

## ROOTS™ RAM™ WHISPAIR™ Rotary Positive Gas Blowers

Frames 404J thru 624J

**RAM™** stands for Reliability, Availability and Maintainability. Today, more than ever, ROOTS is committed to supplying our customers with reliable products manufactured with state-of-the-art CNC machine tools. Production and inventory are being scheduled and controlled to ensure these units will be available when you need them. Design improvements such as repositionable rugged steel mounting feet and die-cast aluminum drive end covers and gear covers help to reduce installation costs and make normal maintenance easier.

### BASIC GAS PUMP DESCRIPTION

The RAM™ WHISPAIR™ line of standard rotary positive gas pumps is intended for use with non-corrosive gases. Stainless steel construction is available for corrosive gases and optional O-ring material is also available. The gas pumps have a proprietary design that reduces noise and power loss by utilizing an exclusive wrap-around flange and jet to control pressure equalization - eliminating rapid backflow of gas into the pump from the discharge area.

The standard model is designed using integral-shaft ductile iron impellers with an involute profile. Alloy steel timing gears are taper mounted on the shafts, and cylindrical roller bearings are used. Both ends of the unit are splash oil lubricated. A hydrodynamic seal on the drive shaft prevents shaft seal oil leaks. The casing and headplates are grey iron on standard units, while the drive end cover and gear cover are aluminum. Piston ring seals form labyrinth between the compression chamber and cored vent cavities. The vent cavities are plugged for purge or drain.

Special long-life mechanical seals and viton O-rings are installed at each bearing to control gas and oil leakage, and are suitable for vacuum or pressure service. Each seal incorporates a unique geometry that promotes the flow of oil, air and vapor across the back of the stainless steel seat to enhance cooling and extend seal life.

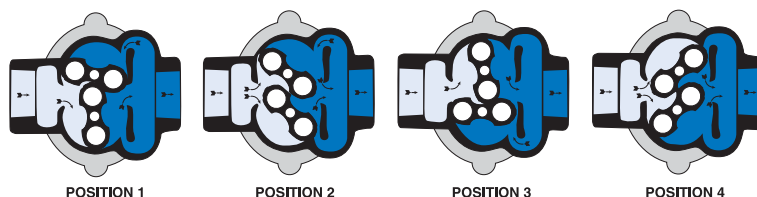
All frame sizes are designed with detachable rugged steel mounting feet which permit in-field adaptability to either vertical or horizontal installation requirements.



### DESIGN AND CONSTRUCTION FEATURES

1. Designed for gas services
2. Low noise level, less operating power required
3. Improved volumetric efficiency and reduced operating temperatures
4. Alloy steel timing gears
5. Cylindrical roller bearings
6. Long-life mechanical seals – hydrodynamic drive shaft seal
7. Splash oil lubrication
8. Fewer moving parts – no valves or vanes to wear
9. Horizontal and vertical configurations available
10. Stainless steel construction available for corrosive gases

### OPERATING PRINCIPLE



Incoming gas is trapped by the impellers. Simultaneously, pressurized gas (right) is being discharged. As the lower impeller passes wrap-around flange, Whispair jet equalizes pressure between trapped gas and discharge area, aiding impeller movement and reducing power. Impellers move gas into the discharge area (right). Backflow is controlled, resulting in reduction of noise relative to conventional gas pumps.

### WARRANTY PERIOD

Twenty-Four (24) months from date of original unit start-up or 30 months from date of original shipment, whichever occurs first.

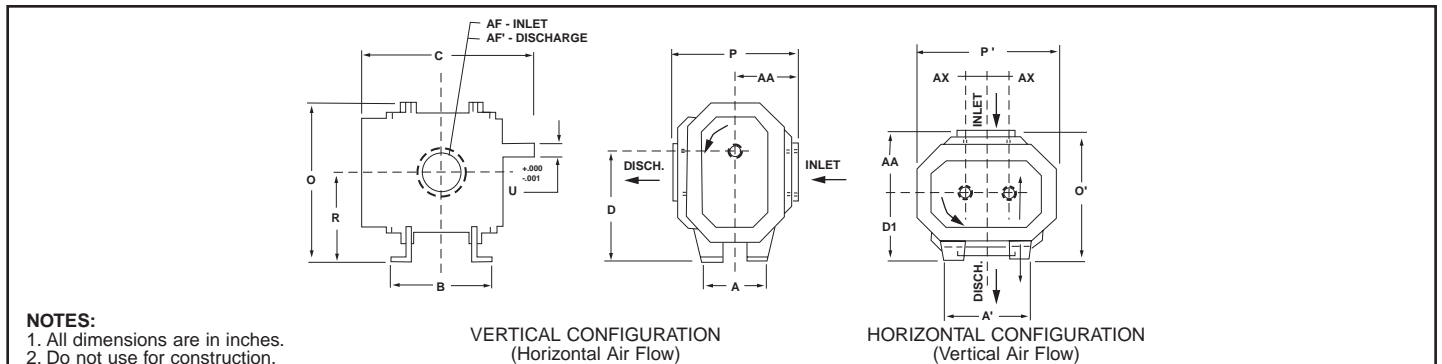


## PERFORMANCE TABLE

FRAME SIZE	SPEED RPM	4 PSI		6 PSI		8 PSI		10 PSI		12 PSI		15 PSI		18 PSI		MAX. VACUUM		
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	"Hg	CFM	BHP
404J	1750	149	3.6	139	5.3	130	7.0	123	8.7	116	10.4					14.0	115	5.9
	2950	281	7.0	271	9.8	262	12.6	255	15.4	248	18.2	239	22.4			15.0	240	10.9
	4000	396	8.3	386	14.2	378	17.9	370	21.6	364	25.3	355	30.9	347	37.0	16.0	353	15.9
406J	1750	225	5.4	210	8.0	198	10.5	187	13.0	177	15.6					14.0	173	9.0
	2950	426	10.5	411	14.7	398	18.9	387	23.1	377	27.3	363	33.6			15.0	365	16.4
	4000	601	15.0	586	20.1	574	26.0	562	31.9	552	37.0	539	46.5	526	54.0	16.0	531	23.6
409J	1750	338	8.5	315	12.0	296	15.8	279	20.0	264	23.5					14.0	259	13.5
	2950	638	15.2	615	21.5	596	27.8	579	34.1	564	40.4	544	49.8			15.0	546	24.4
	4000	900	24.0	878	30.0	859	38.1	842	46.8	827	55.0	806	67.9	788	79.0	16.0	795	35.1
412J	1750	450	11.0	420	16.0	394	21.0	372	26.0	352	32.0					14.0	343	17.7
	2950	849	19.9	819	28.3	794	36.6	772	45.0	752	53.4	724	66.0			15.0	728	32.3
	4000	1199	28.8	1169	39.9	1144	51.0	1121	62.2	1101	73.3	1074	90.0			16.0	1059	46.5
418J	1750	675	16.5	630	24.0	592	31.7	559	39.0							14.0	515	26.5
	2950	1275	29.5	1230	42.1	1192	54.7	1159	67.3							15.0	1092	48.4
	4000	1800	42.9	1755	59.7	1717	73.4	1684	93.1							16.0	1590	69.7
616J	1170	718	16.9	672	24.9	633	32.9	599	40.9	568	49.0					13.0	579	25.9
	1750	1176	26.2	1130	38.2	1091	50.1	1056	62.0	1025	73.9					14.0	1013	42.0
	3000	2162	48.9	2116	68.7	2077	88.5	2043	108.3	2012	128.0	1970	157.7			16.0	1946	81.7
624J	1170	1077	25.4	1008	37.5	950	49.5	899	61.5							13.0	869	39.0
	1750	1764	39.9	1695	57.8	1637	75.7	1585	93.6							14.0	1519	63.4
	3000	3244	77.6	3175	107.3	3117	137.0	3065	166.7							16.0	2920	124.6

- Notes:**
- Ratings based on inlet gas at standard pressure of 14.7 psia, standard temperature of 68°F, and specific gravity of 1.0.
  - Estimated ACFM for specific gravity of 0.6  
Multiply tabulated CFM by:  
4 - 10 PSIG — 0.90                      12 - 15 PSIG — 0.85
  - Consult Factory for performance of units with stainless steel construction.

## OUTLINE DRAWING & DIMENSIONAL TABLE



- NOTES:**
- All dimensions are in inches.
  - Do not use for construction.

FRAME SIZE	A	A'	B	C	Drive Shaft Location		O	O'	P	P'	R	U	Keyway	AF Inlet Diameter	AF' Discharge Diameter	AA	AX	Approx. NetWt (lbs)
					D	D1												
404J	8.00	11.00	8.75	18.50	11.25	7.50	16.63	14.75	14.50	15.25	9.00	1.500	.375 x.188	3.0 NPT	3.0 NPT	7.25	2.25	270
406J	8.00	11.00	10.75	20.50	11.25	7.50	16.63	14.75	14.50	15.25	9.00	1.500	.375 x.188	4.0 NPT	4.0 NPT	7.25	2.25	300
409J	8.00	11.00	13.75	23.50	11.25	7.50	16.63	14.75	14.50	15.25	9.00	1.500	.375 x.188	5.0 NPT	5.0 NPT	7.25	2.25	350
412J	8.00	11.00	16.75	26.50	11.25	7.50	16.63	13.50	13.00	15.25	9.00	1.500	.375 x.188	6.0 FLG	5.0 FLG	6.00	2.25	400
418J	8.00	11.00	22.75	32.50	11.25	7.50	16.63	14.50	14.00	15.25	9.00	1.500	.375 x.188	8.0 FLG	6.0 FLG	7.00	2.25	500
616J	9.00	15.00	20.75	32.19	15.00	9.00	22.00	16.50	16.25	20.00	12.00	2.000	.500 x.250	8.0 FLG	6.0 FLG	7.50	3.00	700
624J	9.00	15.00	28.75	40.19	15.00	9.00	22.00	17.75	17.50	20.00	12.00	2.000	.500 x.250	10.0 FLG	8.0 FLG	8.75	3.00	910

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