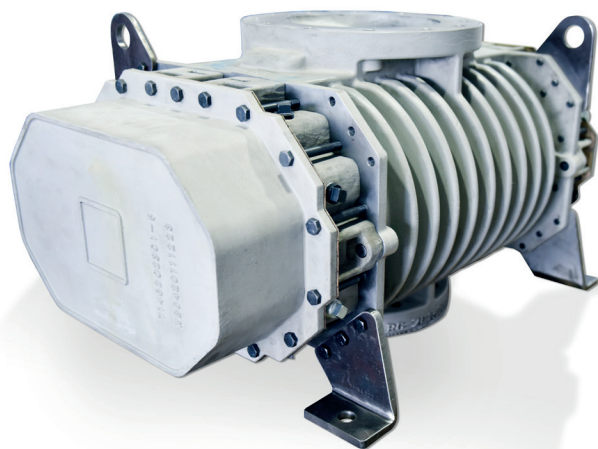


# Roots™ Tri-RAM™ Positive Displacement blowers

Models 409, 413, 416, 617, 621, 722, 728, 826, 832



The Howden Roots™ Tri-RAM™ tri-lobe Positive Displacement blower has been designed to incorporate the latest technology for reduced noise and vibration and minimal downstream pulse.

This series is based upon the field operation success of Roots RAM blower series and features engineering based on Roots tri-lobe principles originally designed in 1914.

## Basic blower description

Tri-RAM tri-lobe rotary blowers are heavy-duty units with high strength integral-shaft ductile iron impellers designed for maximum efficiency. The blowers feature Roots WHISPAIR™ discharge design which, when combined with tri-lobe impellers, delivers quieter operation than conventional tri-lobe blowers.

The headplates and rigid, one-piece cylinders are cast iron, and the drive-end and gear covers are aluminum (cast iron for models 722–832). Carburized and ground alloy steel spur timing gears are taper mounted on the shafts and are secured with a locknut (bolt for models 826 and 832). Cylindrical roller bearings are used to accept side loads from v-belt drives.

Piston rings reduce air leakage through the shaft openings in the headplates and hydrodynamic oil seals prevent lubricant from entering the air chamber. Tri-RAM blowers incorporate thrust control, with splash oil lubrication at both ends of the blower.

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

The top shaft is adaptable for drive on side outlet blowers, and either shaft can be extended for drive on top or bottom outlet blowers.

## Warranty period

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

## Design and construction features

Tri-lobe impellers for less vibration and minimal downstream pulse

WHISPAIR discharge design combined with tri-lobe impellers for quieter operation than conventional tri-lobe blowers

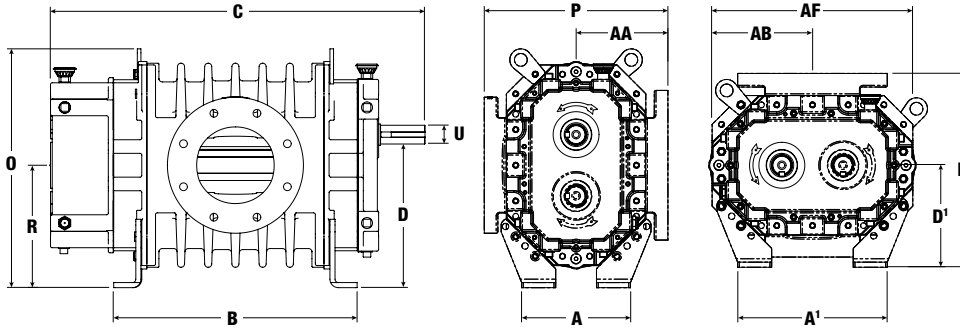
Carburized and ground alloy steel timing gears for long life and consistent performance

Cylindrical roller bearings for longer bearing life

Piston ring seals for less air leakage

Splash lubrication from oil sumps with sight glasses on each end for easy maintenance

Detachable feet and drive shaft extension to adapt to horizontal or vertical configuration



Outline drawing

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**Dimensional table**

| Model | A     | A'    | B     | C     | D     | D'    | O     | P     | R     | U  | Keyway     | Inlet conn (DIN) | Disc conn (DIN) | AA    | AB    | AF    | Approx. weight |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|------------|------------------|-----------------|-------|-------|-------|----------------|
| 409   | 8     | 11    | 13.77 | 23.5  | 11.25 | 7.5   | 16.63 | 13.50 | 9     | 35 | 10.0 x 5.0 | 125              | 125             | 6.75  | 7.63  | 15.25 | 335            |
| 413   | 8     | 11    | 17.78 | 27.5  | 11.25 | 7.5   | 16.63 | 13.50 | 9     | 35 | 10.0 x 5.0 | 150              | 125             | 6.75  | 7.63  | 15.25 | 400            |
| 416   | 8     | 11    | 21.03 | 30.75 | 11.25 | 7.5   | 16.63 | 13.50 | 9     | 35 | 10.0 x 5.0 | 200              | 150             | 6.75  | 7.63  | 15.25 | 470            |
| 617   | 9     | 15    | 22.11 | 33.56 | 15    | 9     | 22    | 16.50 | 12    | 50 | 14.0 x 5.5 | 200              | 150             | 8.25  | 10.00 | 20.00 | 695            |
| 621   | 9     | 15    | 26.28 | 37.73 | 15    | 9     | 22    | 16.50 | 12    | 50 | 14.0 x 5.5 | 250              | 200             | 8.25  | 10.00 | 20.00 | 805            |
| 722   | 19    | 26    | 28.79 | 41.17 | 17    | 10    | 25.13 | 20.00 | 13.5  | 60 | 18.0 x 7.0 | 250              | 200             | 10.00 | 11.63 | 23.26 | 1325           |
| 728   | 19    | 26    | 34.54 | 46.92 | 17    | 10    | 25.13 | 20.00 | 13.5  | 60 | 18.0 x 7.0 | 300              | 250             | 10.00 | 11.63 | 23.26 | 1540           |
| 826   | 21.74 | 29.73 | 32.54 | 46.98 | 19.36 | 11.37 | 29.29 | 22.00 | 15.37 | 70 | 20.0 x 8.0 | 300              | 250             | 11.00 | 13.92 | 27.84 | 2000           |
| 832   | 21.74 | 29.73 | 38.55 | 52.98 | 19.36 | 11.37 | 29.29 | 22.00 | 15.37 | 70 | 20.0 x 8.0 | 350              | 300             | 11.00 | 13.92 | 27.84 | 2200           |

**Notes:**

1. Dimensions are in inches (except U and Keyway are mm), weight is in pounds.

**Performance table**

| Model | Speed RPM | 4 PSI |       | 6 PSI |       | 8 PSI |       | 10 PSI |        | 12 PSI |       | 15 PSI |       | Maximum Vacuum |      |       |
|-------|-----------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|--------|-------|----------------|------|-------|
|       |           | CFM   | BHP   | CFM   | BHP   | CFM   | BHP   | CFM    | BHP    | CFM    | BHP   | CFM    | BHP   | in HgV         | CFM  | BHP   |
| 409   | 2000      | 317   | 7.2   | 301   | 10.6  | 288   | 13.9  | 276    | 17.3   | 266    | 20.7  | 251    | 25.7  | 15             | 253  | 12.6  |
|       | 3560      | 618   | 14.8  | 602   | 20.8  | 589   | 26.8  | 577    | 32.8   | 567    | 38.8  | 553    | 47.8  | 16             | 545  | 24.7  |
|       | 4750      | 847   | 22.8  | 832   | 30.8  | 818   | 38.8  | 807    | 46.7   | 796    | 54.7  | 782    | 66.7  | 16             | 774  | 34.4  |
| 413   | 2000      | 459   | 10.3  | 436   | 15.2  | 417   | 20.1  | 400    | 25     | 385    | 29.8  | 364    | 37.2  | 15             | 366  | 18.2  |
|       | 3560      | 895   | 20.9  | 872   | 29.5  | 853   | 38.2  | 836    | 46.9   | 821    | 55.6  | 800    | 68.6  | 16             | 789  | 35.6  |
|       | 4750      | 1227  | 31.5  | 1205  | 43.1  | 1186  | 54.7  | 1169   | 66.3   | 1154   | 77.9  | 1133   | 95.2  | 16             | 1122 | 49.2  |
| 416   | 2000      | 573   | 13.01 | 545   | 19.1  | 521   | 25.2  | 500    | 31.3   | 481    | 37.4  | -      | -     | 15             | 458  | 22.7  |
|       | 3560      | 1118  | 26.3  | 1090  | 37.1  | 1066  | 48    | 1045   | 58.8   | 1026   | 69.7  | -      | -     | 16             | 986  | 44.6  |
|       | 4400      | 1412  | 33.3  | 1383  | 46.7  | 1360  | 60.1  | 1339   | 73.5   | 1320   | 86.9  | -      | -     | 16             | 1280 | 55.5  |
| 617   | 1500      | 801   | 18.2  | 758   | 26.8  | 721   | 35.5  | 689    | 44.2   | 660    | 52.8  | -      | -     | 14             | 648  | 30.1  |
|       | 2500      | 1463  | 33    | 1420  | 47.04 | 1383  | 61.8  | 1351   | 76.3   | 1322   | 90.7  | 1283   | 112   | 16             | 1261 | 58.3  |
|       | 3560      | 2165  | 53.1  | 2122  | 73.6  | 2085  | 94.2  | 2053   | 114.72 | 2024   | 135.3 | 1985   | 166.1 | 16             | 1963 | 85.9  |
| 621   | 1500      | 995   | 23    | 941   | 33.8  | 896   | 44.5  | 856    | 55.3   | 820    | 66    | -      | -     | 14             | 805  | 37.6  |
|       | 2500      | 1817  | 43.1  | 1763  | 61    | 1718  | 78.9  | 1678   | 96.8   | 1642   | 114.8 | -      | -     | 16             | 1566 | 73.4  |
|       | 3560      | 2688  | 72.1  | 2634  | 97.6  | 2589  | 123.1 | 2549   | 148.6  | 2513   | 174.1 | -      | -     | 16             | 2437 | 109.6 |
| 722   | 1400      | 1360  | 31.3  | 1294  | 45.7  | 1238  | 60.1  | 1189   | 74.6   | 1144   | 89    | -      | -     | 14             | 1127 | 50.7  |
|       | 2200      | 2307  | 54.8  | 2240  | 77.4  | 2184  | 100.1 | 2135   | 122.8  | 2090   | 145.5 | 2030   | 179.6 | 16             | 1998 | 93.1  |
|       | 3050      | 3312  | 88    | 3246  | 119.4 | 3190  | 150.9 | 3141   | 182.3  | 3096   | 213.8 | 3035   | 261   | 16             | 3003 | 134.8 |
| 728   | 1400      | 1705  | 39.1  | 1622  | 57.2  | 1552  | 75.3  | 1490   | 93.4   | 1434   | 111.5 | -      | -     | 14             | 1413 | 63.5  |
|       | 2200      | 2892  | 68.1  | 2809  | 96.6  | 2738  | 125   | 2676   | 153.5  | 2620   | 181.9 | -      | -     | 16             | 2504 | 116.5 |
|       | 3050      | 4152  | 108.9 | 4069  | 148.4 | 3999  | 187.8 | 3937   | 227.3  | 3881   | 266.7 | -      | -     | 16             | 3765 | 168.3 |
| 826   | 1300      | 1898  | 43.3  | 1808  | 63.3  | 1732  | 83.3  | 1666   | 103.4  | 1605   | 123.4 | -      | -     | 14             | 1582 | 70.3  |
|       | 1900      | 2958  | 68.6  | 2868  | 97.9  | 2793  | 127.2 | 2726   | 156.5  | 2666   | 185.7 | 2584   | 229.6 | 16             | 2541 | 119.2 |
|       | 2670      | 4319  | 110.3 | 4229  | 151.5 | 4153  | 192.6 | 4086   | 233.7  | 4026   | 274.9 | 3945   | 336.6 | 16             | 3901 | 174   |
| 832   | 1300      | 2372  | 54    | 2260  | 79    | 2166  | 104.1 | 2082   | 129.1  | 2007   | 154.1 | -      | -     | 14             | 1978 | 87.8  |
|       | 1900      | 3698  | 85.4  | 3586  | 122   | 3491  | 158.6 | 3408   | 195.2  | 3332   | 231.8 | -      | -     | 16             | 3176 | 148.9 |
|       | 2670      | 5399  | 136.9 | 5287  | 188.3 | 5192  | 239.8 | 5109   | 291.2  | 5033   | 342.6 | -      | -     | 16             | 4877 | 217.1 |