HeliFlow® Industrial Series

Positive Displacement Blowers & Vacuum Pumps

2008 Plant Engineering PRODUCT of the YEAR WINNER

GD GARDNER DENVER

Experience Proven Results™

GD HeliFlow®
Built By the Industry Leaders

GD HeliFlow

HeliFlow integrates proven experience with blower design and manufacturing techniques to create an innovative helical tri-lobe blower. Gardner Denver has created a low noise solution for positive displacement blower and vacuum pump applications.

Gardner Denver

– Tradition

– Quality

– Innovation

– Results

Quality + Tradition = Trust

- Tradition: more than 145 years of quality manufacturing with proven results
- Every HeliFlow is machined, assembled and packaged in our state-of-the-art 330,000 sq. ft. ISO 9001 Certified facility in Sedalia, Missouri
- Each HeliFlow is individually tested to meet rigorous performance specifications
- Superior and consistent quality can be found in each HeliFlow as a result of:
  - Continual investment in the training of world-class manufacturing personnel
  - Advanced Flexible Machining Systems (FMS)
  - Quality inspections throughout the entire manufacturing process
- The HeliFlow Warranty
  - 30 months from the date of shipment or
  - 24 months from the date of installation, whichever occurs first

Model 408

HeliFlow Provides

– Pressure to 15 psig

– Vacuum to 17" Hg

– Airflow to 3200 cfm

– 24/30 Warranty

Model 616

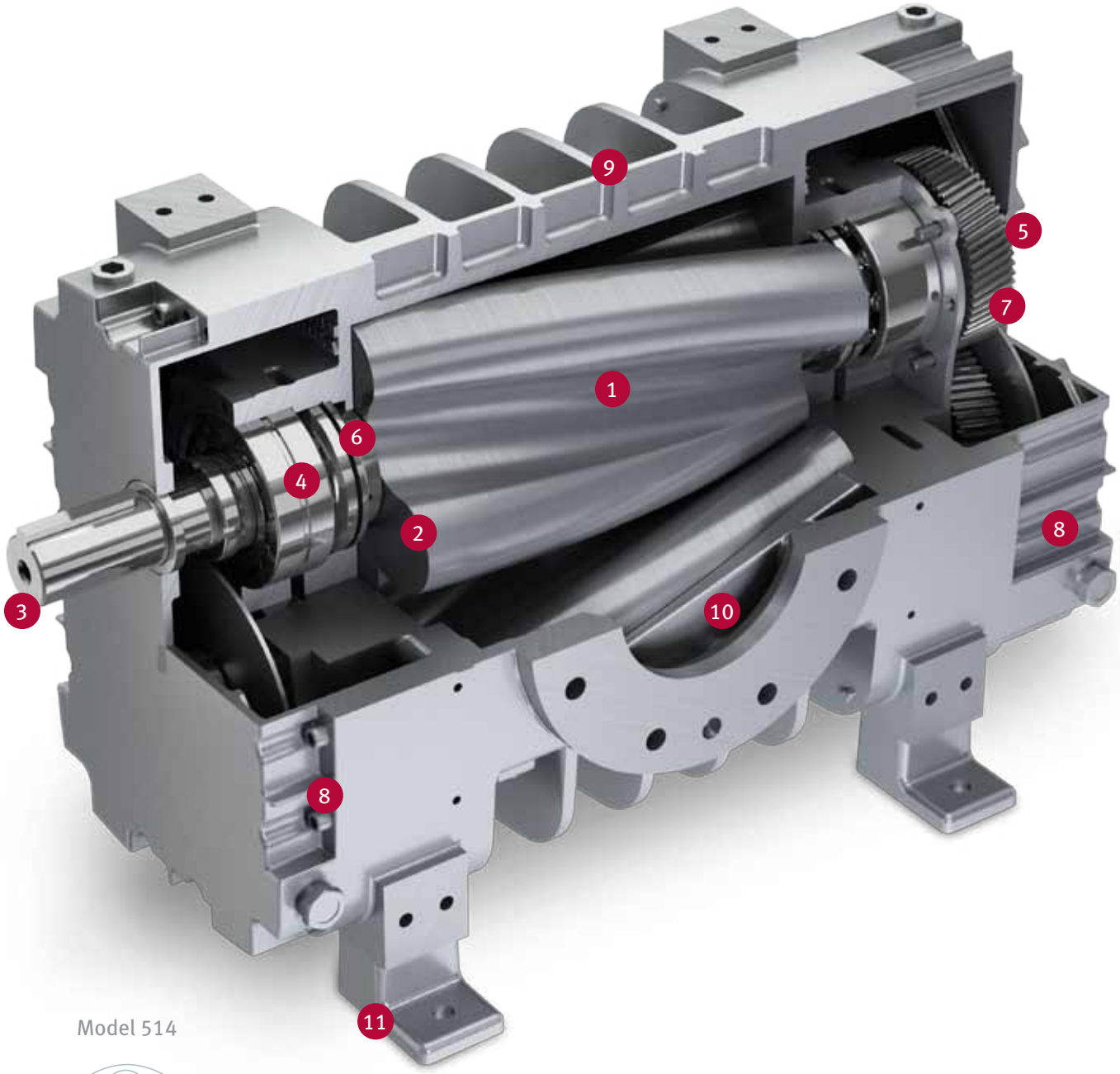
Innovation

- Solid, helical tri-lobe rotors
  - Eliminate the potential for unbalanced rotors caused by build-up of ingested material inside the impellers
- Greater durability with an increased capacity for overhung load
- Refined timing and locking device incorporates a frictional keyless shaft gear locking ring
  - Improves blower life
  - Provides an easily adjustable and releasable mechanical shrink fit on timing gears
  - Allows for easier maintenance
- Advanced piston ring air and oil seals for a dependable supply of oil-free air
- Spherical roller bearings
  - Better for misalignment and longevity

Results

- Overhung load limit of 13,500 in-lbs vs. competition of less than 7,999 in-lbs
- Reduced noise levels by 4–7 dba over similar sized, straight-lobe blowers
- Lower pulsations to protect downstream instrumentation and extend blower life
- HeliFlow 624 vs. competitive units
  - Greater temperature rise limits across the blower—250° F vs. 230° F
  - Increased pressure capability—12 psig vs. 10 psig
- Single-piece case with integral fins
  - Results in superior structural integrity and minimal torsional twist
  - Provides better heat dissipation to help maintain clearances
- Helical gears for quieter operation (616 and 624)
- Supported by a worldwide network of experienced and trusted sales and service professionals

Raising the Bar Through Innovation



Model 514

514, 616 & 624 Design Advantages

1. Innovative, proprietary, smooth-running, helical rotor profile significantly reduces pulsations and discharge noise levels for quieter operation

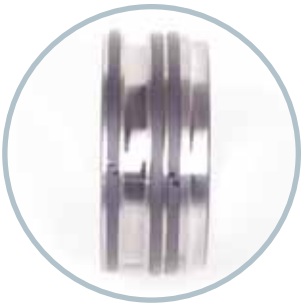
2. Solid rotor design eliminates the potential for vibration caused when hollow rotors become unbalanced due to build-up of ingested material inside the rotor cavities
   - Rotors and shafts are machined from high-strength ductile iron and are dynamically balanced to ISO Grade 6.3 as standard

3. Large diameter shafts provide superior overhung load capacity compared to competitive models

4. Oversized spherical roller bearings for superior reliability
   - Precision fit bearings mounted on large diameter shafts provide longer blower service life

5. Refined timing and gear locking device
   - Grip rings expand against the bore of the gear and compress on the shaft for a secure, mechanical shrink fit

6. Advanced piston ring oil and air seals provide leak-free operation
   - 1 air and 2 oil seals



7. Helical alloy steel timing gears provide quiet and smooth mechanical operation at all speeds

8. Dual splash lubrication for reduced maintenance intervals and superior durability

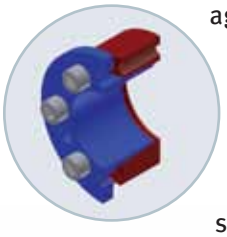
9. The single piece cylinder incorporates large external fins for heat dissipation and structural integrity

10. The unique triangular tuned ports and extra cylinder mass provides greater strength and noise attenuation

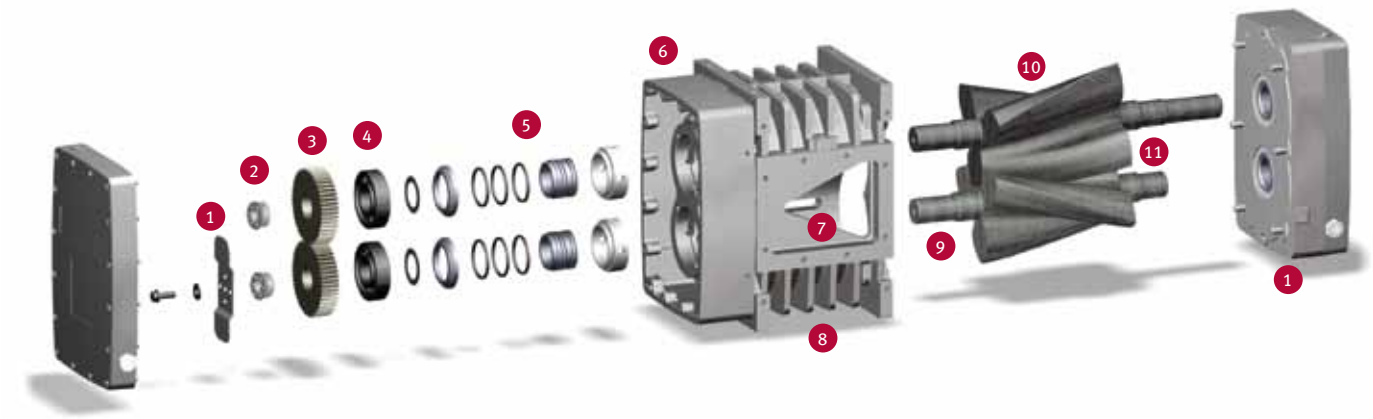
11. Flexible design allows mounting feet to be attached inward or outward based on installation requirements
    - Offers the ability to connect units in a variety of configurations

406 & 408 Design Advantages

1. Reliable dual-splash lubrication
2. Refined timing and gear locking device
   – Grip rings expand against the bore of the gear and compress on the shaft for a secure, mechanical shrink fit

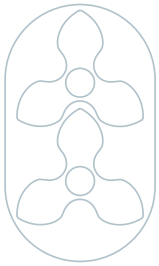


3. Alloy steel timing gears
4. Oversized, precision fit bearings mounted on large diameter shafts provide longer blower service life and added overhung load capacity
5. Advanced piston ring oil and air seals
6. The integral cylinder and gear-side head plate incorporate large external fins for greater strength and heat dissipation



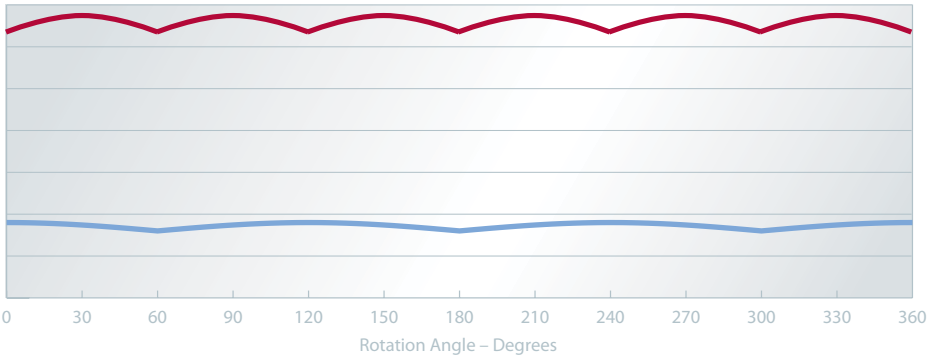
7. The unique triangular tuned ports and extra cylinder mass aid in reducing noise levels (bolt on adapters are standard and shown below)

8. Flexible design for easy installation
9. Rotors and shafts are machined from a single, high-strength ductile iron casting and are dynamically balanced
10. Innovative, proprietary, smooth-running, helical rotor profile significantly reduces pulsations and discharge noise levels for quieter operation
11. Solid rotor design eliminates the potential for vibration caused when hollow rotors become unbalanced due to build-up of ingested material inside the rotor cavities

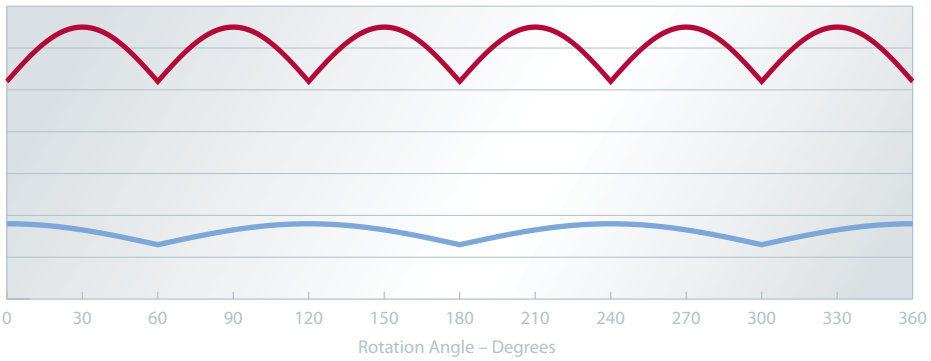


HeliFlow: Lower Pulsation & Noise Levels

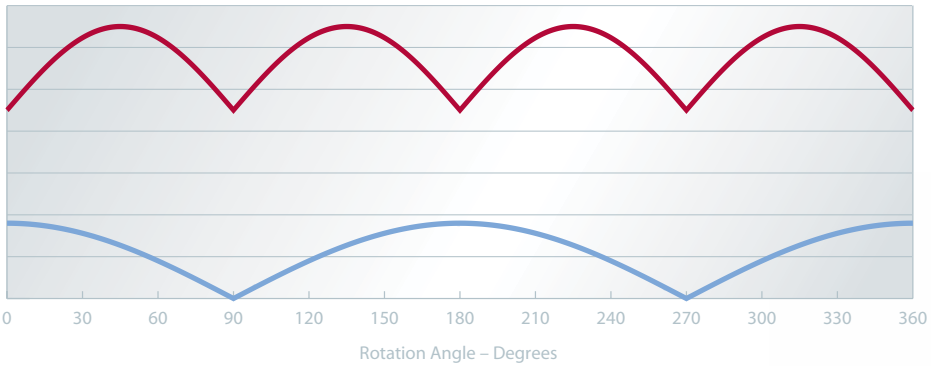
HeliFlow Low Pulse, Helical Tri-Lobe Blower



Typical Tri-Lobe Blower



Typical Dual-Lobe Blower



Change in Torque

Change in Flow

Lower Noise

Discharge pulsation is the chief contributor to high noise levels. HeliFlow provides the lowest pressure pulse which reduces noise levels by 4–7 dba over similar sized, straight-lobe blowers.

Reduced Pulsations

HeliFlow provides more consistent flow variation, reducing the potential for damage to downstream valves and instrumentation.

Higher Reliability

Discharge pressure pulsation causes axial thrust and higher variations in torque resulting in reduced bearing life. The HeliFlow smooth pulse operation extends the life of the blower.

HeliFlow is Innovation

Product Design	HeliFlow 514 & 616 & 624	Competitor A	Competitor B	HeliFlow Advantages
Cylinder & Rib Design	One piece with integral ribs	One piece without ribs	One piece without ribs	• Noise & pulsation dampening • Improves heat dissipation • Reduces stress on cylinder • Ensures better tip clearance accuracy
Drive/Gear End Bearings	Spherical roller	Cylindrical roller (drive) Double row ball (gear)	Cylindrical roller	• Increases bearing life • Better equipped to handle radial & axial loads commonly caused by misaligned V-belt drives
Gear Type	Helical	Helical	Spur	• Quiet & smooth mechanical operation • Reduces backlash • Allows tighter clearances
Gear Attachments	Grip rings	Keyed interference fit	Taper gear fit	• Improves reliability and eliminates timing loss • Easier to rebuild • Easily adjustable and release-able mechanical shrink fit
Rotor Profile	Solid, Helical Tri-Lobe	Hollow, Dual-Lobe	Hollow, Dual-Lobe	• Reduces noise and pulsations • Improves blower life • Eliminates the potential for unbalanced rotors due to product contamination
Oil Seals	Two piston ring seals with slinger and groove	Lip seal	Lip seal	• Superior oil sealing • Dependable supply of oil-free air • Extends maintenance intervals
Max. Overhung Limit (in-lbs)	514 = 8100 616/624 = 13500	3200 <7999	1600 <7999	• More resistant to overhung loads • Will ***not*** require a jack shaft at higher HP
Pressure Capability (psig)	514 = 15 624 = 12	10 10	13 10	• Increased pressure capability
Temperature Rise Limits (deg. F)	624 = 250	230	230	• Improved ability to withstand extreme operating conditions
Approximate Weight (lbs)	514 = 667 616 = 865 624 = 1145	410 650 775	615 650 775	• Extra cylinder mass for reduced noise and pulsations • More robust design

The Perfect Fit
For Your Industry Needs

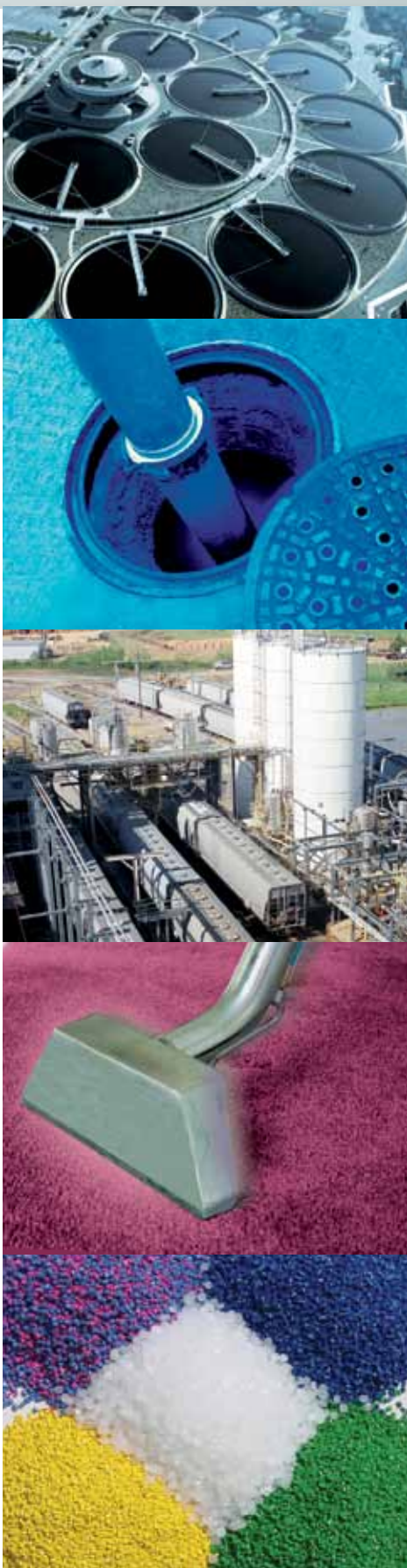
Industry	Application
Aquaculture	Aeration
Cement & Lime	Fluidization & Conveying
Chemical	Vacuum Processing & Conveying
Dairy	Automated Milking
Dry Bulk Hauling	Trailer Unloading & Aeration
Environmental Services	Sewer Cleaning & Portable Restroom Services
Industrial	Material Vacuuming
Milling & Baking	Blending & Conveying
Power Generation	Fly Ash Conveying & Aeration
Pulp & Paper	Chip Conveying & Process Vacuum
Resin & Plastic	Processing & Conveying
Vacuum Excavation	Potholing & Slurry Recovery
Wastewater	Aeration & Backwashing

The table above illustrates industries which depend upon the HeliFlow Industrial Series to deliver clean, oil-free air to a wide range of global applications.

Model 624

New Product Development

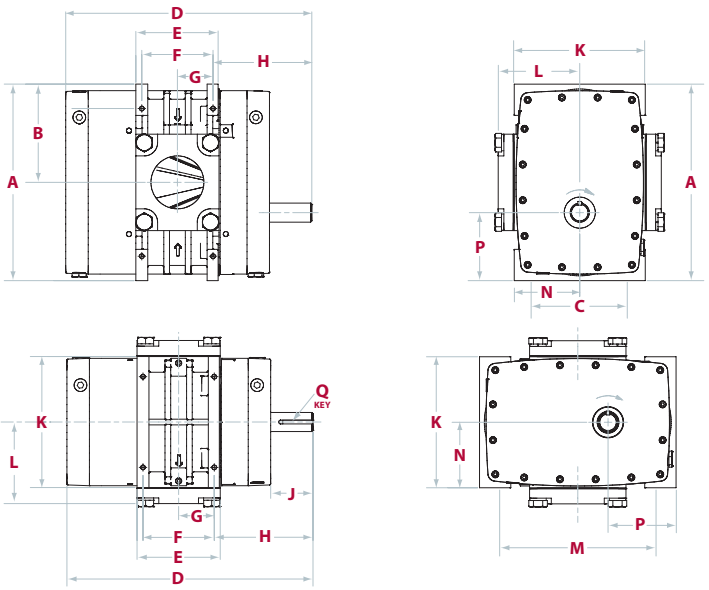
With a commitment to research and development, Gardner Denver provides our customers with products which uphold our tradition of quality and proven results. As part of the new product development process, the HeliFlow Industrial Series has passed extensive design reviews as well as performance, endurance and sound testing requirements.



406 & 408
Dimensional & Performance Data

MODEL	WT.	SHAFT DIAM.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
HF 406	173	1.25	13.0	6.5	6.0	16.27	5.5	4.71	2.36	6.53	2.8	8.66	5.39	9.76	4.33	4.5	0.25 X 0.25 X 2.0
HF 408	201	1.25	13.0	6.5	6.0	18.77	7.94	7.21	3.61	6.53	2.8	8.66	6.36	9.76	4.33	4.5	0.25 X 0.25 X 2.0

Dimensions shown in inches. Weights are in pounds and approximate (packaging materials included). Dimensions for installation purposes provided upon request.
406 = 3" NPT & 408 = 4" NPT; Mounting holes 3/8–16 UNC



Models 406, 408

PRESSURE	MODEL	RPM	5 PSIG		7 PSIG		10 PSIG		12 PSIG		15 PSIG	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
	HF 406	1760	147	4.7	136	6.4	120	9.0	111	10.8		
		2190	198	6.0	187	8.2	171	11.5	161	13.8		
		2620	248	7.6	236	10.3	220	14.3	211	17.0	198	21.0
		3600	357	12.0	345	15.7	328	21.3	318	25.1	305	30.7
		4000	399	14.2	387	18.3	370	24.5	360	28.7	346	35.0
	HF 408	1760	223	7.1	211	9.7	193	13.4	182	15.7		
		2190	297	9.2	284	12.5	265	17.2	253	20.2		
		2620	369	11.5	356	15.4	336	21.1	324	24.8		
		3600	529	16.8	515	22.3	493	30.3	479	35.5		
		4000	592	19.2	577	25.3	555	34.2	541	40.0		

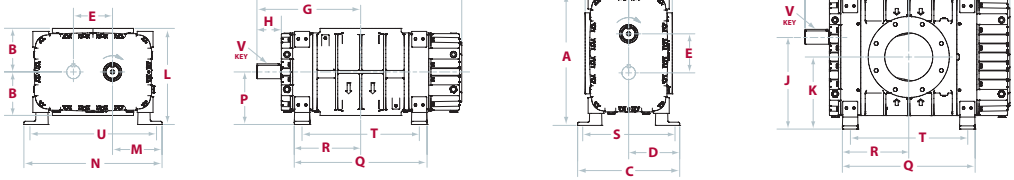
VACUUM	MODEL	RPM	10" HG		12" HG		14" HG		16" HG	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
	HF 406	1760	135	4.2	125	5.0	113	5.8		
		2190	187	5.5	176	6.5	164	7.5	152	8.5
		2620	236	7.0	226	8.2	214	9.4	201	10.6
		3600	345	11.0	333	12.7	321	14.4	308	16.1
		4000	387	13.0	375	14.8	362	16.7	349	18.6
	HF 408	1760	217	6.3	204	7.6	189	8.9		
		2190	292	8.1	278	9.6	264	11.1	247	12.8
		2620	364	10.1	351	11.8	337	13.6	321	15.4
		3600	523	15.3	511	17.5	497	19.8	482	22.1
		4000	584	17.7	573	20.1	560	22.6	545	25.1

Performance based on inlet air at standard temperature of 68°F, an ambient pressure of 14.7 psia and 36% relative humidity.
For performance at non-standard conditions, contact your authorized Gardner Denver representative.

514, 616 & 624
Dimensional & Performance Data

MODEL	WT.	SHAFT DIAM.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
HF 514	667	1.875	19.1	6.37	15.0	7.5	5.5	31.6	16.29	3.53	12.0	10.56	14.18	7.5	20.5	7.81	19.92	9.96	13.0	17.31	18.5	0.5 X 0.5 X 3.25
HF 616	866	2.25	22.0	7.25	17.0	8.5	6.5	34.1	17.27	4.07	15.25	12.0	16.0	8.25	23.0	8.75	22.11	11.05	15.0	19.5	21.0	0.5 X 0.5 X 3.75
HF 624	1144	2.25	22.0	7.25	17.0	8.5	6.5	42.1	21.27	4.07	15.25	12.0	16.0	8.25	23.0	8.75	30.11	15.05	15.0	27.5	21.0	0.5 X 0.5 X 3.75

Dimensions shown in inches. Weights are in pounds and approximate. Dimensions for installation purposes provided upon request.
514 = 6" flange, 616 = 8" flange & 624 = 10" flange (150# flange connections); Hold down bolt hole diameter = .59"



	MODEL	RPM	5 PSIG		7 PSIG		10 PSIG		12 PSIG		15 PSIG	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
PRESSURE	HF 514	1000	252	9.5	225	13	188	18.5	165	22.2		
		1600	519	15.2	493	21.1	457	29.9	436	35.9	408	45
		2200	783	21.6	758	29.6	723	41.9	703	50.2	676	62.7
		2800	1044	28.4	1019	38.8	986	54.4	967	65	942	80.9
		3300	1258	34.6	1235	46.8	1203	65.3	1184	77.8	1161	96.5
		4000	1555	43.8	1532	58.7	1503	81.2	1485	96.3	1463	119
	HF 616	1000	444	16.3	405	21.7	353	30.1	323	35.8		
		1600	880	25.4	840	34.7	788	48.7	757	58.3	718	72.9
		2200	1305	36.3	1265	49.3	1212	69.1	1181	82.5	1141	102.7
		2800	1720	48.9	1680	65.7	1626	91.2	1594	108.4	1553	134.3
		3300	2058	60.8	2018	80.7	1963	111.0	1931	131.3	1889	162.0
	HF 624	1000	673	23.2	620	31.5	547	44.5	502	53.6		
		1600	1310	37.7	1259	51.8	1187	73.5	1144	88.4		
		2200	1947	54.3	1896	74.1	1827	104.5	1785	125.1		
		2800	2581	72.7	2532	98.4	2464	137.4	2423	163.7		
		3300	3109	89.6	3060	120.0	2994	166.3	2955	197.4		

	MODEL	RPM	10" HG		12" HG		14" HG		16" HG	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
VACUUM	HF 514	1000	238	9.3	212	11.2	185	13.1		
		1600	503	14.9	479	17.8	453	20.7	427	23.7
		2200	767	20.9	743	24.8	719	28.8	695	32.8
		2800	1028	27.3	1006	32.3	983	37.3	960	42.4
		3300	1244	33.1	1223	38.9	1202	44.8	1180	50.7
		4000	1545	41.7	1525	48.7	1505	55.8	1484	63
	HF 616	1000	469	15.8	419	18.5	358	21.2	285	23.9
		1600	904	25.8	863	30.1	811	34.4	746	38.8
		2200	1335	36.7	1302	42.7	1258	48.8	1202	54.8
		2800	1760	48.8	1737	56.4	1701	64.1	1653	71.9
		3300	2111	59.6	2095	68.7	2066	77.7	2025	86.9
	HF 624	1000	657	23.8	608	27.7	563	31.2	521	34.5
		1600	1341	38.4	1300	45.0	1262	51.4	1227	57.5
		2200	2014	53.8	1980	63.3	1949	72.4	1922	81.3
		2800	2676	70.0	2649	82.4	2626	94.4	2605	106.1
		3300	3218	84.3	3198	98.9	3181	113.3	3167	127.3

Performance based on inlet air at standard temperature of 68˚F, an ambient pressure of 14.7 psia and 36% relative humidity.
For performance at non-standard conditions, contact your authorized Gardner Denver representative.




Quality Promise

- Gardner Denver industrial blowers are manufactured under rigid ISO 9001 quality standards
- All models are thoroughly tested to meet the highest performance standards for unequaled service life under the most severe operating conditions

Genuine Gardner Denver Parts and Lubricants

- Maintain the Gardner Denver performance advantage and reliability with Genuine GD Replacement Parts available through authorized sales and service representatives
- Protect your Gardner Denver investment with AEON® PD, the only lubricant specially formulated for all blowers in any environment
  - Now available:
    - ›› AEON® PD-XD (extreme duty)
    - ›› Designed specifically for high ambient and high discharge temperature applications
  - Also available:
    - ›› AEON® PD (standard applications)
    - ›› AEON® PD-FG (food grade)

Gardner Denver®

www.GardnerDenverProducts.com

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