

Roots RAM WHISPAIR™ Blowers, 404J thru 624J

Rotary positive gas blowers



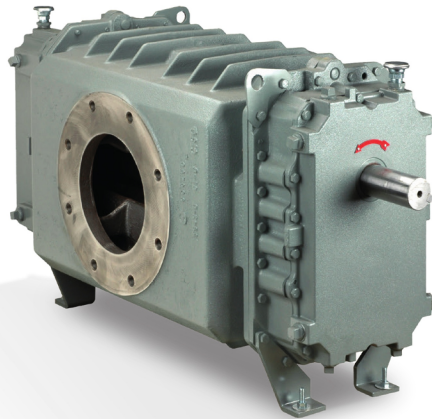
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Design and construction features

- Designed for gas services.
- Low noise level, less operating power required.
- Improved volumetric efficiency and reduced operating temperatures.
- Alloy steel timing gears.
- Cylindrical roller bearings.
- Long-life mechanical seals – hydrodynamic drive shaft seal.
- Splash oil lubrication.
- Fewer moving parts – no valves or vanes to wear.
- Horizontal and vertical configurations available.

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 blower operations

The RAM WHISPAIR line of standard rotary positive gas pumps is intended for use with non-corrosive gases. 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.

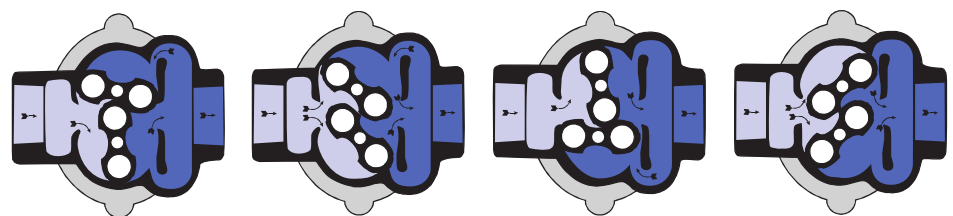
All frame sizes are designed with detachable rugged steel mounting feet which permit in-field adaptability to either vertical or horizontal installation requirements.

Warranty period

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

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.

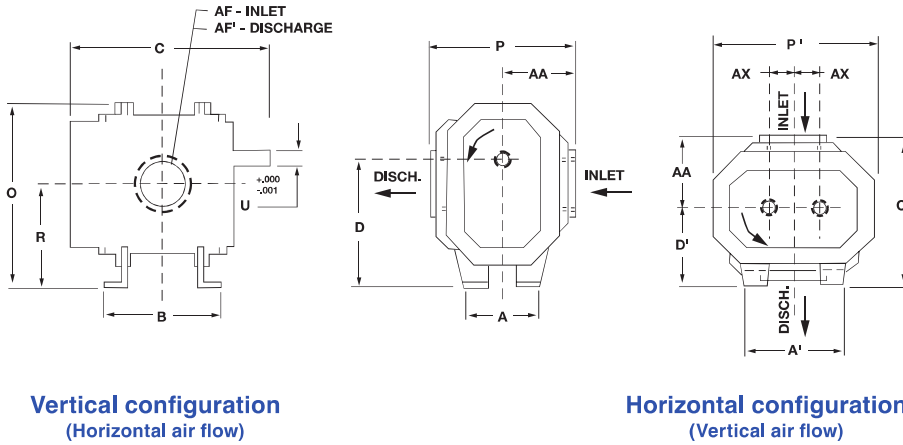


POSITION 1

POSITION 2

POSITION 3

POSITION 4



Vertical configuration
(Horizontal air flow)

Horizontal configuration
(Vertical air flow)

Outline drawing of Roots RAM WHISPAIR gas blower.

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Dimensional table

| 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. net Wt (lbs) |
|------------|------|-------|-------|-------|----------------------|------|-------|-------|-------|-------|-------|-------|-------------|-------------------|------------------------|------|------|----------------------|
| | | | | | D | D' | | | | | | | | | | | | |
| 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 |

Notes:

1. All dimensions are in inches. 2. Do not use for construction.

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 | 0.4 | - | - | - | - | 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 | 505 | 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 | 10.9 | 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:

1. Pressure ratings based on inlet air at standard pressure of 14.7 psia, standard temperature of 68° F, and specific gravity of 1.0.
2. Estimated ACM for specific gravity of 0.6. multiply tabulate CFM by: 4-10 PSIG = 0.90 12-15 PSIG = 0.85