Software for SIMATIC Controllers
TIA Portal
PLC programming

## ■ Technical specifications (continued)

### *Compatibility with other SIMATIC products*

STEP 7 Professional / Basic V14 SP1 (incl. WinCC Basic V14 SP1) can be installed on a PC in parallel with other versions of STEP 7 V11 to V13 SP2, STEP 7 V5.5 SP4, STEP 7 Micro/WIN V4.0 SP9, WinCC flexible 2008 SP3 and WinCC (from V7.2).

A project upgrade to TIA Portal V14 is carried out exclusively on the basis of TIA Portal V13 SP1 projects (latest update recommended). In order to provide you with the best possible support here, the current version of V13 SP2 is included with the V14 products. A compatibility mode is not supported.

## ■ Ordering data

| | Article No. |
|---|---|
| **STEP 7 Basic V14 SP1** | |
| Target system: SIMATIC S7-1200 Requirement: Windows 7 Home Premium SP1 (64-bit), Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 (64-bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Home Version 1607, Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: German, English, Chinese, Italian, French, Spanish | |
| **STEP 7 Basic V14 SP1, floating license** | 6ES7822-0AA04-0YA5 |
| **STEP 7 Basic V14 SP1, floating license, software download incl. license key**[1] Email address required for delivery | 6ES7822-0AE04-0YA5 |
| **STEP 7 Basic V14 SP1, trial license** | 6ES7822-0AA04-0YA7 |
| **Upgrade STEP 7 Basic V12/V13 to STEP 7 Basic V14 SP1, floating license** | 6ES7822-0AA04-0YE5 |
| **Upgrade STEP 7 Basic V12/V13 to STEP 7 Basic V14 SP1, floating license, software download incl. license key**[1] Email address required for delivery | 6ES7822-0AE04-0YE5 |
| **Powerpack STEP 7 Basic V14 SP1 to STEP 7 Professional V14 SP1, floating license** | 6ES7822-1AA04-0YC5 |
| **Powerpack STEP 7 Basic V14 SP1 to STEP 7 Professional V14 SP1, floating license, software download incl. license key**[1] Email address required for delivery | 6ES7822-1AE04-0YC5 |

| | Article No. |
|---|---|
| **Software Update Service** For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration. Requires the current software version | |
| **Software Update Service (Standard Edition)**[2] The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB sticks, etc.) • STEP 7 Basic | 6ES7822-0AA00-0YL0 |
| **Software Update Service (Compact Edition)**[2] The delivery items are combined. For several contracts, only 1 package with 1 data storage medium set, 1 USB stick with the corresponding number of licenses and the corresponding number of COLs will be supplied. Delivery items to be combined must be ordered as one item. • STEP 7 Basic | 6ES7822-0AA00-0YM0 |
| **Software Update Service (download)**[2] The upgrades and service packs are available for downloading. Email address required for delivery • STEP 7 Basic | 6ES7822-0AE00-0YY0 |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see page 11/2.

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## Overview
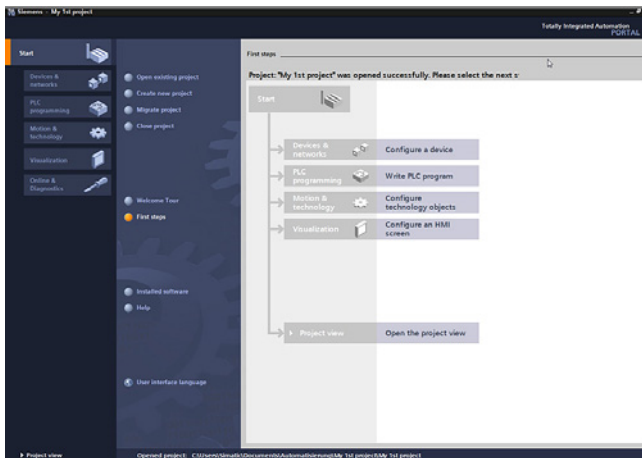

STEP 7 Professional V14 SP1 (TIA Portal), portal view
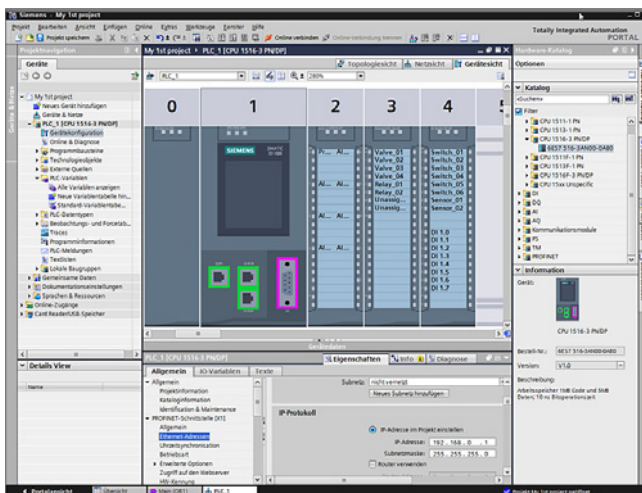

STEP 7 Professional V14 SP1 (TIA Portal), device view configuring and parameterizing in realistic photo-quality representation

*Intuitive, efficient and future-oriented - the engineering software for programming the SIMATIC controllers*

SIMATIC STEP 7 Professional V14 is the engineering system for the SIMATIC S7-1200, S7-1500, S7-300, S7-400 Controllers, WinAC and Software Controllers.

STEP 7 V14 is based on the Totally Integrated Automation Portal (TIA Portal) central engineering framework, which offers users a uniform, efficient and intuitive solution for all automation tasks.

*New with V14*

- Supports new S7-1500T family, CPU 1518(F)-4 PN/DP ODK, CPU 1516pro (F)-2 PN and S7-1500 fail-safe Software Controllers
- Useful function extensions in the language editors for LAD/FBD, S7-Graph and SCL
- Systematic further development of language elements for programming (Array[*], Array of multi-instances, etc.)
- Preconfigured and integrated connection and configuring of the SINAMICS V90 PN drive to a SIMATIC S7-1500 motion control technology object
- Higher-level measurement with Trace
- New configuring of toolbar in the DB Editor
- New system functions, e.g. global search and extended cross-reference information
- Multiple usability expansions for efficient engineering

*New with V14 SP1*

- Useful function extensions in the language editors for LAD/FBD and SCL
- Systematic further development of language elements for programming (Array[*], Array of multi-instances, etc.)
- Higher-level measurement with Trace
- New configuring of toolbar in the DB Editor
- New system functions, e.g. global search and extended cross-reference information
- Multiple usability expansions for efficient engineering

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# Software for SIMATIC Controllers
TIA Portal
PLC programming

## ■ Technical specifications

| | STEP 7 Professional V14 (TIA Portal) |
|---|---|
| Type of license | Floating license |
| Software class | A |
| Current version | V14 SP1 |
| Target system | SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC, software controllers |
| **Minimum software and hardware requirements** | |
| Processor | Intel Core i3-6100M 2.30 GHz or higher |
| RAM | 4 GB |
| Hard disk | SATA with at least 8 GB storage space |
| Network | 100 Mbit or more |
| Screen resolution | 1024 x 768 |
| Operating systems | Windows 7 (64-bit) • Windows 7 Professional SP1 • Windows 7 Enterprise SP1 • Windows 7 Ultimate SP1 Windows 8.1 (64-bit) • Windows 8.1 Professional • Windows 8.1 Enterprise Windows 10 (64-bit) • Windows 10 Professional Version 1607 • Windows 10 Enterprise Version 1607 • Windows 10 Enterprise 2016 LTSB • Windows 10 Enterprise 2015 LTSB Windows Server (64-bit) • Windows Server 2008 R2 StdE SP1 (full installation) • Windows Server 2012 R2 StdE (full installation) • Windows Server 2016 Standard (full installation) |
| **Recommended PC hardware** | |
| Computer | SIMATIC Field PG M5 Advanced or higher (or comparable PC) |
| Processor | Intel Core i5-6440EQ (up to 3.4 GHz) |
| RAM | 16 GB or more (32 GB for large projects) |
| Hard disk | SSD with at least 50 GB storage space available |
| Network | 1 Gbit (for multi-user) |
| Screen | 15.6" full HD display (1920 x 1080 or higher) |

### *Compatibility with other SIMATIC products*

STEP 7 Professional / Basic V14 SP1 (incl. WinCC Basic V14 SP1) can be installed on a PC in parallel with other versions of STEP 7 V11 to V13 SP2, STEP 7 V5.5 SP4, STEP 7 Micro/WIN V4.0 SP9, WinCC flexible 2008 SP3 and WinCC (from V7.2).

A project upgrade to TIA Portal V14 is carried out exclusively on the basis of TIA Portal V13 SP1 projects (latest update recommended). In order to provide you with the best possible support here, the current version of V13 SP2 is included with the V14 products. A compatibility mode is not supported.

## ■ Ordering data — Article No.

**STEP 7 Professional V14 SP1**

Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC
Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation);
Type of delivery: German, English, Chinese, Italian, French, Spanish

| | |
|---|---|
| STEP 7 Professional V14 SP1, floating license | 6ES7822-1AA04-0YA5 |
| STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] Email address required for delivery | 6ES7822-1AE04-0YA5 |
| STEP 7 Professional V14 SP1, trial license | 6ES7822-1AA04-0YA7 |

**Conversion package STEP 7 Professional V14 SP1**

Only valid if ordered together with software update service 6ES7810-5CC04-0YE2 (STEP 7 Professional and STEP 7 Professional in TIA Portal).

| | |
|---|---|
| • PowerPack & upgrade from STEP 7 V5.5 to STEP 7 Professional 2010/V14 SP1, floating license. Prerequisite is an existing STEP 7 Software Update Service. | 6ES7822-1AA04-0XC2 |
| • PowerPack & upgrade from STEP 7 V5.5 to STEP 7 Professional 2010/V14 SP1, floating license. Software download incl. license key [1] Email address required for delivery | 6ES7822-1AE04-0XC2 |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Upgrade from STEP 7 Professional V11...13 to STEP 7 Professional V14 SP1 or STEP 7 Professional V11... V13/ 2010 Combo to V14 SP1/2010 combo, floating license** | 6ES7822-1AA04-0YE5 | **Software Update Service** For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration. Requires the current software version | |
| **Upgrade from STEP 7 Professional V11...13 to STEP 7 Professional V14 SP1 or STEP 7 Professional V11... V13/ 2010 Combo to V14 SP1/2010 combo, floating license, software download incl. license key[1]** Email address required for delivery | 6ES7822-1AE04-0YE5 | | |
| **Upgrade from STEP 7 Professional 2006/2010 to STEP 7 Professional 2010/ V14 SP1 combo, floating license** | 6ES7822-1AA04-0XE5 | **Software Update Service (Standard Edition)[2]** The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.) | |
| **Upgrade from STEP 7 Professional 2006/2010 to STEP 7 Professional 2010/ V14 SP1 combo, floating license, software download incl. license key[1]** Email address required for delivery | 6ES7822-1AE04-0XE5 | • STEP 7 Professional V1x • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7822-1AA00-0YL5 6ES7810-5CC04-0YE2 |
| **PowerPack STEP 7 Professional V14 SP1 Trial 365 to STEP 7 Prof. V14 SP1, floating license.** Only valid if ordered together with Software Update Service 6ES7822-1AE00-0YY0 (STEP 7 Professional V1x) Prerequisite is a STEP 7 V13 Trial 365 license. License key download [1] Email address required for delivery | 6ES7822-1BE04-0YC5 | **Software Update Service (Compact Edition)[2]** The delivery items are combined. For several contracts, only 1 package with 1 data storage medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied. Delivery items to be combined must be ordered as one item. • STEP 7 Professional V1x • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7822-1AA00-0YM5 6ES7810-5CC00-0YM2 |
| **Fifty hours of engineering with STEP 7 Professional Combo, WinCC Professional (incl. WinCC flexible 2008) and STEP 7 Safety Advanced (incl. Distributed Safety)** | 6ES7823-1GE04-0YA5 | **Software Update Service (download)[2]** The upgrades and service packs are available for downloading. Email address required for delivery • STEP 7 Professional V1x • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7822-1AE00-0YY0 6ES7810-5CC04-0YY2 |
| **PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/ V14 SP1 combo, floating license** | 6ES7822-1AA04-0XC5 | | |
| **PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/ V14 SP1 combo, floating license, software download incl. license key [1]** Email address required for delivery | 6ES7822-1AE04-0XC5 | | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see page 11/2.

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## Software for SIMATIC Controllers
TIA Portal
PLC programming

**STEP 7 (TIA Portal) options > STEP 7 Safety (TIA Portal)**

### ■ Overview
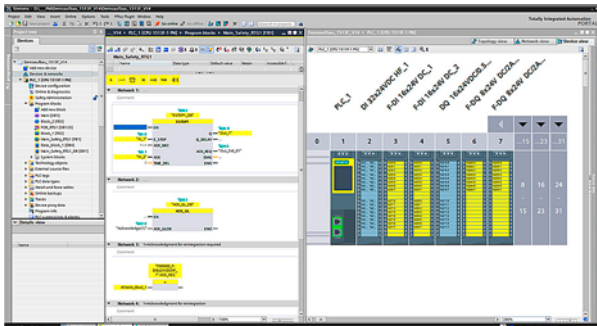


STEP 7 Safety Advanced V14 SP1, configuration and programming

- For creating safety-related programs on the STEP 7 operator interface
- For seamless and easy to use integration of safety-related functions into the standard automation
- All the required configuration and programming tools are integrated into the STEP 7 operator interface and utilize a common project structure
- STEP 7 Safety Basic option package for parameter assignment and programming of the fail-safe S7-1200
- STEP 7 Safety Advanced option package for all fail-safe TIA SIMATIC controller classes (S7-1200, S7-1500, S7-1500 software controller, S7-300, S7-400, WinAC)

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **STEP 7 Safety Advanced V14 SP1** | | **STEP 7 Safety Advanced Upgrade** | |
| Task:<br>Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controllers, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controllers and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O<br>Requirement:<br>STEP 7 Professional V14 SP1 | | Upgrade from Distributed Safety V5.4 SP5 to STEP 7 Safety Advanced V14 SP1 for parallel use of both versions; upgrade of combo license for 1 user; software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YF5 |
| | | Upgrade from Distributed Safety V5.4 SP5 to STEP 7 Safety Advanced V14 SP1 for parallel use of both versions; upgrade of combo license for 1 user; software, license key and documentation for download[2]<br>Email address required for delivery | 6ES7833-1FA14-0YY5 |
| Floating license for 1 user, software and documentation on DVD; license key on USB flash drive | 6ES7833-1FA14-0YA5 | | |
| Floating license for 1 user, software, documentation and license key for download[2];<br>Email address required for delivery | 6ES7833-1FA14-0YH5 | Upgrade from STEP 7 Safety Advanced V11 ... V13 to STEP 7 Safety Advanced V14 SP1 for parallel use of versions; upgrade of license for 1 user; software and documentation on DVD, license key on USB flash drive | 6ES7833-1FA14-0YE5 |
| Software Update Service (Standard Edition)[1] | 6ES7833-1FC00-0YX2 | | |
| The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.).<br>Requires the current software version. | | Upgrade from STEP 7 Safety Advanced V11 ... V13 to STEP 7 Safety Advanced V14 SP1 for parallel use of versions; upgrade of license for 1 user; software, license key and documentation for download[2];<br>Email address required for delivery | 6ES7833-1FA14-0YK5 |
| Software Update Service (Compact Edition)[1] | 6ES7833-1FC00-0YM2 | **STEP 7 Safety Advanced PowerPack** | |
| The delivery items are combined. For several contracts, only 1 package with 1 data storage medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied. The deliveries that are to be grouped together must be ordered as a single item.<br>Requires the current software version. | | PowerPack STEP 7 Safety Basic V14 SP1 to STEP 7 Safety Advanced V14 SP1;<br>floating license for 1 user;<br>license key on USB flash drive | 6ES7833-1FA14-0YC5 |
| | | PowerPack STEP 7 Safety Basic V14 SP1 to STEP 7 Safety Advanced V14 SP1;<br>floating license for 1 user;<br>license key for download[2];<br>Email address required for delivery | 6ES7833-1FA14-0YJ5 |
| Minimum order quantity: 3 units | | | |
| Software Update Service (Download)[1] | 6ES7833-1FC00-0YY0 | | |
| Requires the current software version. | | | |
| Email address required for delivery. | | | |

[1] For more information on the Software Update Service, see page 11/2.
[2] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **STEP 7 Safety Advanced V14 SP1 Trial** | 6ES7833-1FA14-0YA8 | **STEP 7 Safety Basic Upgrade** | |
| Trial license, valid for 21 days; software and documentation on DVD; executable with TIA Portal V14 SP1 from STEP 7 Professional V14 or higher; for configuring S7-1200 FC, S7-1500F, S7-1500F Software Controllers, S7-300F, S7-400F, WinAC F | | Upgrade from STEP 7 Safety Basic V13 SP1 to STEP 7 Safety Basic V14 SP1 for parallel use of the versions; upgrade license for 1 user; software and documentation on DVD, license key on USB flash drive | 6ES7833-1FB14-0YE5 |
| | | Upgrade from STEP 7 Safety Basic V13 SP1 to STEP 7 Safety Basic V14 SP1 for parallel use of the versions; upgrade license for 1 user; software, license key and documentation for download[2]; Email address required for delivery | 6ES7833-1FB14-0YK5 |
| **STEP 7 Safety Basic V14 SP1** | | Software Update Service (Standard Edition)[1] | 6ES7833-1FD00-0YX2 |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC Requirement: STEP 7 Basic V14 SP1 and higher | | The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.). Requires the current software version. | |
| Floating license for 1 user, software and documentation on DVD, license key on USB flash drive | 6ES7833-1FB14-0YA5 | Software Update Service (Compact Edition)[1] | 6ES7833-1FD00-0YM2 |
| Floating license for 1 user, software, documentation and license key for download[2]; Email address required for delivery | 6ES7833-1FB14-0YH5 | The delivery items are combined. For several contracts, only 1 package with 1 data storage medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied. The deliveries that are to be grouped together must be ordered as a single item. Requires the current software version. | |
| | | Minimum order quantity: 3 units | |
| | | Software Update Service (Download)[1] | 6ES7833-1FD00-0YN2 |
| | | Requires the current software version. | |
| | | Email address required for delivery. | |

[1] For more information on the Software Update Service, see page 11/2.

[2] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

**11**

# Software for SIMATIC Controllers
## TIA Portal
## PLC programming

### Overview SIMATIC S7-PLCSIM Advanced

With SIMATIC S7-PLCSIM Advanced, virtual controllers can be used for simulation of S7-1500 and ET 200SP Controllers and for extensive function simulation.

The virtual controllers can also be tested and validated in conjunction with a plant/machine. An extensive API is available for interfacing plant/machine simulations.

### Technical specifications

#### *Minimum requirements for use*

| Hardware / software | Requirements |
| --- | --- |
| Processor | 2.2 GHz Intel Celeron Dual Core |
| RAM | • 4 GB for one instance<br>• 8 GB for 4 instances |
| Free hard disk space | 5 GB |
| Operating system (64-bit version) | • Windows 7 Home Premium SP1<br>• Windows 7 Professional SP1<br>• Windows 7 Enterprise SP1<br>• Windows 7 Ultimate SP1<br>• Windows Server 2012 R2 StdE |
| Screen resolution | 1024 x 768 |

### Ordering data | Article No.

| | |
| --- | --- |
| **SIMATIC S7-PLCSIM Advanced** | |
| Option for simulation of S7-1500 and ET200 SP | |
| Floating license, software and documentation on DVD;<br>license key on USB flash drive | **6ES7823-1FA00-0YA5** |
| Floating license, software, documentation and license key for download [1]<br>Email address required for delivery | **6ES7823-1FE00-0YA5** |
| **Software Update Service** | |
| For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration.<br>Requires the current software version. | |
| Software Update Service:<br>Upgrades and service packs are provided in the form of DVDs, USB flash drives etc. | **6ES7823-1FA00-0YL5** |
| Software Update Service (download)[2]:<br>Upgrades and service packs are available for downloading.<br>Email address required for delivery | **6ES7823-1FE00-0YL5** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see page 11/2.

### Overview SIMATIC Target 1500S

The SIMATIC Target 1500S is an add-on for the Simulink® software from The MathWorks. This makes it possible to also use model-based design with MATLAB® and Simulink for SIMATIC S7-1500 controllers. For this purpose, executable code for all ODK-compatible S7-1500 controllers (S7-1500 Software Controllers, ET 200SP Open Controllers and CPU 1518 ODK) is generated directly from Simulink via the target 1500S.

### Technical specifications

| Requirements at the MATLAB end | |
| --- | --- |
| MATLAB 2016a (64-bit) or more recent version | • MATLAB 9.0<br>• MATLAB Coder 3.1<br>• Simulink 8.7<br>• Simulink Coder 8.10 |

| Requirements at the SIMATIC end | |
| --- | --- |
| SIMATIC ODK 1500S V2.0 | Must be installed together with target 1500S, MATLAB and Simulink on the same PC |
| STEP 7 Professional from V14 | For configuration of the S7-1500 CPUs, not essentially on the same PC as the target 1500S |
| Supported CPUs | • CPU 1507S(F) with firmware V2.0 or higher<br>• CPU 1515SP PC (F) with firmware V2.0 or higher<br>• CPU 1518 (F) ODK |

### Ordering data | Article No.

| | |
| --- | --- |
| **SIMATIC Target 1500S for Simulink V1.0** | **6ES7823-1BE00-0YA5** |
| Download incl. license key [1]<br>Email address required for delivery | |
| **SIMATIC target + ODK 1500S bundle** | **6ES7823-1BE10-0YA0** |
| Download incl. license key [1]<br>Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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## Overview
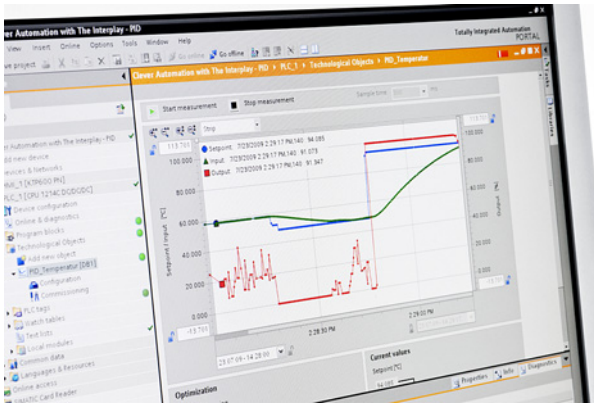


- PID Professional combines the two option packages Modular PID Control and Standard PID Control in the TIA Portal.
- Permits the simple integration of continuous PID controllers, pulse controllers and step controllers in the application program
- Can be used for simple to complex closed-loop control tasks in SIMATIC S7-300 (CPU 313 or higher), S7-400, and WinAC.
- The engineering software for PID Professional is already included in the STEP 7 package in V13 or higher.
- Tuning functionality by means of PID Self-Tuner (part of STEP 7 as of V11 SP1).
- Reduces engineering costs thanks to time-saving parameterization and optimization of the controller

## Ordering data

| | Article No. |
|---|---|
| **PID Professional for TIA Portal** | |
| Task:<br>Function blocks and editors for PID controllers<br>Requirement:<br>STEP 7 V13 or higher<br>Delivery package:<br>Licenses on USB flash drive/downloadable | |
| Floating license for the engineering and single license for runtime | **6ES7860-1XA02-0XA5** |
| Upgrade license from Standard PID Control or Modular PID Control V5.1 to PID Professional for TIA Portal | **6ES7860-1XA02-0XE5** |
| Single license (Certificate of License) for runtime;<br>per CPU (all versions) | **6ES7860-1XA01-0XB0** |
| Floating license for the engineering;<br>Download (email address required for delivery)[1] | **6ES7860-1XA01-0XH5** |
| Upgrade from Standard PID Control or Modular PID Control V5.1 to PID Professional for TIA Portal;<br>download (email address required for delivery)[1] | **6ES7860-1XA01-0XK5** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# Software for SIMATIC Controllers
TIA Portal
PLC programming

## ■ Overview



- Low-priced package for simple, controlled positioning and simple geared synchronous motion
- For use with any standard variable-speed drive, such as frequency converter or servo drive
- For incremental and absolute encoders

## ■ Technical specifications

### Supported hardware:

Easy Motion Control is runnable on the following CPUs:
- S7-300.
- S7-400.
- WinAC.
- ET 200S.
- ET 200pro.

Supported modules for the measuring of actual values:
- CPU 314C (FW version 2.0 of the CPU or higher).
- ET 200S 1 Count 5V/500 kHz.
- ET 200S 1 Count 24V/100kHz.
- ET 200S 1SSI.
- SM 338.
- FM 350-1, FM 450-1.
- SIMODRIVE sensor with PROFIBUS DP.
- IM 174.
- Other modules for measuring actual values (using free driver).

Supported modules for setpoint output:
- ET 200S 2AO U.
- SM 332.
- SM 432.
- IM 174.
- Other modules for setpoint output (using free driver).

Supported drives using PROFIBUS DP:
- Micromaster 4.
- SINAMICS G120.
- SINAMICS S120.

### Storage space requirements

| Required work memory in byte | | |
|---|---|---|
| Block | Required work memory per block | Additional work memory required per instance |
| MC_Init | 1086 | - |
| MC_MoveAbsolute | 3924 | 112 |
| MC_MoveRelative | 2982 | 110 |
| MC_MoveJog | 3110 | 110 |
| MC_Home | 2886 | 104 |
| MC_StopMotion | 1114 | 70 |
| MC_Control | 1756 | 58 |
| MC_Simulation | 410 | 64 |
| MC_GearIn | 3476 | 128 |
| Input driver | 1416 … 2654 | 76 ... 128 |
| Output driver | 384 ... 1242 | 52 ... 68 |
| Axis data block | - | 294 |

## ■ Ordering data                           Article No.

| | |
|---|---|
| **Easy Motion Control for TIA Portal** | |
| Requirement: STEP 7 from V12 SP1; software included in STEP 7 V13 | |
| Floating license and single license (Runtime) | **6ES7864-2XA02-0XA5** |
| Type of delivery: CoL for the configuration software, USB flash drive with a license key for the configuration software, CoL for a runtime license; without software or documentation | |
| Floating license download by email, valid for V11 or higher (email address required for delivery[1] ); without software or documentation | **6ES7864-2XA01-0XH5** |
| **Easy Motion Control Runtime License** | |
| Type of delivery: CoL for one runtime single license (valid for Easy Motion Control V2.x and V11 or higher), without software or documentation | **6ES7864-0AF01-0YX0** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## Overview

The vendor- and platform-independent OPC Unified Architecture (UA) is the communication standard for Industry 4.0 and is the standard mechanism for accessing S7-1500 data from non-Siemens devices.

## Technical specifications

| Can be used for | |
|---|---|
| SIMATIC OPC UA S7-1500 | For all S7-1500 CPUs and ET200SP CPUs with FW V2.0 and higher (incl. S/F/T versions) and PLCSIM Advanced |

## Ordering data

| | Article No. |
|---|---|
| **SIMATIC OPC UA S7-1500 Small** | |
| Single runtime license | |
| License certificate for OPC UA server (data access) | **6ES7823-0BA00-1BA0** |
| Download incl. license certificate for OPC UA server (data access) [1] | **6ES7823-0BE00-1BA0** |
| Email address required for delivery | |
| **SIMATIC OPC UA S7-1500 Medium** | |
| Single runtime license | |
| License certificate for OPC UA server (data access) | **6ES7823-0BA00-1CA0** |
| Download incl. license certificate for OPC UA server (data access) [1] | **6ES7823-0BE00-1CA0** |
| Email address required for delivery | |
| **SIMATIC OPC UA S7-1500 Large** | |
| Single runtime license | |
| License certificate for OPC UA server (data access) | **6ES7823-0BA00-1DA0** |
| Download incl. license certificate for OPC UA server (data access) [1] | **6ES7823-0BE00-1DA0** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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## Software for SIMATIC Controllers
TIA Portal
TIA Portal options

**TIA Portal Multiuser Engineering, TIA Portal Cloud Connector**

### ■ Overview TIA Portal Multiuser Engineering

TIA Portal Multiuser Engineering allows several users to work on the same project simultaneously. This results in a significant reduction in configuration times, and projects can be commissioned faster.

The basic principle:
The project administration is handled by an autonomous server application. This can be installed independent of a TIA Portal.

### ■ Ordering data | Article No.

**TIA Portal Multiuser Engineering V14**

Software is component of STEP 7 / WinCC V14 and higher. Only the Certificates of License (CoL) are delivered with the license.

| | |
|---|---|
| Data storage medium package | **6ES7823-1AA04-0YA5** |
| Download incl. license key [1] | **6ES7823-1AE04-0YA5** |
| Email address required for delivery | |

**Software Update Service [2]**

| | |
|---|---|
| Data storage medium package | **6ES7823-1AA00-0YL5** |
| Download [1] | **6ES7823-1AE00-0YL5** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see page 11/2.

### ■ Overview TIA Portal Cloud Connector

The TIA Portal Cloud Connector enables access to local PG/PC interfaces and connected SIMATIC hardware from the TIA Portal Engineering while the engineering is taking place via a remote desktop on a server of a private cloud.

### ■ Ordering data | Article No.

**TIA Portal Cloud Connector**

Single license; software is component of STEP 7 / WinCC V14 and higher.
Only the Certificates of License (CoL) are delivered with the license.
• Data medium package
• Download including license key [1] Email address required for the delivery

**6ES7823-1CA00-0YA0**
**6ES7823-1CE00-0YA0**

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## Overview TIA Portal Teamcenter Gateway

The Teamcenter Gateway permits storage and management of TIA Portal projects and global libraries in Teamcenter. Program handling is integrated into the TIA Portal.

## Technical specifications

| Can be used with | |
|---|---|
| TIA Portal Teamcenter Gateway V14 | • TIA Portal V14<br>• Teamcenter V11 |

## Ordering data — Article No.

| | Article No. |
|---|---|
| **TIA Portal Teamcenter Gateway** | |
| Data storage medium package | **6ES7823-1EA00-0YA5** |
| Download incl. license certificate for TIA Portal Teamcenter Gateway V14 [1] | **6ES7823-1EE00-0YA5** |
| Email address required for delivery | |
| **Software Update Service[2]** | |
| For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration.<br>Requires the current software version | |
| Data storage medium package | **6ES7823-1EA00-0YL5** |
| Download[1] | **6ES7823-1EE00-0YL5** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see page 11/2.

## Overview SIMATIC ProDiag

The TIA Portal option ProDiag makes it possible to monitor a machine or plant and to intervene in the event of a fault. The monitoring messages which can be generated for the various faults provide specific information on the monitoring mode, location and cause of the fault. Information on troubleshooting can be provided in addition. Plant operators can then not only recognize faults, they can also identify any potential danger in advance and take appropriate countermeasures.

## Technical specifications

| Can be used for | |
|---|---|
| SIMATIC ProDiag S7-1500 | For all S7-1500 CPUs and ET200SP CPUs with FW V2.0 and higher |

## Ordering data — Article No.

| | Article No. |
|---|---|
| **SIMATIC ProDiag S7-1500 for 250 monitoring functions** | |
| For SIMATIC S7-1500 CPUs and ET 200SP CPUs with FW 2.0 and higher. Independent of the TIA Portal version. | |
| Package with data storage medium | **6ES7823-0AA00-1AA0** |
| Download incl. license key [1] | **6ES7823-0AE00-1AA0** |
| Email address required for delivery | |
| **SIMATIC ProDiag S7-1500 for SIMATIC Comfort Panels / Multi Panels** | |
| Package with data storage medium | **6AV2107-0UP00-0BB0** |
| Download incl. license key [1] | **6AV2107-0UP00-0BH0** |
| Email address required for delivery | |
| **SIMATIC ProDiag S7-1500 for SIMATIC WinCC Runtime Advanced** | |
| Package with data storage medium | **6AV2107-0UA00-0BB0** |
| Download incl. license key [1] | **6AV2107-0UA00-0BH0** |
| Email address required for delivery | |
| **SIMATIC ProDiag S7-1500 for SIMATIC WinCC Runtime** | |
| Package with data storage medium | **6AV2107-0UB00-0BB0** |
| Download incl. license key [1] | **6AV2107-0UB00-0BH0** |
| Email address required for delivery | |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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## Software for SIMATIC Controllers
TIA Portal
TIA Portal options

**SIMATIC Visualization Architect**

### ■ Overview

#### *SIMATIC Visualization Architect*

Challenge:
- To standardize the user interfaces of the visualizations throughout the plant
- To significantly reduce the engineering costs for the generation of the visualizations

Solution:
- Automatic generation and creation of the visualizations, based on the program code of the controller and corresponding visualization objects as part of the comprehensive library concepts.

### ■ Technical specifications

| SIMATIC Visualization Architect | |
|---|---|
| Operating system requirements | In accordance with the requirements of the TIA Portal components:<br>• SIMATIC STEP 7 (TIA Portal)<br>• SIMATIC WinCC Professional, Advanced, Comfort, Basic |
| Supported STEP 7 version | SIMATIC STEP 7 V14 |
| Supported WinCC versions | SIMATIC WinCC V14 Professional, Advanced, Comfort, Basic |

### ■ Ordering data | Article No.

**SIMATIC Visualization Architect V14**

As package
- SIMATIC Visualization Architect V14 — **6AV2107-0PX04-0AA5**
- SIMATIC Visualization Architect V14 Rental — **6AV2107-0PX04-0AA6**
- SIMATIC Visualization Architect V14 Trial
  Download in Customer Support Portal — **6AV2107-0PX04-0AA7**

Download
- SIMATIC Visualization Architect V14 — **6AV2107-0PX04-0AH5**
- SIMATIC Visualization Architect V14 Rental — **6AV2107-0PX04-0AH6**
- SIMATIC Visualization Architect V14 Trial — Download in Customer Support Portal

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## Overview
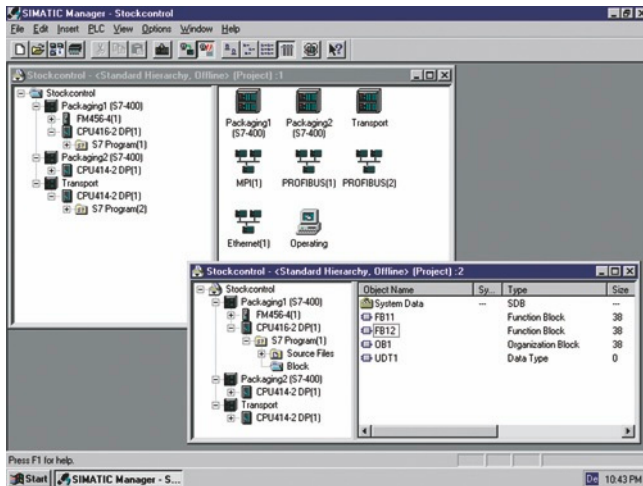


- STEP 7 basic software:
  The standard tool for the SIMATIC S7, SIMATIC C7 and SIMATIC WinAC automation systems.
- Makes use of the full performance capabilities of the systems
- User-friendly functions for all phases of an automation project:
  - Configuring and parameterizing the hardware
  - Definition of communication
  - Programming
  - Testing, commissioning and service
  - Documentation, archiving
  - Operating, diagnostics functions

## Technical specifications

| | |
|---|---|
| Article number | **6GK1571-0BA00-0AA0** |
| Product type designation | PC adapter USB A2 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| Number of interfaces acc. to USB | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS 485) |
| • of the USB interface | Standard-B socket |
| Standard for interfaces USB 2.0 | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Type of voltage supply optional external supply | No |
| Supply voltage | |
| • from USB | 5 V |
| • Note | Supply direct from USB |
| Relative symmetrical tolerance at DC | |
| • at 5 V | 5 % |
| Consumed current | |
| • from USB | 0.2 A |
| Power loss [W] | 1 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 30 °C during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | USB V2.0 adapter |
| Width | 58 mm |
| Height | 26 mm |
| Depth | 105 mm |
| Net weight | 365 g |
| Mounting type 35 mm DIN rail mounting | No |
| Number of plug-in cards of same design plug-in per PC station | 1 |
| Number of units Note | - |
| **Performance data** | |
| **Product functions Diagnosis** | |
| Product function | |
| • Port diagnostics | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • for EMC | 2004/108/EC |
| • for safety from CSA and UL | cULus, UL 60950-1, CSA22.2 |
| • for emitted interference | EN 61000-6-3, EN 61000-6-4 |
| • for interference immunity | EN 61000-6-1, EN 61000-6-2 |
| Certificate of suitability | |
| • CE marking | Yes |
| • C-Tick | Yes |

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**Software for SIMATIC Controllers**
STEP 7 V5.x
Basic software and editors

## STEP 7

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **STEP 7 Version 5.5** | | **STEP 7 reference manuals** | |
| Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirement: Windows XP Prof., Windows 7 Professional / Ultimate Type of delivery: German, English, French, Spanish, Italian; incl. license key on USB flash drive, with electronic documentation | | Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400 | |
| | | German | 6ES7810-4CA10-8AW1 |
| | | English | 6ES7810-4CA10-8BW1 |
| | | French | 6ES7810-4CA10-8CW1 |
| | | Spanish | 6ES7810-4CA10-8DW1 |
| | | Italian | 6ES7810-4CA10-8EW1 |
| Floating license on DVD | 6ES7810-4CC10-0YA5 | **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |
| Floating license, license key download without software and documentation[1]; email address required for delivery | 6ES7810-4CE10-0YB5 | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Rental license for 50 hours | 6ES7810-4CC10-0YA6 | | |
| Rental license for 50 hours, license key download without software and documentation[1]; email address required for delivery | 6ES7810-4CE10-0YB6 | | |
| Upgrade floating license 3.x/4.x/5.x to V5.5; on DVD | 6ES7810-4CC10-0YE5 | **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |
| Trial license STEP 7 V5.5; on DVD, 14 day trial | 6ES7810-4CC10-0YA7 | Current "Manual Collection" DVD and the three subsequent updates | |
| **STEP 7 Version 5.5 Japanese** | | **EPROM programming device, USB prommer** | 6ES7792-0AA00-0XA0 |
| Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirement: Windows XP Professional Japanese Type of delivery: English, Japanese; incl. license key on USB flash drive, with electronic documentation | | For programming SIMATIC Memory Cards and EPROM modules | |
| | | **MPI cable** | 6ES7901-0BF00-0AA0 |
| | | For linking SIMATIC S7 and PG through MPI (5 m) | |
| | | **Components for connecting a PC to MPI and PROFIBUS** | |
| | | *For PCs with a free PCI slot:* | |
| Floating license Japanese on DVD | 6ES7810-4CC10-0JA5 | **CP 5612** | 6GK1561-2AA00 |
| Upgrade floating license Japanese 3.x/4.x/5.x to V5.5; on DVD | 6ES7810-4CC10-0JE5 | *For PCs without a free PCI slot:* | |
| **STEP 7 Version 5.5, Chinese** | | **USB A2 PC adapter** | 6GK1571-0BA00-0AA0 |
| Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirement: Windows XP Professional Chinese Type of delivery: English, Chinese; incl. license key on USB flash drive, with electronic documentation | | for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |
| | | **Components for connecting the PC to Industrial Ethernet** | |
| | | *For PCs with a free PCI slot:* | |
| | | **Layer 2 Ethernet cards** | |
| | | *For PCs with a free PCMCIA slot:* | |
| Floating license Chinese on DVD | 6ES7810-4CC10-0KA5 | **SOFTNET-IE RNA V7.1 (Win XP/Vista/Server2003)** | 6GK1704-1PW71-3AA0 |
| Upgrade floating license Chinese 3.x/4.x/5.x to V5.5; on DVD | 6ES7810-4CC10-0KE5 | **SOFTNET-IE RNA V8.2 (Win 7/server2008)** | 6GK1704-1PW08-2AA0 |
| **Documentation package STEP 7 basic information** | | | |
| Comprising Getting Started, hardware configuration manual, programming manual, migration manual | | | |
| German | 6ES7810-4CA10-8AW0 | | |
| English | 6ES7810-4CA10-8BW0 | | |
| French | 6ES7810-4CA10-8CW0 | | |
| Spanish | 6ES7810-4CA10-8DW0 | | |
| Italian | 6ES7810-4CA10-8EW0 | | |

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[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

## Overview



STEP 7 Professional supports all IEC languages.

In addition to the languages familiar from STEP 7:

- LAD,
- FBD and
- STL,

these languages are also available:

- "sequential function chart"
- "structured text".

An offline simulation of user programs created with these languages is included. STEP 7 Professional thus replaces the combination of the individual packages STEP 7, S7-GRAPH, S7-SCL and S7-PLCSIM.

A POWERPACK (conversion package) is available for customers who use STEP 7 already and wish to change. A valid STEP 7 license is required for purchasing the POWERPACK. A separate update service can be purchased for STEP 7 Professional.

## Technical specifications

| Article number | **6GK1571-0BA00-0AA0** |
| --- | --- |
| Product type designation | PC adapter USB A2 |
| **Transmission rate** | |
| Transfer rate | |
| • at the 1st interface acc. to PROFIBUS | 9.6 kbit/s ... 12 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • at the 1st interface acc. to PROFIBUS | 1 |
| Number of interfaces acc. to USB | 1 |
| Type of electrical connection | |
| • at the 1st interface acc. to PROFIBUS | 9-pin Sub-D socket (RS 485) |
| • of the USB interface | Standard-B socket |
| Standard for interfaces USB 2.0 | Yes |

| Article number | **6GK1571-0BA00-0AA0** |
| --- | --- |
| Product type designation | PC adapter USB A2 |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | DC |
| Type of voltage supply optional external supply | No |
| Supply voltage | |
| • from USB | 5 V |
| • Note | Supply direct from USB |
| Relative symmetrical tolerance at DC | |
| • at 5 V | 5 % |
| Consumed current | |
| • from USB | 0.2 A |
| Power loss [W] | 1 W |
| **Permitted ambient conditions** | |
| Ambient temperature | |
| • during operation | 0 ... 60 °C |
| • during storage | -40 ... +70 °C |
| • during transport | -40 ... +70 °C |
| Relative humidity at 30 °C during operation maximum | 95 % |
| Protection class IP | IP20 |
| **Design, dimensions and weight** | |
| Module format | USB V2.0 adapter |
| Width | 58 mm |
| Height | 26 mm |
| Depth | 105 mm |
| Net weight | 365 g |
| Mounting type 35 mm DIN rail mounting | No |
| Number of plug-in cards of same design plug-in per PC station | 1 |
| Number of units Note | - |
| **Performance data** | |
| **Product functions Diagnosis** | |
| Product function | |
| • Port diagnostics | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • for EMC | 2004/108/EC |
| • for safety from CSA and UL | cULus, UL 60950-1, CSA22.2 |
| • for emitted interference | EN 61000-6-3, EN 61000-6-4 |
| • for interference immunity | EN 61000-6-1, EN 61000-6-2 |
| Certificate of suitability | |
| • CE marking | Yes |
| • C-Tick | Yes |

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## Software for SIMATIC Controllers
STEP 7 V5.x
Basic software and editors

**STEP 7 Professional**

■ **Ordering data** | **Article No.** | | **Article No.**

| | |
|---|---|
| **STEP 7 Professional 2010/V13** | |
| Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC | |
| Requirement: Windows XP Prof. (32-bit), Windows 7 Professional / Ultimate (32/64-bit) | |
| Type of delivery: German, English, French, Spanish, Italian; license key on USB flash drive, with electronic documentation | |
| **Floating combo license on DVD** | 6ES7810-5CC11-0YA5 |
| **Floating license, license key download**[2] without software and documentation; email address required for delivery | 6ES7810-5CE11-0YB5 |
| **Rental license for 50 hours** | 6ES7810-5CC11-0YA6 |
| **Rental license for 50 hours, license key download**[2] without software and documentation; email address required for delivery | 6ES7810-5CE11-0YB6 |
| **Upgrade of floating license to 2010 Edition; on DVD** | 6ES7810-5CC11-0YE5 |
| **Powerpack floating license for upgrading from STEP 7 to STEP 7 Professional** | 6ES7810-5CC11-0YC5 |
| **Trial license STEP 7 Professional 2010; on DVD, runs for 14 days** | 6ES7810-5CC11-0YA7 |

| | |
|---|---|
| **Software Update Service** | |
| For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration. Requires the current software version | |
| **Software Update Service (Standard Edition)**[1] | |
| The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.) | |
| • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7810-5CC04-0YE2 |
| **Software Update Service (Compact Edition)**[1] | |
| The delivery items are combined. For multiple contracts, only 1 package with 1 data medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied. | |
| Delivery items to be combined must be ordered as one item. | |
| • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7810-5CC00-0YM2 |
| **Software Update Service (download)**[1] | |
| The upgrades and service packs are available for downloading. | |
| Email address required for delivery | |
| • STEP 7 Professional and STEP 7 Professional in the TIA Portal | 6ES7810-5CC04-0YY2 |

[1] For more information on the Software Update Service, see page 11/2.
[2] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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| ■ **Ordering data** | Article No. | | Article No. |
|---|---|---|---|
| **Documentation package STEP 7 basic information** | | **EPROM programming device, USB prommer** | **6ES7792-0AA00-0XA0** |
| Comprising Getting Started, hardware configuration manual, programming manual, migration manual | | For programming SIMATIC Memory Cards and EPROM modules | |
| German | **6ES7810-4CA10-8AW0** | **MPI cable** | **6ES7901-0BF00-0AA0** |
| English | **6ES7810-4CA10-8BW0** | For linking SIMATIC S7 and PG through MPI (5 m) | |
| French | **6ES7810-4CA10-8CW0** | **Components for connecting a PC to MPI and PROFIBUS** | |
| Spanish | **6ES7810-4CA10-8DW0** | *For PCs with a free PCI slot:* | |
| Italian | **6ES7810-4CA10-8EW0** | **CP 5612** | **6GK1561-2AA00** |
| **STEP 7 reference manuals** | | *For PCs without a free PCI slot:* | |
| Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400 | | **USB A2 PC adapter** | **6GK1571-0BA00-0AA0** |
| German | **6ES7810-4CA10-8AW1** | for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery | |
| English | **6ES7810-4CA10-8BW1** | **Components for connecting the PC to Industrial Ethernet** | |
| French | **6ES7810-4CA10-8CW1** | *For PCs with a free PCI slot:* | |
| Spanish | **6ES7810-4CA10-8DW1** | **Layer 2 Ethernet cards** | |
| Italian | **6ES7810-4CA10-8EW1** | *For PCs with a free PCMCIA slot:* | |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** | **SOFTNET-IE RNA V7.1 (Win XP/Vista/Server2003)** | **6GK1704-1PW71-3AA0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | | **SOFTNET-IE RNA V8.2 (Win 7/server2008)** | **6GK1704-1PW08-2AA0** |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** | | |
| Current "Manual Collection" DVD and the three subsequent updates | | | |

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## S7-SCL

### Overview



- PASCAL-type high-level language
- Optimized for programming programmable controllers
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 314 and CPU 312C or higher), S7-400, C7 and WinAC



### Technical specifications

| Engineering Tool | S7-SCL |
|---|---|
| Current version | V5.3 |
| Software class | A |
| **Application areas** | |
| Can be used for | Text-based high-level language programming of simple and complex calculations, CASE, loop, jump, and comparison functions |
| Marketing message | Programming of algorithms and calculations made easy! |
| Advantages | • Clear and easy-to-read programs<br>• Functional, module-based programming<br>• CASE instruction replaces a large number of jump and comparison functions<br>• Easily understood by PLC programmers, as the programming philosophy of LAD/FBD/STL is retained<br>• Easy switchover to PLC programming for PC programmers<br>• Exchangeability (porting) of subroutines in accordance with IEC 61131-3<br>• Less time required for engineering compared to LAD/FBD/STL: Up to 20% for simple programs; at least 50% for demanding program structures |
| Sectors | • Labeling machines<br>• Chemical plants (e.g. oxygen extraction, evaluation of measured values)<br>• Rubber and plastics machines<br>• Woodworking machines<br>• Storage and logistics systems<br>• Paper and printing machinery<br>• Punching and cutting machines<br>• Water industry<br>• Coilers |
| **Target systems** | |
| Can be used in | S7-300 (CPU 313 or higher and CPU 312C or higher recommended) |
| | S7-400 |
| | C7 (C7-626 or higher recommended) |
| | WinAC |
| **System prerequisites** | |
| Operating system | Windows XP Professional<br>Windows 7 Ultimate/Professional (S7-SCL V5.3 SP5 and higher) |
| Required hard drive memory in the PG/PC | 50 MB |
| Required software | STEP 7 V5.4 or higher |

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## ■ Technical specifications (continued)

| Engineering Tool | S7-SCL |
|---|---|
| **Properties** | |
| Monitoring tags | Yes |
| Controlling tags | Yes |
| Single-step processing | Yes |
| Integration in CFC | Yes |
| **Program runtimes** | |
| with S7-300 (typical) | Similar to LAD/FBD/STL |
| with S7-400 (typical) | Similar to LAD/FBD/STL |
| **Diagnostics** | |
| Integration of diagnostic data in ProAgent | - |
| Integration of diagnostic data in ProTool/Pro | - |
| Integration of diagnostic data in WinCC | - |
| **Supported standards** | |
| IEC 61131-3 | PLCopen certification<br>• Base level ST available<br>• Reusability Level ST available |
| **Available versions/licenses** | |
| Floating license | CD-ROM with<br>• Tool<br>• Electronic manual<br>• Getting Started guide<br>• Examples<br>License on USB stick<br>Certificate of License<br>Product information |
| Upgrade (floating license) | CD-ROM with<br>• Tool<br>• Electronic manual<br>• Getting Started guide<br>• Examples<br>License on USB stick<br>Certificate of License<br>Product information |
| Software Update Service (SUS) | |
| **Also a component part of** | |
| STEP 7 Professional | Yes |
| S7 Trainer Package | Yes |
| PCS 7 | Yes |
| D7-SYS | - |

## ■ Ordering data | Article No.

**SIMATIC S7 SCL, Version 5.3**

Task:
High-level language programming
Target system:
SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC
Requirement:
STEP 7 V5.4 SP5 and higher
Type of delivery:
on CD; German, English, French, Spanish, Italian;
incl. authorization diskette, with electronic documentation

| | |
|---|---|
| Floating license | **6ES7811-1CC05-0YA5** |
| Software Update Service (requires current software version)[1] | **6ES7811-1CA01-0YX2** |
| Upgrade floating to V5.3 | **6ES7811-1CC05-0YE5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |

Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC

| | |
|---|---|
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |

Current "Manual Collection" DVD and the three subsequent updates

[1] For more information on the Software Update Service, see page 11/2.

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# Software for SIMATIC Controllers
## STEP 7 V5.x
Basic software and editors

## S7-GRAPH

### Overview



- For configuring and programming sequential processes using sequencers
- Standardized representation to EN 1131-3
- Clearly comprehensible program thanks to structuring of the process into separate steps
- With extensive diagnostics functions, integrated into the SIMATIC diagnostics concept
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 315 and CPU 312C or higher), S7-400, C7 and WinAC



### Technical specifications

| Engineering Tool | S7-GRAPH |
|---|---|
| Current version | V5.3 |
| Software class | A |
| **Application areas** | |
| Can be used for | Graphical programming of sequential controllers and sequencers |
| Marketing message | Fast, elegant way to program sequential processes easily and transparently! |
| Advantages | • Can be used to optimum effect even during the design phase<br>• Less configuration effort thanks to graphical structuring and programming<br>• Quick and easy familiarization<br>• Precise fault localization thanks to integrated diagnostics in combination with ProAgent for ProTool/Pro and WinCC<br>• Less time required for engineering compared to LAD/FBD/STL: approx. 40 to 70% |
| Sectors | • Automotive industry (e.g. body-in-white, final assembly)<br>• Electrical equipment manufacture<br>• Rubber and plastics machines<br>• Pick-and-place machines<br>• Woodworking machines<br>• Metalworking machines<br>• Paper and printing machinery<br>• Testing machines<br>• Rolling mills<br>• Coilers<br>• Leisure and entertainment facilities |
| **Target systems** | |
| Can be used in | S7-300 (CPU 314 or higher and CPU 312C or higher recommended) |
| | S7-400 |
| | C7 (C7-626 or higher recommended) |
| | WinAC |
| **System prerequisites** | |
| Operating system | Windows XP Professional<br>Windows 7 Professional<br>Windows 7 Ultimate |
| Required hard drive memory in the PG/PC | 50 MB |
| Required software | STEP 7 V5.4 with SP4 or SP5<br>or<br>STEP 7 V5.5 with or without SP1 |
| **Properties** | |
| Monitoring tags | Yes |
| Controlling tags | Yes |
| Single-step processing | Yes |
| Integration in CFC | - |
| **Program runtimes** | |
| with S7-300 (typical) | 3 ms per block + 1 ms per active step |
| with S7-400 (typical) | 0.4 ms per block + 0.06 ms per active step |
| **Diagnostics** | |
| Integration of diagnostic data in ProAgent | Yes |
| Integration of diagnostic data in ProTool/Pro | Via ProAgent |
| Integration of diagnostic data in WinCC | Via ProAgent |

■ **Technical specifications** (continued)

| Engineering Tool | S7-GRAPH |
|---|---|
| **Supported standards** | |
| IEC 61131-3 | PLCopen certification<br>• Base Level SFC available |
| Status of PLCopen activities | - |
| **Available versions/licenses** | |
| Floating license | CD-ROM with<br>• Tool<br>• Electronic manual<br>• Getting Started guide<br>• Examples |
| | License key on USB stick |
| | Certificate of License |
| | Product information |
| Upgrade (floating license) | CD-ROM with<br>• Tool<br>• Electronic manual<br>• Getting Started guide<br>• Examples |
| | License key on USB stick |
| | Certificate of License |
| | Product information |
| Software Update Service (SUS) | |
| **Also a component part of** | |
| STEP 7 Professional | Yes |
| S7 Trainer Package | Yes |
| PCS 7 | - |
| D7-SYS | - |

■ **Ordering data**       **Article No.**

| | |
|---|---|
| **SIMATIC S7-GRAPH, Version 5.3** | |
| Task:<br>Configuring and programming of sequences<br>Target system:<br>SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC<br>Requirement:<br>STEP 7 V5.4 or higher with SP4/SP5 or STEP 7 V5.5 with or without SP1<br>Type of delivery:<br>on CD; German, English, French, Spanish, Italian; including license key on USB flash drive, with electronic documentation | |
| Floating license | **6ES7811-0CC06-0YA5** |
| Software Update Service (requires current software version)[1] | **6ES7811-0CA01-0YX2** |
| Floating license upgrade to V5.3 | **6ES7811-0CC06-0YE5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the Software Update Service, see page 11/2.

# Software for SIMATIC Controllers
## STEP 7 V5.x
Basic software and editors

### Overview
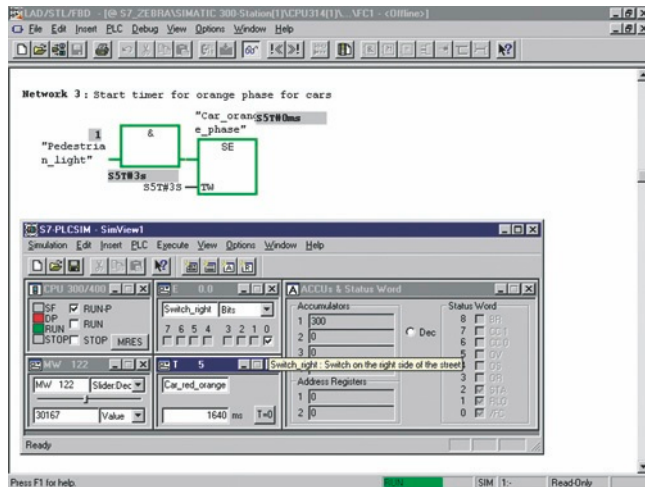


- For functional testing of the generated SIMATIC S7 user blocks on the PG/PC, independent of the availability of the target hardware
- To transfer detection and elimination of program faults to an early phase of program development
- Permits accelerated, cost-reduced initial commissioning, and an increase in program quality
- Can be used for LAD, FBD, STL, S7-GRAPH, S7-HiGraph, S7-SCL, CFC, S7-PDIAG, WinCC (local installation)

### Technical specifications

| Engineering Tool | S7-PLCSIM |
|---|---|
| Type of license | Floating license |
| Software class | A |
| Current version | V5.4 |
| Target system (recommended) | SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7 |
| Operating system | Windows XP Professional Windows 7 Professional Windows 7 Ultimate |
| Required software packages | STEP 7 V5.4 with SP4 or SP5 or STEP 7 V5.5 with or without SP1 |
| Disk space required in PG/PC | 5 MB |

### Ordering data — Article No.

**S7-PLCSIM, Version 5.4**

Task:
Functional testing of SIMATIC S7 user blocks on PG/PC
Target system:
SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7
Requirement:
STEP 7 V5.4 or higher incl. SP4/SP5 or STEP 7 V5.5 with or without SP1
Type of delivery:
on CD; English, German, French, Spanish, Italian; license key on USB flash drive, with electronic documentation

| | |
|---|---|
| Floating license | 6ES7841-0CC05-0YA5 |
| Software Update Service (requires current software version)[1] | 6ES7841-0CA01-0YX2 |
| Floating license upgrade to V5.4 | 6ES7841-0CC05-0YE5 |
| **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |

Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC

| | |
|---|---|
| **SIMATIC Manual Collection update service for 1 year** | 6ES7998-8XC01-8YE2 |

Current "Manual Collection" DVD and the three subsequent updates

[1] For more information on the Software Update Service, see page 11/2.

## Overview
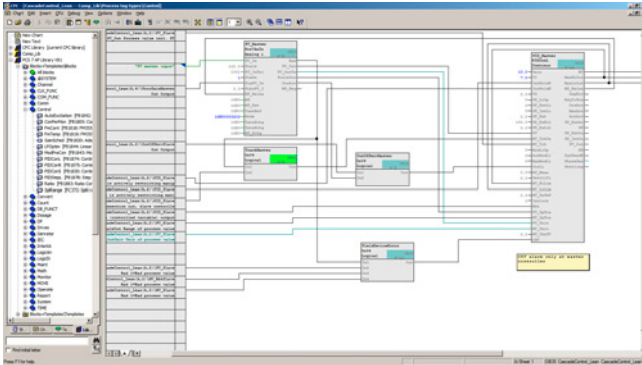


- For the generation of automation programs by drawing a technology chart
- With extensive libraries of ready-made software blocks to which user-created blocks can be added
- Minimized outlay and reduced error susceptibility due to the interconnection of ready-made blocks
- Optimized integration in the world of automation, for example, through guaranteed compatibility with all STEP 7 tools
- Can be used for SIMATIC S7-300 (recommended for CPU 316 or CPU 314C or higher), SIMATIC S7-400, SIMATIC WinAC and D7-SYS

## Technical specifications

| EngineringTool | CFC |
|---|---|
| Current version | V8.2 |
| Software class | A |
| **Application areas** | |
| Can be used for | Graphical creation, interconnection and parameterization of (preconfigured) blocks and functions |
| Marketing message | Simply interconnect and configure instead of programming! |
| Advantages | • Can be used to optimum effect even during the design phase<br>• Reduced configuration effort thanks to graphical interconnection<br>• High degree of reusability of diagrams that have already been created<br>• Quick and easy familiarization<br>• Quick and transparent interconnection of ready-made functions<br>• Technological creation of the program as a whole<br>• Clear representation of control loop structures<br>• Short commissioning time<br>• High plant availability<br>• Less time required for engineering compared to LAD/FBD/STL: up to 50% |
| Sectors | • Automotive industry (e.g. thermostats, tire production processes)<br>• Chemicals<br>• Power engineering and supply<br>• Rubber and plastics machines<br>• Metalworking machines<br>• Food and beverage machines<br>• Petrochemicals<br>• Rolling mills<br>• Water industry<br>• Coilers |
| **Target systems** | |
| Can be used in | S7-300 |
| | S7-400 |
| | F/H systems |
| | WinAC |
| **System prerequisites** | |
| Operating system | MS Windows XP Professional SP3<br>MS Windows Server 2003 SP2 Standard<br>MS Windows Server 2003 R2 SP2<br>MS Windows 7 SP1 Ultimate 32-bit<br>MS Windows 7 SP1 Ultimate 64-bit<br>MS Windows Server 2008 SP2 32-bit<br>MS Windows Server 2008 R2 SP1 64-bit<br>MS Windows 7 Professional SP1 32-bit<br>MS Windows 7 Professional SP1 64-bit<br>MS Windows Vista 32-bit SP2 Ultimate<br>MS Windows Vista 32-bit SP2 Business |
| Required hard drive memory in the PG/PC | approx. 80 MB |
| Required software | STEP 7 V5.4 SP5 or higher |

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# Software for SIMATIC Controllers
STEP 7 V5.x
Options for programming and design

## CFC

### ■ Technical specifications (continued)

| EngineringTool | CFC |
| --- | --- |
| **Properties** | |
| Monitoring tags | Yes |
| Controlling tags | Yes |
| Single-step processing | - |
| Integration in CFC | Yes |
| **Program runtimes** | |
| with S7-300 (typical) | Depending on the interconnected blocks |
| with S7-400 (typical) | Depending on the interconnected blocks |
| **Diagnostics** | |
| Integration of diagnostic data in ProAgent | - |
| Integration of diagnostic data in ProTool/Pro | - |
| Integration of diagnostic data in WinCC | - |
| **Supported standards** | |
| IEC 61131-3 | based on the IEC standard |
| Status of PLCopen activities | - |
| **Available versions/licenses** | |
| Floating license | • 1 CD<br>• 1 license key memory stick<br>• 1 Certificate of License |
| Upgrade (floating license) | • 1 CD<br>• 1 license key memory stick<br>• 1 Certificate of License |
| Software Update Service (SUS) | |
| **Also a component part of** | |
| STEP 7 Professional | - |
| S7 Trainer Package | - |
| PCS 7 | Yes |
| D7-SYS | Yes |

### ■ Ordering data / Article No.

**SIMATIC CFC, Version 8.2**

Task:
Graphic configuring and programming of automation applications in the form of technology-oriented diagrams
Target system:
SIMATIC S7-300/400, SIMATIC WinAC, D7-SYS
Requirements:
STEP 7 V5.4 SP5 and higher
Type of delivery:
Engineering software and electronic documentation on CD-ROM, License Key on USB flash drive, Certificate of License

| | Article No. |
| --- | --- |
| Floating license | **6ES7658-1EX28-0YA5** |
| Floating license upgrade from V8.x to V8.2 | **6ES7658-1EX28-0YE5** |
| Software Update Service (requires current software version)[1] | **6ES7658-1EX00-2YL8** |
| Software Update Service for multiple orders (requires current software version); the delivery items are combined. For multiple contracts, only 1 package (1 data medium set and the corresponding number of licenses) will be supplied. Can be ordered with 5 or more contracts[1] | **6ES7658-1EX00-2YM8** |
| The delivery items to be combined must be ordered as one item. | |

| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| --- | --- |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the Software Update Service, see page 11/2.

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## Overview

- For creating safety-oriented automation applications with SIMATIC S7 in LAD or FBD (STEP 7 required)
- Implementation of safety functions by making simple connections between function blocks
- With preconfigured function block library
- User-defined blocks can be created
- Optimum embedding in the automation world due to guaranteed integration with STEP 7 tools
- Scope of supply:
  - Distributed Safety editor
  - Code generator
  - Debugger
  - Libraries of standard blocks

## Ordering data

| | Article No. |
|---|---|
| **S7 Distributed Safety V5.4 programming tool** | |
| Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher | |
| Floating license for 1 user | **6ES7833-1FC02-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7833-1FC02-0YH5** |
| **S7 Distributed Safety upgrade** | |
| From V5.x to V5.4; floating license for 1 user | **6ES7833-1FC02-0YE5** |

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# Software for SIMATIC Controllers
STEP 7 V5.x
Options for programming and design

## ◼ Overview
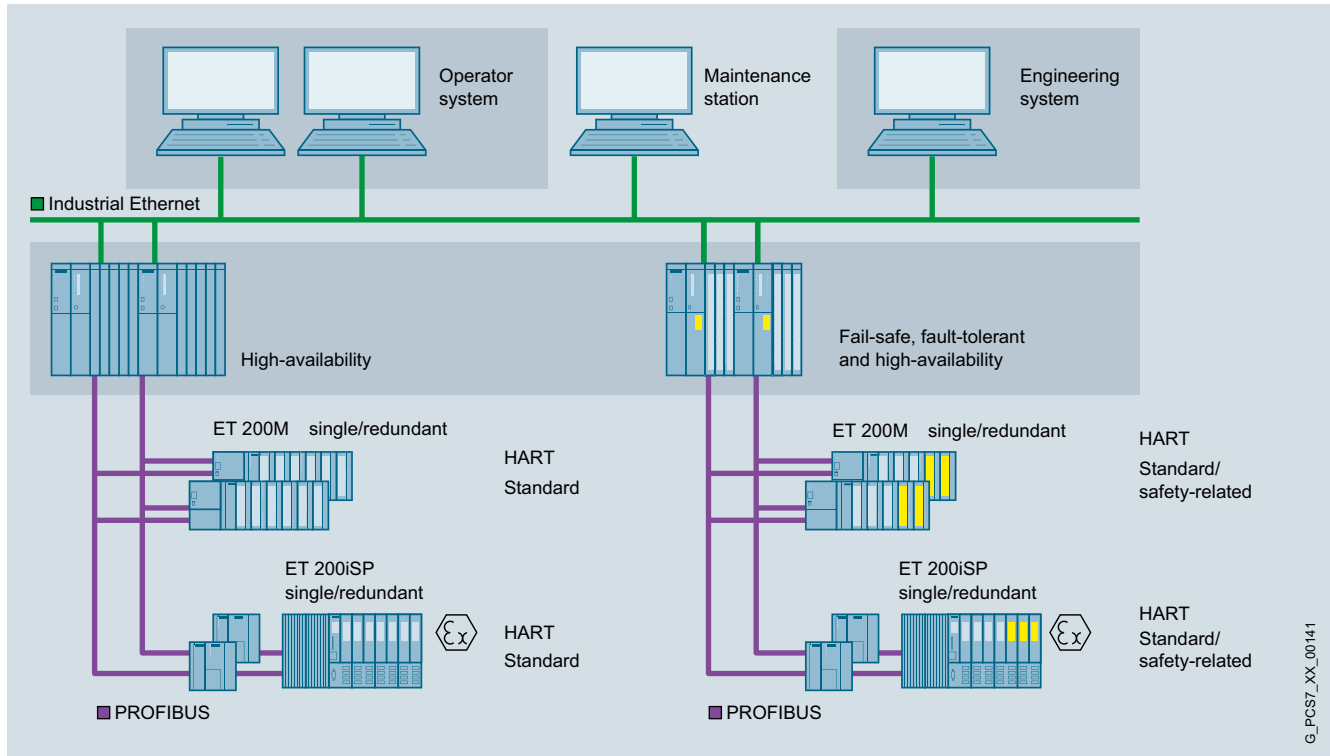


Common engineering system for basic process control system and safety instrumented system

The process industry frequently features complex technological sequences with high safety demands, and faults and failures in the process automation could have fatal consequences for personnel, machines, plants and the environment. Therefore process safety is of particular significance. The safety technology used must reliably detect errors in the process and also its own internal errors, and automatically set the plant/application to a safe state if an error is detected.

S7 F/FH Systems is the comprehensive range of products and services from Siemens for safe, fault-tolerant applications in the process industry. This is characterized by:

• Safe communication via PROFIBUS with PROFIsafe
• Safe communication also via PROFIBUS PA with PROFIsafe
• ET 200 distributed I/O systems with safety-related I/O modules
• User-friendly process visualization, including safety-relevant fault messages, via the optional operator system
• Engineering system with S7 F Systems software package and SIMATIC Safety Matrix

• AS 412F/FH, AS 414F/FH and AS 417F/FH safety-related automation systems
  The safety-related automation systems of the S7 F/FH-System are based on the hardware of the CPU 412H, CPU 414H or CPU 417H automation systems that are extended with the S7 F Systems software package to include safety functions. All F/FH systems listed are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508. There are two design variants:
  - Single-channel (with one CPU, safety-related)
  - High-availability (with redundant CPUs, safety-related and fault-tolerant)

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## Overview
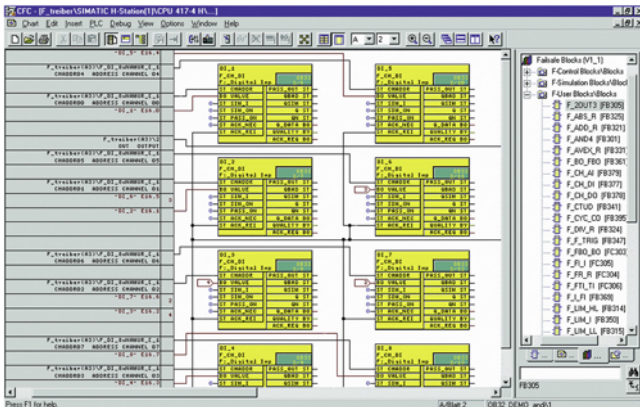


The S7 F Systems engineering tool integrated in the SIMATIC Manager can be used to configure an S7 F/FH System. With this tool you can:

• Parameterize CPU and F-signal modules

• Create safety-related applications in the CFC.

Predefined, TÜV-approved blocks are available for this purpose. The safety-related blocks save the user having to perform redundant programming for detecting and reacting to errors.

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **S7 F Systems RT license**<br><br>For processing safety-related application programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH | **6ES7833-1CC00-6YX0** | **SIMATIC S7 F Systems V6.2 Upgrade Package**<br><br>For S7 F Systems upgrade from V6.0/V6.1 to V6.2<br><br>2 languages (English, German), software class A, runs on the engineering station under Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit; on operator station additionally under Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit,<br><br>Floating license for 1 user<br><br>No SIMATIC PCS 7 Software Media Package | |
| **S7 F Systems V6.2**<br><br>Programming and configuration environment for creating and using safety-related STEP 7 programs.<br><br>2 languages (English, German), software class A, runs on the engineering station under Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit; on operator station additionally under Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit,<br><br>Floating license for 1 user<br><br>No SIMATIC PCS 7 Software Media Package | **6ES7833-1CC02-0YA5** | | |
| Type of delivery:<br>Goods delivery<br>License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC S7 F Systems Software Media Package per order item | **6ES7833-1CC26-0YA5** | Type of delivery:<br>Goods delivery<br>License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC S7 F Systems Software Media Package per order item | **6ES7833-1CC26-0YE5** |
| Type of delivery:<br>Online delivery<br>License key download and online certificate of license, combined with SIMATIC S7 F Systems Software Media Package (software download and online certificate of license)<br><br>Note:<br>email address required | **6ES7833-1CC26-0YH5** | Type of delivery:<br>Online delivery<br>License key download and online certificate of license, combined with SIMATIC S7 F Systems Software Media Package (software download and online certificate of license)<br><br>Note:<br>email address required | **6ES7833-1CC26-0YK5** |

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# Software for SIMATIC Controllers
## STEP 7 V5.x
## Options for programming and design

| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|

**SIMATIC S7 F Systems V6.1 Upgrade Package**

For S7 F Systems upgrade from V5.x/V6.0 to V6.1 (including SP)

2 languages (English, German), software class A, runs on Windows XP Professional 32-bit, Windows Server 2003 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit,

Floating license for 1 user

No SIMATIC PCS 7 Software Media Package

Note:
In the case of an S7 F Systems upgrade from V5.x to V6.1, the type of S7 F Systems license changes from single license to floating license.

Type of delivery:
Goods delivery
License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC S7 F Systems Software Media Package per order item
    **6ES7833-1CC02-0YE5**

Type of delivery:
Online delivery
License key download and online certificate of license combined with SIMATIC S7 F Systems Software Media Package (software download and online certificate of license)
Note: email address required
    **6ES7833-1CC02-0YK5**

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## Overview



The SIMATIC Safety Matrix which can be used in addition to the CFC is an innovative safety lifecycle tool from Siemens that can be used not only for user-friendly configuration of safety applications, but also for their operation and service. The tool, which is based on the proven principle of a cause & effect matrix, is ideally suited to processes where defined statuses require specific safety reactions.

The SIMATIC Safety Matrix not only means that programming of the safety logic is significantly simpler and more convenient, but also much faster than in the conventional manner. During the risk analysis of a plant, the configuration engineer can assign exactly defined reactions (effects) to events (causes) which may occur during a process.

## Ordering data

| | Article No. |
|---|---|
| **SIMATIC Safety Matrix Tool V6.2** | |
| Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment | |
| Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with multiple operator control levels | |
| 1 language (English), executes with Windows XP Professional, | |
| Type of supply: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD | |
| Floating license for 1 installation | **6ES7833-1SM02-0YA5** |
| Floating license upgrade from V5.x/V6.x to V6.2 | **6ES7833-1SM02-0YE5** |
| **SIMATIC Safety Matrix Editor V6.2** | **6ES7833-1SM42-0YA5** |
| Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment | |
| 1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation | |
| Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD | |
| **SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7** | |
| Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with multiple operating levels Bilingual (English/German), runs on Windows 2000 Professional or Windows XP Professional, Windows 2003 Server | |
| Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD | |
| Floating license for 1 installation | **6ES7833-1SM62-0YA5** |
| Floating license upgrade from V6.x to V6.2 | **6ES7833-1SM62-0YE5** |

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## Overview
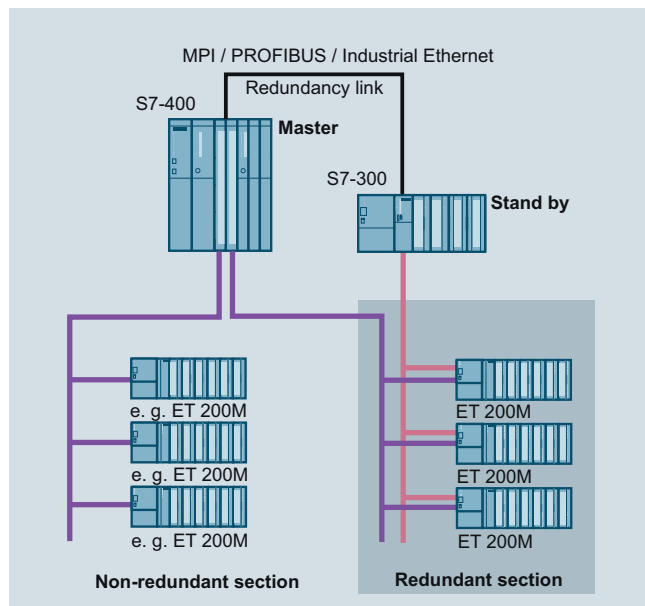


- Software package for assembling fault-tolerant control systems based on software
- Designed for control systems with single-channel distributed I/O
- For use in applications with low demands on changeover speed, such as the control of hydroelectric power plants, cooling circuits, traffic flows, level control, measured data acquisition
- Inexpensive thanks to the use of standard S7-300 and S7-400 components
- I/O linking with PROFIBUS DP in redundant configuration
- Optional control via WinCC operator station

## Technical specifications

| Technical specifications | |
|---|---|
| **Hardware requirements** | |
| CPU | S7-300: CPU 313C-2 DP, 314C-2 DP, 315-2 DP, 316-2 DP, 318-2 DP S7-400: all CPUs |
| Redundancy link of the CPUs | MPI, PROFIBUS, Industrial Ethernet; existing connections can also be used. |
| Suitable modules for ET 200M | IM 153-2; all DI/O, AI/O for ET 200M; FM 350-1 counter module CP 341 |
| **Software requirements** | |
| Configuring/programming | STEP 7 V4.0 |
| Communication configuration for redundant PROFIBUS DP | NCM S7 for PROFIBUS |

## Ordering data — Article No.

**Program package software redundancy V1.2**

Task:
Configuring a redundant control.
Target system:
SIMATIC S7-300, S7-400
Requirement:
STEP 7 V5.2, NCM S7 for PROFIBUS
Delivery package:
incl. electronic documentation (English, German, French, Spanish, Italian), 4 application examples and faceplate for WinCC on CD-ROM

| | |
|---|---|
| Single license (for 2 CPUs) | 6ES7862-0AC01-0YA0 |
| Single license, without software and documentation | 6ES7862-0AC01-0YA1 |
| **SIMATIC Manual Collection** | 6ES7998-8XC01-8YE0 |

Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC

**SIMATIC Manual Collection update service for 1 year** — 6ES7998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

## Overview
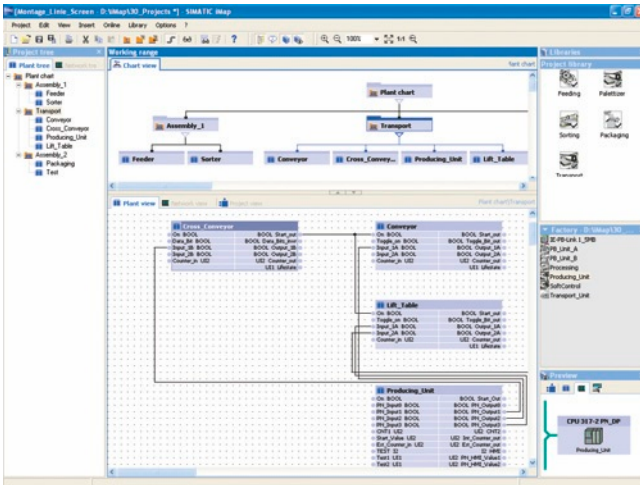


- Component-based software tool for configuring the communication in distributed automation solutions
- For easy graphical configuration of the communication between subsystems and machine-to-machine communication in the production line
- Based on the PROFINET standard
- Open for PROFINET devices from various manufacturers on Industrial Ethernet
- Runs under Windows XP Professional and Windows 7 Ultimate/Professional

## Technical specifications

| Engineering tool | SIMATIC iMap |
| --- | --- |
| Current version | V3.0 |
| Software class | A |
| **Application areas** | |
| Keyword | SIMATIC iMap is an engineering tool for configuring communication between automation and field devices in distributed automation solutions. |
| Marketing message | "Time and cost savings in modular machine and plant construction with Component Based Automation." "Modularization and machine-to-machine communication along the production line." |
| Advantages | • Open component-based engineering tool to the PROFINET standard.<br>• Simple communication between intelligent automation and field devices on PROFIBUS DP and on Ethernet.<br>• Graphical configuration of communication on PROFIBUS DP and on Ethernet<br>• Extremely high reusability of software components (technology modules)<br>• Graphical structuring of the plant using "chart-in-chart" function<br>• Convenient navigation through the project tree<br>• Easy creation and structuring of technology libraries<br>• PROFIBUS and Ethernet in the overview of the network view<br>• Fast start-up thanks to downloading and testing directly on Ethernet (also of PROFIBUS slaves)<br>• Online display of values of the technology modules on the interfaces and in the variable table<br>• Diagnosis of communication in the diagnostics window |
| Sectors | • Automotive industry (especially in assembly, conveyor systems and in the paint shop)<br>• Complex food and packaging machines<br>• Conveyor systems based on PROFIBUS DP<br>• Production lines with several interlinked machines |

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# Software for SIMATIC Controllers
## STEP 7 V5.x
## Options for programming and design

**SIMATIC iMap**

### ■ Technical specifications (continued)

| Engineering tool | SIMATIC iMap |
|---|---|
| Target systems | • SIMATIC S7 CPU 31x-2 PN/DP and SIMATIC S7 CPU 319-3 PN/DP (with integrated PROFINET interface. This can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only)<br>• SIMATIC WinAC PN (can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only)<br>• SIMATIC NET IE/PB Link (can be used as a proxy function for the devices of a complete PROFIBUS segment)<br>• SIMATIC NET CP 343-1 and CP 343-1 Advanced (for connecting SIMATIC S7-300 to Ethernet), CP443-1 Advanced (for connecting SIMATIC S7-400 to Ethernet)<br>• Distributed I/O stations with separate CPU (all intelligent field devices on PROFIBUS such as SIMATIC CPU 313C-2DP, CPU 314C-2DP, CPU 315-2DP, CPU 316-2DP, ET 200 IM 151 CPU, ET 200S BM 147 CPU),<br>• PROFINET CBA OPC Server (for access from PC applications to data in PROFINET devices)<br>• Devices on Industrial Ethernet based on the PROFINET CBA standard<br>• SIMATIC OPs (within the components)<br>• SIMATIC ProTool/Pro, WinCC or any other visualization system with OPC client function |
| **System prerequisites** | |
| Operating system | Windows XP Prof. with Service Pack 2 or Windows 7 Ultimate/Professional; PC administration rights are required for installation |
| PG/PC hardware | Pentium processor, 1 GHz or higher |
| Recommended expansion of main memory in PG/PC | RAM: 512 MB or more |
| Hard disk space required in PG/PC | Approx. 200 MB |
| Software required | • STEP 7 V5.3 Service Pack 3 or higher<br>• PN OPC-Server V6.3 or higher<br><br>The following software must be installed before iMap (included in the iMap package):<br>• MS Internet Explorer V6.0 Service Pack 1 and higher<br>• Adobe Acrobat Reader V5.0 |
| **Delivery format** | |
| Languages | English, German, French, Italian and Spanish |
| Single License (SL) | Yes |
| Upgrade License (UL) | Yes, from V2.0 to V3.0 |
| Paper manuals | Electronically on CD |
| **Authorization/licenses** | |
| Authorization | Yes |
| Single License (SL) | Yes |
| Upgrade License (UL) | Yes |
| Software Update Service | Yes |
| Unlock Copy License | No |

### ■ Ordering data · · · · · · · · · · · · · · · · · · Article No.

**SIMATIC iMap V3.0**

Target system:
CPU 31x-2 PN/DP,
CPU 319-3 PN/DP,
SIMATIC WinAC PN,
SIMATIC NET IE/PB Link,
SIMATIC NET CP 343-1,
SIMATIC NET CP 343-1 Advanced,
SIMATIC NET CP 443-1 Advanced,
distributed I/O devices with own
CPU, PROFINET CBA OPC server,
devices on Industrial Ethernet
based on the PROFINET CBA
standard, SIMATIC OPs,
SIMATIC ProTool/Pro
Requirements:
Windows XP Prof. with Service Pack
2 or higher or Windows 7 Ultimate/
Professional; on PG or PC with
Pentium processor, min. 1 GHz;
STEP 7 V5.3 Service Pack 3 or
higher, PN OPC Server V6.3 or
higher
Type of delivery:
German, English, with electronic
documentation

| | |
|---|---|
| Floating license | **6ES7820-0CC04-0YA5** |
| Software Update Service (requires current software version)[1] | **6ES7820-0CC01-0YX2** |
| Upgrade to V3.0, floating license | **6ES7820-0CC04-0YE5** |

[1] For more information on the Software Update Service, see page 11/2.

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## Overview



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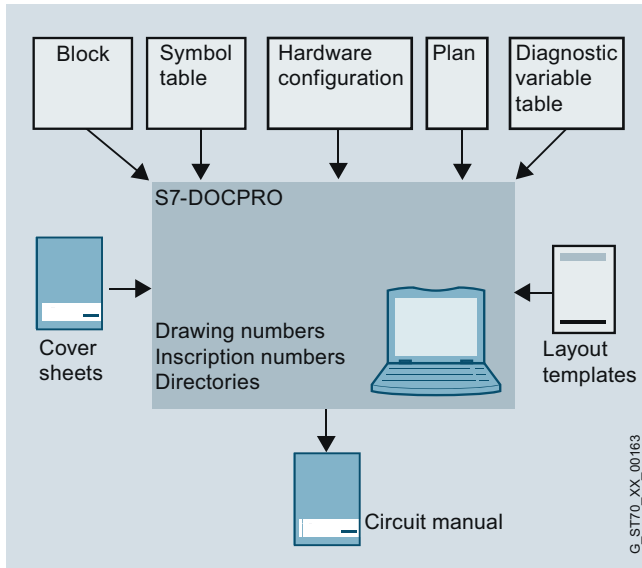
- For creating and managing plant documentation
- Permits structuring of project data, the preparation in the form of wiring manuals, and the printout in a unified print image.
- For use in SIMATIC S7-300, S7-400 and C7

## Technical specifications

| Engineering Tool | DOCPRO |
|---|---|
| Type of license | Floating license |
| Software class | A |
| Current version | V5.4 |
| Target system (recommended) | SIMATIC S7-300/400<br>SIMATIC C7 |
| Operating system | Windows XP Professional<br>Windows 7 Ultimate/Professional from DOCPRO V5.4 SP1 |
| Required software packages | STEP 7, V5.4 and higher;<br>for operation under Windows 7<br>STEP 7, V5.5 and higher |
| Disk space required in PG/PC | 5 MB |

## Ordering data | Article No.

| | |
|---|---|
| **DOCPRO, Version 5.4** | |
| Task:<br>Creation of circuit manuals for plant documentation management<br>Target system:<br>SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7<br>Requirement:<br>from STEP 7 V5.4<br>Delivery package:<br>on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation | |
| Floating license | **6ES7803-0CC03-0YA5** |
| Software Update Service (requires current software version)[1] | **6ES7803-0CA01-0YX2** |
| Floating license upgrade to V5.4 | **6ES7803-0CC03-0YE5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the Software Update Service, see page 11/2.

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# Software for SIMATIC Controllers
STEP 7 V5.x
Options for diagnostics and service

## S7-PDIAG

### Overview
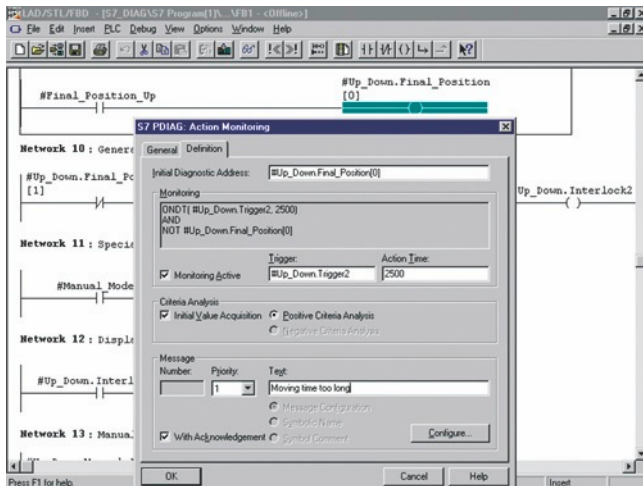


- For configuration of process diagnostics with SIMATIC S7
- Increases the availability of machines and production plants and supports with fault analysis and elimination on site
- For use on the SIMATIC S7-300, S7-400

### Technical specifications

| Engineering Tool | S7-PDIAG |
|---|---|
| Type of license | Floating license |
| Software class | A |
| Current version | V5.3 |
| Target system (recommended) | SIMATIC S7-300 (CPU 314 or higher) SIMATIC S7-400 |
| Operating system | Windows XP Professional Windows 7 Ultimate/Professional |
| Required software packages | STEP 7 V5.4 or higher |
| Disk space required in PG/PC | 6 MB |

### Ordering data     Article No.

**S7-PDIAG, Version 5.3**

Task:
Configuring of process diagnostics for LAD/FBD/STL
Target system:
SIMATIC S7-300 (CPU 314 and higher); SIMATIC S7-400
Requirement:
STEP 7 V5.4 or higher
Type of delivery:
on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation

| | |
|---|---|
| Floating license | 6ES7840-0CC04-0YA5 |
| Software Update Service (requires current software version)[1] | 6ES7840-0CA01-0YX2 |
| Upgrade to V5.3 | 6ES7840-0CC04-0YE5 |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |

Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC

| | |
|---|---|
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |

Current "Manual Collection" DVD and the three subsequent updates

[1] For more information on the Software Update Service, see page 11/2.

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## Overview
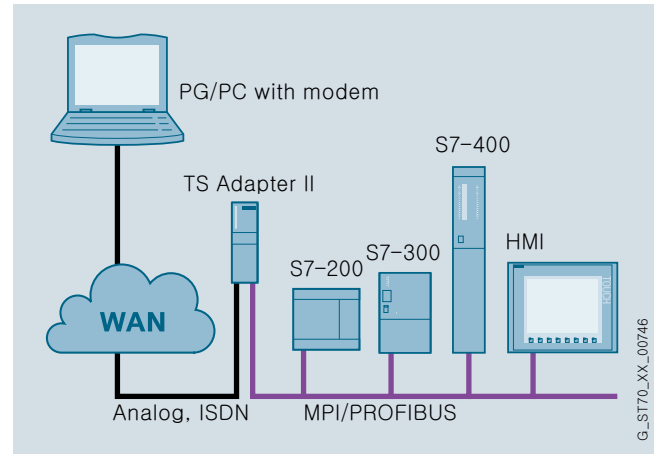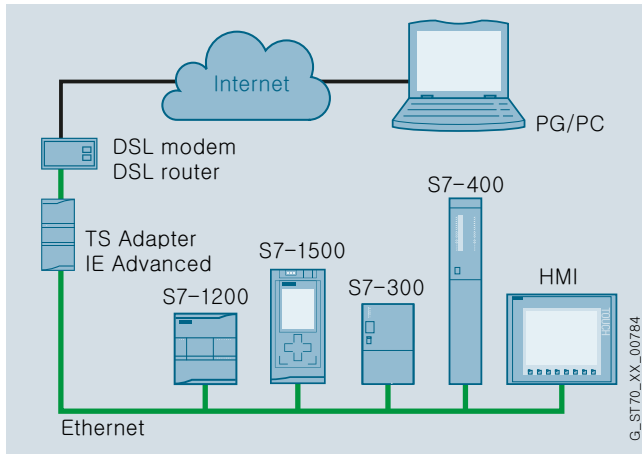




Teleservice with TS Adapter II
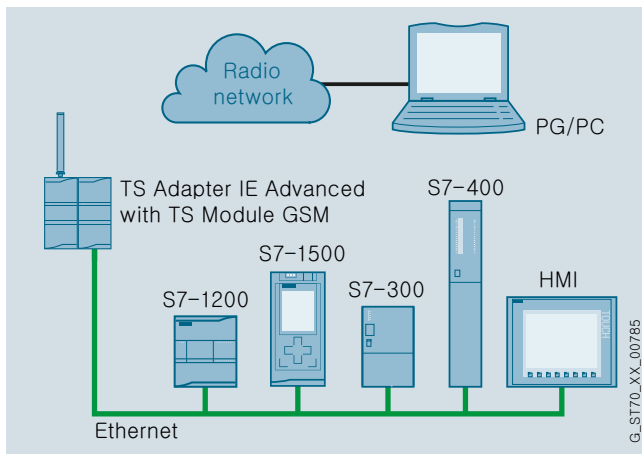


Teleservice with TS Adapter IE Advanced
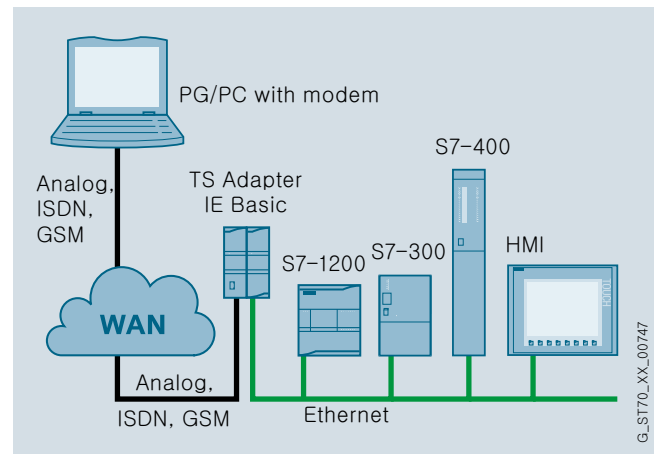


Teleservice with TS Adapter IE Basic
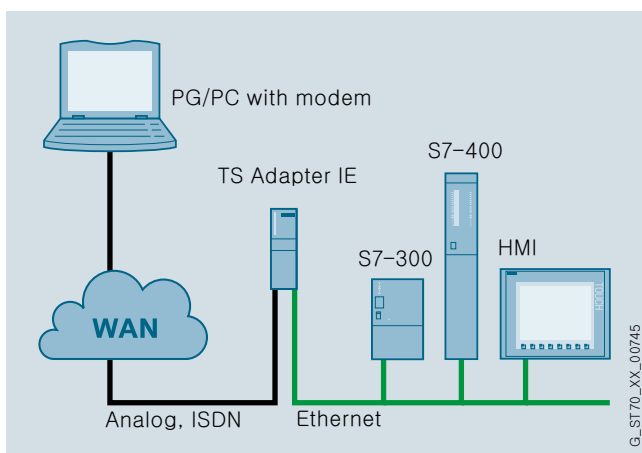


Teleservice with TS Adapter IE

- For performing remote maintenance:
  A programming device/PC with an engineering tool such as STEP 7, or the TIA Portal can access automation components (e.g. S7 CPUs) which are connected to the appropriate adapters over Industrial Ethernet or PROFIBUS.
- Comprising the TeleService software and various adapters:
  - TS Adapter II for connection to PPI, MPI or PROFIBUS DP
  - TS Adapter IE, TS Adapter IE Basic or TS Adapter IE Advanced for connection to Industrial Ethernet
- Additional functions with TS Adapter II:
  - Establishing a connection from/to remote plants, e.g. for calling up process data from an automation system (PG-to-AS remote coupling).
  - Exchanging data between plants (AS-to-AS remote coupling):
    Exchange of process data between two SIMATIC automation systems.
  - Sending a text message:
    Sending a text message from a SIMATIC automation system via a GSM wireless modem.

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# Software for SIMATIC Controllers
STEP 7 V5.x
Options for diagnostics and service

## TeleService

■ **Overview** (continued)

- Additional functions with TS Adapter IE:
  - Remote operation of HMI devices:
    Access to the HMI device via an Internet browser installed on the adapter
  - Sending emails:
    Establishing a modem link to a dial-up server (e.g. to an Internet service provider): A SIMATIC CPU can send emails over an email server that can be accessed in this manner.
  - Standard routing:
    A modem link can be established to an Internet service provider for accessing data on the Internet.

- Additional functions with TS Adapter IE Advanced:
  - Remote connection via the Internet

■ **Technical specifications**

| TS Adapter II | |
|---|---|
| Dimensions (W x H x D) in mm | 125 x 110 x 40 |
| Weight, approx. | 250 g |
| Interfaces<br>• to S7/C7<br>• to the PC<br>• to an external modem<br>• to the analog telephone network<br>• to the ISDN telephone network | RS 485 (up to 12 Mbit/s)<br>USB 1.1 (12 Mbit/s)<br>RS 232 (up to 115 kbaud)<br>RJ12<br>RJ45 |
| Supply voltage, external or via MPI interface | 24 V DC |
| Current consumption | 60 mA (typ.) / 120 mA (max.) |
| Switch-on current, max. | 0.7 A; 8 µs |
| Degree of protection | IP20 |
| Temperature<br>• Operation<br>• Storage/transport | ± 0 °C to +60 °C<br>-40 °C to +70 °C |

| TS Adapter IE | |
|---|---|
| Dimensions (W x H x D) in mm | 125 x 110 x 40 |
| Weight, approx. | approx. 370 g |
| Interfaces<br>• Ethernet<br>• to an external modem<br>• to the analog telephone network<br>• to the ISDN telephone network | RJ45 (10/100 Mbit/s)<br>RS 232 (up to 115 kbaud)<br>RJ12<br>RJ45 |
| Supply voltage, external or via MPI interface | 24 V DC |
| Current consumption of the TSA-IE ISDN | typ. 170 mA / max. 230 mA |
| Current consumption of the modem TSA IE | typ. 180 mA (typ.) / max. 240 mA |
| Switch-on current, max. | 0.7 A; 8 µs |
| Degree of protection | IP20 |
| Temperature<br>• Operation<br>• Storage/transport | ± 0 °C to +60 °C<br>-40 °C to +70 °C |

| TS Adapter IE Basic (basic unit) | |
|---|---|
| Dimensions (W x H x D) in mm | 30 x 100 x 75 |
| Weight, approx. | 100 g |
| Interfaces<br>• Ethernet<br>• To the TS module | RJ45 (10/100 Mbit/s)<br>Proprietary (can only be used for TS modules) |
| Supply voltage, external | 24 V DC |
| Current consumption<br>• With TS module modem<br>• with TS module ISDN<br>• with TS module RS232<br>• with TS module GSM | typ. 50 mA, max. 80 mA<br>typ. 50 mA, max. 80 mA<br>typ. 40 mA, max. 60 mA<br>typ. 100 mA, max. 180 mA |
| Switch-on current, max. | 240 mA |
| Degree of protection | IP20 |
| Temperature<br>• Operation<br><br><br><br>• Storage | ±0 °C to +60 °C<br>(horizontal installation)<br>±0 °C to +40 °C<br>(vertical installation)<br>-40 °C to +70 °C |

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## ◼ **Technical specifications** (continued)

| TS module modem | |
|---|---|
| Dimensions (W x H x D) in mm, approximately | 30 x 100 x 75 |
| Weight, approx. | 98 g |
| ITU transmission standards | • V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, V.34x, K56flex, V.90, V.92 |
| Other features | • Error correction and data compression<br>• a/b interface<br>• Hayes (AT) command set<br>• All data formats<br>• Dial procedures: dual-tone multiple-frequency (DTMF), pulse dialing |

| TS module ISDN | |
|---|---|
| Dimensions (W x H x D) in mm | 30 x 100 x 75 |
| Weight, approx. | 92 g |
| Reports<br>• D channel protocols<br>• B channel protocols | DSS1 (Euro-ISDN), 1TR6<br>V.110 (9600 bit/s, 19200 bit/s, 38400 bit/s)<br>V.120 (64 Kbit/s)<br>X.75 (64 Kbit/s) |
| Other features | • Multiple subscriber number (MSN)<br>• AT command interpreter |

| TS module RS232 | |
|---|---|
| Dimensions (W x H x D) in mm | 30 x 100 x 75 |
| Weight, approx. | 100 g |
| Operating mode | Full duplex, asynchronous |
| Signals | TXD, RXD, DSR, CTS, RTS, DTR, DCD |
| Data transmission rate | 2 400 ... 115 200 bit/s |
| Message frame | 8 data bits (LSB first), no parity bit, 1 stop bit |
| Rule | according to RS232 standard |
| Connector | D-sub 9-pin, male (PC COMx) |

| TS module GSM | |
|---|---|
| Dimensions (W x H x D) in mm | 30 x 100 x 75 |
| Weight, approx. | 118 g |
| Transmission rate<br>• GPRS Multislot Class 10<br>  - Up to 2 uplinks<br>  - Up to 4 downlinks | <br><br>13.4 Kbit/s … 27 Kbit/s upload gross<br>40 Kbit/s … 54 Kbit/s download gross |
| Interfaces<br>• SIM interface<br>• Antenna connection | <br>3 V/1.8 V<br>1 x SMA antenna socket (50 Ohm) |
| Frequency ranges | Quad band:<br>850, 900, 1800, 1900 MHz |
| Transmitted output power | 2 W at 850 MHz, 900 MHz<br>1 W at 1800 MHz, 1900 MHz |

| TS Adapter IE Advanced | |
|---|---|
| **General information** | |
| Engineering with | |
| STEP 7 TIA Portal can be configured/ integrated as of version | V12 SP1 |
| Installation | |
| Rail mounting possible | Yes |
| Wall/direct mounting possible | Yes |
| Supply voltage | |
| 24 V DC | Yes |
| Permissible range | +19.2 V ... +28.8 V |
| Input current | |
| Current consumption, typ. | 100 mA |
| Current consumption, max. | 200 mA; incl. TS module GSM |
| Switch-on current, max. | 4.3 A |
| Activation time, max. | 3.1 ms |
| Power loss | |
| Power loss, typ. | 2.4 W |
| **Interfaces** | |
| Industrial Ethernet | |
| Industrial Ethernet interface | 3x Ethernet (RJ45), 100 Mbit |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics display LED | RUN LED, ERROR LED, MAINT LED, LINK LED, ONLINE LED, VPN LED, RX/TX LED |
| **Insulation** | |
| Insulation tested at | 707 V DC (type test) |
| **Dimensions** | |
| W x H x D | 55 x 117 x 75 mm |
| **Weight** | |
| Weight, approx. | 225 g |

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# Software for SIMATIC Controllers
## STEP 7 V5.x
### Options for diagnostics and service

## TeleService

### ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **TeleService, Version 6.1** | | **TS Adapter IE Basic** | **6ES7972-0EB00-0XA0** |
| Task: | | Basic unit | |
| Remote maintenance by means of wired or radio network | | **TS module modem** | **6ES7972-0MM00-0XA0** |
| Target system: | | **TS module ISDN** | **6ES7972-0MD00-0XA0** |
| SIMATIC S7-200, SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 | | **TS module RS232** | **6ES7972-0MS00-0XA0** |
| Requirement: | | **TS module GSM** | **6GK7972-0MG00-0XA0** |
| TS Adapter (STEP 7 not required) | | **TS Adapter IE Advanced** | **6ES7972-0EA00-0XA0** |
| Delivery package: on CD, German, English, French, Spanish, Italian; with electronic documentation | | for accessing automation components via the Internet (GSM, DLS, WAN) | |
| Floating license | **6ES7842-0CE00-0YE0** | **S7 DIN rail adapter** | **6ES7972-0SE00-7AA0** |
| Floating license Upgrade (from each previous version) | **6ES7842-0CE00-0YE4** | For mounting the TS Adapter IE Basic on S7-300 DIN rail, width 60 mm | |
| Software Update Service (requires current software version)[1] | **6ES7842-0CA01-0YX2** | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| **TS Adapter II modem** | **6ES7972-0CB35-0XA0** | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| With MPI connection and RS 232; 9-pin, male | | | |
| **TS Adapter II ISDN** | **6ES7972-0CC35-0XA0** | | |
| With MPI connection and RS 232; 9-pin, male | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| | | Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the Software Update Service, see page 11/2.

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■ **Overview**



PG/PC

Reading, writing
and processing
data

PRODAVE MPI

G_ST70_XX_00130

- The toolbox for exchange of process data between SIMATIC S7, SIMATIC C7 and a PG/PC
- For autonomous handling of data traffic over MPI/PPI, PROFIBUS and Industrial Ethernet

■ **Technical specifications**

| Parameterization software | PRODAVE |
|---|---|
| Type of license | Simple license, copy license |
| Software class | A |
| Current version | V6.2 |
| Target system | SIMATIC S7-200<br>SIMATIC S7-300<br>SIMATIC S7-400<br>SIMATIC C7 |
| Operating system | Windows XP Professional,<br>Windows 7 Professional and Ultimate<br>(32 and 64-bit in each case) |
| Required software packages | - |
| Main memory configuration in target system | 8 MB on PG/PC |
| Disk space required in PG/PC | 2 MB |
| **Standard FBs** | |
| Required libraries | - |

■ **Ordering data**        **Article No.**

| | |
|---|---|
| **PRODAVE MPI/IE V6.2 for Windows XP Professional, Windows 7 Professional and Ultimate (32 and 64-bit in each case)** | |
| Task:<br>Data link between PG/PC and SIMATIC S7/C7 via MPI (S7-200 via PPI) or Industrial Ethernet<br>Requirements:<br>Windows XP Professional, Windows 7 Professional and Ultimate (32 and 64-bit in each case); CP 5611, integrated MPI or PC adapter<br>Delivery package:<br>CD incl. electr. documentation (German, English) | |
| Single license | **6ES7807-4BA03-0YA0** |
| Copy license, without software and documentation | **6ES7807-4BA03-0YA1** |
| **PRODAVE MPI Mini V6.0 for Windows 95/98/ME/NT 4.0/ 2000 Prof./XP Prof.** | |
| Task:<br>Data link between PG/PC and SIMATIC S7/C7 over MPI (S7-200 over PPI); with reduced functional scope<br>Requirement:<br>Windows 95/98/ME/NT 4.0/ 2000 Prof./XP Prof.;<br>CP 5611, integrated MPI or PC adapter<br>Delivery package:<br>CD incl. electr. documentation (German, English) | |
| Single license | **6ES7807-3BA01-0YA0** |
| Copy license, without software and documentation | **6ES7807-3BA01-0YA1** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

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# Software for SIMATIC Controllers
## STEP 7 V5.x
## Options for technology and drive systems

**Loadable function blocks   > Standard PID Control**

### ◾ Overview
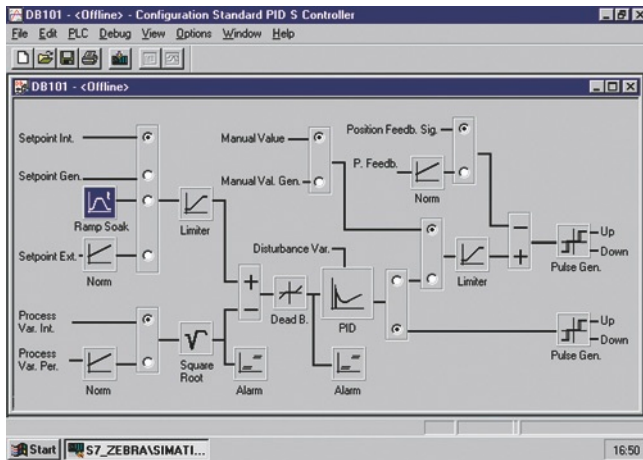


- For integrating continuous PID controllers, pulse controllers and step controllers in the application program
- Reduces engineering costs thanks to time-saving parameterization and optimization of the controller
- For use in SIMATIC S7-300 (CPU 313 or higher), S7-400 and WinAC

### ◾ Technical specifications

| Parameterization software | Standard PID Control | | | | |
|---|---|---|---|---|---|
| Type of license | Single license | | | | |
| Software class | A | | | | |
| Current version | V 5.2 | | | | |
| Target system | SIMATIC S7-300 (CPU 313 or higher)<br>SIMATIC S7-400<br>SIMATIC C7 | | | | |
| Required software packages | STEP 7 V5.3 SP2 or higher | | | | |
| Main memory configuration in PG/PC | 16 MB | | | | |
| Disk space required in PG/PC | 1.85 MB | | | | |
| **Standard function blocks** | **PID_CP (FB 1)** | | **PID_ES (FB 2)** | | **LP_SCHED (FC 1)** | |
| Storage space requirements<br>• FB length in the memory<br>• DB length in the memory | Load memory<br>8956 bytes<br>1168 bytes | Work memory<br>7796 bytes<br>510 bytes | Load memory<br>9104 bytes<br>1124 bytes | Work memory<br>7982 bytes<br>484 bytes | Load memory<br>1064 bytes<br>184 bytes[2] | Work memory<br>976 bytes<br>100 bytes[2] |
| Runtimes<br>• In S7-300[1]<br>• In S7-400[1] | 0.18 - 4.4 ms<br>0.13 - 0.35 ms | | 0.2 - 5.1 ms<br>0.16 - 0.35 ms | | 0.03 - 0.3 ms<br>0.03 - 0.08 ms | |
| Required libraries | Standard PID Control FBs | | | | | |
| Licensing forms | Simple license and 1 runtime license;<br>1 runtime license | | | | | |
| Software class | A | | | | | |
| Current version | V 5.2 | | | | | |
| Target system | SIMATIC S7-300 (CPU 313 or higher)<br>SIMATIC S7-400<br>SIMATIC C7 | | | | | |
| Required software packages | STEP 7 V5.3 SP2 or higher | | | | | |
| Main memory configuration in PG/PC | 16 MB | | | | | |
| Disk space required in PG/PC | 1.85 MB | | | | | |

[1] Depending on the CPU
[2] With 5 control loops

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## Ordering data

| Ordering data | Article No. | | Article No. |
|---|---|---|---|

**Standard PID Control parameterization tool, V5.2**

Task:
Parameter assignment tool for standard controllers
Requirement:
STEP 7, V5.3 SP2 or higher
Delivery package:
With electronic manual/Getting Started English, German; incl. authorization diskette

| | |
|---|---|
| Floating license | **6ES7830-2AA22-0YX0** |
| Upgrade license from V5.x to V5.2 | **6ES7830-2AA22-0YX4** |

**Standard function blocks for Standard PID Control, V5.2**

Task:
Standard FBs for standard controllers
Target system:
SIMATIC S7-300 (CPU 313 or higher), S7-400
Type of delivery:
With electronic manual/Getting Started English, German

| | |
|---|---|
| Single license | **6ES7860-2AA21-0YX0** |
| Single license without software and documentation | **6ES7860-2AA21-0YX1** |

**SIMATIC Manual Collection** — **6ES7998-8XC01-8YE0**

Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC

**SIMATIC Manual Collection update service for 1 year** — **6ES7998-8XC01-8YE2**

Current "Manual Collection" DVD and the three subsequent updates

# Software for SIMATIC Controllers
STEP 7 V5.x
Options for technology and drive systems

## ■ Overview
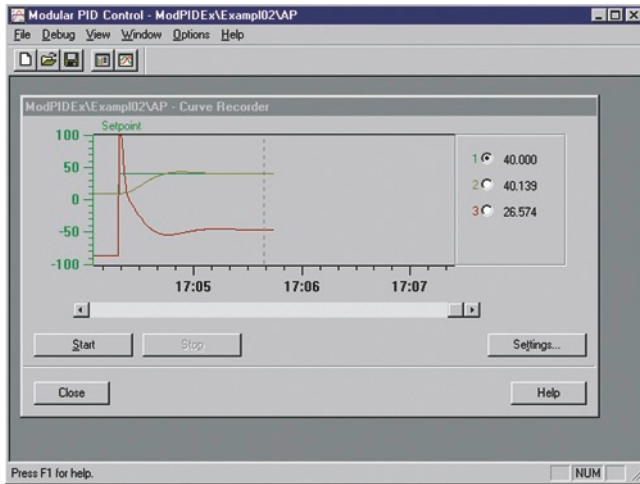


- For creating complex closed-loop control structures
- Preferred for implementation in closed-loop control equipment in mid-range and high-end applications and in process engineering
- For use in SIMATIC S7-300 (CPU 313 or higher), S7-400 and WinAC

## ■ Technical specifications

| Parameterization software | Modular PID Control |
|---|---|
| Type of license | Single license |
| Software class | A |
| Current version | V 5.1 |
| Target system | SIMATIC S7-300 (CPU 313 or higher) SIMATIC S7-400 SIMATIC C7 |
| Required software packages | STEP 7 V5.3 SP2 or higher |

| Parameterization software | Modular PID Control |
|---|---|
| Main memory configuration in PG/PC | 16 MB |
| Disk space required in PG/PC | 1.85 MB |
| Processor, at least | 486 |
| Windows swap area, approx. | 20 MB (max. possible) |

| Standard function blocks | A_DEAD_B | | CRP_IN | | CPR_OUT | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 898 bytes | 692 bytes | 182 bytes | 70 bytes | 206 bytes | 96 bytes |
| • DB length in the memory | 186 bytes | 44 bytes | 122 bytes | 20 bytes | 114 bytes | 14 bytes |
| Runtimes in S7-300 | 0.13 to 0.17 ms | | 0.06 ms | | 0.18 to 0.22 ms | |
| Runtimes in S7-400 | 0.01 to 0.03 ms | | 0.01 to 0.02 m | | 0.01 to 0.04 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | DEAD_T | | DEAD_BAND | | DIF | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 532 bytes | 394 bytes | 232 bytes | 120 bytes | 410 bytes | 268 bytes |
| • DB length in the memory | 142 bytes | 22 bytes | 114 bytes | 16 bytes | 158 bytes | 30 bytes |
| Runtimes in S7-300 | 0.26 to 0.33 ms | | 0.16 to 0.21 ms | | 0.55 to 0.71 ms | |
| Runtimes in S7-400 | 0.02 to 0.06 m | | 0.01 to 0.03 ms | | 0.03 to 0.09 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

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■ **Technical specifications** (continued)

| Standard function blocks | ERR_MON | | INTEG | | LAG1ST | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 558 bytes | 360 bytes | 488 bytes | 314 bytes | 534 bytes | 368 bytes |
| • DB length in the memory | 206 bytes | 52 bytes | 168 bytes | 36 bytes | 156 bytes | 30 bytes |
| Runtimes in S7-300 | 0.27 to 0.35 ms | | 0.40 to 0.51 ms | | 0.52 to 0.67 ms | |
| Runtimes in S7-400 | 0.01 to 0.05 ms | | 0.02 to 0.07 ms | | 0.03 to 0.09 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | LAG2ND | | LIMALARM | | LIMITER | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 690 bytes | 516 bytes | 390 bytes | 240 bytes | 262 bytes | 140 bytes |
| • DB length in the memory | 190 bytes | 46 bytes | 152 bytes | 28 bytes | 124 bytes | 20 bytes |
| Runtimes in S7-300 | 0.88 to 1.14 ms | | 0.47 to 0.61 ms | | 0.14 to 0.17 ms | |
| Runtimes in S7-400 | 0.04 to 0.16 ms | | 0.02 to 0.07 ms | | 0.03 to 0.01 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | LMNGEN_C | | LMNGEN_S | | NONLIN | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 1576 bytes | 1280 bytes | 2578 bytes | 2152 bytes | 826 bytes | 672 bytes |
| • DB length in the memory | 276 bytes | 80 bytes | 360 bytes | 110 bytes | 138 bytes | 18 bytes |
| Runtimes in S7-300 | 0.32 to 0.41 ms | | 1.16 to 1.47 ms | | 0.32 to 0.41 ms | |
| Runtimes in S7-400 | 0.02 to 0.06 ms | | 0.06 to 0.18 ms | | 0.02 to 0.07 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | NORM | | OVERRIDE | | PARA_CTL | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 234 bytes | 122 bytes | 362 bytes | 214 bytes | 406 bytes | 232 bytes |
| • DB length in the memory | 130 bytes | 24 bytes | 146 bytes | 28 bytes | 234 bytes | 82 bytes |
| Runtimes in S7-300 | 0.33 to 0.43 ms | | 0.15 to 0.18 ms | | 0.12 to 0.15 ms | |
| Runtimes in S7-400 | 0.02 to 0.07 ms | | 0.01 to 0.04 ms | | 0.01 to 0.03 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | PID | | PULSEGEN | | RMP_SOAK | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 1560 bytes | 1242 bytes | 1110 bytes | 872 bytes | 1706 bytes | 1500 bytes |
| • DB length in the memory | 340 bytes | 98 bytes | 190 bytes | 34 bytes | 212 bytes | 62 bytes |
| Runtimes in S7-300 | 1.15 to 1.46 ms | | 0.17 to 0.20 ms | | 0.16 to 0.20 ms | |
| Runtimes in S7-400 | 0.06 to 0.18 ms | | 0.01 to 0.05 ms | | 0.01 to 0.04 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

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**Software for SIMATIC Controllers**
STEP 7 V5.x
Options for technology and drive systems

## ◼ Technical specifications (continued)

| Standard function blocks | ROC_LIM | | SCALE | | SP_GEN | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 1242 bytes | 980 bytes | 136 bytes | 32 bytes | 658 bytes | 484 bytes |
| • DB length in the memory | 222 bytes | 50 bytes | 114 bytes | 16 bytes | 164 bytes | 40 bytes |
| Runtimes in S7-300 | 0.53 to 0.68 ms | | 0.10 to 0.13 ms | | 0.27 to 0.35 ms | |
| Runtimes in S7-400 | 0.02 to 0.09 ms | | 0.01 to 0.02 ms | | 0.02 to 0.06 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

| Standard function blocks | SPLT_RAN | | SWITCH | | LP_SCHED | |
|---|---|---|---|---|---|---|
| Storage space requirements | Load memory | Work memory | Load memory | Work memory | Load memory | Work memory |
| • FB length in the memory | 304 bytes | 180 bytes | 238 bytes | 116 bytes | 1104 bytes | 972 bytes[1] |
| • DB length in the memory | 138 bytes | 28 bytes | 118 bytes | 18 bytes | 234 bytes | 64 bytes[1] |
| Runtimes in S7-300 | 0.09 to 0.11 ms | | 0.07 to 0.09 ms | | 0.28 to 0.34 ms | |
| Runtimes in S7-400 | 0.01 to 0.02 ms | | 0.01 to 0.03 ms | | 0.03 to 0.08 ms | |
| Target system | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | | SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC | |

[1] With 5 control loops

| Standard FBs in general | |
|---|---|
| Required libraries | Modular PID Control FBs |
| Licensing forms | Simple license and 1 runtime license; 1 runtime license |
| Software class | A |
| Current version | V 5.1 |
| Required software packages | STEP 7 V5.3 SP2 or higher |
| Main memory configuration in PG/PC | 16 MB |
| Disk space required in PG/PC | 1.85 MB |

## ◼ Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **Modular PID Control commissioning tool, V5.1 for SIMATIC S7 and WinAC** | | | **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Task: Start-up tool for modular PID controllers Requirement: STEP 7, V5.3 SP2 or higher Delivery package: With electronic manual, English, German; incl. authorization diskette | | | Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| Floating license | **6ES7830-1AA11-0YX0** | | | |
| Upgrade license from V5.0 to V5.1 | **6ES7830-1AA11-0YX4** | | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| **Standard function blocks for Modular PID Control, V5.1** | | | Current "Manual Collection" DVD and the three subsequent updates | |
| Task: Standard FBs for modular PID controllers Target system: SIMATIC S7-300 (CPU 313 or higher), S7-400, WinAC Type of delivery: English, German; with electronic manual | | | | |
| Single license | **6ES7860-1AA10-0YX0** | | | |
| Single license, without software and documentation | **6ES7860-1AA10-0YX1** | | | |

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## Overview

- PID Self-Tuner: For expanding existing PID controllers to create self-tuning PI or PID controllers.
- Optimization of PI or PID controllers with 3-step action (HEATING – OFF – COOLING)
- Convenient online initial setting and online adaptation during operation
- Ideally applicable to temperature controllers, but also suitable for level and flow controllers
- Can be used with SIMATIC S7-300 (CPU 313 or higher), SIMATIC S7-400 and WinAC; in combination with PID control (integrated in STEP 7), Standard PID Control, Modular PID Control, FM 355, FM 455 as well as with any PID algorithm

## Technical specifications

| Parameterization software | PID Self-Tuner | | | |
|---|---|---|---|---|
| Type of license | - | | | |
| Software class | - | | | |
| Current version | - | | | |
| Target system | - | | | |
| Operating system | - | | | |
| Required software packages | - | | | |
| Main memory configuration in PG/PC | - | | | |
| Disk space required in PG/PC | - | | | |
| **Standard FBs** | **-** | | | |
| **PID Self-Tuner** | **TUN_EC** | | **TUN_ES** | |
| Storage space requirements<br>• FB length in the memory<br>• DB length in the memory | Load memory<br>approx. 6542 bytes<br>644 bytes | Work memory<br>approx. 5956 bytes<br>294 bytes | Load memory<br>6332 bytes<br>638 bytes | Work memory<br>5714 bytes<br>288 bytes |
| Runtimes<br>• In S7-300<br>• In S7-400 | 1.0 ms to 1.5 ms [1]<br>0.06 ms to 0.19 ms [1] | | 1.0 ms to 1.5 ms [1]<br>0.06 ms to 0.19 ms [1] | |
| Required libraries | PID Self-Tuner FBs V5.0 | | | |
| Licensing forms | - | | | |
| Software class | A | | | |
| Current version | V5.0 | | | |
| Target system | SIMATIC S7-300 (CPU 313 or higher)<br>SIMATIC S7-400<br>SIMATIC C7-620 | | | |
| Required software packages | STEP 7 V3.2 or higher | | | |
| Main memory configuration in PG/PC | - | | | |
| Disk space required in PG/PC | - | | | |

[1] Depending on the CPU selected

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **PID Self Tuner V5.1**<br><br>Task:<br>Online tuning for PID controller<br>Target system:<br>SIMATIC S7-300 (CPU 313 or higher), S7-400, WinAC<br>Type of delivery:<br>Standard function blocks, electronic manual and Getting Started English/German | | **SIMATIC Manual Collection**<br><br>Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | **6ES7998-8XC01-8YE0** |
| Single license | **6ES7860-4AA01-0YX0** | **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Single license, without software and documentation | **6ES7860-4AA01-0YX1** | Current "Manual Collection" DVD and the three subsequent updates | |

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# Software for SIMATIC Controllers
## STEP 7 V5.x
## Options for technology and drive systems

### S7 Technology

#### Overview

- Option package for creating motion control tasks for CPU 31xT-2 DP and CPU 317TF-2 DP
- Optimal embedding in the automation world thanks to total integration in the STEP 7 tools
- Programming in the standard SIMATIC programming languages LAD, FBD and STL
- Additional Engineering Tools such as S7-SCL or S7-GRAPH can be used

#### Ordering data

| | Article No. |
|---|---|
| **S7 Technology V4.2** | |
| Task: Optional package for configuring and programming of technology tasks with SIMATIC S7 CPU 31xT-2 DP and SIMATIC S7 CPU 317TF-2 DP Requirement: STEP 7 V5.5 SP2 or higher Type of delivery: on DVD; incl. documentation for CPU 31xT-2 DP, CPU 317TF-2 DP (included on DVD) | |
| Floating license | **6ES7864-1CC42-0YA5** |
| Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery | **6ES7864-1CC42-0XH5** |
| Upgrade to V4.2 | **6ES7864-1CC42-0YE5** |
| Trial license | **6ES7864-1CC42-0YA7** |

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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## ■ Overview



- Low-priced package for simple, controlled positioning and simple geared synchronous motion
- For use with any standard variable-speed drive, such as frequency converter or servo drive
- For incremental and absolute encoders

## ■ Technical specifications

### *Supported hardware:*

Easy Motion Control is runnable on the following CPUs:
- S7-300.
- S7-400.
- WinAC.
- ET 200S.
- ET 200pro.

Supported modules for the measuring of actual values:
- CPU 314C (FW version 2.0 of the CPU or higher).
- ET 200S 1 Count 5V/500 kHz.
- ET 200S 1 Count 24V/100kHz.
- ET 200S 1SSI.
- SM 338.
- FM 350-1, FM 450-1.
- SIMODRIVE sensor with PROFIBUS DP.
- IM 174.
- Other modules for measuring actual values (using free driver).

Supported modules for setpoint output:
- ET 200S 2AO U.
- SM 332.
- SM 432.
- IM 174.
- Other modules for setpoint output (using free driver).

Supported drives using PROFIBUS DP:
- Micromaster 4.
- SINAMICS G120.
- SINAMICS S120.

## *Storage space requirements*

| Required work memory in byte | | |
|---|---|---|
| Block | Required work memory per block | Additional work memory required per instance |
| MC_Init | 1086 | - |
| MC_MoveAbsolute | 3924 | 112 |
| MC_MoveRelative | 2982 | 110 |
| MC_MoveJog | 3110 | 110 |
| MC_Home | 2886 | 104 |
| MC_StopMotion | 1114 | 70 |
| MC_Control | 1756 | 58 |
| MC_Simulation | 410 | 64 |
| MC_GearIn | 3476 | 128 |
| Input driver | 1416 ... 2654 | 76 ... 128 |
| Output driver | 384 ... 1242 | 52 ... 68 |
| Axis data block | - | 294 |

## ■ Ordering data

| | Article No. |
|---|---|
| **Easy Motion Control V2.1** | **6ES7864-0AC01-0YX0** |
| Requirement: STEP 7 V5.3 SP2 Type of delivery: Software und documentation in 2 languages (English, German) on CD and CoL for one runtime single license | |
| **Easy Motion Control Runtime License** | **6ES7864-0AF01-0YX0** |
| Type of delivery: CoL for one runtime single license (valid for Easy Motion Control V2.x and V11 or higher), without software or documentation | |

For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

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# Software for SIMATIC Controllers
STEP 7 V5.x
Options for technology and drive systems

## D7-SYS

### Overview



- Optional package for STEP 7 V5.5 for configuring closed-loop control and automation tasks with SIMATIC TDC, FM 458-1 DP and T400
- Extensive block library
- Generation of user libraries in ANSI C with D7-FB-GEN function block generator

### Ordering data

| | Article No. |
|---|---|
| **SIMATIC D7-SYS V8.1** | |
| Reference hardware: SIMATIC TDC, FM 458-1 DP, T400 Requirement: MS Windows 7 Professional/ Enterprise/Ultimate + SP1 (32/64-bit); MS Windows XP Professional SP3 (32-bit); MS Windows Server 2003 R2 SP2 (32-bit) / 2008 R2 SP1 (64-bit); STEP 7 V5.5 SP4 or higher Type of delivery: on DVD, German, English, with electronic documentation | |
| Floating license | **6ES7852-0CC04-0YA5** |
| Upgrade license V7.x and higher | **6ES7852-0CC04-0YE5** |
| Software Update Service[1] | **6ES7852-0CC01-0YL5** |
| **SIMATIC Manual Collection** | **6ES7998-8XC01-8YE0** |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | |
| **SIMATIC Manual Collection update service for 1 year** | **6ES7998-8XC01-8YE2** |
| Current "Manual Collection" DVD and the three subsequent updates | |

[1] For more information on the Software Update Service, see page 11/2.

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## Overview

| SIMATIC Programs | Configuration / Commissioning |
|---|---|
| Drive ES PCS 7 | Drive ES Basic |



Drive ES is the engineering system used to integrate the communication, configuration and data management functions of Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively.

Various software packages are available for selection:

- Drive ES Basic (phase-out product)
- Drive ES Basic Maintenance (available soon)
- Drive ES PCS 7

Drive ES (**D**rive **E**ngineering **S**oftware) fully integrates drives from Siemens into the world of Totally Integrated Automation.

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Drive ES PCS 7 V8.0 SPx** [*] | | **Drive ES PCS 7 APL V8.1 SPx** [*] | |
| Block library for PCS 7 for the integration of drives in Classic Style (as predecessor) | | Block library for PCS 7 for the integration of drives in APL Style (Advanced Process Library) | |
| Requirement: PCS 7 V8.0 and higher | | Requirement: PCS 7 V8.1 and higher | |
| Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | | Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | |
| • Single-user license incl. 1 runtime license | **6SW1700-8JD00-0AA0** | • Single-user license incl. 1 runtime license | **6SW1700-8JD01-1AA0** |
| • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** | • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** |
| • Update service for single-user license | **6SW1700-0JD00-0AB2** | • Update service for single-user license | **6SW1700-0JD01-0AB2** |
| • Upgrade from V6.x to V8.0 SPx [*] | **6SW1700-8JD00-0AA4** | • Upgrade of APL V8.x to V8.1 SPx [*] or Drive ES PCS 7 V6.x, V7.x, V8.x classic to Drive ES PCS 7 APL V8.1 SPx [*] | **6SW1700-8JD01-1AA4** |
| **Drive ES PCS 7 APL V8.0 SPx** [*] | | **Drive ES PCS 7 V8.2 SPx** [*] | |
| Block library for PCS 7 for the integration of drives in APL Style (Advanced Process Library) | | Block library for PCS 7 for the integration of drives in Classic Style (as predecessor) | |
| Requirement: PCS 7 V8.0 and higher | | Requirement: PCS 7 from V8.2 and higher | |
| Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | | Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | |
| • Single-user license incl. 1 runtime license | **6SW1700-8JD01-0AA0** | • Single-user license incl. 1 runtime license | **6SW1700-8JD00-2AA0** |
| • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** | • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** |
| • Update service for single-user license | **6SW1700-0JD01-0AB2** | • Update service for single-user license | **6SW1700-0JD00-0AB2** |
| • Upgrade of APL V8.0 to V8.0 SP1 or Drive ES PCS7 V6.x, V7.x, V8.x classic to Drive ES PCS7 APL V8.0 SPx [*] | **6SW1700-8JD01-0AA4** | • Upgrade from V6.x/V7.x/V8.x to V8.2 SPx [*] | **6SW1700-8JD00-2AA4** |
| **Drive ES PCS 7 V8.1 SPx** [*] | | **Drive ES PCS 7 V8.2 SPx** [*] | |
| Block library for PCS 7 for the integration of drives in Classic Style (as predecessor) | | Block library for PCS 7 for the integration of drives in APL Style (Advanced Process Library) | |
| Requirement: PCS 7 V8.1 and higher | | Requirement: PCS 7 from V8.2 and higher | |
| Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | | Type of delivery: CD-ROM Languages: Ger, Eng, Fr, It, Sp with electronic documentation | |
| • Single-user license incl. 1 runtime license | **6SW1700-8JD00-1AA0** | • Single-user license incl. 1 runtime license | **6SW1700-8JD01-2AA0** |
| • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** | • Runtime license (without data storage medium) | **6SW1700-5JD00-1AC0** |
| • Update service for single-user license | **6SW1700-0JD00-0AB2** | • Update service for single-user license | **6SW1700-0JD01-0AB2** |
| • Upgrade from V6.x/V7.x/V8.x to V8.1 SPx [*] | **6SW1700-8JD00-1AA4** | • Upgrade of APL V8.x to V8.2 SPx[*] or Drive ES PCS 7 V6.x, V7.x, V8.x classic to Drive ES PCS 7 APL V8.2 SPx [*] | **6SW1700-8JD01-2AA4** |

[*] Orders are automatically supplied with the latest Service Pack (SP).

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# Software for SIMATIC Controllers
STEP 7 V5.x
Additional software

## KNX/EIB2S7

### ■ Overview



- Software for SIMATIC S7 communication with components of a building automation unit
- For use of industry automation components in building automation
- Allows the integration of actuators/sensors on a KNX/EIB bus in automation solutions with SIMATIC S7
- For the use of information from building automation for the automation of a production plant

### ■ Ordering data

| | Article No. |
|---|---|
| **KNX/EIB2S7 program package** | **6AV6643-7AC10-0AA1** |
| Task:<br>Software for connecting KNX/EIB building technology components to SIMATIC S7;<br>package includes:<br>Editor, function blocks for SIMATIC S7, samples, documentation on C; license for editor on USB flash memory | |

**Software for SIMATIC Controllers**
Software for common tasks
For network planning/commissioning

**SINETPLAN network planning**

## Overview
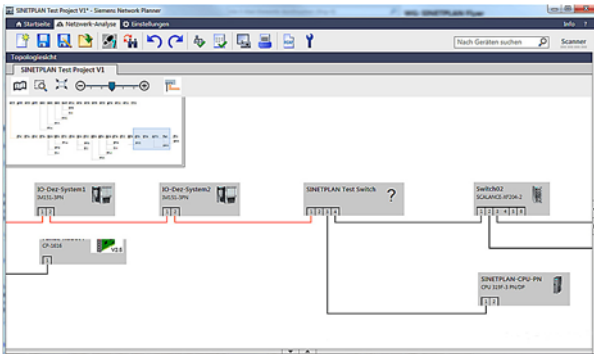


SINETPLAN topology view

The Siemens Network Planner SINEPLAN

- supports planners of automation systems based on PROFINET and
- facilitates the professional and proactive simulation of a plant / system network.

## Technical specifications

SINETPLAN V1.0 can be used on the following operating systems (32-bit and 64-bit each):

- Microsoft Windows 7 Professional SP1
- Microsoft Windows 7 Enterprise SP1
- Microsoft Windows 7 Ultimate SP1

## Ordering data

| | Article No. |
|---|---|
| **Siemens Network Planner SINETPLAN V1.0** | |
| Software for the simulation of PROFINET networks; bilingual de/en, executable under Windows 7 (32-bit / 64-bit) | |
| • Floating license; software and documentation on DVD, license key on USB flash drive | **6ES7853-0AA00-0YA5** |
| • Floating license; software download incl. license key[1] Email address required for the delivery | **6ES7853-0AE00-0YA5** |

[1] For up-to-date information and download availability, see:
https://support.industry.siemens.com/cs/ww/en/view/109739454

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# Software for SIMATIC Controllers
Software for common tasks
For maintenance

## SIMATIC PDM

### Overview
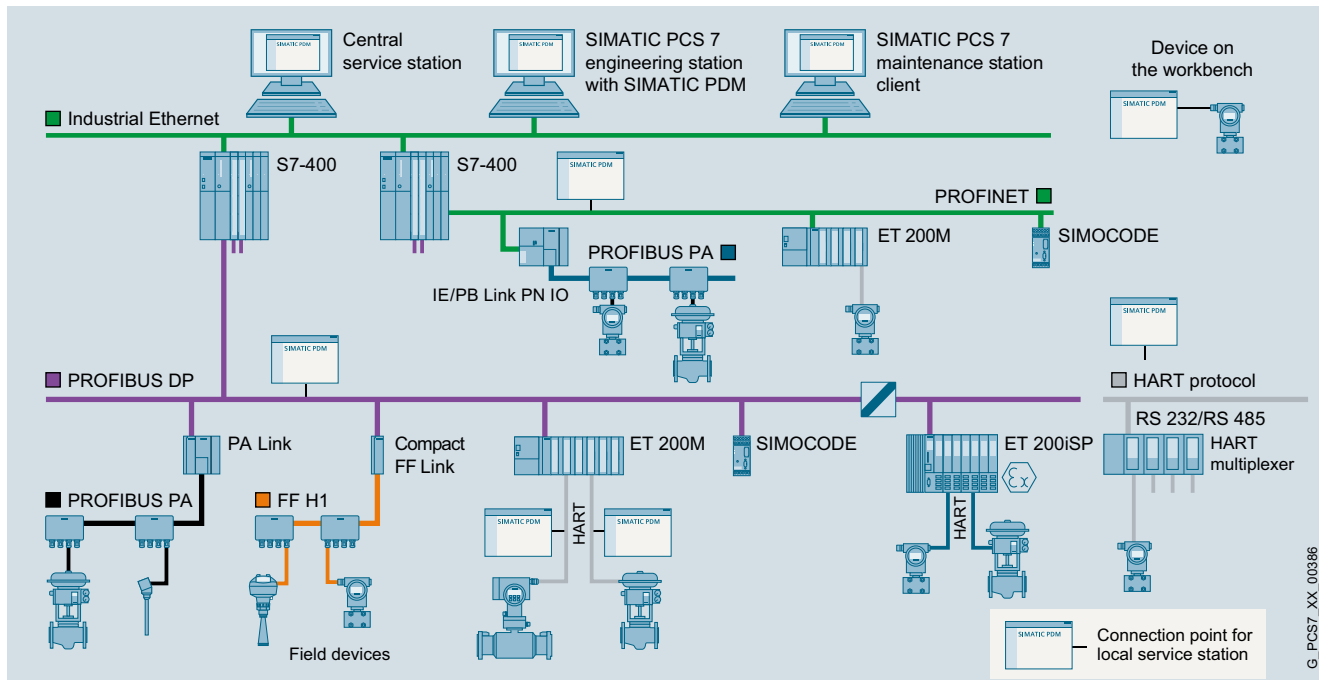


Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

With *one* software product, SIMATIC PDM enables users to work with over 3 500 devices and device variants of Siemens and over 200 other manufacturers worldwide on a *single* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open process device manager on the global market. Devices which previously were not supported can be integrated in SIMATIC PDM by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- Uniform presentation and operation of devices
- Uniform representation of diagnostics information
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs

Maintenance personnel can assign field device parameters using Microsoft Internet Explorer at mobile and stationary workstations with SIMATIC PDM. Practically every workstation integrated in the production plant can be used for configuration. Service personnel are thus able to work directly at the location of the field device, while data is stored centrally in the engineering station or maintenance station. This leads to a significant shortening of maintenance and travel times.

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated in it and transmits parameter data and diagnostic information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station.

A SIMATIC PDM user administration system based on SIMATIC Logon is used to assign various roles with defined function privileges to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices described per Electronic Device Description (EDD), SIMATIC PDM delivers a range of information for display and further processing on the maintenance station, e.g.:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (e.g. local configuration changes)
- Information on changes (audit trail report)
- Parameter information

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## Technical specifications

| SIMATIC PDM V9.0 | |
|---|---|
| Hardware | • PG/PC/notebook with processor corresponding to operating system requirements |
| Operating system (alternatives) | Can be used generally:<br>• Windows 7 Professional/Ultimate/ Enterprise SP1, 32-bit/64-bit<br>Only with integration in SIMATIC PCS 7:<br>• Windows Server 2008 R2 SP1 Standard Edition, 64-bit<br>• Windows Server 2012 R2 SP1 Standard Edition, 64-bit |

| SIMATIC PDM V9.0 | |
|---|---|
| Integration in STEP 7/PCS 7 | • SIMATIC PCS 7 V8.0+SP2 (without Communication FOUNDATION Fieldbus)<br>• SIMATIC PCS 7 V8.1/V8.2 (with/without ServicePack)<br>• STEP 7 V5.5+SP4 |
| SIMATIC PDM Client | • Internet Explorer 10 or 11 |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC PDM Stand alone product packages** | | **Basic configuration for individual product package as well as local service and parameter assignment stations** | |
| **Minimum configuration** | | | |
| **SIMATIC PDM Single Point V9.0** including 1 TAG; product package for operation and configuration of one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET | | **SIMATIC PDM Basic V9.0** including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET | |
| Additional functions or SIMATIC PDM TAGs are not possible | | | |
| 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user | | 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user | |
| • Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position | **6ES7658-3HA58-0YA5** | • Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position | **6ES7658-3AB58-0YA5** |
| • Online delivery (without SIMATIC PCS 7 Software Media Package) License Key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! | **6ES7658-3HA58-0YH5** | • Online delivery (without SIMATIC PCS 7 Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! | **6ES7658-3AB58-0YH5** |

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# Software for SIMATIC Controllers
## Software for common tasks
## For maintenance

### SIMATIC PDM

| Ordering data | Article No. | | Article No. |
|---|---|---|---|

**Configuration for local service and parameter assignment station**

**SIMATIC PDM Service V9.0**
Product package for service and measuring circuit tests on a local service station, with
• SIMATIC PDM Basic incl. 4 TAGs
• 50 TAGs

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user

• Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3JD58-0YA5**

• Online delivery (without SIMATIC PCS 7 Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! — **6ES7658-3JD58-0YH5**

**Configuration for central service and parameter assignment station**

**SIMATIC PDM Stand alone Server V9.0**
Product package for service and device management in plant units, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM Server
- 2 × SIMATIC PDM 1 Client
- 100 TAGs

6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation

• Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3TX58-0YA5**

• Online delivery (without SIMATIC PCS 7 Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! — **6ES7658-3TX58-0YH5**

**SIMATIC PDM system-integrated product packages**

**Configuration for local SIMATIC S7 engineering and service station**

**SIMATIC PDM S7 V9.0**
Product package for use in a SIMATIC S7 configuration environment, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 TAGs

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user

• Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3KD58-0YA5**

• Online delivery (without SIMATIC PCS 7 Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! — **6ES7658-3KD58-0YH5**

**Configuration for central SIMATIC PCS 7 engineering and service stations**

**SIMATIC PDM PCS 7 V9.0**
Product package for use in a SIMATIC PCS 7 configuration environment

6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 TAGs

• Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3LD58-0YA5**

• Online delivery (without SIMATIC PCS 7 Software Media Package) License Key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required! — **6ES7658-3LD58-0YH5**

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| ■ Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC PDM PCS 7-FF V9.0**<br>Product package for use in a SIMATIC PCS 7 configuration environment, including FOUNDATION Fieldbus H1 communication<br><br>6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit<br><br>Floating license for 1 user, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM integration in STEP 7/PCS 7<br>- SIMATIC PDM Routing<br>- SIMATIC PDM Communication FOUNDATION Fieldbus<br>- 100 TAGs<br>• Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position | 6ES7658-3MD58-0YA5 | **Optional product components for SIMATIC PDM** | |
| | | **SIMATIC PDM Extended V9.0**<br>For enabling additional system functions<br><br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user<br>• Goods delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive and certificate of license | 6ES7658-3NX58-2YB5 |
| | | • Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license<br><u>Note</u>: Email address required! | 6ES7658-3NX58-2YH5 |
| • Online delivery (without SIMATIC PCS 7 Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br><u>Note</u>: Email address required! | 6ES7658-3MD58-0YH5 | **SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V9.0**<br>For integration in a SIMATIC S7/ SIMATIC PCS 7 configuration environment<br><br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user<br>• Goods delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive and certificate of license | 6ES7658-3BX58-2YB5 |
| **SIMATIC PDM PCS 7 Server V9.0**<br>Product package for use in a SIMATIC PCS 7 configuration environment, including server functionality<br><br>6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit<br><br>Single license for 1 installation, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM integration in STEP 7/PCS 7<br>- SIMATIC PDM Routing<br>- SIMATIC PDM Server<br>- 100 TAGs | | • Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license<br><u>Note</u>: Email address required! | 6ES7658-3BX58-2YH5 |
| | | **SIMATIC PDM Routing V9.0**<br>For plant-wide navigation to field devices<br><br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user | |
| • Goods delivery (without SIMATIC PCS 7 Software Media Package) License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position | 6ES7658-3TD58-0YA5 | • Goods delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive and certificate of license | 6ES7658-3CX58-2YB5 |
| • Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br><u>Note</u>: Email address required! | 6ES7658-3TD58-0YH5 | • Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download, online certificate of license<br><u>Note</u>: Email address required! | 6ES7658-3CX58-2YH5 |

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## Software for SIMATIC Controllers
Software for common tasks
For maintenance

**SIMATIC PDM**

| Ordering data | Article No. | | Article No. |
|---|---|---|---|
| **SIMATIC PDM Server V9.0**<br>For activating the server functionality<br><br>6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation<br>• Goods delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive, certificate of license<br>• Online delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-3TX58-2YB5**<br><br><br><br>**6ES7658-3TX58-2YH5** | **SIMATIC PDM 1 Client**<br>Cumulative client license for SIMATIC PDM configurations with SIMATIC PDM Server, software class A, single license for 1 installation<br>• Goods delivery<br>License key on USB flash drive and certificate of license<br>• Online delivery<br>License key download and online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-3UA00-2YB5**<br><br><br>**6ES7658-3UA00-2YH5** |
| **SIMATIC PDM Communication FOUNDATION Fieldbus V9.0**<br>For communication with field devices on FOUNDATION Fieldbus H1<br><br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user<br>• Goods delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive and certificate of license<br>• Online delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-3QX58-2YB5**<br><br><br><br>**6ES7658-3QX58-2YH5** | **SIMATIC PDM TAGs**<br>TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user<br>• Goods delivery<br>License key on USB flash drive and certificate of license<br>  - 10 TAGs<br>  - 100 TAGs<br>  - 1 000 TAGs<br>• Online delivery<br>License key download and online certificate of license<br><u>Note</u>: Email address required!<br>  - 10 TAGs<br>  - 100 TAGs<br>  - 1 000 TAGs | <br><br><br><br>**6ES7658-3XC00-2YB5**<br>**6ES7658-3XD00-2YB5**<br>**6ES7658-3XE00-2YB5**<br><br><br><br>**6ES7658-3XC00-2YH5**<br>**6ES7658-3XD00-2YH5**<br>**6ES7658-3XE00-2YH5** |
| | | **SIMATIC PDM Software Media Package** | |
| **SIMATIC PDM HART Server V9.0**<br>For using HART multiplexers as well as for configuration of wireless HART field devices<br><br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user<br>• Goods delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key on USB flash drive and certificate of license<br>• Online delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-3EX58-2YB5**<br><br><br><br>**6ES7658-3EX58-2YH5** | **SIMATIC PDM Software Media Package V9.0**<br>Installation software without license, 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit<br><u>Note</u>:<br>Can only be used in conjunction with a valid license or in demo mode!<br>• Goods delivery<br>(without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software on DVD<br>• Online delivery<br>(without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software download<br><u>Note</u>: Email address required! | <br><br><br><br><br><br>**6ES7658-3GX58-0YT8**<br><br><br><br>**6ES7658-3GX58-0YG8** |

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## Overview
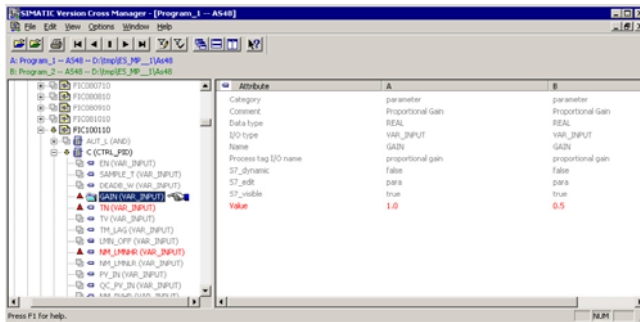


The SIMATIC Version Cross Manager is a user-friendly tool for determining the differences between various versions of individual projects or multi-projects by:

- Tracing missing, additional or differing objects by comparing hardware configuration, communication, plant hierarchy, CFC/SFC plans, SFC details, block types, messages, global tags, signals and run sequences
- Graphic display of comparison results in a combination of tree and tabular formats
- Clear hierarchical structuring according to the technological hierarchy of the plant
- Color-coded identification of the differences

## Ordering data

| | Article No. |
|---|---|
| **SIMATIC Version Cross Manager V8.2**<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Professional/Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user | |
| No SIMATIC PCS 7 Software Media Package | |
| • Physical delivery<br>License key on USB flash drive and certificate of license and TIA Engineering Toolset CD | **6ES7658-1CX28-2YA5** |
| • Online delivery<br>License key download and online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-1CX28-2YH5** |
| **Upgrade package<br>(only for TIA applications)** | |
| **SIMATIC Version Cross Manager Upgrade from V7.1 to V8.2**<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Professional/Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user | |
| No SIMATIC PCS 7 Software Media Package | |
| • Physical delivery<br>License key on USB flash drive, certificate of license and TIA Engineering Toolset CD | **6ES7658-1CX28-2YE5** |
| • Online delivery<br>License key download, online certificate of license<br><u>Note</u>: Email address required! | **6ES7658-1CX28-2YK5** |

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# Software for SIMATIC Controllers
Software for common tasks
For administration

## Version Trail

### ■ Overview
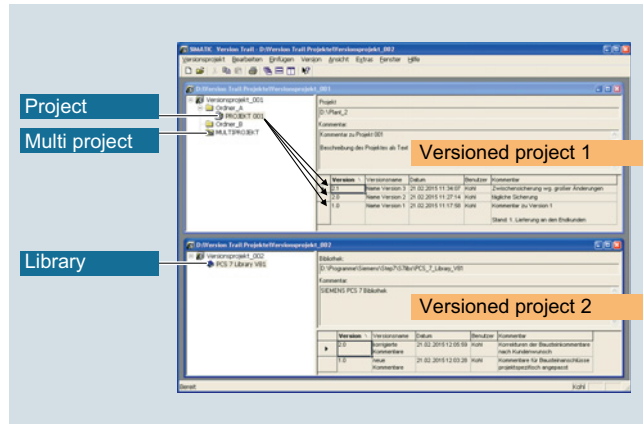


SIMATIC Version Trail is a software option for engineering which, together with the SIMATIC Logon central user administration, can assign a version history to libraries, projects and multi-projects.

### ■ Ordering data

| | Article No. |
|---|---|
| **SIMATIC Version Trail V8.2**<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Professional/Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user | |
| No SIMATIC PCS 7 Software Media Package | |
| • Physical delivery<br>License key on USB flash drive, certificate of license and TIA Engineering Toolset CD | **6ES7658-1FX28-2YA5** |
| • Online delivery<br>License key download, online certificate of license<br>Note: Email address required! | **6ES7658-1FX28-2YH5** |
| **Upgrade package<br>(only for TIA applications)** | |
| **SIMATIC Version Trail Upgrade from V8.0/8.1 to V8.2**<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Professional/Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user | |
| No SIMATIC PCS 7 Software Media Package | |
| • Physical delivery<br>License key on USB flash drive, certificate of license | **6ES7658-1FX28-2YE5** |
| • Online delivery<br>License key download and online certificate of license<br>Note: Email address required! | **6ES7658-1FX28-2YK5** |

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# SIMATIC programming devices

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### Brochures

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# SIMATIC programming devices
Programming devices

## Field PG M5

### ■ Overview



- The mobile, industry-standard programming device for automation engineers with a powerful, sixth-generation Intel® Core™ i processor (Skylake) and high-speed RAM (DDR4 RAM)
- Elegant, robust enclosure made of light-weight stable injection-molded magnesium with rubber-protected corners and retractable carry-handle
- Can optimally be used both for engineering in the office and for the commissioning, service or maintenance of automation systems
- Industrial notebook with all commonly used interfaces for industrial applications
- Can be used immediately thanks to pre-installed SIMATIC engineering software

### ■ Technical specifications

| Article number | 6ES7717-.....-0... |
| --- | --- |
| | SIMATIC FIELD PG M5 |
| **General information** | |
| Design of the programming device | Notebook |
| **Display** | |
| Design of display | 15.6" full HD display in 16:9 format |
| **Resolution (pixels)** | |
| • Horizontal image resolution | 1 920 Pixel |
| • Vertical image resolution | 1 080 Pixel |
| **General features** | |
| • Non-reflecting | Yes |
| • Luminance | 300 cd/m² |
| **Backlighting** | |
| • Type of backlighting | LED |
| **Control elements** | |
| **Keyboard fonts** | |
| • Design | QWERTZ/QWERTY or AZERTY (French); 87 keys |
| **Touch operation** | |
| • Integrated touch pad | Yes; Clickpad |
| **Supply voltage** | |
| Design of the power supply | External wide-range power supply; 3-pole |
| permissible range, lower limit (AC) | 100 V; +/- 10%, sinusoidal |
| permissible range, upper limit (AC) | 240 V; +/- 10%, sinusoidal |
| **Line frequency** | |
| • permissible range, lower limit | 47 Hz |
| • permissible range, upper limit | 63 Hz |
| **Processor** | |
| Processor type | Intel Core i5-6440EQ (2.7 GHz to 3.4 GHz, 4 cores, 6 MB Smart Cache) or i7-6820EQ (2.8 GHz to 3.5 GHz, 4 cores, 8 MB Smart Cache) |
| Chipset | Mobile Intel QM170 |
| Hyper-threading | Yes; for Intel Core i7 processor |
| Turbo Boost Technology 2.0 | Yes |

| Article number | 6ES7717-.....-0... |
| --- | --- |
| | SIMATIC FIELD PG M5 |
| **Graphic** | |
| Graphics controller | Intel® HD graphics 530 |
| **Drives** | |
| DVD-RW | Yes |
| Hard disk | Yes; Easy to replace |
| • Memory capacity | 1 Tbyte; HDD |
| SSD | Yes; Easy to replace |
| • Memory capacity | 512 Gbyte; up to 1 TB SSD |
| TPM Security Chip | Yes; 2.0 (version for China without TPM) |
| **Memory** | |
| Type of memory | DDR4-SDRAM SO-DIMM |
| **Work memory** | |
| • Number of slots | 2; Can be equipped with 1x 8 GB, 1x 16 GB or 2x 16 GB |
| **Accumulator** | |
| Replaceable | Yes; Lithium-ion battery |
| Capacity | 8.8 A·h |
| **Hardware configuration** | |
| **Slots** | |
| • Number of ExpressCard slots | 1; Type 34 |
| **Interfaces** | |
| PROFIBUS/MPI | 1x PROFIBUS DP / MPI; 9-pin Sub-D socket; 9.6 kBaud to 12 MBaud |
| Number of USB interfaces | 4; USB 3.0 |
| • Type A | 3; 1x USB port incl. integrated charging function for USB devices (e.g. smartphone) – also with device switched off |
| • Type C | 1 |
| Number of RS 232 interfaces | 1; 25-pin socket |
| Number of chip-card readers | 1; Smart Card Reader (ISO/IEC 7816) |
| Bluetooth radio standard | Yes; V4.0 |
| Multimedia card/SD card slot | 2 in 1 (SDHC UHS-II, MMC) |
| Card reader for SIMATIC memory cards | SIMATIC memory cards (for S7-300/400), SMC (for S7-1x00), SIMATIC micro memory card (for S7-300/C7/ET 200) - including programming interfaces |
| Universal Audio Jack | Yes; Audio socket for 3.5 mm jack |

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■ **Technical specifications** (continued)

| Article number | 6ES7717-.....-0... |
|---|---|
| | SIMATIC FIELD PG M5 |
| **Video interfaces** | |
| • analog video signal (VGA) | Yes; via adapter from DVI to VGA |
| • DVI-I | Yes; 1x |
| • DisplayPort | Yes; 1x |
| **Industrial Ethernet** | |
| • Industrial Ethernet interface | 2 x Ethernet (RJ45) |
| - 100 Mbps | Yes |
| - 1000 Mbps | Yes; Gigabit Ethernet; 2x RJ45 with 2 independent MAC/IP addresses |
| • Wake on LAN | Yes; Via Port 1 |
| • IAMT (Intel Active Management Technology) | Yes |
| **WLAN** | |
| • Type | 802.11ac |
| **Integrated Functions** | |
| **Monitoring functions** | |
| • Status LEDs | Battery status, device status, access to HDD/DVD, access to SD/MMC, MPI/DP, S5 and S7 modules / Card Reader (except Smart Card Reader), Num Lock, Caps Lock, WLAN active |
| **EMC** | |
| **Interference immunity against discharge of static electricity** | |
| • Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 | Yes; ±4 kV contact discharge (to IEC 801-2/IEC 1000-4-2; ESD), ±8 kV air discharge (to IEC 801-2/IEC 1000-4-2; ESD) |
| **Interference immunity to cable-borne interference** | |
| • Interference immunity on supply cables | ±2 kV (according to IEC 61000-4-4, burst); ±1 kV (according to IEC 61000-4-5, surge pulse/line to line); ±2 kV (according to IEC 61000-4-5, surge pulse/line to ground) |
| • Interference immunity on signal cables | ±1 kV (according to IEC 61000-4-4, burst, length < 30 m); ±2 kV (according to IEC 61000-4-4, burst, length > 30 m); ±2 kV (according to IEC 61000-4-5, surge sym./line to ground, length > 30 m) |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| CSA approval | Yes |
| UL approval | Yes |
| DIN/ISO 9001 | Yes |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 5 °C; Max. 10 °C/h (no condensation) |
| • max. | 40 °C; Max. 10 °C/h (no condensation) |
| **Ambient temperature during storage/transportation** | |
| • min. | -20 °C; Max. 20 °C/h (no condensation) |
| • max. | 60 °C; Max. 20 °C/h (no condensation) |

| Article number | 6ES7717-.....-0... |
|---|---|
| | SIMATIC FIELD PG M5 |
| **Relative humidity** | |
| • Operation, min. | 5 %; At 30 °C/h (no condensation); Tested according to IEC 60068-2-78, IEC 60068-2-30, IEC 60068-2-14 |
| • Operation, max. | 85 %; At 30 °C/h (no condensation); Tested according to IEC 60068-2-78, IEC 60068-2-30, IEC 60068-2-14 |
| **Vibrations** | |
| • Operation, tested according to IEC 60068-2-6 | Yes |
| **Shock testing** | |
| • tested according to IEC 60068-2-27 | Yes |
| **Operating systems** | |
| Additional info on operating system | Multi-Language User Interface (MUI): 6 languages (English, German, French, Spanish, Italian, Chinese) |
| **pre-installed operating system** | |
| • Windows 7 | Yes; Ultimate 64 bit, SP1 |
| **Software** | |
| **Preinstalled** | |
| • STEP 7 Professional 2010 | Yes; Software version: SR4 |
| • STEP 7 Professional (TIA Portal) | Yes |
| • WinCC flexible Advanced 2008 | Yes; Software version: SP3 |
| • WinCC Advanced (TIA Portal) | Yes |
| **Mechanics/material** | |
| Material of housing | metal |
| Handle | Yes; retractable |
| Socket for Kensington lock | Yes |
| rubber corner guards | Yes |
| **Dimensions** | |
| Width | 385 mm |
| Height | 53 mm |
| Depth | 275 mm |
| **Weights** | |
| Weight, approx. | 3.4 kg; incl. rechargeable battery |
| **Scope of supply** | |
| Accumulator | Yes |
| Power supply | Yes |
| Backpack | Yes |
| SIMATIC Software | Yes |
| Recovery media | Yes; Restore & Recovery |
| **Other** | |
| free hotline | Yes |
| Warranty period | 24 mo; except for: rechargeable battery (6 months) |
| Note: | Made in Germany: development and production in Germany |

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# SIMATIC programming devices
## Programming devices

**Field PG M5**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**Field PG M5 Comfort programming device** — Article No. **6ES7717- 0 ■ ■ 0 ■ -0 A ■ 1**

Intel i5-6440EQ processor,
6 MB cache, 2.7 to 3.4 GHz,
15.6" display, full HD (1920x1080),
multistandard DVD+-R/+-RW drive,
Intel HD graphics, WLAN 802.11ac,
Bluetooth v4.0;
Windows 7 Ultimate SP1, 64-bit
(EN, DE, FR, ES, IT selectable);
without SIMATIC S5 interface,
without SIMATIC S5-EPROMMER

RAM
- 1 x 8 GB DDR4 SDRAM SO-DIMM — **A**
- 1 x 16 GB DDR4 SDRAM SO-DIMM — **B**
- 2 x 16 GB DDR4 SDRAM SO-DIMM — **C**

Hard disk
- 1 TB HDD SATA — **A**
- 512 GB SSD SATA — **B**
- 1 TB SSD SATA — **C**

Keyboard and power cable (essential)
- Keyboard: QWERTY (& German); power supply cable: Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland — **0**
- Keyboard: AZERTY (France); power supply cable: Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland — **1**
- Keyboard: QWERTY (& German); power supply cable: Italy — **2**
- Keyboard: QWERTY (& German); power supply cable: Switzerland — **3**
- Keyboard: QWERTY (& German); power supply cable: USA — **4**
- Keyboard: QWERTY (& German); power supply cable: United Kingdom — **5**
- Keyboard: QWERTY (& German); power supply cable: China; approvals for China (CCC) — **6**
- Keyboard: QWERTY (& German); without power supply cable — **7**

SIMATIC Software licenses
- Trial license: STEP 7 Prof. Combo (STEP 7 Prof. V14 and STEP 7 Prof. 2010), WinCC Adv. Combo (WinCC V14 and WinCC flexible 2008) — **A**
- License: STEP 7 Prof. V14, WinCC Adv. V14 — **B**
- License: STEP 7 Prof. Combo (STEP 7 Prof. V14 and STEP 7 Prof. 2010), WinCC Adv. Combo (WinCC V14 and WinCC flexible 2008) — **C**

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**Field PG M5 Advanced programming device** — Article No. **6ES7717- 1 ■ ■ ■ ■ -0 A ■ 1**

Intel i7-6820EQ processor,
8 MB cache, 2.8 to 3.5 GHz,
15.6" display, full HD (1920x1080),
multistandard DVD+-R/+-RW drive,
Intel HD graphics, WLAN 802.11ac,
Bluetooth v4.0;
Windows 7 Ultimate SP1, 64-bit
(EN, DE, FR, ES, IT selectable);
without SIMATIC S5 interface,
without SIMATIC S5-EPROMMER

RAM
- 1 x 8 GB DDR4 SDRAM SO-DIMM — **A**
- 1 x 16 GB DDR4 SDRAM SO-DIMM — **B**
- 2 x 16 GB DDR4 SDRAM SO-DIMM — **C**

Hard disk
- 1 TB HDD SATA — **A**
- 512 GB SSD SATA — **B**
- 1 TB SSD SATA — **C**

SIMATIC S5 interface
- Without S5 interface, without S5 EPROMMER — **0**
- With S5 interface, with S5 EPROMMER; incl. STEP 5 license, S5 PLC cable and EPROM adapter — **1**

Keyboard and power cable (essential)
- Keyboard: QWERTY (& German); power supply cable: Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland — **0**
- Keyboard: AZERTY (France); power supply cable: Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland — **1**
- Keyboard: QWERTY (& German); power supply cable: Italy — **2**
- Keyboard: QWERTY (& German); power supply cable: Switzerland — **3**
- Keyboard: QWERTY (& German); power supply cable: USA — **4**
- Keyboard: QWERTY (& German); power supply cable: United Kingdom — **5**
- Keyboard: QWERTY (& German); power supply cable: China; approvals for China (CCC) — **6**
- Keyboard: QWERTY (& German); without power supply cable — **7**

SIMATIC Software licenses
- Trial license: STEP 7 Prof. Combo (STEP 7 Prof. V14 and STEP 7 Prof. 2010), WinCC Adv. Combo (WinCC V14 and WinCC flexible 2008) — **A**
- License: STEP 7 Prof. V14, WinCC Adv. V14 — **B**
- License: STEP 7 Prof. Combo (STEP 7 Prof. V14 and STEP 7 Prof. 2010), WinCC Adv. Combo (WinCC V14 and WinCC flexible 2008) — **C**

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## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | **Adapter serial ATA to USB 3.0** | 6ES7790-1AA01-0AA0 |
| **Memory expansion** | | For using the removable hard disk in the hard disk kit as an external hard disk (only for Field PG M4/M5) | |
| 8 GB RAM | 6ES7648-2AK70-0PA0 | | |
| 16 GB RAM | 6ES7648-2AK80-0PA0 | **Backpack for Field PG M4/M5** | 6ES7798-0DA02-0XA0 |
| **AC/DC external power supply unit** | 6ES7798-0GA04-0XA0 | **SIMATIC IPC Image & Partition Creator V3.5** | 6ES7648-6AA03-5YA0 |
| For Field PG M5 only; spare part, included in the scope of supply of the Field PG M5 | | Software tool for very easy preventive data backup and efficient partition management on SIMATIC IPCs | |
| **Power cord (length 3 m)** | | **Software Update Service (Standard Edition)[2]** | |
| For Field PG M2/M4/M5 only | | The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.) | |
| For Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland | 6ES7900-5AA00-0XA0 | | |
| For Great Britain | 6ES7900-5BA00-0XA0 | • STEP 7 Professional V1x | 6ES7822-1AA00-0YL5 |
| For Switzerland | 6ES7900-5CA00-0XA0 | • STEP 7 Professional Combo (STEP 7 Prof. V1x (TIA Portal) and STEP 7 Prof.) | 6ES7810-5CC04-0YE2 |
| For the USA | 6ES7900-5DA00-0XA0 | | |
| For Italy | 6ES7900-5EA00-0XA0 | • SIMATIC WinCC Advanced | 6AV6613-0AA00-0AL0 |
| For China | 6ES7900-5FA00-0XA0 | | |
| **Spare battery (lithium ion, 8.8 Ah)[1]** | 6ES7798-0AA08-0XA0 | **Software Update Service (download)[2]** | |
| For Field PG M5 only; spare part, included in the scope of supply of the Field PG M5 | | The upgrades and service packs are available for downloading. Email address required for delivery | |
| **MPI cable** | 6ES7901-0BF00-0AA0 | • STEP 7 Professional V1x | 6ES7822-1AE00-0YY0 |
| For connecting a PG and SIMATIC S7 via MPI; 5 m | | • STEP 7 Professional Combo (STEP 7 Prof. V1x (TIA Portal) and STEP 7 Prof.) | 6ES7810-5CC04-0YY2 |
| **S5 EPROM programming adapter** | 6ES7798-0CA00-0XA0 | • SIMATIC WinCC Advanced | 6AV6613-0AA00-0AY0 |
| For SIMATIC S5 EPROM programming using the Field PG | | | |
| **S5 connection cable** | 6ES5734-2BF00 | | |
| For connecting programming devices to SIMATIC S5 PLCs, 5 m | | | |
| **Replaceable hard disk kit** | 6ES7791-2BA02-0AA0 | | |
| Replaceable hard disk 1 TB serial ATA; with protective pocket and torx screwdriver; for Field PG M4/M5 | | | |
| **Replaceable SSD kit** | | | |
| Replaceable SSD 512 GB serial ATA; with protective pocket and torx screwdriver; for Field PG M5 | 6ES7791-2BA22-0AA0 | | |
| Replaceable SSD 1 TB serial ATA; with protective pocket and torx screwdriver; for Field PG M5 | 6ES7791-2BA23-0AA0 | | |

[1] The capacity of the battery decreases for technological reasons with each charging/discharging cycle and also as the result of being stored at excessively high or low temperatures. The running time per charge decreases therefore over the course of time. With normal use, the battery can be charged and discharged over a period of six months from when the Field PG is purchased. Loss of capacity is not covered by the warranty. For the battery's operation we grant a warranty of six months. We recommend replacing the battery with an original Siemens battery at the end of these six months if there is a significant drop in performance.

[2] For more information on the Software Update Service, see page 11/2.

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# SIMATIC programming devices
Programming devices
Accessories

## External prommer

### ■ Overview
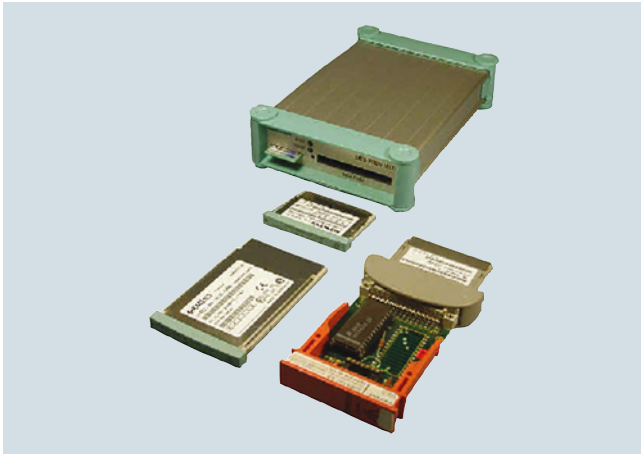


- External EPROM programming device
- For programming SIMATIC Memory Cards,
  SIMATIC Micro Memory Cards as well as SIMATIC EPROM
  and EEPROM modules
- For connection to the PC via the USB interface

### ■ Technical specifications

| Article number | 6ES7792-0AA00-0XA0 |
| --- | --- |
| | USB PROMMER, 115/220V |
| **General information** | |
| Design of the programming device | Desktop device |
| **Display** | |
| Design of display | without |
| **Supply voltage** | |
| Design of the power supply | 90 to 264 V; 47 to 63 Hz; wide range power supply unit |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 5 °C |
| • max. | 40 °C |
| **Ambient temperature during storage/transportation** | |
| • min. | -20 °C |
| • max. | 60 °C |
| **Dimensions** | |
| Width | 172 mm |
| Height | 40 mm |
| Depth | 121 mm |
| **Weights** | |
| Weight, approx. | 400 g |

### ■ Ordering data

| | Article No. |
| --- | --- |
| **EPROM programming device USB-Prommer** | **6ES7792-0AA00-0XA0** |
| For programming SIMATIC Memory Cards and EPROM modules | |

■ **Overview**



PC/IPC with
CP 5612/
CP 5622/CP 5711
and SOFTNET for
PROFIBUS

PROFIBUS ■

S7-1200 with
CM 1243-5

S7-1500 with
CM 1542-5

S7-300 with
CP 342-5

S7-400 with
CP 443-5 Extended

G_IK10_XX_50039
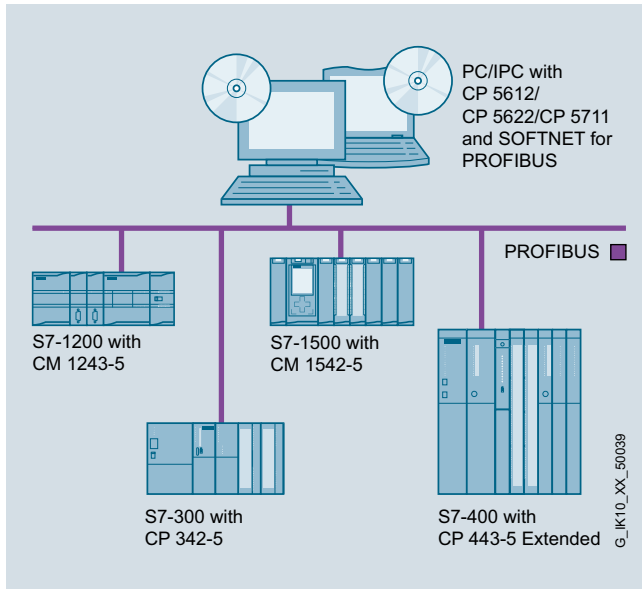
| DP-M | DP-S | FMS | OPC | PG/OP | S7/S5 |
|------|------|-----|-----|-------|-------|
| ● | ● | | ● | ● | ● |

G_IK10_XX_10186

- Software for connecting PCs/programming devices and
  notebooks to automation systems
- Communication services:
  - PROFIBUS DP master Class 1 and 2 with acyclic expansions
  - PROFIBUS DP slave
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE) based on the
    FDL interface
- The appropriate OPC servers and configuration tools
  are included in the scope of supply of the respective
  communications software

■ **Technical specifications**

| Performance data | CP 5612/CP 5622/CP 5711 |
|------------------|-------------------------|
| Mono protocol mode | |
| Number of connectable DP slaves | max. 60 |
| Number of FDL tasks waiting | max. 50 |
| Number of PG/OP and S7 connections | max. 8 |
| • DP master | DP-V0, DP-V1 with SOFTNET-PB DP |
| • DP slave | DP-V0, DP-V1 with SOFTNET-PB DP slave |

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# SIMATIC programming devices
Programming devices
Accessories

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SOFTNET-PB S7** | | **SOFTNET-PB DP slave** | |
| Software for S7 communication, incl. FDL protocol with OPC server and configuration tool, runtime software, software and electronic manual on DVD-ROM, license key on USB stick, Class A; for CP 5612 (Win 7 and higher), CP 5622 (Win 7 and higher), CP 5711 | | Software for DP slave, with OPC server and configuration tool, single license for one installation, runtime software, software and electronic manual on DVD-ROM, license key on USB stick, Class A; for CP 5612 (Win 7 and higher), CP 5622 (Win 7 and higher), CP 5711 | |
| **SOFTNET-PB S7 V14** | | **SOFTNET-PB DP slave V14** | |
| For 32/64-bit: Windows 7 SP1 Professional/Ultimate; For 64-bit: Windows 8.1 Pro; For 64-bit: Windows Server 2008 R2 SP1; For 64-bit: Windows Server 2012 R2; German/English | | For 32/64-bit: Windows 7 SP1 Professional/Ultimate; For 64-bit: Windows 8.1 Pro; For 64-bit: Windows Server 2008 R2 SP1; For 64-bit: Windows Server 2012 R2; German/English | |
| • Single license for one installation | 6GK1704-5CW14-0AA0 | • Single license for one installation | 6GK1704-5SW14-0AA0 |
| **Software Update Service** | 6GK1704-5CW00-3AL0 | **Software Update Service** | 6GK1704-5SW00-3AL0 |
| For 1 year, with automatic extension; requirement: current software version | | For 1 year, with automatic extension; requirement: current software version | |
| **Upgrade** | | **Upgrade** | |
| • From Edition 2006 to SOFTNET-S7 Edition 2008 or V14 | 6GK1704-5CW00-3AE0 | • From Edition 2006 to SOFTNET-DP slave Edition 2008 or V14 | 6GK1704-5SW00-3AE0 |
| • From V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7 Edition 2008 or V14 | 6GK1704-5CW00-3AE1 | • From V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP slave Edition 2008 or V14 | 6GK1704-5SW00-3AE1 |
| **SOFTNET-PB DP** | | | |
| Software for DP protocol (master Class 1 and 2), incl. FDL protocol with OPC server and configuration tool; runtime software, software and electronic manual on DVD-ROM, license key on USB stick; for CP 5612 (Win 7 and higher), CP 5622 (Win 7 and higher), CP 5711 | | | |
| **SOFTNET-PB DP V14** | | | |
| For 32/64-bit: Windows 7 SP1 Professional/Ultimate; For 64-bit: Windows 8.1 Pro; For 64-bit: Windows Server 2008 R2 SP1; For 64-bit: Windows Server 2012 R2; German/English | | | |
| • Single license for one installation | 6GK1704-5DW14-0AA0 | | |
| **Software Update Service** | 6GK1704-5DW00-3AL0 | | |
| For 1 year, with automatic extension; requirement: current software version | | | |
| **Upgrade** | | | |
| • From Edition 2006 to SOFTNET-DP Edition 2008 or V14 | 6GK1704-5DW00-3AE0 | | |
| • From V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Edition 2008 or V14 | 6GK1704-5DW00-3AE1 | | |

Note:

The Windows XP software version is still available for older CPs; see the Industry Mall:
http://www.siemens.com/industrymall.

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■ **Overview**
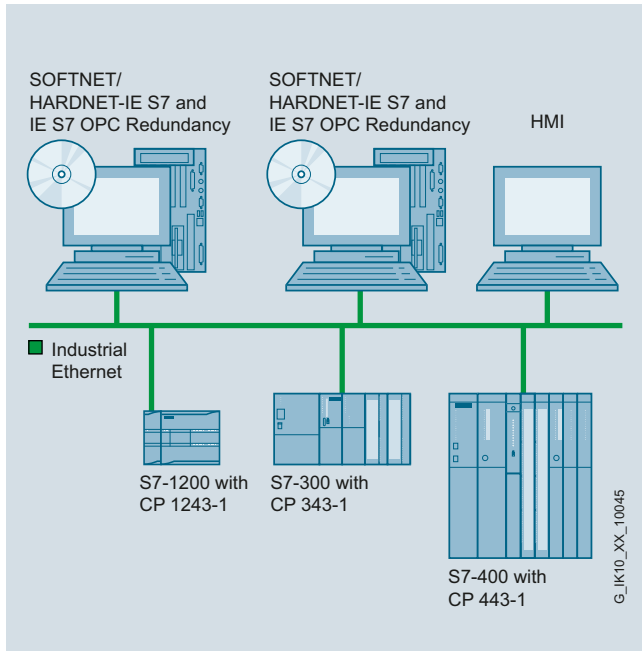


System configuration SOFTNET for Industrial Ethernet

| ISO | TCP/UDP | PN | MRP | OPC | PG/OP | S7/S5 | IT |
|-----|---------|----|-----|-----|-------|-------|----|
| ● | ● | | | ● | ● | ● | |

- Software for coupling programming devices/workstations to automation systems
- Communication services:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Can be used with
  - Layer 2 Ethernet card (PCI/PCIe), e.g. CP 1612 A2
  - Integrated Industrial Ethernet interface
  - Modem/ISDN (Remote Access Service RAS)
- Complete protocol stack as a software package
- Increased availability thanks to additional option packages such as OPC Server Redundancy

■ **Technical specifications**

| Performance data | |
|---|---|
| **S7 and PG/OP communication** (number of operable connections) | |
| • SOFTNET-IE S7 Extended | Max. 255 (S7-300 / S7-400) |
| | Max. 512 (S7-1200 / S7-1500) |
| • SOFTNET-IE S7 | Max. 64 |
| • SOFTNET-IE S7 Lean | Max. 8 |

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# SIMATIC programming devices
Programming devices
Accessories

**Communications software   > SOFTNET for Industrial Ethernet**

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|

**SOFTNET S7
for Industrial Ethernet**

Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC/STEP 7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A

**SOFTNET-IE S7 V14**

For 32/64-bit: Windows 7 SP1 Professional/Ultimate;
For 64-bit: Windows 8.1 Pro;
For 64-bit: Windows Server 2008 R2 SP1;
For 64-bit: Windows Server 2012 R2;
German/English

Up to 64 connections; single license for one installation
- On DVD — **6GK1704-1CW14-0AA0**
- Download [1] — **6GK1704-1CW14-0AK0**

**Software Update Service** — **6GK1704-1CW00-3AL0**

For 1 year with automatic extension; requirement: current software version

**Upgrade**
- From Edition 2006 to Edition 2008 or V14 — **6GK1704-1CW00-3AE0**
- From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V14 — **6GK1704-1CW00-3AE1**

**SOFTNET-IE S7 REDCONNECT VM V14**

Software for fail-safe S7 communication via redundant networks, incl. S7 OPC server, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A
For 32/64-bit: Windows 7 SP1 Professional/Ultimate;
For 64-bit: Windows 8.1 Pro;
For 64-bit:
Windows Server 2008 R2 SP1;
For 64-bit:
Windows Server 2012 R2;
German/English
- Single license for one installation — **6GK1704-0HB14-0AA0**

**SOFTNET-IE S7 Lean Edition V14**

For 32/64-bit: Windows 7 SP1 Professional/Ultimate;
For 64-bit: Windows 8.1 Pro;
For 64-bit: Windows Server 2008 R2 SP1;
For 64-bit: Windows Server 2012 R2;
Up to eight connections;
German/English;
single license for one installation
- On DVD — **6GK1704-1LW14-0AA0**
- Download [1] — **6GK1704-1LW14-0AK0**

**Software Update Service** — **6GK1704-1LW00-3AL0**

For 1 year with automatic extension; requirement: current software version

**Upgrade**
- From Edition 2006 to Edition 2008 or V14 — **6GK1704-1LW00-3AE0**
- From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V14 — **6GK1704-1LW00-3AE1**

**IE S7 OPC Redundancy**

Software for redundant OPC servers in the environment of Industrial Ethernet software, S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A

**IE S7 OPC Redundancy V14**

For 64-bit: Windows 2008 Server R2 SP1; German/English
- Single license for one installation — **6GK1706-1CW14-0AA0**

[1] For more details of online software delivery, visit: http://www.siemens.com/tia-online-software-delivery under Ordering Data.

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***Brochures***

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# Products for specific requirements
## Telecontrol systems for comprehensive applications

### Introduction

#### Overview

Telecontrol systems for controlling and monitoring widely distributed plants usually consist of a supervisory control system (telecontrol center) and one or more outstations connected over large distances for the automation of distributed plant sections.

SIPLUS RIC is a versatile telecontrol system that uses the internationally standardized telecontrol protocols:

• Serial transmission IEC 60870-5-101

• Ethernet (TCP/IP) IEC 60870-5-104

• Connection of protection devices IEC 60870-5-103

It provides secure communication with reduced data volume for reliable operation in the Wide Area Network (WAN) thanks to event-driven, time-stamped transmission and monitored output of commands.

#### Application

SIPLUS RIC offers maximum functionality and modularity to meet the requirements made upon the monitoring and control of spatially distributed systems, even under extreme environmental conditions.

It is therefore suitable for sectors such as oil, gas, water, wastewater, power generation/distribution, and transportation.



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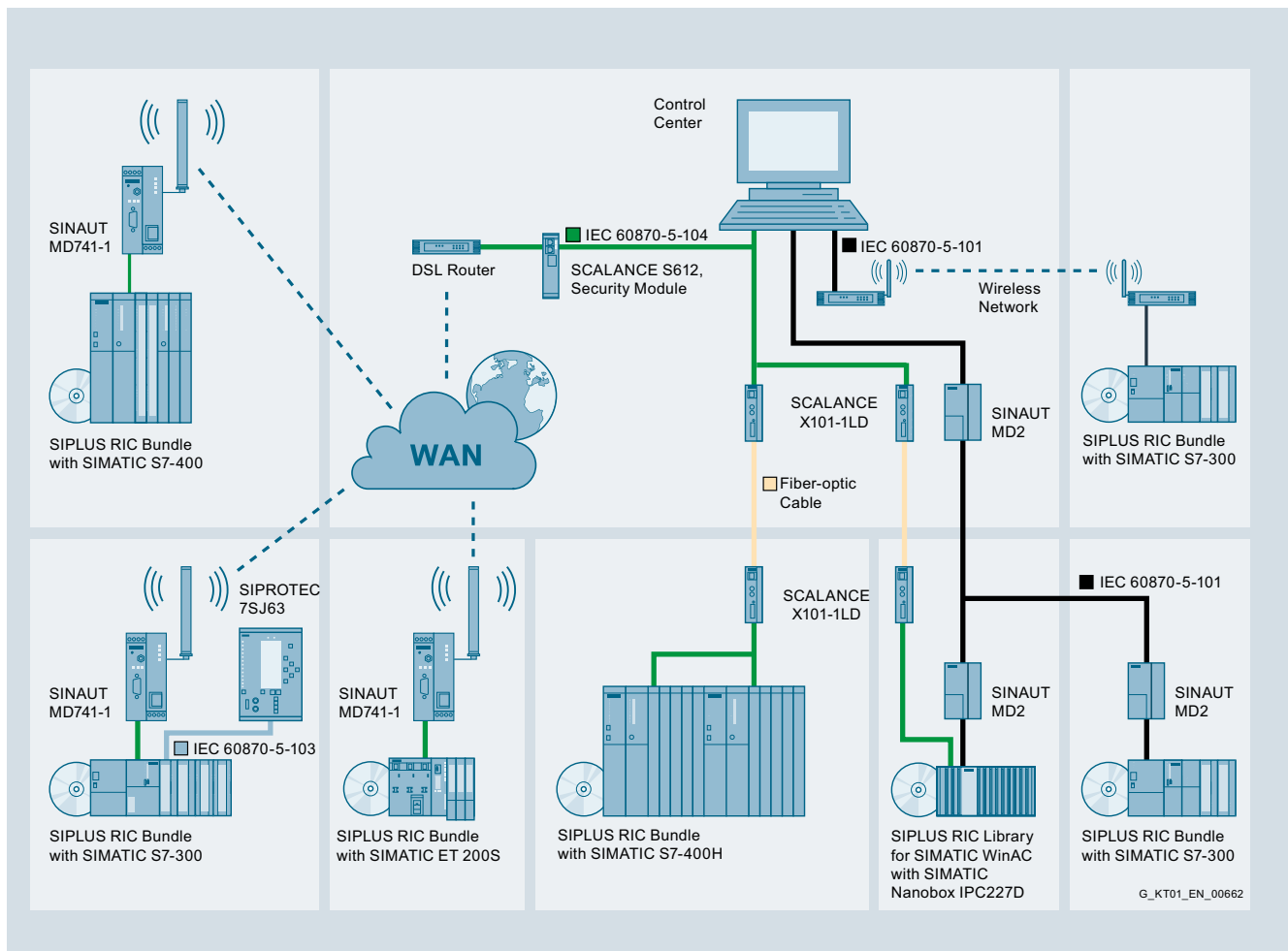
■ **Overview**

IEC 60870-5-101, IEC 60870-5-103 and IEC 60870-5-104 are standardized vendor-independent protocols. With SIPLUS RIC, they can be parameterized with the SIMATIC Manager or TIA Portal V13 SP1 without the need for additional installations.

The IEC 60870-5-101 protocol supports standard WLAN connections via dedicated lines; in the automation system the modems are coupled via RS 232 to the 1SI, CP 340, CP 341, CP 441, CP 1540 or CP 1541 communication modules.

The protocol IEC 60870-5-103 permits serial communication with protection devices, e.g. SIPROTEC. Coupling takes place via the 1SI, CP 340, CP 341, CP 441, CM PTP, CP1540 or CP1541 communication modules and RS 485 interface with fiber-optic cables.

The IEC 60870-5-104 protocol supports TCP/IP-based WAN connections such as Internet/DSL or GPRS/UMTS/LTE. Either the PN interfaces of the CPUs or the CP 343-1CX10/-1EX30/-1GX30 and CP 1543 communication modules are used as interfaces. Redundancy groups and substitute routes (combinations of serial and Ethernet transmission paths) are both possible and enabled via the interfaces.

The libraries for the IEC 60870-5-101 and -104 protocols are supplied as master and slave including activation for PN-CPU and CP interface. The IEC 60870-5-103 is only provided as master.

SIMATIC Controllers can also communicate with third-party products by means of the IEC protocols.

Information can be forwarded both from lower-level stations and protection devices to the control centers. Automatic updating of the information objects can take place which can then be forwarded with the information object and ASDU address unchanged. These addresses can however also be changed by means of parameter assignment.

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# Products for specific requirements
Telecontrol systems for comprehensive applications
SIPLUS RIC substations for IEC protocol

## SIPLUS RIC libraries for SIMATIC S7-1500 and ET 200SP

### ■ Overview



If a SIMATIC S7-1500/ET 200SP-based system is to commu-
nicate with a Siemens control center, e.g. SIMATIC PCS 7
TeleControl, WinCC TeleControl, WinCC OA, or a control center
of a third-party supplier using the IEC 60870-5 telecontrol
standard, the IEC 60870-5-101 (serial), -103 (protection) or -104
(TCP/IP) telecontrol protocols can be used in the SIMATIC
automation systems.

SIPLUS RIC libraries offer an integrated, scalable system based
on SIMATIC S7-1500/ET 200SP functions, for the following data
volumes:

- 200 information points, for use with CPU 1510SP-1 PN,
  CPU 1511-1 PN and CPU 1511C-1 PN
- 800 information points, for use with CPU 1512SP-1 PN and
  CPU 1512C-1 PN
- 1000 information points, for use with CPU 1513-1 PN
- 2000 information points, for use with CPU 1515-2 PN
- 4000 information points, for use with CPU 1516-3 PN/DP
- 5000 information points, for use with CPU 1517-3 PN/DP and
  with CPU 1518-4 PN/DP

The work memory for data is used for buffering the message
frames. Longer communication failure times can thus be
bridged. The SIPLUS RIC software libraries are based on the
standard TIA Portal and can be used on various, mutually
compatible types of SIMATIC S7 devices, thus saving hardware
costs and programming overhead.

The libraries on CD are supplied together with a SIMATIC
Memory Card, which can be used on all CPUs. Four versions
with different memory sizes are available for selection.

With SIPLUS extreme hardware, telecontrol devices for an
extended ambient temperature range (-25 ... +70 °C) and
exceptional exposure to media (conformal coating) can be
implemented using the telecontrol protocols.

A license certificate with the activation of all telecontrol protocols
IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) is
supplied for the SIMATIC Memory Card included in the scope of
delivery.

### ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS RIC libraries for SIMATIC S7-1500/ET 200SP** | |
| Runtime license; CD with software and documentation | |
| • with SIMATIC Memory Card; 12 MB | **6AG6003-8CF00-0LE0** |
| • with SIMATIC Memory Card; 24 MB | **6AG6003-7CF00-0LF0** |
| • with SIMATIC Memory Card, 256 MB | **6AG6003-7CF00-0LL0** |
| • with SIMATIC Memory Card, 2 GB | **6AG6003-7CF00-0LP0** |

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**Products for specific requirements**
Telecontrol systems for comprehensive applications
SIPLUS RIC substations for IEC protocol

**SIPLUS RIC libraries for SIMATIC ET 200S**

■ **Overview**



If a SIMATIC ET 200S-based system is to communicate with a Siemens control center, e.g. SIMATIC PCS 7 TeleControl, WinCC TeleControl, WinCC OA, or a control center of a third-party supplier using the IEC 60870-5 telecontrol standard, the IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) telecontrol protocols can be used in the SIMATIC automation systems.

SIPLUS RIC libraries offer an integrated, scalable system based on SIMATIC ET 200S functions, for up to 200 information points.

The non-retain memory can also be used for buffering message frames. Longer communication failure times can thus be bridged. The SIPLUS RIC software libraries are based on the standard SIMATIC Manager or TIA Portal and can be used on various, mutually compatible types of SIMATIC S7 devices – this saves hardware costs and programming overhead.

The libraries on CD are supplied together with a SIMATIC Memory Card, which can be used on all CPUs. Two versions with different memory sizes are available for selection.

With SIPLUS Extreme Hardware, telecontrol devices for an extended ambient temperature range (-25 ... +70 °C) and exceptional exposure to media (conformal coating) can be implemented using the telecontrol protocols.

A license certificate with the activation of all telecontrol protocols IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) is supplied for the SIMATIC Memory Card included in the scope of delivery.

Note:

The SIPLUS RIC libraries for ET 200S completely replace the previous SIPLUS RIC ET 200S bundles und SIPLUS RIC ET 200S extreme bundles.

■ **Ordering data** — **Article No.**

| | Article No. |
|---|---|
| **SIPLUS RIC libraries for SIMATIC ET 200S** | |
| Runtime license; CD with software and documentation | |
| • with SIMATIC Memory Card, 512 KB | **6AG6003-5CF00-0CA0** |
| • with SIMATIC Memory Card, 2 MB | **6AG6003-5CF00-0DA0** |

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# Products for specific requirements
Telecontrol systems for comprehensive applications
SIPLUS RIC substations for IEC protocol

## SIPLUS RIC libraries for SIMATIC S7-300

### Overview



If a SIMATIC S7-300-based system is to communicate with a Siemens control center, e.g. SIMATIC PCS 7 TeleControl, WinCC TeleControl, WinCC OA, or a control center of a third-party supplier using the IEC 60870-5 telecontrol standard, the IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) telecontrol protocols can be used in the SIMATIC automation systems.

SIPLUS RIC libraries offer an integrated, scalable system based on SIMATIC S7-300 functions, for the following data quantities:

• 200 information points, for use with CPU 314

• 1 000 information points, for use with CPU 315

• 2 000 information points, for use with CPU 317

• 5 000 information points, for use with CPU 319

The non-retain memory can also be used for buffering message frames. Longer communication failure times can thus be bridged. The SIPLUS RIC software libraries are based on the standard SIMATIC Manager or TIA Portal and can be used on various, mutually compatible types of SIMATIC S7 devices – this saves hardware costs and programming overhead.

The libraries on CD are supplied together with a SIMATIC Memory Card, which can be used on all CPUs. Two versions with different memory sizes are available for selection.

With SIPLUS Extreme Hardware, telecontrol devices for an extended ambient temperature range (-25 ... +70 °C) and exceptional exposure to media (conformal coating) can be implemented using the telecontrol protocols.

A license certificate with the activation of all telecontrol protocols IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) is supplied for the SIMATIC Memory Card included in the scope of delivery.

Note:

The SIPLUS RIC libraries for S7-300 completely replace the previous SIPLUS RIC S7-300 bundles und SIPLUS RIC S7-300 extreme bundles.

### Ordering data

| | Article No. |
|---|---|
| **SIPLUS RIC libraries for SIMATIC S7-300** | |
| Runtime license; CD with software and documentation | |
| • with SIMATIC Memory Card, 512 KB | **6AG6003-1CF00-0CA0** |
| • with SIMATIC Memory Card, 2 MB | **6AG6003-1CF00-0DA0** |

# Products for specific requirements
Telecontrol systems for comprehensive applications
SIPLUS RIC substations for IEC protocol

**SIPLUS RIC libraries for SIMATIC S7-400**

## Overview



If a SIMATIC S7-400-based system is to communicate with a Siemens control center, e.g. SIMATIC PCS 7 TeleControl, WinCC TeleControl, WinCC OA, or a control center of a third-party supplier using the IEC 60870-5 telecontrol standard, the IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) telecontrol protocols can be used in the SIMATIC automation systems.

SIPLUS RIC libraries offer an integrated, scalable system based on SIMATIC S7-400 functions, for the following data quantities:

• 1 000 information points, for use with CPU 412 or CPU 412H

• 2 000 information points, for use with CPU 414 or CPU 414H

• 5 000 information points, for use with CPU 416 or CPU 416H

The non-retain memory can also be used for buffering message frames. Longer communication failure times can thus be bridged. The SIPLUS RIC software libraries are based on the standard SIMATIC Manager or TIA Portal and can be used on various, mutually compatible types of SIMATIC S7 devices – this saves hardware costs and programming overhead.

The libraries are supplied on a CD and can be used on all CPUs.

With SIPLUS Extreme Hardware, telecontrol devices for an extended ambient temperature range (-25 ... +70 °C) and exceptional exposure to media (conformal coating) can be implemented using the telecontrol protocols.

A memory card or a CPU (CPU V4.x or higher and CPU 410H) is licensed. All IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP) telecontrol protocols are activated via the email address siplus-ric.automation@siemens.com.

Note:

The SIPLUS RIC libraries for S7-400 completely replace the previous SIPLUS RIC S7-400 bundles, SIPLUS RIC S7-400 extreme bundles, and IEC 60870 libraries for SIMATIC PCS 7.

## Ordering data      Article No.

| | Article No. |
|---|---|
| **SIPLUS RIC libraries for SIMATIC S7-400**<br><br>Runtime license for SIMATIC S7-400 firmware version 4.x or higher; CD with software and documentation; note: If used in S7-400H systems, a license will be required for both CPUs | **6AG6003-3CF00-0AA0** |

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# Products for specific requirements
Telecontrol systems for comprehensive applications
SIPLUS RIC substations for IEC protocol

## SIPLUS RIC libraries for PC-based Automation

### ■ Overview



If a SIMATIC WinAC RTX-/S7-1500 Software Controller/
Open Controller-based system is to communicate with a
Siemens control center, e.g. SIMATIC PCS 7 TeleControl,
WinCC TeleControl, WinCC OA, or a control center of a third-
party supplier using the IEC 60870-5 telecontrol standard, the
IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP)
telecontrol protocols can be used in the SIMATIC automation
systems.

The SIPLUS RIC software libraries are based on the standard
SIMATIC Manager or TIA Portal and can be used on various,
mutually compatible types of SIMATIC S7 devices – this saves
hardware costs and programming overhead.

The libraries are supplied on a CD and can be used for all
WinAC-RTX-/S7-1500 Software Controller/Open Controller
systems.

With SIPLUS Extreme Hardware, telecontrol devices for an
extended ambient temperature range (-25 ... +70 °C) and
exceptional exposure to media (conformal coating) can be
implemented using the telecontrol protocols.

All IEC 60870-5-101 (serial), -103 (protection) or -104 (TCP/IP)
telecontrol protocols are activated via the email address
siplus-ric.automation@siemens.com.

Note:

The SIPLUS RIC libraries for PC-based Automation include
SIPLUS RIC libraries for:
- SIMATIC ET 200SP Open Controller, CPU 1515SP PC
- SIMATIC S7-1500 Software Controller
- SIMATIC WinAC

### ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS RIC libraries for PC-based Automation** | |
| Runtime license; CD with software and documentation | **6AG6003-0CF00-0AA0** |

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■ **Overview**

SIDOOR door control systems

Door control system is the general term for a controller of an access system.

The SIDOOR product family is primarily intended for the operation of sliding doors, whereby these doors can be operated both horizontally and vertically.

Door control systems are characterized by the fact that there are always two defined states for the open and closed position of the door.

The door is always controlled, regulated and moved between these two positions in accordance with the guidelines of the respective application.

In a defined learn run via "Single-button operation", the door system independently determines the values for the door width, the dynamic door weight and the drive direction of the geared motor and stores these data in a non-volatile memory.

The optimum drive characteristics at the door are automatically calculated and are consistently adhered to.

The travel curve transitions are rounded off so that the door movement is smooth and jerk-free.
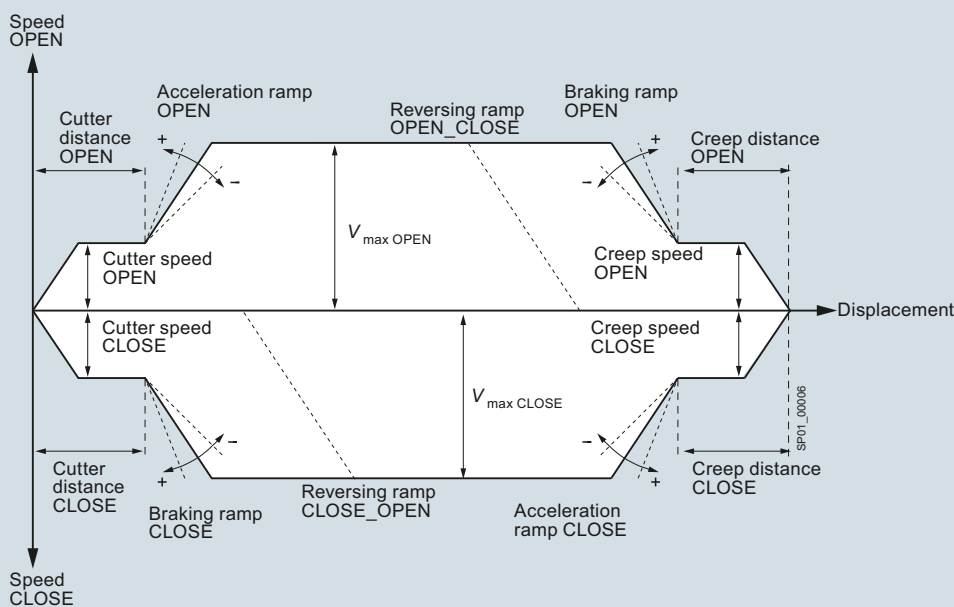
| Creep speed | Reduced speed in the vicinity of the OPEN position of the elevator door (creep distance) |
|---|---|
| Cutter speed | Reduced speed in the vicinity of the CLOSED position of the elevator door (cutter distance) |
| Creep distance | Range of door travel in the vicinity of the OPEN position |
| Cutter distance | Range of door travel in the vicinity of the CLOSED position |
| $V_{max}$ | Maximum permissible door speed |

| Reversing ramp OPEN_CLOSE | Travel reverses from the OPEN to the CLOSE direction |
|---|---|
| Reversing ramp CLOSE_OPEN | Travel reverses from the CLOSE to the OPEN direction |

Note:
When reversing from the open to the close direction, the door is braked with the reversing ramp OPEN_CLOSE, and starts the closing movement with the acceleration ramp CLOSE.

Travel curve

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# Products for specific requirements
## Automatic door controls

**For elevators**

### Overview

The elevator door drive is comprised of a controller and a maintenance-free drive unit, geared motor or gearless EC technology direct drive motor.

Controllers are electronic controllers connected to the power supply via either an internal power supply unit (SIDOOR AT12) or an external power supply unit (SIDOOR NT40, SIDOOR Transformer). They are generally connected to the higher-level controller via digital or fieldbus interfaces, and can be configured via a user interface.

The SIDOOR AT12, SIDOOR AT40 and SIDOOR ATE500E controllers can be used to operate horizontally operated cabin and shaft doors at adjustable speeds and accelerations.

The SIDOOR ATD400V controller for rising doors and rolling shutters enables the operation of vertical door systems on elevators at adjustable speeds and accelerations.

Geared motors form the maintenance-free drive unit in the door drive. The geared motors are DC motors with non-self-locking gearing, and are speed-controlled. The set force and speed limits are not exceeded. The gearless motor (direct drive) is the maintenance-free drive unit of the door drive.

Operation of the named door drives does not require limit switches. The door width and the "OPEN"/"CLOSE" positions are determined automatically.

The power is transmitted by a toothed belt. The toothed belt passes over a deflector pulley and can be fitted with 2 door clutch holders. This enables it to drive both one-sided and centrally opening doors. The accessories are not included in the scope of supply, see "Accessories".

### Design

The product-specific property of the elevator door controllers is based on the fact that the closing weights/closing springs integrated in the shaft doors are also taken into account.

These weights/springs are integrated in the shaft doors so that open doors close automatically if the cabin is not at the relevant floor.

They must also be moved by the elevator door drive in their opening direction and support it their closing movement.
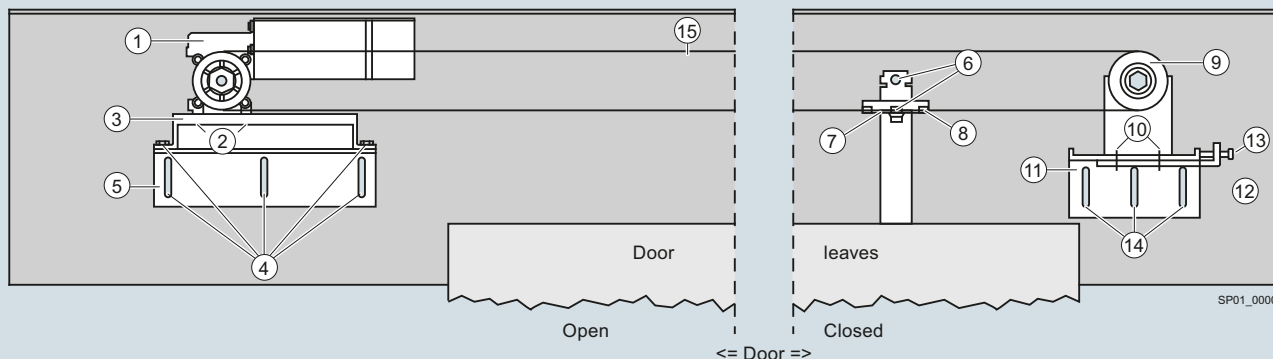


Complete motor mounting
1. Geared motor
2. 4 x locking hexagonal safety bolts M5 x 10
3. Rubber-metal anti-vibration mount
4. 10 x locking hexagonal safety bolts M6 x 16
5. Mounting bracket for the motor mounting

Mounting material for door clutch holder
6. 2 x locking hexagonal safety bolts M6 x 12
7. Door clutch holder
8. Clamping plate

Deflector unit and clamping device
9. Deflector unit
10. 2 x locking hexagonal safety bolts M6 x 12
11. Mounting bracket for the deflector unit and tensioning device
12. Tensioning lug for the deflector unit and tensioning device
13. Tensioning screw M6 x 30
14. 10 x locking hexagonal safety bolts M6 x 16
15. Toothed belt (length 4 m)

Mounting suggestion for door control systems

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**Products for specific requirements**
Automatic door controls
for elevators

**Controllers  > SIDOOR AT12 elevator door drive**

## Overview
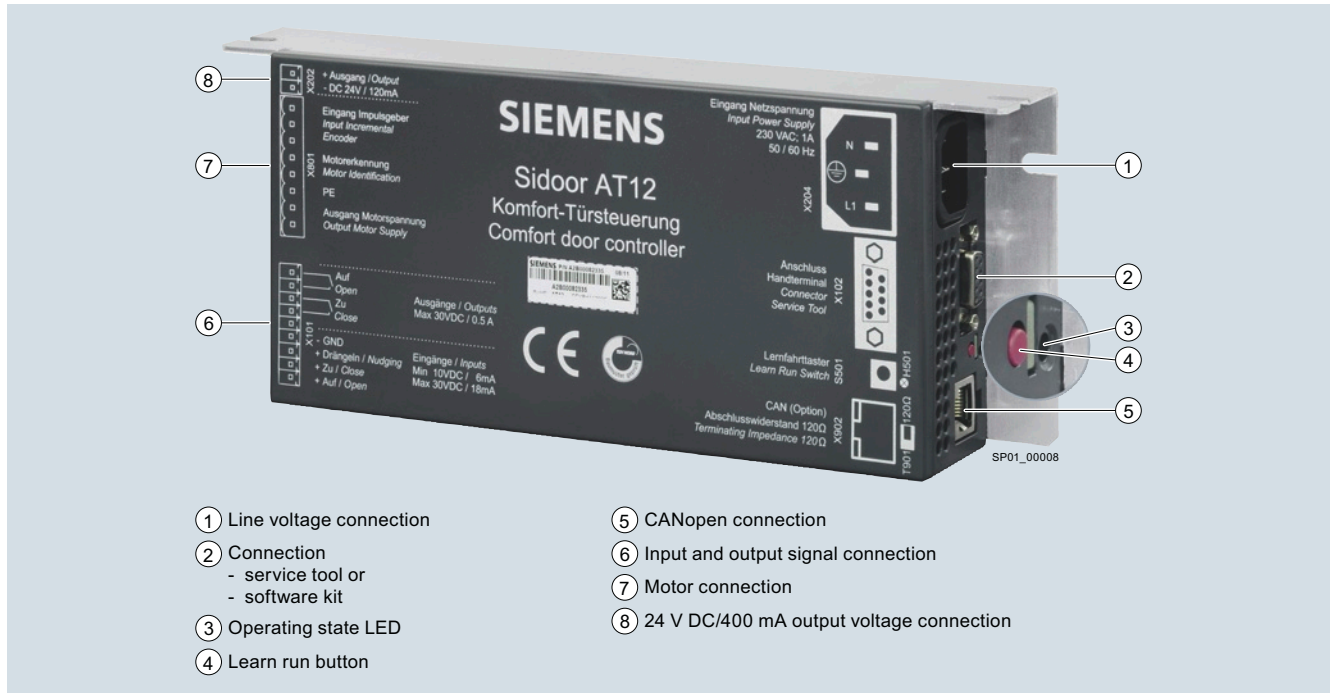


1. Line voltage connection
2. Connection
   - service tool or
   - software kit
3. Operating state LED
4. Learn run button
5. CANopen connection
6. Input and output signal connection
7. Motor connection
8. 24 V DC/400 mA output voltage connection

SIDOOR AT12 elevator door drive

SIDOOR AT12 – SIDOOR enables the quick, easy and versatile installation, configuration and operation of a wide range of elevator door systems.

- For dynamic door weights up to 120 kg
- 4 kg maximum counterweight
- Operating temperature 0 to +50 °C
- Opening width 0.3 to 2.4 m

- Integrated switched-mode power supply
- Auxiliary voltage output 24 V DC, 120 mA (short-circuit-proof)
- CANopen interface (integrated in the controller)
- IP20 degree of protection

## Technical specifications

| Article number | **6FB1111-1AT20-1AT1** |
|---|---|
| | SIDOOR AT12 |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | AT12 |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT10-5MA0, 6FB1103-0AT11-5MA0 |
| **Supply voltage** | |
| Type of power supply | 230 V AC |
| Supply voltage (AC) | 230 V |
| **Line frequency** | |
| • permissible range, lower limit | 50 Hz |
| • permissible range, upper limit | 60 Hz |
| **Input current** | |
| Current consumption, max. | 10 A |
| $I^2t$, min. | 30 A²·s |
| Operational current of fuse protection at input, min. | 6 A |
| Operational current of fuse protection at input, max. | 10 A |

| Article number | **6FB1111-1AT20-1AT1** |
|---|---|
| | SIDOOR AT12 |
| **Power** | |
| Active power input | 80 W |
| Active power input, max. | 160 W |
| Active power input (standby mode) | 3 W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 6 mA |
| • per DC input, max. | 18 mA |

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# Products for specific requirements
Automatic door controls
for elevators

## Technical specifications (continued)

| Article number | 6FB1111-1AT20-1AT1 |
|---|---|
| | SIDOOR AT12 |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 120 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 30 V DC, min. | 0.01 A |
| - at 30 V DC, max. | 0.5 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 2.4 m |
| Weight of door, max. | 120 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 40 N |
| Kinetic energy, max. | 15 J |
| **Counterweight** | |
| • with SIDOOR M2 geared motor, max. | 4 kg |

| Article number | 6FB1111-1AT20-1AT1 |
|---|---|
| | SIDOOR AT12 |
| **Interfaces** | |
| Interfaces/bus type | CANopen, CiA standard 301, profile 417 |
| Number of bus nodes | 32 |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | Yes |
| CE mark | Yes |
| UL approval | No |
| EAC (formerly Gost-R) | Yes |
| TÜV Inspectorate approval | Yes |
| TÜV prototype tested | Yes |
| Standard for EMC | EN 12015 / EN 12016 |
| Standard for safety | EN 60950-1 / EN 81-20 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | 0 °C |
| • max. | 50 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -20 °C |
| • Storage, max. | 85 °C |
| **Dimensions** | |
| Width | 260 mm |
| Height | 45 mm |
| Depth | 105 mm |

## Ordering data | Article No.

| | |
|---|---|
| **SIDOOR AT12 elevator door drive** | **6FB1111-1AT20-1AT1** |
| Controller with integrated switch-mode power supply | |

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**Products for specific requirements**
Automatic door controls
for elevators

Controllers > SIDOOR AT40 elevator door drive

## ◼ Overview



(1) Optional: additional input signal
(2) CAN module or relay module
(3) Terminal module
(4) Connection for 24 V DC/400 mA output voltage
(5) Connection
  - software kit or
  - service tool

(6) Input signal connection
(7) Control panel
(8) Connector
  - NT40 switch-mode power supply or
  - Mains transformer
(9) Motor connection

SIDOOR AT40 elevator door drive (relay module version)

SIDOOR AT40 – SIDOOR enables the quick, easy and versatile installation, configuration and operation of a wide range of elevator door systems.

- Version:
  - Relay module
  - CAN module
- For dynamic door weights up to 600 kg
- Automatic door weight detection
- 4 to 8 kg maximum counterweight (depending on motor version)
- Operating temperature -20 to +50 °C

- Flexible motor management (four different motor types), automatic detection
- Opening width 0.3 to 5 m
- Auxiliary power output 24 V DC ± 15 %; 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Supports power-optimized operation in the elevator cabin
- Vandal-proof
- IP54 degree of protection for 180 to 600 kg motor versions, gear unit IP40 (SIDOOR M5: entirely IP54)
- The current operating states are indicated via a 7-segment display directly in the elevator door drive or externally using the software kit or service tool, see "Additional units".

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# Products for specific requirements
Automatic door controls
for elevators

**Controllers   > SIDOOR AT40 elevator door drive**

## ■ Technical specifications

| Article number | 6FB1111-0AT10-3AT2 | 6FB1111-1AT10-3AT3 |
|---|---|---|
| | SIDOOR AT40 RELAY | SIDOOR AT40 CAN |
| **General information** | | |
| Product brand name | SIDOOR | |
| Product designation | Door controller | |
| Product version | AT40 relay | AT40 CAN |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT10-5MA0, 6FB1103-0AT11-5MA0, 6FB1103-0AT10-4MB0, 6FB1103-0AT11-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0, 6FB1103-0AT10-3MD0, 6FB1103-0AT11-3MD0 | |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0 | |
| **Supply voltage** | | |
| Type of power supply | via SIDOOR mains transformer / NT40 | |
| **Input current** | | |
| Current consumption, max. | 10 A | |
| $I^2t$, min. | 30 A$^2$·s | |
| **Power** | | |
| Active power input | 80 W | |
| Active power input, max. | 540 W | |
| Active power input (standby mode) | 5 W | 6 W |
| **Digital inputs** | | |
| Control inputs isolated | Yes | |
| Control inputs p-switching | Yes | |
| **Input voltage** | | |
| • per DC input, min. | 10 V; Observe polarity ! | |
| • per DC input, max. | 28 V; Observe polarity ! | |
| **Input current** | | |
| • per DC input, min. | 9 mA | |
| • per DC input, max. | 27 mA | |

| Article number | 6FB1111-0AT10-3AT2 | 6FB1111-1AT10-3AT3 |
|---|---|---|
| | SIDOOR AT40 RELAY | SIDOOR AT40 CAN |
| **Digital outputs** | | |
| short-circuit proof | Yes | |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! | |
| **Output voltage** | | |
| • Output voltage (DC) | 24 V | |
| **Output current** | | |
| • For output (24 V DC), max. | 400 mA | |
| **Relay outputs** | | |
| **Switching capacity of contacts** | | |
| - at 30 V DC, min. | 0.01 A | |
| - at 30 V DC, max. | 1 A | 0.5 A |
| - at 50 V DC, min. | 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 50 V DC, max. | 1 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 230 V AC, min. | 0.01 A | |
| - at 230 V AC, max. | 1 A | |
| **Mechanical data** | | |
| Opening width of door, min. | 0.3 m | |
| Opening width of door, max. | 5 m | |
| Weight of door, max. | 600 kg | |
| Operating cycle frequency of door, max. | 180 1/h | |
| Counterforce, max. | 80 N | |
| Kinetic energy, max. | 100 J | |
| **Counterweight** | | |
| • with SIDOOR M2 geared motor, max. | 4 kg | |
| • with SIDOOR M3 geared motor, max. | 6 kg | |
| • with SIDOOR M4 geared motor, max. | 8 kg | |
| • with SIDOOR M5 geared motor, max. | 8 kg | |

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**Products for specific requirements**
Automatic door controls
for elevators

**Controllers** **> SIDOOR AT40 elevator door drive**

## Technical specifications (continued)

| Article number | 6FB1111-0AT10-3AT2 | 6FB1111-1AT10-3AT3 |
|---|---|---|
| | SIDOOR AT40 RELAY | SIDOOR AT40 CAN |
| **Interfaces** | | |
| Interfaces/bus type | without | CANopen, CiA standard 301, profile 417 |
| Number of bus nodes | | 32 |
| **Isolation** | | |
| Overvoltage category | 2 | |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | |
| **Standards, approvals, certificates** | | |
| Certificate of suitability according to EN 81 | Yes | |
| CE mark | Yes | |
| UL approval | No | |
| EAC (formerly Gost-R) | Yes | |
| TÜV Inspectorate approval | Yes | |
| TÜV prototype tested | Yes | |
| Standard for EMC | EN 12015 / EN 12016 | |
| Standard for safety | EN 60950-1 / EN 81-20 | |

| Article number | 6FB1111-0AT10-3AT2 | 6FB1111-1AT10-3AT3 |
|---|---|---|
| | SIDOOR AT40 RELAY | SIDOOR AT40 CAN |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C | |
| • max. | 50 °C | |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -40 °C | |
| • Storage, max. | 50 °C | |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • Installation altitude above sea level, max. | 2 000 m | |
| **Relative humidity** | | |
| • No condensation, min. | 10 % | |
| • No condensation, max. | 93 % | |
| **Dimensions** | | |
| Width | 320 mm | |
| Height | 60 mm | |
| Depth | 80 mm | |

## Ordering data

| | Article No. |
|---|---|
| **SIDOOR AT40 elevator door drive** | |
| Controller with relay module | **6FB1111-0AT10-3AT2** |
| Controller with CAN module | **6FB1111-1AT10-3AT3** |

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# Products for specific requirements
## Automatic door controls
## for elevators

**Controllers > SIDOOR ATD400V elevator door drive**

## ■ Overview



1. Optional: additional input signal
2. Relay module
3. Terminal module
4. Output voltage 24 V DC/400 mA connection
5. Connection
   - software kit or
   - service tool
6. Input signal connection
7. Control panel
8. Connection
   - NT40 switch mode power supply or
   - Mains transformer
9. Motor connection

SIDOOR ATD400V elevator door drive

SIDOOR ATD400V – The SIDOOR ATD400V elevator door drive enables the quick, easy and versatile installation, configuration and operation of vertical elevator door systems, such as rising doors and roller shutters.

- Relay module design
- For dynamic door weights up to 400 kg
- Automatic door weight detection
- Operating temperature -20 to +50 °C
- Opening width 0.3 to 4 m

- Auxiliary power output 24 V DC ± 15 %; 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Vandal-proof
- Degree of protection:
  - motor IP54
  - gear unit IP40

The current operating states are indicated via a 7-segment display directly in the elevator door drive or externally using the software kit or service tool, see "Additional units".

## ■ Technical specifications

| Article number | 6FB1111-1AT10-3VE2 |
|---|---|
| | SIDOOR ATD400V RELAY |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD400V relay |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0) |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0 |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0 |
| **Supply voltage** | |
| Type of power supply | via SIDOOR mains transformer / NT40 |
| **Input current** | |
| Current consumption, max. | 10 A |
| I²t, min. | 30 A²·s |

| Article number | 6FB1111-1AT10-3VE2 |
|---|---|
| | SIDOOR ATD400V RELAY |
| **Power** | |
| Active power input | 80 W |
| Active power input, max. | 540 W |
| Active power input (standby mode) | 5 W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |

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**Products for specific requirements**
Automatic door controls
for elevators

Controllers > SIDOOR ATD400V elevator door drive

## ■ Technical specifications (continued)

| Article number | 6FB1111-1AT10-3VE2 |
|---|---|
| | SIDOOR ATD400V RELAY |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 50 V DC, min. | 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries |
| - at 50 V DC, max. | 1 A; 50 V DC switching voltage not released for NFPA-relevant countries |
| - at 230 V AC, min. | 0.01 A |
| - at 230 V AC, max. | 1 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 4 m |
| Weight of door, max. | 400 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 80 N |
| Kinetic energy, max. | 100 J |
| **Counterweight** | |
| • with SIDOOR M4 geared motor, max. | 8 kg |
| **Interfaces** | |
| Interfaces/bus type | without |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |

| Article number | 6FB1111-1AT10-3VE2 |
|---|---|
| | SIDOOR ATD400V RELAY |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | Yes |
| CE mark | Yes |
| UL approval | No |
| EAC (formerly Gost-R) | Yes |
| TÜV Inspectorate approval | Yes |
| TÜV prototype tested | Yes |
| Standard for EMC | EN 12015 / EN 12016 |
| Standard for safety | EN 60950-1 / EN 81-20 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 50 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 50 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIDOOR ATD400V elevator door drive** | |
| Controller with relay module for rising gates and roller shutters, for vertical door systems | **6FB1111-1AT10-3VE2** |

# Products for specific requirements
## Automatic door controls
## for elevators

**Controllers > SIDOOR ATE500E elevator door drive**

■ **Overview**



① CAN module or RELAY module
② Output voltage 24 V DC/400 mA connection
③ Connection
  - service tool or
  - software kit
④ Input signal connection
⑤ Control panel
⑥ Connection
  - NT40 switch mode power supply
  - Transformer
⑦ Motor connection (direct drive)
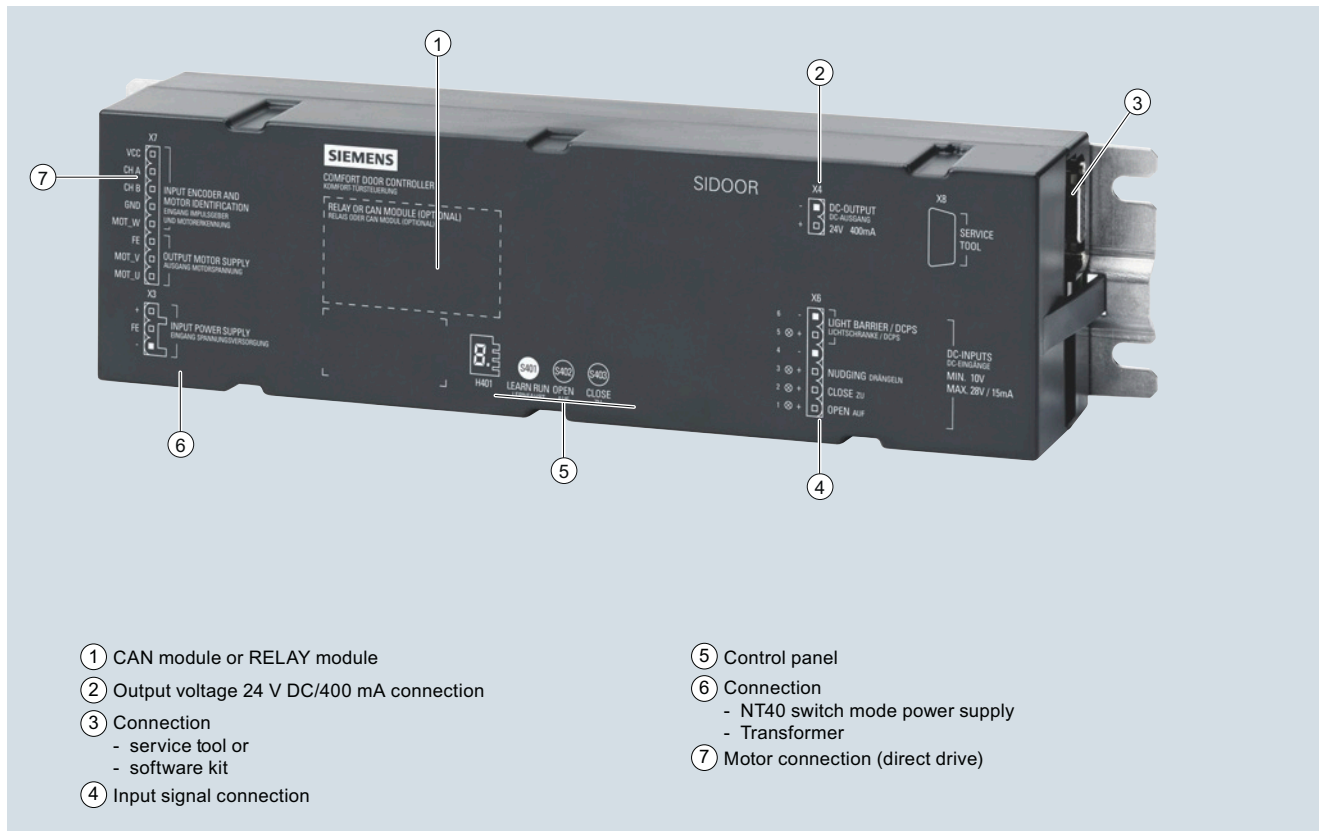
SIDOOR ATE500E elevator door drive

The SIDOOR ATE500E elevator door drive enables the quick, easy and versatile installation, configuration and operation of EC technology gearless elevator door systems.

- Design:
  - Relay module
  - CAN module
- For dynamic door weights up to 280 kg
- High control performance und optimized drive characteristic transitions
- Automatic door weight detection (single-button commissioning)
- 6 kg maximum counterweight of the coupled floor door

- Operating temperature -25 to +50 °C without restrictions
- Automatic identification of the connected motor
- Opening width 0.3 to 5 m
- Auxiliary voltage output 24 V DC ± 15 %; 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Optimized energy consumption during cabin operation (DCPS)
- Vandal-proof
- IP20 degree of protection
- The current operating states are indicated via a 7-segment display directly in the elevator door drive or externally using the software kit or service tool, see Additional units.

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**Products for specific requirements**
Automatic door controls
for elevators

**Controllers** **> SIDOOR ATE500E elevator door drive**

## ◼ Technical specifications

| Article number | 6FB1211-5AT10-7AT2 | 6FB1211-1AT10-7AT3 |
|---|---|---|
| | SIDOOR ATE500E RELAY | SIDOOR ATE500E CAN |
| **General information** | | |
| Product brand name | SIDOOR | |
| Product designation | Door controller | |
| Product version | ATE500E Relais | ATE500E CAN |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0), NT40 (6FB1112-0AT20-3PS0) | |
| Manufacturer's article no. of the usable motor | 6FB1203-0AT12-7DA0 | |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0 | |
| **Installation type/mounting** | | |
| Installation and mounting instructions | No direct sunlight, requirements specific to the end application must be observed. NFPA industry environment: Installation outside a control cabinet only horizontal. NFPA elevator environment: Must be installed in a fire protection enclosure | |
| **Supply voltage** | | |
| Type of power supply | via SIDOOR mains transformer / NT40 or via DC | |
| Rated value (DC) | 36 V; with MED280: At 24 V DC max. door speed of 500 mm/s; at 28.8 V DC max. door speed of 800 mm/s | |
| permissible range, lower limit (DC) | 19.2 V | |
| permissible range, upper limit (DC) | 38 V | |
| **Input current** | | |
| I²t, min. | 30 A²·s | |
| **Power** | | |
| Active power input | 85 W | |
| Active power input, max. | 540 W | |
| Active power input (standby mode) | 5 W | 6 W |
| **Digital inputs** | | |
| Control inputs isolated | Yes | |
| Control inputs p-switching | Yes | |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 | |
| **Input voltage** | | |
| • per DC input, min. | 10 V; Observe polarity ! | |
| • per DC input, max. | 28 V; Observe polarity ! | |
| **Input current** | | |
| • per DC input, min. | 3 mA | |
| • per DC input, max. | 15 mA | |

| Article number | 6FB1211-5AT10-7AT2 | 6FB1211-1AT10-7AT3 |
|---|---|---|
| | SIDOOR ATE500E RELAY | SIDOOR ATE500E CAN |
| **Digital outputs** | | |
| short-circuit proof | Yes | |
| Overload-proof | Yes | |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! | |
| **Output voltage** | | |
| • Output voltage (DC) | 24 V | |
| **Output current** | | |
| • For output (24 V DC), max. | 400 mA | |
| **Relay outputs** | | |
| **Switching capacity of contacts** | | |
| - at 30 V DC, min. | 0.01 A | |
| - at 30 V DC, max. | 1 A | 0.5 A |
| - at 50 V DC, min. | 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 50 V DC, max. | 1 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 230 V AC, min. | 0.01 A | |
| - at 230 V AC, max. | 1 A | |
| **Mechanical data** | | |
| Opening width of door, min. | 0.3 m | |
| Opening width of door, max. | 5 m | |
| Weight of door, max. | 280 kg | |
| Operating cycle frequency of door, max. | 180 1/h | |
| Kinetic energy, max. | 75 J | |
| **Counterweight** | | |
| • with SIDOOR MED280 direct drive, max. | 6 kg | |
| **Interfaces** | | |
| Interfaces/bus type | without | CANopen, CiA standard 301, profile 417 |
| Number of bus nodes | | 32 |
| **Isolation** | | |
| Overvoltage category | 2 | |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | |

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# Products for specific requirements
Automatic door controls
for elevators

## ■ Technical specifications (continued)

| Article number | 6FB1211-5AT10-7AT2 | 6FB1211-1AT10-7AT3 |
|---|---|---|
| | SIDOOR ATE500E RELAY | SIDOOR ATE500E CAN |
| **Standards, approvals, certificates** | | |
| Certificate of suitability according to EN 81 | Yes | |
| CE mark | Yes | |
| UL approval | Yes | |
| EAC (formerly Gost-R) | Yes | |
| TÜV Inspectorate approval | Yes | |
| TÜV prototype tested | Yes | |
| Standard for EMC | EN 12015 / EN 12016 / EN 61000-6-2 / EN 61000-6-4 / EN 61326-3-1 | |
| Standard for safety | EN 60335-1 / EN 60950-1 / EN 81-20 / UL61010-1 / UL61010-2-201 / EN ISO 13849-1 Cat. 2 PL d / IEC 62061: SIL2 | |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -25 °C | |
| • max. | 50 °C | |
| • Remark | Bolt the controller onto a metal mounting surface so that thermal conductivity is ensured | |

| Article number | 6FB1211-5AT10-7AT2 | 6FB1211-1AT10-7AT3 |
|---|---|---|
| | SIDOOR ATE500E RELAY | SIDOOR ATE500E CAN |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -40 °C | |
| • Storage, max. | 85 °C | |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • Installation altitude above sea level, max. | 2 000 m | |
| **Relative humidity** | | |
| • No condensation, min. | 10 % | |
| • No condensation, max. | 93 % | |
| **Mechanics/material** | | |
| **Service life** | | |
| • Mean time between failures (MTBF) | 19 y | |
| **Dimensions** | | |
| Width | 320 mm | |
| Height | 60 mm | |
| Depth | 80 mm | |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIDOOR ATE500E elevator door drive** | |
| Controller with relay module | **6FB1211-5AT10-7AT2** |
| Controller with CAN module | **6FB1211-1AT10-7AT3** |

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**Products for specific requirements**
Automatic door controls
for elevators

**Power supplies   > Power transformer**

## Overview

The SIDOOR Transformer power supply is a standard power supply unit operated with 220-240 V AC, 50/60 Hz, from the SIDOOR product range. It can be used for all controllers without an integrated power supply unit. The SIDOOR AT12 elevator door drive has an integrated power supply unit, for example.

## Technical specifications

| Article number | **6FB1112-0AT20-2TR0** |
|---|---|
|  | SIDOOR TRANSFORMER |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Power transformer |
| Product version | Transformer |
| **Supply voltage** | |
| relative symmetrical tolerance of the supply voltage | 15 % |
| **Mains filter** | |
| • present | Yes |
| **Input current** | |
| Current consumption, max. | 2.2 A |
| Operational current of fuse protection at input, min. | 6 A |
| Operational current of fuse protection at input, max. | 10 A |
| **Output voltage** | |
| Rated value (DC) | unsmoothed |
| RMS value (pulsating DC voltage at full load) | 17.3 V |
| RMS value (pulsating DC voltage at 20 mA) | 23 V |
| **Output current** | |
| Rated value, max. | 15.9 A |
| **Degree and class of protection** | |
| IP degree of protection | IP54 |
| **Standards, approvals, certificates** | |
| Standard for EMC | EMC Directive 2004/108/EC, EN 12015, EN 12016, EN 61000-6-2, EN 61000-6-3 |

| Article number | **6FB1112-0AT20-2TR0** |
|---|---|
|  | SIDOOR TRANSFORMER |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 55 °C |
| • Remark | No direct exposure to the sun |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -20 °C |
| • Storage, max. | 70 °C |
| • Transportation, min. | -40 °C |
| • Transportation, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Cables** | |
| Cable length | |
| • Input side | 2 m |
| • Output side | 1.5 m |
| **Connection method** | |
| Design of electrical connection at input | SCHUKO connector DIN 49.441, CEE7/VII |
| Design of electrical connection at output | WAGO 721-103/026 |
| **Dimensions** | |
| Height | 65 mm |
| Diameter | 126 mm |

## Ordering data

| | **Article No.** |
|---|---|
| **SIDOOR Transformer power supply** | **6FB1112-0AT20-2TR0** |

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# Products for specific requirements
Automatic door controls
for elevators

**Power supplies   > Switched-mode power supply**

## Overview
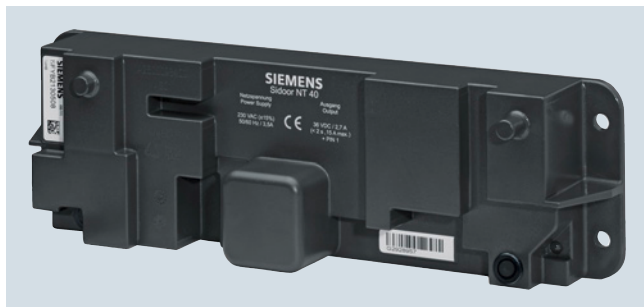
The SIDOOR NT40 switched-mode power supply is operated with 230 V AC (± 15 %), 50/60 Hz, to power the following SIDOOR door controllers:
- SIDOOR AT40 and SIDOOR ATD400V elevator door drives
- SIDOOR ATD400K cold room gate drives
- SIDOOR ATD4xxW machine tool door drives

It is especially suitable for door systems with high door weights.

On the output side, the power supply unit delivers a voltage of 36 V DC (± 3 %) SELV at a rated output power of < 100 W.

In order to enable fast acceleration/deceleration of the doors by the controller, the device can briefly (< 2 s) deliver a current of 15 A (corresponds to a short-time power output of 540 W).

## Technical specifications

| Article number | 6FB1112-0AT20-3PS0 |
|---|---|
| | SIDOOR NT40 |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Switched-mode power supply |
| Product version | NT40 |
| **Installation type/mounting** | |
| Mounting type | Four 5 mm screws |
| **Supply voltage** | |
| relative symmetrical tolerance of the supply voltage | 15 % |
| **Input current** | |
| Current consumption for 2 s, max. | 3.5 A |
| Operational current of fuse protection at input, min. | 6 A |
| Operational current of fuse protection at input, max. | 10 A |
| Tripping characteristic class of fuse protection at input | B |
| **Output voltage** | |
| Rated value (DC) | 36 V; SELV |
| Relative symmetrical tolerance of the output voltage | 3 % |
| **Output current** | |
| Rated value, min. | 0 A |
| Rated value, max. | 2.5 A |
| Temporary overload current (for 2 s maximum) | 15 A |
| **Power** | |
| Active apparent power, max. | 650 V·A |
| Emitted active power, max. | 100 W |
| Emitted active power (restricted to 2 s) | 540 W |
| Efficiency at 230 V AC (with 100 W emitted active power) | 90 % |
| **Isolation** | |
| Overvoltage category | 2 |

| Article number | 6FB1112-0AT20-3PS0 |
|---|---|
| | SIDOOR NT40 |
| **Degree and class of protection** | |
| IP degree of protection | IP54 |
| Equipment protection class | I |
| **Standards, approvals, certificates** | |
| Standard for EMC | EMC Directive 2004/108/EC, EN 12015, EN 12016 |
| Standard for safety | EN 60950-1:2006 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 55 °C |
| • Remark | No direct exposure to the sun |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -20 °C |
| • Storage, max. | 70 °C |
| • Transportation, min. | -40 °C |
| • Transportation, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Cables** | |
| Cable length | |
| • Input side | 2 m |
| • Output side | 1.5 m |
| **Connection method** | |
| Design of electrical connection at input | SCHUKO connector DIN 49.441, CEE7/VII |
| Design of electrical connection at output | WAGO 721-103/026 |
| **Dimensions** | |
| Width | 270 mm |
| Height | 55 mm |
| Depth | 80 mm |

## Ordering data

| | Article No. |
|---|---|
| **SIDOOR NT40 switched-mode power supply** | 6FB1112-0AT20-3PS0 |

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**Products for specific requirements**
Automatic door controls
for elevators

**Additional units   > Software kit, Service tool**

### Overview SIDOOR software kit



SIDOOR software kit

The scope of delivery of the SIDOOR software kit includes an installation CD.

Note:

Some firmware updates are offered as free downloads in the Siemens Industry Online Support. For information on the availability and acquisition of more firmware, please contact Technical Support.

The following functionalities are included on the CD:

| SIDOOR User Software | The component that enables the door control system to be configured, parameters to be assigned, and analyzed. |
|---|---|
| Siemens HCS12 Firmware Loader | This component is used to update the operating software of the door controller. |
| SIDOOR USB to UART Bridge Driver | This driver is essential for operation of the USB adapter. |

| **Ordering data** | **Article No.** |
|---|---|
| **SIDOOR software kit** | **6FB1105-0AT01-6SW0** |

### Overview SIDOOR service tool



The service tool can be used to input run commands, change run parameters and read out learned parameters, door states, input/output signals and service data.

The service tool is connected to the various controllers by the respective cable.
- SIDOOR AT12, SIDOOR AT40 and SIDOOR ATD400V elevator door drives
- SIDOOR ATD400K Cold Room Gate Drive, SIDOOR ATD400W and SIDOOR ATD410W machine tool door drives
- SIDOOR ATD400S and SIDOOR ATE250S platform screen door drives

You do not need to open the cover of the controller to do this.

Note:

If the service tool is in the "Quick adjustment" or "Total adjustment" menu, the run commands of the controller are blocked via the command inputs.

| **Ordering data** | **Article No.** |
|---|---|
| **SIDOOR service tool**<br>Hand-held terminal for parameter assignment of controllers | **6FB1105-0AT01-6ST0** |

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# Products for specific requirements
Automatic door controls
for elevators

## Geared motors

### Overview

SIDOOR geared motors are a combination of gear unit, motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning.

The maintenance-free, variable speed drive unit comprises a DC motor with non-self-locking gearing.

The geared motors must be selected according to the dynamic door weight. Two different versions are available for each of the SIDOOR M2 to SIDOOR M5 geared motors:

- SIDOOR M2 geared motors (max. door weight 120 kg)
  - SIDOOR M2 L (pinion left) 6FB1103-0AT10-5MA0
  - SIDOOR M2 R (pinion right) 6FB1103-0AT11-5MA0
- SIDOOR M3 geared motors (max. door weight 180 kg)
  - SIDOOR M3 L (pinion left) 6FB1103-0AT10-4MB0
  - SIDOOR M3 R (pinion right) 6FB1103-0AT11-4MB0
- SIDOOR M4 geared motors (max. door weight 400 kg)
  - SIDOOR M4 L (pinion left) 6FB1103-0AT10-3MC0
  - SIDOOR M4 R (pinion right) 6FB1103-0AT11-3MC0
- SIDOOR M5 geared motors (max. door weight 600 kg)
  - SIDOOR M5 L (pinion left) 6FB1103-0AT10-3MD0
  - SIDOOR M5 R (pinion right) 6FB1103-0AT11-3MD0

The gear outlet direction is defined as left or right when viewing the gear unit from the front.

Geared motors:
SIDOOR M2 L 6FB1103-0AT10-5MA0 (version with pinion left),
SIDOOR M3 L 6FB1103-0AT10-4MB0 (version with pinion left),
SIDOOR M4 L 6FB1103-0AT10-3MC0 (version with pinion left),
SIDOOR M5 L 6FB1103-0AT10-3MD0 (version with pinion left)
(Images are shown in the order from bottom to top)

### Technical specifications

| Article number | 6FB1103-0AT10-5MA0 | 6FB1103-0AT11-5MA0 | 6FB1103-0AT10-4MB0 | 6FB1103-0AT11-4MB0 | 6FB1103-0AT10-3MC0 | 6FB1103-0AT11-3MC0 | 6FB1103-0AT10-3MD0 | 6FB1103-0AT11-3MD0 |
|---|---|---|---|---|---|---|---|---|
| | SIDOOR M2 L | SIDOOR M2 R | SIDOOR M3 L | SIDOOR M3 R | SIDOOR M4 L | SIDOOR M4 R | SIDOOR M5 L | SIDOOR M5 R |
| **General information** | | | | | | | | |
| Product brand name | SIDOOR | | | | | | | |
| Product designation | Motor for door control | | | | | | | |
| Product version | M2 L | M2 R | M3 L | M3 R | M4 L | M4 R | M5 L | M5 R |
| **Supply voltage** | | | | | | | | |
| Supply voltage (DC) | 24 V | | 30 V | | | | | |
| **Input current** | | | | | | | | |
| Operational current (rated value) | 1.8 A | | 4 A | | | | 7.5 A | |
| **Power** | | | | | | | | |
| Active power input | 43 W | | 120 W | | | | 225 W | |
| **Mechanical data** | | | | | | | | |
| Torque of the rotary operating mechanism (rated value) | 1.05 N·m | | 3 N·m | | | | 6.8 N·m | |
| Speed, max. | 0.5 m/s | | 0.65 m/s | | 0.75 m/s | | 0.5 m/s | |
| Gear ratio | 15 | | | | | | | |
| Number of pulses per revolution, max. | 100 | | | | | | | |
| Weight of door, max. | 120 kg | | 180 kg | | 400 kg | | 600 kg | |
| **Degree and class of protection** | | | | | | | | |
| IP degree of protection | | | | | | | | |
| • of the motor | IP20 | | IP54 | | | | | |
| • of the gear unit | IP20 | | IP40 | | | | IP54 | |

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**Products for specific requirements**
Automatic door controls
for elevators

**Geared motors**

## ■ Technical specifications (continued)

| Article number | 6FB1103-0AT10-5MA0 | 6FB1103-0AT11-5MA0 | 6FB1103-0AT10-4MB0 | 6FB1103-0AT11-4MB0 | 6FB1103-0AT10-3MC0 | 6FB1103-0AT11-3MC0 | 6FB1103-0AT10-3MD0 | 6FB1103-0AT11-3MD0 |
|---|---|---|---|---|---|---|---|---|
| | SIDOOR M2 L | SIDOOR M2 R | SIDOOR M3 L | SIDOOR M3 R | SIDOOR M4 L | SIDOOR M4 R | SIDOOR M5 L | SIDOOR M5 R |
| **Ambient conditions** | | | | | | | | |
| **Ambient temperature during operation** | | | | | | | | |
| • min. | -20 °C | | | | | | | |
| • max. | 50 °C | | | | | | | |
| **Ambient temperature during storage/transportation** | | | | | | | | |
| • Storage, min. | -40 °C | | | | | | | |
| • Storage, max. | 85 °C | | | | | | | |
| **Dimensions** | | | | | | | | |
| Height of motor | 90 mm | | 98 mm | | 115 mm | | 124 mm | |
| Length of motor | 207 mm | | 236 mm | | 275 mm | | 344 mm | |
| Diameter of motor | 48 mm | | 63 mm | | | | 80 mm | |
| Width of gear unit, including drive pinion | 90 mm | | 85 mm | | 105 mm | | 111 mm | |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIDOOR M2 geared motors** | | **SIDOOR M4 geared motors** | |
| M2 L | **6FB1103-0AT10-5MA0** | M4 L | **6FB1103-0AT10-3MC0** |
| M2 R | **6FB1103-0AT11-5MA0** | M4 R | **6FB1103-0AT11-3MC0** |
| **SIDOOR M3 geared motors** | | **SIDOOR M5 geared motors** | |
| M3 L | **6FB1103-0AT10-4MB0** | M5 L | **6FB1103-0AT10-3MD0** |
| M3 R | **6FB1103-0AT11-4MB0** | M5 R | **6FB1103-0AT11-3MD0** |

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# Products for specific requirements
## Automatic door controls
## for elevators

### Direct drives

## Overview



SIDOOR MED280 direct drive

SIDOOR direct drives are a combination of motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning.

The maintenance-free drive unit consists of a gearless, speed-controlled, electronically commutated motor with non-self-locking gearing.

Direct drives are designed for certain maximum dynamic door weights and can control both drive directions.

- SIDOOR MED280 direct drive for dynamic door weights up to 280 kg (6FB1203-0AT12-7DA0)

## Technical specifications

| Article number | **6FB1203-0AT12-7DA0** |
| --- | --- |
| | SIDOOR MED280 |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Motor for door control |
| Product version | MED280 |
| **Supply voltage** | |
| Supply voltage (DC) | 24 V |
| **Input current** | |
| Operational current (rated value) | 9.7 A |
| **Power** | |
| Active power input | 233 W |
| **Mechanical data** | |
| Torque of the rotary operating mechanism (rated value) | 4.7 N·m |
| Speed, max. | 0.8 m/s |
| Number of pulses per revolution, max. | 1 024 |
| Weight of door, max. | 280 kg |
| **Degree and class of protection** | |
| IP degree of protection | |
| • of the motor | IP54 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 70 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 85 °C |
| **Dimensions** | |
| Width of motor | 160 mm |
| Height of motor | 140 mm |
| Length of motor | 56 mm |
| • including drive pinion | 91 mm |

| Ordering data | Article No. |
| --- | --- |
| **SIDOOR MED280 direct drive** | **6FB1203-0AT12-7DA0** |
| Motor for door control | |

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**Products for specific requirements**
Automatic door controls
for elevators

Accessories

## Overview

***A range of accessories is available for SIDOOR elevator door drive systems with geared motors:***

This is necessary to ensure low-noise operation of the door by the controller. The geared motors can be optimally integrated into the respective door drive system.

Rubber-metal anti-vibration mounts for geared motors

To ensure low-noise door operation, SIDOOR geared motors are integrated in the door system using rubber-metal anti-vibration mounts.

• Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0 for geared motors with a door weight of less than 300 kg
• Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0 for geared motors with a door weight of 300 kg or more



Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0
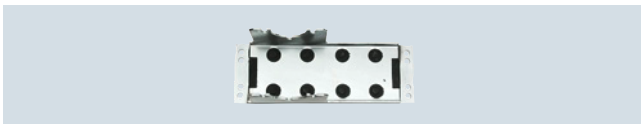


Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0

Mounting brackets

Two different mounting brackets are available with elongated holes:

• Mounting bracket 6FB1104-0AT01-0AS0 for the geared motors for flexible accommodation of the rubber-bonded metal
• Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit. This enables the toothed belt to be set to the required belt tension.



Mounting bracket 6FB1104-0AT01-0AS0 for mounting the geared motor



Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit

Door clutch holder

The door clutch holder serves to connect the respective door leaf by means of a toothed belt while also functioning as a toothed-belt lock. One door clutch holder per door leaf is required. The toothed-belt lock can accommodate both open ends of the toothed belt.

A door clutch holder is available for each toothed belt width:
• Width 12 mm: 6FB1104-0AT01-0CP0
• Width 14 mm: 6FB1104-0AT02-0CP0



Door clutch holder 6FB1104-0AT01-0CP0 (packing size = 1 unit)

Deflector unit

The deflector unit 6FB1104-0AT03-0AS0 contains an embedded belt pulley which can be mounted on the door system.

The STS toothed belt is redirected via this deflector unit.



Deflector unit 6FB1104-0AT03-0AS0

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# Products for specific requirements
Automatic door controls
for elevators

## Accessories

### ■ Overview (continued)

STS toothed belt

The door system is moved between the end positions of the door using the STS toothed belts. Two different toothed belt lengths can be ordered for each toothed belt width.

Toothed belt width 12 mm:
- Length 4 m: 6FB1104-0AT01-0AB0
- Length 45 m: 6FB1104-0AT02-0AB0

Toothed belt width 14 mm:
- Length 4 m: 6FB1104-0AT03-0AB0
- Length 55 m: 6FB1104-0AT04-0AB0



Toothed belt 6FB1104-0AT01-0AB0, length 4 m



Toothed belt 6FB1104-0AT02-0AB0, length 45 m

*A range of accessories is available for SIDOOR elevator door systems with EC technology:*

Motor holder 6FB1104-0AT03-0AD0 for accommodation of the SIDOOR MED280 direct drive.
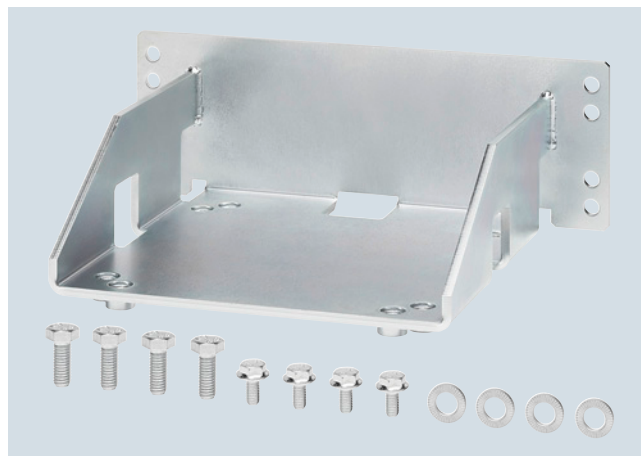


Mounting bracket:
- For mounting the SIDOOR motor holder 6FB1104-0AT01-0AS0



- With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (large) 6FB1104-0AT05-0AS4



SIDOOR mounting bracket, large

- With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (small) 6FB1104-0AT05-0AS5



SIDOOR mounting bracket, small

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**Products for specific requirements**
Automatic door controls
for elevators

**Accessories**

■ **Overview** (continued)

Door clutch holder

• For attaching both ends of the toothed belt and connecting the respective door panel to the toothed belt, width 20 mm 6FB1104-0AT05-0AS1



SIDOOR door clutch holder

Deflector unit:

For attaching the SIDOOR toothed belt and fixing to the door 6FB1104-0AT07-0AS0



SIDOOR deflector unit

Toothed belt STD

As a connection between the door system and the end positions of the door

Toothed belt width 20 mm. Length 4 m 6FB1104-0AT05-0AB0



SIDOOR toothed belt, small

Toothed belt width 20 mm. Length 45 m 6FB1104-0AT06-0AB1



SIDOOR toothed belt, large

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# Products for specific requirements
## Automatic door controls
## for elevators

**Accessories**

### Ordering data

| Elevator door systems with EC technology | Article No. |
|---|---|
| **Motor holder for SIDOOR MED280 direct drive** | **6FB1104-0AT03-0AD0** |
| **Mounting bracket for mounting the motor holder** | **6FB1104-0AT01-0AS0** |
| **Mounting bracket with tensioning device for mounting the deflector unit** • Large • Small | **6FB1104-0AT05-0AS4** **6FB1104-0AT05-0AS5** |
| **SIDOOR door clutch holder** For toothed belt, width 20 mm | **6FB1104-0AT05-0AS1** |
| **SIDOOR deflector unit** | **6FB1104-0AT07-0AS0** |
| **SIDOOR STD toothed belt** Width 20 mm • 4 m • 55 m | **6FB1104-0AT05-0AB0** **6FB1104-0AT06-0AB1** |

| Elevator door systems with geared motors | Article No. |
|---|---|
| **Rubber-metal anti-vibration mounts for geared motors** • SIDOOR rubber-metal anti-vibration mount for geared motors for door weights up to 300 kg • SIDOOR rubber-metal anti-vibration mount for geared motors for door weights from 300 kg | **6FB1104-0AT02-0AD0** **6FB1104-0AT01-0AD0** |
| **Mounting bracket** • SIDOOR mounting bracket for geared motor • SIDOOR mounting bracket with tensioning device for deflector pulley | **6FB1104-0AT01-0AS0** **6FB1104-0AT02-0AS0** |
| **SIDOOR door clutch holder** • For toothed belt, width 12 mm • For toothed belt, width 14 mm | **6FB1104-0AT01-0CP0** **6FB1104-0AT02-0CP0** |
| **SIDOOR deflector unit** | **6FB1104-0AT03-0AS0** |
| **SIDOOR STS toothed belt** Width 12 mm • 4 m • 45 m | **6FB1104-0AT01-0AB0** **6FB1104-0AT02-0AB0** |
| **SIDOOR STS toothed belt** Width 14 mm • 4 m • 55 m | **6FB1104-0AT03-0AB0** **6FB1104-0AT04-0AB0** |

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## Overview

The machine tool door drive consists of a controller and a maintenance-free drive unit, the geared motors.

Controllers are electronic controllers connected to the power supply via an external power supply unit (SIDOOR NT40, SIDOOR Transformer). They are generally connected to the higher-level controller via digital or fieldbus interfaces, and can be configured via a user interface.

Three controllers are available for selection for machine tool doors:

- SIDOOR ATD401W, connected to the higher-level controller via the digital interface (relay module), up to 600 kg door weight

- SIDOOR ATD410W, connected to the higher-level controller via a USS bus interface (USS module), up to 600 kg door weight

- SIDOOR ATD420W, connected to the higher-level controller via a PROFIBUS interface (PROFIBUS module), up to 600 kg door weight

The safe functions – force limitation, energy limitation and end position detection – fulfill the requirements according to EN ISO 13849-1:2008 for Category 2 and Performance Level d. The drives are suitable for power-operated guards according to EN 953:1997+A1:2009 Section 5.2.5.2 "Actuating forces".

Geared motors form the maintenance-free drive unit in the door drive. The geared motors are DC motors with non-self-locking gearing, and are speed-controlled. The set force and speed limits are not exceeded.

Operation of the named door drives does not require limit switches. The door width and the "OPEN"/"CLOSE" positions are determined automatically.

The power is transmitted by a toothed belt. The toothed belt passes over a deflector pulley and can be fitted with 2 door clutch holders. This enables it to drive both one-sided and centrally opening doors. The accessories are not included in the scope of delivery, see "Accessories".

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# Products for specific requirements
Automatic door controls
for industry applications

**Controllers > SIDOOR ATD400K cold room gate drive**

## ■ Overview



SIDOOR ATD400K cold room gate drive

The legend for the numbered callouts:

1. Emergency power module connection
2. Relay module, USS module or PROFIBUS module (according to requirements)
3. Terminal module
4. Output voltage 24 V DC/400 mA connection
5. Connection
   - software kit or
   - service tool
6. Input signal connection
7. Control panel
8. Input voltage connection
   16.8 to 36 V DC
   for connection of power supply
9. Motor connection

The SIDOOR ATD400K door controller enables the optimally controlled movement of horizontally opening cold room gates with dynamic weights of up to 400 kg.

Both drive variants offer a range of assignment options for the digital inputs here:

- Relay module design
  - SIDOOR ATD400K RELAY LB for connection of a light barrier
  - SIDOOR ATD400K RELAY RC for connection of a gate interlock
- For dynamic door weights up to 400 kg
- Operator terminal/seven-segment display
- 4 digital inputs, 3 relay contacts
- Automatic door weight detection
- Operating temperature from -20 to +50 °C
- Flexible motor management with automatic motor recognition
- Opening width 0.3 to 4 m
- Closing speeds of up to 0.5 m/s

- Emergency power input via special emergency power module 24 V DC ± 15 %
- Auxiliary power output 24 V DC ± 15 %; 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Vandal-proof
- IP54 degree of protection for 180 to 400 kg motor versions, gear unit IP40
- The "cord-operated switch" function is supported. Pulling the cord opens the door to an adjustable width.
- Pulse operation: The door control signal remains active until a new command arrives.
- Hold-open time can be parameterized
- A higher force can be set for the first 10 cm of the opening movement (boosting the door)

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**Products for specific requirements**
Automatic door controls
for industry applications

**Controllers > SIDOOR ATD400K cold room gate drive**

## Technical specifications

| Article number | 6FB1141-1AT10-3KU2 | 6FB1141-1AT11-3KU2 |
|---|---|---|
| | SIDOOR ATD400K RELAY LB | SIDOOR ATD400K RELAY RC |
| **General information** | | |
| Product brand name | SIDOOR | |
| Product designation | Door controller | |
| Product version | ATD400K relay LS | ATD400K relay RC |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0) | |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT10-4MB0, 6FB1103-0AT11-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0 | |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0 | |
| **Supply voltage** | | |
| Type of power supply | via SIDOOR mains transformer | |
| **Input current** | | |
| Current consumption, max. | 10 A | |
| I²t, min. | 30 A²·s | |
| **Power** | | |
| Active power input | 80 W | |
| Active power input, max. | 540 W | |
| Active power input (standby mode) | 5 W | |
| **Digital inputs** | | |
| Control inputs isolated | Yes | |
| Control inputs p-switching | Yes | |
| **Input voltage** | | |
| • per DC input, min. | 10 V; Observe polarity ! | |
| • per DC input, max. | 28 V; Observe polarity ! | |
| **Input current** | | |
| • per DC input, min. | 9 mA | |
| • per DC input, max. | 27 mA | |
| **Digital outputs** | | |
| short-circuit proof | Yes | |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! | |
| **Output voltage** | | |
| • Output voltage (DC) | 24 V | |
| **Output current** | | |
| • For output (24 V DC), max. | 400 mA | |
| **Relay outputs** | | |
| **Switching capacity of contacts** | | |
| - at 50 V DC, min. | 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 50 V DC, max. | 1 A; 50 V DC switching voltage not released for NFPA-relevant countries | |
| - at 230 V AC, min. | 0.01 A | |
| - at 230 V AC, max. | 1 A | |

| Article number | 6FB1141-1AT10-3KU2 | 6FB1141-1AT11-3KU2 |
|---|---|---|
| | SIDOOR ATD400K RELAY LB | SIDOOR ATD400K RELAY RC |
| **Mechanical data** | | |
| Opening width of door, min. | 0.3 m | |
| Opening width of door, max. | 4 m | |
| Weight of door, max. | 400 kg | |
| Operating cycle frequency of door, max. | 180 1/h | |
| **Interfaces** | | |
| Interfaces/bus type | without | |
| **Isolation** | | |
| Overvoltage category | 2 | |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | |
| **Standards, approvals, certificates** | | |
| CE mark | Yes | |
| UL approval | No | |
| TÜV Inspectorate approval | Yes | |
| TÜV prototype tested | Yes | |
| Requirement class for protective devices according to EN 12453, section 5.5.1 | Protection level C | |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-3 | |
| Standard for safety | EN ISO 13849-1 Cat. 2 PL d | |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -20 °C | |
| • max. | 50 °C | |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -40 °C | |
| • Storage, max. | 50 °C | |
| **Relative humidity** | | |
| • No condensation, min. | 10 % | |
| • No condensation, max. | 93 % | |
| **Dimensions** | | |
| Width | 320 mm | |
| Height | 60 mm | |
| Depth | 80 mm | |

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| **Ordering data** | **Article No.** |
|---|---|
| **SIDOOR ATD400K** | |
| • SIDOOR ATD400K RELAY LB with light barrier function support | **6FB1141-1AT10-3KU2** |
| • SIDOOR ATD400K RELAY RC with gate interlock function support | **6FB1141-1AT11-3KU2** |

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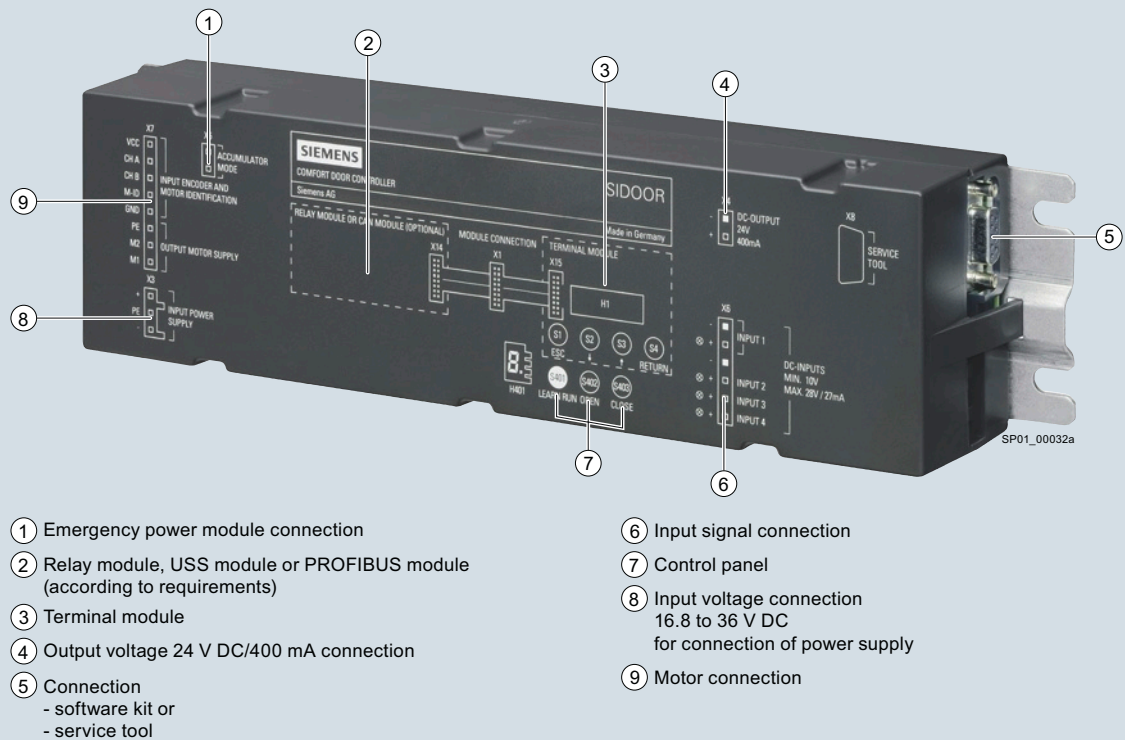
# Products for specific requirements
Automatic door controls
for industry applications

**Controllers   > SIDOOR ATD401W machine tool door drive**

## Overview
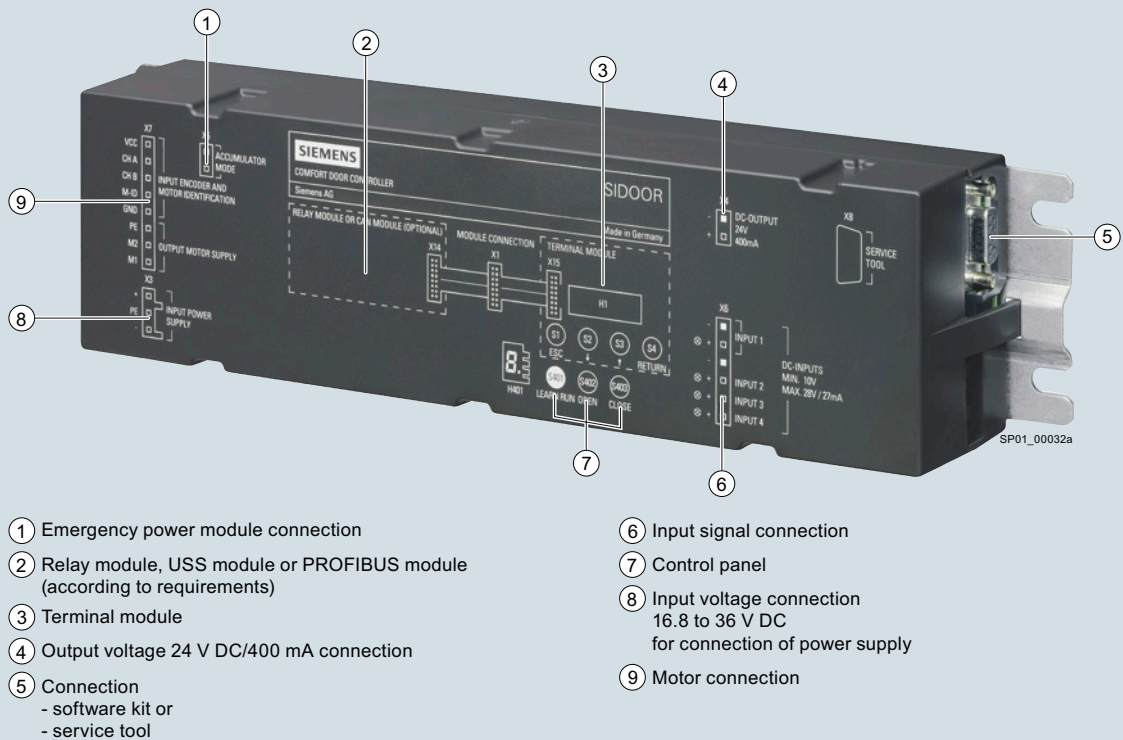


SIDOOR ATD401W machine tool door drive

The SIDOOR ATD401W machine tool door drive enables the quick, easy and versatile installation, configuration and operation of a wide range of industrial door drive systems.

- Relay module design
- For dynamic door weights up to 600 kg
- Automatic determination of the door weight and friction during the learn run
- Digital inputs, for example for direct connection of a light barrier as type 2 ESPE (electro-sensitive protective equipment) according to EN 61496-1

- 3 relay outputs for position feedback and reversing feedback
- Operating temperature -20 to +50 °C
- Flexible motor management, automatic recognition of the geared motor
- Opening width 0.3 to 5 m
- Auxiliary voltage output 24 V DC ±15%; 0.4 A (short-circuit-proof)
- Output stage for the motor control is short-circuit-proof
- Indicates the current operating states on a 7-segment display directly on the controller or using the software kit or service tool

Legend:
1. Emergency power module connection
2. Relay module, USS module or PROFIBUS module (according to requirements)
3. Terminal module
4. Output voltage 24 V DC/400 mA connection
5. Connection - software kit or - service tool
6. Input signal connection
7. Control panel
8. Input voltage connection 16.8 to 36 V DC for connection of power supply
9. Motor connection

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**Products for specific requirements**
Automatic door controls
for industry applications

Controllers   > SIDOOR ATD401W machine tool door drive

## Technical specifications

| Article number | 6FB1141-1AT11-3WE2 |
| --- | --- |
| | SIDOOR ATD401W |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD401W |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0), NT40 (6FB1112-0AT20-3PS0), DIN rail holder (6FB1144-0AT00-3AS0) |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT11-3MC0, 6FB1103-0AT10-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-4MB0, 6FB1103-0AT14-4MB0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-3MC0, 6FB1103-0AT11-3MD0, 6FB1103-0AT10-3MD0 |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0, 6EP3446-8SB10-0AY0 |
| **Installation type/mounting** | |
| Installation and mounting instructions | No direct sunlight, requirements specific to the end application must be observed. NFPA industry environment: Installation outside a control cabinet only horizontal |
| **Supply voltage** | |
| Type of power supply | via SIDOOR mains transformer / NT40 / SITOP PSU8200 13 A, 6 V or via DC |
| Rated value (DC) | 36 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 38 V |
| **Input current** | |
| I²t, min. | 30 A²·s |
| **Power** | |
| Active power input | 145 W |
| Active power input, max. | 540 W |
| Active power input (standby mode) | 5 W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |

| Article number | 6FB1141-1AT11-3WE2 |
| --- | --- |
| | SIDOOR ATD401W |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
|   - at 30 V DC, min. | 0.01 A |
|   - at 30 V DC, max. | 1 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 5 m |
| Weight of door, max. | 600 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 75 N |
| Kinetic energy, max. | 100 J |
| **Interfaces** | |
| Interfaces/bus type | without |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | No |
| CE mark | Yes |
| UL approval | Yes |
| EAC (formerly Gost-R) | Yes |
| TÜV Inspectorate approval | Yes |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-4 |
| Standard for safety | EN 60950-1 / UL61010-1 / UL61010-2-201 / EN ISO 13849-1 Cat. 2 PL d |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 50 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

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## Ordering data

| | Article No. |
| --- | --- |
| **SIDOOR ATD401W** | **6FB1141-1AT11-3WE2** |
| Controller for machine tool doors, relay module design | |

# Products for specific requirements
## Automatic door controls
## for industry applications

**Controllers   > SIDOOR ATD410W machine tool door drive**

## ■ Overview
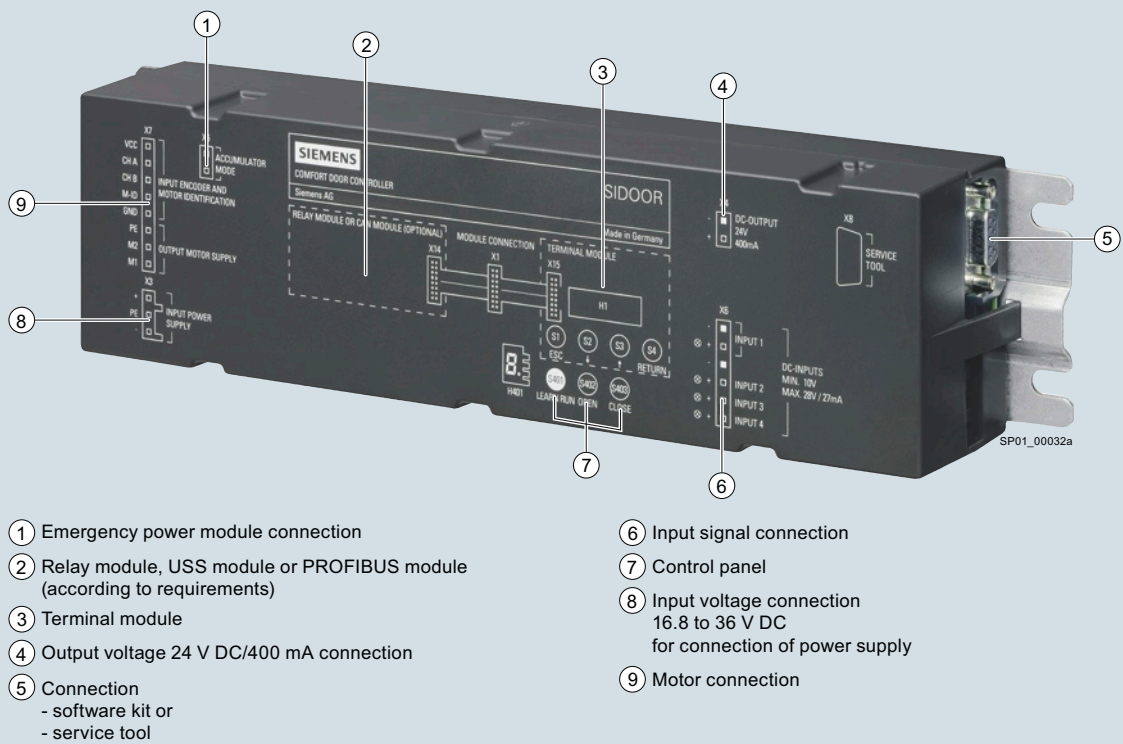


SIDOOR ATD410W machine tool door drive

The SIDOOR ATD410W machine tool door drive can be used to operate horizontal sliding doors. The drive system has been specifically designed for use in a very wide range of machine tools. The communication-capable ATD410W controller offers complete flexibility for integration with a machine tool via the USS protocol (universal serial interface protocol).

- For dynamic door weights up to 600 kg
- USS module design: USS communications interface for connection to ET 200-type higher-level controllers, SIMATIC S7-1200, SIMATIC S7-1500 and SIMATIC S7-300 via USS interface
- 5 freely parameterizable digital inputs for signal acquisition, of which one input is optionally parameterizable for:
  - Connection of a light barrier as type 2 ESPE (electro-sensitive protective equipment) according to EN 61496-1
  - Connection of a pressure-sensitive edge according to ISO 13856-22, relay contacts for additional position signals

- Automatic determination of the door weight and friction during the learn run
- Operating temperature -20 to +50 °C
- Flexible motor management, i.e. automatic recognition of the geared motor
- Assisted drive (motor-assisted movement of the door)
- Impulse stop (door stopped automatically by applying light force)
- Impulse drive (automatic door movement by applying light force)
- Opening width 0.3 to 5 m
- Auxiliary voltage output 24 V DC ± 15 %; 0.4 A (short-circuit-proof)
- Output stage for the motor control short-circuit-proof
- Displays the current operating states on a 7-segment display directly on the controller or with the software kit or service tool
- All door parameters can be assigned via the PROFIdrive profile with the function block provided. For details, see the System Manual "SIDOOR AT40, ATD400V, ATD400K, ATD400W, ATD410W, ATD400S, ATE250S, ATD400T", http://support.automation.siemens.com/WW/view/en/58531074

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**Products for specific requirements**
Automatic door controls
for industry applications

Controllers   > SIDOOR ATD410W machine tool door drive

■ **Technical specifications**

| Article number | 6FB1141-4AT10-3WE2 |
|---|---|
| | SIDOOR ATD410W |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD410W |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0), NT40 (6FB1112-0AT20-3PS0), DIN rail holder (6FB1144-0AT00-3AS0) |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT11-3MC0, 6FB1103-0AT10-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-4MB0, 6FB1103-0AT14-4MB0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-3MC0, 6FB1103-0AT11-3MD0, 6FB1103-0AT10-3MD0 |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0, 6EP3446-8SB10-0AY0 |
| **Installation type/mounting** | |
| Installation and mounting instructions | No direct sunlight, requirements specific to the end application must be observed. NFPA industry environment: Installation outside a control cabinet only horizontal |
| **Supply voltage** | |
| Type of power supply | via SIDOOR mains transformer / NT40 / SITOP PSU8200 13 A, 6 V or via DC |
| Rated value (DC) | 36 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 38 V |
| **Input current** | |
| I²t, min. | 30 A²·s |
| **Power** | |
| Active power input | 145 W |
| Active power input, max. | 540 W |
| Active power input (standby mode) | 5 W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |

| Article number | 6FB1141-4AT10-3WE2 |
|---|---|
| | SIDOOR ATD410W |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 30 V DC, min. | 0.01 A |
| - at 30 V DC, max. | 0.5 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 5 m |
| Weight of door, max. | 600 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 75 N |
| Kinetic energy, max. | 100 J |
| **Interfaces** | |
| Interfaces/bus type | USS according to EIA 485, IEC 61800-7-200 Type 3 |
| Number of bus nodes | 32 |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | No |
| CE mark | Yes |
| UL approval | No |
| EAC (formerly Gost-R) | Yes |
| TÜV Inspectorate approval | Yes |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-4 |
| Standard for safety | EN 60950-1 / EN ISO 13849-1 2008 Cat. 2 PL d |

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# Products for specific requirements
## Automatic door controls
## for industry applications

■ **Technical specifications** (continued)

| Article number | 6FB1141-4AT10-3WE2 |
|---|---|
| | SIDOOR ATD410W |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 50 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

■ **Ordering data**  **Article No.**

**SIDOOR ATD410W**

Controller for machine tool doors, with USS interface for connection to higher-level controllers

**6FB1141-4AT10-3WE2**

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**Products for specific requirements**
Automatic door controls
for industry applications

Controllers   > SIDOOR ATD420W machine tool door drive

## Overview



SIDOOR ATD420W machine tool door drive

The SIDOOR ATD420W machine tool door drive can be used to operate horizontal sliding doors. The drive system has been specially designed for use in a very wide range of machine tools. The communication-capable ATD420W controller offers complete flexibility for integration with a machine tool.

- For dynamic door weights up to 600 kg
- 5 freely parameterizable digital inputs for signal acquisition, of which one input is optionally parameterizable for
  - Connection of a light barrier as type 2 ESPE (electrosensitive protective equipment) according to EN 61496-1
  - Connection of a pressure-sensitive edge according to ISO 13856-2
- 2 relay contacts for additional position signals
- Automatic determination of the door weight and friction during the learn run
- Parameter assignment and analysis of the door parameters via PROFIdrive
- Operating temperature -20 to +50 °C

- Flexible motor management, i.e. automatic recognition of the geared motor
- Assisted drive (motor-assisted movement of the door)
- Impulse stop (door stopped automatically by applying light force)
- Impulse drive (automatic door movement after applying light force)
- Opening width 0.3 to 5 m
- Auxiliary power output 24 V DC ±15 % and 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Displays the current operating states on a 7-segment display directly on the controller or with the software kit or service tool
- All door parameters can be assigned via the PROFIdrive profile with the function block provided. For details see the System Manual "SIDOOR AT40, ATD400V, ATD400K, ATD400W, ATD410W, ATD400S, ATE250S, ATD400T"
  http://support.automation.siemens.com/WW/view/en/58531074

**Legend:**
1. Emergency power module connection
2. Relay module, USS module or PROFIBUS module (according to requirements)
3. Terminal module
4. Output voltage 24 V DC/400 mA connection
5. Connection
   - software kit or
   - service tool
6. Input signal connection
7. Control panel
8. Input voltage connection
   16.8 to 36 V DC
   for connection of power supply
9. Motor connection

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# Products for specific requirements
## Automatic door controls
for industry applications

## ■ Technical specifications

| Article number | **6FB1141-2AT10-3WE2** |
|---|---|
| | SIDOOR ATD420W |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD420W |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0), NT40 (6FB1112-0AT20-3PS0), DIN rail holder (6FB1144-0AT00-3AS0) |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT11-3MC0, 6FB1103-0AT10-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-4MB0, 6FB1103-0AT14-4MB0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-3MC0, 6FB1103-0AT11-3MD0, 6FB1103-0AT10-3MD0 |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0, 6EP3446-8SB10-0AY0 |
| **Installation type/mounting** | |
| Installation and mounting instructions | No direct sunlight, requirements specific to the end application must be observed. NFPA industry environment: Installation outside a control cabinet only horizontal |
| **Supply voltage** | |
| Type of power supply | via SIDOOR mains transformer / NT40 / SITOP PSU8200 13 A, 6 V or via DC |
| Rated value (DC) | 36 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 38 V |
| **Input current** | |
| I²t, min. | 30 A²·s |
| **Power** | |
| Active power input | 145 W |
| Active power input, max. | 540 W |
| Active power input (standby mode) | 5 W |

| Article number | **6FB1141-2AT10-3WE2** |
|---|---|
| | SIDOOR ATD420W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 30 V DC, min. | 0.01 A |
| - at 30 V DC, max. | 0.5 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 5 m |
| Weight of door, max. | 600 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 75 N |
| Kinetic energy, max. | 100 J |
| **Interfaces** | |
| Interfaces/bus type | PROFIBUS according to IEC 61784-3 |
| Number of bus nodes | 32 |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |

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**Products for specific requirements**
Automatic door controls
for industry applications

Controllers   > SIDOOR ATD420W machine tool door drive

## ■ Technical specifications  (continued)

| Article number | **6FB1141-2AT10-3WE2** |
|---|---|
| | SIDOOR ATD420W |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | No |
| CE mark | Yes |
| UL approval | Yes |
| EAC (formerly Gost-R) | Yes |
| TÜV Inspectorate approval | Yes |
| PNO certificate | Yes |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-4 |
| Standard for safety | EN 60950-1 / UL61010-1 / UL61010-2-201 / EN ISO 13849-1 Cat. 2 PL d |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 50 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIDOOR ATD420W** | **6FB1141-2AT10-3WE2** |
| Controller for machine tool doors, integrated PROFIBUS interface | |

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# Products for specific requirements
## Automatic door controls
### for industry applications

**Controllers > SIDOOR ATD430W machine tool door drive**

■ **Overview**



1. Emergency power module connection
2. Relay module, USS module or PROFIBUS module (according to requirements)
3. Terminal module
4. Output voltage 24 V DC/400 mA connection
5. Connection
   - software kit or
   - service tool
6. Input signal connection
7. Control panel
8. Input voltage connection 16.8 to 36 V DC for connection of power supply
9. Motor connection

SIDOOR ATD430W machine tool door drive

The SIDOOR ATD430W machine tool door drive can be used to operate horizontal sliding doors. The drive system has been specially designed for use in a very wide range of machine tools. The communication-capable ATD430W controller offers complete flexibility for integration into a machine tool via PROFINET.

- For dynamic door weights up to 600 kg
- Integrated PROFINET interface (2 RJ45 ports)
- 5 freely parameterizable digital inputs for signal acquisition, of which one input is optionally parameterizable for:
  - Connecting a light barrier as type 2 ESPE (electro-sensitive protective equipment) according to EN 61496-1
  - Connecting a pressure-sensitive edge according to ISO 13856-22, relay contacts for additional position signals
- 2 relay contacts for additional position signals
- Automatic determination of the door weight and friction during the learn run
- Parameter assignment and analysis of the door parameters via PROFIdrive
- Operating temperature -20 to +50 °C

- Flexible motor management, i.e. automatic recognition of the geared motor
- Assisted drive (motor-assisted door movement)
- Impulse stop (door stopped automatically by applying light force)
- Impulse drive (automatic door movement after applying light force)
- Opening width 0.3 to 5 m
- Auxiliary power output 24 V DC ±15 % and 0.4 A (short-circuit-proof)
- Output stage for the motor control is short-circuit-proof
- Indicates the current operating states on a 7-segment display directly on the controller or using the software kit or service tool
- All door parameters can be assigned via the PROFIdrive profile with the function block provided. For details, see System Manual "SIDOOR AT40, ATD400V, ATD400K, ATD4xxW, ATD400S, ATE250S, ADT400T", http://support.automation.siemens.com/WW/view/en/58531074

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**Products for specific requirements**
Automatic door controls
for industry applications

Controllers > **SIDOOR ATD430W machine tool door drive**

■ **Technical specifications**

| Article number | **6FB1141-3AT10-3WE2** |
|---|---|
| | SIDOOR ATD430W |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD430W |
| Optional product expansion | Mains transformer (6FB1112-0AT20-2TR0), NT40 (6FB1112-0AT20-3PS0), DIN rail holder (6FB1144-0AT00-3AS0) |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT11-3MC0, 6FB1103-0AT10-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-4MB0, 6FB1103-0AT14-4MB0, 6FB1103-0AT14-3MC0, 6FB1103-0AT13-3MC0, 6FB1103-0AT11-3MD0, 6FB1103-0AT10-3MD0 |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0, 6FB1112-0AT20-3PS0, 6EP3446-8SB10-0AY0 |
| **Installation type/mounting** | |
| Installation and mounting instructions | No direct exposure to the sun |
| **Supply voltage** | |
| Type of power supply | via SIDOOR mains transformer / NT40 / SITOP PSU8200 13 A, 6 V or via DC |
| Rated value (DC) | 36 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 38 V |
| **Input current** | |
| $I^2t$, min. | 30 $A^2 \cdot s$ |
| **Power** | |
| Active power input | 145 W |
| Active power input, max. | 540 W |
| Active power input (standby mode) | 5 W |

| Article number | **6FB1141-3AT10-3WE2** |
|---|---|
| | SIDOOR ATD430W |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |
| **Digital outputs** | |
| short-circuit proof | Yes |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output voltage** | |
| • Output voltage (DC) | 24 V |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 30 V DC, min. | 0.01 A |
| - at 30 V DC, max. | 0.5 A |
| **Mechanical data** | |
| Opening width of door, min. | 0.3 m |
| Opening width of door, max. | 5 m |
| Weight of door, max. | 600 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 75 N |
| Kinetic energy, max. | 100 J |
| **Interfaces** | |
| Interfaces/bus type | PROFINET IO according to Conformance Class C |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |

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# Products for specific requirements
## Automatic door controls
for industry applications

**Controllers   > SIDOOR ATD430W machine tool door drive**

## ■ Technical specifications  (continued)

| Article number | **6FB1141-3AT10-3WE2** |
|---|---|
| | SIDOOR ATD430W |
| **Standards, approvals, certificates** | |
| Certificate of suitability according to EN 81 | No |
| CE mark | Yes |
| UL approval | Yes |
| TÜV Inspectorate approval | Yes |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-4 |
| Standard for safety | EN 60950-1 / UL61010-1 / UL61010-2-201 / EN ISO 13849-1 Cat. 2 PL d |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 50 °C |
| • Remark | Screw control device thermally conductive onto a metallic mounting surface or standard rail mounting, otherwise the maximum operating temperature is only 40 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

## ■ Ordering data                                   Article No.

| **SIDOOR ATD430W** | **6FB1141-3AT10-3WE2** |
|---|---|
| Controller for machine tool doors, integrated PROFINET interface (2 RJ45 ports) | |

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**Products for specific requirements**
Automatic door controls
for industry applications

**Power supplies**

## Overview

The power supply units can be used for the various SIDOOR controllers:

SIDOOR Transformer power supply:
for masses of up to 400 kg and moderate performance.

- SIDOOR AT40, SIDOOR ATD400V and ATE500E elevator door drives
- SIDOOR ATD400K cold room gate drives
- SIDOOR ATD4xxW machine tool door drives
- SIDOOR ATE53xS platform screen door drives

SIDOOR NT40 switched-mode power supply:
for masses of up to 600 kg and maximum performance.

- SIDOOR AT40, SIDOOR ATD400V and ATE500E elevator door drives
- SIDOOR ATD4xxW machine tool door drives

SITOP PSU8200 3-phase stabilized power supply,
36 V DC/13 A:
for masses of up to 600 kg and maximum performance.

- SIDOOR ATD4xxW machine tool door drives

## Overview Power transformer



The SIDOOR Transformer power supply is a standard power supply unit operated with 220-240 V AC, 50/60 Hz, from the SIDOOR product range. It can be used for all controllers without an integrated power supply unit. The SIDOOR AT12 elevator door drive has an integrated power supply unit, for example.

For more information, see page 13/21.

## Overview Switched-mode power supply



The SIDOOR NT40 switched-mode power supply is operated with 230 V AC (± 15 %), 50/60 Hz, to power the following SIDOOR door controllers:

- SIDOOR AT40 and SIDOOR ATD400V elevator door drives
- SIDOOR ATD400K cold room gate drives
- SIDOOR ATD4xxW machine tool door drives

It is especially suitable for door systems with high door weights.

On the output side, the power supply unit delivers a voltage of 36 V DC (± 3 %) SELV at a rated output power of < 100 W.

In order to enable fast acceleration/deceleration of the doors by the controller, the device can briefly (< 2 s) deliver a current of 15 A (corresponds to a short-time power output of 540 W).

For more information, see page 13/22.

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# Products for specific requirements
## Automatic door controls
for industry applications

**Power supplies   > SITOP PSU8200 3-phase, 36 V DC/13 A**

### Overview SITOP PSU8200 3-phase, 36 V DC/13 A



The 3-phase SITOP modular are technology power supplies for sophisticated solutions and offer maximum functionality for use in complex plants and machines. The wide-range input allows connection to almost any electrical power system worldwide and ensures a high degree of safety, even if there are large voltage fluctuations. The power boost provides up to three times the rated current for brief periods. In case of overload, you can choose between constant current with automatic restart or latching shutdown. The high degree of efficiency keeps energy consumption and heating in the control cabinet low, and the compact metal housing also saves space.

### *Main product highlights*

- 36 V DC/13 A
- 3-phase AC input 400 to 500 volts
- Extremely slim design – no lateral installation clearances required
- Power boost with 3 times the rated current (for 25 ms) for tripping protective devices
- Extra power with 1.5 times the rated current (5 s/min) for brief functional overload
- Choice of constant current or latching shutdown short-circuit response
- Optional symmetrical load distribution for parallel operation
- Operating state on 3 LEDs
- Extremely high efficiency up to 94%
- Wide temperature range from -25 to +70 °C
- Comprehensive certifications, such as cULus, ATEX

### Technical specifications

| Article number | **6EP3446-8SB10-0AY0** |
|---|---|
| Product | SITOP PSU8200 |
| Power supply, type | 36 V/13 A |
| **Input** | |
| Input | 3-phase AC |
| Rated voltage value $V_{in\ rated}$ | 400 ... 500 V |
| Voltage range AC | 320 ... 575 V |
| Wide-range input | Yes |
| Mains buffering at $I_{out\ rated}$, min. | 15 ms; at $V_{in}$ = 400 V |
| Rated line frequency 1 | 50 Hz |
| Rated line frequency 2 | 60 Hz |
| Rated line range | 47 ... 63 Hz |
| Input current | |
| • at rated input voltage 400 V | 1.2 A |
| • at rated input voltage 500 V | 1 A |
| Switch-on current limiting (+25 °C), max. | 16 A |
| $I^2t$, max. | 0.8 A²·s |
| Built-in incoming fuse | none |
| Protection in the mains power input (IEC 898) | Required: 3-pole connected miniature circuit breaker 6 ... 16 A characteristic C or circuit breaker 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489) |
| **Output** | |
| Output | Controlled, isolated DC voltage |
| Rated voltage $V_{out}$ DC | 36 V |
| Total tolerance, static ± | 3 % |
| Static mains compensation, approx. | 0.1 % |
| Static load balancing, approx. | 0.2 % |
| Residual ripple peak-peak, max. | 100 mV |
| Spikes peak-peak, max. (bandwidth: 20 MHz) | 200 mV |
| Adjustment range | 36 ... 42 V |
| Product function Output voltage adjustable | Yes |
| Output voltage setting | via potentiometer; max. 480 W |
| Status display | Green LED for 36 V OK |
| Signaling | Relay contact (NO contact, rating 60 V DC/ 0.3 A) for 36 V OK |
| On/off behavior | No overshoot of $V_{out}$ (soft start) |
| Startup delay, max. | 2.5 s |
| Voltage increase time of the output voltage maximum | 500 ms |
| Rated current value $I_{out\ rated}$ | 13 A |
| Current range | 0 ... 13 A |
| • Note | +60 ... +70 °C: Derating 2%/K |
| Supplied active power typical | 468 W |
| Short-term overload current | |
| • at short-circuit during operation typical | 39 A |
| Duration of overloading capability for excess current | |
| • at short-circuit during operation | 25 ms |
| Constant overload current | |
| • on short-circuiting during the start-up typical | 14 A |
| Parallel switching for enhanced performance | Yes; switchable characteristic |
| Numbers of parallel switchable units for enhanced performance | 2 |

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**Products for specific requirements**
Automatic door controls
for industry applications

**Power supplies** > **SITOP PSU8200 3-phase, 36 V DC/13 A**

## ■ Technical specifications (continued)

| Article number | 6EP3446-8SB10-0AY0 |
| --- | --- |
| Product | SITOP PSU8200 |
| Power supply, type | 36 V/13 A |
| **Efficiency** | |
| Efficiency at $V_{\text{out rated}}$, $I_{\text{out rated}}$, approx. | 94 % |
| Power loss at $V_{\text{out rated}}$, $I_{\text{out rated}}$, approx. | 30 W |
| **Closed-loop control** | |
| Dynamic mains compensation ($V_{\text{in rated}}$ ±15 %), max. | 0.1 % |
| Dynamic load smoothing ($I_{\text{out}}$: 50/100/50 %), $U_{\text{out}}$ ± typ. | 1 % |
| Load step setting time 50 to 100%, typ. | 0.2 ms |
| Load step setting time 100 to 50%, typ. | 0.2 ms |
| Dynamic load smoothing ($I_{\text{out}}$: 10/90/10 %), $U_{\text{out}}$ ± typ. | 2 % |
| Load step setting time 10 to 90%, typ. | 0.2 ms |
| Load step setting time 90 to 10%, typ. | 0.2 ms |
| Setting time maximum | 10 ms |
| **Protection and monitoring** | |
| Output overvoltage protection | < 48 V |
| Current limitation, typ. | 14 A |
| Property of the output Short-circuit proof | Yes |
| Short-circuit protection | Alternatively, constant current characteristic approx. 14 A or latching shutdown |
| Enduring short circuit current RMS value | |
| • typical | 14 A |
| Overcurrent overload capability in normal operation | overload capability 150 % $I_{\text{out rated}}$ up to 5 s/min |
| Overload/short-circuit indicator | LED yellow for "overload", LED red for "latching shutdown" |
| **Safety** | |
| Primary/secondary isolation | Yes |
| Galvanic isolation | Safety extra low output voltage $V_{\text{out}}$ according to EN 60950-1 |
| Protection class | Class I |
| Leakage current | |
| • maximum | 3.5 mA |
| • typical | 0.9 mA |
| CE mark | Yes |
| UL/cUL (CSA) approval | cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259 |
| Explosion protection | No |
| FM approval | - |
| CB approval | Yes |
| Marine approval | GL, ABS |
| Degree of protection (EN 60529) | IP20 |

| Article number | 6EP3446-8SB10-0AY0 |
| --- | --- |
| Product | SITOP PSU8200 |
| Power supply, type | 36 V/13 A |
| **EMC** | |
| Emitted interference | EN 55022 Class B |
| Supply harmonics limitation | EN 61000-3-2 |
| Noise immunity | EN 61000-6-2 |
| **Operating data** | |
| Ambient temperature | |
| • during operation | -25 ... +70 °C |
| - Note | with natural convection |
| • during transport | -40 ... +85 °C |
| • during storage | -40 ... +85 °C |
| Humidity class according to EN 60721 | Climate class 3K3, no condensation |
| **Mechanics** | |
| Connection technology | screw-type terminals |
| Connections | |
| • Supply input | L1, L2, L3, PE: 1 screw terminal each for 0.2 ... 4 mm² single-core/finely stranded |
| • Output | +, -: 2 screw terminals each for 0.2 ... 4 mm² |
| • Auxiliary | 13, 14 (alarm signal): 1 screw terminal each for 0.14 ... 1.5 mm²; 15, 16 (Remote): 1 screw terminal each for 0.14 ... 1.5 mm² |
| Width of the enclosure | 70 mm |
| Height of the enclosure | 125 mm |
| Depth of the enclosure | 125 mm |
| Required spacing | |
| • top | 50 mm |
| • bottom | 50 mm |
| • left | 0 mm |
| • right | 0 mm |
| Weight, approx. | 1.2 kg |
| Product feature of the enclosure housing for side-by-side mounting | Yes |
| Installation | Snaps onto DIN rail EN 60715 35x7.5/15 |
| Electrical accessories | Buffer module |
| Mechanical accessories | Device identification label 20 mm × 7 mm, pale turquoise 3RT1900-1SB20 |
| Other information | Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified) |

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## ■ Ordering data

| | Article No. |
| --- | --- |
| **SITOP PSU8200 3-phase, 36 V DC/13 A**<br><br>Stabilized power supply<br>Input: 3 400 ... 500 V AC<br>Output: 36 V DC/13 A | 6EP3446-8SB10-0AY0 |

# Products for specific requirements
## Automatic door controls
for industry applications

**Additional units   > Software kit, Service tool**

## ■ Overview SIDOOR software kit



SIDOOR software kit

The scope of delivery of the SIDOOR software kit includes an installation CD which includes the following functionalities:

| | |
|---|---|
| SIDOOR User Software | The component that enables the door control system to be configured, parameters to be assigned, and analyzed. |
| Siemens HCS12 Firmware Loader | This component is used to update the operating software of the door controller. |
| SIDOOR USB to UART Bridge Driver | This driver is essential for operation of the USB adapter. |

Note:

Some firmware updates are offered as free downloads in the Siemens Industry Online Support (SIOS Service & Support Portal). For information on the availability and acquisition of more firmware, please contact Technical Support.

## ■ Overview SIDOOR service tool



The service tool can be used to input run commands, change run parameters and read out learned parameters, door states, input/output signals and service data.

The service tool is connected to the various controllers by the respective cable.

- SIDOOR AT12, SIDOOR AT40 and SIDOOR ATD400V elevator door drives
- SIDOOR ATD400K Cold Room Gate Drive, SIDOOR ATD400W and SIDOOR ATD410W machine tool door drives
- SIDOOR ATD400S and SIDOOR ATE250S platform screen door drives

You do not need to open the cover of the controller to do this.

Note:

If the service tool is in the "Quick adjustment" or "Total adjustment" menu, the run commands of the controller are blocked via the command inputs.

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**Products for specific requirements**
Automatic door controls
for industry applications

**Geared motors**

## Overview

SIDOOR geared motors are a combination of gear unit, motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning.

The maintenance-free, variable speed drive unit comprises a DC motor with non-self-locking gearing.

The geared motors must be selected according to the dynamic door weight. Two different versions are available for each of the SIDOOR MDG180, SIDOOR MDG400 and SIDOOR M3 to SIDOOR M5 geared motors:

- SIDOOR MDG180 geared motors
  (max. door weight of 180 kg)
  - SIDOOR MDG180 L (pinion left) 6FB1103-0AT14-4MB0
  - SIDOOR MDG180 R (pinion right) 6FB1103-0AT13-4MB0
- SIDOOR MDG400 geared motors
  (max. door weight of 400 kg)
  - SIDOOR MDG400 L (pinion left) 6FB1103-0AT14-3MC0
  - SIDOOR MDG400 R (pinion right) 6FB1103-0AT13-3MC0
- SIDOOR MDG400 NMS geared motors
  (max. door weight 400 kg)
  Shaft with groove and feather key A5X5
  acc. to DIN 6885 – without pinion
  - SIDOOR MDG400 NMS L (shaft left) 6FB1103-0AT14-3MC1
  - SIDOOR MDG400 NMS R (shaft right) 6FB1103-0AT13-3MC1
- SIDOOR M3 geared motors (max. door weight 180 kg)
  - SIDOOR M3 L (pinion left) 6FB1103-0AT10-4MB0
  - SIDOOR M3 R (pinion right) 6FB1103-0AT11-4MB0
- SIDOOR M4 geared motors (max. door weight 400 kg)
  - SIDOOR M4 L (pinion left) 6FB1103-0AT10-3MC0
  - SIDOOR M4 R (pinion right) 6FB1103-0AT11-3MC0
- SIDOOR M5 geared motors (max. door weight 600 kg)
  - SIDOOR M5 L (pinion left) 6FB1103-0AT10-3MD0
  - SIDOOR M5 R (pinion right) 6FB1103-0AT11-3MD0

The gear outlet direction is defined as left or right when viewing the gear unit from the front.

Geared motors (versions with pinion left) shown from bottom to top: SIDOOR MDG180 L, SIDOOR MDG400 L, SIDOOR M3 L, SIDOOR M4 L, SIDOOR M5 L

## Technical specifications

| Article number | 6FB1103 -0AT14- 4MB0 | 6FB1103 -0AT13- 4MB0 | 6FB1103 -0AT14- 3MC0 | 6FB1103 -0AT13- 3MC0 | 6FB1103 -0AT14- 3MC1 | 6FB1103 -0AT13- 3MC1 | 6FB1103 -0AT10- 4MB0 | 6FB1103 -0AT11- 4MB0 | 6FB1103 -0AT10- 3MC0 | 6FB1103 -0AT11- 3MC0 | 6FB1103 -0AT10- 3MD0 | 6FB1103 -0AT11- 3MD0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SIDOOR MDG180 L | SIDOOR MDG180 R | SIDOOR MDG400 L | SIDOOR MDG400 R | SIDOOR MDG400 NMS L | SIDOOR MDG400 NMS R | SIDOOR M3 L | SIDOOR M3 R | SIDOOR M4 L | SIDOOR M4 R | SIDOOR M5 L | SIDOOR M5 R |
| **General information** | | | | | | | | | | | | |
| Product brand name | SIDOOR | | | | | | | | | | | |
| Product designation | Motor for door control | | | | | | | | | | | |
| Product version | MDG180 L | MDG180 R | MDG400 L | MDG400 R | MDG400 NMS L | MDG400 NMS R | M3 L | M3 R | M4 L | M4 R | M5 L | M5 R |
| **Supply voltage** | | | | | | | | | | | | |
| Supply voltage (DC) | 30 V | | | | | | | | | | | |
| **Input current** | | | | | | | | | | | | |
| Operational current (rated value) | 4 A | | | | | | | | | | 7.5 A | |
| **Power** | | | | | | | | | | | | |
| Active power input | 120 W | | | | | | | | | | 225 W | |
| **Mechanical data** | | | | | | | | | | | | |
| Torque of the rotary operating mechanism (rated value) | 3 N·m | | | | | | | | | | 6.8 N·m | |
| Speed, max. | 0.65 m/s | | 0.75 m/s | | | | 0.65 m/s | | 0.75 m/s | | 0.5 m/s | |
| Gear ratio | 15 | | | | | | | | | | | |
| Number of pulses per revolution, max. | 100 | | | | | | | | | | | |
| Weight of door, max. | 180 kg | | 400 kg | | | | 180 kg | | 400 kg | | 600 kg | |

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# Products for specific requirements
## Automatic door controls
## for industry applications

**Geared motors**

## Technical specifications (continued)

| Article number | 6FB1103 -0AT14- 4MB0 | 6FB1103 -0AT13- 4MB0 | 6FB1103 -0AT14- 3MC0 | 6FB1103 -0AT13- 3MC0 | 6FB1103 -0AT14- 3MC1 | 6FB1103 -0AT13- 3MC1 | 6FB1103 -0AT10- 4MB0 | 6FB1103 -0AT11- 4MB0 | 6FB1103 -0AT10- 3MC0 | 6FB1103 -0AT11- 3MC0 | 6FB1103 -0AT10- 3MD0 | 6FB1103 -0AT11- 3MD0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SIDOOR MDG180 L | SIDOOR MDG180 R | SIDOOR MDG400 L | SIDOOR MDG400 R | SIDOOR MDG400 NMS L | SIDOOR MDG400 NMS R | SIDOOR M3 L | SIDOOR M3 R | SIDOOR M4 L | SIDOOR M4 R | SIDOOR M5 L | SIDOOR M5 R |
| **Degree and class of protection** | | | | | | | | | | | | |
| IP degree of protection | | | | | | | | | | | | |
| • of the motor | IP56 | | | | | | IP54 | | | | | |
| • of the gear unit | IP56 | | | | | | IP40 | | | | IP54 | |
| **Ambient conditions** | | | | | | | | | | | | |
| **Ambient temperature during operation** | | | | | | | | | | | | |
| • min. | -20 °C | | | | | | | | | | | |
| • max. | 50 °C | | | | | | | | | | | |
| **Ambient temperature during storage/transportation** | | | | | | | | | | | | |
| • Storage, min. | -40 °C | | | | | | | | | | | |
| • Storage, max. | 85 °C | | | | | | | | | | | |
| **Dimensions** | | | | | | | | | | | | |
| Height of motor | 98 mm | | 115 mm | | | | 98 mm | | 115 mm | | 124 mm | |
| Length of motor | 236 mm | | 275 mm | | | | 236 mm | | 275 mm | | 344 mm | |
| Diameter of motor | 63 mm | | | | | | | | | | 80 mm | |
| Width of gear unit, including drive pinion | 85 mm | | 105 mm | | 106 mm | | 85 mm | | 105 mm | | 111 mm | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIDOOR MDG180 geared motors** | | **SIDOOR M3 geared motors** | |
| MDG180 L | **6FB1103-0AT14-4MB0** | M3 L | **6FB1103-0AT10-4MB0** |
| MDG180 R | **6FB1103-0AT13-4MB0** | M3 R | **6FB1103-0AT11-4MB0** |
| **SIDOOR MDG400 geared motors** | | **SIDOOR M4 geared motors** | |
| MDG400 L | **6FB1103-0AT14-3MC0** | M4 L | **6FB1103-0AT10-3MC0** |
| MDG400 R | **6FB1103-0AT13-3MC0** | M4 R | **6FB1103-0AT11-3MC0** |
| **SIDOOR MDG400 NMS** | | **SIDOOR M5 geared motors** | |
| MDG400 NMS L, without pinion | **6FB1103-0AT14-3MC1** | M5 L | **6FB1103-0AT10-3MD0** |
| MDG400 NMS R, without pinion | **6FB1103-0AT13-3MC1** | M5 R | **6FB1103-0AT11-3MD0** |

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**Products for specific requirements**
Automatic door controls
for industry applications

Accessories

## ■ Overview

An extensive range of accessories is available for the door control drives.

This is necessary to ensure low-noise operation of the door by the motor. The geared motors can be optimally integrated into the respective door drive system.

Accessories for all controllers for industrial applications

Rubber-metal anti-vibration mounts for geared motors

To ensure low-noise door operation, SIDOOR geared motors are integrated in the door system using rubber-metal anti-vibration mounts.

- Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0 for SIDOOR MDG180, SIDOOR M2 and SIDOOR M3 geared motors (door weights up to 180 kg)
- Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0 for SIDOOR MDG400 and SIDOOR M4 (door weights up to 400 kg), and SIDOOR M5 geared motors (door weights up to 600 kg)



Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0 for geared motors with door weights up to 180 kg
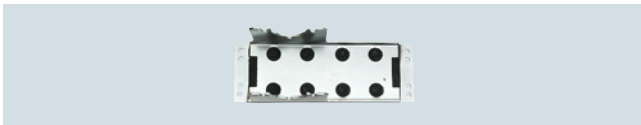


Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0 for geared motors with door weights up to 600 kg

Mounting bracket

Two different mounting brackets are available with elongated holes:

- Mounting bracket 6FB1104-0AT01-0AS0 for mounting SIDOOR geared motors, for flexible accommodation of the rubber-bonded metal
- Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit. This enables the toothed belt to be set to the required belt tension.



Mounting bracket 6FB1104-0AT01-0AS0 for mounting the geared motor



Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit

DIN rail holder

The standard DIN rail holder 6FB1144-0AT00-3SA0 is available for mounting controllers on the TH 35 standard DIN rail according to IEC 60715.

Door clutch holder

The door clutch holder serves to connect the respective door leaf by means of a toothed belt while also functioning as a toothed-belt lock. One door clutch holder per door leaf is required. The toothed-belt lock can accommodate both open ends of the toothed belt.

A door clutch holder is available for each toothed belt width:

- Width 12 mm: 6FB1104-0AT01-0CP0
- Width 14 mm: 6FB1104-0AT02-0CP0



Door clutch holder 6FB1104-0AT01-0CP0 (packing size = 1 unit)

Deflector unit

The deflector unit 6FB1104-0AT03-0AS0 contains an embedded belt pulley which can be mounted on the door system. The STS toothed belt is redirected via this deflector unit.



Deflector unit 6FB1104-0AT03-0AS0

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# Products for specific requirements
## Automatic door controls
## for industry applications

**Accessories**

■ **Overview** (continued)

### STS toothed belt

The door system is moved between the end positions of the door using the STS toothed belts. Two different toothed belt lengths can be ordered for each toothed belt width.

- Toothed belt width 12 mm:
  - Length 4 m: 6FB1104-0AT01-0AB0
  - Length 45 m: 6FB1104-0AT02-0AB0
- Toothed belt width 14 mm:
  - Length 4 m: 6FB1104-0AT03-0AB0
  - Length 55 m: 6FB1104-0AT04-0AB0



Toothed belt 6FB1104-0AT01-0AB0 (width 12 mm, length 4 m)
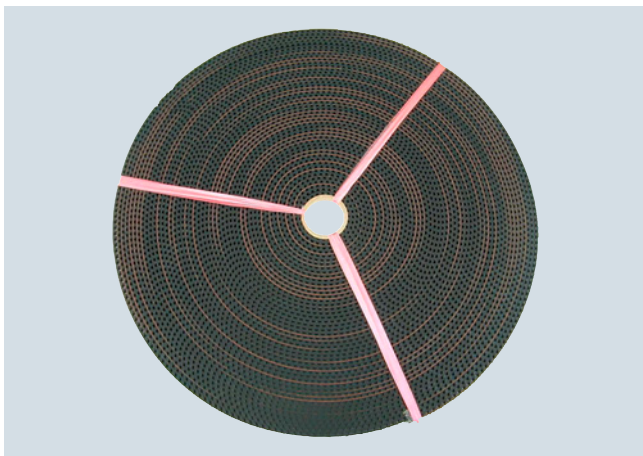


Toothed belt 6FB1104-0AT02-0AB0 (width 12 mm, length 45 m)

### *For machine tool door drives only*

### CABLE-MDG  hybrid connecting cables

These connecting cables connect the machine tool door drives to the SIDOOR MDG geared motor. Various lengths are available.

- Length 0.5 m: 6FB1104-0AT00-0CB5
- Length 1.5 m: 6FB1104-0AT01-0CB5
- Length 5 m: 6FB1104-0AT05-0CB0
- Length 7 m: 6FB1104-0AT07-0CB0
- Length 10 m: 6FB1104-0AT10-0CB0
- Length 15 m: 6FB1104-0AT15-0CB0
- Length 20 m: 6FB1104-0AT20-0CB0

Machine tool door drives are connected to a higher-level SIMATIC controller via the PB FC RS 485 PLUG 180 connector (6GK1500-0FC10) and the PB FC Standard Cable GP (6XV1830-0EH10), a standard bus cable with a special design for quick mounting. A SIMATIC RS 485/USS communication module is required on the controller side, such as the ET 200S electronic module (6ES7138-4DF11-0AB0) for the SIMATIC ET 200.
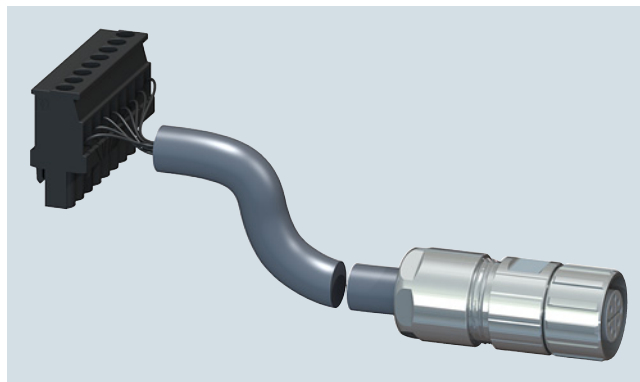


SIDOOR CABLE-MDG

### Electronic module for ET 200S

1-channel module 6ES7138-4DF11-0AB0 for serial data exchange via point-to-point connection, for telegrams with a max. length of 224 bytes, RS 232C, RS 422, RS 485, 2 versions, ASCII and 3964(R) protocol, Modbus and USS protocol, parameter assignment via GSD file or STEP 7 (from V5.1)

### CM PtP RS 422/485 BA communication module

Basic communication module 6ES7540-1AB00-0AA0 with one RS 422/485 interface, Freeport, 3964(R) and USS protocols, 15-pin sub D socket, max. 19.2 kbps, for SIMATIC S7-1500

### CM 1241 communication module

Communication module 6ES7241-1CH32-0XB0 for point-to-point connection with one RS 422/RS 485 interface, 9-pin, sub D (pin), supports Freeport, for SIMATIC S7-1200

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**Products for specific requirements**
Automatic door controls
for industry applications

Accessories

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Rubber-metal anti-vibration mounts for geared motors** | | **For machine tool drives only** | |
| • SIDOOR rubber-metal anti-vibration mount for geared motors for door weights up to 300 kg | **6FB1104-0AT02-0AD0** | **CABLE-MDG hybrid connecting cables** | |
| | | • 0.5 m | **6FB1104-0AT00-0CB5** |
| | | • 1.5 m | **6FB1104-0AT01-0CB5** |
| • SIDOOR rubber-metal anti-vibration mount for geared motors for door weights from 300 kg | **6FB1104-0AT01-0AD0** | • 5 m | **6FB1104-0AT05-0CB0** |
| | | • 7 m | **6FB1104-0AT07-0CB0** |
| | | • 10 m | **6FB1104-0AT10-0CB0** |
| | | • 15 m | **6FB1104-0AT15-0CB0** |
| **Mounting bracket** | | • 20 m | **6FB1104-0AT20-0CB0** |
| • SIDOOR mounting bracket for geared motor | **6FB1104-0AT01-0AS0** | **PB FC RS485 PLUG 180** | **6GK1500-0FC10** |
| • SIDOOR mounting bracket with tensioning device for deflector pulley | **6FB1104-0AT02-0AS0** | **PB FC Standard Cable GP** | **6XV1830-0EH10** |
| | | **Electronic module for ET 200S** | **6ES7138-4DF11-0AB0** |
| **DIN rail holder** | | **CM PtP RS422/485 BA communication module** | **6ES7540-1AB00-0AA0** |
| For mounting controllers on the TH 35 standard DIN rail | **6FB1144-0AT00-3AS0** | **CM 1241 communication module** | **6ES7241-1CH32-0XB0** |
| **SIDOOR door clutch holder** | | **SIDOOR door clutch holder** | |
| For toothed belt, width 12 mm | **6FB1104-0AT01-0CP0** | For toothed belt, width 14 mm | **6FB1104-0AT02-0CP0** |
| **SIDOOR deflector unit** | **6FB1104-0AT03-0AS0** | | |
| **SIDOOR STS toothed belt** | | | |
| Width 12 mm | | | |
| • 4 m | **6FB1104-0AT01-0AB0** | | |
| • 45 m | **6FB1104-0AT02-0AB0** | | |
| **SIDOOR STS toothed belt** | | | |
| Width 14 mm | | | |
| • 4 m | **6FB1104-0AT03-0AB0** | | |
| • 55 m | **6FB1104-0AT04-0AB0** | | |

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# Products for specific requirements
Automatic door controls

## Overview

The product-specific application/requirement lies in complying with the special railway requirements concerning functional safety.

Interior railway doors have a closing spring which must always bring the door into the "CLOSED" position. This applies to either side, even when a train car is inclined at 10°.

These specific operating states are handled by the door controller.

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**Products for specific requirements**
Automatic door controls
for railway applications

Controllers  > Platform screen door drive

■ **Overview**



| 1a 1b | Input signal connection | | 6 | Fan (only for SIDOOR ATE531S) |
| 2 | PROFINET modul (2PN incl. status LEDs) | | 7 | Connection<br>- software kit or<br>- service tool |
| 3 | SIDOOR EC direct drive connection | | 8 | 24 V DC / 400 mA output |
| 4 | Power supply connection (SIDOOR Transformer or SITOP) | | 9 | Display status and push button service |
| 5 | Output signal connection | | | |

SIDOOR ATE530S/531S wiring diagram

The SIDOOR ATE53xS door controller is an "intelligent" door drive which can be used for safety-oriented operation of platform screen doors (PSD) according to individual requirements. Siemens has once again shown just how easy integration can be with the innovative SIDOOR ATE53xS platform screen door drive in conjunction with SIDOOR MED280 or MEG251 motors. The PROFINET module integrated in the SIDOOR ATE53xS enables standardized, certified connection to PROFINET IO systems.

- Use of standard automation components
- Full integration into TIA Portal and STEP 7 thanks to PROFINET connection
- Parameter assignment and monitoring of door control parameters via the PROFINET interface (function blocks available as example applications in SIOS).

- Application example:
  Synchronization of two-panel and independent platform screen doors with SIDOOR ATE530S PROFINET EC door drive and S7-1500 CPU via TIA Portal
  https://support.industry.siemens.com/cs/ww/en/view/109480495
- Application example:
  Safety-oriented automation of platform screen doors with SIDOOR ATE530S PROFINET EC door drive and S7-1500 CPU via TIA Portal
  https://support.industry.siemens.com/cs/ww/en/view/109477186
- Read-in of two safe signals (two-channel, antivalent)
- High level of system safety thanks to safe torque off (e.g. self-release in the event of a fault)
- Firmware update for all SIDOOR controllers on an entire platform possible centrally via TCP/IP
- SIL 2 according to IEC 62061

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# Products for specific requirements
Automatic door controls
for railway applications

**Controllers   > Platform screen door drive**

## ■ Technical specifications

| Article number | 6FB1231-3BM10-7AT0 | 6FB1231-3BM12-7AT0 | 6FB1231-3BM11-7AT0 |
|---|---|---|---|
| | SIDOOR ATE530S | SIDOOR ATE530S COATED | SIDOOR ATE531S |
| **General information** | | | |
| Product brand name | SIDOOR | | |
| Product designation | Door controller | | |
| Product version | ATE530S | ATE530S with protective coating | ATE531 with protective coating and with temperature extension |
| Optional product expansion | Standard mounting rail holder 6FB1144-0AT00-3AS0 | | |
| Manufacturer's article no. of the usable motor | 6FB1203-0AT12-7DA0 | | |
| Manufacturer's article no. of the usable power supply unit | 6FB1112-0AT20-2TR0 | | |
| **Installation type/mounting** | | | |
| Installation and mounting instructions | No direct exposure to the sun | | |
| **Supply voltage** | | | |
| Rated value (DC) | 36 V; With MED280: At 24 V DC max. door speed of 500 mm/s, at 28.8 V DC max. door speed of 800 mm/s. With MEG251: At 24 V DC max. door speed of 500 mm/s, at 28.8 V DC max. door speed of 750 mm/s | | |
| **Power** | | | |
| Active power input (standby mode) | 7 W | | |
| **Digital inputs** | | | |
| Control inputs isolated | Yes | | |
| Control inputs p-switching | Yes | | |
| Fuse protection at DC end (recommendation) | Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 | | |
| **Input voltage** | | | |
| • per DC input, min. | 10 V; Observe polarity ! | | |
| • per DC input, max. | 28 V; Observe polarity ! | | |
| **Input current** | | | |
| • per DC input, min. | 3 mA | | |
| • per DC input, max. | 15 mA | | |
| **Digital outputs** | | | |
| Overload-proof | Yes | | |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! | | |
| **Output current** | | | |
| • For output (24 V DC), max. | 400 mA | | |
| **Relay outputs** | | | |
| **Switching capacity of contacts** | | | |
| - at 30 V DC, min. | 0.01 A | | |
| - at 30 V DC, max. | 0.5 A | | |
| **Mechanical data** | | | |
| Opening width of door, min. | 0.35 m | | |
| Opening width of door, max. | 5 m | | |
| Weight of door, max. | 280 kg | | |
| Operating cycle frequency of door, max. | 180 1/h | | |
| Kinetic energy, max. | 75 J | | |
| **Interfaces** | | | |
| Interfaces/bus type | PROFINET according to Conformance Class A, B, C; integrated switch for linear and ring structure | | |

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**Products for specific requirements**
Automatic door controls
for railway applications

**Controllers > Platform screen door drive**

## ■ Technical specifications (continued)

| Article number | 6FB1231-3BM10-7AT0 | 6FB1231-3BM12-7AT0 | 6FB1231-3BM11-7AT0 |
|---|---|---|---|
| | SIDOOR ATE530S | SIDOOR ATE530S COATED | SIDOOR ATE531S |
| **Isolation** | | | |
| Overvoltage category | 2 | | |
| **Degree and class of protection** | | | |
| IP degree of protection | IP20 | | |
| **Standards, approvals, certificates** | | | |
| CE mark | Yes | | No |
| UL approval | No | | |
| TÜV Inspectorate approval | Yes | | |
| Standard for EMC | EN 61000-6-2 / EN 61000-6-4 / EN 61326-3-1 / EN 50121-3-2 / EN50121-4 / EN50121-5 | | |
| Standard for safety | EN 60950-1 / EN 60335-1 / EN 14752 / EN ISO 13849-1 Cat. 2 PL d / IEC 62061: SIL 2 | | |
| **Ambient conditions** | | | |
| **Ambient temperature during operation** | | | |
| • min. | -25 °C | | |
| • max. | 50 °C | | 70 °C |
| • Remark | Screw control device thermally conductive onto a metallic mounting surface or standard rail mounting, otherwise the maximum operating temperature is only 40 °C | | To ensure compliance with MTBF value, ensure that the ambient temperature is less than 50 °C for 90 % of operating time and screw the control unit onto a metallic mounting surface in a manner that ensures thermal conductivity or use standard rail mounting. At operating temperatures above 50 °C, the maximum output current of the 24 V DC output is a maximum of 0.1 A and the maximum number of cycles is 60/h. |
| **Ambient temperature during storage/transportation** | | | |
| • Storage, min. | -40 °C | | |
| • Storage, max. | 85 °C | | |
| **Air pressure acc. to IEC 60068-2-13** | | | |
| • Installation altitude above sea level, max. | 2 000 m | | |
| **Relative humidity** | | | |
| • No condensation, min. | 10 % | | |
| • No condensation, max. | 93 % | | |
| **Mechanics/material** | | | |
| **Service life** | | | |
| • Mean time between failures (MTBF) | 13 y | | |
| **Dimensions** | | | |
| Width | 320 mm | | |
| Height | 60 mm | | |
| Depth | 80 mm | | |

## ■ Ordering data

| | Article No. |
|---|---|
| **SIDOOR ATE530S Platform Screen Door Drive** | |
| SIDOOR ATE530S | **6FB1231-3BM10-7AT0** |
| SIDOOR ATE530S coated, version with protective coating | **6FB1231-3BM12-7AT0** |
| **SIDOOR ATE531S Platform Screen Door Drive** | |
| SIDOOR ATE531S, version with protective coating and extended temperature range | **6FB1231-3BM11-7AT0** |

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# Products for specific requirements

Automatic door controls
for railway applications

**Controllers   > Interior railway door drive**

■ **Overview**



① Emergency RELAY module connection
② Terminal module
③ Output voltage 24 V DC/400 mA connection
④ Connection
    - service tool or
    - software kit
⑤ Input signal connection
⑥ Control panel
⑦ 16.8 to 36 V DC input voltage connection
⑧ Motor connection
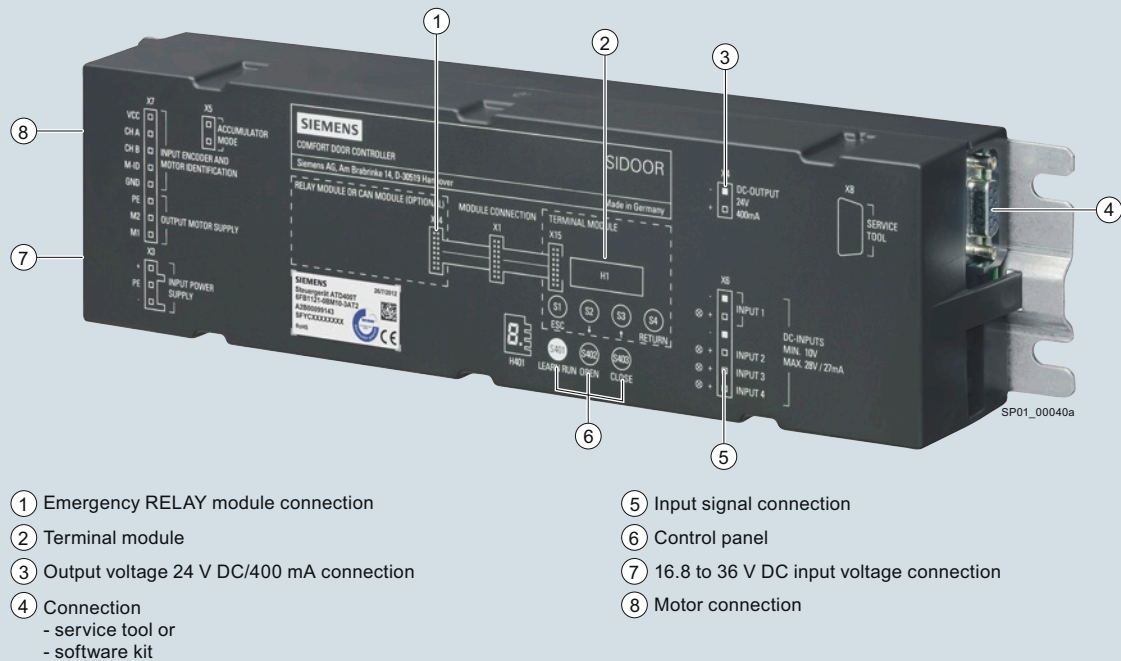
SIDOOR ATD400T interior railway door drive

The SIDOOR ATD400T interior railway door drive is an "intelligent" door drive which enables gangway doors to be opened and closed at adjustable speeds and accelerations.

- Relay module design
- For dynamic door weights up to 180 kg
- Automatic door weight detection
- Operating temperature -20 to +70 °C [1]
- Flexible motor management (two different motor types), automatic detection
- Opening width 0.25 to 4 m
- Door can be operated with and without closing springs (60 to 80 N)
- With two identical door leaves, can be used up to a train inclination of 0 to 10%
- Forces and energies are limited in accordance with EN 14752
- EMC according to EN 50121-3-2
- Fulfills HL3 according to fire protection standard EN 45545-2 (Railway applications – Fire protection on rail vehicles)
- Vandal-proof

[1] Note:
- Maximum output current at 24 V DC:
    - 0.4 A at ≤ 55 °C ambient temperature during operation
    - 0.1 A from 55 °C to 70 °C ambient temperature during operation, with restrictions at operating temperatures > 55 °C
- Maximum ambient temperature during operation:
    - 55 °C
    - 70 °C with restrictions at operating temperatures > 55 °C
- Restrictions at operating temperatures > 55 °C:
    - Only use the 24 V output voltage to operate control inputs (max. 0.1 A)
    - Use a sufficiently large (at least 350 x 350 mm), unpainted, metal mounting plate
    - The maximum drive parameters are restricted to the default values
    - If temperature class T3 according to EN 50155 is used, the maximum air temperature of 85 °C must not be exceeded near the printed-circuit board

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**Products for specific requirements**
Automatic door controls
for railway applications

Controllers > Interior railway door drive

## Technical specifications

| Article number | **6FB1121-0BM13-3AT2** |
|---|---|
| | SIDOOR ATD400T RELAY |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Door controller |
| Product version | ATD400T relay |
| Optional product expansion | EMC filter |
| Manufacturer's article no. of the usable motor | 6FB1103-0AT10-5MA0, 6FB1103-0AT11-5MA0, 6FB1103-0AT10-4MB0, 6FB1103-0AT11-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT11-3MC0 |
| **Installation type/mounting** | |
| Installation and mounting instructions | At operating temperatures > 55 °C a sufficiently large (at least 350 mm x 350 mm), unpainted, metal mounting plate must be used |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| **Input current** | |
| Current consumption, max. | 15 A |
| **Digital inputs** | |
| Control inputs isolated | Yes |
| Control inputs p-switching | Yes |
| **Input voltage** | |
| • per DC input, min. | 10 V; Observe polarity ! |
| • per DC input, max. | 28 V; Observe polarity ! |
| **Input current** | |
| • per DC input, min. | 9 mA |
| • per DC input, max. | 27 mA |
| **Digital outputs** | |
| Overload-proof | Yes |
| Remark | Ensure correct polarity! CAUTION: Do not supply with external voltage! |
| **Output current** | |
| • For output (24 V DC), max. | 400 mA |
| • For output (24 V DC) at 55 to 70 °C, max. | 100 mA |
| **Relay outputs** | |
| **Switching capacity of contacts** | |
| - at 50 V DC, min. | 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries |
| - at 50 V DC, max. | 1 A; 50 V DC switching voltage not released for NFPA-relevant countries |
| - at 230 V AC, min. | 0.01 A |
| - at 230 V AC, max. | 1 A |

| Article number | **6FB1121-0BM13-3AT2** |
|---|---|
| | SIDOOR ATD400T RELAY |
| **Mechanical data** | |
| Opening width of door, min. | 0.25 m |
| Opening width of door, max. | 4 m |
| Weight of door, max. | 400 kg |
| Operating cycle frequency of door, max. | 180 1/h |
| Counterforce, max. | 80 N |
| **Counterweight** | |
| • with SIDOOR M2 geared motor, max. | 4 kg |
| • with SIDOOR M3 geared motor, max. | 6 kg |
| • with SIDOOR M4 geared motor, max. | 8 kg |
| **Interfaces** | |
| Interfaces/bus type | without |
| **Isolation** | |
| Overvoltage category | 2 |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| UL approval | No |
| Standard for EMC | EN 50121-3-2 |
| **Ambient conditions** | |
| Ambient temperature class according to EN 50155 | T3 |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 70 °C; At operating temperatures > 55 °C the operating parameters are limited to default values |
| • Remark | At operating temperatures > 55 °C, the maximum air temperature of 85 °C must not be exceeded near the printed-circuit board if temperature class T3 according to EN 50155 is used |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 50 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 2 000 m |
| **Relative humidity** | |
| • No condensation, min. | 10 % |
| • No condensation, max. | 93 % |
| **Fire resistance** | |
| • Behavior in fire | complies with EN 45545-2 Hazard Level HL3 |
| **Dimensions** | |
| Width | 320 mm |
| Height | 60 mm |
| Depth | 80 mm |

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## Ordering data

| | Article No. |
|---|---|
| **SIDOOR ATD400T** | |
| Controller for interior railway doors, relay module design | **6FB1121-0BM13-3AT2** |

# Products for specific requirements
Automatic door controls
for railway applications

## Overview Power transformer

The SIDOOR Transformer power supply is a standard power supply unit operated with 220-240 V AC, 50/60 Hz, from the SIDOOR product range. It can be used for all controllers without an integrated power supply unit. The SIDOOR AT12 elevator door drive has an integrated power supply unit, for example.

For more information, see page 13/21.

## Overview Switched-mode power supply

The SIDOOR NT40 switched-mode power supply is operated with 230 V AC (± 15 %), 50/60 Hz, to power the following SIDOOR door controllers:

• SIDOOR AT40 and SIDOOR ATD400V elevator door drives
• SIDOOR ATD400K cold room gate drives
• SIDOOR ATD4xxW machine tool door drives

It is especially suitable for door systems with high door weights.

On the output side, the power supply unit delivers a voltage of 36 V DC (± 3 %) SELV at a rated output power of < 100 W.

In order to enable fast acceleration/deceleration of the doors by the controller, the device can briefly (< 2 s) deliver a current of 15 A (corresponds to a short-time power output of 540 W).

For more information, see page 13/22.

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**Products for specific requirements**
Automatic door controls
for railway applications

**Additional units   > Software kit, Service tool**

## ■ Overview SIDOOR software kit



SIDOOR software kit

The scope of delivery of the SIDOOR software kit includes an installation CD which includes the following functionalities:

| | |
|---|---|
| SIDOOR User Software | The component that enables the door control system to be configured, parameters to be assigned, and analyzed. |
| Siemens HCS12 Firmware Loader | This component is used to update the operating software of the door controller. |
| SIDOOR USB to UART Bridge Driver | This driver is essential for operation of the USB adapter. |

Note:

Some firmware updates are offered as free downloads in the Siemens Industry Online Support (SIOS Service & Support Portal). For information on the availability and acquisition of more firmware, please contact Technical Support.

## ■ Overview SIDOOR service tool



The service tool can be used to input run commands, change run parameters and read out learned parameters, door states, input/output signals and service data.

The service tool is connected to the various controllers by the respective cable.

- SIDOOR AT12, SIDOOR AT40 and SIDOOR ATD400V elevator door drives
- SIDOOR ATD400K Cold Room Gate Drive, SIDOOR ATD400W and SIDOOR ATD410W machine tool door drives
- SIDOOR ATD400S and SIDOOR ATE250S platform screen door drives

You do not need to open the cover of the controller to do this.

Note:

If the service tool is in the "Quick adjustment" or "Total adjustment" menu, the run commands of the controller are blocked via the command inputs.

# Products for specific requirements
Automatic door controls
for railway applications

**Geared motors**

## ■ Overview

SIDOOR motors are speed controlled, taking set force and speed limits into account. The gear outlet direction is defined as left or right when viewing the gear unit from the front. Force transmission is via a toothed belt. The toothed belt passes over a deflector pulley and can be fitted with two door clutch holders. This enables it to drive both single-side and centrally opening doors.

SIDOOR geared motors are available in two technological versions.

- 1. DC technology in version
  (area of application: interior railway doors)
  - DC geared motor
    SIDOOR geared motors are a combination of gear unit, motor, and encoder. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. The variable speed drive unit comprises a speed-controlled DC motor with non-self-locking gearing.

- 2. EC technology in version
  (area of application: platform screen doors):
  - EC direct drive
    SIDOOR direct drives are a combination of motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. The maintenance-free drive unit consists of a gearless, speed-controlled, electronically commutated motor. The EC direct drive can be fitted in various mounting orientations, facilitating reduced inventory management and minimizing assets.
  - EC geared motors
    EC geared motors are electronically commutated DC motors with non-self-locking gearing and are speed-controlled. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. Due to the brushless drive technology, EC geared motors are subject to less abrasion compared with DC geared motors and thus have a longer service life. There is also less commutation noise thanks to the brushless technology, which means there is lower noise generation than with DC geared motors.

### Motors for interior railway door drives

The following **DC geared motors** are available for interior railway door drives. They should be selected according to the dynamic door weight.

- SIDOOR MDG180 geared motors, compliance with fire protection standard EN 45545-2 (max. door weight 180 kg)
  - SIDOOR MDG180 L EN 45545-2 (pinion left)
    6FB1103-0AT16-4MB0
  - SIDOOR MDG180 R EN 45545-2 (pinion right)
    6FB1103-0AT15-4MB0
- SIDOOR M3 geared motors (max. door weight 180 kg)
  - SIDOOR M3 L (pinion left) 6FB1103-0AT10-4MB0
  - SIDOOR M3 R (pinion right) 6FB1103-0AT11-4MB0
- SIDOOR M4 geared motors (max. door weight 400 kg)
  - SIDOOR M4 L (pinion left) 6FB1103-0AT10-3MC0
  - SIDOOR M4 R (pinion right) 6FB1103-0AT11-3MC0

### Motors for platform screen door drives

#### EC technology:

- SIDOOR MEG251 geared motors (max. door weight 250 kg)
  - SIDOOR MEG251 L (pinion left), 6FB1203-5AT00-7MP0
  - SIDOOR MEG251 R (pinion right), 6FB1203-5AT01-7MP0



Photo: DC geared motor SIDOOR M3 L, 6FB1103-0AT10-4MB0 or SIDOOR MDG180 L, 6FB1103-0AT16-4MB0. (version with pinion left)



Photo: EC geared motor SIDOOR MEG251 L, 6FB1203-5AT00-7MP0. (version with pinion left)

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**Products for specific requirements**
Automatic door controls
for railway applications

Geared motors

## Technical specifications

| Article number | 6FB1103-0AT16-4MB0 | 6FB1103-0AT15-4MB0 | 6FB1103-0AT10-4MB0 | 6FB1103-0AT11-4MB0 | 6FB1103-0AT10-3MC0 | 6FB1103-0AT11-3MC0 | 6FB1203-5AT00-7MP0 | 6FB1203-5AT01-7MP0 |
|---|---|---|---|---|---|---|---|---|
| | SIDOOR MDG180 L DIN EN 45545-2 | SIDOOR MDG180 R DIN EN 45545-2 | SIDOOR M3 L | SIDOOR M3 R | SIDOOR M4 L | SIDOOR M4 R | SIDOOR MEG251 L | SIDOOR MEG251 R |
| **General information** | | | | | | | | |
| Product brand name | SIDOOR | | | | | | | |
| Product designation | Motor for door control | | | | | | | |
| Product version | MDG180 L DIN EN 45545-2 | MDG180 R DIN EN 45545-2 | M3 L | M3 R | M4 L | M4 R | MEG251 L | MEG251 R |
| **Supply voltage** | | | | | | | | |
| Supply voltage (DC) | 30 V | | | | | | 24 V | |
| **Input current** | | | | | | | | |
| Operational current (rated value) | 4 A | | | | | | 6.8 A | |
| **Power** | | | | | | | | |
| Active power input | 120 W | | | | | | 163 W | |
| **Mechanical data** | | | | | | | | |
| Torque of the rotary operating mechanism (rated value) | 3 N·m | | | | | | 4.1 N·m | |
| Speed, max. | 0.65 m/s | | | | 0.75 m/s | | | |
| Gear ratio | 15 | | | | | | | |
| Number of pulses per revolution, max. | 100 | | | | | | | |
| Weight of door, max. | 180 kg | | | | 400 kg | | 250 kg | |
| **Degree and class of protection** | | | | | | | | |
| IP degree of protection | | | | | | | | |
| • of the motor | IP54 | | | | | | IP40 | |
| • of the gear unit | IP40 | | | | | | | |
| **Ambient conditions** | | | | | | | | |
| **Ambient temperature during operation** | | | | | | | | |
| • min. | -20 °C | | | | | | | |
| • max. | 50 °C | | | | | | 70 °C | |
| **Ambient temperature during storage/transportation** | | | | | | | | |
| • Storage, min. | -40 °C | | | | | | | |
| • Storage, max. | 85 °C | | | | | | | |
| **Fire resistance** | | | | | | | | |
| • Behavior in fire | complies with EN 45545-2 Hazard Level HL3 | | | | | | | |
| **Dimensions** | | | | | | | | |
| Height of motor | 98 mm | | | | 115 mm | | 100 mm | |
| Length of motor | 236 mm | | | | 275 mm | | 249 mm | |
| Diameter of motor | 63 mm | | | | | | 62 mm | |
| Width of gear unit, including drive pinion | 85 mm | | | | 105 mm | | 86 mm | |

## Ordering data

| | Article No. | | | Article No. |
|---|---|---|---|---|
| **Motors for interior railway door drives** | | | **Motors for platform screen doors** | |
| SIDOOR MDG180 geared motors | | | SIDOOR MEG251 EC technology geared motor | |
| MDG180 L, EN 45545-2 | **6FB1103-0AT16-4MB0** | | MEG251 L | **6FB1203-5AT00-7MP0** |
| MDG180 R, EN 45545-2 | **6FB1103-0AT15-4MB0** | | MEG251 R | **6FB1203-5AT01-7MP0** |
| SIDOOR M3 geared motors | | | | |
| M3 L | **6FB1103-0AT10-4MB0** | | | |
| M3 R | **6FB1103-0AT11-4MB0** | | | |
| SIDOOR M4 geared motors | | | | |
| M4 L | **6FB1103-0AT10-3MC0** | | | |
| M4 R | **6FB1103-0AT11-3MC0** | | | |

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# Products for specific requirements
Automatic door controls
for railway applications

**Direct drives**

## ◼ Overview



SIDOOR direct drives are a combination of motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning.

The maintenance-free drive unit consists of a gearless, speed-controlled, electronically commutated motor with non-self-locking gearing.

Direct drives are designed for certain maximum dynamic door weights and can control both drive directions.

• SIDOOR MED280 direct drive for dynamic door weights up to 280 kg (6FB1203-0AT12-7DA0)

SIDOOR MED280 direct drive

## ◼ Technical specifications

| Article number | 6FB1203-0AT12-7DA0 |
|---|---|
| | SIDOOR MED280 |
| **General information** | |
| Product brand name | SIDOOR |
| Product designation | Motor for door control |
| Product version | MED280 |
| **Supply voltage** | |
| Supply voltage (DC) | 24 V |
| **Input current** | |
| Operational current (rated value) | 9.7 A |
| **Power** | |
| Active power input | 233 W |
| **Mechanical data** | |
| Torque of the rotary operating mechanism (rated value) | 4.7 N·m |
| Speed, max. | 0.8 m/s |
| Number of pulses per revolution, max. | 1 024 |
| Weight of door, max. | 280 kg |
| **Degree and class of protection** | |
| IP degree of protection | |
| • of the motor | IP54 |

| Article number | 6FB1203-0AT12-7DA0 |
|---|---|
| | SIDOOR MED280 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -25 °C |
| • max. | 70 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -40 °C |
| • Storage, max. | 85 °C |
| **Dimensions** | |
| Width of motor | 160 mm |
| Height of motor | 140 mm |
| Length of motor | 56 mm |
| • including drive pinion | 91 mm |

## ◼ Ordering data | Article No.

| SIDOOR MED280 direct drive | 6FB1203-0AT12-7DA0 |
|---|---|
| Motor for door control | |

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**Products for specific requirements**
Automatic door controls
for railway applications

Accessories

■ **Overview**

A comprehensive range of accessories is available for the SIDOOR systems. This is necessary to ensure low-noise operation of the door by the controller.

***Accessories for SIDOOR DC and EC geared motors***

Rubber-metal anti-vibration mount

To ensure low-noise door operation, the SIDOOR geared motors are integrated in the door system using rubber-metal anti-vibration mounts.

- Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0 for SIDOOR M3 and SIDOOR MDG180 DC geared motors (also for EN 45545-2) and SIDOOR MEG251 EC geared motors (door weights up to 250 kg)
- Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0 for SIDOOR M4 DC geared motors (door weights up to 400 kg)



Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0
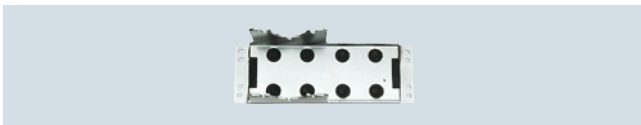


Rubber-metal anti-vibration mount 6FB1104-0AT01-0AD0

Mounting bracket

Two different mounting brackets are available with elongated holes:

- Mounting bracket 6FB1104-0AT01-0AS0 for SIDOOR M3 and SIDOOR MDG180 DC geared motors (also for EN 45545-2) and SIDOOR MEG251 EC geared motors for flexible accommodation of the rubber-bonded metal.
- Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit. This enables the toothed belt to be set to the required belt tension.



Mounting bracket 6FB1104-0AT01-0AS0 for mounting the geared motor



Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit

Door clutch holder

The door clutch holder 6FB1104-0AT01-0CP0 serves to connect the respective door leaf by means of a toothed belt while also functioning as a toothed-belt lock. One door clutch holder per door leaf is required. The toothed-belt lock can accommodate both open ends of the toothed belt.



Door clutch holder 6FB1104-0AT01-0CP0 (packing size = 1 unit)

Deflector unit

The deflector unit 6FB1104-0AT03-0AS0 contains an embedded belt pulley which can be mounted on the door system.

The STS toothed belt is redirected via this deflector unit.



Deflector unit 6FB1104-0AT03-0AS0

STS toothed belt

The door system is moved between the end positions of the door using the STS toothed belt 6FB1104-0AT0.-0AB0. Two different toothed belt lengths are available.
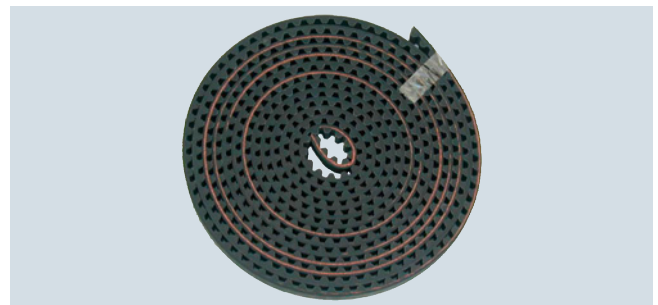


Toothed belt 6FB1104-0AT01-0AB0, length 4 m



Toothed belt 6FB1104-0AT02-0AB0, length 45 m

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# Products for specific requirements

Automatic door controls
for railway applications

## Accessories

■ **Overview** (continued)

### *Accessories for the SIDOOR ATE530S/ATE531S platform screen door drive in conjunction with the SIDOOR MED280 EC direct drive*

#### Motor holder

• Motor holder 6FB1104-0AT03-0AD0 for accommodation of the SIDOOR MED280 direct drive.
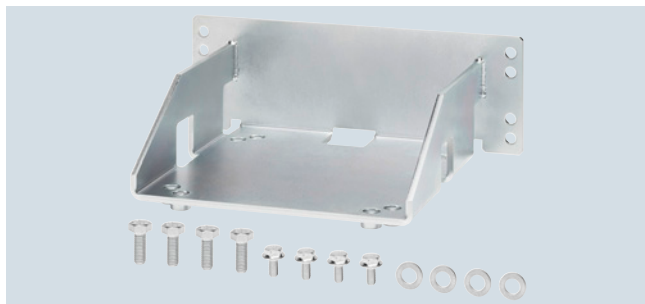
SIDOOR motor holder

#### Mounting bracket

• For mounting the SIDOOR motor holder 6FB1104-0AT01-0AS0. Identical to the mounting bracket 6FB1104-0AT01-0AS0 for DC geared motors.

Mounting bracket for geared motor

• With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (large) 6FB1104-0AT05-0AS4

SIDOOR mounting bracket, large

• With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (small) 6FB1104-0AT05-0AS5

SIDOOR mounting bracket, small

#### Door clutch holder

• For attaching both ends of the toothed belt and connecting the respective door panel to the toothed belt, width 20 mm, 6FB1104-0AT05-0AS1
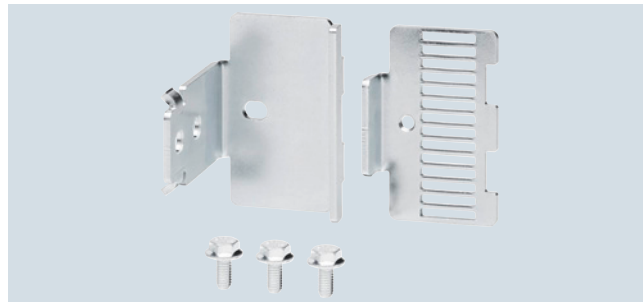
SIDOOR door clutch holder

#### Deflector unit

• For attaching the SIDOOR toothed belt and fixing to the door 6FB1104-0AT07-0AS0

SIDOOR deflector unit

#### STD toothed belt

• As a connection between the door system and the end positions of the door, toothed belt width 20 mm. Length 4 m, 6FB1104-0AT05-0AB0

SIDOOR toothed belt, small

• Toothed belt width 20 mm. Length 45 m 6FB1104-0AT06-0AB1

SIDOOR toothed belt, large

**Products for specific requirements**
Automatic door controls
for railway applications

Accessories

■ **Ordering data**

| | Article No. | | Article No. |
|---|---|---|---|
| **Accessories for the SIDOOR ATE530S/ATE531S platform screen door drive in conjunction with the SIDOOR MED280 EC direct drive** | | **Accessories for SIDOOR DC and EC geared motors** | |
| **Motor holder for SIDOOR MED280 direct drive** | **6FB1104-0AT03-0AD0** | **Rubber-metal anti-vibration mounts for geared motors**<br>• SIDOOR rubber-metal anti-vibration mount for geared motors for door weights up to 300 kg<br>• SIDOOR rubber-metal anti-vibration mount for geared motors for door weights from 300 kg | **6FB1104-0AT02-0AD0**<br><br><br>**6FB1104-0AT01-0AD0** |
| **Mounting bracket for mounting the motor holder** | **6FB1104-0AT01-0AS0** | | |
| **Mounting bracket with tensioning device for mounting the deflector unit**<br>• Large<br>• Small | <br><br>**6FB1104-0AT05-0AS4**<br>**6FB1104-0AT05-0AS5** | **Mounting bracket**<br>• SIDOOR mounting bracket for geared motor<br>• SIDOOR mounting bracket with tensioning device for deflector pulley | <br>**6FB1104-0AT01-0AS0**<br><br>**6FB1104-0AT02-0AS0** |
| **SIDOOR door clutch holder**<br>• For toothed belt, width 20 mm | <br>**6FB1104-0AT05-0AS1** | **SIDOOR door clutch holder**<br>• For toothed belt, width 12 mm | <br>**6FB1104-0AT01-0CP0** |
| **SIDOOR deflector unit** | **6FB1104-0AT07-0AS0** | **SIDOOR deflector unit** | **6FB1104-0AT03-0AS0** |
| **SIDOOR STD toothed belt**<br><br>Width 20 mm<br>• 4 m<br>• 5 m | <br><br><br>**6FB1104-0AT05-0AB0**<br>**6FB1104-0AT06-0AB1** | **SIDOOR STS toothed belt**<br><br>Width 12 mm<br>• 4 m<br>• 45 m | <br><br><br>**6FB1104-0AT01-0AB0**<br>**6FB1104-0AT02-0AB0** |

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# Products for specific requirements
Condition monitoring systems

## ■ Overview



SIPLUS CMS family

With the Condition Monitoring System from Siemens you can constantly monitor your machines and plants. Maintenance procedures can be planned better and only performed when they are actually necessary – predictive maintenance.

## ■ Overview SIPLUS CMS1200
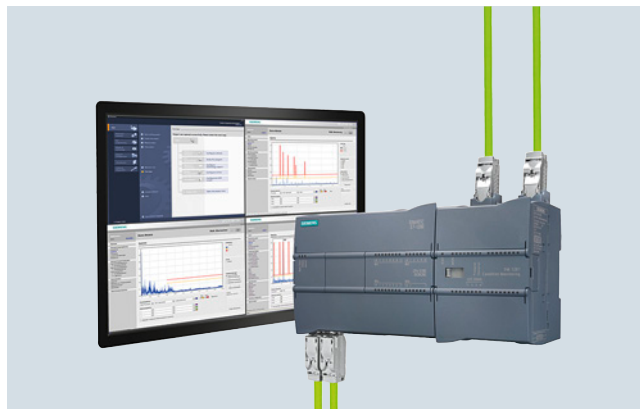


The SIPLUS CMS1200 Condition Monitoring System is part of SIMATIC S7-1200 and is designed for the early detection of mechanical damage.

It provides the following benefits:
• vRMS machine monitoring in acc. with ISO 10816-3
• aRMS machine monitoring
• Detailed identification of damage with frequency-selective diagnostics
• Raw data recording and export for SIPLUS CMS X-Tools
• Trend recording and analysis
• Signaling of limit violations
• Permanent monitoring to protect the machines
• Effective monitoring of important processes and systems
• Early detection of damage
• Scheduled maintenance instead of spontaneous repair
• Reduction in maintenance costs
• Increase in system availability
• Optimum utilization of the service life of the units

# Products for specific requirements
Condition monitoring systems
SIPLUS CMS1200 Condition Monitoring System

**SIPLUS CMS1200 SM 1281 Condition Monitoring**

## Overview

SIPLUS CMS1200 SM 1281 Condition Monitoring forms part of SIMATIC S7-1200 and is used for the:

- Monitoring of motors, generators, pumps, fans, or other mechanical components
- Recording and analysis of vibrations
- Expansion capability of up to 7 modules

## Technical specifications

| Article number | 6AT8007-1AA10-0AA0 |
|---|---|
| | SM1281_Condition_Monitoring |
| **General information** | |
| Product brand name | SIPLUS |
| Product category | Condition Monitoring IEPE |
| Product designation | CMS1200 SM 1281 Condition Monitoring |
| Product description | S7-1200 module for the monitoring of vibrations on mechanical components based on parameters and frequency-selective analysis functions |
| Physical measuring principle | Vibration acceleration |
| Measurement range vibration frequency, min. | 0.1 Hz |
| Measurement range vibration frequency, max. | 10 000 Hz |
| **Installation type/mounting** | |
| Mounting type | Rail or wall mounting |
| Mounting position | Horizontal, vertical |
| Recommended mounting position | Horizontal |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | |
| • 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption, typ. | 200 mA |
| Current consumption, max. | 250 mA |
| from backplane bus 5 V DC, typ. | 80 mA |
| from backplane bus 5 V DC, max. | 85 mA |
| **Memory** | |
| Total memory capacity | 1 Gbyte |
| **Hardware configuration** | |
| Design of hardware configuration | Modular, up to 7 modules per CPU |

| Article number | 6AT8007-1AA10-0AA0 |
|---|---|
| | SM1281_Condition_Monitoring |
| **Speed input** | |
| Number of speed inputs | 1 |
| **Protocols** | |
| • 24 V DC digital | Yes |
| **Sensor input** | |
| Number of IEPE sensor inputs | 4 |
| Sampling frequency, max. | 46 875 Hz |
| **Interfaces** | |
| Type of data transmission | Exporting of raw data as WAV file for further analyses (e.g. using CMS X-Tools) can be downloaded via browser |
| Ethernet interface | Yes |
| **Protocols** | |
| Bus communication | Yes |
| **Web server** | |
| • HTTP | Yes |
| **Interrupts/diagnostics/status information** | |
| **Alarms** | |
| • Diagnostic alarm | Yes |
| **Diagnostics indication LED** | |
| • Status indicator digital input (green) | No |
| • for status of the inputs | Yes |
| • for maintenance | Yes |

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## Products for specific requirements
Condition monitoring systems
SIPLUS CMS1200 Condition Monitoring System

**SIPLUS CMS1200 SM 1281 Condition Monitoring**

### ■ Technical specifications  (continued)

| Article number | 6AT8007-1AA10-0AA0 |
|---|---|
| | SM1281_Condition_Monitoring |
| **Integrated Functions** | |
| **Monitoring functions** | |
| • Monitoring of the sensor inputs | Yes; Cable break and short-circuit |
| • Vibration characteristic monitoring via RMS value of the vibration speed | Yes |
| • Vibration characteristic monitoring via RMS value of the vibration acceleration | Yes |
| • Frequency-selective monitoring via vibration speed spectrum | Yes |
| • Frequency-selective monitoring via vibration acceleration spectrum | Yes |
| • Frequency-selective monitoring via envelope curve analysis | Yes |
| **Degree and class of protection** | |
| Degree of protection acc. to EN 60529 | |
| • IP20 | Yes |
| **Standards, approvals, certificates** | |
| Certificate of suitability | CE |
| CE mark | Yes |
| UL approval | Yes |
| EAC (formerly Gost-R) | Yes |
| China RoHS compliance | Yes |
| Device tag according to DIN EN 81346-2 | P |
| **Ambient conditions** | |
| **Free fall** | |
| • Fall height, max. | 0.3 m; five times, in product package |
| **Ambient temperature during operation** | |
| • horizontal installation, min. | -20 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -20 °C |
| • vertical installation, max. | 45 °C |

| Article number | 6AT8007-1AA10-0AA0 |
|---|---|
| | SM1281_Condition_Monitoring |
| **Ambient temperature during storage/transportation** | |
| • min. | -40 °C |
| • max. | 70 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Operation, min. | 795 hPa |
| • Operation, max. | 1 080 hPa |
| • Storage/transport, min. | 660 hPa |
| • Storage/transport, max. | 1 080 hPa |
| **Relative humidity** | |
| • Operation without condensation, min. | 5 % |
| • Operation without condensation, max. | 95 % |
| **Software** | |
| Browser software required | Web browser Mozilla Firefox (ESR31) or Microsoft Internet Explorer (10/11) |
| **Connection method** | |
| required front connector | Yes |
| Design of electrical connection | Screw connection |
| **Mechanics/material** | |
| Material of housing | Plastic: polycarbonate, abbreviation: PC- GF 10 FR |
| Enclosure material (front) | |
| • Plastic | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 112 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight | 260 g |

### ■ Ordering data

| | Article No. |
|---|---|
| **SIPLUS CMS1200 SM 1281 Condition Monitoring** | |
| Module for SIMATIC S7-1200 for monitoring vibrations in mechanical components based on characteristic values and frequency-selective analysis functions | **6AT8007-1AA10-0AA0** |

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**Products for specific requirements**
Condition monitoring systems
SIPLUS CMS1200 Condition Monitoring System

**Accessories**

## ■ Overview

### SIPLUS CMS1200 SM 1281 shield clamp set
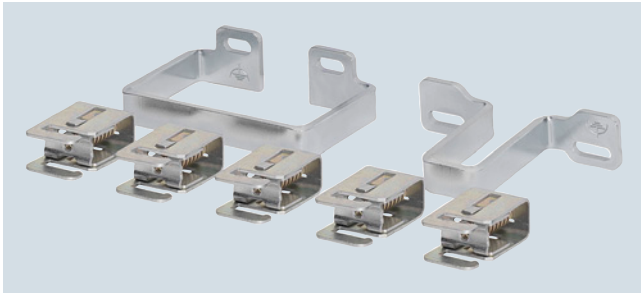


CMS1200 accessory

SIPLUS CMS1200 SM 1281 shield clamp set,
6AT8007-1AA20-0AA0

An additional shield clamp set must be ordered for the
EMC-compliant connection of cables to the SIPLUS CMS1200
SM 1281 Condition Monitoring system.

The SM 1281 shield clamp set comprises two shield clamps and
five terminal clamps. One shield clamp is screwed on above and
one below the module. The sensor cable shields are connected
to the shield clamps by means of the terminal clamps.

### VIB-SENSOR S01 vibration sensor



VIB-SENSOR S01 vibration sensor

VIB-SENSOR S01, 6AT8002-4AB00 vibration sensor

The VIB-SENSOR S01 vibration sensor with IEPE (integrated
electronics piezoelectric) interface can be directly connected to
the SIPLUS CM1200 SM1281 Condition Monitoring module.

The sensor detects vibration accelerations in the frequency
range from 0.5 Hz to 15 kHz with a resolution of 100 mv/$g$.

A threaded screw with an M8 thread for mounting to the measur-
ing point is included in the scope of supply. The connecting
cable is connected to the vibration sensor via the MIL connector.

### SIPLUS CABLE-MIL connecting cable



SIPLUS CABLE-MIL connecting cable

SIPLUS CABLE-MIL connecting cables, 6AT8002-4AC03,
6AT8002-4AC10

The VIB-SENSOR S01 vibration sensor is connected to the
SIPLUS CMS1200 SM1281 module by means of the
SIPLUS CABLE-MIL connecting cable.

This high-quality industrial cable is made of black polyurethane
and is pre-assembled on one end with a MIL connector
(MIL-C5015). The open cable end of the shielded two-wire cable
is connected directly to the screw terminals of the basic unit.

The connecting cable is available in lengths of 3 m and 10 m.

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# Products for specific requirements
Condition monitoring systems
SIPLUS CMS1200 Condition Monitoring System

## Accessories

### Technical specifications

| Article number | 6AT8007-1AA20-0AA0 |
|---|---|
| | SM 1281 shield clamp set |
| **General information** | |
| Product brand name | SIPLUS |
| Product designation | CMS1200 SM 1281 accessory set |
| Product description | For the EMC-compliant connection of cables to the SIPLUS CMS1200 SM 1281 Condition Monitoring Module |
| **Installation type/mounting** | |
| Mounting type | wall mounting |
| **Connection method** | |
| Number of signal cables connectable to the shield support | 5 |

| Article number | 6AT8002-4AB00 |
|---|---|
| | SIPLUS CMS2000 VIB-SENSOR S01 |
| **General information** | |
| Product brand name | SIPLUS CMS |
| Product designation | VIB SENSOR S01 |
| Product description | Piezoelectric sensor for connection to the SIPLUS CMS2000 Basic Unit VIB or the SIPLUS CMS2000 VIB-MUX expansion module |
| Physical measuring principle | Piezo-quartz recorder with integrated evaluation electronics |
| Operating range of sensor at +/- 3 dB, min. | 0.5 Hz |
| Operating range of sensor at +/- 3 dB, max. | 15 000 Hz |
| Measurement range vibration acceleration, max. | 50 gn |
| Sensitivity, typ. | 100 mV/gn |
| Resolution of measured value of vibration acceleration, min. | 0.002 gn |
| Resonance frequency | 23 kHz |
| **Installation type/mounting** | |
| other mounting | incl. mounting bolts UNF1/4-28 on M8 |
| **Input current** | |
| Type of power supply | IEPE 2 to 10 mA |
| **Sensor input** | |
| **Encoder signals, IEPE** | |
| • Signal voltage (DC), min. | 10 V |
| • Signal voltage (DC), max. | 14 V |
| **Degree and class of protection** | |
| IP degree of protection | IP65 |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • Operating temperature range, min. | -50 °C |
| • Operating temperature range, max. | 120 °C |
| **Cables** | |
| Cable length, max. | 80 m |
| **Connection method** | |
| Type of connection | MIL-C5015 |
| **Mechanics/material** | |
| Material of housing | Stainless steel |

### Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CMS1200 SM1281 shield clamp set** | | **SIPLUS CABLE-MIL** | |
| For EMC-compliant connection of signal and encoder cables to SIPLUS CMS1200 SM 1281 Condition Monitoring. | 6AT8007-1AA20-0AA0 | For connection of VIB-SENSOR S01 vibration sensor to SIPLUS CMS1200 SM 1281 Condition Monitoring. | |
| **VIB-SENSOR S01 vibration sensor** | 6AT8002-4AB00 | SIPLUS CABLE MIL-300; length 3 m | 6AT8002-4AC03 |
| Piezoelectric sensor for connection to SIPLUS CMS1200 SM 1281 Condition Monitoring. | | SIPLUS CABLE MIL-1000; length 10 m | 6AT8002-4AC10 |

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## ■ Overview
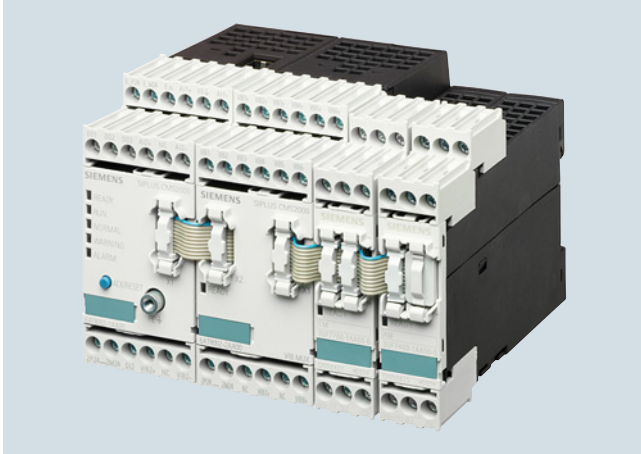
The modular and parameterizable SIPLUS CMS2000 Condition Monitoring System is an easy-to-parameterize, web-based system.

It provides the following benefits:

- Analysis of the status of rolling-contact bearings in accordance with VDI 3832 (DKW)
- RMS machine monitoring in accordance with DIN ISO 10816-3
- Detailed identification of damage with frequency-selective diagnostics
- Raw data recording and export for SIPLUS CMS X-Tools
- Trend recording and analysis
- Monitoring of process variables
- Signaling of limit violations
- Permanent monitoring to protect the machines
- Effective monitoring of important processes and systems
- Energy efficiency support
- Early detection of damage
- Scheduled maintenance instead of spontaneous repair
- Reduction in maintenance costs
- Increased system availability
- Optimum utilization of the service life of the units

The SIPLUS CMS2000 Condition Monitoring System is modularly expandable, e.g. with the

- SIPLUS CMS2000 VIB-MUX expansion module for expanding the IEPE vibration channels
- Temperature module for direct connection of temperature sensors (Pt100, Pt1000, etc.)

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# Products for specific requirements
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

## Basic units

### ■ Overview



The SIPLUS CMS2000 Basic Unit VIB is used for:
- Monitoring of motors, generators, pumps, fans, or other mechanical components
- Recording and analysis of vibrations, speed, and temperature

It is modularly expandable via the system interface, e.g. using SIPLUS CMS2000 VIB-MUX expansion modules and temperature modules.

### ■ Technical specifications

| Article number | 6AT8002-1AA00 |
|---|---|
| | SIPLUS CMS2000 Basic Unit VIB |
| **General information** | |
| Product brand name | SIPLUS |
| Product designation | SIPLUS CMS2000 Basic Unit VIB |
| Product description | Basic unit for the monitoring of vibrations on mechanical components based on parameters and frequency-selective analysis functions for measuring category 0 acc. to EN 61010 |
| Physical measuring principle | Vibration acceleration |
| Measurement range vibration frequency, min. | 2 Hz |
| Measurement range vibration frequency, max. | 10 000 Hz |
| **Installation type/mounting** | |
| Mounting type | standard rail |
| Mounting position | vertical |
| Recommended mounting position | vertical |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 28.8 V |
| **Power loss** | |
| Power loss, typ. | 2.6 W |
| **Memory** | |
| Total memory capacity | 1 Gbyte |
| **Hardware configuration** | |
| Design of hardware configuration | modular construction, basic unit can be expanded by means of expansion modules |
| **Digital inputs** | |
| Number of disable inputs | 1 |
| Number of trigger inputs | 1 |
| **Input voltage** | |
| • At the 24 V DC disable input | Yes |
| • At the disable input (DC), max. | 28.8 V |
| • At the trigger input 24 V DC | Yes |
| • At the trigger input (DC), max. | 28.8 V |

| Article number | 6AT8002-1AA00 |
|---|---|
| | SIPLUS CMS2000 Basic Unit VIB |
| **Digital outputs** | |
| Number of signaling outputs | 3 |
| Design of signaling outputs | Electronic |
| **Output current** | |
| • For signaling output, max. | 0.1 A |
| **Analog inputs** | |
| Number of analog inputs | 2 |
| **Input ranges (rated values), voltages** | |
| • At DC, min. | -10 V |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | No |
| • +/- 4 mA to +/- 20 mA | Yes |
| **Speed input** | |
| Number of speed inputs | 1 |
| **Protocols** | |
| • 24 V DC digital | Yes |
| • At DC, max. | 28.8 V |
| • -10 V to +10 V | No |
| **Protocols** | |
| • 0 to 20 mA | No |
| • 4 mA to 20 mA | No |
| • permissible range, upper limit | 0.1 A |
| • Short-circuit current | 0.7 A |
| **Sensor input** | |
| Number of IEPE sensor inputs | 2 |
| Number of MEMS sensor inputs | 0 |
| Sampling frequency, max. | 46 875 Hz |
| **Interfaces** | |
| Type of data transmission | Exporting of raw data as WAV file for further analyses (e.g. using CMS X-Tools) can be downloaded via browser |
| Ethernet interface | Yes |
| SIMOCODE interface | Yes |

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**Products for specific requirements**
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

**Basic units**

## Technical specifications (continued)

| Article number | 6AT8002-1AA00 |
|---|---|
| | SIPLUS CMS2000 Basic Unit VIB |
| **Protocols** | |
| Bus communication | Yes |
| **Open IE communication** | |
| • TCP/IP | Yes |
| **Web server** | |
| • HTTP | Yes |
| **Interrupts/diagnostics/ status information** | |
| Diagnostics via e-mail | Yes |
| **Integrated Functions** | |
| **Monitoring functions** | |
| • Monitoring of the sensor inputs | Yes |
| • Vibration characteristic monitoring via RMS value of the vibration speed | Yes |
| • Vibration characteristic monitoring via diagnostic characteristic value | Yes |
| • Frequency-selective monitoring via vibration speed spectrum | Yes |
| • Frequency-selective monitoring via vibration acceleration spectrum | Yes |
| • Frequency-selective monitoring via envelope curve analysis | Yes |
| **Isolation** | |
| Overvoltage category | II |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| Certificate of suitability | CE, UL 508, CSA C22.2 Nr.142, C-TICK (RCM) |
| Degree of pollution | 2 |
| Equipment marking according to EN 61346-2 | P |
| Equipment marking according to DIN 40719, expanded according to IEC 204-2, according to IEC 750 | P |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 65 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -25 °C |
| • Storage, max. | 85 °C |
| • Transportation, min. | -25 °C |
| • Transportation, max. | 85 °C |
| **Air pressure acc. to IEC 60068-2-13** | |
| • Installation altitude above sea level, max. | 1 500 m |
| **Relative humidity** | |
| • Operation without condensation, min. | 5 % |
| • Operation without condensation, max. | 95 % |

| Article number | 6AT8002-1AA00 |
|---|---|
| | SIPLUS CMS2000 Basic Unit VIB |
| **Software** | |
| Browser software required | Webbrowser Mozilla Firefox, Google Chrome or Microsoft Internet Explorer |
| **Connection method** | |
| Design of electrical connection for the inputs and outputs | Screw connection |
| Design of electrical connection for auxiliary and control circuit | Screw connection |
| • Connectable conductor cross-section, solid or stranded, min. | 0.5 mm² |
| • Connectable conductor cross-section, solid or stranded, max. | 4 mm² |
| • Connectable conductor cross-section, finely stranded with end sleeve, min. | 0.5 mm² |
| • Connectable conductor cross-section, finely stranded with end sleeve, max. | 2.5 mm² |
| • Connectable cable cross-section finely stranded without end sleeve, min. | 0.5 mm² |
| • Connectable cable cross-section finely stranded without end sleeve, max. | 2.5 mm² |
| **Terminals** | |
| • Removable terminal for main circuit | Yes |
| • Removable terminal for auxiliary and control circuit | Yes |
| **Mechanics/material** | |
| Material of housing | plastic |
| **Dimensions** | |
| Width | 45 mm |
| Height | 106 mm |
| Depth | 124 mm |
| **Weights** | |
| Weight | 300 g |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CMS2000 Basic Unit VIB** | **6AT8002-1AA00** | **Shield connection** | **6AT8002-4AA00** |
| Basic unit for monitoring vibrations in mechanical components based on characteristic values and frequency-selective analysis functions for measuring Category 0 according to EN 61010 | | For the EMC-compliant connection of signal and encoder cables to the basic unit VIB (packing unit = 2 pieces) | |

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# Products for specific requirements
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

## Expansion modules

### ■ Overview

SIPLUS CMS2000 VIB-MUX expansion modules and temperature modules can be connected to the SIPLUS CMS2000 Basic Unit VIB via the SIMOCODE system interface.

#### *SIPLUS CMS2000 VIB-MUX expansion modules*

Up to two SIPLUS CMS2000 VIB-MUX expansion modules can be connected to the SIPLUS CMS2000 Basic Unit VIB to expand the vibration channels. In this way, the number of vibration channels can be expanded modularly from 2 to a maximum of 16 channels.

The following configuration options are possible:

• Basic unit without expansion:
  2 time-synchronous, continuously sampled vibration channels
• Basic unit with one SIPLUS CMS2000 VIB-MUX:
  8 + 1: 8 channels via the SIPLUS CMS2000 VIB-MUX in multiplex mode, 1 channel continuous and independent of the channels connected on the SIPLUS CMS2000 VIB-MUX
• Basic unit with two SIPLUS CMS2000 VIB-MUX:
  16 vibration channels in multiplex mode

SIMOCODE connecting cable for connecting the SIPLUS CMS2000 Basic Unit VIB to the SIPLUS CMS2000 VIB-MUX, see "Accessories".



SIPLUS CMS2000 VIB-MUX expansion module 6AT8002-2AA00

#### *Temperature modules*

Up to two temperature modules can be connected to the SIPLUS CMS2000 Basic Unit VIB.

Each temperature module has three inputs for the connection of up to three analog temperature sensors (sensor types: Pt100/Pt1000, KTY83/KTY84 or NTC).

SIMOCODE connecting cable for connecting the SIPLUS CMS2000 Basic Unit VIB to the temperature modules, see "Accessories".



Temperature module 3UF7700-1AA00-0

### ■ Technical specifications

| Article number | 6AT8002-2AA00 |
|---|---|
|  | SIPLUS CMS2000 VIB-MUX |
| **General information** | |
| Product brand name | SIPLUS |
| Product designation | SIPLUS CMS2000 VIB-MUX |
| Product description | Up to two SIPLUS CMS2000 VIB-MUX expansion modules can be connected to the SIPLUS CMS2000 Basic Unit VIB. Up to 8 IEPE vibration channels can be connected for each expansion module. |
| Functional principle | Multiplexing of analog IEPE signals |
| Physical measuring principle | Vibration acceleration |
| Measurement range vibration frequency, min. | 2 Hz |
| Measurement range vibration frequency, max. | 10 000 Hz |
| **Installation type/mounting** | |
| Mounting type | standard rail |
| Mounting position | vertical |
| Recommended mounting position | vertical |

| Article number | 6AT8002-2AA00 |
|---|---|
|  | SIPLUS CMS2000 VIB-MUX |
| **Supply voltage** | |
| Type of supply voltage | DC |
| Rated value (DC) | 24 V |
| **Power** | |
| Active power input, max. | 2.4 W |
| **Power loss** | |
| Power loss, typ. | 0.05 W |
| **Digital outputs** | |
| Number of digital outputs | 1 |
| **Sensor input** | |
| Number of IEPE sensor inputs | 8 |
| Number of MEMS sensor inputs | 0 |
| **Interfaces** | |
| SIMOCODE interface | Yes |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |

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**Products for specific requirements**
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

**Expansion modules**

## Technical specifications (continued)

| Article number | 6AT8002-2AA00 |
|---|---|
| | SIPLUS CMS2000 VIB-MUX |
| **Standards, approvals, certificates** | |
| Certificate of suitability | CE, UL 508, CSA C22.2 Nr.142, C-TICK (RCM) |
| CE mark | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| EAC (formerly Gost-R) | Yes |
| China RoHS compliance | Yes |
| Equipment marking according to EN 61346-2 | P |
| Equipment marking according to DIN 40719, expanded according to IEC 204-2, according to IEC 750 | P |
| **Ambient conditions** | |
| **Ambient temperature during operation** | |
| • min. | -20 °C |
| • max. | 65 °C |
| **Ambient temperature during storage/transportation** | |
| • Storage, min. | -25 °C |
| • Storage, max. | 85 °C |
| • Transportation, min. | -25 °C |
| • Transportation, max. | 85 °C |
| **Relative humidity** | |
| • Operation without condensation, min. | 5 % |
| • Operation without condensation, max. | 95 % |
| **Connection method** | |
| Design of electrical connection for the inputs and outputs | Screw connection |
| Design of electrical connection for auxiliary and control circuit | Screw connection |
| • Connectable conductor cross-section, solid or stranded, min. | 0.5 mm² |
| • Connectable conductor cross-section, solid or stranded, max. | 4 mm² |
| • Connectable conductor cross-section, finely stranded with end sleeve, min. | 0.5 mm² |
| • Connectable conductor cross-section, finely stranded with end sleeve, max. | 2.5 mm² |
| • Connectable cable cross-section finely stranded without end sleeve, min. | 0.5 mm² |
| • Connectable cable cross-section finely stranded without end sleeve, max. | 2.5 mm² |
| **Terminals** | |
| • Removable terminal for main circuit | Yes |
| • Removable terminal for auxiliary and control circuit | Yes |

| Article number | 6AT8002-2AA00 |
|---|---|
| | SIPLUS CMS2000 VIB-MUX |
| **Mechanics/material** | |
| Material of housing | plastic |
| **Dimensions** | |
| Width | 45 mm |
| Height | 106 mm |
| Depth | 124 mm |
| **Weights** | |
| Weight | 0.27 kg |

| Article number | 3UF7700-1AA00-0 |
|---|---|
| Product designation | temperature module |
| **General technical data:** | |
| Protection class IP | IP20 |
| Ambient temperature | |
| • during storage | -40 ... +80 °C |
| • during operation | -25 ... +60 °C |
| • during transport | -40 ... +80 °C |
| Equipment marking | |
| • acc. to DIN 40719 extended according to IEC 204-2 acc. to IEC 750 | A |
| • acc. to DIN EN 61346-2 | B |
| **Installation/ mounting/ dimensions:** | |
| Installation altitude at height above sea level maximum | 4 000 m |
| Mounting type | screw and snap-on mounting |
| Width | 22.5 mm |
| Height | 92 mm |
| Depth | 124 mm |
| **Inputs/ Outputs:** | |
| Number of analog inputs | 3 |
| **Connections:** | |
| Type of electrical connection for auxiliary and control current circuit | screw-type terminals |
| Connectable conductor cross-section for auxiliary contacts | |
| • single or multi-stranded | 0.5 ... 4 |
| • finely stranded | |
| - with core end processing | 0.5 ... 2.5 |
| - without core end processing | 0.5 ... 2.5 |
| **Standards:** | |
| Certificate of suitability | CE / UL / CSA / CCC / C-Tick (RCM) / GOST / NOM / ABS / DNV / GL / LRS / RoHS |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIPLUS CMS2000 VIB-MUX expansion modules** | 6AT8002-2AA00 | **Temperature modules** | 3UF7700-1AA00-0 |
| Up to two expansion modules can be connected to the SIPLUS CMS2000 Basic Unit VIB. | | Up to two temperature modules can be connected to the SIPLUS CMS2000 Basic Unit VIB. | |
| Up to 8 IEPE vibration channels can be connected for each expansion module. | | | |

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# Products for specific requirements
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

## Accessories

### ■ Overview

#### *SIMOCODE connecting cables*
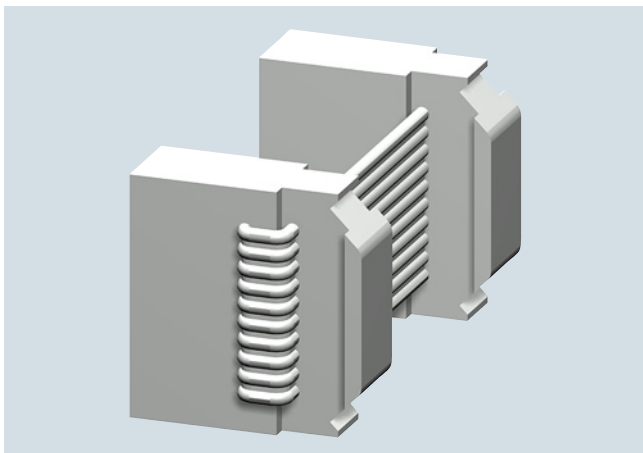


SIMOCODE connecting cable 3UF7930-0AA00-0

The connecting cable is used for connecting the
SIPLUS CMS2000 Basic Unit VIB to the
SIPLUS CMS2000 VIB-MUX expansion modules and the temperature modules via the SIMOCODE system bus interface.

The connecting cable with a length of 0.025 m must be used for side-by-side mounting of the basic unit and
SIPLUS CMS2000 VIB-MUX expansion modules or temperature modules on a TH 35-15 standard DIN rail in accordance with IEC 60715.

#### *Shield connection*
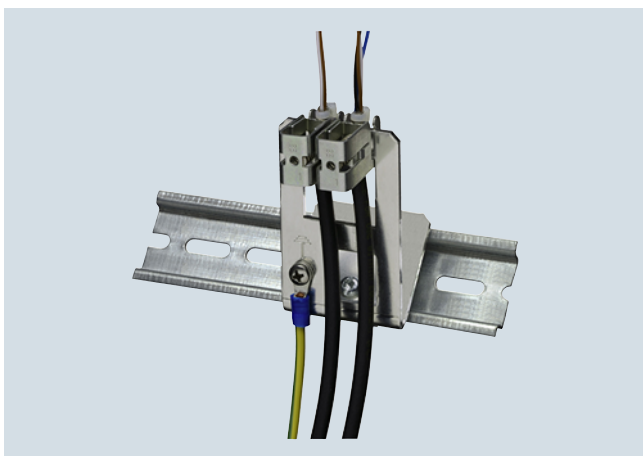


6AT8002-4AA00 shield connection

A separate shield connection must be ordered for the EMC-compliant connection of signal and encoder cables to the SIPLUS CMS2000 Basic Unit VIB and the SIPLUS CMS2000 VIB-MUX expansion module.

The shield connection comprises two shield clamps and five terminal clamps. One shield clamp each is attached to the DIN rail above and below the basic unit. The sensor cable shields are connected to the shield clamps by means of the terminal clamps.

#### *VIB-SENSOR S01 vibration sensor*



VIB-SENSOR S01 vibration sensor 6AT8002-4AB00

The VIB-SENSOR S01 vibration sensor with IEPE (integrated electronics piezo-electric) interface can be directly connected to the SIPLUS CMS2000 Basic Unit VIB and the SIPLUS CMS2000 VIB-MUX expansion module.

The sensor detects vibration accelerations in the frequency range from 0.5 Hz to 15 kHz with a resolution of 100 mV/$g$.

A threaded screw with an M8 male thread for mounting to the measuring point is included in the scope of delivery. The connecting cable is connected to the vibration sensor via the MIL connector.

#### *CABLE-MIL connecting cables*
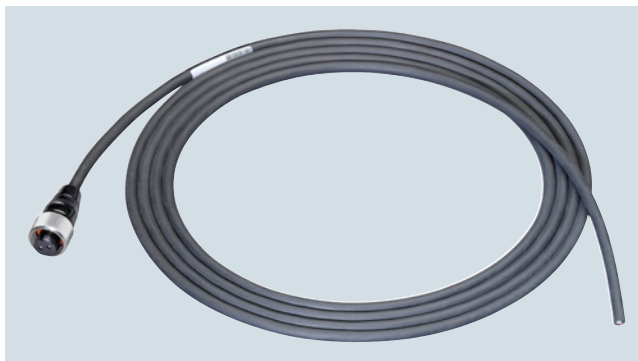


CABLE-MIL connecting cables 6AT8002-4AC03, 6AT8002-4AC10

The VIB-SENSOR S01 vibration sensor is connected to the SIPLUS CMS2000 Basic Unit VIB or the SIPLUS CMS2000 VIB-MUX expansion module by means of the CABLE-MIL connecting cable.

This high-quality industrial cable is made of black polyurethane and is pre-assembled on one end with a MIL connector (MIL-C5015). The open cable end of the shielded two-wire cable is connected directly to the screw terminals of the basic unit.

The connecting cable is available in lengths of 3 m and 10 m.

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**Products for specific requirements**
Condition monitoring systems
SIPLUS CMS2000 Condition Monitoring System

**Accessories**

## ■ Technical specifications

| Article number | 6AT8002-4AA00 |
|---|---|
| | CMS2000 SHIELD CONNECTION ACCESSORY |
| **General information** | |
| Product brand name | SIPLUS |
| Product designation | SIPLUS CMS2000 shield support |
| Product description | For the EMC-compliant connection of signal and encoder cables to the SIPLUS CMS2000 Basic Unit VIB or the SIPLUS CMS2000 VIB-MUX expansion module |
| **Installation type/mounting** | |
| Mounting type | standard rail |
| **Connection method** | |
| Number of signal cables connectable to the shield support | 3 |

| Article number | 6AT8002-4AC03 | 6AT8002-4AC10 |
|---|---|---|
| | SIPLUS CMS2000 CABLE 3m | SIPLUS CMS2000 CABLE 10m |
| **General information** | | |
| Product brand name | SIPLUS CMS | |
| Product category | Industrial cable | |
| Product designation | Connecting cable CABLE-MIL-300 | Connecting cable MIL-CABLE-1000 |
| Product description | For connection of the VIB-SENSOR S01 vibration sensor to the SIPLUS CMS2000 Basic Unit VIB or the SIPLUS CMS2000 VIB-MUX expansion module | |
| **Cables** | | |
| Type of insulation | black polyurethane | |
| Design of shield | Braided shielding with stranded drain wire | |
| Cable length | 3 m | 10 m |
| **Connection method** | | |
| Type of connection | MIL-C5015 / open cable end | |

| Article number | 6AT8002-4AB00 |
|---|---|
| | SIPLUS CMS2000 VIB-SENSOR S01 |
| **General information** | |
| Product brand name | SIPLUS CMS |
| Product designation | VIB SENSOR S01 |
| Product description | Piezoelectric sensor for connection to the SIPLUS CMS2000 Basic Unit VIB or the SIPLUS CMS2000 VIB-MUX expansion module |
| Physical measuring principle | Piezo-quartz recorder with integrated evaluation electronics |
| Operating range of sensor at +/- 3 dB, min. | 0.5 Hz |
| Operating range of sensor at +/- 3 dB, max. | 15 000 Hz |
| Measurement range vibration acceleration, max. | 50 gn |
| Sensitivity, typ. | 100 mV/gn |
| Resolution of measured value of vibration acceleration, min. | 0.002 gn |
| Resonance frequency | 23 kHz |
| **Installation type/mounting** | |
| other mounting | incl. mounting bolts UNF1/4-28 on M8 |
| **Input current** | |
| Type of power supply | IEPE 2 to 10 mA |
| **Sensor input** | |
| **Encoder signals, IEPE** | |
| • Signal voltage (DC), min. | 10 V |
| • Signal voltage (DC), max. | 14 V |
| **Degree and class of protection** | |
| IP degree of protection | IP65 |
| **Cables** | |
| Cable length, max. | 80 m |
| **Connection method** | |
| Type of connection | MIL-C5015 |
| **Mechanics/material** | |
| Material of housing | Stainless steel |

## ■ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **SIMOCODE connecting cable** For side-by-side mounting of SIPLUS CMS2000 Basic Unit VIB and SIPLUS CMS2000 VIB-MUX expansion modules or 3UF7700-1AA00-0 temperature modules | 3UF7930-0AA00-0 | **VIB-SENSOR S01 vibration sensor** Piezoelectric sensor for connection to the SIPLUS CMS2000 Basic Unit VIB or to the SIPLUS CMS2000 VIB-MUX expansion module | 6AT8002-4AB00 |
| **SIPLUS CMS2000 shield connection** For the EMC-compliant connection of signal and encoder cables to the SIPLUS CMS2000 Basic Unit VIB or to the SIPLUS CMS2000 VIB-MUX expansion module | 6AT8002-4AA00 | **CABLE-MIL connecting cable** For connection of the VIB-SENSOR S01 vibration sensor to the SIPLUS CMS2000 Basic Unit VIB or to the SIPLUS CMS2000-VIB-MUX expansion module | |
| | | • CABLE-MIL-300 connecting cable, 3 m long | 6AT8002-4AC03 |
| | | • CABLE-MIL-100 connecting cable, 10 m long | 6AT8002-4AC10 |

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# Products for specific requirements
Time synchronisation

## Introduction

### Overview



SICLOCK time synchronization

#### Introduction

In many applications it is becoming increasingly important to synchronize the time in plants and systems. Only if all network stations are supplied cyclically with a reliable time frame from a central location can optimum process operation be ensured. This results in benefits for the plant operator such as increased operational reliability, the possibility of tracing system faults in a targeted manner, increased economic efficiency due to fewer production outages, and increased productivity in manufacturing.

For this purpose, the SICLOCK product family offers a comprehensive range of optimally matched components for setting up highly reliable time synchronization systems.

Typical industries and fields of application for time synchronization systems are:

- Factory/process automation
- Power supply
- Building automation
- Transportation systems
- Safety engineering
- IT systems

The SICLOCK product range comprises the following product groups:

- Wireless receivers
- Central plant clocks
- Pulse converters
- Accessories

#### System description

Satellites or long-wave transmitters are used as primary time sources. The SICLOCK wireless receivers (e.g. SICLOCK GPS1000) receive these high-frequency signals and transmit the demodulated time signal to the central plant clock via a robust and interference-proof 2-wire connection.

The central plant clock converts the time signal into an Ethernet-based network frame (e.g. NTP, SIMATIC procedure) and thus provides all connected network stations with precise and uniform time information.

Furthermore, in the event of failure or loss of reception from the primary time source, the central plant clock ensures stable continuation of the clock time and tracking of the system time without time jumps as soon as reception is restored.
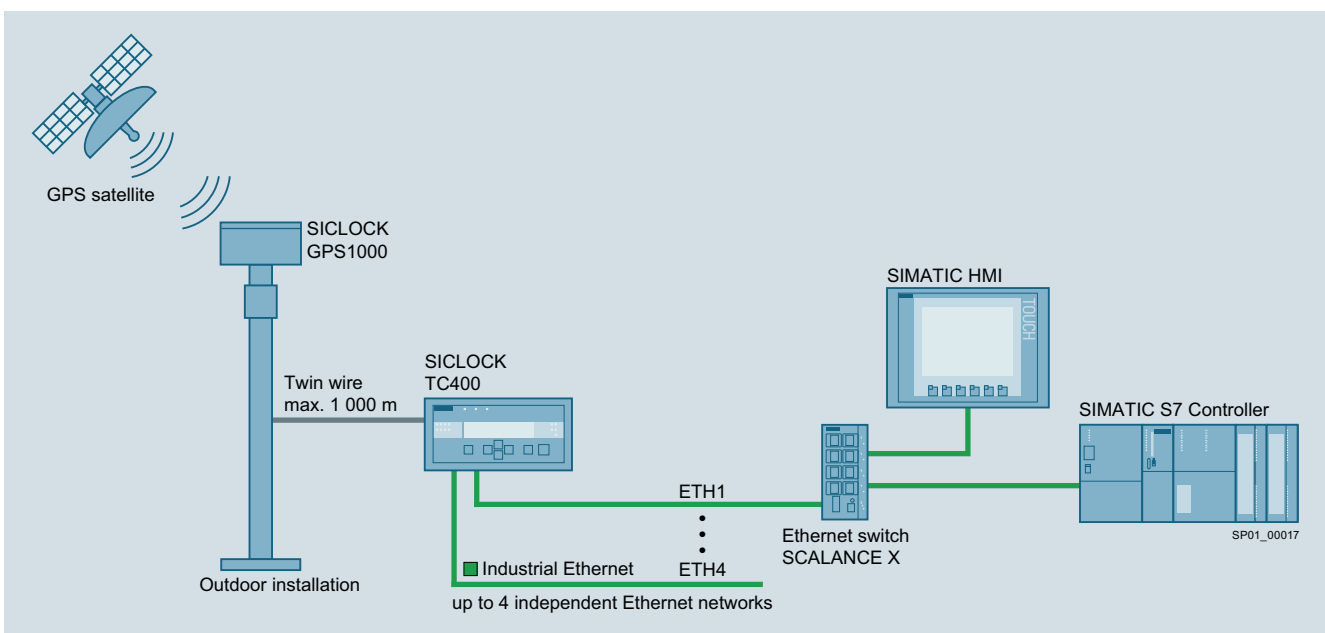


SICLOCK TC400 central plant clock with SICLOCK GPS1000 wireless receiver

## Overview

The central plant clocks evaluate the clock time data that is transmitted from the wireless receiver and generate diverse output signals in order to synchronize the connected I/O devices.

If the wireless receiver fails or signal transmission is interrupted, the central plant clocks switch over to their internal high-precision quartz system and thus ensure reliable tracking of the clock time. When the input signal is available again, the central plant clock adjusts any time differences that may have occurred without time jumps by means of "microsteps".



SICLOCK TC100 and SICLOCK TC400 central plant clocks

### Inputs and outputs

The high-precision SICLOCK TC100 and SICLOCK TC400 central plant clocks have one (SICLOCK TC100) or two (SICLOCK TC400) inputs for connection to wireless receivers.

The central plant clocks have one (SICLOCK TC100) or four (SICLOCK TC400) independent 10/100 Mbit Ethernet interfaces.

The network stations are synchronized using the proven SNTP standard and by means of the SIMATIC procedure.

The SICLOCK central plant clocks have two relay outputs for signaling alarms or warnings.

Alternatively and/or in addition, two TTY point-to-point connections (20 mA current interface) or one RS 422 (5 V level) connection can be set up for the SICLOCK TC400 central plant clock.

### Operation

Parameterization of the interfaces, setting of the signal types, redundancy modes, and read-out of the status messages stored in the device are conveniently implemented via the integrated web interface.

LEDs and a display indicate operating states and show any error messages, which can also be read out via the web interface.

### Note:

In order to use the comfort parameterization, you have to use a PC with Java Runtime software V1.4.0 or higher from Oracle. This software is not included in the scope of delivery and has to be acquired separately, which may incur additional cost.

## Technical specifications

| Article number | **2XV9450-2AR22** | **2XV9450-2AR01** |
|---|---|---|
| | SICLOCK_TC100_Device | SICLOCK_TC400_Single device |
| **General information** | | |
| Product brand name | SICLOCK | |
| Product type designation | TC100 | TC400 |
| Product designation | Central plant clock | |
| **Installation type/mounting** | | |
| Mounting type | DIN rail 35 mm or 19 inch rack | |
| **Supply voltage** | | |
| Supply voltage (DC) | 24 V | |
| Relative negative tolerance | 15 % | |
| Relative positive tolerance | 20 % | |
| **Mains buffering** | | |
| • Buffering time, max. | 3 ms | |
| **Input current** | | |
| Continuous rated current, max. | 0.5 A | 0.7 A |
| Operating current of fuse protection at input, slow-blow | 1 A | |
| **Output current** | | |
| Design of outputs for supply of the antenna | 20 mA to 40 mA at 48 V | |
| **Power** | | |
| Power consumption, max. | 9 W | 15 W |
| **Power loss** | | |
| Power loss, typ. | 6 W | 7.5 W |

| Article number | **2XV9450-2AR22** | **2XV9450-2AR01** |
|---|---|---|
| | SICLOCK_TC100_Device | SICLOCK_TC400_Single device |
| **Time of day** | | |
| Design of the inputs | 1x GPS1000 / DCFRS time input 48 V / 40 mA | 2x GPS1000 / DCFRS time input 48 V / 40 mA |
| **Clock** | | |
| • Time deviation relative to GPS signal, max. | 50 µs | |
| • Time deviation relative to DCF77 signal, max. | 1 000 µs | |
| • Time deviation of the GPS signal with jitter, max. | 200 ns | |
| • Relative accuracy on loss of GPS signal, max. | 0.0001 % | |
| • Relative accuracy on loss of DCF77 signal, max. | 0.000001 % | |
| • Relative accuracy on power supply failure, max. | 0.0004 % | |
| • Clock error compensation relative to 1 s | 50 µs | |
| **Digital outputs** | | |
| **Relay outputs** | | |
| • Number of relay outputs | | |
|   - as NC contact for ALARM | 1 | |
|   - as NC contact for WARNING | 1 | |
| **Switching capacity of contacts** | | |
|   - Current carrying capacity at 48 V DC | 0.06 A | |

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# Products for specific requirements
## Time synchronisation
## Wireless receivers

**Central plant clocks**

## Technical specifications  (continued)

| Article number | 2XV9450-2AR22 | 2XV9450-2AR01 |
|---|---|---|
| | SICLOCK_TC100_ Device | SICLOCK_TC400_ Single device |
| **Interfaces** | | |
| Number of industrial Ethernet interfaces | 1 | 4 |
| Number of 20 mA interfaces (TTY) | | |
| • As output | | 2 |
| Number of RS 422 interfaces | | |
| • As output | | 1 |
| **Industrial Ethernet** | | |
| • Transmission rate, min. | 10 Mbit/s | |
| • Transmission rate, max. | 100 Mbit/s | |
| **Interface types** | | |
| **RJ 45 (Ethernet)** | | |
| • Autonegotiation | Yes | |
| **Protocols** | | |
| Bus protocol/transmission protocol | (S)NTP, DCF77 | (S)NTP, DCF77, pulses, cycles, message frames |
| **Potential separation** | | |
| between Ethernet and electronics | Yes | |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | |
| Equipment protection class | III (according to EN 60536) | |
| **Standards, approvals, certificates** | | |
| Standard for EMC | EN 55022 Class A, FCC Class, EN 55024 | |
| Standard for ambient influences | | |
| • During operation | EN 60721-3-3 class 3KS | |
| • During storage | EN 60721-3-2 class 2K4 | |
| • Relative humidity during operation | IEC 60068-2-78, IEC 60068-2-30 | |
| • Relative humidity during storage | IEC 60068-2-78, IEC 60068-2-30 | |

| Article number | 2XV9450-2AR22 | 2XV9450-2AR01 |
|---|---|---|
| | SICLOCK_TC100_ Device | SICLOCK_TC400_ Single device |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | |
| • max. | 55 °C | |
| • Permissible temperature change relative to one hour (without condensation) | 10 °C | |
| **Ambient temperature during storage/transportation** | | |
| • Storage, min. | -40 °C | |
| • Storage, max. | 70 °C | |
| • Permissible temperature change relative to one hour (without condensation) | 20 °C | |
| • Transportation, min. | -40 °C | |
| • Transportation, max. | 70 °C | |
| **Air pressure acc. to IEC 60068-2-13** | | |
| • permissible range, lower limit | 795 hPa | |
| • permissible range, upper limit | 1 080 hPa | |
| • Installation altitude, min. | -1 000 m | |
| • Installation altitude, max. | 2 000 m | |
| **Relative humidity** | | |
| • Operation at 25 °C without condensation, min. | 10 % | |
| • Operation at 25 °C without condensation, max. | 95 % | |
| • Storage at 25 °C without condensation, min. | 10 % | |
| • Storage at 25 °C without condensation, max. | 95 % | |
| **Mechanics/material** | | |
| **Service life** | | |
| • Battery (during operation), min. | 10 y | 12 y |
| • Battery unconnected (during storage), min. | 10 y | 12 y |
| • Battery connected (during storage), min. | 6 y | |
| **Dimensions** | | |
| Width | 180 mm | |
| Height | 89 mm | |
| Depth | 47 mm | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Central plant clock** | | **SICLOCK TC100 central plant clock, single device** | 2XV9450-2AR22 |
| A wireless receiver supplies the central plant clocks with time data; these then generate signals which are used to synchronize the connected I/O devices. | | • 1 Ethernet interface | |
| | | • 1 DCF77 input for antennas | |
| **SICLOCK TC400 central plant clock, single device** | 2XV9450-2AR01 | | |
| • 4 independent Ethernet interfaces | | | |
| • 2 DCF77 inputs for antennas | | | |
| • 2 DCF77 outputs for redundancy and extensions | | | |

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## Overview



SICLOCK GPS2000 wireless receiver with antenna base

The SICLOCK GPS1000 wireless receiver is designed to receive signals on the 1.575 GHz frequency from the GPS satellite system. The wireless receiver generates the time information (UTC – coordinated universal time) from this high-frequency signal and converts it on the output side into the DCF77 time signal. The wireless receiver can be used all over the world.

The SICLOCK GPS1000 wireless receiver is designed for direct connection to the SICLOCK TC100 and SICLOCK TC400 central plant clocks. The line current method used permits a distance of up to one kilometer between the wireless receiver and the central plant clock.

The antenna has to be installed outdoors for optimum reception of the satellite signals. The wireless receiver needs no parameter assignment or maintenance and, when used with the SICLOCK TC100 or SICLOCK TC400 central plant clocks, is supplied by them with the required operational energy.

The 2XV9450-1AR82 package is available for the direct synchronization of PCs. This package also includes the SICLOCK GPS1000 PS pulse converter for level conversion and the receiving software, which runs on PCs.

Note:

When ordering SICLOCK GPS1000 and bundles with GPS1000, the corresponding product will be delivered with SICLOCK GPS2000. SICLOCK GPS2000 is fully compatible with SICLOCK GPS1000. In the event of repairs, SICLOCK GPS2000 will be supplied as a replacement.

## Technical specifications

| Article number | 2XV9450-1AR88-0AA0 | 2XV9450-1AR88-0AB0 |
|---|---|---|
| | GPS2000 wireless receiver Cable length 2.5 | GPS2000 wireless receiver Cable length 20m |
| **General information** | | |
| Product brand name | SICLOCK | |
| Product type designation | GPS2000 | |
| Product designation | GPS satellite receiver with TTY interface | |
| **Installation type/mounting** | | |
| Mounting type | Outdoor installation | |
| **Supply voltage** | | |
| Type of power supply | via basic unit | |
| **Power** | | |
| Power consumption, max. | 1 W | |
| **Time of day** | | |
| Signal type | GPS | |
| Electrical input frequency of the antenna | 1 574 MHz | |
| **Clock** | | |
| • Time deviation relative to master clock, max. | 1 000 µs | |
| **Interfaces** | | |
| Number of 20 mA interfaces (TTY) | | |
| • As output | 1 | |
| **Degree and class of protection** | | |
| IP degree of protection | IP65 | |

| Article number | 2XV9450-1AR88-0AA0 | 2XV9450-1AR88-0AB0 |
|---|---|---|
| | GPS2000 wireless receiver Cable length 2.5 | GPS2000 wireless receiver Cable length 20m |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | -40 °C | |
| • max. | 60 °C | |
| **Cables** | | |
| Length of the connecting cable | 2.5 m | 20 m |
| **Connection method** | | |
| Design of electrical connection for the connecting cable | 2x 1 mm² shielded | |
| **Dimensions** | | |
| Width of antenna head | 160 mm | |
| Height of antenna head | 85 mm | |
| Depth of antenna head | 80 mm | |
| Width of attachment frame | 160 mm | |
| Height of attachment frame | 630 mm | |

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# Products for specific requirements
Time synchronisation
Wireless receivers

## GPS receivers

| Ordering data | Article No. | | Article No. |
|---|---|---|---|

**GPS receivers**

**SICLOCK GPS2000**

GPS radio clock for the time synchronization of PCs, programmable controllers, as well as the SICLOCK TC100 and SICLOCK TC400 central plant clocks
- Single device with 2.5 m connecting cable — **2XV9450-1AR88-0AA0**
- Single device with 20 m connecting cable — **2XV9450-1AR88-0AB0**

**SICLOCK GPS2000 package with lightning protection** — **2XV9450-1AR84-0AA0**

GPS radio clock for the time synchronization of PCs, programmable controllers, as well as the SICLOCK TC100 and SICLOCK TC400 central plant clocks

Package comprises
- GPS2000 wireless receiver with integrated electronics 2XV9450-1AR88-0AA0
- 2.5 m connecting cable with end sleeves
- Lightning protection module 2XV9450-1AR83

**SICLOCK GPS2000 package with power supply** — **2XV9450-1AR82-0AA0**

GPS radio clock for the time synchronization of PCs as well as programmable controllers via RS 232 interface; in industrial environments with high levels of interference; for distances up to 1 000 m between the antenna and the device

Package comprises
- SICLOCK GPS2000 GPS wireless receiver with 2.5 m connecting cable and lightning protection, extendable to 1 000 m
- Lightning protection module 2XV9450-1AR83
- SICLOCK GPS1000 power supply 2XV9450-1AR85-0AA2
- Antenna holding frame for universal mounting
- Distribution socket for connecting the control cable

**SICLOCK GPS2000 package with 20 m connecting cable** — **2XV9450-2AR82-0AB0**

GPS radio clock for time synchronization with 20 m connecting cable for combination with GPS1000PS, TC100, TC400, PCON and EOPC

Package comprises
- GPS2000 wireless receiver with integrated electronics
- 20 m connecting cable with end sleeves, extendable to 1 000 m
- Lightning protection module 2XV9450-1AR83
- Antenna holding frame for universal mounting
- Distribution socket for connecting the control cable
- Connecting cable to PC COM port (9-pin sub D)
- CD containing operating instructions (German/English)

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## Overview

The pulse converter is available in three versions:
- SICLOCK PCON
- SICLOCK EOPC
- SICLOCK GPS1000 PS

SICLOCK GPS1000 PS, SICLOCK PCON and SICLOCK EOPC pulse converters

### SICLOCK PCON pulse converter

The SICLOCK PCON is a single-channel, electrical-optical pulse converter. It enables electrical and optical time frames and pulses to be distributed.

The device has three inputs for electrical signals (RS 422, RS 232, etc.), one optical input, as well as five electrical outputs and one optical output. By using fiber-optic cables, longer distances can be bridged with very high interference immunity.

The SICLOCK PCON pulse converter can be operated in two modes:
- In transparent mode, the input signal is output at all outputs without any change.
- In pulse mode, an edge change at the input triggers a pulse with parameterizable length at all outputs.

The device is easily parameterized by means of DIP switches located directly on the device.

| Inputs X1 | Outputs X2 |
|---|---|
| RS 422 (non-isolated) | RS 422 (non-isolated) |
| RS 232 (non-isolated) | RS 232 (non-isolated) |
| Pulse input 5 ... 35 V or 5 ... 70 V | Pulse output 24 V (non-isolated) |
|  | Pulse output 24 ... 220 V (isolated) |
| FOC | FOC |
| BFOC connection system | BFOC connection system |
|  | TTY 20 mA current interface |
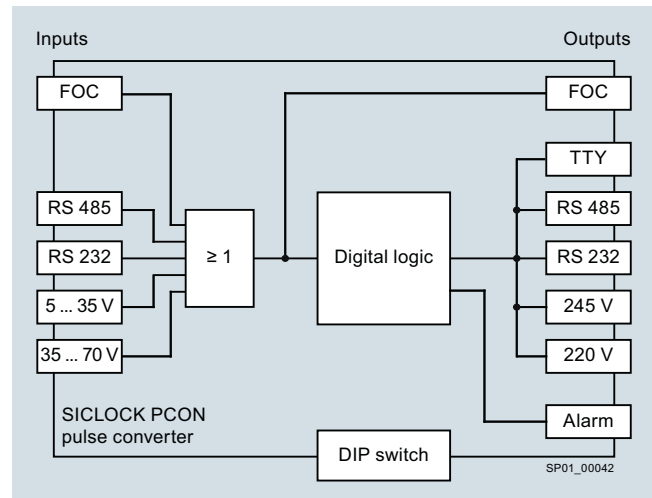


SICLOCK PCON pulse converter (functional diagram)

### SICLOCK EOPC pulse converter

The SICLOCK EOPC is an electrical-optical converter and hub. It features two electrical inputs, which can be alternatively used, and transfers these signals at its 32 fiber-optic outputs. This pulse converter is therefore the ideal choice for applications with numerous nodes with optical pulse interface which have to be synchronized.

| Inputs X1 | Outputs |
|---|---|
| TTY 20 mA current interface | 32 x BFOC 62.5/125 µm |
| Pulse input 10 ... 65 V |  |

# Products for specific requirements
## Time synchronisation

**Pulse converters**

### ◾ Technical specifications

| Article number | 2XV9450-1AR72 | 2XV9450-1AR63-1SA3 |
|---|---|---|
| | SICLOCK EOPC 24-60V DC | SICLOCK PCON E10433-E0415-H100 |
| **General information** | | |
| Product brand name | SICLOCK | |
| Product type designation | EOPC 24 V DC | PCON 24 - 230 V AC/DC, multimode |
| Product designation | Pulse converter | |
| **Installation type/mounting** | | |
| Mounting type | DIN rail 35 mm or 19 inch rack | DIN rail 35 mm |
| **Supply voltage** | | |
| permissible range, lower limit (DC) | 20 V | 24 V |
| permissible range, upper limit (DC) | 28 V | 230 V |
| permissible range, lower limit (AC) | | 24 V |
| permissible range, upper limit (AC) | | 230 V |
| Number of electrical connections for redundant power supply | 2 | |
| **Power** | | |
| Power consumption, max. | 60 W | |
| **Digital inputs** | | |
| Number of voltage inputs | 1 | |
| Design of voltage inputs | 10 - 60 V / 5 mA | 5 - 35 V or 5 - 70 V |
| Number of inputs for FOC | | 1 |
| **Digital outputs** | | |
| Number of outputs (24 V DC) | | 1 |
| Number of outputs (24 V ... 230 V AC/DC) | | 1 |
| Number of outputs for FOC | 32 | 1 |
| **Output current** | | |
| • For output (24 V DC) | | 0.8 A |
| • For output (24 V ... 230 V AC/DC) | 6 A | 0.1 A |
| **Relay outputs** | | |
| • Number of relay outputs | | |
| - As changeover contact for ALARM | | 1 |

| Article number | 2XV9450-1AR72 | 2XV9450-1AR63-1SA3 |
|---|---|---|
| | SICLOCK EOPC 24-60V DC | SICLOCK PCON E10433-E0415-H100 |
| **Interfaces** | | |
| Number of RS 485 interfaces | | |
| • As input | | 1 |
| • As output | | 1 |
| Number of 20 mA interfaces (TTY) | | |
| • As input | 2 | |
| • As output | | 1 |
| Number of RS 232 interfaces | | |
| • As input | | 1 |
| • As output | | 1 |
| **Degree and class of protection** | | |
| IP degree of protection | IP20 | IP40 |
| **Ambient conditions** | | |
| **Ambient temperature during operation** | | |
| • min. | 0 °C | |
| • max. | 50 °C | |
| **Connection method** | | |
| Design of the FOC connection | BFOC | |
| **Mechanics/material** | | |
| Design of the FOC | Glass fiber 62.5/126 µm, plastic 1 000 µm | |
| Material of optical fiber | Glass, plastic | |
| **Dimensions** | | |
| Width | 250 mm | 100 mm |
| Height | 140 mm | 70 mm |
| Depth | 135 mm | 120 mm |

### ◾ Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Pulse converters** | | **SICLOCK EOPC** | **2XV9450-1AR72** |
| **SICLOCK PCON** | **2XV9450-1AR63-1SA3** | Electrical-optical pulse converter for industrial applications with 32 fiber-optic cable outlets for transparent operation and pulse mode, 24 ... 110 V DC | |
| Single-channel, electrical-optical pulse converter for industrial applications, 820 nm, 24 ... 230 V AC/DC, with multimode fiber-optic connection | | | |

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## Overview

### *Software*

For less complex applications, the wireless receivers can even be operated without central plant clocks.

Two software packages are available for such applications to process the time information on Windows computers or in a SIMATIC PLC.

- 2XV9450-1AR28: SICLOCK DCF77 receiving service software for Windows XP, Windows Vista, Windows 7, Windows Server 2003/2008/2008 R2

### *Lightning protection*

The 2XV9450-1AR83 lightning protection element is integrated by default into the connecting cable downstream of the wireless receiver and protects the components connected to it against overvoltage caused by lightning strikes.

### *Mounting hardware*

For easy installation in 19" rack units, a 2XV9450-2AR81 mounting frame for two SICLOCK TC100 and/or SICLOCK TC400 central plant clocks each is available.

## Technical specifications

| Article number | 2XV9450-2AR81 | 2XV9450-1AR28 | 2XV9450-1AR83 |
|---|---|---|---|
| | SICLOCK TC400 19" kit | SICLOCK DCF77 DRIVER FOR WINDOWS | SICLOCK GPS1000 LIGHTNING PROTECTION |
| **General information** | | | |
| Product brand name | SICLOCK | | |
| Product designation | 19 inch frame for SICLOCK TC400 / TC100 | DCF77 receiver software for Windows | Lightning protection for GPS1000 or DCFRS radio clock |
| **Installation type/mounting** | | | |
| 19-inch installation | Yes | | |
| Number of modular height units | 3 | | |
| **Time of day** | | | |
| Signal type | | | |
| • At the input | | | DCF77 |
| • At the output | | | DCF77 |
| **Digital inputs** | | | |
| Number of digital inputs | | | 1 |
| **Digital outputs** | | | |
| Number of digital outputs | | | 1 |
| **Operating systems** | | | |
| Required operating system | | Microsoft Windows XP, Windows Vista, Windows 7, Windows Server 2003, Windows Server 2008/2008 R2 | |

## Ordering data

| | Article No. | | Article No. |
|---|---|---|---|
| **Accessories** | | **Mounting frame for SICLOCK TC100 and SICLOCK TC400 central plant clocks** | **2XV9450-2AR81** |
| **Software** | | | |
| • Receiving service software for Windows | **2XV9450-1AR28** | | |
| **Lightning protection for antenna cable** | **2XV9450-1AR83** | | |
| Lightning protection for TTY connecting cable for SICLOCK GPS1000 or SICLOCK DCFRS wireless receivers | | | |

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# Products for specific requirements
Time synchronisation

## Bundles

### Overview

The SICLOCK TC100 and SICLOCK TC400 central plant clocks can be operated with the SICLOCK GPS1000 or SICLOCK DCFRS wireless receivers.
With the bundles you order the complete unit comprising: the central plant clock, the antennas/wireless receivers and the accessories required.

### Ordering data

| | Article No. |
|---|---|
| **SICLOCK TC400 bundle** | **2XV9450-2AR10-0AA0** |
| Complete solution, e.g. for use in PCS 7, package comprises | |
| • SICLOCK TC400 | |
| • SICLOCK GPS2000 antenna with 2.5 m connecting cable, mounted, extendable to 1 000 m | |
| • Antenna frame | |
| • Distribution socket | |
| • Lightning protection | |
| **SICLOCK TC100 bundle** | **2XV9450-2AR50-0AA0** |
| Complete solution, e.g. for use in PCS 7, package comprises | |
| • SICLOCK TC100 | |
| • SICLOCK GPS2000 antenna with 2.5 m connecting cable, mounted, extendable to 1 000 m | |
| • Antenna frame | |
| • Distribution socket | |
| • Lightning protection | |

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**Overviews**

***Brochures***

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

Siemens ST 70 · 2017

## Overviews
SIMATIC HMI

■ **Overview**



***SIMATIC HMI operator control and monitoring systems – efficient machine-level operator control and monitoring***

Equipment for monitoring and operator control is needed wherever people have to work with or on machinery and plants performing diverse tasks from cylinder driers to waste compactors. It is not difficult to find the right device for your specific task. The challenge is to find a solution that is future-proof and flexible, that can be integrated into higher-level networks, and that can also meet the ever-increasing demands for transparency and data provision. SIMATIC HMI Panels have proven their value in a variety of different applications in all industrial sectors over many years. The range of the systems in use is just as wide as that of the applications and technologies in the respective plants.

SIMATIC HMI stands for highly efficient machine-level operator control and monitoring and has some unique advantages:

- Efficient engineering
  Visualization can be created more quickly and easily than ever before.
- Innovative design and operation
  Visualization becomes the outstanding feature of the machine.
- Brilliant HMI operator panels
  The right HMI operator panel for every application.
- Backup – with security
  Protection for investments and know-how, secure operation.
- Commissioning in the fast lane
  Lose no time with testing and servicing.

www.siemens.com/hmi

SIMATIC HMI software in the TIA Portal – a lot more than just visualization software

With the product families SIMATIC WinCC (TIA Portal), SIMATIC WinCC and SIMATIC WinCC Open Architecture, SIMATIC HMI covers the entire engineering and visualization software spectrum for the human machine interface.

- Almost the entire range of SIMATIC operator panels can be configured with SIMATIC WinCC (TIA Portal), the successor to SIMATIC WinCC flexible.
  The functionality covers both visualization tasks at machine level and SCADA applications on PC-based multi-user systems.
- The current version 7.4 of SIMATIC WinCC is available for extremely complex process visualization tasks and SCADA applications, e.g. taking account of redundant solutions and vertical integration all the way to plant intelligence solutions.
- And, last but not least, WinCC Open Architecture addresses applications with high customer-specific demand for adaptation and specialized functional scope, even on non-Windows platforms.

www.siemens.com/wincc-tia-portal

***SIMATIC HMI - Brilliant and rugged operator panel***

Basic HMI - for the entry level
- Key Panels
  Pre-assembled and ready for installation, for conventional operator panels.
  http://www.siemens.com/key-panels
- Basic Panels
  The entry level series for simple HMI applications.
  http://www.siemens.com/basic-panels

Panel-based HMI Advanced - for more sophistication
- Comfort Panels
  High-end functionality for demanding HMI applications.
  http://www.siemens.com/comfort-panels
- Mobile Panels
  Portable HMI operator panels for mobile deployment on site.
  http://www.siemens.com/mobile-panels

***Individual HMI devices in customized versions***

http://www.siemens.com/customized-automation

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## Overview (continued)

Enterprise Resource Planning (ERP)

Manufacturing Execution Systems (MES)

Plant Intelligence

**Process visualization**

Single-user PC

Client/Server

Internet client

SCADA system WinCC

**Operator control and monitoring directly at the machine**

Basic HMI

Key Panels

Basic Panels

Advanced HMI

Comfort Panels

Mobile Panels

Panel PCs
Flat Panel Monitors

Thin Clients

HMI Software

WinCC (TIA Portal)

SIMOTION
Motion Control

SIMATIC controllers

S7-200     S7-400

S7-1500

S7-1200

S7-300

Additional automation systems

Actuators / Sensors

Field devices

Drives

# Overviews
## PC-based Automation

### ■ Overview



**SIMATIC PC-based Automation**

http://www.siemens.com/pc-based
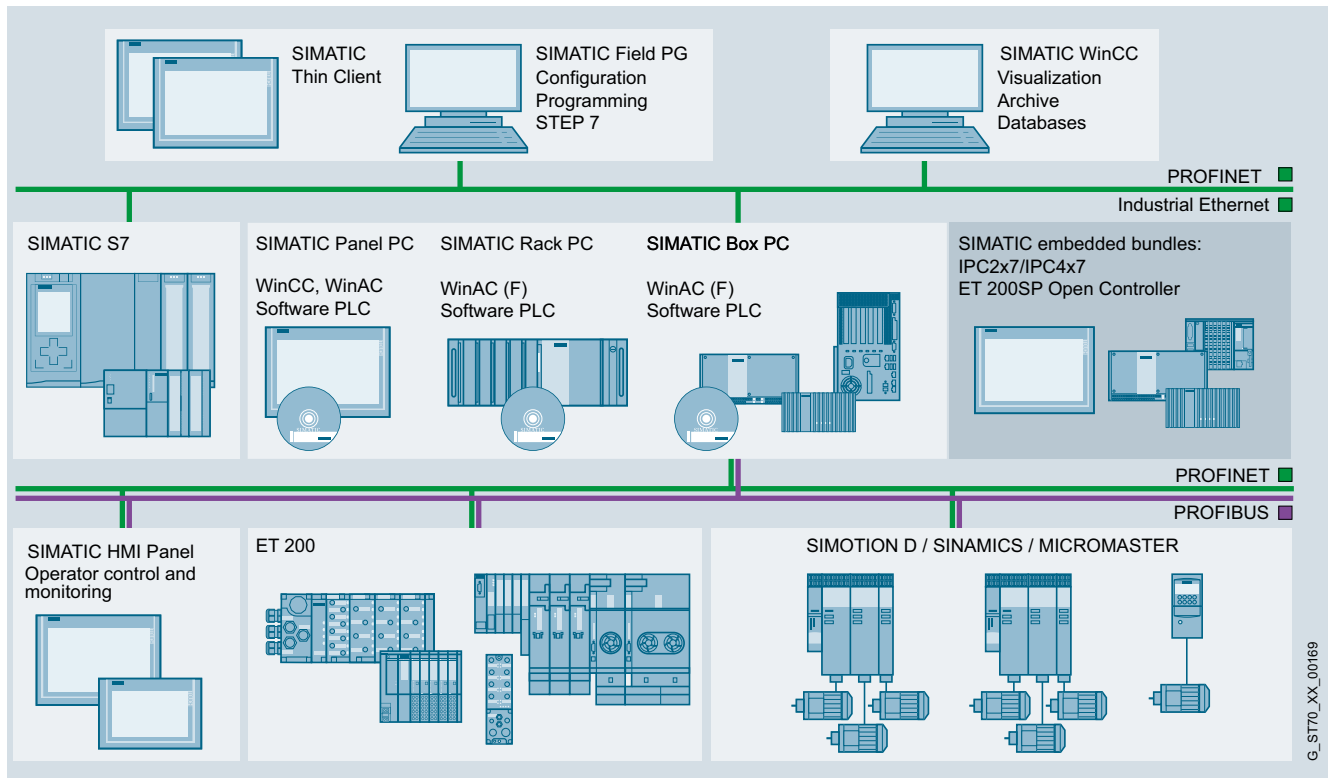
Industrial IoT Gateway - SIMATIC IOT2000

An intelligent gateway which harmonizes communication between the various sources of data before analyzing and forwarding it to the corresponding recipients. An easy-to-implement solution.

www.siemens.com/iot2000

Industrial PC

Our reliable and innovative industrial PCs are the optimal PC hardware platform for PC-based Automation from Siemens.

- Rack PC
- Box PC
- Panel PC
- Tablet PC
- Industrial monitors and Thin Clients
- Devices for special requirements
  - Fully-enclosed IP65 devices
  - Devices with stainless steel front
  - Devices for hazardous areas
- IPC software
- Embedded bundles/software packages

www.siemens.com/simatic-ipc

Software Controller

The SIMATIC S7-1500 Software Controller realizes a SIMATIC S7-1500 controller on a SIMATIC IPC. It is particularly suitable for control solutions in special-purpose machine manufacturing which involve a high-performance implementation of complex control tasks, the integration of PC applications, or the realization of multiple tasks on a single device.

PC-based controllers

PC-based controllers combine the functions of a PC-based software controller with visualization, PC applications and central I/Os (inputs/outputs) in a single, compact device. The SIMATIC ET 200SP Open Controller is an industrial PC with the design of the ET 200SP I/O system and a pre-installed S7-1500 Software Controller.

www.siemens.com/open-controller

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## Overview



SIMATIC PCS 7 system architecture

### *Performance you trust*

In process engineering plants, the process control system is the starting point for optimal value added: All procedures and processes can be operated, monitored and influenced with the process control system.

The more powerful the process control system, the more effectively this potential can be used. For this reason, performance is in the foreground with SIMATIC PCS 7, alongside scalability, flexibility, and integration. Starting with planning and engineering, the process control system offers powerful tools, functions and features for cost-effective and efficient plant operation through all phases of the plant life cycle.

### *Performance through integration*

Integration is one of the special strengths of SIMATIC PCS 7. This has many aspects:

• Horizontal integration into TIA
• Vertical integration into hierarchical communication
• System-integrated tools for engineering tasks
• Integration of the field level, including drives, switchgear, etc.
• Integrated functions, e.g. for batch process automation, route control, process safety, energy management, telecontrol tasks, etc.

### Horizontal integration

A system for integrated automation of the entire process chain, from incoming raw materials to outgoing goods – this is one of the decisive advantages resulting from the seamless integration of SIMATIC PCS 7 into Totally Integrated Automation.

The process control system is mainly responsible for automating the primary processes here, but it can do much more: All auxiliary facilities, as well as the electrical infrastructure in the form of low-voltage or medium-voltage switchgear and the building management system, can also be integrated into the system.

Integration of selected SIMATIC standard components – automation systems, industrial PCs, network components, or distributed process I/O – into the process control system guarantees optimum interaction of individual components, and secures economic benefits such as simple selection, reduced stock keeping, and global support.

### Vertical integration

The hierarchal communication of a company encompasses the field level, the control level, and the process level, up to management and enterprise resource planning (ERP). Thanks to standardized interfaces – based on international industry standards as well as internal interfaces – SIMATIC PCS 7 is able to provide process data for analysis, planning, coordination, and optimization of plant sequences or production and business processes – in real time, and at any location in the company.

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# Overviews
## SIMATIC PCS 7

**Introduction**

■ **Overview** (continued)

Central engineering

SIMATIC PCS 7 convinces with graded functional diversity, consistent operator control philosophy, and uniformly structured engineering and management tools. A central engineering system with a coordinated range of tools for integrated system engineering and configuring of batch automation, safety functions, material transport or telecontrol systems creates value added over the entire life cycle. Reductions in configuring and training costs result in minimization of total cost of ownership (TCO) over the entire plant life cycle.

Functional diversity

Depending on the typical process automation or customer-specific requirements, SIMATIC PCS 7 can be functionally expanded for the following, for example:

- Batch process automation (SIMATIC BATCH)
- Functional safety and protection functions (Safety Integrated for Process Automation)
- Route control for material transport (SIMATIC Route Control)
- Telecontrol of remote units (SIMATIC PCS 7 TeleControl)
- Automation of electrical switchgear (SIMATIC PCS 7 PowerControl)

Further additional functions that are also integrated, or can be integrated, seamlessly into the control system make optimization of processes and reductions in operating costs possible. SIMATIC PCS 7 has, for example, tools for energy and asset management, and it offers higher quality closed-loop control functions, as well as industry-specific automation solutions and libraries.

*Customized performance*

Thanks to a unique scalable system architecture, SIMATIC PCS 7 creates the ideal basis for cost-effective implementation of individual automation solutions and economic operation of process plants.

SIMATIC PCS 7 users derive sustained profit from a modular system platform based on standard SIMATIC components. Its uniformity enables flexible scaling of hardware and software, as well as perfect interaction both within the system and beyond system limits. The architecture of the SIMATIC PCS 7 Process Control System is designed in such a manner that instrumentation and control can be configured in accordance with customer requirements and optimally matched to the dimensions of the plant. The control system can be subsequently expanded or reconfigured at any time if there is an increase in capacity or a technological modification. When the plant grows, SIMATIC PCS 7 simply grows along with it – without the provision of expensive reserve capacities.

*Performance im Engineering*

With regard to planning and engineering, performance can be equated with minimizing time and costs. This is where the SIMATIC PCS 7 Plant Automation Accelerator offers its unique approach, with an integrated planning workflow from the process description to the automation program.

The object-oriented approach of the SIMATIC PCS 7 Plant Automation Accelerator makes it possible to work on a central data platform, thus ensuring completely integrated planning – from plant engineering through to automation – based on an electronic workflow. This modular engineering approach enhances efficiency and minimizes risks. Project planning and documentation takes places early during the quote and engineering phase, resulting in significant time and cost savings.

Engineering using other planning tools is also mastered extremely efficiently by SIMATIC PCS 7 by means of the Advanced Engineering System (AdvES). This can be used to import plant data from CAD/CAE tools without problems. It additionally allows automatic generation of the AS configuration thanks to simple multiplication of process tag types and model solutions, as well as parameter processing.

*Performance in operation*

Process control also becomes more complex due to the multi-layer nature of automation engineering and the increased merging with information technology. Intuitive and fault free operation is therefore more important than ever with regard to efficient working and the minimization of downtimes and servicing requirements. Using effective Advanced Process Control (APC) functions and an excellent operator system, SIMATIC PCS 7 supports optimization as well as user-friendly and safe control of the process. Monitoring of product quality and performance indicators additionally allows the process to be operated more economically. At the same time, SIMATIC PCS 7 convinces with high flexibility, plant availability, and investment security.

Process control and maintenance

SIMATIC PCS 7's operator system is used to monitor process operation using various views, and permits interventions when necessary. Its architecture is flexible and scalable – from single-user systems up to multi-user systems with a redundant client/server architecture. The operator interface takes account of the current specifications of NAMUR (user association of automation technology in the process industries) and PI (Profibus International) and offers a high level of user-friendliness for simple, intuitive interaction with the plant. Ergonomic symbols, task-oriented faceplates, uniform representation of status information, and optimized alarm functions allow safe process control.

The alarm management function integrated in SIMATIC PCS 7 is able to focus on essential alarms and to specifically guide the operator in exceptional circumstances. In this way, it systematically reduces the workload of operating staff.

Preventive and predictive maintenance strategies reduce total cost of ownership. With the SIMATIC PCS 7 Maintenance Station, maintenance personnel always have a watchful eye on critical production equipment such as pumps, valves, distillation columns or motors, and can carry out the relevant maintenance measures in good time before servicing is required – independent of the maintenance plan and without the risk of an unplanned plant standstill.

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## ■ Overview (continued)

Process optimization

SIMATIC PCS 7 supports process optimization in many different manners, including:

- Control Performance Monitoring
- Advanced Process Control
- Process Historian

The Control Performance Monitoring function monitors and signals the control quality of the closed-loop control block. If the performance declines, the controller can be optimized in good time or specific maintenance measures can be initiated.

The integrated I&C libraries of SIMATIC PCS 7 also provide higher quality closed-loop control functions with which cost-effective Advanced Process Control applications can be implemented: multi-variable control, predictive control, or override control. It is thus possible to effectively improve profitability, product quality, safety, and environmental protection in small and medium-sized plants.

Current and historic process data form the basis of all optimization. Secure and user-friendly real-time data storage and analysis is handled using the Process Historian. The process values, messages, and batch data managed in the database of the Process Historian can be called extremely rapidly. User-specific processing and visualization of this historic data are supported by the information server, which is a reporting system based on the Microsoft Reporting Services.

### SIMATIC PCS 7 system and technology components

With the rugged, high-performance SIMATIC PCS 7 system components from Catalog ST PCS 7, you already have a versatile platform for cost-effective implementation and economical operation of your process control systems. Perfect interplay of these system components makes it possible for you to sustain high-quality production and to establish new products significantly faster on the market.

With SIMATIC PCS 7 technology components from Catalog ST PCS 7 T that can be seamlessly integrated into the process control system, you can expand the functional scope of the system components in a carefully targeted manner for specific automation tasks.

This covers a wide spectrum, for example:

- Telecontrol for monitoring and controlling remote plant units
- Automation technology for electrical low-voltage or medium-voltage switchgear
- Industry-specific automation systems for the cement and mining industries, as well as for laboratory and training facilities
- Graphical objects for task-oriented optimization of process visualization
- Block libraries for technological functions, package unit and panel integration, monitoring and analyzing mechanical assets, as well as for building automation systems (heating, ventilation, air-conditioning – FMCS/HVAC)

- Editors and function blocks for the efficient configuration of small or medium-sized automation systems with simple parameter control and materials management
- Process analytical technology for quality assurance through optimization of development and production processes based on up-to-date measurements, and critical quality and performance attributes
- Simulation system for testing and commissioning of plant-specific application software
- Flexible, high-performance Manufacturing Execution System (MES)
- System expansion for operator systems for the integration of third-party controllers, programmable logic controllers and package units
- Products for migration of the process control systems TELEPERM M, APACS+/QUADLOG or Bailey INFI 90/NET 90 with SIMATIC PCS 7

SIMATIC PCS 7 technology components have been released for all versions and service packs of SIMATIC PCS 7 system components. Development and testing of SIMATIC PCS 7 technology components are dependent on the corresponding SIMATIC PCS 7 system components, so versioning and release is normally performed asynchronously, that is following a delay of between 3 and 6 months.

### Additional functionality can be integrated using add-on products

Modularity, flexibility, scalability, and the openness of SIMATIC PCS 7 offer optimal prerequisites for integrating supplementary components and solutions in the process control system in an applicative manner and thus extend and round off its functionality.

Many supplementary add-on products for SIMATIC PCS 7 have been developed by Siemens as well as by external partners (see Catalog ST PCS 7 AO, Add-ons for the SIMATIC PCS 7 Process Control System). These software packages and hardware components authorized by the system manufacturer enable cost-effective implementation of SIMATIC PCS 7 for special automation tasks.

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# Overviews
## SIMATIC NET

### Overview

**SIMATIC NET**
*Industrial communication – the backbone of automation*
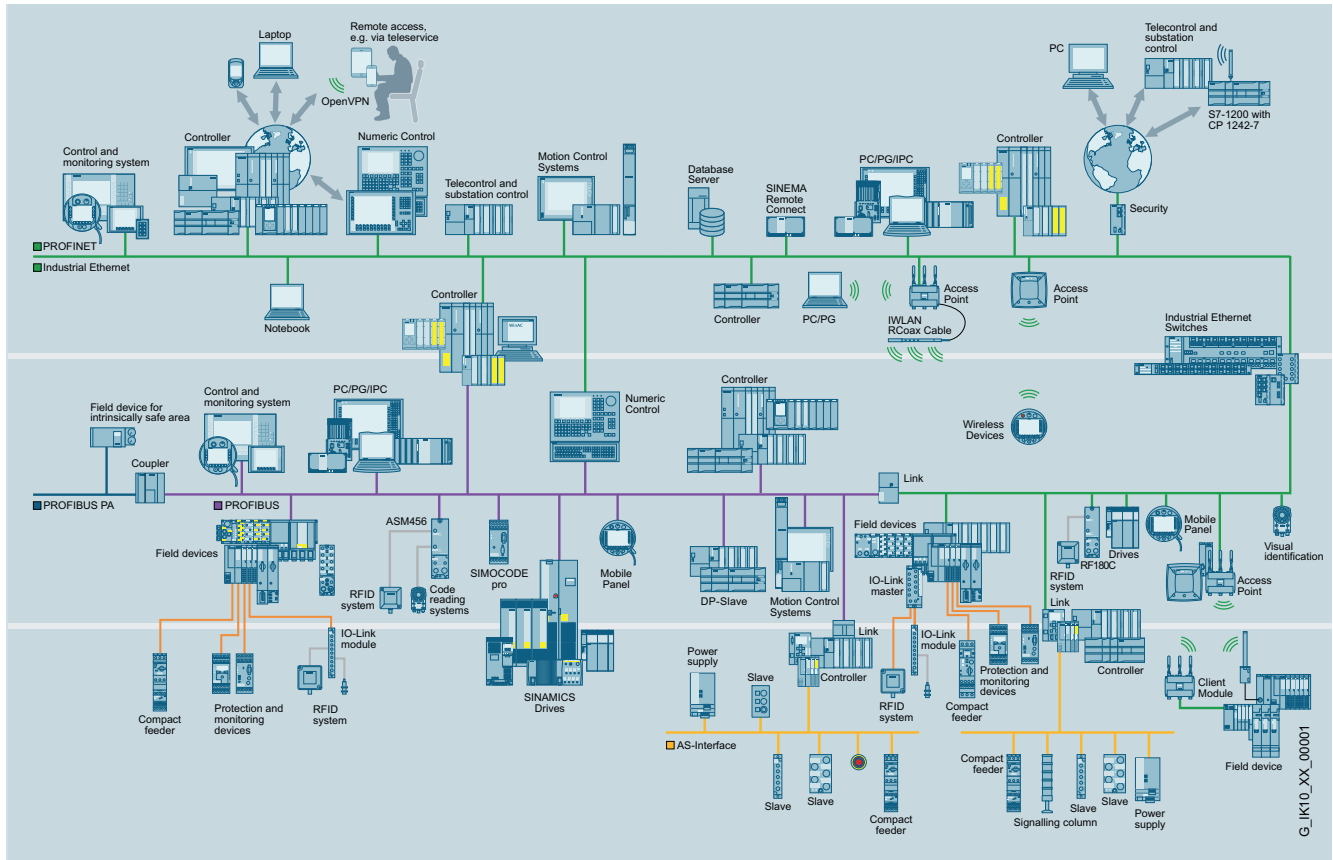


Powerful and open communication systems ensure trouble-free communication for automation systems, covering

- data communication or
- process or field communication.

Openness and flexibility of the individual communication systems in different topologies enable linking of a wide variety of systems and their subsequent expansions. By using standardized communication systems, it is possible to connect standardized components from different suppliers without any problems. This ensures maximum protection of investment, as existing networks can be extended without any adverse effects.

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■ **Overview** (continued)



SIMATIC NET provides components for an integrated overall solution beyond network boundaries.

These include:

- Passive network components, e.g. FastConnect cabling systems
- Active network components, e.g. SCALANCE X Industrial Ethernet switches
- Interfaces for connecting programmable controllers to the communication systems:
  - Integrated interfaces
  - Communications processors
- Components for wireless networks, e.g. Industrial Wireless LAN, SCALANCE W Access Points, and Client Modules
- Components for industrial security
- Components for Industrial Remote Communication, worldwide access to outlying plants, distant machines, and for mobile applications such as TeleControl.
- Components for the connection to remote networks, e.g. SCALANCE M and SINEMA Remote Connect
- Network transitions, e.g. IE/PB LINK PN IO
- Software for configuration, monitoring and diagnosis of the network, e.g. SINEMA Server

*More information*

- Catalog IK PI
- Catalog IC 10
- Catalog CA 01 on DVD
- Internet:
  www.siemens.com/industrial-communication

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# Overviews
## SIMATIC Ident

### Overview

#### SIMATIC Ident – for more cost-effective production and logistics processes

To stay ahead in ever more dynamic markets and in the face of growing competition, stricter standards and statutory obligations, shorter product life cycles, more individual customer requirements, and increasingly globalized value-added, companies must be in a position to significantly boost the efficiency of their value added chains. In production control, asset management, tracking & tracing as well as in supply chain management. By using innovative identification technologies, companies can gain important advantages. Together with high-performance, reliable communication networks, this creates the infrastructure that prepares companies for the forthcoming industrial digitalization.

With SIMATIC Ident, we offer a unique portfolio for industrial identification which provides the perfect solution for your requirements while keeping you flexible for the future.

The right identification technology depends on factors such as sensing distance, lighting conditions, single or repeat markings, as well as environmental effects such as temperature and pollution.

Whether RFID, barcode, DMC or OCR: each technology has its specific strengths. For instance, optical character recognition is used for cases in which codes must also be readable for persons, such as use-by dates.

2D codes and RFID impress customers with their high level of data security and reliability, even in harsh industrial environments.

But the most important factor for your identification system is: your individual application.

Whatever your requirements – with our SIMATIC Ident Portfolio we can always provide the appropriate solution. Using communication modules and convenient function blocks, it is easy to connect SIMATIC Ident systems to PLCs, such as SIMATIC, or embed them in the IT landscape. This ensures that you have a system-wide, uniform software architecture, saving you considerable outlay and costs in engineering, commissioning and maintenance.



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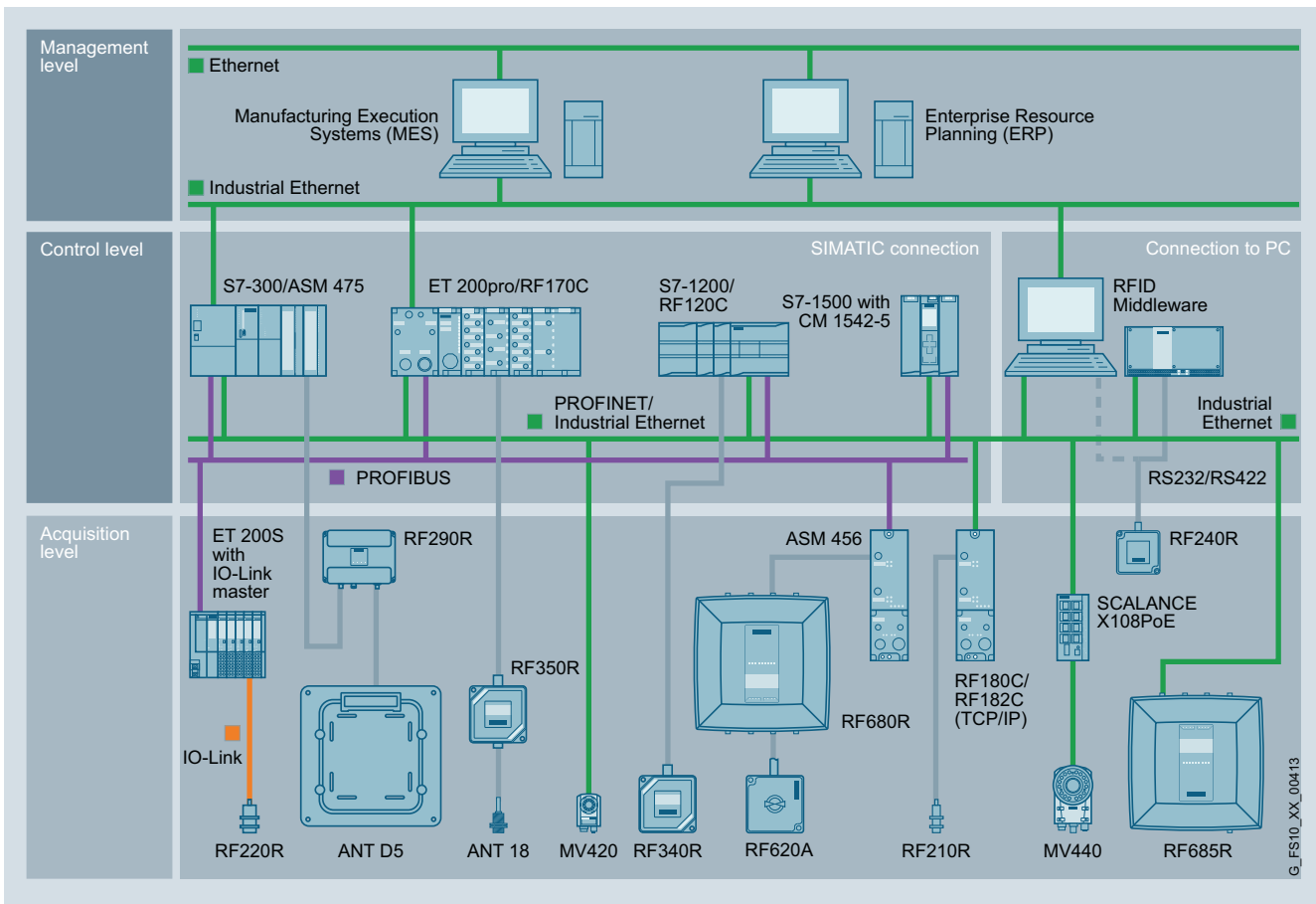
## Overview (continued)

### Identification, mobile data storage: RFID



RFID is the ideal solution when there is no line of sight between the reader and the marking, large volumes of data or wide ranges are required, or the stored information has to be changed. Here the product or object is fitted with a memory chip that can be programmed and read using radio techniques. With low-cost SmartLabels available for logistics, rugged data memories for assembly lines as well as transponders with a wide range, RFID is perfectly suited to a variety of different applications.

Our intelligent SIMATIC RF system family offers you transparency without gaps. Data is therefore available at any time along the complete production and distribution chain - for perfect control and optimization of material flow and logistics.

### Identification, verification: Optical identification



When higher performance is required, 2D codes are recommended as an alternative to barcodes. 2D codes offer more memory capacity, higher reading rates, and enhanced reading security. They can be applied inexpensively, e.g. together with shipping labels. They also enable products to be marked directly (Direct Part Marking, DPM) using lasers, printing or dot-peening, which is extremely resistant to external influences. 2D codes can be read with complete reliability even from a small viewing angle or under difficult lighting conditions.

With our optical reading devices, we offer you the ideal solution for reading and verifying 1D and 2D codes as well as for text recognition (OCR) and object recognition (Pat-Genius) for the reliable tracing of production batches beyond the manufacturing plant.

***More information***

- Catalog ID 10
- Catalog CA 01 on DVD
- Internet: www.siemens.com/simatic-ident

## Overviews

**Notes**

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*Brochures*

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

# Supplementary components
## Drive systems

**SINAMICS drive system**

■ **Overview**

### The SINAMICS range



- Totally integrated range of drives for any application and every industry
- Wide range of power ratings from 0.12 kW to 120 MW
- Broad functional scope from simple *U/f* control through to highly dynamic servo control
- Designed for problem-free interaction with other Siemens automation components
- Shared platform concept with uniform functionality, engineering, commissioning, operation as well as a uniform diagnostics concept and communication mechanisms

### SINAMICS V20 –
### The perfect solution for basic applications



- Power range from 0.12 kW to 30 kW
- Voltage:
  - 230 V 1AC: 200 V to 240 V 1 AC (-10 % to +10 %)
  - 400 V 3AC: 380 V to 480 V 3 AC (-15 % to +10 %)
- Integrated USS and Modbus RTU interfaces
- Integrated braking module for 7.5 kW to 30 kW
- Parameter readout and cloning without power supply
- Integrated connection and application macros
- ECO mode for *U/f*, $U^2/f$
- Integrated hibernation mode in the idle state
- Wireless commissioning, operation and diagnostics via mobile device or laptop thanks to the optional SINAMICS V20 Smart Access (Web server module)

More information
- SINAMICS V20 Brochure, Catalog D 31.1
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-v20
  http://www.siemens.com/industrymall

### SINAMICS V90 basic servo drive system –
### the performance-optimized and easy-to-use servo drive system



- SINAMICS V90 and SIMOTICS S-1FL6 form an optimized servo drive system for positioning, as well as speed and torque control. Thanks to the optimized design, the system permits high servo performance with a high level of ruggedness in a simple, low-cost way.
- SINAMICS V90 is designed for all-purpose servo applications while taking into consideration the challenges for machine builders and system integrators in terms of costs and time-to-market.
- The SINAMICS V90 system can essentially be commissioned effortlessly by means of a simple plug-and-play procedure. The SINAMICS V90 drive offers optimum servo-performance, can be integrated quickly into SIMATIC PLC control systems and offers a high level of reliability. The connection is made, for example, via PROFINET by means of a pulse-direction interface or via analog inputs/outputs. A seamless drive system can be created by combining the SINAMICS V90 servo drive with our SIMOTICS S-1FL6 servomotor.
- SINAMICS V90 offers internal positioning, positioning with pulse sequence, and speed and torque control.
- With integral auto-tuning in real time and automatic suppression of machine resonances, the system automatically optimizes itself to achieve a highly dynamic performance and smooth operation. In addition, the pulse train input makes it easier to achieve high positioning accuracy due to its high frequency limit of up to 1 MHz.

More information
- SINAMICS V90 Brochure
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-v90
  http://www.siemens.com/industrymall

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■ **Overview** (continued)

*SINAMICS G120P –*
*the specialist for pumps, fans, and compressors*





- Power range from 0.37 kW to 630 kW
- Automatic switchover to mains operation at rated speed
- Numerous functions for pumps, fans and compressors, e. g. energy-saving mode, Pt1000/LG-Ni1000/DIN-Ni1000 temperature sensor interface, cascade connection, programmable timer switches, bypass mode, multi-zone control
- Communication: RS485, USS, Modbus RTU, BACnet MS/TP, PROFINET, EtherNet/IP, PROFIBUS DP
- Integrated in the TIA Portal with SINAMICS Startdrive
- Energy efficient through minimal apparent power losses, automatic adaptation of the motor current to the actual load conditions with ECO mode

More information
- Catalog D 35
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g120p
  http://www.siemens.com/industrymall

*SINAMICS G120D –*
*the distributed single-motor drive for high-performance solutions*



- Positioning capability
- Power range from 0.75 kW to 7.5 kW
- Energy efficient thanks to regenerative feedback and low line harmonic distortion
- Safety Integrated: STO, SS1, SDI, SSM and SLS encoderless
- Thanks to the modular design, electronics stocks are minimal
- Interchangeable memory card
- Communication via PROFIBUS DP, PROFINET, EtherNet/IP
- Integrated in the TIA Portal with SINAMICS Startdrive

More information
- Catalog D 31.2
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g120d
  http://www.siemens.com/industrymall

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# Supplementary components
## Drive systems

### ■ Overview (continued)

*SINAMICS G120C –*
*the compact and versatile inverter with optimum*
*functionality*



- Compact unit
- Highest power density in its class
- Power range from 0.55 kW to 132 kW
- Easy commissioning and maintenance
- With BOP-2 or IOP-2 operator panel
- Safety Integrated: STO
- Available communication: PROFIBUS DP, USS, Modbus RTU, PROFINET, EtherNet/IP
- Integrated in the TIA Portal with SINAMICS Startdrive

More information
- Catalog D 31.1
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g120c
  http://www.siemens.com/industrymall

*SINAMICS G120 –*
*the modular single-motor drive for low to medium*
*power ratings*



- Power range from 0.37 kW to 250 kW
- Safety Integrated: STO, SS1, SBC, SLS, SDI and SSM encoderless
- Communication via PROFIBUS, PROFINET, EtherNet/IP, RS485, USS, Modbus RTU, CANopen, BACnet MS/TP
- Energy efficient thanks to regenerative feedback and low line harmonic distortion
- Parameter copy function for standard commissioning
- Integrated in the TIA Portal with SINAMICS Startdrive

More information
- Catalog D 31.1
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g120
  http://www.siemens.com/industrymall

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■ **Overview** (continued)

*SINAMICS G110D –*
*the distributed single-motor drive for simple solutions*



- Continuous speed control of three-phase induction motors
- Meets all the requirements of conveyor applications with frequency control
- Distributed configuration – ideal for applications covering large areas
- Integrated into TIA via AS-Interface
- Wide power range from 0.75 kW to 7.5 kW

More information
- Catalog D 31.2
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g110d
  http://www.siemens.com/industrymall

*SINAMICS G110M –*
*the distributed inverter integrated in the motor*



- Power range from 0.37 kW to 4 kW
- Integrated safety functions (STO locally via F-DI or via PROFIsafe)
- Integrated communication: USS, Modbus RTU, PROFIBUS, PROFINET, EtherNet/IP and AS-Interface
- Basic PLC functions and additional conveyor technology functions
- Local commissioning via DIP switch and potentiometer, memory card, USB interface or Intelligent Operator Panel (IOP-2)
- Integrated in the TIA Portal with SINAMICS Startdrive

More information
- Catalog D 31.2
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g110m
  http://www.siemens.com/industrymall

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# Supplementary components
## Drive systems

### Overview (continued)

***SINAMICS G130/SINAMICS G150 –
the universal drive converter solution for single-motor
drives with a high power rating***





- Available as a standardized control cabinet or chassis unit
- Output range from 75 kW to 800 kW or 2700 kW with parallel switching
- Specifically tuned for drives with quadratic and constant load characteristics with medium performance requirements without regenerative feedback
- Service-friendly thanks to easy access to all modules
- Communication via PROFIBUS DP, PROFINET, Ethernet/IP, CANopen
- Energy-efficient due to variable-speed operation
- Sensorless vector control
- Safety Integrated: STO, SBC, SS1 with SBR/SAM; SLS, SSM, SDI, SBT
- Easy commissioning and parameterization by means of user-friendly AOP30 control panel or PC-controlled via the STARTER commissioning tool

More information
- Catalog D 11
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-g130
  http://www.siemens.com/sinamics-g150
  http://www.siemens.com/industrymall

***SINAMICS S110 –
the specialist for simple positioning tasks***



- Servo control
- Power range from 0.55 kW to 132 kW
- Safety Integrated
- Integrated positioning functions
- Straightforward system interface with higher-level controllers (e.g. PLC) with PROFIBUS DP or PROFINET

More information
- Catalog D 31.1
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-s110
  http://www.siemens.com/industrymall

## Overview (continued)

### SINAMICS S120 –
*the flexible, modular drive system for demanding single-axis and multi-axis applications from the low-end to the high-end performance range*
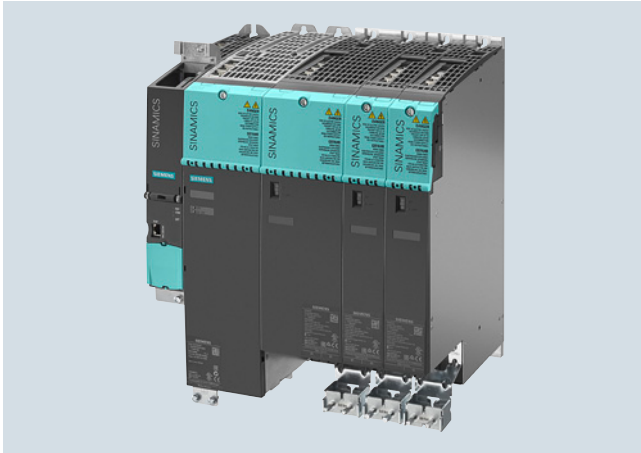
- Modular drive system for single-axis and multi-axis applications in all areas of machine and plant manufacturing
- Servo/vector control, *U/f*-control
- Power range from 0.12 kW to 5700 kW
- Various types of construction for different application areas
- Highly flexible due to, for example, modular system architecture, different cooling methods, support for a wide range of motors/encoders, easy expansion
- High degree of scalability with regard to performance, number of axes, functionality
- Integrated safety functions
- Comprehensive motion control functionality
- High availability and efficiency, even in unstable networks
- Automatic parameterization and easy drive commissioning/optimization

More information
- Catalogs NC 62, D 21.3, D 21.4
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinamics-s120
  http://www.siemens.com/industrymall

### SINAMICS S150 –
*the sophisticated drive solution for mid to high-performance single-motor drives*

- Particularly suitable for applications with high requirements regarding precision and dynamic response in the mid to upper performance range, as well as for frequent braking cycles with high braking energies and four-quadrant operation
- Ready-to-operate control cabinet
- Power range from 75 kW to 1200 kW
- Straightforward configuring and commissioning provided by the SIZER for Siemens Drives and STARTER
- High availability and efficiency, even in unstable networks
- Economic operation due to standard energy recovery
- Line-friendly operation thanks to Clean Power Filter (line feedback < 1 %)
- Reactive power compensation possible
- Fitted as standard with PROFIBUS DP interface for connection to higher-level controls

More information
- Catalog D 21.3
- Internet:
  http://www.siemens.com/sinamics-s150
  http://www.siemens.com/industrymall

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# Supplementary components
## Drive systems

**SINAMICS drive system**

■ **Overview** (continued)

*SINAMICS GM150 –*
*the universal drive solution for single-motor drives in the*
*medium-voltage range*



- Single-motor drive for applications with a square law and constant load characteristic without energy recovery
- Space-saving, simple and fast commissioning
- Ready-to-connect cabinet unit
- Ideally suited to the economical deployment of pumps, fans, extruders, mixers etc.
- Power section in HV-IGBT technology for outputs up to 13 MVA, output voltage 2.3 kV to 4.16 kV, with choice of air or water-cooling
- Power section in IGCT technology for outputs from 10 MVA to 24 MVA, output voltage 3.3 kV, water-cooled
- Optimum interaction with SIMATIC

More information
- Catalog D 12
- Internet:
  http://www.siemens.com/sinamics-gm150

*SINAMICS SM150 –*
*the sophisticated drive solution for single- and multi-motor*
*drives in the medium-voltage range*



- Single- or multi-motor drive for regenerative, highly dynamic applications
- Roller drives (cold, hot), shaft conveyor drives, test benches, belt systems
- Power section in HV-IGBT technology for outputs from 3.4 MVA to 5.8 MVA, output voltage 3.3 kV and 4.16 kV, with choice of air or water-cooling
- Power section in IGCT technology for outputs from about 5 MVA to 31.5 MVA, output voltage 3.3 kV, water-cooled
- Ideal for direct power exchange via the common DC bus for multi-motor drives involving both regenerative and motor operation
- Optimum interaction with SIMATIC

More information
- Catalog D 12
- Internet:
  http://www.siemens.com/sinamics-sm150

■ **Overview** (continued)

*SINAMICS DCM –*
*the scalable drive system for basic and demanding*
*DC applications*



- In the power range from 6 kW to 30 MW for machines and plants in the industrial environment (steel/aluminum, plastics, printing, paper, cranes, mining, oil and gas, excitation equipment) in the new plant and retrofit businesses
- PROFIBUS DP as standard, PROFINET optional
- Control Unit variance
- Field power supply to suit requirements
- Electronics power supply for connection to 24 V DC
- Power section isolated with respect to ground (floating voltage sensing)
- Free function blocks and Drive Control Chart (DCC)
- Expandable functionality using SINAMICS components
- Single-phase operation possible
- Painted modules and nickel-plated copper rails
- Wide temperature range

More information
- Catalogs D 23.1
- Internet:
  http://www.siemens.com/sinamics-dcm

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# Supplementary components
## Overvoltage protection

**SICROWBAR overvoltage protection**

### Overview

#### SICROWBAR AC
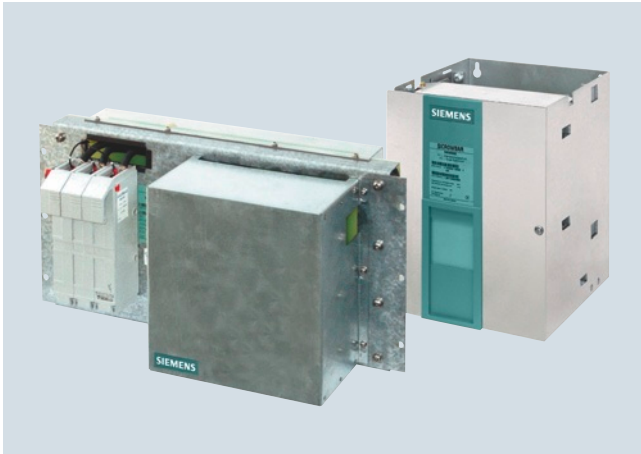


**SICROWBAR AC** is used to protect power semiconductors in converters (thyristors and diodes) against overvoltage that occurs between the phases of a three-phase network. The range of applications is not restricted to protecting DC drive converters, but also comprises infeed/regenerative feedback units of the AC drive technology that are equipped with thyristors.

Overvoltage that occurs on the AC side of converters is mainly caused by switching operations when disconnecting from the line supply at the transformer's primary side. This applies both to operational switching operations (shutdown at no-load) as well as in the case of a fault (shutdown under load).

The overvoltage protection is mainly used in the following configuration:
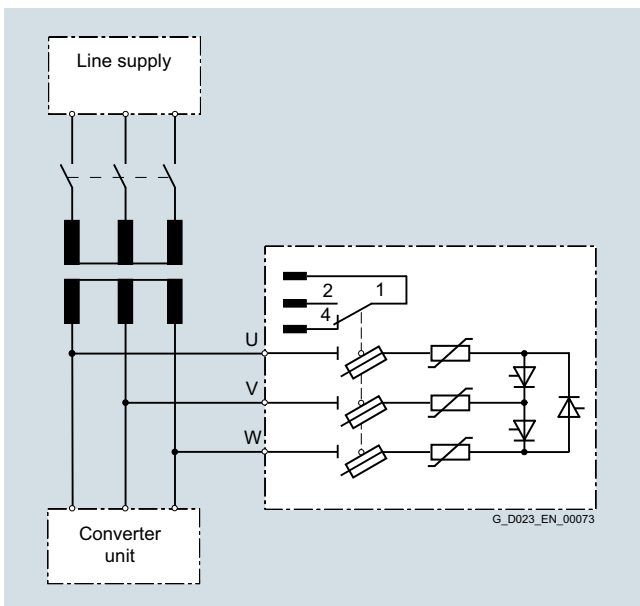


More information
- Catalog D 23.1
- Internet:
  www.siemens.com/sinamics-dcm

#### SICROWBAR DC



**SICROWBAR DC** protects coils and converters against overvoltage conditions when they are used to supply large inductances, for instance, the excitation coils of synchronous machine motors, DC machine motors or hoisting solenoids. An appropriate de-excitation/discharge resistor must be provided. A thermostatic switch can be ordered as an option for the resistor from the manufacturer.

The fast de-excitation option G11 (module 7VV3003-7FG00) makes it possible to initiate fast de-excitation, triggered by a higher-level signal, for the 7VV3003-5... units.
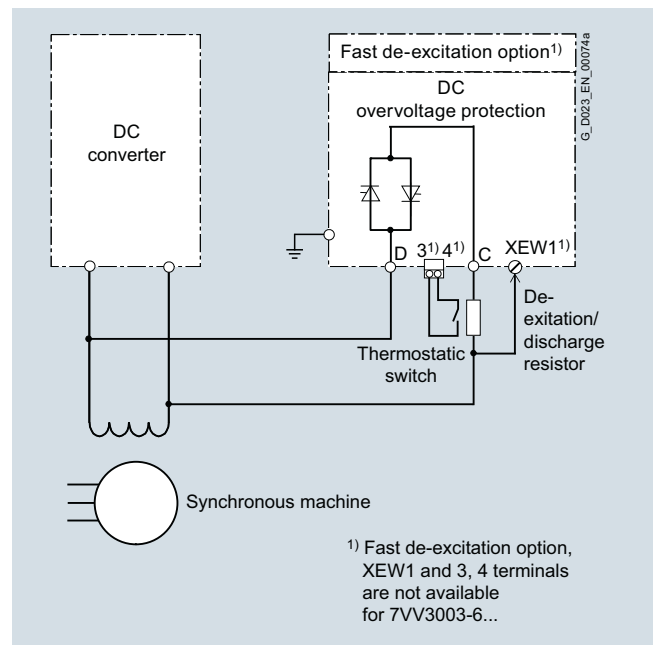


More information
- Catalog D 23.1
- Internet:
  www.siemens.com/sinamics-dcm

## Overview



### SIRIUS relays – one range for every application

Our range of SIRIUS relays offers you everything you need for a motor feeder application. Easy and convenient – and all from one source. Whether you require compact timing relays or reliable monitoring relays, particularly narrow coupling relays, plug-in relays, low-noise power relays or signal converters – it will not be easy to find a more complete and comprehensive range of relays anywhere. Quite simply, there is one for every possible need. What is more: all SIRIUS relays are particularly easy to use. So take a closer look at our range and convince yourself – you will be surprised.

### SIRIUS 3UG, 3RR, 3RN, 3RS monitoring relays
### Reliable monitoring and protection

SIRIUS relays from Siemens offer maximum protection for machines and plants, and they now also communicate with the control level thanks to IO-Link. The new SIRIUS relays for IO-Link reliably monitor network quality, power values, voltages, speeds and temperatures and at the same time they open up an even wider field of applications for you.

*3RS temperature monitoring relays* operate autonomously or in parallel with a closed temperature control loop and serve to monitor a defined limit temperature in solid, liquid or gaseous media.

*3UG monitoring relays* are used to monitor electric and non-electric variables which cannot (or should not) be directly recorded by an automation system.

- Monitoring of networks for overvoltage or undervoltage, direction of rotation, or asymmetry.
- Monitoring of loads using Cos-phi or current measurement.
- Monitoring for insulation faults and fault currents.
- Monitoring of levels or speeds of rotation.

*The 3RR current monitoring relays* are suitable not only for monitoring motors or other loads, but are also well suited to monitoring multiphase currents of the entire plant or the driven process. In this way, for example, an idling pump or an overload is promptly detected and reported in good time.
The 3RR2 monitoring relays can be set up individually or integrated directly into the load feeder.

*3RN thermistor motor protection devices* monitor the winding temperature of motors fitted with a PTC sensor.

- Compliance with the ATEX directive 2014/34/EC through conformity with EN 50495 and EN 60947-8 standards.
- Compliance with the safety requirements for PL c according to ISO 13849 or SIL 1 according to IEC 61508
- Fast fault diagnostics through display of open-circuit and short-circuit.
- Solid-state compatible output due to hard gold-plated contacts.

Note:
The 3RN1 relays have been replaced by the 3RN2 thermistor motor protection devices.

### SIRIUS speaks IO-Link

With the SIRIUS monitoring relay for IO-Link you are opting for maximum flexibility: As well as the autonomous monitoring function that is still available, measured values and data can also be transferred directly to the controller via IO-Link. Parameters can also be assigned locally or via IO-Link. This means that the SIRIUS relays for IO-Link are fully integrated into Totally Integrated Automation, our open system architecture for integrated automation. You also profit from significantly simplified device replacement – thanks to data matching and automatic re-parameterization via a parameter server.

### SIRIUS 3RP, 7PV timing relays

Electronic timing relays are used for all delayed switching operations in open-loop control, starting, protection and closed-loop control circuits.

Thanks to their sophisticated and compact design, the 3RP timing relays are ideal timer modules for control cabinet, switchgear and controller manufacturers from the industry. Due to their narrower design, the 7PV timing relays are particularly suitable for use in heating, ventilation and air-conditioning systems and compressors.

### SIRIUS 3RA28 function modules and solid-state time-delayed auxiliary switch blocks

The 3RA281 function modules permit the construction of starters and contactor combinations for direct and star-delta starting. They include the essential control functions that are needed for the respective feeder – for example, timing and electrical interlocking functions. Function modules that function as timing relays can easily and quickly be fitted to SIRIUS contactors – without any significant wiring effort. They permit both ON-delay and OFF-delay switching of contactors.

The 3RA283 solid-state time-delayed auxiliary switch blocks can be connected to contactors and are designed for contactor coil voltages in the 24 to 240 V AC/DC wide voltage range. Auxiliary switches for control and alarm signals are used specially for switching the smallest signals for electronics applications. They are used, for example, for allowing a pump or fan to run on, in a similar way to an OFF-delay relay or for the delayed activation of a gate drive. Simply by snapping and locking it into place, both the electrical and mechanical connection is made. To attenuate switching overvoltages of the contactor coil, a varistor is integrated in the time-delayed auxiliary switch.

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# Supplementary components
Timing, coupling and monitoring relays

## Overview (continued)

### SIRIUS 3RQ3, 3RS18, 3TG10 and LZS coupling relays

As the successors to the familiar 3TX7 coupling relays, the *3RQ3 coupling relays* are now available in a new uniform enclosure design. With their narrow width of 6.2 mm and low installation depth/height, they are ideal for space-optimized use in control cabinets with short gaps between tiers, and in flat control boxes. All versions are available with screw-type or spring-loaded terminals (push-in technology). Wiring time is reduced because conductors are inserted and clamped from the front.

3RQ3 coupling relays are available as:

- Coupling relay with relay output (not plug-in)
- Coupling relay with plug-in relay
- Coupling relay with semiconductor output (not plug-in)

The *3RS18 coupling relays* set new standards: With a wide voltage range from 24 V to 240 V AC/DC they are the star attraction on the coupler market. In this series, we offer you devices in the field-proven 22.5 mm industrial enclosure with one, two or three changeover contacts – using screw-type or spring-loaded connections and for combination and wide-range voltage with hard gold-plated contacts for an especially high contact reliability – even at low current levels. Thanks to the well-proven industrial enclosure, you can enjoy the benefits of user-friendly connection systems with permanent wiring, just the same as with our timing relays. Two conductors can be connected at each terminal point.

*3TG10 power relays/miniature contactors* prove their worth wherever small, low-noise relays or contactors are required at a reasonable price. This makes them ideal for simple controllers, especially for use in large-series manufactured devices and controllers. For applications that do not require an overload relay and need only one auxiliary switch – and which therefore need more switching power, higher switching voltage, and a longer service life.

*LZS coupling relays with plug-in relays* are available as complete devices or as individual modules for self-assembly or spare parts requirements. This series is divided into three designs: RT, PT, and MT.

- Can be used for contact multiplication, adaptation of potential, or for switching small loads.
- Max. 4 changeover contacts in one device:
  - Wide-voltage versions with or without hard gold-plated contacts.
  - With screw-type or push-in spring-loaded terminals.

### SIRIUS 3RS70 signal converters

The 3RS70 (previously 3RS17) signal converters (also innovated), share the enclosure concept with the 3RQ3 coupling relays. They are used mainly for the electrical isolation and conversion of analog signals. Sensors/actuators and controllers usually have different potentials and therefore require electrical isolation in the signal circuit. This is done either in the controller or by means of signal converters.

The conversion of one signal into another is required if, for example, a voltage signal has to be converted into a current signal for transmission over a longer distance, or if the output of a sensor and the input of a controller do not match.

The implemented frequency outputs offer another application. The input signal is converted to a proportional frequency here. This means that analog signals can be processed with digital inputs.

This is important if a controller offers no possibility for an analog input, or if all analog inputs are already occupied, for example, in the case of retrofits.

More information
- Catalog IC 10
- "SIRIUS relays" product brochure
- Internet: www.siemens.com/relays

**Motion Control Encoder Measuring Systems**

## ■ Overview



- Measuring systems are encoders for recording distances, angles of rotation and speeds.
- They can be used on machines in various industries, such as production machines, handling equipment, machine tools and special-purpose machines.
- Connectable to SIMATIC, SINAMICS, SINUMERIK and SIMOTION.
- Available accessories for measuring systems include couplings, fixing materials, connectors and fully pre-assembled signal cables.

- Built-on encoders are available as both incremental and absolute encoders.
- Incremental encoders:
  - Interfaces RS422 (TTL) , 1 $V_{pp}$ and HTL.
  - Operating voltage 5 V DC or 10 V to 30 V DC.
- Absolute encoders:
  - All absolute encoders are available in single-turn and multi-turns versions.
  - Synchronous serial interface (SSI) or connection for EnDat, PROFIBUS DP, PROFINET IO with RT/IRT and DRIVE-CLiQ.
  - Encoders with PROFIBUS DP support Class 1 ... 3 profiles as well as isochronous mode, direct communication and additional application-specific functions. They are designed to be parameterizable.
  - Encoders with PROFINET IO support Class 1 ... 4 profiles.
- All measuring systems are available in both synchro flange and supported flange joint versions. The absolute encoders are available in a hollow-shaft version.

More information
- Catalogs NC 62, NC 82, D 21.4
- Interactive Catalog CA  01
- Internet:
  http://www.siemens.com/sensor-systems
  http://www.siemens.com/industrymall

**SIMOTION Motion Control System**

## ■ Overview



*SIMOTION system*

The well-proven, modular and scalable SIMOTION Motion Control System with high-end functions for motion control is the ideal solution for applications in mechanical engineering, in which modularity, maximum precision and speed are vital.

SIMOTION ensures a high level of flexibility at low engineering outlay with the modular technology object approach. Object-oriented programming and a programming model with units and libraries enable the creation of reusable software modules and the effective implementation of large quantity structures.

SIMOTION simplifies the development and integration of standard modules in an executable project with libraries for industry-specific applications and the SIMOTION easyProject project generator.

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# Supplementary components
## Automation systems

**SIMOTION Motion Control System**

### ■ Overview (continued)

The SIMOTION system is made up of three components:

#### Engineering system

The SCOUT engineering system enables Motion Control, PLC and technology functions to be incorporated in one comprehensive, integrated system and provides all the necessary tools: From programming and parameterization through testing and commissioning, to diagnostics.

SCOUT can be used in SIMATIC STEP 7, either with standardized data management and configuring procedures, or as a stand-alone engineering tool (SCOUT Stand-Alone). SCOUT TIA (SIMOTION in the TIA Portal) is available as an optional package for TIA Portal V13 and above and is included in the scope of supply of SCOUT.

The following options, for example, are available in the engineering system for programming:

- Graphic programming with Motion Control Chart (MCC)
- Ladder Diagram (LAD)/Function Block Diagram (FBD)
- High-level language Structured Text (ST), including object-oriented programming

#### Runtime system

The runtime system offers a high-performance execution system for cyclic and sequential tasks. The runtime software modules make the different PLC, Motion Control and technology functions available. By selecting the appropriate modules, the overall functionality of the system can be flexibly adapted to the machine.

#### Hardware platforms

The hardware platforms are the basis of the SIMOTION Motion Control System. The application created with the engineering system and the associated runtime software modules can be implemented on different hardware platforms. The scalable SIMOTION hardware supports centralized, distributed and mixed topologies for all machine designs with up to 128 axes per controller.

### *SIMOTION D – Compact and integrated in the drive*

- The complete machine automation with drive control, PLC, Motion Control and technology functionality in one compact unit of SINAMICS S120 design.
- Particularly fast response
- Versatile networking options via PROFINET, PROFIBUS or Ethernet
- Scalable since multiple performance versions available
- SIMOTION D is available in two configurations:
  - As a single-axis system SIMOTION D410-2 with multi-axis option (blocksize configuration). The Control Units are available in D410-2 DP and D410-2 DP/PN versions and are snapped onto the SINAMICS S120 PM240-2 Power Modules in blocksize format.
  - As a multi-axis system SIMOTION D4x5-2 in four performance variants for as many as 128 axes (booksize format)
- Ideal for:
  - Compact machines
  - Distributed automation concepts, e.g. on machines with a large number of axes
  - Modular machines
  - Time-critical demands on the axis couplings

### *SIMOTION P – Open for other tasks*

- This PC-based, open Motion Control System is available in two versions:
  - SIMOTION P320-4E for embedded PC solutions running on the Windows Embedded Standard 7 operating system
  - SIMOTION P320-4S for high-performance applications running on the Windows 7 Ultimate operating system
- Control, Motion Control, and HMI functions are executed together with standard PC applications on one platform. The advantage for the user:
  Using the PC platform and the Microsoft Windows operating system, with a real-time expansion for SIMOTION – the advantages of both worlds are combined in SIMOTION P:
- Openness thanks to the Windows operating system
- Real-time capability thanks to the SIMOTION operating system
- Ideal for:
  - Applications requiring an open PC world
  - Applications with particularly high performance requirements, e.g. hydraulics applications
  - Applications requiring control and visualization on one hardware system
  - Extensive data storage, evaluation and logging

### *SIMOTION C – Modularity and flexibility*

- Controllers in SIMATIC S7-300-design
- 2 versions, optionally with PROFINET interface or with integrated drive interfaces for analog and stepper drives
- Onboard inputs/outputs expandable using I/O modules from the SIMATIC S7-300 range of products
- With integrated isochronous PROFIBUS interfaces
- Ideal for:
  - Highest possible level of freedom for drive selection
  - Broad range of process signals
  - Retrofit applications by means of integrated analog interfaces

#### More information

- Catalog PM 21
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/simotion
  http://www.siemens.com/industrymall

**15**

## ■ Overview

SINUMERIK 828 – optimum scalability in the compact class

Alongside two high-performance CNC variants of SINUMERIK 828D, SINUMERIK 828D BASIC is an additional low-cost starter model in the compact class. SINUMERIK 828 therefore fits the performance requirements of standard machine concepts perfectly.

Compact, strong, simple – simply ingenious

The compact, operator-panel-based SINUMERIK 828 CNC systems are extremely rugged and very easy to maintain.

An operator panel front of die-cast magnesium, the panel-based CNC design with minimal interfaces and the high degree of protection make the SINUMERIK 828 CNC systems reliable partners even in harsh environments. Designed without a fan or hard disk, with NVRAM memory technology and no back-up battery, SINUMERIK 828 is a completely maintenance-free CNC.

Powerful CNC functions coupled with a unique 80-bit NANOFP accuracy permit excellent workpiece precision to be achieved in very short machining times. Thanks to a flexible CNC programming language as well as the unique machining step programming ShopTurn/ShopMill package, it is possible to program and machine both mass-production parts or single workpieces with the highest efficiency. Preconfigured technology-specific system software and unique service functions reduce the commissioning and servicing costs to an absolute minimum.

Technology tailor-made for use in standard turning and milling machines

SINUMERIK 828D is perfectly adapted for use in standard machines and provides optimum support for turning and milling technology. With two preconfigured system software variants for machining technology, the SINUMERIK 828 CNC systems are ready for use in turning and milling machines on dispatch from the factory.

An ideal basis for implementing a compact grinding machine

The G-Tech technology variant provides grinding machine manufacturers with a perfect platform on which to design grinding machines – it also supports cylindrical and surface grinding machines.

Since grinding machine manufacturers want to fully incorporate their specific process know-how so that it is even reflected in the operating philosophy of the CNC, the G-Tech variant of the SINUMERIK 828D offers a number of sophisticated grinding and dressing cycles for this purpose. Additionally, SINUMERIK Integrate for engineering Run MyScreens provides manufacturers with the option of designing their own HMI.

More information
• Catalog NC 82
• Interactive Catalog CA 01
• Internet:
  http://www.siemens.com/sinumerik
  http://www.siemens.com/industrymall

## ■ Overview

The SINUMERIK 840D sl CNC offers modularity, openness, flexibility and uniform structures for operation, programming, and visualization. It provides a system platform with trend-setting functions for almost all technologies.

Integrated into the SINAMICS S120 drive system and complemented by the SIMATIC S7-300 automation system, the SINUMERIK 840D sl forms a complete digital system that is ideally suited for the mid to upper performance range.

SINUMERIK 840D sl is characterized by:
• A high degree of flexibility
• Excellent dynamic response and precision
• Optimum integration into networks

# Supplementary components
## Automation systems, System cabling

**SINUMERIK 840D sl**

### ■ Overview (continued)

#### *Benefits*

- Outstanding performance and flexibility for multi-axis systems of average to high complexity thanks to scalable hardware and software
- Universal openness of the user interface, the PLC and the NCK area to allow integration of your specialist know-how
- Integrated safety functions for man and machine: SINUMERIK Safety Integrated
- Comprehensive range of products for integrating machine tools into communication, engineering and production processes: SINUMERIK Integrate

#### *Application*

The SINUMERIK 840D sl can be deployed around the world for the following technologies:

- Turning
- Drilling
- Milling
- Grinding
- Laser machining

- Nibbling
- Punching
- Tool and mold making
- High-speed cutting applications
- Woodworking and glass processing
- Handling
- Transfer lines
- Rotary indexing machines
- Mass production
- JobShop production

The SINUMERIK 840DE sl is available as an export version for use in countries where approval is required.

More information

- Catalog NC 62
- Interactive Catalog CA 01
- Internet:
  http://www.siemens.com/sinumerik
  http://www.siemens.com/industrymall

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**Connection system MOTION-CONNECT**

### ■ Overview

MOTION-CONNECT includes connection systems and components which are optimally tailored to individual areas of application. MOTION-CONNECT cables feature state-of-the-art connection systems to ensure fast, reliable connection of different components, and offer maximum quality as well as system-tested reliability.



MOTION-CONNECT power cable and signal cable

MOTION-CONNECT cables are available as fully-assembled power and signal cables or sold by the meter. The pre-assembled cables can be ordered in length units of 10 cm (3.94 in) and can be extended, if necessary.

Whatever your machine requirements, MOTION-CONNECT offers the solution.

- **Robust, high-performance and easy to use**
  thanks to pre-assembled cables with a rugged metal connector in degree of protection IP67 and reliable SPEED-CONNECT quick-release lock
- **Outstanding and proven quality**
  achieved by consistent quality management and system-tested cables

Cables are available in two different qualities –
MOTION-CONNECT 500 and MOTION-CONNECT 800PLUS.

| MOTION-CONNECT 500 | MOTION-CONNECT 800PLUS |
|---|---|
| • Cost-effective solution for predominantly fixed installation | • Meets requirements for use in cable carriers |
| • Tested for travel distances up to 5 m (16.4 ft) | • Oil-resistant |
| | • Tested for travel distances of up to 50 m (164 ft) |

#### *More information*

- Catalogs D 21.4, NC 62, NC 82, PM 21
- Interactive catalog CA 01
- Internet:
  http://www.siemens.com/motion-connect
  http://www.siemens.com/industrymall

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# Appendix
## SITRAIN – Training for Industry

■ **Overview**



**Your benefit from practical training directly from the manufacturer**

SITRAIN – Training for Industry – provides you with comprehensive support in solving your tasks.

Training directly from the manufacturer enables you to make correct decisions with confidence.

**Increased profits and lower costs:**

- Shorter times for commissioning, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Shorten commissioning times, reduce downtimes, and faster troubleshooting
- Exclude expensive faulty planning right from the start.
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

> **Contact**
>
> Visit our site on the Internet at:
> www.siemens.com/sitrain
>
> or let us advise you personally. You can request our latest training catalog from:
>
> **SITRAIN – Training for Industry**
> **SITRAIN Customer Support Germany:**
>
> Tel.: +49 911 895-7575
> Fax: +49 911 895-7576
>
> Email: info@sitrain.com

**Your benefits with SITRAIN – Training for Industry**

Certified top trainers

Our trainers are skilled specialists with practical experience. Course developers have close contact with product development, and pass on their knowledge to the trainers and then to you.

Practical application with practice

Practice, practice, practice! We have designed the trainings with an emphasis on practical exercises. They take up to half of the course time in our trainings. You can therefore implement your new knowledge in practice even faster.

300 courses in more than 60 countries

We offer a total of about 300 classroom-based courses. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You can find which course is offered at which location at:
www.siemens.com/sitrain

Skills development

Do you want to develop skills and fill in gaps in your knowledge? Our solution: We will provide a program tailored exactly to your personal requirements. After an individual requirements analysis, we will train you in our training centers near you or directly at your offices. You will practice on the most modern training equipment with special exercise units. The individual training courses are optimally matched to each other and help with the continuous development of knowledge and skills. After finishing a training module, the follow-up measures make success certain, as well as the refreshment and deepening of the knowledge gained.

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## ■ Overview

The SIMATIC manual collection brings together the manuals of Totally Integrated Automation in the smallest possible package. It is eminently suitable for startup and service, replaces the space-consuming paper version in the office and provides fast access to the information.

The manual collection contains manuals in 5 languages for
- LOGO!
- SIMADYN
- SIMATIC bus components
- SIMATIC C7
- SIMATIC Distributed I/O
- SIMATIC HMI
- SIMATIC Sensors
- SIMATIC NET
- SIMATIC PC Based Automation
- SIMATIC PCS 7
- SIMATIC PG/PC
- SIMATIC S7
- SIMATIC Software
- SIMATIC TDC

Manuals that are not yet available in all 5 languages will at least be included in English and German.

There is an update contract for the SIMATIC Manual Collection that encompasses supply of the up-to-date collection and three subsequent updates which is valid for one year. If the update contract is not cancelled, it is automatically extended and the list price will be charged to the customer.

## ■ Ordering data

| | Article No. |
|---|---|
| **SIMATIC Manual Collection** <br> Electronic manuals on DVD, multilingual: <br> LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC | **6ES7998-8XC01-8YE0** |
| **SIMATIC Manual Collection update service for 1 year** <br> Current "Manual Collection" DVD and the three subsequent updates | **6ES7998-8XC01-8YE2** |

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# Appendix
## Standards and approbations

**CE marking**

### Overview

The electronic products described in this catalog comply with the requirements and protection objectives of the following EU directives insofar as they relate to the product concerned. They also comply with the corresponding harmonized European standards (EN) published for these products in the Official Journals of the European Community.

- 2014/30/EU "Electromagnetic Compatibility" (EMC Directive)
- 2014/35/EU "Electrical equipment designed for use within certain voltage limits" (Low Voltage Directive)
- 2014/34/EU "Equipment and protective systems intended for use in potentially explosive atmospheres" (Explosion Protection Directive)
- For ET 200SP fail-safe modules, the following also applies: 2006/42/EC "Machinery Directive"

The originals of the declarations of conformity are kept available by us for the responsible supervisory authorities.

***Note on the EMC Directive:***

In terms of their interference emissions, SIMATIC products are designed for industrial applications.

If individual products deviate from this specification, it is noted in the catalog with the products.

The installation instructions in the manuals must be adhered to when installing and operating the products described in this catalog. These contain, for example, important information on installation in cabinets and on the use of shielded cables.

### Notes for machine manufacturers

The SIMATIC automation system is not a machine within the context of the EU machine guidelines. Therefore a declaration of conformity with regard to the EU machine directive 89/392/EEC or 2006/42/EU (new edition, applicable from end of 2009) may not be provided for SIMATIC.

The EU machine directive regulates the requirements placed on a machine or a part thereof. A machine is understood for the purposes of this guideline to be a combination of interconnected parts or mechanisms (see also EN 292-1, Paragraph 3.1).

SIMATIC is part of the electrical equipment of a machine, and must therefore be integrated into the evaluation of the complete machine by the machine manufacturer.

As electrical equipment, SIMATIC is subject to the low-voltage directive which, as a "total safety directive", covers all dangers just like the machine directive.

The EN 60204-1 standard (safety of machines, general requirements for the electrical equipment of machines) is applicable to the electrical equipment of machines.

The following table will help you in the provision of your declaration of conformity, and shows which criteria according to EN 60204-1 (2006-06) apply to SIMATIC. You can obtain further information from the enclosed declaration of conformity according to the low-voltage and EMC directives (with list of included standards).

| EN 60204-1 | Topic/criterion | Notes |
|---|---|---|
| Paragraph 4 | General requirements | The requirements are met when the equipment is assembled/installed in accordance with the installation guidelines. Please note the relevant information in the manuals. |
| Paragraph 11.2 | Digital input/output interfaces | The requirements are met |
| Paragraph 12.3 | Programmable equipment | The requirements are met when the equipment is installed in lockable cabinets to protect against alteration of the memory contents by unauthorized persons |
| Paragraph 20.4 | Voltage tests | The requirements are met |

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## Certificates, authorizations, approbations, declarations of conformity

An overview of the certificates available for SIMATIC products (CE, UL, CSA, FM, shipping authorizations) can be found in the internet at

http://www.siemens.com/simatic/certificates

The lists are continuously updated. The data for products which have not yet been included in the overview is continuously collected and prepared for the subsequent edition.

You can also find certificates, approbations, verification certificates or characteristic curves under Product support "Entry list"
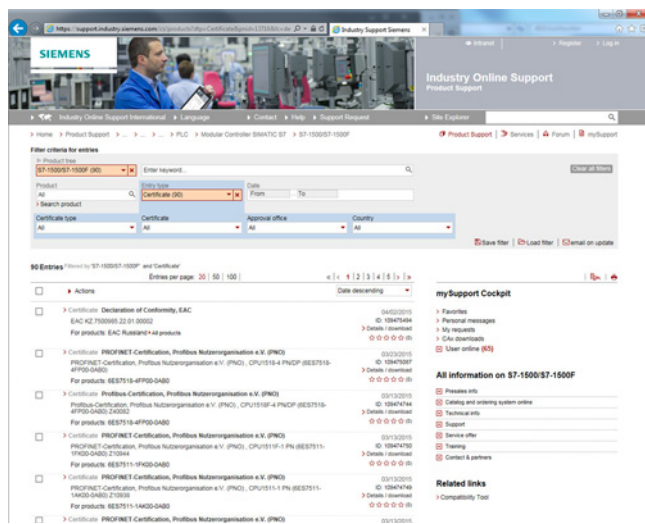


or by going directly to the Link Box:
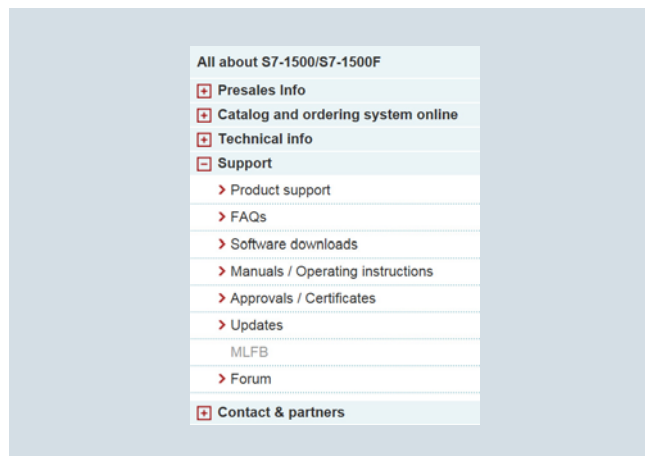


## Quality management

The quality management system of the Industry Sector, Industry Automation Division, complies with the international standard ISO 9001.

The products and systems described in this catalog are sold under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001.

The DQS certificate is recognized in all IQ Net countries.

### *DQS Registered Certificate No.:*

Siemens AG
• DF FA
  Reg. No.: 001323 QM08

# Appendix
## Partner at Siemens

**Contacts worldwide**

### Overview
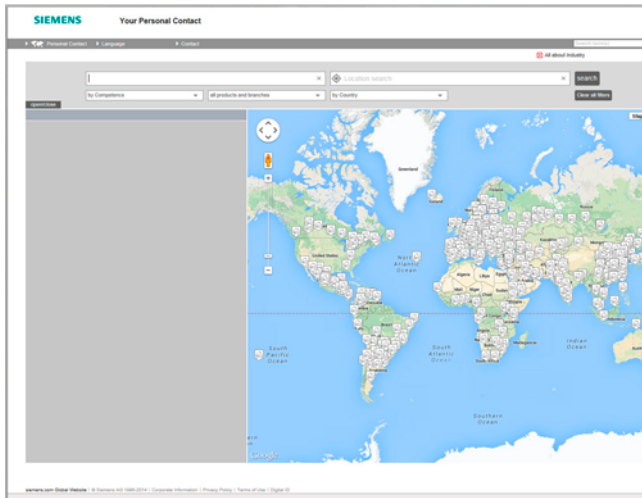


At Siemens we are resolutely pursuing the same goal: long-term improvement of your competitive ability.
We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Digital Factory and Process Industries and Drives.

Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation-contact

You start by selecting
• the required competence,
• products and branches,
• a country,
• a city

or by a
• location search or
• person search.
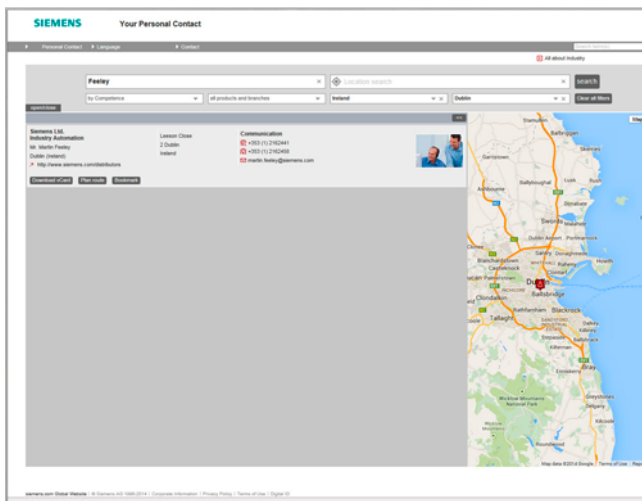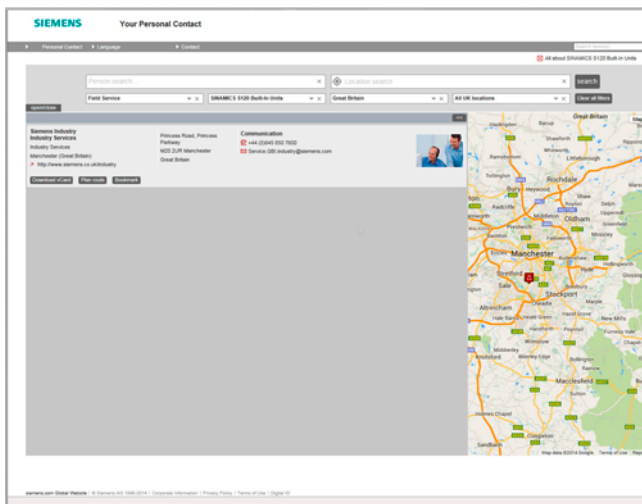
## Overview

### Siemens Solution und Approved Partners



#### Highest competence in automation and drive technology as well as power distribution

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives, as well as power distribution, are fulfilled as best as possible – wherever you are, and whatever the time. It is for this reason that we systematically train and keep our partners well prepared, in addition to certifying them in specific technologies. It is our declared intention and goal to train and prepare our partners to the same standards as our own employees.

This approach is based on contractually agreed quality criteria as well as optimum support for our partners by providing clearly-defined processes. This ensures that they possess all the qualities to meet customer requirements optimally. The partner emblem is the guarantee and indicator of proven quality.

#### Solution Partners and Approved Partners

The Siemens Partner Program distinguishes between Solution Partners and Approved Partners.

At present we are working with more than 1,400 Solution Partners worldwide. They represent countless tailored and future-proof automation and drive solutions in the most diverse industries.

With their extensive technical product knowledge, Siemens Approved Partners offer a combination of goods and services that include specialist technologies, customized modifications and the provision of high-quality system and product packages. They also provide qualified technical support and assistance

### Partner Finder
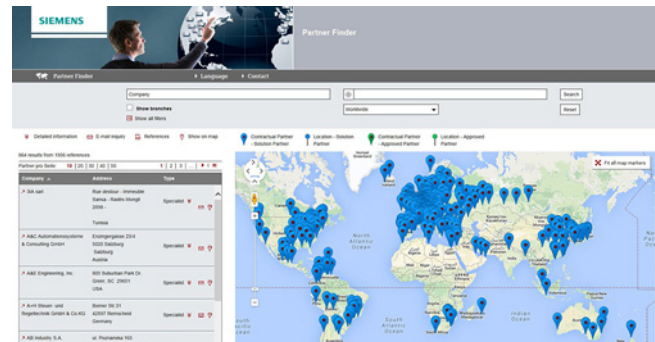


In the Siemens global Solution Partner program, customers are certain to find the optimum partner for their specific requirements - with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our solution partners.

Easy selection:
Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:
Gain a quick insight into the specific competencies of any particular partner with the reference reports.

Direct contact option:
Use our electronic query form:

www.siemens.com/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/partner-program

# Appendix
Siemens Automation Cooperates with Education

**Simplify your education in automation**

## Unique support for educators and students in educational institutions



**Siemens Automation Cooperates with Education (SCE)**
offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

*Our services at a glance*
• Training curriculums for your lessons
• Trainer packages for hands-on learning
• Courses convey up-to-date specialist knowledge
• Support for your projects / textbooks
• Complete didactic solutions from our partners
• Personal contact for individual support

*Training curriculums for your lessons*



Use our profound industrial know-how for practiceoriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:
• The new SIMATIC PCS 7 curriculums and trainer packages. Using plant simulation, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester).

• The new TIA Portal training materials for SIMATIC S7-1500 / S7-1200 / S7-300 are available in English, German, French, Italian, Spanish, Portuguese and Chinese for download.
www.siemens.com/sce/curriculums

*Trainer packages for hands-on learning*



Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price-reduced bundles available exclusively to schools include innovative and flexible hardware and software packages.
SCE currently offers more than 80 SCE trainer packages including related equipment e.g. Micro Memory. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:
• Introduction to automation technology with LOGO! logic module
• PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-1500, S7-1200, S7-300 and TIA Portal)
• Operator control and monitoring with SIMATIC HMI
• Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
• Sensor systems with VISION, RFID and SIWAREX
• Process automation with SIMATIC PCS 7
• Networked drive and motion technologies with SINAMICS/SIMOTION
• Power Monitoring Devices SENTRON PAC 4200
• Motor Management SIMOCODE
• CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

■ **Unique support for educators and students in educational institutions** (continued)

*Courses convey up-to-date specialist knowledge*



Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

www.siemens.com/sce/courses

*Support for your projects/textbooks*



Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web-based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact
www.siemens.com/sce/books

*Complete didactic solutions from our partners*



Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of selfconstruction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

*Contact for individual support*

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

*SCE Support Finder for your Internet request*

You are an educator and need support on the topic of industry automation? Send us your request:

www.siemens.com/sce/supportfinder

**Appendix**
Online Services

■ **The Future of Manufacturing on the Internet**

Detailed knowledge of the range of products and services available is essential when planning and engineering automation systems. It goes without saying that this information must always be as up-to-date as possible.

Industry is on the threshold of the fourth industrial revolution as digitization now follows after the automation of production. The goals are to increase productivity and efficiency, speed, and quality. In this way, companies can remain competitive on the path to the future of industry.

You will find everything you need to know about products, systems and services on the internet at:

www.siemens.com/industry

■ **Product Selection Using the Interactive CA 01 Automation and Drives Catalog**
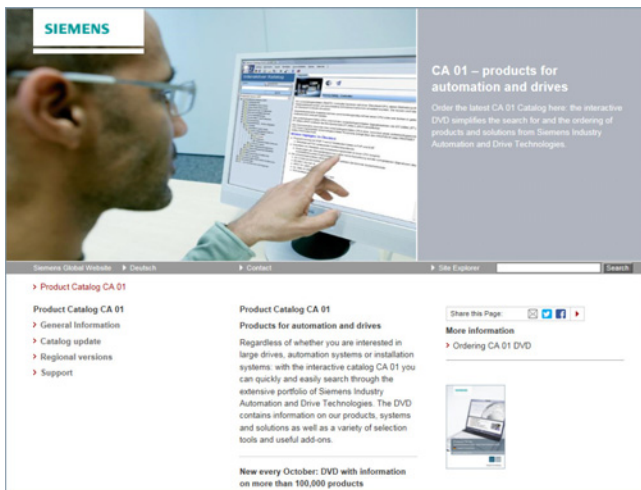
Detailed information together with user-friendly interactive functions:
The CA 01 interactive catalog covers more than 100,000 products, thus providing a comprehensive overview of the product range provided by Siemens.

You will find everything you need here for solving tasks in the fields of automation, switching, installation and drives.
All information is provided over a user interface that is both user-friendly and intuitive.

You can order the CA 01 product catalog from your Siemens sales contact or in the Information and Download Center:

www.siemens.com/industry/infocenter

Information about the CA 01 interactive catalog can be found on the Internet at:

www.siemens.com/automation/ca01

or on DVD.

■ **Easy Shopping with the Industry Mall**
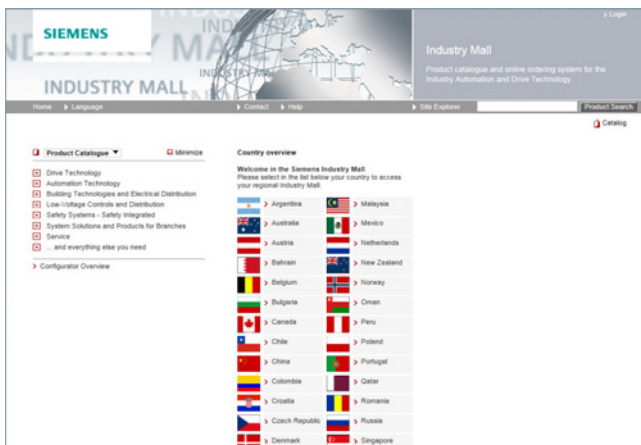
The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure, from selection through ordering to tracking and tracing, to be carried out online. Availability checks, customer-specific discounts and bid creation are also possible.

Numerous additional functions are provided for your support. For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

You can find the Industry Mall on the Internet at:

www.siemens.com/industrymall

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## Downloading Catalogs
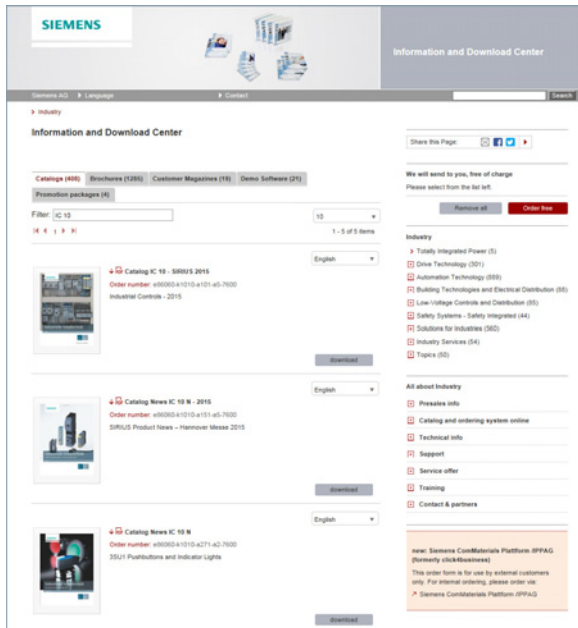


In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. You can download these catalogs in PDF format without having to register.

The filter dialog above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "IC 10", both the IC 10 catalog and the associated news or add-ons are displayed.

Visit us at:

www.siemens.com/industry/infocenter

## Social and Mobile Media
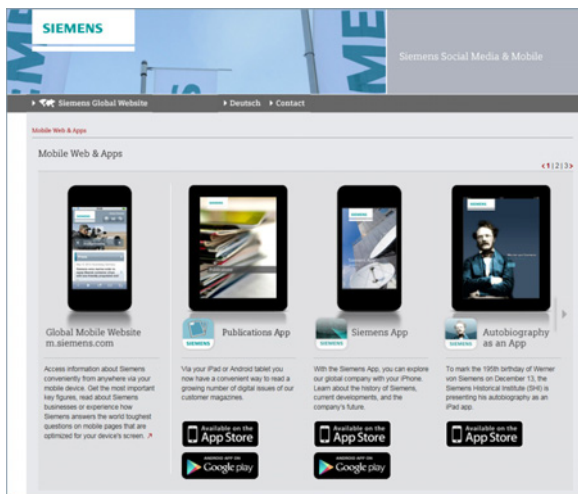




Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

To find out more about Siemens' current social media activities, visit us at:

www.siemens.com/socialmedia

Or via our product pages at:

www.siemens.com/automation or www.siemens.com/drives

Connect with Siemens Industry at our central access point to read all the news on the future of manufacturing, watch current videos and inform yourself about all the latest industry developments:

www.siemens.com/future-of-manufacturing
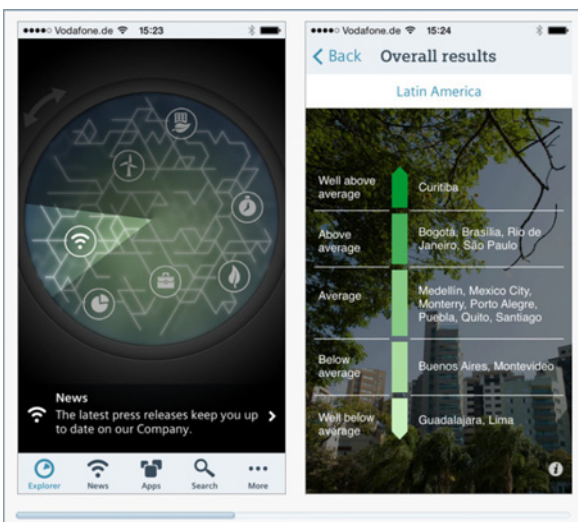
Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the App Store (iOS) or at Google Play (Android):

https://itunes.apple.com/en/app/siemens/id452698392?mt=8

https://play.google.com/store/search?q=siemens

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

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# Appendix
Industry Services

## Overview

*Unleash potential – with services from Siemens*



**Support and Consulting Services**

**Training Services**

**Plant Data Services**

**Service Programs and Agreements**

**Spare Parts Services**

Industry Services

**Repair Services**

**Field and Maintenance Services**

**Retrofit and Modernization Services**

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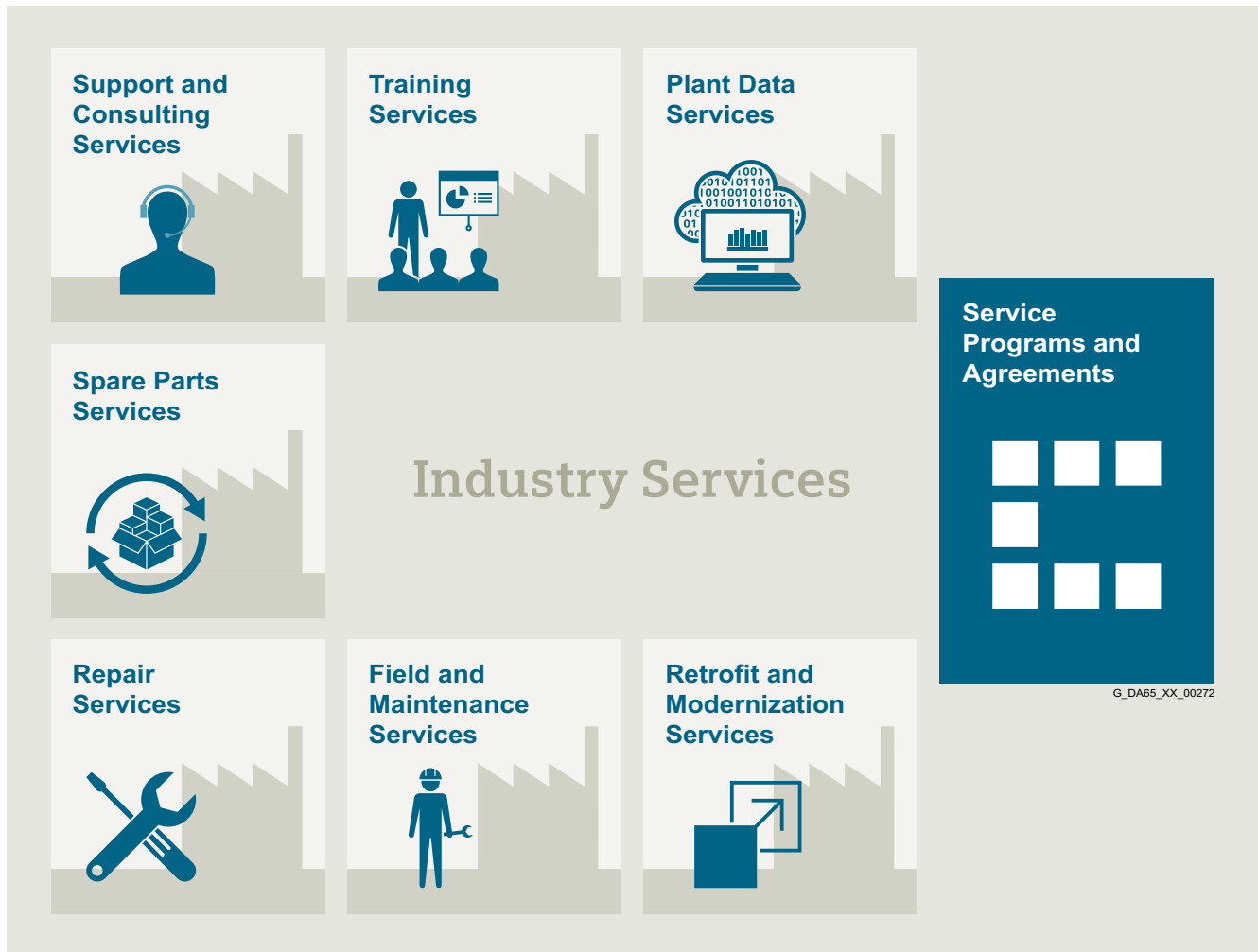
### Increase your performance – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

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■ **Overview**

### Plant Data Services

Make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber attack threats.

www.industry.siemens.com/services/global/en/portfolio/
plant-data-services/Pages/index.aspx

### Support and Consulting Services

**Industry Online Support** site for comprehensive information, application examples, FAQs and support requests.

**Technical and Engineering Support** for advice and answers for all inquiries about functionality, handling, and fault clearance.

**Information & Consulting Services**, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

www.industry.siemens.com/services/global/en/portfolio/
support-consulting/Pages/index.aspx

### Training Services

From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

www.industry.siemens.com/services/global/en/portfolio/
training/Pages/index.aspx

### Spare Parts Services

Are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Asset optimization services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

www.industry.siemens.com/services/global/en/portfolio/
spare_parts/Pages/index.aspx

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**Industry Services – Portfolio overview**

■ **Overview** (continued)

### Repair Services

Are offered on-site and in regional repair centers for fast resto-ration of faulty devices' functionality.

Also available are extended repair services, which include addi-tional diagnostic and repair measures, as well as emergency services.

www.industry.siemens.com/services/global/en/portfolio/repair_services/Pages/index.aspx

### Retrofit and Modernization Services

Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commis-sioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants

www.industry.siemens.com/services/global/en/portfolio/retrofit-modernization/Pages/index.aspx

### Field and Maintenance Services
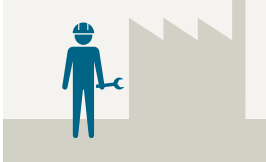
Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.
All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

www.industry.siemens.com/services/global/en/portfolio/field_service/Pages/index.aspx

### Service Programs and Agreements

A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique require-ments or fill gaps in your organization's maintenance capa-bilities.
Programs and agreements can be customized as KPI-based and/or performance-based contracts.

www.industry.siemens.com/services/global/en/portfolio/service_programs/Pages/index.aspx

■ **Overview**



Online Support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimedia-based – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts.
The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.

www.siemens.com/industry/onlinesupport

*Online Support App*



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products – anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristic curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance.
The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code for information on our Online Support app.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

https://support.industry.siemens.com/cs/ww/en/sc/2067

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## Appendix
Software licenses

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### ■ Overview

#### Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

#### Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

#### Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

#### License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

#### Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

#### Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

#### Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

#### Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

#### Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes.
It can be transferred to another license.

#### Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

#### Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

#### Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

#### Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

#### Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

#### PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

#### Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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## ■ Overview

### *ServicePack*

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

### *License key*

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

### *Software Update Service (SUS)*

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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# Appendix
## Conditions of sale and delivery

### 1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

#### 1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"[1] and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].

#### 1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"[1] and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"[1].

### 2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charget the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

### 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

### 4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i .a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

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1) The text of the Terms and Conditions of Siemens AG can be downloaded at
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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## Catalogs
### Digital Factory, Process Industries and Drives and Energy Management

**Further information can be obtained from our branch offices listed at www.siemens.com/automation-contact**

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There you'll find additional catalogs in other languages.

Please note the section "Downloading catalogs" on page "Online services" in the appendix of this catalog.

## Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
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Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

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