



## Basic engine specifications

Rating .....	P1
Rated power-kW .....	36.8
Rated speed-rpm .....	2400
Overload power-kW .....	40
Overload speed-rpm .....	2477
Rated power tolerance-% .....	3
Low idle speed -rpm .....	650
High idle speed-rpm .....	2640
N° of Cylinders / Valves .....	4/8
Cylinders arrangement .....	In-line
Thermodynamic cycle .....	4 stroke
Bore × Stroke-mm(in) .....	98×105 (3.86×4.13)
Compression ratio .....	18:1
Displacement-L(in <sup>3</sup> ) .....	3.17 (193.4)
Fuel system .....	Common rail
Injection system .....	Direct injection
Aspiration .....	Natural Aspiration
Flywheel housing/Flywheel/N° of teeth on flywheel ring gear(standard) .....	SAE 3/11.5°/120
Flywheel housing/Flywheel/N° of teeth on flywheel ring gear(optional) .....	/
Firing order .....	1-3-4-2
Rotation(from flywheel end) .....	Counterclockwise
Overall dimensions(L×W×H)-mm(in) .....	898×612×722 (35.34×24.08×28.41)
Dry weight-kg(lb) .....	325 (717)
Wet weight-kg(lb) .....	340 (750)
Max. output power of front end-kW(Ps) .....	5 (6.8)
Emission compliance .....	IMO Tier II
Lifting cylinder height- m(ft) .....	0.8 (2.62)

## Rating definitions

### Continuous Duty (P1)

The engine can run at full load continuously. The average load factor is 70% to 100%. Annual working time is recommended but not limited to 5000h~8000h.

### Heavy Duty (P2)

The engine can run at full load for 8h every 12h. The average load factor is 40% to 80%. Annual working time is recommended but not limited to 5000h.

### Intermittent Duty (P3)

The engine can run at full load for 4h every 12h. The average load factor is 40% to 80%. Annual working time is recommended but not limited to 3000h.

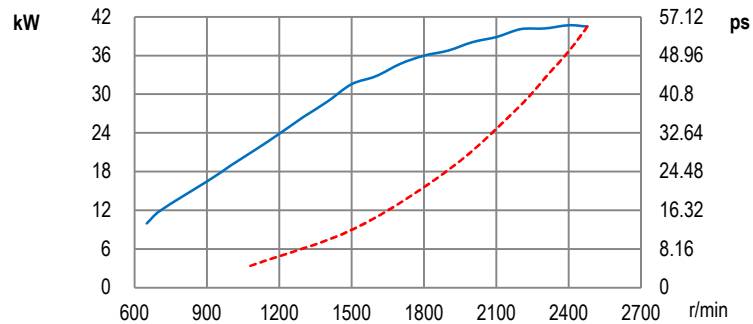
### Light Duty (P4)

The engine can run at full load for 2h every 8h. The average load factor is about 60%. Annual working time is recommended but not limited to 1000h.

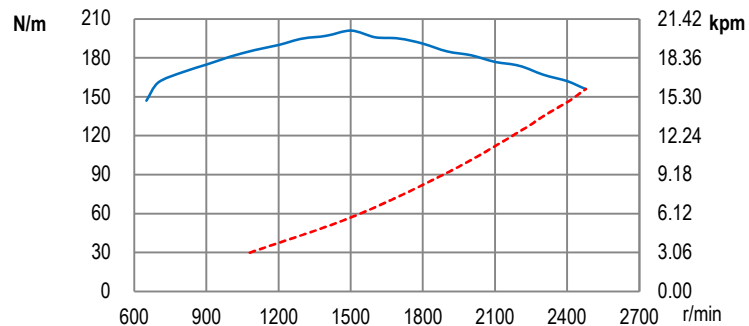
### High Performance Duty (P5)

The engine can run at full load for 0.5h every 5h. The average load factor is about 60%. Annual working time is recommended but not limited to 500h.

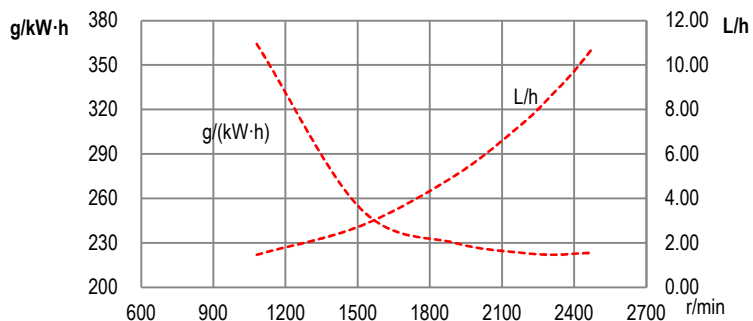
## Power



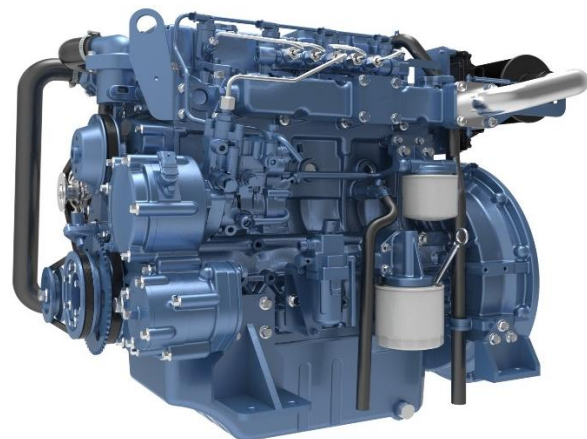
## Torque



## Fuel consumption



— Full load speed characteristics  
 - - - Propeller characteristics





## Air intake system

Intake air flow-m <sup>3</sup> /min(cfm)	2.9 (102.9)
Max. allowable intake air restriction- kPa(in H <sub>2</sub> O)	6 (24.1)
Intake air temperature up to-°C(°F)	/ ( / )
Heat rejection to atmosphere-kW(BTU/min)	4.9(278.7)

## Cooling system

Coolant capacity of the engine-L(gal)	7(1.54)
Max. sea water strainer mesh hole diameter- mm(in)	2 (0.08)
Sea water pump flow-m <sup>3</sup> /h(gal/h)	6.9 (1518)
Head of sea water pump -m(in)	5.6(18.37)
Max. self-priming height of sea water pump- m(ft)	1.5(4.92)
Expansion tank pressure cap- kPa(psi)	50(7.3)
Heat dissipating to heat exchanger- kW(BTU/min)	23.1(1313.7)
Coolant flow-m <sup>3</sup> /h(gal/h)	9.6(2112)
Temperature range of engine outlet -°C(°F)	85~95(185~203)
Temperature range of thermostat-°C(°F)	72~84(163~190)

## Exhaust system

Exhaust flow-m <sup>3</sup> /min(cfm)	8.0 (285.42)
Max. exhaust back pressure-kPa(in H <sub>2</sub> O)	11 (44.18)
Max. exhaust temperature before turbocharger-°C(°F)	/ ( / )
Max. exhaust temperature after turbocharger-°C(°F)	414(769)
Max. bending moment of turbocharger flange- N.m(ft-lbs)	/ ( / )
Exhaust smoke-FSN	≤2.0

## Lubricating system

Max. install angle(fore-aft)	5°
Max. install angle(athwart ship)	15°
Max. operating angle(fore-aft)	7.5°
Max. operating angle(athwart ship)	22.5°
Sump type	Wet
Oil capacity Low/High-L(gal)	6/9 (1.32/1.98)
Oil consumption -g/kW·h	≤0.1
Oil flow- L/min(gal/min)	/ ( / )
Oil pressure of idle speed- kPa(in H <sub>2</sub> O)	≥90(≥361.35)
Oil pressure of rated speed- kPa(in H <sub>2</sub> O)	200~500(803~2008)

## Fuel system

Fuel flow supply line- L/h(gal/h)	9.8 (2.2)
Fuel flow return line- L/h(gal/h)	/ ( / )
Max. Allowable fuel supply restriction -kPa(in H <sub>2</sub> O)	65 (261.0)
Fuel supply restriction on engine-kPa(in H <sub>2</sub> O)	/ ( / )
Allowable fuel restriction of shipyard supplied components-kPa(in H <sub>2</sub> O)	/ ( / )
Max. fuel return restriction-kPa(in H <sub>2</sub> O)	50 (200.8)
Max. self-priming height of fuel delivery pump-m(ft)	/ ( / )
Max. fuel inlet temperature-°C(°F)	70 (170.8)
Max. fuel inlet pressure- kPa(in H <sub>2</sub> O)	10(40.2)

## Starting system

Electrical system voltage(2-pole)-V	12
Electric starter power-kW(Ps)	3.8 (5.17)
Recommended battery capacity- A.h	165×2
Alternator working current-A	50

## Security parameters

Alarm speed-rpm	2760
Shut down speed-rpm	2880
Alarm oil pressure-MPa	0.12
Shut down oil pressure-MPa	0.08
Alarm oil temperature-°C(°F)	120(259)
Alarm coolant temperature-°C(°F)	97(206.6)

## Noise

Noise(SPL)- dB(A)	95.8
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## General remarks

- The origin of coordinates is at the center of the flywheel housing back end surface. X axis directs from flywheel to front, Z axis directs vertical up, Y axis direction is defined by right-hand rule.
- All ratings are based on operating conditions under ISO 8665, ISO 3046-1.
- Curves represent net engine performance in accordance with ISO 3046/1 with standard accessories such as fuel injection pump, water pump and L.O. pump under the condition of 25°C/77°F ambient temperature, 100kPa[29.612 in Hg] barometric pressure, 30% relative humidity and 25°C/77°F raw water temperature at inlet.

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Materials and specifications are subject to change without notice.