

ORION Dry Vacuum Pump / Blower



Long-selling global design dry pump thanks to its high reliability and improved functionality.

5 Concepts Which Define the

**Our Global Design Dry Pump has
its high reliability and**



1 Environmentally Conscious

Worldwide Forerunner with RoHS Directive Certification (CE Marking compliant models only)

ENVIRONMENTALLY FRIENDLY

3 Global Design

Established International Market Share

GLOBAL DESIGN

2 Designed for Safety

- Meets CE Marking Standards (Excluding models with single-phase motors.)
- Special Protective Covering Protects Against Surface Heat and Contact with Moving Parts.

SAFE DESIGN

Basis of ORION Dry Pumps

(KRF, CBF series)

been a long seller thanks to improved functionality.



Low Noise Design

Reduced Annoying Low Frequency Noise

LOW NOISE

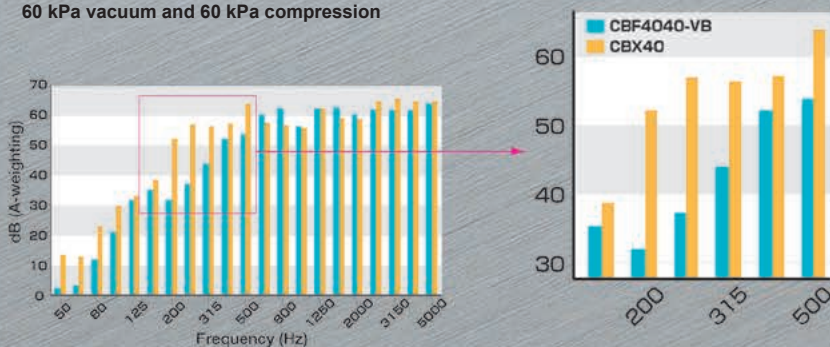
Long Life

Vane Life Increased 30%
(compared to previous models)

LONG LIFE

Annoying low frequency noise (below 500 Hz) greatly reduced.

Comparison of noise level by frequency of CBF4040-VB and CBX40 operating at 60 Hz, 60 kPa vacuum and 60 kPa compression



Long-Selling Global Des

Standard Capacity Dry Pump KRF series

- Longer Operating Life
 - Vane Life Increased 30% (KRF 15A, 25A, 40A)
 - Vane Life Increased 20% (KRF 04A, 08A)
 - Vane Life Increased 10% (KRF 70, 110)
- Safe and Environmentally Conscious
 - CE Marking Certified (excluding models with single-phase motors)
- Low Noise Design



Original F Series Dry Pumps

Combination Dry Pump CBF series

- Original Twin Cylinder Design
- Safety Enhanced Design, Environmentally Conscious
CE Marking
- Improved Ease of Maintenance
- Does Not Require Alignment Adjustments
- Easy to Replace Filter



High-Vacuum Dry Pump KHF series

- Safety Enhanced Design
CE Marking Certified [04(CE), 01B(CE) models] (Excluding models with single-phase motors)
- Operable from Ultimate Pressure Down to Atmospheric Pressure. (KHF14 • KHF20)



Support for the Ideal Shop Environment For a Quieter Working Environment

Air Station

10 to 15 dB Noise Reduction

Pump and Blower System Cabinet (Built-to-order model)

Multiple pumps and blowers in a single cabinet for easier pump management



Air Cooled AS135A

Exhaust Duct Support

Water Cooled AS135W

Heat Output from Enclosed Pumps
Cooled via Water-Cooled Heat Exchanging Unit.
Zero-Level Heat Output!

Silent Box KCS series

5 to 10 dB Noise Reduction

Matched to Individual Pump



KCS70

KCS110

KCS21A,31A,61A

Index

Product Overview

Working Principles • Model Nomenclature • Sample Applications	2 • 5
Pressure Unit Comparison Chart, Pump Pressure Guide, Pressure Units Notes, Unit Conversion Chart, Model List	6 • 7
Selection of Suitable Pump	8 to 11
Model List	12 • 13

Compact Type



KRF series KM41A

KRF Series	14 • 15
KM41A	15

Standard Type



KRF series

KRF Series	16 to 19
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Combination Pumps



CBF series CBX62 CBXP series

CBF Series	20 • 21
CBX62	22 • 23
CBXP Series	24 to 27

High Vacuum Models



KHF series KHA series KHH251

KHF Series	28 • 29
KHA Series	30 • 31
KHH251	32

Working Environment & Related Products



KCS series AS series

KCS Series (Silent Box)	33 to 35
AS135 Series (Pump and Blower System Box)	36
KE Series (Air Ejectors).....	36

Accessories & Information

Accessory (Sold Separately)	37 to 40
Safety Precautions and Information	41 to 43
Energy Savings Proposals	
KCP/KCE Series Oil-Free Vacuum Pump and Blower, Vaneless Pump	44 • 45



Model Nomenclature / Functioning Principles / Sample Applications

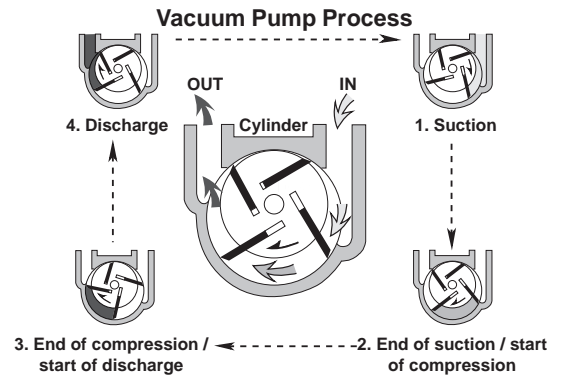
Oil-Free Rotary Vane Vacuum Pump that Meets Your Clean Work Needs

In 1965, the history of the oil-free rotary vane vacuum pump began in Japan with the birth of the Orion Dry Pump. And ever since, due to their excellent functionality, Orion Dry Pumps are vital components regularly used in automation and energy-saving applications in various industries. On the other hand, despite impressive features, they are also traditionally known for their loud operating noise and short lifespans. Fortunately, the results of years of great efforts have yielded an oil-free pump with low operating noise levels and increased lifespans previously unimaginable. Starting with automation and energy savings in mind, it's time you took advantage of the infinite possibilities of Orion Dry Pumps.

- **ORION Dry Pumps are oil-free for both vacuum and pressure systems, and do not contaminate the work environment and workpieces with oil. These pumps are ideally suited for various applications.**
- **Low operating sound levels and long service life. Pre-equipped with gauges and controllers. (Some models don't apply.)**
- **Specially designed wear-resistant, self-lubricating carbon vanes.**
- **High-speed rotating multi-vane for stable suction/exhaust with little fluctuation.**

Functioning Principles

- A rotor is placed eccentrically within a cylinder. All components are precisely manufactured and adjusted to achieve minimum clearances. Vanes are inserted into slots in the rotor and are free to slip in and out within the walls of the cylinder. As the rotor turns, the vanes slide out and are kept in constant contact with the cylinder wall due to centrifugal force.
- As the rotor turns, the volume of space between the vanes changes. As shown in the illustration, when the rotor spins from state 1 to 2, the increase in volume at the intake creates a vacuum. As the volume of space between the vanes decreases during the cycle, the air trapped between the vanes is compressed as shown between states 2 and 3. Finally between states 3 and 4 the compressed air is allowed to escape through the air outlet. The process repeats as the rotor continuously rotates in order to achieve a constant air flow from inlet to outlet.
- A four-vane-type pump provides intake/discharge 4 times in a single rotation. Defining volume at the end of intake as V (L), and rotation speed as N (rpm), 4VN (L) of air is discharged per minute. This theoretical value is what's known as the designed pumping capacity.



Basic Specifications

- Utilize Vacuum • Vacuum Spec. (Suction Air)

Construction	Mark	Designation	Operation
		V	Intake-side (vacuum-side) of pump is utilized. This is called "Suction Air".

- Utilize Exhaust • Blower Spec. (Delivery Air)

Construction	Mark	Designation	Operation
		B	Exhaust-side of pump is utilized. This is called "Delivery Air"

- Vacuum/Blower Spec.

Construction	Mark	Designation	Operation
		VB	Simultaneously utilizes the intake and exhaust sides of the pump. This is called "1-Cylinder VB Spec."

* Construction diagrams are of the KRF Series of pumps.

Please refer to page 3 for model descriptions.

- Combination Type

Construction	Mark	Designation	Operation
		VV	Pump 1 and Pump 2 are both built in. Each are vacuum spec. pumps.

Construction	Mark	Designation	Operation
		BB	Pump 1 and Pump 2 are both built in. Each are blower spec. pumps.

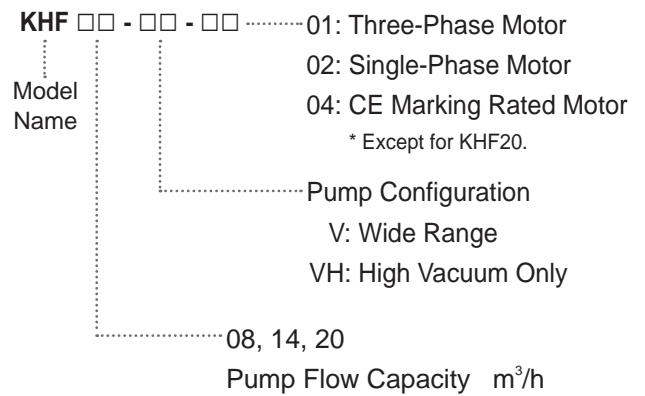
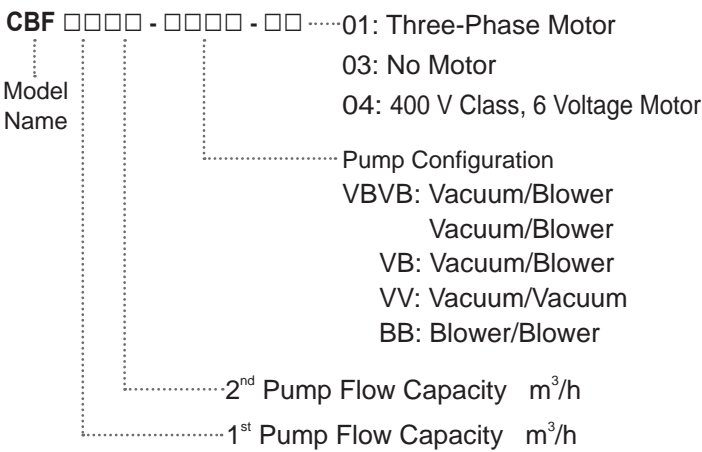
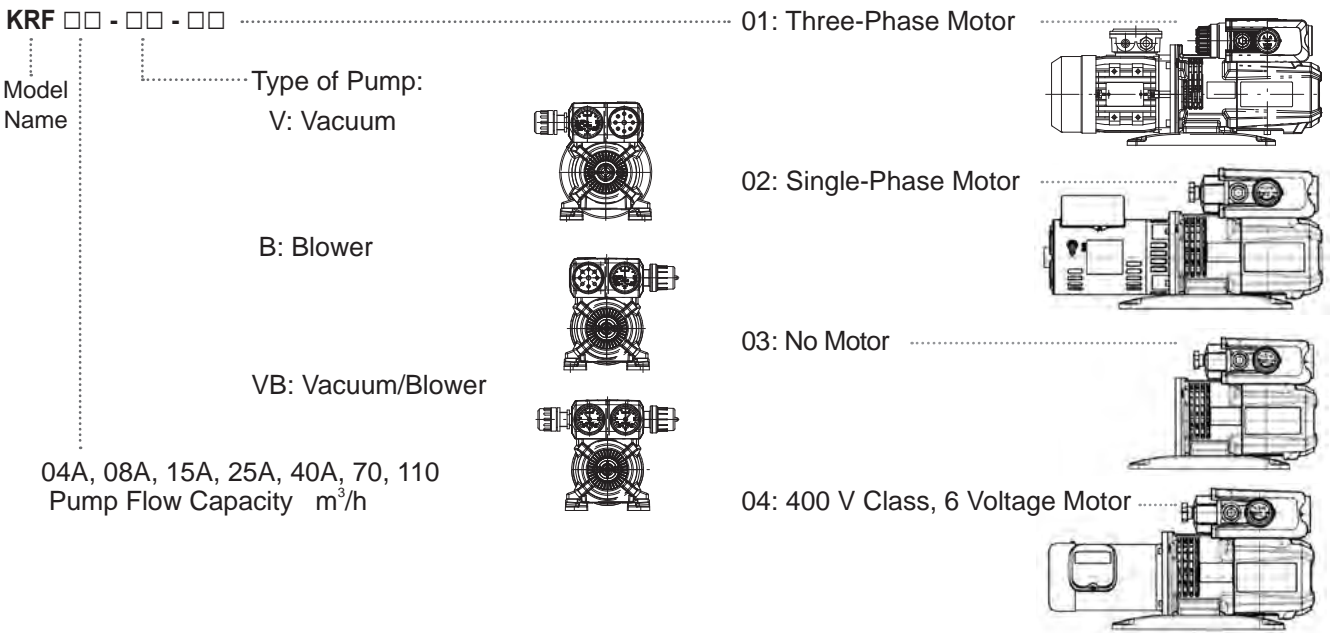
Construction	Mark	Designation	Operation
		VB	Pump 1 and Pump 2 are both built in. 1 is a vacuum spec. pump and the other is a blower spec. pump. This is called "2-Cylinder VB Spec."

Construction	Mark	Designation	Operation
		VBVB	Pump 1 and Pump 2 are both built in. Each are vacuum spec. and blower spec. pumps. This is called "2-Cylinder VBVB Spec."

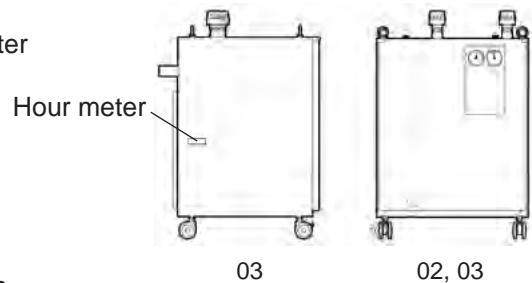
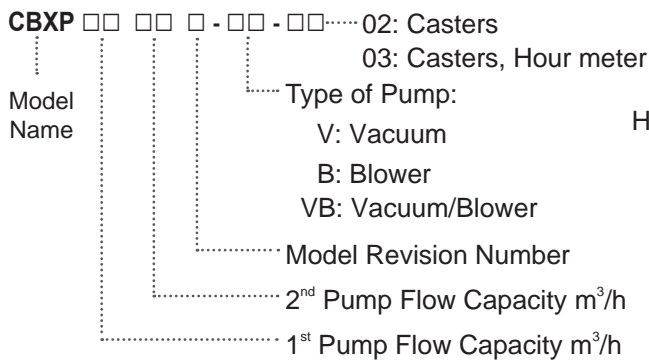
* Model CBX62 differs from the above chart.

Model Nomenclature

Depending on the model, further variations may exist. Please consult the page of the specific model for further details.



Model Nomenclature

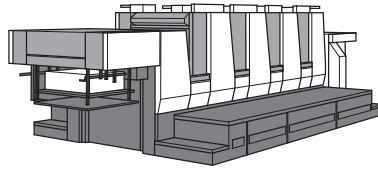


Sample Applications

Printing Equipment

Using a vacuum pad, a sheet of printing paper is lifted by vacuum, while at the same time, blower-air is blown under the sheet, enabling transport of sheets one by one.

Orion has a vast variety of combination pumps available to match any and all printing machine needs.

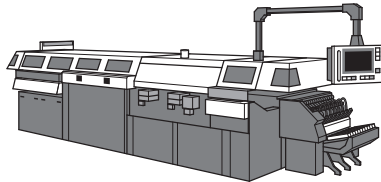


CBF Series Combination Pump

Bookbinding

During the bookbinding process, air is used in paper handling in order to take up individual pages.

We have a line of high-air-flow pumps that can move the large numbers of sections processed by large bookbinding machines.



KRF Series Vacuum Blower

Photolithography Machine

Rotary vane pumps are used in the vacuum-transport of organic substrate plates because they provide a clean vacuum source with little pulsation.

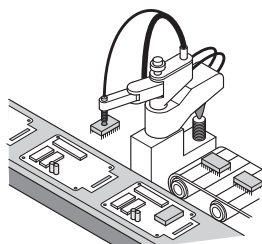
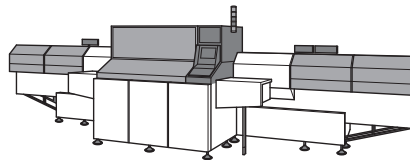


KHA Series
(These pumps are built into the installed machine.)

Chip Mounter (Vacuum tweezer for minute parts) and Robotic Arm

The vacuum source is used to pick up and place IC chips onto printed circuit boards.

The vacuum pad mounted at the end of the robotic arm uses a vacuum to pick up and hold very small semiconductor components and electronic devices, which are then placed at precise predetermined locations on the board.

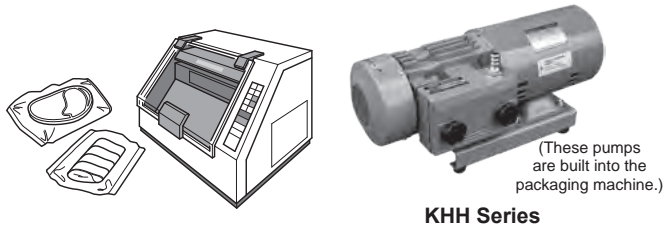


KHA Series
(These pumps are built into the installed machine.)

Sample Applications

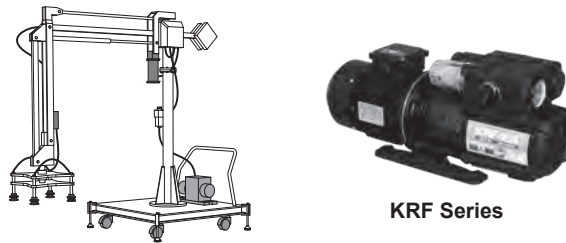
For Vacuum Packaging Machines and Deep-Drawing Packaging Machines, etc.

Food is placed into vacuum-pack bags, and air is drawn out from the bag by a vacuum applied to the nozzle inserted into the bag. The ends of the bag are closed by heat-sealing.



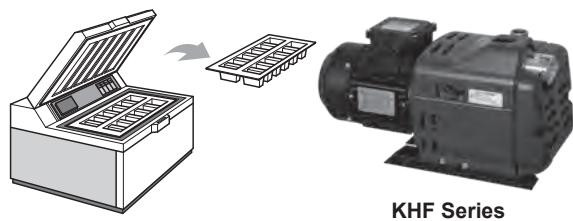
Vacuum Lift

The vacuum generated from the vacuum pump is applied to vacuum pads that pick up and transport the work.



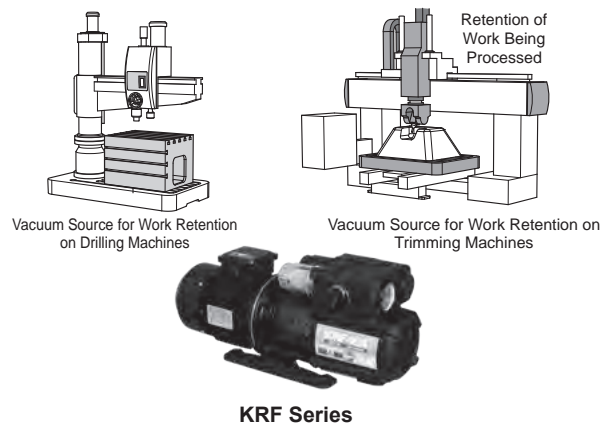
Vacuum Forming Machine and Sheet Forming Machine (for Lightweight Plastic Containers), etc.

A thin flat film is placed on the forming machine and an instantaneous burst of vacuum is applied inside the mold, which draws the film over the shape of the mold. (Materials Used: PP filler, expanded PP, A-PET, PS-based, PSP-based, etc.)



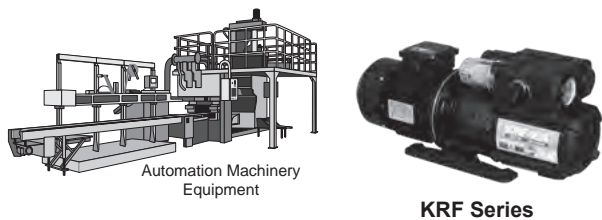
Vacuum Chuck and Vacuum Retention of Work, etc.

The vacuum generated from the vacuum pump is applied to vacuum pads that pick up and transport the work.



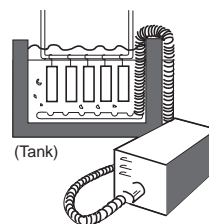
Bag and Filling Machines, etc.

An oil-free vacuum pump is used as the vacuum source needed for paper processing or bag-opening and roller-handling.



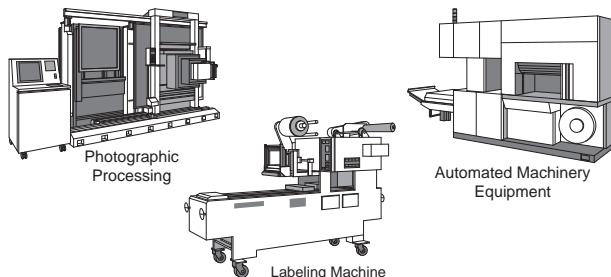
Liquid Agitation and Aeration

A pipe with small holes is placed at the bottom of the tank. Air from a blower is sent to the pipe, and the rising air agitates and aerate the liquid in the tank.



Other Applications

- Photographic Processing
- Insertion Machinery
- Packaging Machines
- Computer Applications
- Paper Counter
- Labeling Machine
- Parts Feeder
- Dust Gas Sampling
- Air Bearing
- Oxygen Production
- Medical / Health Care Equipment
- Business Machinery
- Other Automation Machinery Equipment
- Please contact us regarding use in dry rooms.

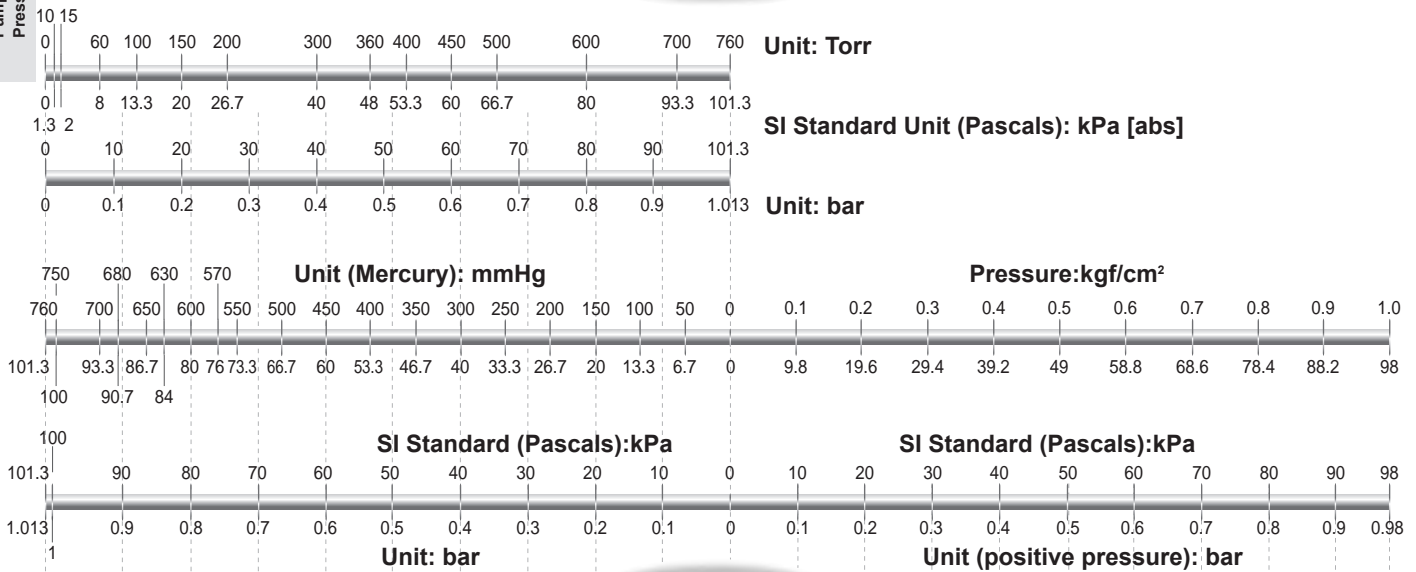




Pressure Unit Comparison Chart / Pump Pressure Guide / Pressure Units Notes / Model List

Pressure Unit Comparison
Pump Pressure Guide
Pressure Units Notes

Pressure Units Comparison Chart



Pump Pressure Guide * KHF exhaust cannot be used.

Absolute Vacuum Vacuum: kPa Atmospheric Pressure Positive Pressure: kPa

8 [abs]		KHF14-V/20-V	10	Maximum Exhaust Resistance
8 [abs]	48 [abs]	KHF08-VH/KHA100200/400/750	25	Maximum Exhaust Resistance
1.3 abs		KHH251	10	Maximum Exhaust Resistance
	55	KM41A		
	55	KRF04A	KRF04A	50
	75	KRF08A/KRF15A	KRF08A/KRF15A	70
80		KRF25A/40A	KRF25A/40A	70
80		KRF70-VH	KRF70-BH	70
80		KRH10		
	60	KRF70-V/110-V	KRF70-B/110-B	60
	60	CBF1515/2525/4040	CBF1515/2525/4040	60
	60	CBX62	CBX62	60
	55	CBX62A :No.1	20 CBX62A :No.1	
	CBX62A :No.2	35	CBX62A :No.2	50
60		CBXP□A-VB	CBXP□A-VB	80
60		CBXP□B-VB	CBXP□B-VB	70
60		CBXP□A,□B-VV	CBXP□A,□B-BB	60

Elevation Correction Value

Elevation (m)	Correction Value (kPa)
100	1.2
200	2.4
300	3.6
400	4.7
500	5.9
600	7.0
700	8.1
800	9.3
900	10.4
1,000	11.5

- The elevation correction value is based on the elevation where the pump is operated and this value is to be subtracted from the degree of vacuum.

When operating at atmospheric pressure in areas of high elevation, there will be a difference in the actual degree of vacuum compared to operating at atmospheric pressure at sea level. Accordingly, the upper limit of the continuous degree of vacuum will be lower, and the pump should be operated within the adjusted range. Operating the pump at a degree of vacuum exceeding this adjusted upper limit will shorten the operating lifespan of the pump and can also result in breakdown of the pump. For the same reason, the actual ultimate vacuum will also be lower than the value noted in the specifications.

Example: For operation at an elevation of 500 m:

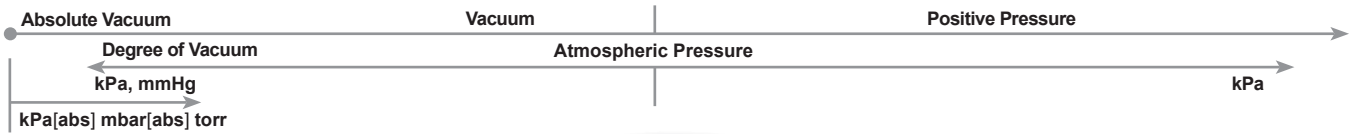
The continuous degree of vacuum of the KRF40A would be in the range of $80 - 5.9 = 74.1$ kPa.

Pressure Units Notes

Please note that the same units can be used to indicate atmospheric or absolute pressure standard measurements based on the individual case. Please be careful regarding these units.

	Atmospheric Pressure Standard	Absolute Pressure Standard
Notes	• Atmospheric pressure regarded as "0". Also known as "gauge pressure". • We refer to it as "degree of vacuum." "A" (minus) sign will not be indicated as it is an absolute value.	• Absolute vacuum will be indicated as "0". • Indicated as pressure.
Units	• kPa • mmHg	• kPa[abs] • mbar[abs] • torr

* mmHg and torr units cannot be used in business transactions.



Units Conversion Chart

Vacuum Units		Vacuum (Gauge Pressure)		
From	To	kPa	mmHg	mbar
1 kPa	→	1	7.5	10
1 mmHg	→	0.1333	1	1.333
1 mbar	→	0.1	0.75	1

Vacuum Units		Absolute Pressure			
From	To	kPa [abs]	Torr	atm	mbar [abs]
1 kPa [abs]	→	1	7.5	9.87×10 ⁻³	10
1 Torr	→	0.1333	1	1.316×10 ⁻³	1.333
1 atm	→	1.013×10 ²	760	1	1.013×10 ³
1 mbar [abs]	→	0.1	0.75	9.87×10 ⁻⁴	1

Pressure Units		Exhaust Pressure (Gauge Pressure)			
From	To	kPa	kgf/cm ²	psi	mbar
1 kPa	→	1	1.02×10 ⁻²	1.45×10 ⁻¹	10
1 kgf/cm ²	→	98.07	1	14.223	9.807×10 ²
1 psi (lb/in)	→	6.89	7.031×10 ⁻²	1	68.9
1 mbar	→	0.1	1.02×10 ⁻³	1.45×10 ⁻²	1

Volumetric Units		cfm	m ³ /h	L/min	L/s	m ³ /s
1 cfm (ft ³ /min)	→	1	1.6992	28.32	0.472	4.72×10 ⁻⁴
1 m ³ /h	→	0.589	1	16.67	0.278	2.78×10 ⁻⁴
1 L/min	→	0.0353	0.06	1	0.0167	1.67×10 ⁻⁵
1 L/s	→	2.119	3.6	60	1	10 ⁻³
1 m ³ /s	→	2119	3600	60000	1000	1

Model List

Model	Specification	Applications	Model (Three-Phase 200 V)	Continuous opera- tive vacuum (kPa)	Designed pumping capacity L/min (50 Hz)	Three-Phase Motor		Single- Phase Motor	Without Motor	Other Voltage, 3-Phase Motor	CE Marking	UL	Gauge	Controller	Operational Sound		Page
						50 Hz 200 V	60 Hz 200- 220 V								Silent Box		
						Operational (maximum)									Without	With	
	V	• Printing / Binding	08A-V-01	60 (75)	135	○	○	○	○	MTO	○	MTO	○	○	60 / 61	50 / 52	P14
	B		08A-B-01	60 (70)											64 / 67		
	VB		08A-VB-01	60 (75) in total											60 / 61		
	V	• Automation	15A-V-01A	60 (75)	235	○	○	○	○	MTO	○	MTO	○	○	60 / 62	54 / 56	P16
	B		15A-B-01A	60 (70)											64 / 65		
	VB		15A-VB-01A	60 (75) in total											60 / 62		
	V	• Packaging *Vacuum requirement 55 to 80 kPa	25A-V-01B	60 (80)	405	○	○	○	○	MTO	○	MTO	○	○	62 / 64	54 / 56	P16
	B		25A-B-01B	60 (70)											65 / 67		
	VB		25A-VB-01B	60 (80) in total											62 / 64		
	V	• Blower for aer- ation, dust/ water blowoff (air knife), etc.	40A-V-01B	60 (80)	575	○	○	—	○	MTO	○	MTO	○	○	66 / 67	54 / 56	P16
	B		40A-B-01B	60 (70)											68 / 70		
	VB		40A-VB-01B	60 (80) in total											66 / 67		
	V	* Discharge pres- sure require- ment 50 to 70 kPa	70-V-01B	60	1130	○	○	—	○	MTO	○	MTO	○	○	67 / 68	57 / 58	P18
	B		70-B-01B	60											74 / 76	58 / 60	
	VB		70-VB-01B	60 in total											67 / 68		
	V	70 kPa	110-V-01B	60	1850	○	○	—	○	MTO	○	MTO	○	○	74 / 75	58 / 59	P18
	B		110-B-01B	60											76 / 77	58 / 60	
	VB		110-VB-01B	60 in total											74 / 75		
		• Chip inserter	100-301 Photo:400	From ultimate pressure to 48 (abs)	55	○	○	○	—	MTO	—	MTO	Accessory (Sold Separately)	Accessory (Sold Separately)	60 / 61	47 / 51	P30
		• Small parts assembly	08-VH-01	From ultimate pressure to 48 (abs)	125	○	○	MTO	MTO	MTO	○	MTO	Accessory (Sold Separately)	Accessory (Sold Separately)	64 / 67		P28
		• Photographic Processing	08-VH-04 (CE)														
		• Packaging	14-V-01	Overall range	230	○	○	MTO	MTO	MTO	○	MTO	Accessory (Sold Separately)	Accessory (Sold Separately)	66 / 68		P28
		• Food processing	14-V-04 (CE)														
		• Vacuum form- ing *Vacuum requirement 60 to 93 kPa	20-V-01A 20-V-04 (CE)	Overall range	340	○	○	MTO	MTO	MTO	○	MTO	Accessory (Sold Separately)	Accessory (Sold Separately)	67 / 69		P28

* The model number will differ depending on the model specification: single-phase motor / models without motor. *1 230 V standard compatible.

* ○ indicates standard equipment.



Selection of Suitable Pump

1. When there is no pressure drop and a vacuum controller is used.

Specific pump choice should take into consideration the variety of conditions in which it will be used. Following are typical configurations based on a simplified set of conditions for the sake of example.

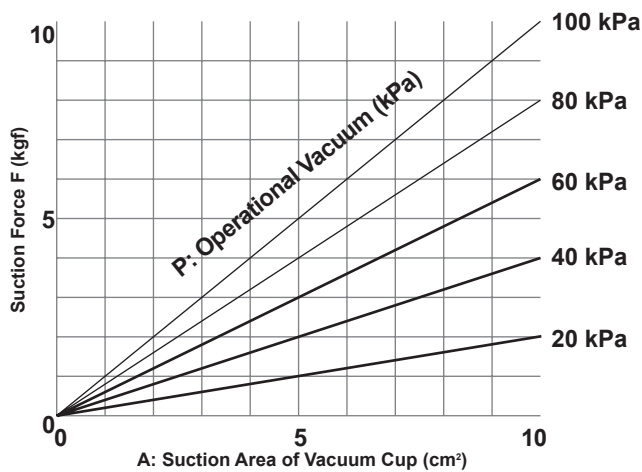
In the case of vacuum lifting, a comparison of grabbing force along with the degree of vacuum, and the size of the area being grabbed.

$$\text{Equation (i)} \quad F = A \times \frac{P}{101.3}$$

Note: The precise formula is $F = A \times P / 98.1 \text{ kPa}$, but for practical use, we assume $101.3 \text{ kPa} \approx 1 \text{ kgf/cm}^2$.

- F:** Suction force (kgf)
- A:** Suction area of vacuum cup (cm²)
- P:** Operational vacuum (kPa)

Graphed, the relationship between these variables is as below:



Conversion formulas of pressure related units:

A	B	A=B×7.5	B=A/7.5
mmHg	kPa	A=B×7.5	B=A/7.5
inHg	kPa	A=B/3.387	B=A×3.387
atm	kPa	A=1—B/101.3	B=101.3×(1—A)
mbar	kPa	A=B×10	B=A/10
mmAq	kPa	A=B×102	B=A/102
Torr	kPa	A=760—(B×7.5)	B=(760—A)/7.5
kPa [abs]	kPa	A=101.33—B	B=101.33—A

Lifting and Conveying Objects

When choosing a pump to be used with equipment that repeatedly grabs/moves/releases objects, the pump must be chosen that can attain the required pressure within the required time constraints. Please refer to this example.

[Example]

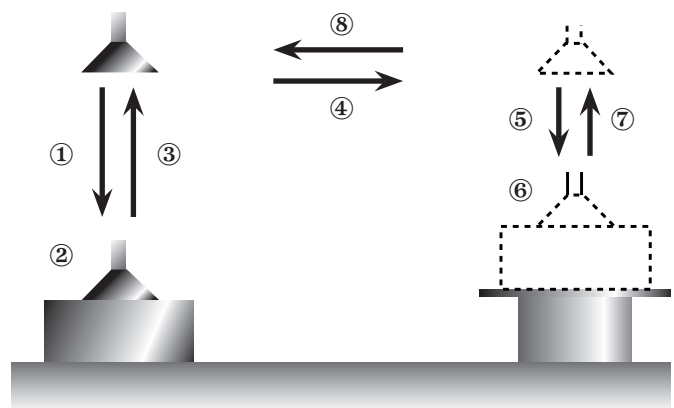
Use: Vacuum lift
 Object conveyed: Aluminum (relative density of 2.7)
 Dimensions: 20 cm×30 cm×15 cm (L×W×H)
 Weight: Approx. 25 kgf
 One processing cycle starts at ① and ends at ⑧.

Task and time

- ① To lower 0.5 s ② To grab 0.6 s ③ To rise 0.5 s
- ④ Move right 0.75 s ⑤ To lower 0.25 s
- ⑥ To release 0.4 s ⑦ To rise 0.25 s ⑧ Move left 0.75 s

Piping: 1 1/2B×300 cm (from pump to vacuum cup.)

Vacuum cup volume: 100 cm³



(a) Vacuum Cup Area Calculation

Vacuum cup area depends on the size and shape of the object to be lifted and the operational vacuum. For this example, the operational vacuum is 50 kPa.

$$F = 25 \text{ kgf} \quad P = 50 \text{ kPa}$$

Therefore, equation (i) will be transformed to

$$A = F / \frac{P}{101.3} = 25 / \frac{50}{101.3} = 50.7$$

Consequently, the required vacuum cup area results in 50.7 cm²

Taking into consideration surface roughness of the object, piping imperfections, etc., we will apply a Safety Factor of 2. Therefore the area of the vacuum cup should be 101.4 cm² (50.7x2.)

***Minimum Safety Factor**

When the vacuum cup lifts and holds an object from a horizontal surface, use a Safety Factor of at least 2.

When the vacuum cup lifts and holds an object from a vertical surface, use a Safety Factor of at least 4.

The Safety Factor should be set larger in proportion to leakage loss due to the roughness of the surface to be grabbed, piping imperfections, and other relevant factors.

* Suction force can be ensured by increasing vacuum when the vacuum cup area is not large enough. Likewise, the vacuum can be lowered when the area of the vacuum cup is larger.

(b) Volume of Piping

The volume of piping, V, is the total of the inner volume of pipes and the vacuum cup.

$$V=V1 \text{ (Inner volume of pipes) } + V2 \text{ (Inner volume of vacuum cup:100 cm}^3\text{)}$$

$$\text{(I.D. of 1 1/2\"B is 4.16 cm)}$$

$$V = \pi \times \left(\frac{4.16}{2} \right)^2 \times 300 + 100 = 4175 \text{ cm}^3 \text{ (4.2 L)}$$

Size, inside diameter, and cross section area of pipes are as below:

Pipe		Inside Diameter cm	Cross Section cm ²	Pipe		Inside Diameter cm	Cross Section cm ²
A	B			A	B		
6	1/8	0.65	0.332	40	1 1/2	4.16	13.585
8	1/4	0.92	0.664	50	2	5.29	21.968
10	3/8	1.27	1.266	65	2 1/2	6.79	36.192
15	1/2	1.61	2.035	80	3	8.07	51.123
20	3/4	2.16	3.662	90	3 1/2	9.32	68.187
25	1	2.76	5.980	100	4	10.53	87.042
32	1 1/4	3.57	10.005	125	5	13.08	134.303

From the above, time required to grab object (0.60 s), operational vacuum (50 kPa), and piping inner volume (4.2 L) are determined. A suitable pump model can be chosen based on the operational vacuum, the grabbing time (the time till operational vacuum is attained), and the piping inner volume. In this case, the operational vacuum is 50 kPa, therefore, graph 2 on page 10 must be referenced. First, seek the intersection of the required time till the operational vacuum is attained (grab time) and the piping inner volume. Then a model whose line appears above that point would be selected. In this example, **KRF40A** would be a suitable choice.



Selection of Suitable Pump

(c) Selection may also be done from calculations and pump performance charts. Below is an example using the same case as (b).

$$\text{Equation (ii)} \quad S = \frac{138.2 \times V}{\Delta t} \times \log \frac{P_0 - P_1}{P_0 - P_2}$$

S: Flow demand (L/min)

V: Piping inner volume 4.2 L

Δt: Time to grab 0.6 s

P0: Ultimate vacuum of pump 90 kPa

90 kPa

P1: Initial pressure inside pipes 0 kPa

0 kPa

P2: Vacuum (Suction force) 50 kPa

50 kPa

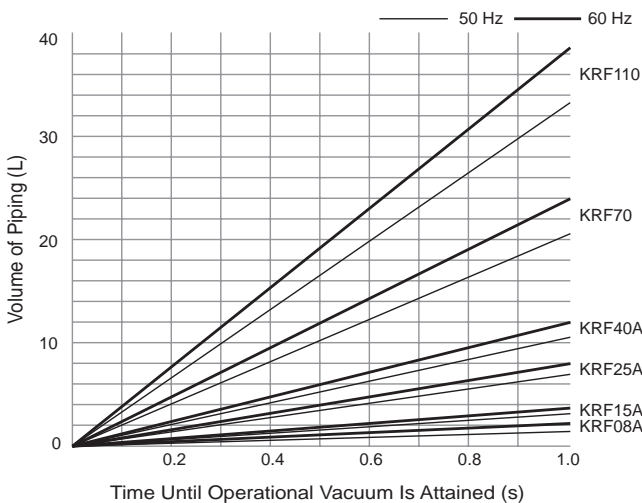
341 L/min is figured from the above.

From the above equation we conclude that the required flow demand is 341 L/min.

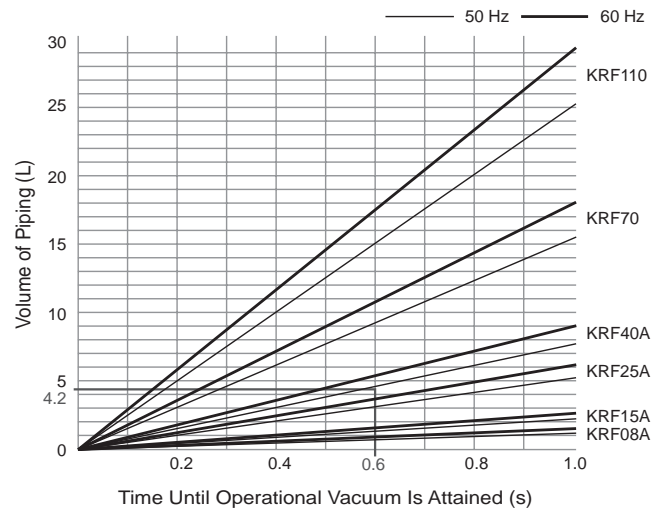
On the vacuum performance graph (Graph 5) we select the point at the intersection of the flow rating of 341 and on the horizontal axis, the midpoint between P1 and P2, which is 25. The nearest line above this point indicates **KRF40A** is a suitable model.

Graphs for Pump Selection

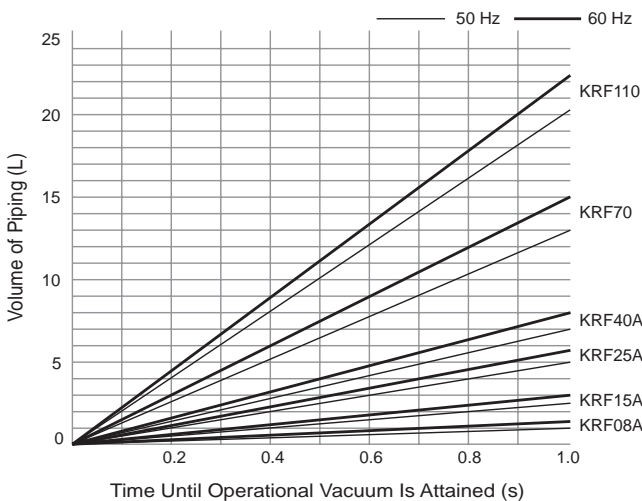
Graph 1 (at 40 kPa)



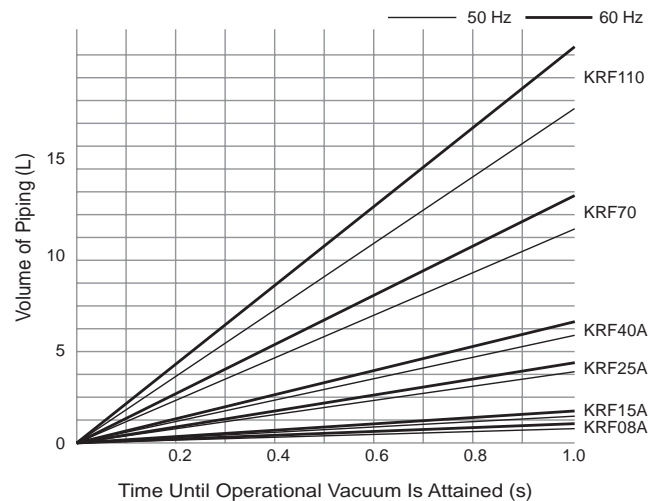
Graph 2 (at 50 kPa)



Graph 3 (at 55 kPa)



Graph 4 (at 60 kPa)



Regarding Pressure Loss

■ **Total pressure loss of piping (ΣP_i)**

$$\Sigma P_i = p_1 + p_2 + p_3 + p_4 + \dots + p_n \quad p_i: \text{pressure loss of each pipe}$$

■ **Pressure loss of each section (each piping size) $P_i = 7.15 \times L \times Q^2 \div D^5$**

p_i : Pressure loss of each pipe. (kPa)

L : Piping Length (m)

The pressure loss is in proportion to the length of the piping.

Calculate the piping length from the piping layout.

Q : Flow rate through the piping (L/min)

the pressure loss will be in proportion to the square of the flow rate. The flow rate is regarded as the air capacity of the selected vacuum pump at 0 kPa.

D : Inner diameter of the piping (diameter) (mm)

The pressure loss is inversely proportional to the inner diameter of the piping raised to the fifth power. when the inner diameter becomes larger, pressure loss is greatly reduced.

2. When there is pressure drop and a vacuum controller is not used.

Influences from various conditions must be considered in choosing an appropriate pump. Plain and simple methods are described here with examples of typical applications.

S : Flow demand (L/min)

V : Piping inner volume (L)

Δt : Time to grab 0.6 s

P_0 : Ultimate vacuum of pump (kPa)

P_1 : Initial pressure inside pipes (kPa)

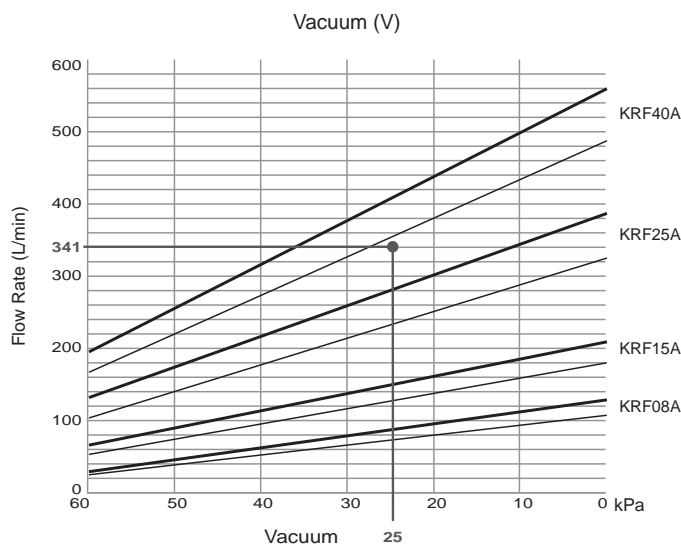
P_2 : Vacuum (suction force) (kPa)

$$S = \frac{138.2 \times V}{\Delta t} \times \log \frac{P_0 - P_1}{P_0 - P_2}$$

Even though the calculation is the same as in equation (ii), S -flow demand is not defined in the same way. Please refer to the table below.

Vacuum Control Is Used		
S	No pressure loss	With pressure loss
	At intermediate point between P_1 and P_2	At intermediate point between pressure drop and P_2
Vacuum Controller Is Not Used		
S	No pressure loss	With pressure loss
	At P_1	At pressure drop

Graph 5 (Performance curve)





Model List

Standard Accessory (Sold Separately)

Note: Please refer to product page in this catalog for further product specifications and information.

Model	Pump No.	Vacuum Use (V)	Blower Use (B)	Vacuum & Blower (VB)	Drive		Compound Gauge		Main equipment							
					Separated	Direct-coupled	Type D	Type A	Vacuum Controller	Pressure Controller	Filter Case	Oil Separator	Water Separator	Clean Filter	After Cooler	Vacuum Switch
Compact Standard Model KRF	04A-V-01/02A								VC32		RA-05A-V,05A-M	RA31	RA41	RA53S		
	04A-B-01/02A									PC32	RA-05A-S,05A-B			RA53D		
	04A-VB-01/02A								VC32	PC32	RA-05A-V,05A-B	RA31	RA41	RA53S,D		
	08A-V-01/02A								VC32		SDF25 (V)	RA31	RA41	RA53S		
	08A-B-01/02A									PC32	SDF15 (B)			RA53D		
	08A-VB-01/02A								VC32	PC32	SDF25 (VB)	RA31	RA41	RA53S,D		
Compact KM	KM41A-101								VC10							
Standard Model KRF	15A-V-01A/02/04								VC63		SDF25 (V)	RA31	RA41	RA53S		
	15A-B-01A/02/04									PCA6	SDF15 (B)			RA53D		
	15A-VB-01A/02/04								VC63	PCA6	SDF15 (VB)	RA31	RA41	RA54D		
	25A-V-01B/02/04B								VC63		SDF25 (V)	RA31	RA41	RA54S		
	25A-B-01B/02/04B									PCA6	SDF25 (B)			RA54D		
	25A-VB-01B/02/04B								VC63	PCA6	SDF15 (VB)	RA31	RA41	RA54S,D		
	40A-V-01B/04B								VC63B		SDF40 (V)	RA31	RA41	RA55S		
	40A-B-01B/04B									PCA6	SDF40 (B)			RA55D		
	40A-VB-01B/04B								VC63B	PCA6	SDF40 (VB)	RA31	RA41			
Heavy Duty Standard Model KRF	70-V-01B/04B								VC81		VFF70 MFF70	RA32	RA42	RA56S		
	70-B-01B/04B									PCA8	SFF70 PSF70			RA56D		
	70-VB-01B/04B								VC81	PCA8	VFF70 PSF70	RA32	RA42	RA56S,D		
	70-VH-01B/04B								VC81		VFF70 MFF70H	RA32	RA42	RA56S		
	70-BH-01B/04B									PCA8	SFF70 PSF70H			RA56D		
	70-VBH-01B/04B								VC81	PCA8	VFF70 PSF70H	RA32	RA42	RA56S,D		
	110-V-01B/04B								VC100B		VFF110 MFF110			RA57S		
	110-B-01B/04B									PCA10	SFF110 PSF110			RA57D		
		110-VB-01B/04B								VC100B	PCA10	VFF110 PSF110			RA57S,D	
Combination Pump CBF	1515-VB-01B/04B	1							VC63		SDF25 (V)	RA31	RA41	RA53S		
		2								PCA6	SDF15 (B)			RA53D		
	1515-VBVB-01B/04B	1							VC63	PCA6	SDF25 (VB)	RA31	RA41	RA53S,D		
		2							VC63	PCA6	SDF25 (VB)	RA31	RA41	RA53S,D		
	1515-VV-01B	1, 2							VC63		SDF25 (V)	RA31	RA41	RA53S		
	1515-BB-01B	1, 2								PCA6	SDF15 (B)			RA53D		
	2525-VB-01B/04B	1							VC63		SDF25 (V)	RA31	RA41	RA54S		
		2								PCA6	SDF25 (B)			RA54D		
	2525-VBVB-01B/04B	1							VC63	PCA6	SDF25 (VB)	RA31	RA41	RA54S,D		
		2							VC63	PCA6	SDF25 (VB)	RA31	RA41	RA54S,D		
	2525-VV-01B	1, 2							VC63		SDF25 (V)	RA31	RA41	RA54S		
	2525-BB-01B	1, 2								PCA6	SDF25 (B)			RA54D		
	4040-VB-01B/04B	1							VC63B		SDF40 (V)	RA31	RA41	RA55S		
		2								PCA6	SDF40 (B)			RA55D		
	4040-VBVB-01B/04B	1							VC63B	PCA6	SDF40 (VB)	RA31	RA41	RA55S,D		
2								VC63B	PCA6	SDF40 (VB)	RA31	RA41	RA55S,D			
4040-VV-01B	1, 2							VC63B		SDF40 (V)	RA31	RA41	RA55S			
4040-BB-01B	1, 2								PCA6	SDF40 (B)			RA55D			

Model		Pump No.	Vacuum Use (V)	Blower Use (B)	Vacuum & Blower (VB)	Drive		Compound Gauge		Main equipment							
						Separated	Direct-coupled	Type D	Type A	Vacuum Controller	Pressure Controller	Filter Case	Oil Separator	Water Separator	Clean Filter	After Cooler	Vacuum Switch
Combination Pump CBX	62-01B-G1	1								VC81		VFS8A MFS8A	RA32	RA42	RA56S		
		2									PCA8	SFS8A PSS8A			RA56D	DA61	
	62-A-01B-G1	1								VC81	PCA8	VFS8A PSS8A	RA32	RA42	RA56S • D	DA61	
		2								VC81	PCA8	SFS8A PSS8A	RA32	RA42	RA56S • D	DA61	
	62-N-01B-G1	1								VC81		VFS8A MFS8A	RA32	RA42	RA56S		
		2								VC81		VFS8A MFS8A	RA32	RA42	RA56S		
Combination Pump One-Package CBXP	6070A-VB-02B	1								VC81		VFS8A MFS8A	RA32	RA42	RA56S		
		2									PCA8	SFS8A PSS8A			RA56D		
	8080B-VB-02B/03B	1								VC81		VFS8A MFF70	RA32	RA42	RA56S		
		2									PCA10	SFS8A PSF70			RA57D		
	90110B-VB-02B/03B	1								VC100A		VFS8A MFF70	RA32		RA57S		
		2									PCA10	SFF110 PSF110					
	6060A-VV-02B	1,2								VC81		VFS8A MFS8A	RA32	RA42	RA56S		
	8080B-VV-02B/03B	1,2								VC81		VFS8A MFF70	RA32	RA42	RA56S		
	9090B-VV-02B/03B	1,2								VC100A		VFS8A MFF70	RA32		RA57S		
	110110B-VV-02B/03B	1,2								VC100B		VFF110 MFF110					
	6060A-BB-02B	1,2									PCA8	SFS8A PSF8A			RA56D		
	8080B-BB-02B/03B	1,2									PCA8	SFS8A PSF70			RA56D		
9090B-BB-02B/03B	1,2									PCA10	SFS8A PSF70			RA57D			
110110B-BB-02B/03B	1,2									PCA10	SFF110 PSF110						
Direct Coupled Motor High Vacuum KHF	08-VH-01									VC32 *2			RA31		RA53S		
	14-V-01									VC63 *3			RA31		RA53S		
	20-V-01B									VC63 *3			RA31		RA54S		
High Vacuum KHA	100-301-G1									VC32 *1			RA31		RA53S		
	200-301A-G1									VC32 *2			RA31		RA53S		
	400-301A-G1									VC63 *2		RA-05A-V	RA31		RA53S		
	750-301B-G1									VC63 *2		RA-05A-V	RA31		RA54S		
High Vacuum KHH	251-101											RA31					

Model List

*1 Adjustable range of vacuum : 28 to 48 kPa [abs]. *2 Adjustable range of vacuum : 21 to 48 kPa [abs]. *3 Adjustable range of vacuum : 21 kPa [abs] and over. *Please note that there may be different part numbers for parts with the same part name.



Compact Standard Pump KRF Series



Safety Enhanced Design • Low Noise • Long Life • Environmentally Friendly

Continuous Operating Vacuum

KRF04A: max. 55 kPa
KRF08A: Recomm. 60 kPa or below (max. 75 kPa)

Continuous Operating Pressure

KRF04A: max. 50 kPa
KRF08A: Recomm. 60 kPa or below (max. 70 kPa)

Flow Rate: 75 to 155 L/min (60 Hz)

CE Marking Certified *1



KRF04A-V-01



KRF08A-V-01

Features

- Safe and Environmentally Conscious -- CE Marking Certified *1
- Low Noise -- Reduced-Noise Design is quieter by 2 to 5 dB. (Compared with our earlier models)
- Long Life -- New blade material yields an increase in lifespan of 20%. (Compared with our earlier models)

Applications

- Vacuum Source for automation equipment, analysis equipment, packaging machines, printing equipment, book making equipment, etc.

Specifications

□ Single-Phase Motor ■ 3-Phase Motor

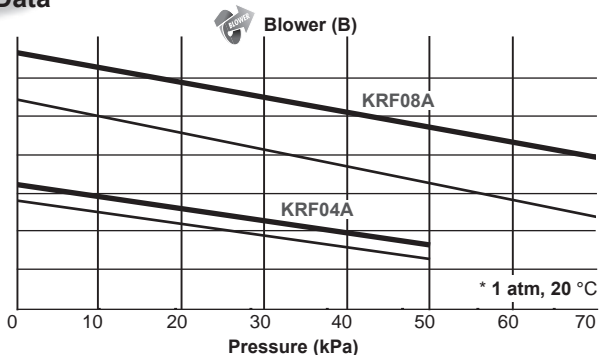
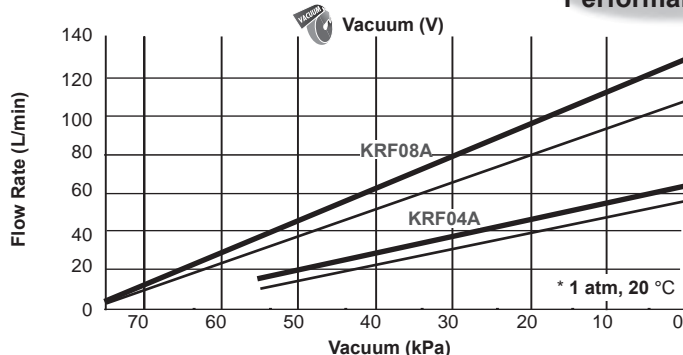
Model	Designed Pumping Capacity		Ultimate Vacuum		Continuous Operating Vacuum		Continuous Operating Pressure		Piping Connection Size	Voltage						Standard Motor Current Rating A				Noise Level		Motor	Mass		
	L/min *2		kPa(min.) *3		kPa (max.) *4		kPa (max.) *4			Single-Phase (02A)			3-Phase (01)			Single-Phase (02A)		3-Phase (01)		dB*6			kW	kg	
	50 Hz	60 Hz	50 Hz	60 Hz	Recom.	Max.	Recom.	Max.		100 V	200 V	220 V	100 V	200 V	220 V	200 V	220 V	50 Hz	60 Hz	50 Hz	60 Hz			Single-Phase	3-Phase
KRF04A-□-□																									
V-01	63	75	70	75	55	—	—	Rc 3/8	—	○	○	—	—	—	0.69/0.6	0.62	61	63	0.1	—	10.5				
V-02A	63	75	70	75	55	—	—	Rc 3/8	○	—	—	1.9/1.7	1.0/0.9	—	—	—	61	63	0.1	12	—				
V-04	63	75	70	75	55	—	—	Rc 3/8	○	○	○	0.34	0.35	0.30	0.31	0.32	61	63	0.1	—	10.5				
B-01	63	75	—	—	—	50	—	Rc 3/8	—	○	○	—	—	0.69/0.6	0.62	—	61	64	0.1	—	10.5				
B-02A	63	75	—	—	—	50	—	Rc 3/8	○	—	—	1.9/1.7	1.0/0.9	—	—	—	61	64	0.1	12	—				
B-04	63	75	—	—	—	50	—	Rc 3/8	○	○	○	0.34	0.35	0.30	0.31	0.32	61	64	0.1	—	10.5				
VB-01	63	75	—	—	55 or less altogether		—	Rc 3/8	—	○	○	—	—	0.69/0.6	0.62	—	61	63	0.1	—	10.5				
VB-02A	63	75	—	—	55 or less altogether		—	Rc 3/8	○	—	—	1.9/1.7	1.0/0.9	—	—	—	61	63	0.1	12	—				
VB-04	63	75	—	—	55 or less altogether		—	Rc 3/8	○	○	○	0.34	0.35	0.30	0.31	0.32	61	63	0.1	—	10.5				
KRF08A-□-□																									
V-01	135	155	78	78	60	75	—	Rc 3/4	—	○	○	—	—	1.3/1.1	1.1	—	60	61	0.2	—	14				
V-02A	135	155	78	78	60	75	—	Rc 3/4	○	—	—	3.3/2.9	1.7/1.5	—	—	—	60	61	0.2	15.5	—				
V-04	135	155	79	79	60	75	—	Rc 3/4	○	○	○	0.62	0.64	0.65	0.55	0.57	0.58	60	61	0.2	—	14			
B-01	135	155	—	—	—	60	70	Rc 3/4	—	○	○	—	—	1.3/1.1	1.1	—	64	67	0.2	—	14				
B-02A	135	155	—	—	—	60	70	Rc 3/4	○	—	—	3.3/2.9	1.7/1.5	—	—	—	64	67	0.2	15.5	—				
B-04	135	155	—	—	—	60	70	Rc 3/4	○	○	○	0.62	0.64	0.65	0.55	0.57	0.58	64	67	0.2	—	14			
VB-01	135	155	—	—	75 or less altogether		—	Rc 3/4	—	○	○	—	—	1.3/1.1	1.1	—	60	61	0.2	—	14				
VB-02A	135	155	—	—	75 or less altogether		—	Rc 3/4	○	—	—	3.3/2.9	1.7/1.5	—	—	—	60	61	0.2	15.5	—				
VB-04	135	155	—	—	Total: sugg. 60, max.75		—	Rc 3/4	○	○	○	0.62	0.64	0.65	0.55	0.57	0.58	60	61	0.2	—	14			

*1 Models with single phase motors and models without motors are excluded. *2 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *3 Operation not allowed at ultimate vacuum. For model selection purposes only. *4 Operable range of vacuum (pressure). *5 "04" models are special order items. *6 Operating noise values are based on a new unit equipped with the standard Orion motor, and running at the standard operating vacuum / pressure. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Operating environment (intake air) conditions: Temperature: 0 to 40 °C, humidity: normal (65±20%). * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). Setting guideline (may vary depending on the specific application): KRF04A-□-01 models: 200 V / 50 Hz @ 0.8 A, 200 V / 60 Hz and 220 V / 60 Hz @ 0.7 A. KRF04A-V-02A/B-02A models: 100 V / 50 Hz @ 2.1 A, 100 V / 60 Hz @ 1.7 A, 200 V / 50 Hz @ 1.1 A, 200 V / 60 Hz @ 0.9 A. KRF04A-VB-02A models: 100 V / 50 Hz @ 2.2 A, 100 V / 60 Hz @ 1.7 A, 200 V / 50 Hz @ 1.2 A, 200 V / 60 Hz @ 0.9 A. KRF08A-□-01 models: 200 V / 50 Hz @ 1.7 A, 200 V / 60 Hz and 220 V / 60 Hz @ 1.4 A. KRF08A-V-02A models: 100 V / 50 Hz @ 3.3 A, 100 V / 60 Hz @ 2.9 A, 200 V / 50 Hz @ 1.7 A, 200 V / 60 Hz @ 1.5 A. KRF08A-B-02A/VB-02A models: 100 V / 50 Hz @ 3.3 A, 100 V / 60 Hz @ 3.2 A, 200 V / 50 Hz @ 1.7 A, 200 V / 60 Hz @ 1.7 A.

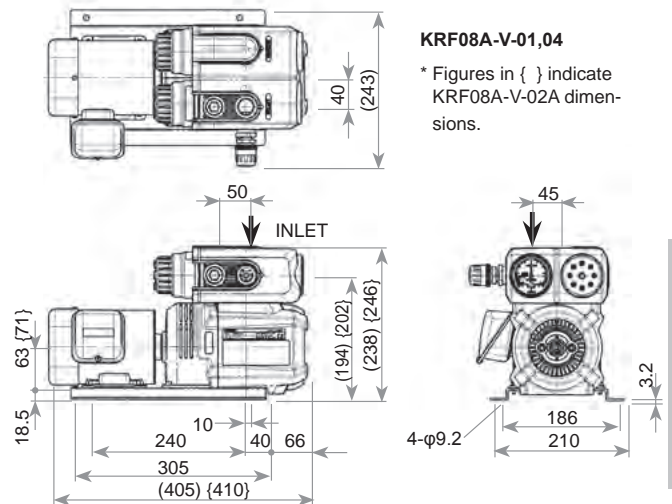
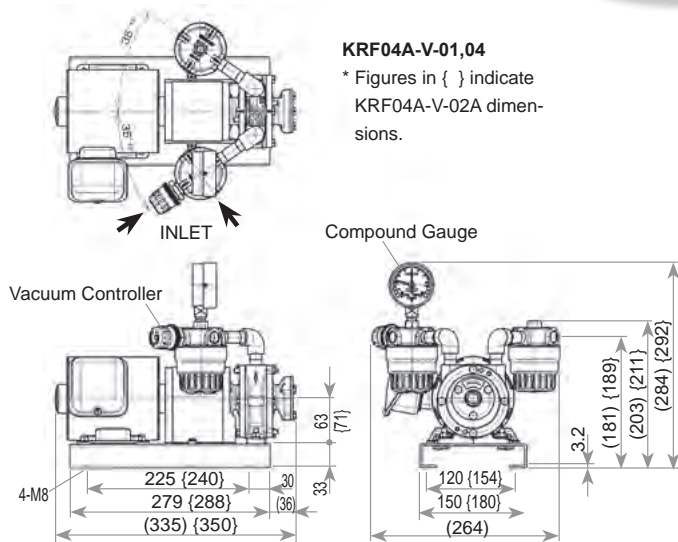
* See specifications sheet for further details.

Performance Data

(— 50 Hz — 60 Hz)



External Dimensions (Units:mm)



Compact Standard Pump
KRF Series
Compact KM Series

Compact KM Model

Continuous Operating Vacuum:
55 kPa or lower

Flow Rate:
29 L/min (60 Hz)

KM41A-101-G1

KM Features

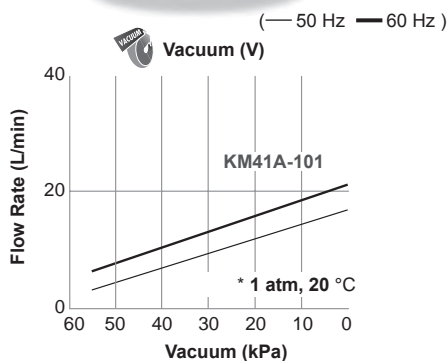
- Can be hooked up directly to rubber or vinyl hoses.

KM Specifications

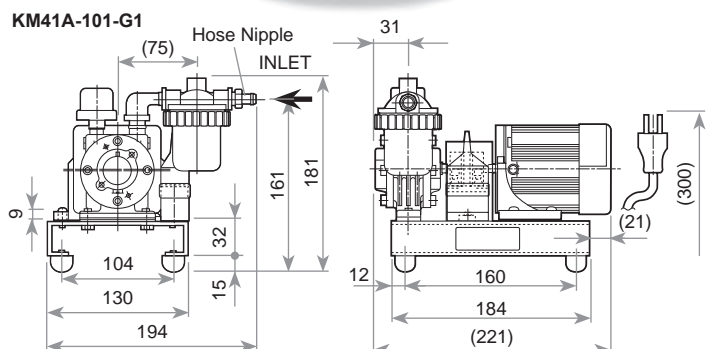
Model	Designed Pumping Capacity		Ultimate Vacuum		Continuous Operating Vacuum	Piping Connection Size	Voltage				Standard motor current rating				Noise Level		Motor	Mass	
							A		A		dB*4		kg						
	L/min *1		kPa (min.) *2		kPa (max.) *3	Hose nipple Outside diameter : φ10	Single phase	3 phase	Single phase	3 phase	50 Hz	60 Hz	kW	Single-Phase	3-Phase				
	50 Hz	60 Hz	50 Hz	60 Hz			100 V	100/200 V	200 V	220 V	100 V	200 V		200 V	220 V	50 Hz	60 Hz	Single-Phase	3-Phase
KM41A-101-G1	24	29	67	75	55	Hose nipple Outside diameter : φ10	○	—	—	—	1.1/ 1.2	—	—	—	60	61	0.06	4.6	—

*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Operation not allowed at ultimate vacuum. For model selection purposes only. *3 Operable range of vacuum (pressure). *4 Operating noise measured on a new pump with an ORION recommended motor running at normal vacuum/pressure conditions. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * A compound gauge and vacuum controller are not included as standard equipment. Install a compound gauge and vacuum controller VC10 on the vacuum piping before the filter and use at a normal degree of vacuum. * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. *Please install an overload protection device (such as a thermal relay). Setting guideline: Use the current rating listed on the motor nameplate as a guide. * See specifications sheet for further details.

Performance Data



External Dimensions (Units:mm)





Standard Pump KRF Series



Safety Enhanced Design • Low Noise • Long Life • Environmentally Friendly

Continuous Operating Vacuum

Recomm. 60 kPa or less (max. 80 kPa)

Max 75 kPa for KRF15A

Continuous Operating Pressure

Recomm. 60 kPa or less (max. 70 kPa)

Flow Rate

280 to 685 L/min (60 Hz)

CE Marking Certification *1



KRF40A-V-01B

Features

- Safe and Environmentally Conscious -- CE Marking Certified *1
- Quiet Operation -- Noise level reduced by 3 dB (compared with conventional models)
- Long Life -- Increased 30% with newly developed vane blade material. (compared with conventional models)

Applications

- Vacuum source for printing machines, book binding, automated machines, packaging machines, etc.

Specifications

□ Single-Phase Motor □ 3-Phase Motor

Model	Designed Pumping Capacity		Ultimate Vacuum		Continuous Operating Vacuum		Continuous Operating Pressure		Piping Connection Size	Voltage						Standard motor current rating A		Noise Level	Motor	Mass			
	L/min*2	60 Hz	kPa*3	60 Hz	Recom.	Max.	Recom.	Max.		Single-Phase (02)		3-Phase (01B)		Single-Phase (02)		3-Phase (01B)				kg	Single-Phase	3-Phase	
	50 Hz	60 Hz	50 Hz	60 Hz						100/200 V		200 V	220 V	100 V	200 V	200 V	220 V						
										50/60 Hz		60 Hz		50/60 Hz		60 Hz							
										3-Phase (04B)*5						3-Phase (04B)*5							
										380 V	400 V	415 V	400 V	440 V	460 V	380 V	400 V	415 V	400 V	440 V	460 V		
										50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz		

KRF15A-□-□

V-01A	235	280	84	86	60	75	—	—	Rc 3/4	—	○	○	—	2.29/2.08	1.99	60	62	0.4	—	17
V-02	235	280	84	86	60	75	—	—	Rc 3/4	○	—	—	6.8/6.0	3.4/3.0	—	62	64	0.4	21	—
V-04	235	280	84	86	60	75	—	—	Rc 3/4	○	○	—	1.1	1.0	—	60	62	0.4	—	20
B-01A	235	280	—	—	—	—	60	70	Rc 3/4	—	○	○	—	2.29/2.08	1.99	64	65	0.4	—	17
B-02	235	280	—	—	—	—	60	70	Rc 3/4	○	—	—	6.8/6.0	3.4/3.0	—	64	65	0.4	21	—
B-04	235	280	—	—	—	—	60	70	Rc 3/4	○	○	○	1.1	1.0	—	64	65	0.4	—	20
VB-01A	235	280	—	—	Total: sugg. 60, max. 75				Rc 3/4	—	○	○	—	2.29/2.08	1.99	60	62	0.4	—	17
VB-02	235	280	—	—	Total: sugg. 60, max. 75				Rc 3/4	○	—	—	6.8/6.0	3.4/3.0	—	62	64	0.4	21	—
VB-04	235	280	—	—	Total: sugg. 60, max. 75				Rc 3/4	○	○	○	1.1	1.0	—	60	62	0.4	—	20

KRF25A-□-□

V-01B	405	480	86	90	60	80	—	—	Rc 3/4	—	○	○	—	3.99/3.47	3.49	62	64	0.75	—	29
V-02	405	480	86	90	60	80	—	—	Rc 3/4	○	—	—	11.0/10.4	5.5/5.2	—	64	66	0.75	32	—
V-04B	405	480	86	90	60	80	—	—	Rc 3/4	○	○	○	2.0	1.9	1.7	62	64	0.75	—	34
B-01B	405	480	—	—	—	—	60	70	Rc 3/4	—	○	○	—	3.99/3.47	3.49	65	67	0.75	—	29
B-02	405	480	—	—	—	—	60	70	Rc 3/4	○	—	—	11.0/10.4	5.5/5.2	—	67	69	0.75	32	—
B-04B	405	480	—	—	—	—	60	70	Rc 3/4	○	○	○	2.0	1.9	1.7	65	67	0.75	—	34
VB-01B	405	480	—	—	Total: sugg. 60, max. 80				Rc 3/4	—	○	○	—	3.99/3.47	3.49	62	64	0.75	—	29
VB-02	405	480	—	—	Total: sugg. 60, max. 80				Rc 3/4	○	—	—	11.0/10.4	5.5/5.2	—	64	66	0.75	32	—
VB-04B	405	480	—	—	Total: sugg. 60, max. 80				Rc 3/4	○	○	○	2.0	1.9	1.7	62	64	0.75	—	34

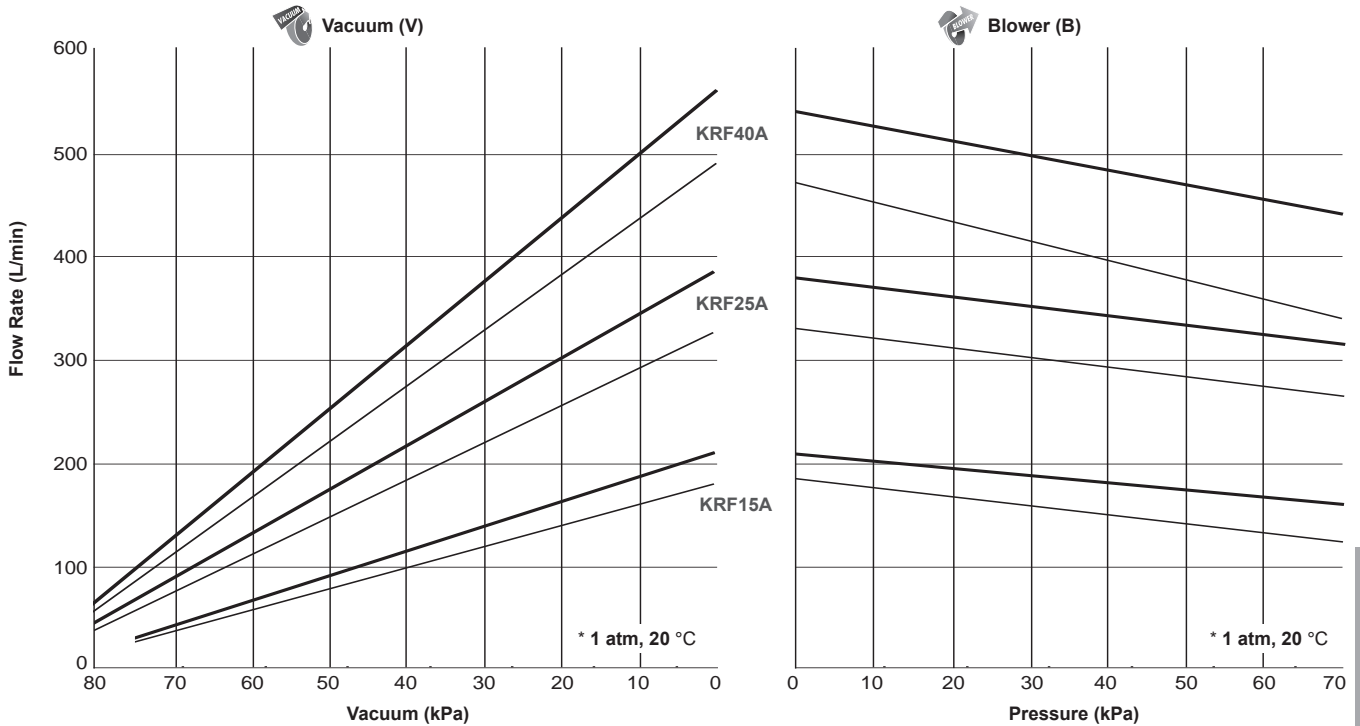
KRF40A-□-□

V-01B	575	685	86	90	60	80	—	—	Rc 3/4	—	○	○	—	5.19/4.71	4.57	66	67	1.1	—	35
V-04B	575	685	86	90	60	80	—	—	Rc 3/4	○	○	○	3.5	3.4	2.5	66	67	1.5	—	43
B-01B	575	685	—	—	—	—	60	70	Rc 3/4	—	○	○	—	5.19/4.71	4.57	68	70	1.1	—	35
B-04B	575	685	—	—	—	—	60	70	Rc 3/4	○	○	○	3.5	3.4	2.5	68	70	1.5	—	43
VB-01B	575	685	—	—	Total: sugg. 60, max. 80				Rc 3/4	—	○	○	—	5.19/4.71	4.57	66	67	1.1	—	35
VB-04B	575	685	—	—	Total: sugg. 60, max. 80				Rc 3/4	○	○	○	3.5	3.4	2.5	66	67	1.5	—	43

*1 Except for KRA. CE Marking is available for KRF15A with three - phase motor as a special specification product. *2 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *3 Operation not allowed at ultimate vacuum. For model selection purposes only. *4 Operable range of vacuum (pressure). *5 "04" models are special order items. *6 Operating noise measured on a new pump with an ORION recommended motor running at the recommended vacuum/pressure conditions. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). * See specifications sheet for further details.

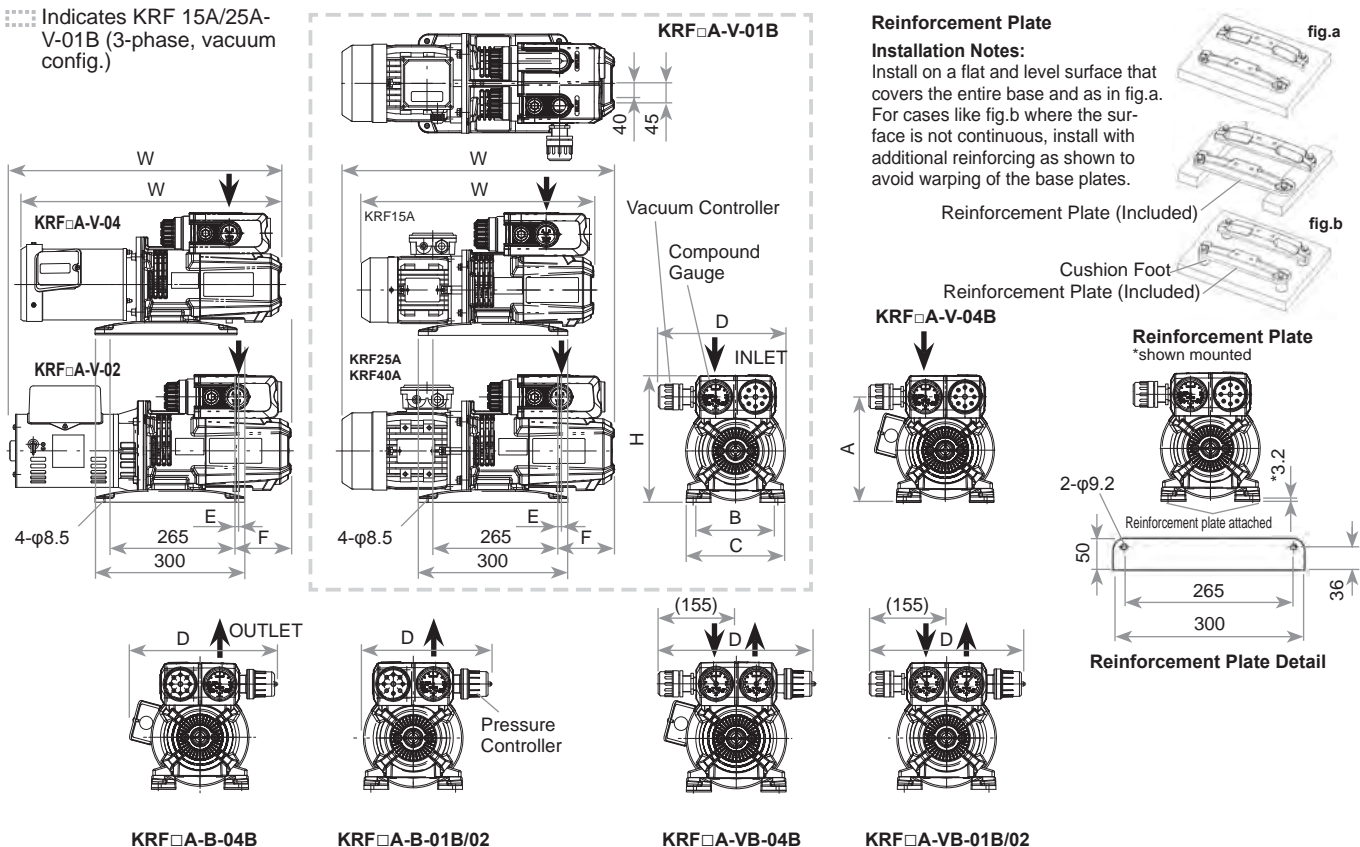
Performance Data

(— 50 Hz — 60 Hz)



External Dimensions (Units:mm)

⋮ Indicates KRF 15A/25A-V-01B (3-phase, vacuum config.)

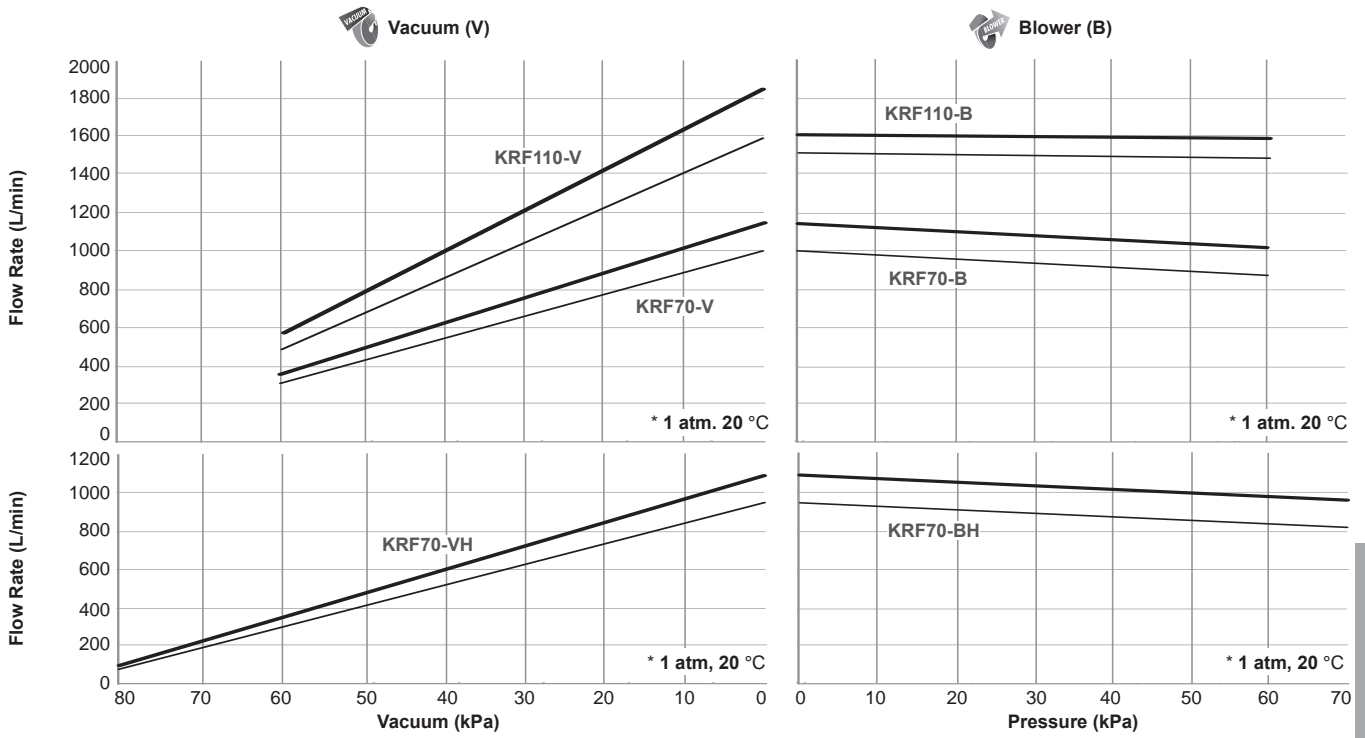


Model	H	D	W	A	B	C	E	F
KRF15A-V-01A, 02, 04	(248)	(249)	01A (466), 02 (484), 04 (486)	(203)	160	188	(26)	(70)
KRF15A-B-01A, 02, 04	(248)	01A (251), 02 (251), 04 (291)	01A (466), 02 (484), 04 (486)	(203)	160	188	(26)	(70)
KRF15A-VB-01A, 02, 04	(248)	(312)	01A (466), 02 (484), 04 (486)	(203)	160	188	(26)	(70)
KRF25A-V-01B, 02, 04B	(257)	(254)	01B (533), 04B (533), 02 (564)	(212)	170	198	(1)	(111)
KRF25A-B-01B, 02, 04B	(257)	01B (258), 04B (314), 02 (258)	01B (533), 04B (533), 02 (564)	(212)	170	198	(1)	(111)
KRF25A-VB-01B, 02, 04B	(255)	(312)	01B (533), 04B (533), 02 (564)	(212)	170	198	(1)	(111)
KRF40A-V-01B, 04B	(269)	(254)	01B (615), 04B (615)	(224)	170	198	(43)	(167)
KRF40A-B-01B, 04B	(269)	(257)	01B (615), 04B (615)	(224)	170	198	(43)	(167)
KRF40A-VB-01B, 04B	(269)	(312)	01B (615), 04B (615)	(224)	170	198	(43)	(167)

Standard Pump
KRF Series

Performance Data

(— 50 Hz — 60 Hz)

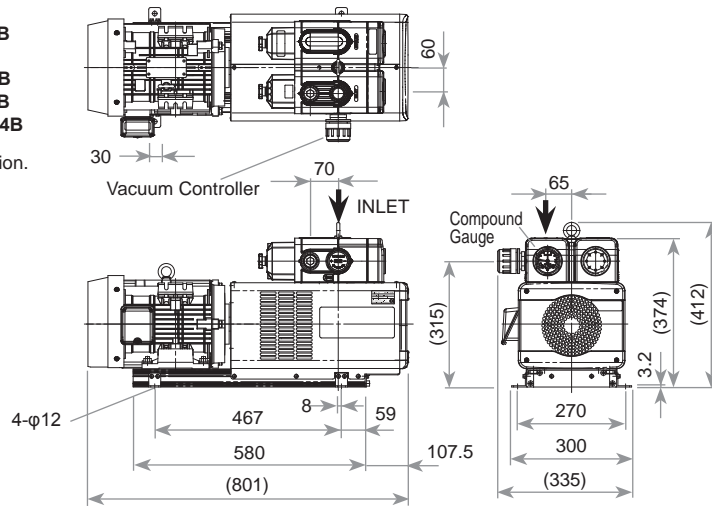


Standard Pump
KRF Series -- Heavy Duty Model

External Dimensions (units: mm)

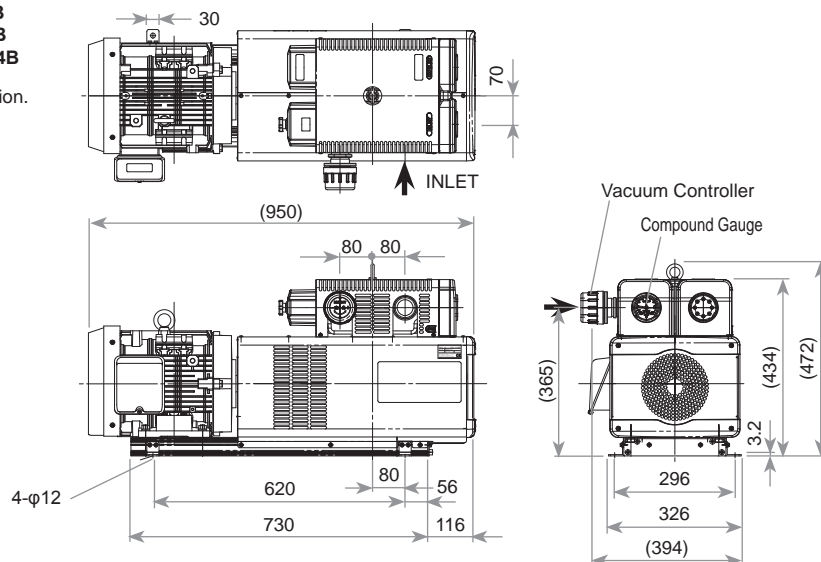
- KRF70-V-01B,04B
- KRF70-VH-01B,04B
- KRF70-B-01B,04B
- KRF70-BH-01B,04B
- KRF70-VB-01B,04B
- KRF70-VBH-01B,04B

*Diagrams are for vacuum configuration.



- KRF110-V-01B,04B
- KRF110-B-01B,04B
- KRF110-VB-01B,04B

*Diagrams are for vacuum configuration.





Combination Pump CBF Series



Safety Enhanced Design • Low Noise • Long Life • Environmentally Friendly

- Continuous Operating Vacuum
Recomm. 60 kPa or less (V Type)
- Continuous Operating Pressure
Recomm. 60 kPa or less (B Type)
- Continuous Combined Operating Vacuum & Pressure
Total Combined Vacuum & Pressure 60 kPa or less (VB•VB Type)
- Flow Rate
280 to 685 L/min (60 Hz)
- CE Marking Certification



CBF4040-VB

Features

- Safe and Environmentally Conscious -- CE Marking Certified
- Quiet Operation -- Noise level reduced by 3 dB (compared with conventional models)
- Long Life -- Increased 30% with newly developed vane blade material. (Compared with conventional models)

Applications

- Vacuum source for printing equipment, book making equipment, packaging equipment, automation equipment, etc.

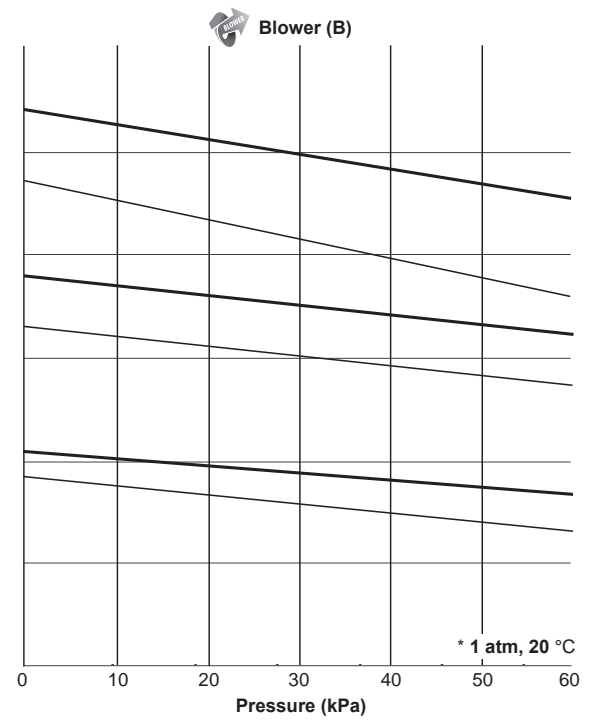
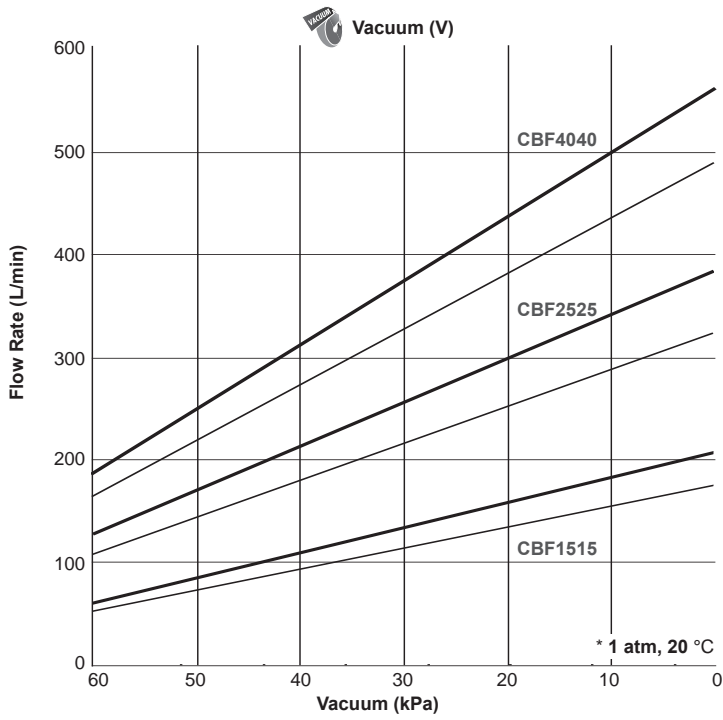
Specifications

Model	Designed Pumping Capacity				Continu-ous Operat-ing Vacuum	Continu-ous Operat-ing Pressure	Continuous Combined Operating Vacuum & Pressure		Piping Connection Size	Voltage						Standard Motor Current Rating A						Noise Level	Motor	Mass
										3-Phase (01B)			3-Phase (01B)			3-Phase (04B)*3			3-Phase (04B)*3					
	L/min*1		kPa (max.)*2							kPa (max.)*2		kPa								dB*4				
Pump 1		Pump 2				Recom. Max.																		
CBF1515-□-□																								
VB-01B	235 (V)	280 (V)	235 (B)	280 (B)	60	60	—	—	Rc3/4	○	○	○	○	3.8/3.4	3.4	3.4	62	63	0.75	37				
VB-04B	235 (V)	280 (V)	235 (B)	280 (B)	60	60	—	—	Rc3/4	○	○	○	○	2.0	1.9/1.7	1.9	1.7	1.7	62	63	0.75	37		
VBVB-01B	235 (V, B)	280 (V, B)	235 (V, B)	280 (V, B)	—	—	*5	*6	Rc3/4	○	○	○	○	3.8/3.4	3.4	3.4	65	66	0.75	37				
VBVB-04B	235 (V, B)	280 (V, B)	235 (V, B)	280 (V, B)	—	—	—	—	Rc3/4	○	○	○	○	2.0	1.9/1.7	1.9	1.7	1.7	65	66	0.75	37		
VV-01B	235 (V)	280 (V)	235 (V)	280 (V)	60	—	—	—	Rc3/4	○	○	○	○	3.8/3.4	3.4	3.4	61	62	0.75	37				
BB-01B	235 (B)	280 (B)	235 (B)	280 (B)	—	60	—	—	Rc3/4	○	○	○	○	3.8/3.4	3.4	3.4	65	66	0.75	37				
CBF2525-□-□																								
VB-01B	405 (V)	480 (V)	405 (B)	480 (B)	60	60	—	—	Rc3/4	○	○	○	○	6.8/6.4	6.0	6.0	64	67	1.5	52				
VB-04B	405 (V)	480 (V)	405 (B)	480 (B)	60	60	—	—	Rc3/4	○	○	○	○	3.5	3.4/3.2	3.4	3.0	3.0	64	67	1.5	52		
VBVB-01B	405 (V, B)	480 (V, B)	405 (V, B)	480 (V, B)	—	—	*5	*6	Rc3/4	○	○	○	○	6.8/6.4	6.0	6.0	67	70	1.5	52				
VBVB-04B	405 (V, B)	480 (V, B)	405 (V, B)	480 (V, B)	—	—	—	—	Rc3/4	○	○	○	○	3.5	3.4/3.2	3.4	3.0	3.0	67	70	1.5	52		
VV-01B	405 (V)	480 (V)	405 (V)	480 (V)	60	—	—	—	Rc3/4	○	○	○	○	6.8/6.4	6.0	6.0	63	66	1.5	52				
BB-01B	405 (B)	480 (B)	405 (B)	480 (B)	—	60	—	—	Rc3/4	○	○	○	○	6.8/6.4	6.0	6.0	67	70	1.5	52				
CBF4040-□-□																								
VB-01B	575 (V)	685 (V)	575 (B)	685 (B)	60	60	—	—	Rc3/4	○	○	○	○	10.6/9.4	9.2	9.2	68	70	2.2	67				
VB-04B	575 (V)	685 (V)	575 (B)	685 (B)	60	60	—	—	Rc3/4	○	○	○	○	5.3	5.3/4.7	5.4	4.6	4.6	68	70	2.2	67		
VBVB-01B	575 (V, B)	685 (V, B)	575 (V, B)	685 (V, B)	—	—	*5	*6	Rc3/4	○	○	○	○	10.6/9.4	9.2	9.2	69	71	2.2	67				
VBVB-04B	575 (V, B)	685 (V, B)	575 (V, B)	685 (V, B)	—	—	—	—	Rc3/4	○	○	○	○	5.3	5.3/4.7	5.4	4.6	4.6	69	71	2.2	67		
VV-01B	575 (V)	685 (V)	575 (V)	685 (V)	60	—	—	—	Rc3/4	○	○	○	○	10.6/9.4	9.2	9.2	67	69	2.2	67				
BB-01B	575 (V)	685 (B)	575 (B)	685 (B)	—	60	—	—	Rc3/4	○	○	○	○	10.6/9.4	9.2	9.2	71	73	2.2	67				

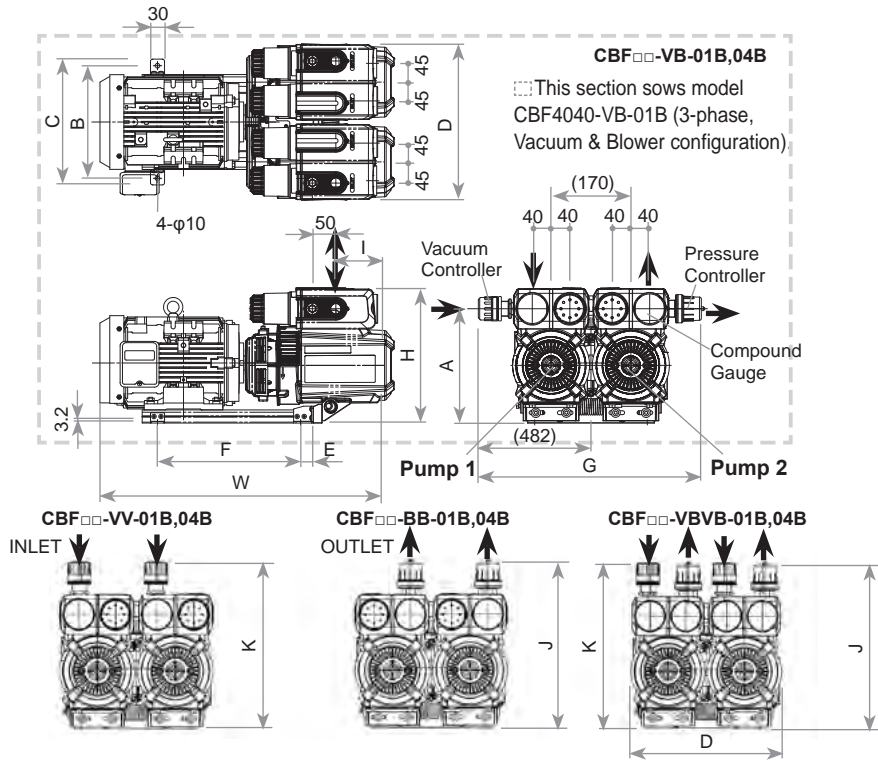
*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Operable range of vacuum (pressure). *3 "04" models are special order items. *4 Operating noise measured on a new pump with an ORION recommended motor running at normal vacuum/pressure conditions. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *5 Recommended range of combined vacuum and pump pressures: 60 or lower. *6 Maximum vacuum/pressure per pump can be any combination of the following (vacuum/pressure): 55/20, 55/30, 40/40, 35/50. The maximum vacuum/pressure of the dry pump indicates the maximum sustainable vacuum/pressure. Do not operate the pump beyond this maximum value. Doing so can reduce the lifespan of the pump and may result in breakdown or an accident. * Please consult with your dealer regarding operation in extremely dry environments, as doing so may lead to pump damage. * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * When using other than the ORION standard motor, follow the electrical guidelines printed on the nameplate of the motor used. * Please install an overload protection device (such as a thermal relay). * See specifications sheet for further details.

Performance Data

(— 50 Hz — 60 Hz)



External Dimensions (Units:mm)



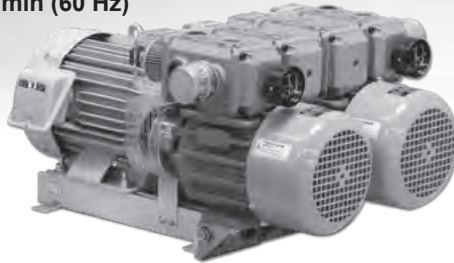
Combination Pump
CBF Series

Model	H	D	W	A	B	C	E	F	G	I	J	K
CBF1515-VB-01B, 04B	(269)	(331)	(483)	224	205	233	15	225	(482)	(95)	—	—
CBF1515-VBVB-01B, 04B	(267)	(331)	(483)	224	205	233	15	225	—	(95)	(343)	(341)
CBF1515-VV-01B	(269)	(335)	(483)	224	205	233	15	225	—	(95)	—	(341)
CBF1515-BB-01B	(269)	(335)	(483)	224	205	233	15	225	—	(95)	(343)	—
CBF2525-VB-01B, 04B	(276)	(331)	(558)	231	220	248	15	270	(482)	(109)	—	—
CBF2525-VBVB-01B, 04B	(274)	(331)	(558)	231	220	248	15	270	—	(109)	(350)	(348)
CBF2525-VV-01B	(276)	(335)	(558)	231	220	248	15	270	—	(109)	—	(348)
CBF2525-BB-01B	(276)	(335)	(558)	231	220	248	15	270	—	(109)	(350)	—
CBF4040-VB-01B, 04B	(288)	(334)	(627)	244	240	268	25	305	(482)	(124)	—	—
CBF4040-VBVB-01B, 04B	(286)	(334)	(627)	244	240	268	25	305	—	(124)	(363)	(361)
CBF4040-VV-01B	(288)	(335)	(627)	244	240	268	25	305	—	(124)	—	(361)
CBF4040-BB-01B	(288)	(335)	(627)	244	240	268	25	305	—	(124)	(363)	—



Combination Pump CBX62,62-□-01B

Continuous Operating Vacuum: 60 kPa or less
 (CBX62-A-01B not included)
Continuous Operating Pressure: 60 kPa or less
 (CBX62-A-01B, CBX62-N-01B not included)
Flow Rate: 1115 L/min (60 Hz)



CBX62-01B-G1



CBX62-A-01B-G1

Features

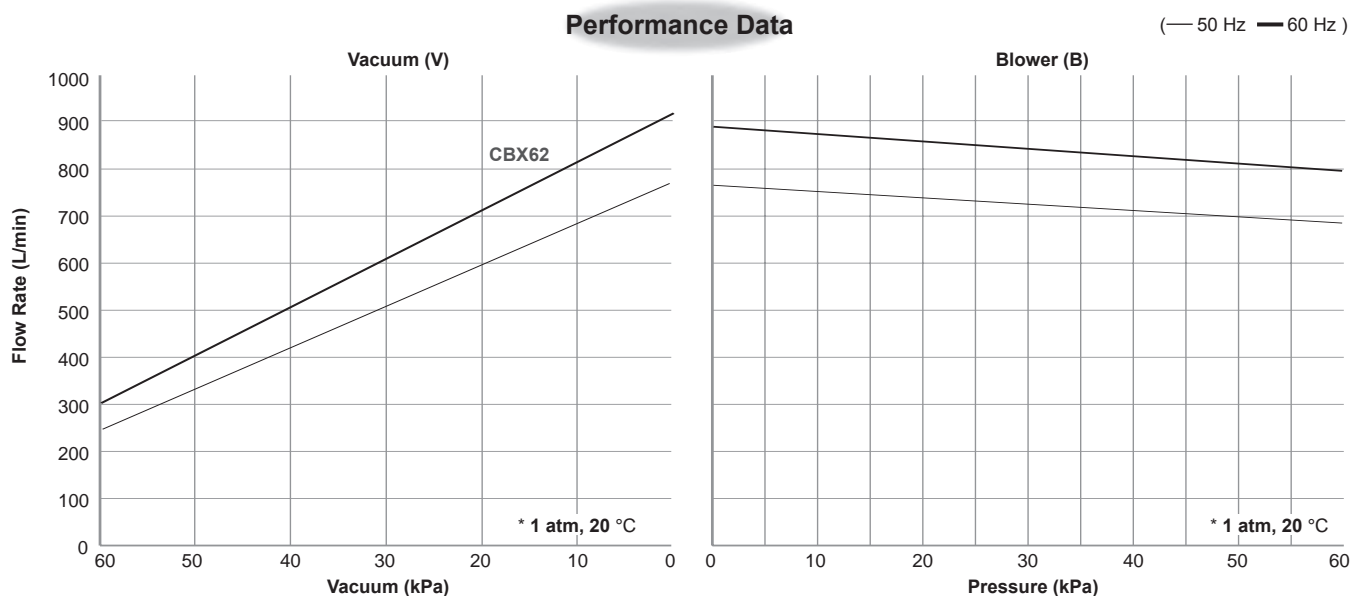
- 2-cylinder (vacuum and pressure) design allows simultaneous vacuum and pressure operation for individual vacuum and pump pressures below 60 kPa.
- Compared with existing Orion models, the CBX line offers smaller size and lighter weight in an easy to use package.

Specifications

Model	Designed Pumping Capacity				Continuous Operating Vacuum	Continuous Operating Pressure	Piping Connection Size	Motor Voltage			Standard Motor Current Rating			Noise Level		Motor	Mass
								A			50 Hz	60 Hz					
	3-Phase			3-Phase				dB *3									
	Pump 1		Pump 2					kPa (max.) *2	kPa (max.) *2	200 V			220 V	230 V	200 V		
CBX62-01B-G1 (V, B specifications)	935	1115	935	1115	60	60	Rc 1			○	○	○	15.4/14.4	13.6	13.6	78	79
CBX62-A-01B-G1 (VB, VB specifications)	935	1115	935	1115	55/35 *4	20/50 *4	Rc 1	○	○	○	15.4/14.4	13.6	13.6	—	—	3.7	112
CBX62-N-01B-G1 (V, V specifications)	935	1115	935	1115	60	—	Rc 1	○	○	○	15.4/14.4	13.6	13.6	—	—	3.7	112

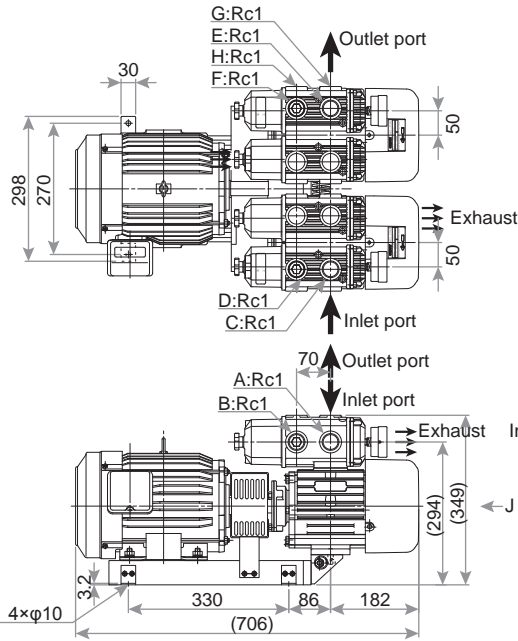
*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate.
 *2 Operable range of vacuum (pressure). *3 Operating noise measured on a new pump with an ORION recommended motor running at normal vacuum/pressure conditions. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *4 Maximum combined output per cylinder (max. vacuum/max. pressure): Pump 1: (55 or lower / 20 or lower), Pump 2: (35 or lower / 50 or lower.) * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). * See specifications sheet for further details.

Performance Data

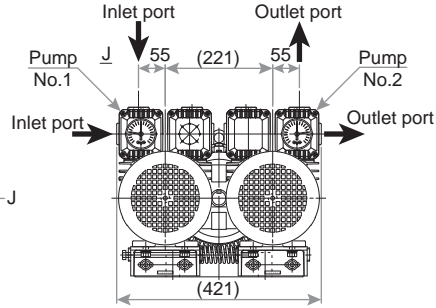


External Dimensions (Units:mm)

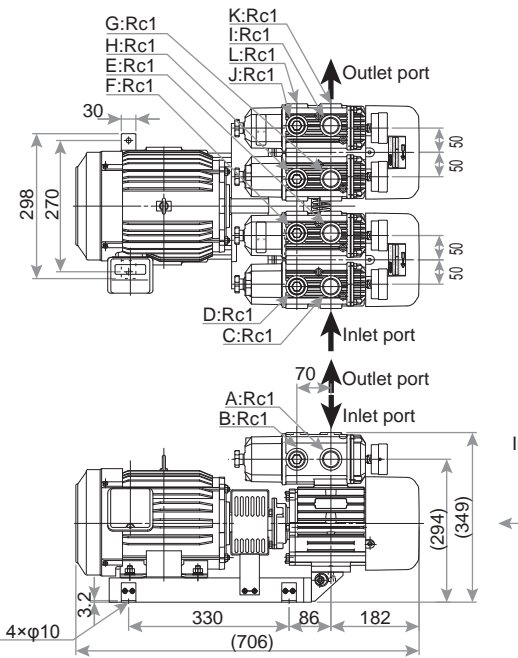
CBX62-01B-G1



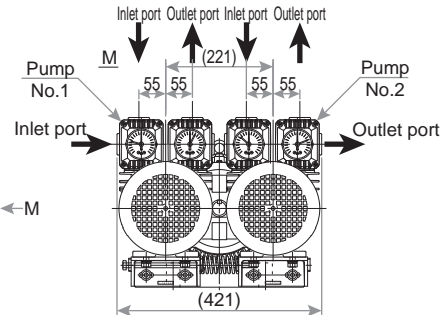
* The vacuum controller and the inlet port can be attached to A, B, C and D. The pressure controller can be attached to E, F, G and H. However, the outlet port can only be attached to G and E.



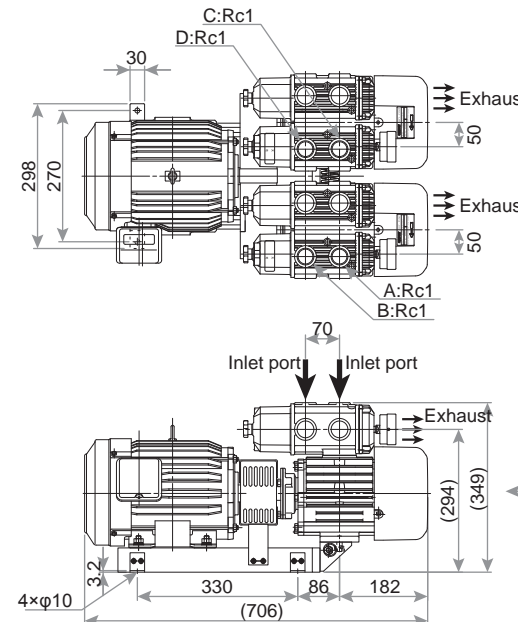
CBX62-A-01B-G1



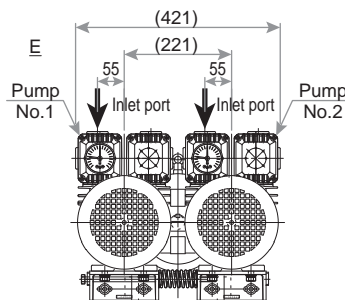
* The vacuum controller and the inlet port can be attached to A, B, C, D, G and H. The pressure controller can be attached to E, F, I, J, K and L. However, the outlet port can only be attached to E, I and K.



CBX62-N-01B-G1



* The vacuum controller and the inlet port can be attached to A, B, C and D.

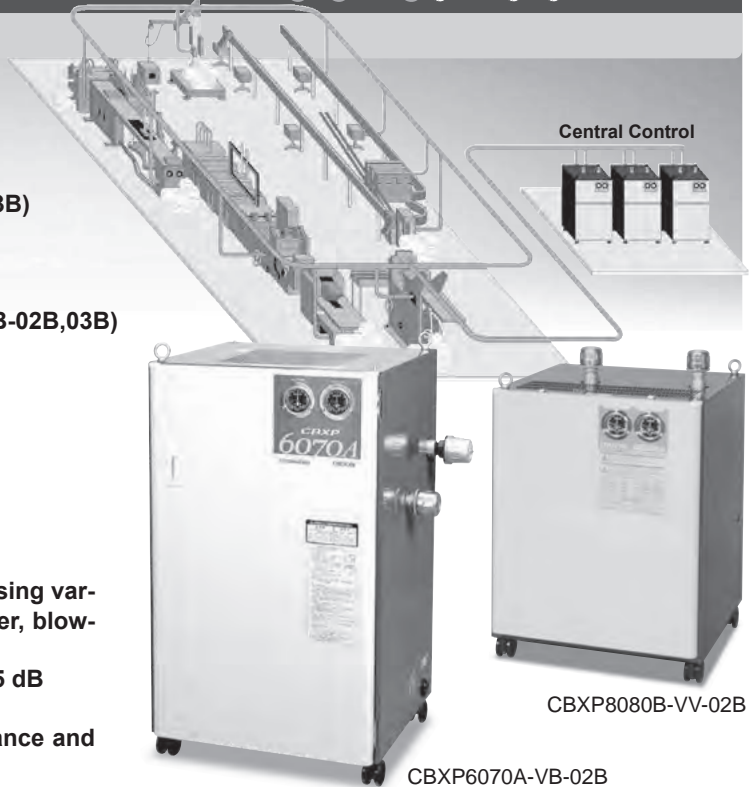




Combination Package CBXP Series



- Continuous Operating Vacuum:**
 60 kPa or less (CBXP □ A-VB-02B/VV-02B)
 (CBXP □ B-VB-02B,03B/VV-02B,03B)
- Continuous Operating Pressure:**
 80 kPa or less (CBXP □ A-VB-02B)
 70 kPa or less (CBXP □ B-VB-02B,03B)
 60 kPa or less (CBXP □ A-BB-02B, CBXP □ B-BB-02B,03B)
- Flow Rate: 1115 to 2200 L/min (60 Hz)**



Features

- Many configurations available. 19 models comprising various combinations such as vacuum, vacuum/blower, blower/blower available.
- Lower operating noise Noise levels reduced 3 to 5 dB compared with our earlier models.
- A standard sized pump that boasts good performance and improved maintenance characteristics.

Specifications

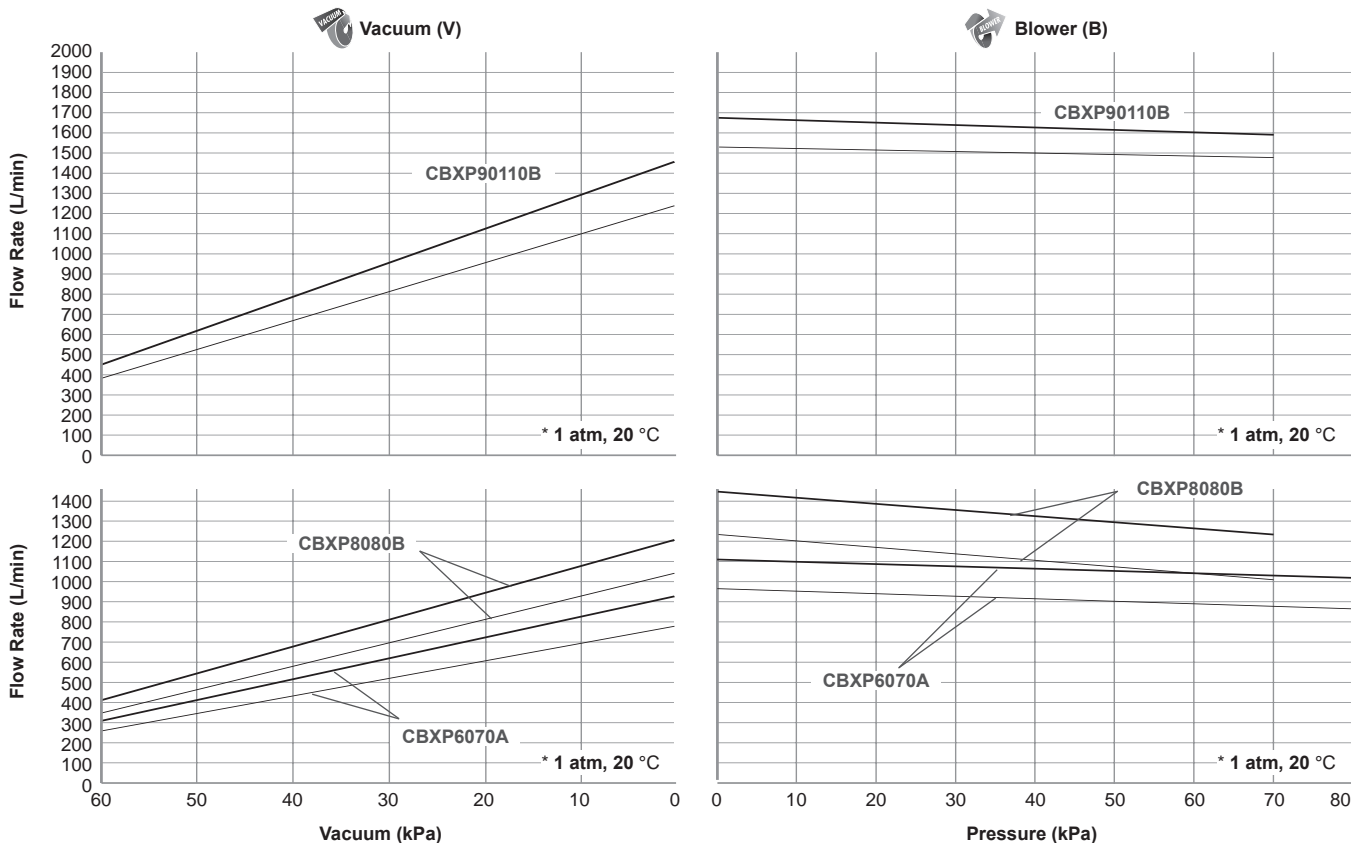
Model	Designed Pumping Capacity				Continuous Operating Vacuum		Continuous Operating Pressure		Piping Connection Size		Voltage	Standard Motor Current Rating A	Noise Level		Motor	Mass
	Pump 1		Pump 2		Pump 1	Pump 2	Pump 1	Pump 2	200 V	200 V	50 Hz	60 Hz	3-Phase			
	50 Hz	60 Hz	50 Hz	60 Hz					Inlet	Outlet	50/60 Hz	50/60 Hz		50 Hz	60 Hz	
CBXP□-□-□ *1 (Vacuum (V) [Pump 1]) (Blower (B) [Pump 2])																
6070A-VB-02B	935	1115	1160	1380	60	—	—	80	R1	R1	○	22.6/20.8	73	76	5.5	177
8080B-VB-02B, 03B	1315	1545	1370	1650	60	—	—	70	R1	R1 1/4	○	29.6/28	76	78	7.5	260
90110B-VB-02B, 03B	1500	1800	1850	2200	60	—	—	70	R1 1/4	R1 1/4	○	29.6/28	79	81	7.5	305
CBXP□-□-□ *1 (Vacuum (V) [Pump 1]) (Vacuum (V) [Pump 2])																
6060A-VV-02B	935	1115	935	1115	60	60	—	—	R1	R1	○	15.4/14.4	72	73	3.7	147
8080B-VV-02B, 03B	1315	1545	1315	1545	60	60	—	—	R1	R1	○	22.6/20.8	72	74	5.5	192
9090B-VV-02B, 03B	1500	1800	1500	1800	60	60	—	—	R1 1/4	R1 1/4	○	22.6/20.8	75	77	5.5	272
110110B-VV-02B, 03B	1850	2200	1850	2200	60	60	—	—	R1 1/4	R1 1/4	○	29.6/28	77	79	7.5	280
CBXP□-□-□ *1 (Blower (B) [Pump 1]) (Blower (B) [Pump 2])																
6060A-BB-02B	935	1115	935	1115	—	—	60	60	R1	R1	○	15.4/14.4	76	79	3.7	147
8080B-BB-02B, 03B	1315	1545	1315	1545	—	—	60	60	R1	R1	○	22.6/20.8	74	78	5.5	192
9090B-BB-02B, 03B	1500	1800	1500	1800	—	—	60	60	R1 1/4	R1 1/4	○	22.6/20.8	78	80	5.5	272
110110B-BB-02B, 03B	1850	2200	1850	2200	—	—	60	60	R1 1/4	R1 1/4	○	29.6/28	80	81	7.5	280

*1 CBXP□A-□-02B and CBXP□B-□-02B models are equipped with casters. CBXP□B-□-03 models are equipped with casters and an hour meter. *2 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *3 Operable range of vacuum (pressure). *4 Operating noise measured on a new pump with an ORION recommended motor running at normal vacuum/pressure conditions. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). * To ensure proper pump ventilation, make sure there is at least 300 mm clearance between the pump and walls, and at least 1,000 mm clearance between the top of the pump and the ceiling. * In order to allow for pump maintenance, maintain an open space at least 500 mm from the front face of the unit. * See specifications sheet for further details.

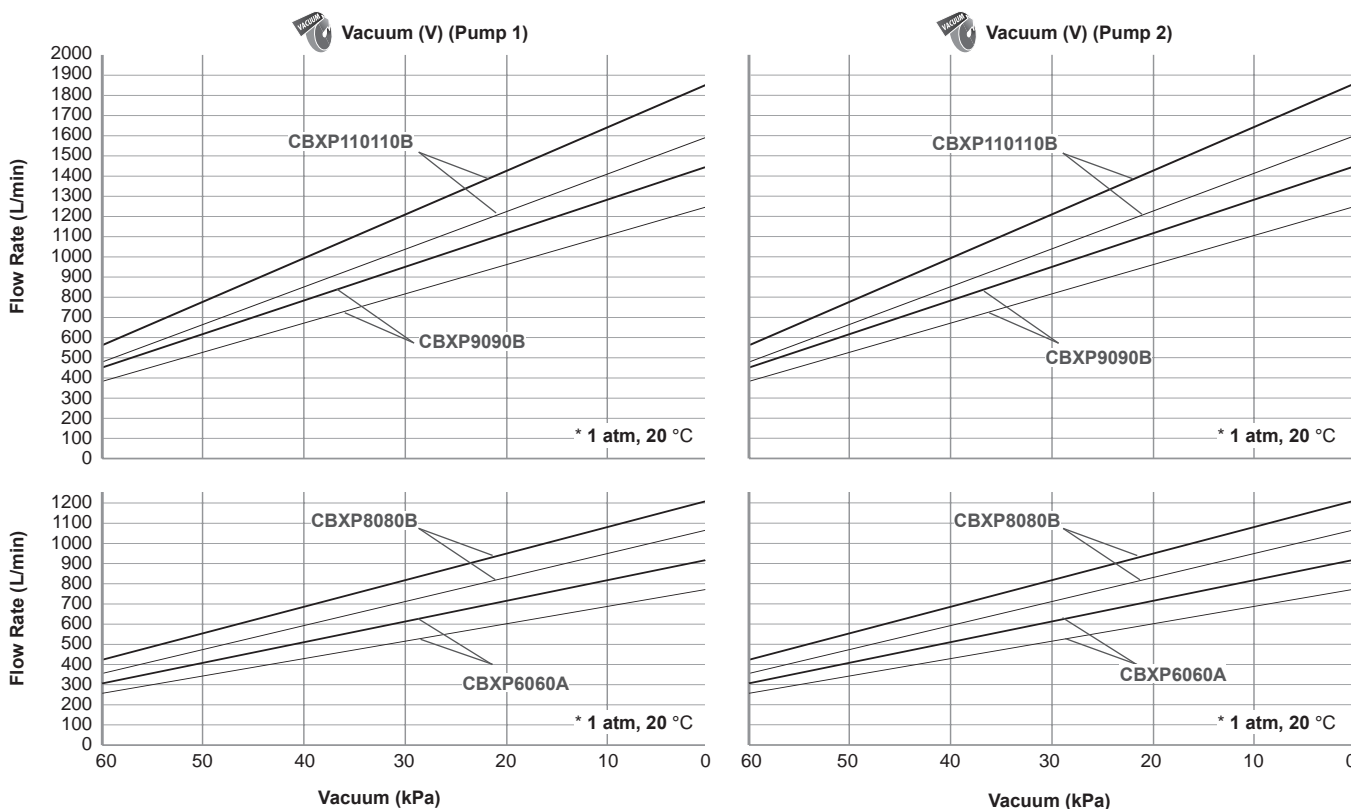
Performance Data

(— 50 Hz — 60 Hz)

CBXP□□□□A-VB-02B, CBXP□□□□B-VB-02B,03B



CBXP□□□□A-VV-02B, CBXP□□□□B-VV-02B,03B



Combination Package
CBXP Series

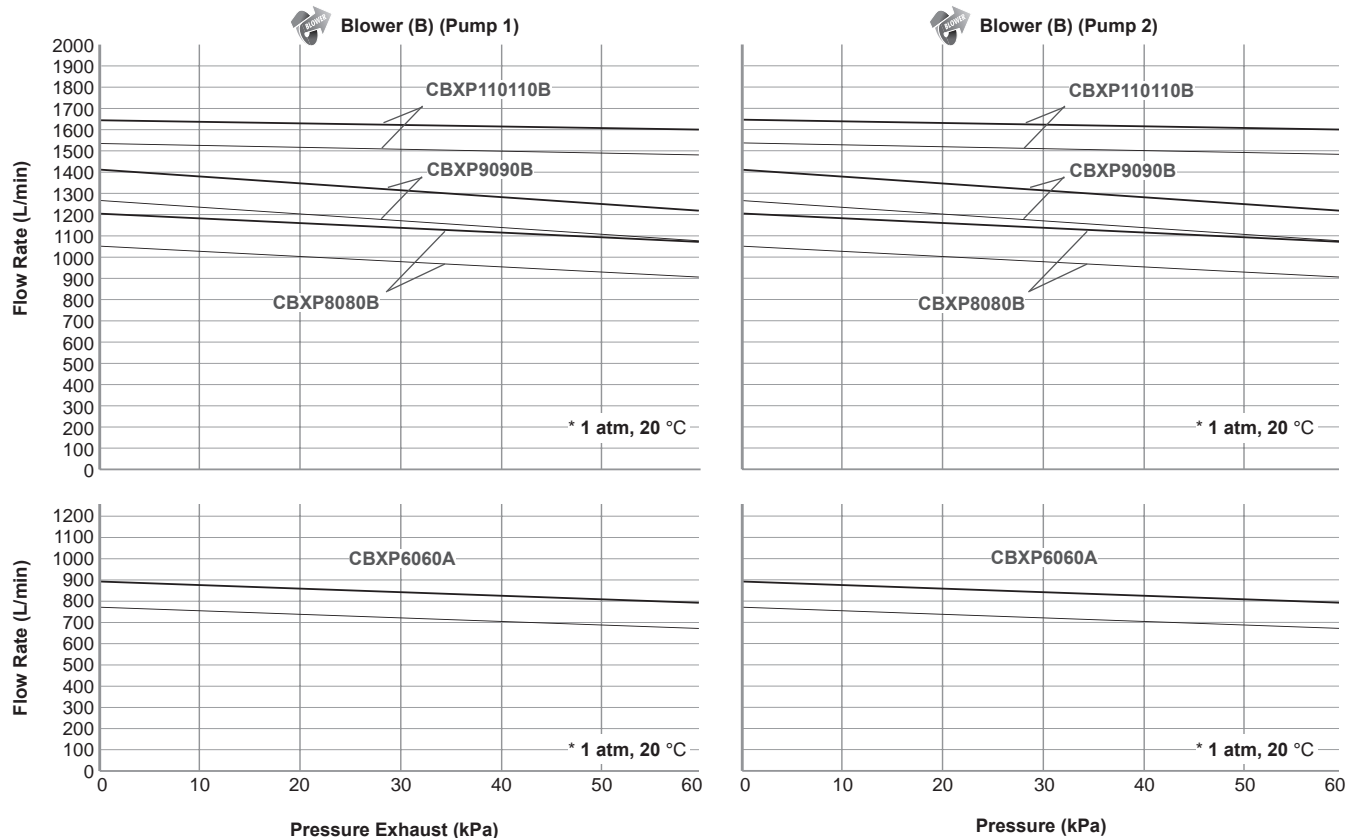


Combination Package CBXP Series

Performance Data

(— 50 Hz — 60 Hz)

CBXP□□□□A-BB-02B, CBXP□□□□B-BB-01B,03B



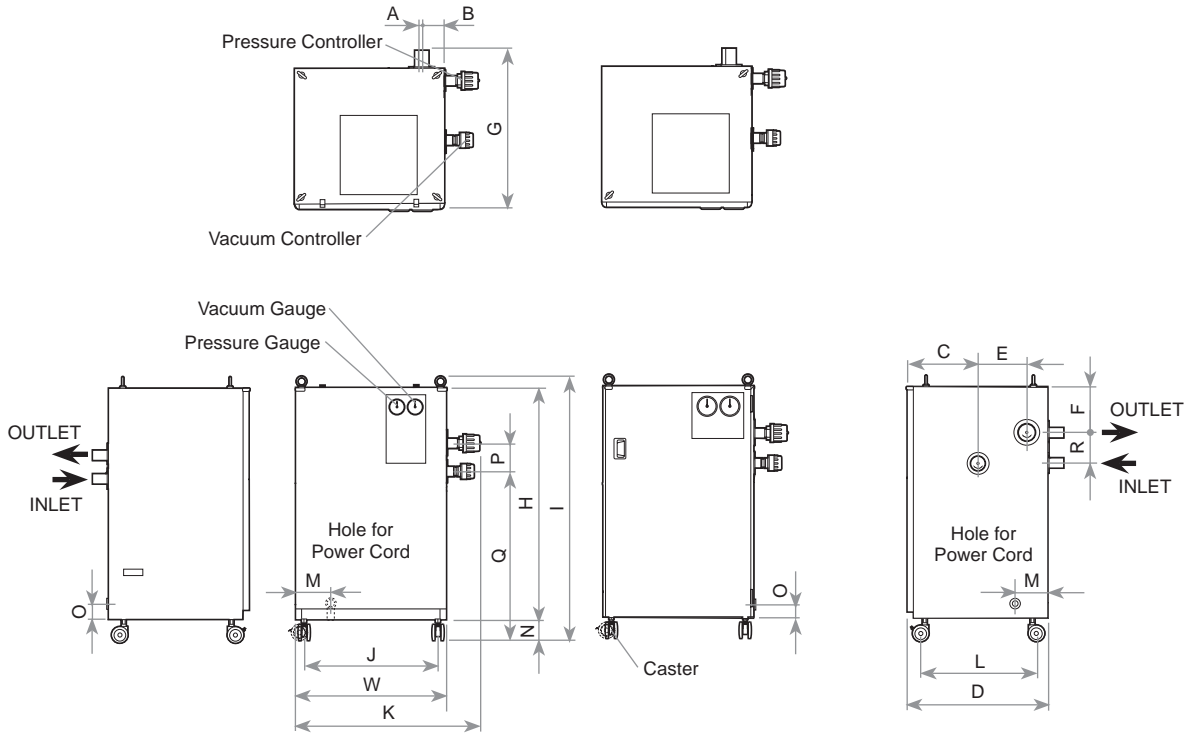
External Dimensions (Units:mm)

Model	H	D	W	A	B	C	E	F	G
CBXP6070A-VB-02B	890	533	560	(26)	(65)	(253)	(190)	(235)	(600)
CBXP8080B-VB-02B, 03B	928	536	680	(11)	(89)	(261)	(233)	(225)	(616)
CBXP90110B-VB-02B, 03B	967	565	730			(303)	(191)	(229)	(653)
CBXP6060A-VV-02B				(280)	(90)	(236)	(15)	(128)	(607)
CBXP8080B-VV-02B, 03B	684	532	560	(293)	(74)	(232)	(19)	(93)	(620)
CBXP9090B-VV-02B, 03B		565				(265)			(630)
CBXP110110B-VV-02B, 03B	750	583	730	(390)	(100)	(364)	(38)	(105)	(627)
CBXP6060A-BB-02B				(280)	(190)	(236)	(15)	(128)	(607)
CBXP8080B-BB-02B, 03B	684	532	560	(293)	(194)	(232)	(19)	(93)	(620)
CBXP9090B-BB-02B, 03B		565				(264)			(630)
CBXP110110B-BB-02B, 03B	750	583	730	(390)	(240)	(364)	(38)	(105)	(627)

Model	I	J	K	L	M	N	O	P	Q	R
CBXP6070A-VB-02B	(1000)	510	(671)	450	86.2	(65)	42	(98)	(621)	(98)
CBXP8080B-VB-02B, 03B	(1051)	610	(794)	451	157	(78)	61	(109)	(672)	(109)
CBXP90110B-VB-02B, 03B	(1090)	660	(843)	480			61	(94)	(722)	(94)
CBXP6060A-VV-02B	(836)				86					
CBXP8080B-VV-02B, 03B	(862)	510	—	450	137	(65)	42	—	—	—
CBXP9090B-VV-02B, 03B	(939)									
CBXP110110B-VV-02B, 03B	(930)	660	—	480	157	(78)	61	—	—	—
CBXP6060A-BB-02B	(843)				86					
CBXP8080B-BB-02B, 03B	(869)	510	—	450	137	(65)	42	—	—	—
CBXP9090B-BB-02B, 03B	(954)									
CBXP110110B-BB-02B, 03B	(945)	660	—	480	157	(78)	61	—	—	—

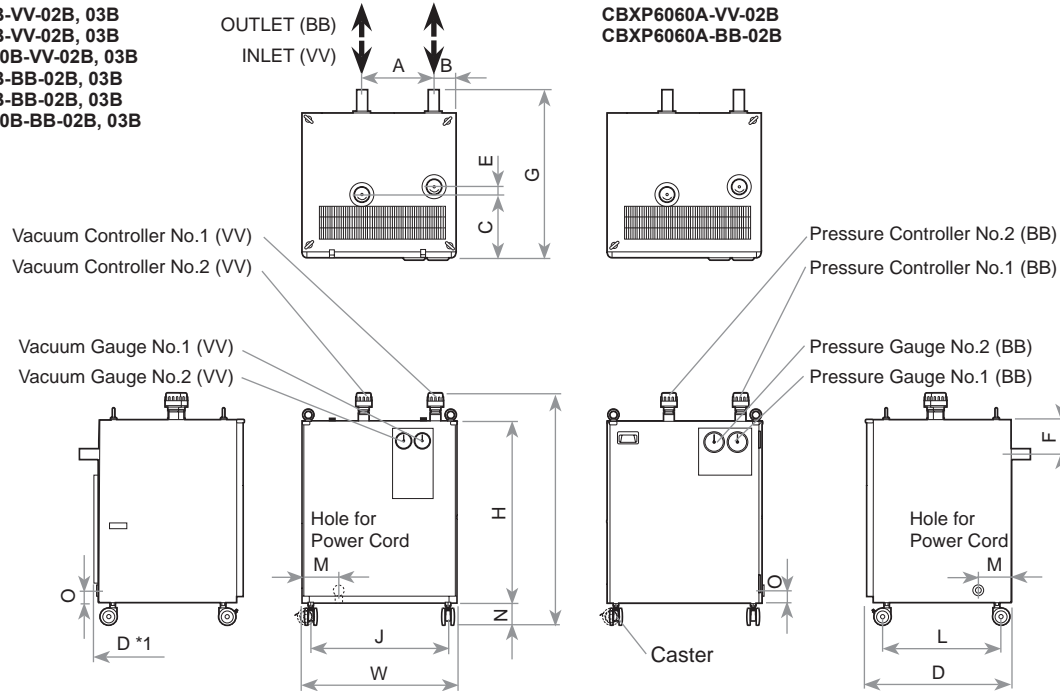
CBXP8080B-VB-02B, 03B
 CBXP90110B-VB-02B, 03B

CBXP6070A-VB-02B



CBXP8080B-VV-02B, 03B
 CBXP9090B-VV-02B, 03B
 CBXP110110B-VV-02B, 03B
 CBXP8080B-BB-02B, 03B
 CBXP9090B-BB-02B, 03B
 CBXP110110B-BB-02B, 03B

CBXP6060A-VV-02B
 CBXP6060A-BB-02B



*1 CBXP110110B-VV-02B,03B/ -BB-02B, 03B models only

Combination Package
 CBXP Series



Direct Drive High Vacuum KHF Series



CE Certification Standard (04, 01B Models)

Ultimate Pressure:
8 kPa [abs]

Continuous operating pressure:
Ultimate pressure to atmospheric pressure
(Note:KHF08-VH:Ultimate pressure to 48 kPa [abs])

Flow Rate:
150 to 400 L/min (60 Hz)



Features

- Meets CE certification standards. [04(CE), 01B(CE) models]
- Continuous operation at ultimate pressure.
- Easier vane blade replacement (compared with KHA models.)
- High degree of vacuum, excellent substitute pump for ejectors and electronic component and small parts handling automated equipment.

Specifications

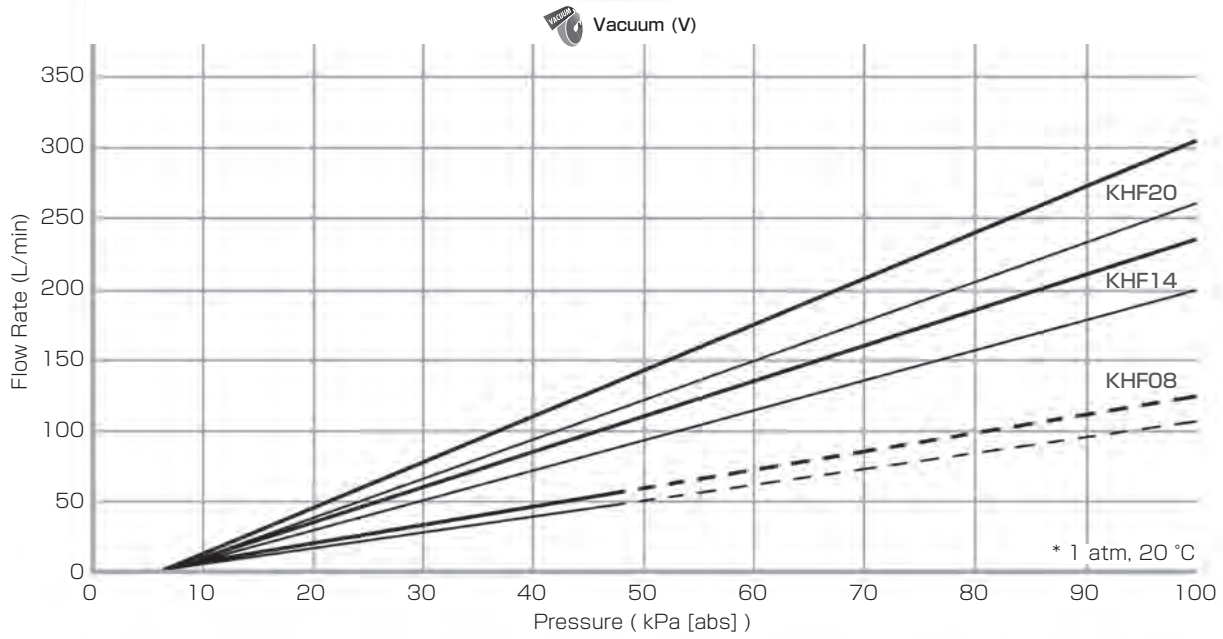
□ Single-Phase ■ 3-Phase Model

Model	Designed Pumping Capacity		Ultimate Pressure	Operating Pressure Range	Piping Connection Size	Voltage			Standard Motor Current Rating		Noise Level		Motor	Mass			
						Single-Phase	3-Phase		Single-Phase (02)	3-Phase (01,01B)(04)		(dB)*3		kW	kg		
							100/200 V	200 V		220 V	100/200 V				200 V	220 V	50 Hz
KHF08-□-□																	
VH-01	125	150	8	Ultimate pres. - 48	Rc 1/4	—	○	○	—	1.3/1.1	1.1	64	67	0.2	—	13.5	
VH-02	125	150	8	Ultimate pres. - 48	Rc 1/4	○	—	—	3.8/3.4, 1.9/1.7	—	—	64	67	0.2	15.5	—	
VH-04(CE)	125	150	8	Ultimate pres. - 48	Rc 1/4	—	○	○	—	1.3/1.1	1.1	64	67	0.2	—	13.5	
KHF14-□-□																	
V-01	230	280	8	Ultimate pres. - 101.3	Rc 3/4	—	○	○	—	2.6/2.5	2.5	66	68	0.4	—	22.5	
V-02	230	280	8	Ultimate pres. - 101.3	Rc 3/4	○	—	—	6.8/6.0, 3.4/3.0	—	—	66	68	0.4	24	—	
V-04	230	280	8	Ultimate pres. - 101.3	Rc 3/4	—	○	○	—	2.6/2.5	2.5	66	68	0.4	—	22.5	
KHF20-□-□																	
V-01B(CE)	340	400	8	Ultimate pres. - 101.3	Rc 3/4	—	○	○	—	3.99/3.47	3.49	67	69	0.75	—	32	
V-02	340	400	8	Ultimate pres. - 101.3	Rc 3/4	○	—	—	11.0/10.4, 5.5/5.2	—	—	67	69	0.75	35	—	

*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Pump can be continuously operated at the maximum attainable vacuum. *3 Operating noise level measured on a new pump with the standard built-in ORION motor. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Please consult your dealer regarding continuous operation at levels on the dotted lines in the performance data charts. * Maximum operational pressure variation pulse: 13.3 kPa [abs] /s. * Allowable back pressure for exhaust ducting: 10 kPa or lower. (This pressure should not be used for any other purpose.) * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Due to the high compression ratios found in high-vacuum pumps, condensation can easily form within the pump. Therefore the following measures should be taken in order to avoid trouble from rust due to condensation: **During a trial run (operation of 5 minutes or less, such as a momentary operation or short test run) if the operating pressure goes above 48 kPa [abs], then a dry run of 10 to 15 minutes should be made at a pressure of 48 kPa [abs] at the vacuum side of the pump.** * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). * Single phase models require pre-order. * See specifications sheet for further details.

Performance Data

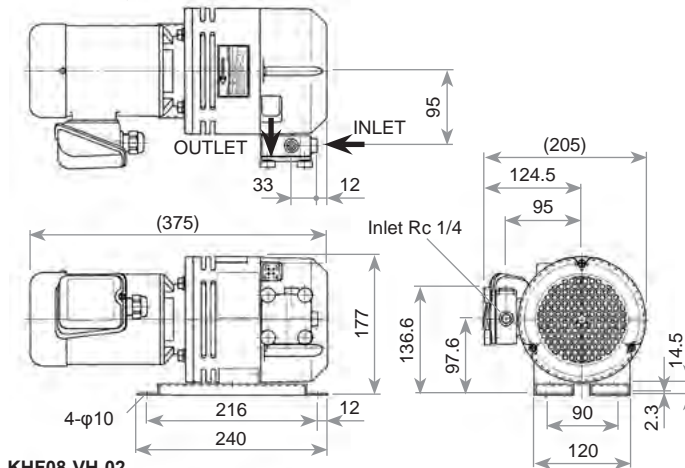
(— 50 Hz — 60 Hz)



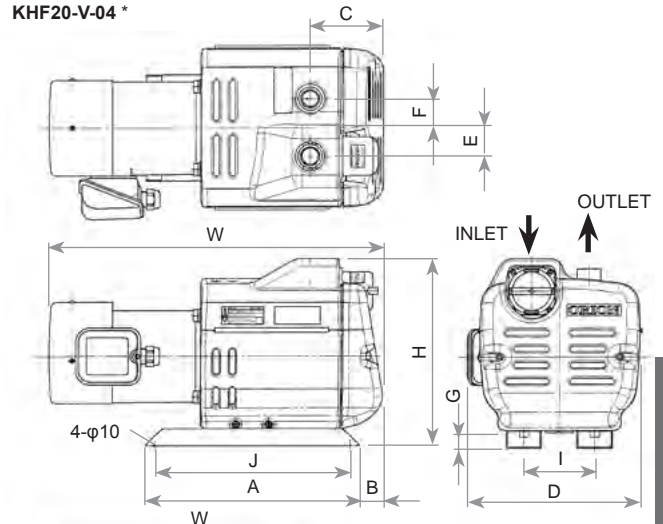
* Please consult with your dealer in advance for continuous operation at 48 kPa [abs] or higher (just on the performance-data dotted line).

External Dimensions (Units:mm)

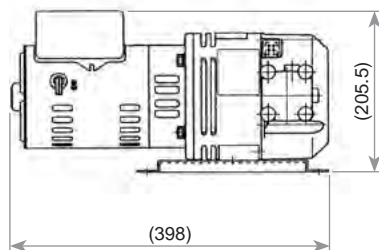
KHF08-VH-01,04 *



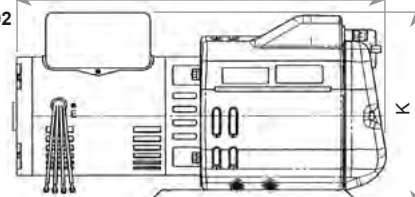
KHF14-V-01,04 *
KHF20-V-04 *



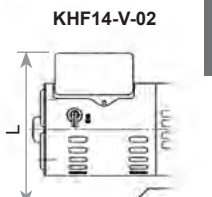
KHF08-VH-02



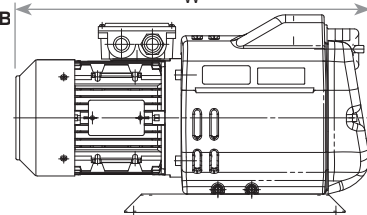
KHF20-V-02



KHF14-V-02



KHF20-V-01B



Direct Drive High Vacuum
KHF Series

Model	H	D	W	A	B	C	E	F	G	I	J	K	L
KHF14-V-01	(245)	(237)	(458)	300	(17)	(100)	42	35	25	80	275	—	—
KHF14-V-02	(245)	(202)	(455)	300	(17)	(100)	42	35	25	80	275	—	(218)
KHF14-V-04	(245)	(237)	(458)	300	(17)	(100)	42	35	25	80	275	—	—
KHF20-V-01B	(269)	(232)	(481)	300	(33)	(103)	40	41	25	100	275	—	—
KHF20-V-02	(269)	(232)	(513)	300	(33)	(103)	40	41	25	100	275	(274)	—

* The indicated diagrams are drawn based on CE certified models.



High Vacuum KHA Series



Ultimate Pressure: 8 kPa [abs] (max.)
Flow Rate: 65 – 400 L/min (60 Hz)



KHA400-301A-G1

Features

- Continuous operation at ultimate pressure (8 kPa).
- High degree of vacuum, excellent substitute pump for electronic component and small parts handling automated equipment.

Specifications

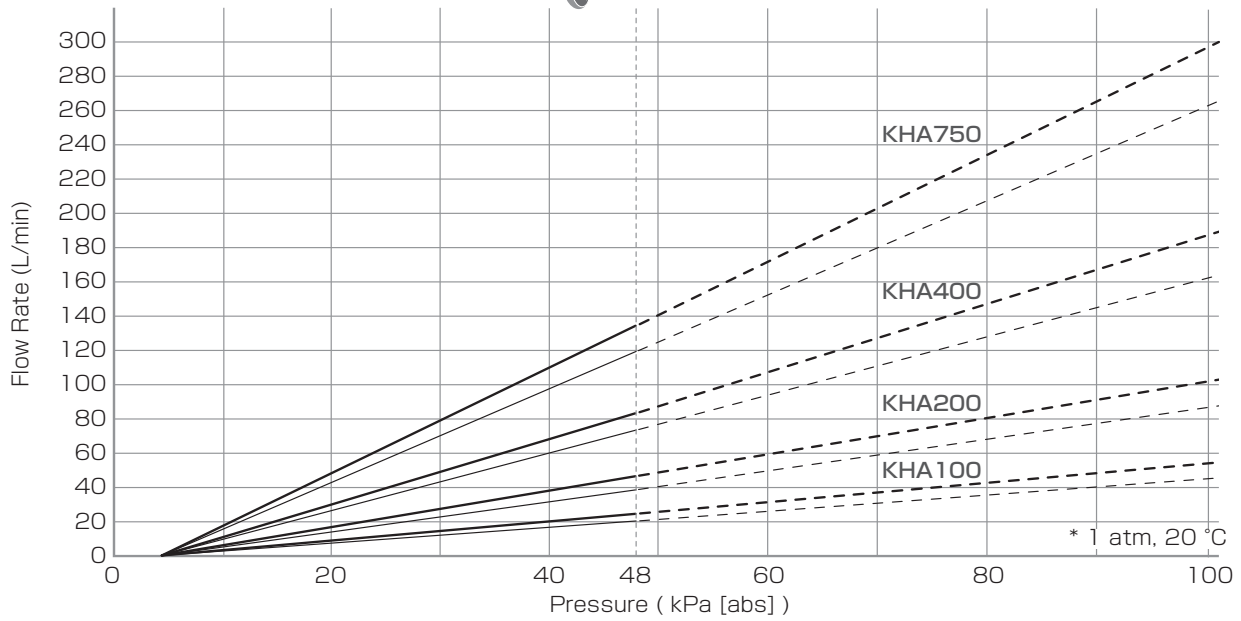
Model	Designed Pumping Capacity		Ultimate Pressure	Piping Connection Size	Voltage		Standard Motor Current Rating		Noise Level		Motor	Mass			
					A		A		(dB)*3						
	L/min				kPa [abs] (max.)	3-Phase		3-Phase					kW	kg	
	50 Hz	60 Hz				200 V	220 V	200 V	220 V	50 Hz					60 Hz
KHA□-□-□															
100-301-G1	55	65	8	Rc 1/4	○	○	0.69/0.6	0.62	60	61	0.1	11			
200-301A-G1	120	145	8	Rc 1/4	○	○	1.56/1.37	1.36	61	62	0.2	13			
400-301A-G1	220	260	8	Rc 3/8	○	○	2.29/2.08	1.99	63	66	0.4	21			
750-301B-G1	330	400	8	Rc 3/8	○	○	3.8/3.4	3.4	67	70	0.75	38			

*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Pump can be continuously operated at the maximum attainable vacuum. *3 Operating noise level measured on a new pump with the standard built-in ORION motor. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Working vacuum range: 48 kPa [abs] to ultimate pressure. * Maximum operational pressure variation pulse: 13.3 kPa [abs] /s. * Models with ductable exhaust available (KHA100A • 200A • 400A • 750A). When ducting off exhaust, the allowable back pressure from the piping is 25 kPa. (This pressure should not be used for any purpose.) * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Due to the high compression ratios found in high-compression pumps, condensation can easily form within the pump. Therefore the following measures should be taken in order to avoid trouble from rust due to condensation: **During a trial run (operation of 5 minutes or less, such as a momentary operation or short test run) if the operating pressure goes above 48 kPa [abs], then a dry run of 10 to 15 minutes should be made at a pressure of 48 kPa [abs] at the vacuum side of the pump.** * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). Setting guideline (may vary depending on the specific application): For Three-phase motors, use the current rating listed on the motor nameplate as a guide. * See specifications sheet for further details.

Performance Data

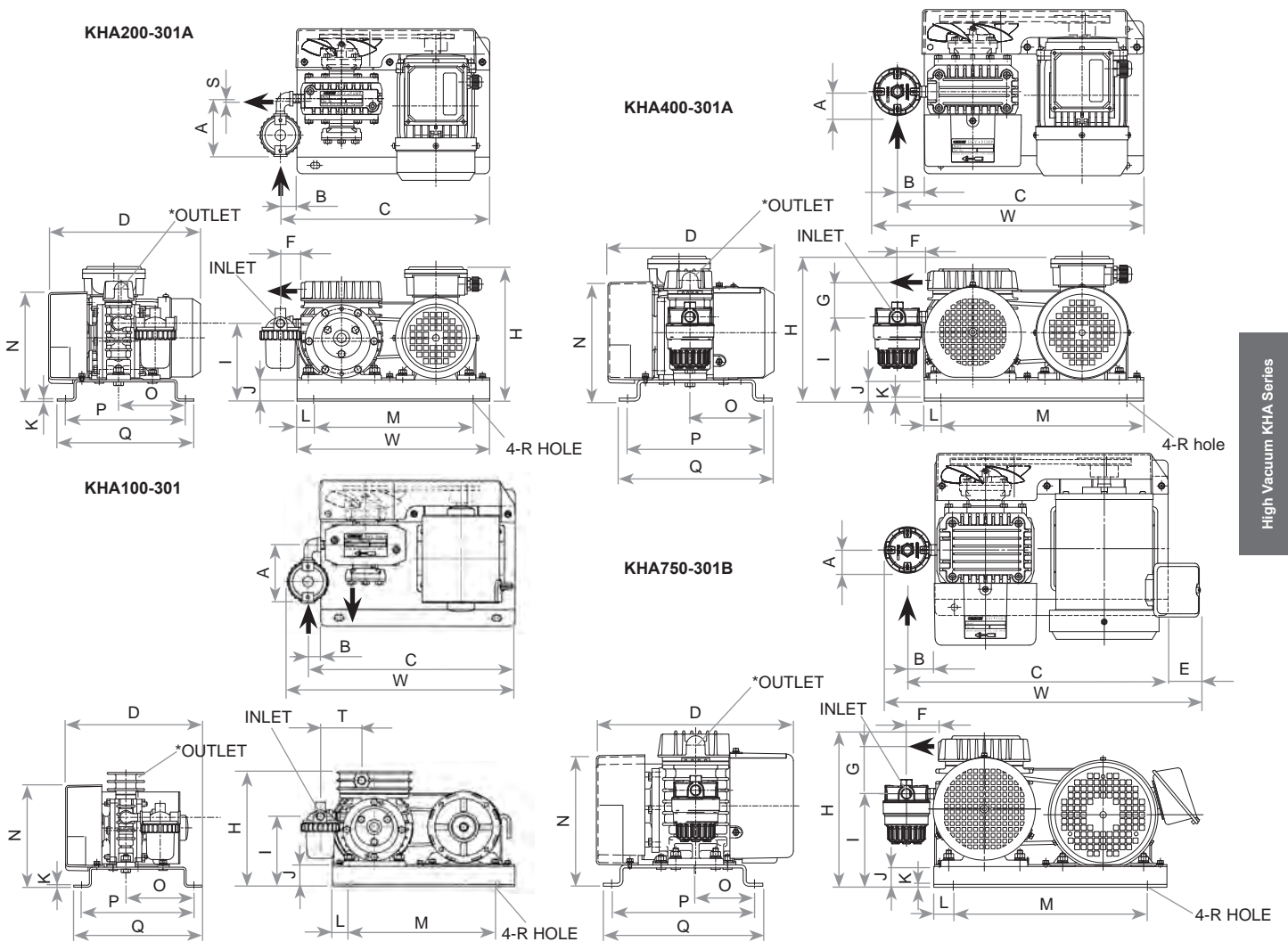
(— 50 Hz — 60 Hz)

Vacuum (V)



* Please consult with your dealer in advance for continuous operation at 48 kPa [abs] or higher (just on the performance-data dotted line) .

External Dimensions (Units:mm)



High Vacuum KHA Series

Model	H	D	W	A	B	C	E	F	G*	I	J	K	L	M	N	O	P	Q	R	S*	T*
KHA100-301-G1	(184)	(218)	(340)	(87)	(19)	309	—	—	57.5	112	32	3.2	25	240	164	109	180	205	5	—	66
KHA200-301A-G1	(202)	(228)	(346)	(87)	(25)	315	—	(31)	51.4	117	32	3.2	25	240	164	100.5	180	205	5	4	—
KHA400-301A-G1	(218)	(250)	(407)	33.5	(41)	370.5	—	(46)	55	127	32	4.5	25	280	180	111	205	230	φ9	—	—
KHA750-301B-G1	(234)	(296.5)	(481)	33.5	(43)	402.5	(42)	(50)	68	144.5	32	4.5	30	300	198	88.5	215	240	φ10	—	—

* G,S,T specifications are for A type (exhaust ductable) models only.



High Vacuum KHH251

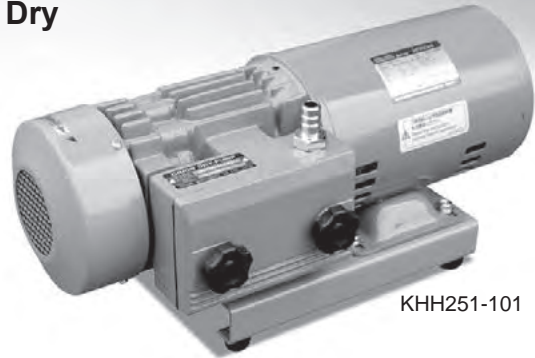


High Vacuum 1.3 kPa [abs] Continuous & Dry

Ultimate Pressure: 1.3 kPa [abs].
Flow Rate: 179 L/min (60 Hz)

Features

- Continuous operation at ultimate pressure of 1.3 kPa or lower. Suitable for applications requiring high degree of vacuum.
- Compact design thanks to direct connect motor flange.
- Quiet operation, long life.



KHH251-101

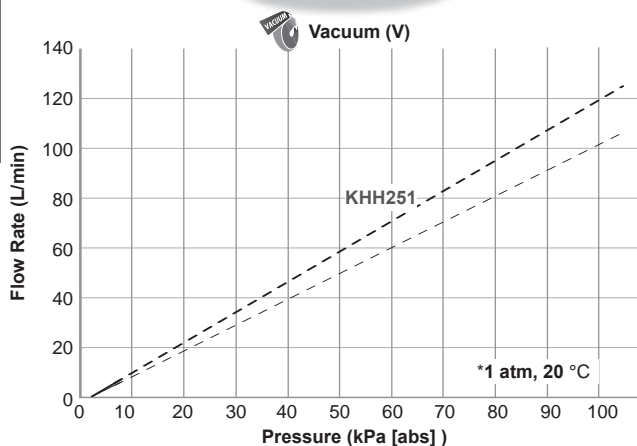
Specifications

Single-Phase

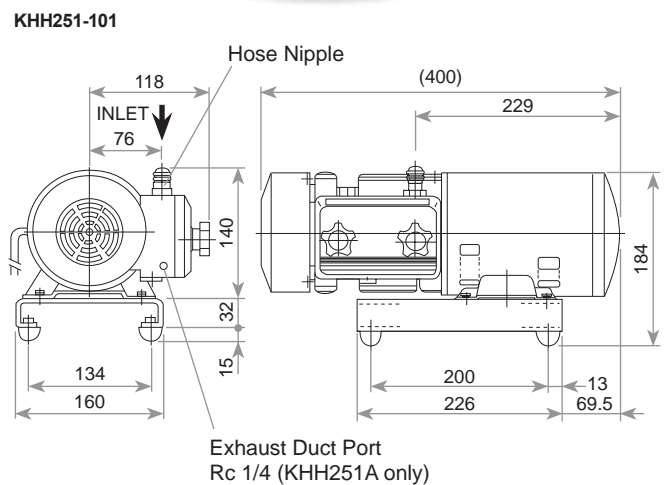
Model	Designed Pumping Capacity		Ultimate Pressure (min.) kPa [abs]*2	Piping Connection Size	Voltage	Standard Motor Current Rating		Noise Level		Motor kW	Mass kg Single-Phase
	L/min *1					A	dB*3				
	50 Hz	60 Hz						Single-Phase	Single-Phase		
KHH251-101	149	179	1.3	Hose nipple (ODφ14)	100 V	6.1/5.5	68	69	0.25	19	

*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Pump can be continuously operated at the maximum attainable vacuum. *3 Operating noise level measured on a new pump with the standard built-in ORION motor. Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. * Working vacuum range: 8 kPa [abs] to ultimate pressure. Please consult your dealer regarding continuous operation at levels on the dotted lines in the performance data charts. Models with ductable exhaust available (KHH251A) are also available. When ducting off exhaust, the allowable back pressure from the piping is 10kPa. (This pressure should not be used for any purpose.) * Operating environment (inlet air) conditions: air temp: 0 to 40 °C, humidity: normal levels (65±20%). * Due to the high compression ratios found in high-compression pumps, condensation can easily form within the pump. Therefore the following measures should be taken in order to avoid trouble from rust due to condensation: **During a trial run (operation of 5 minutes or less, such as a momentary operation or short test run) if the operating pressure goes above 8 kPa [abs], then a dry run of 10 to 15 minutes should be made at a pressure of 8 kPa [abs] at the vacuum side of the pump.** * Allowable intermittent power supply voltage fluctuation range is ±10% of the specified voltage; allowable sustained supply voltage fluctuation range is ±5% of the specified voltage. * Please install an overload protection device (such as a thermal relay). Setting guideline (may vary depending on the specific application): Use the current rating listed on the motor nameplate as a guide. * This is a precision made device. Please handle with care during shipping and installation. * See specifications sheet for further details.

Performance Data



External Dimensions (Units:mm)



* Please consult with your dealer in advance for continuous operation at 8 kPa [abs] or higher (just on the performance- data boundary line) .

- Pumps with higher degrees of vacuum are also available.



Please see our catalog D-VG05 Oil-Free Vacuum Pump and Vacuum Filter System, and check KCPH series pumps.

KCPH30-V





Silent Box KCS Series

Soundproofing Box for Dry Pumps

Dry pump soundproofing and functionality for a quieter and better work environment.
ORION Silent Box



Features

- 5 to 10 dB reduction in pump noise.
- Removable front and back panels for easy pump access and maintenance.
- Electric cooling fan for internal temperature control.

Specifications

Applicable Pump	Vacuum, Exhaust Port Diameter	Motor Voltage			Allowable Ambient Temperature °C	Ventilation Fan Motor W	Mass kg	Included Accessories	
		Single-Phase	3-Phase						
			100/200 V	200 V					220 V
			50/60 Hz	50/60 Hz					60 Hz
KHA Series/ KCS21A-0□□1	Rp 3/4	○	○		0 to 35	11/15.5	21	Connection & fitting parts	
KRF08A • KRF15A/ KCS31A-0□□3	Rp 3/4	○	○		0 to 35	11/15.5	22	Connection & fitting parts	
KRF25A • KRF40A KHA750 • 750A/ KCS61A-0□□1 • 3	Rp 3/4	○	○		0 to 35	11/15.5	32	Connection & fitting parts	
KRF70/ KCS70-□01,01A	R1	—	○		0 to 35	25	75	Connection & fitting parts	
KRF110/ KCS110-□01	R1 1/4	—	○		0 to 35	25	90	Connection & fitting parts	

*Dry pump sold separately. *Silent Box is equipped with internal thermostat relay to be attached to user provided warning system/alarm.
*The KHA750 and 750A models fit in the KCS61A-0121 model Silent Box but require an accessory (sold separately) connection piping parts set.
*A caster set is available as an accessory (sold separately) for KCS21A, 31A, 61A models.
*See specifications sheet for further details.

Handling Notes & Recommendations

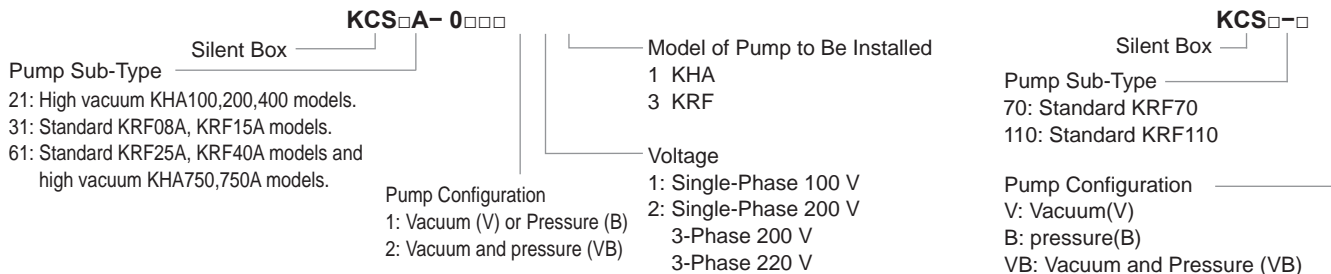
Install in locations that are:

- level and solid.
- well ventilated, ambient temperature of 0 to 35 °C, normal humidity (65±20%.)
- out of direct sunlight, away from heat sources.
- conveniently central to existing air piping.
- away from water and oil spray, and relatively dust free.
- convenient for pump maintenance or overhaul.
- The KCS Series is equipped with a thermostat relay. Please wire the relay to an appropriate alarm system or device.



Silent Box KCS Series

Model Number Nomenclature



Model List

Silent Box Class	Type	Applicable Pump (sold separately)	Power Source	
KCS21A Series for High Vacuum KHA Series Pumps	KCS21A-0111	KHA100-101 KHA200-101 KHA400-101	Single-Phase 100 V 50/60 Hz	
	KCS21A-0211	KHA100A-101 KHA200A-101 KHA400A-101	Single-Phase 100 V 50/60 Hz	
	KCS21A-0121	KHA400-101 KHA100-301 KHA200-301, 301A *1 KHA400-301, 301A	Single-Phase 200 V 50/60 Hz 3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz	
	KCS21A-0221	KHA400A-101 KHA100A-301 KHA200A-301, 301A *1 KHA400A-301, 301A	Single-Phase 200 V 50/60 Hz 3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz	
KCS31A Series for Standard KRF08A • 15A Pumps	KCS31A-0113	KRF08A, 15A-V-02, B-02	Single-Phase 100 V 50/60 Hz	
	KCS31A-0123	KRF08A, 15A-V-01, B-01 KRF15A-V-01A, B-01A	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz	
	KCS31A-0213	KRF08A, 15A-V-02, B-02	Single-Phase 200 V 50/60 Hz	
	KCS31A-0223	KRF08A, 15A-VB-01 KRF15A-VB-01A KRF08A, 15A-VB-02	Single-Phase 100 V 50/60 Hz 3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz Single-Phase 200 V 50/60 Hz	
KCS61A Series for High vacuum KHA750 • 750A Pumps	KCS61A-0121	KHA750-301 KHA750A-301 KHA750-301B-G1 KHA750A-301B-G1	* Requires an accessory (sold separately) installation kit. 3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz	
	KCS61A-0113	KRF25A-V-02, B-02	Single-Phase 100 V 50/60 Hz Single-Phase 200 V 50/60 Hz	
	KCS61A-0123	KRF25A-V-01, B-01 KRF25A-V-01A, B-01A *2 KRF25A-V-01B, B-01B *2 KRF40A-V-01, B-01 KRF40A-V-01A, B-01A *2 KRF40A-V-01B, B-01B *2	3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz	
	KCS61A-0213	KRF25A-VB-02	Single-Phase 100 V 50/60 Hz	
KCS61A Series for Standard KRF25A • 40A Pumps	KCS61A-0223	KRF25A-VB-01, 01A, 01B *2 KRF40A-VB-01, 01A, 01B *2	Single-Phase 200 V 50/60 Hz 3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz	
	KCS70 Series for Standard KRF70 Pumps	KCS70-V-01	KRF70-V-01, 01B KRF70-VH-01, 01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
		KCS70-V-01A	KRF70-V-01A *3 KRF70-VH-01A *3	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
		KCS70-B-01	KRF70-B-01, 01B KRF70-BH-01, 01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
		KCS70-B-01A	KRF70-B-01A *3 KRF70-BH-01A *3	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
		KCS70-VB-01	KRF70-VB-01, 01B KRF70-VBH-01, 01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
KCS70-VB-01A		KRF70-VB-01A *3 KRF70-VBH-01A *3	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz	
KCS110 Series for Standard KRF110 Pumps	KCS110-V-01	KRF110-V-01, KRF110-V-01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz	
	KCS110-B-01	KRF110-B-01, KRF110-B-01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz	
	KCS110-VB-01	KRF110-VB-01, KRF110-VB-01B	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz	

*1 Remove the cable gland from the motor before attaching the cabling to the motor.

*2 Use motor wiring cable set 04037333020 (sold separately) when mounting a 01B series pump in a KCS unit designed for a 01 series pump.

*3 Use motor wiring cable set 04105749010 (sold separately) when mounting a 01A series pump in a KCS unit designed for a 01 series pump.

* Please consult your dealer for different power supply voltages.

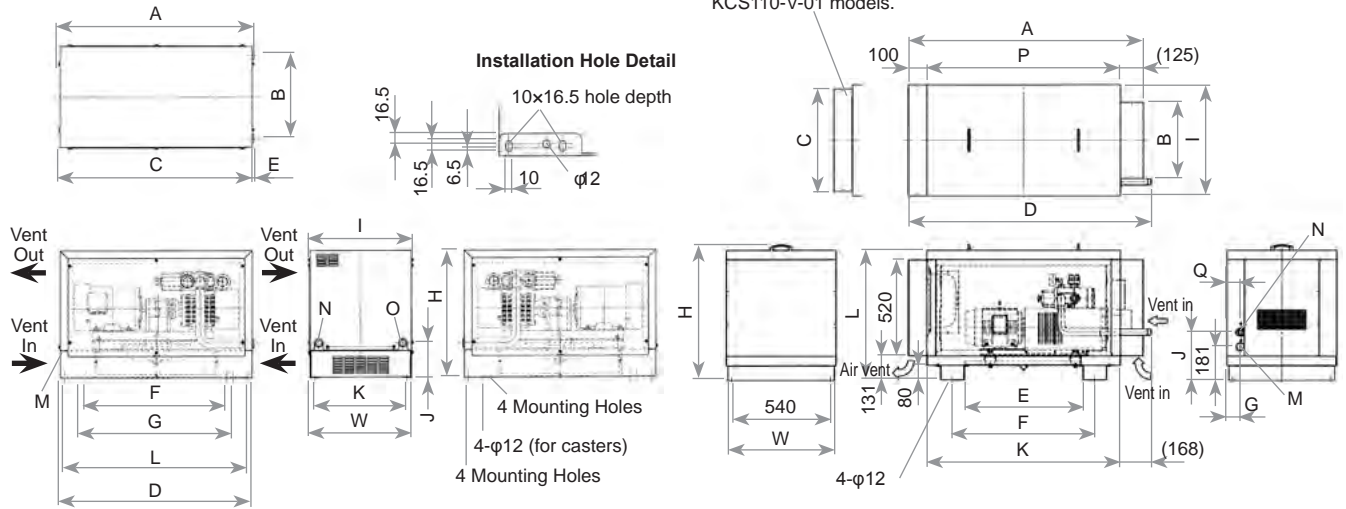
External Dimensions (Units:mm)

KCS21A
KCS31A
KCS61A

KCS70-V-01,01A
KCS110-V-01

*Diagrams are for KCS70-V-01 models.

*Diagrams are for KCS110-V-01 models.



Model KCS	H	D	W	A	B	C	E	F	G	I	J	K	L
21A-0111	(415)	588	337	(602)	270	590	(5)	400	450	(351)	(113)	300	558
21A-0211													
21A-0121													
21A-0221													
31A-0111	(440)	588	337	(602)	270	590	(5)	400	450	(351)	(113)	300	558
31A-0121													
31A-0211													
31A-0221													
31A-0113													
31A-0123													
31A-0213													
31A-0223													
61A-0121	(500)	748	397	(762)	330	750	(5)	550	600	(411)	(137)	360	718
61A-0113													
61A-0123													
61A-0223													
70-V-01, 01A													
110-V-01	(1480)	1435	600	(800)	930	92	(640)	286	1210				

Model KCS	M	N	O	P	Q
21A-0111	$(\phi 19)$ Power Cord Hole	Plug (included)	Vacuum Port INLET Rp 3/4	—	—
21A-0211		Exhaust OUTLET Rp 3/4			
21A-0121		Plug (included)			
21A-0221		Exhaust OUTLET Rp 3/4			
31A-0111	$(\phi 19)$ Power Cord Hole	Vacuum Port INLET Rp 3/4	Pressure (blower) Port OUTLET Rp 3/4	—	—
31A-0121					
31A-0211					
31A-0221					
31A-0113					
31A-0123					
31A-0213					
61A-0121	$(\phi 19)$ Power Cord Hole	Vacuum Port INLET Rp 3/4	Pressure (blower) Port OUTLET Rp 3/4	—	—
61A-0113					
61A-0123					
61A-0223					
70-V-01, 01A					
110-V-01	INLET R1 1/4	1210	82		

*Please consult your dealer for the exact dimensions of KCS70-B-01 (VB-01), B-01A (VB-01A) and KCS110-B-01 (VB-01) models.

*See specifications sheet for further details.



Air Station AS135 Series (Built to order item)

Pump and Blower System Enclosure

Improve Your Shop Environment
And Working Conditions

Installation Capacity:
Heat Dissipation Capacity of Installed Devices:
13.5 kW or less (air-cooled and water-cooled types)



AS135A
Air-Cooled Model



AS135W
Water-Cooled Model

Features

1. Water-cooled and air-cooled models available to best suite your working environment.
Water-cooled models have nearly zero heat emission. Air-cooled models direct hot air away from your workspace with a duct.
2. Works with your existing configuration of pumps and blowers.
3. 10 to 15 dB sound reduction.

Specifications

Model	Cooling Type	Total Installed Pump Capacity kW	External Dimensions *1 mm			Air Connections		Mass *2 kg	Operable Ambient Temp. Range °C
			W	D	H	Inlet/Outlet Port Size max.	Number of Connections Qty.		
AS135A	Air-Cooled	Estimated total heat dissipation capacity for all installed pumps: 13.5	1500	1077	2099	Rc2	Max:10	380	5 to 35
AS135W	Water-Cooled	Estimated total heat dissipation capacity for all installed pumps: 13.5	1500	1077	2411	Rc2	Max:10	420	5 to 35

Model	Cooling Capacity	Cooling Water Connection	Cooling Water Conditions *3			Ambient Temp. °C	Ventilation Air Flow m ³ /h	
			Req. Water Flow L/min	Temp. at Inlet °C	Req. Water Pressure MPa		50 Hz	60 Hz
AS135A	—	—	—	—	—	—	3360	3960
AS135W	13.5	Rc1	30 to 40	15	0.2	25	4800	5760

*1 Including warning lamp at top of unit. *2 Does not include weight of installed pumps. *3 Cooling capacity varies according to number and types of installed pumps, water flow, and water temperature. *Custom models can also be built beyond the above specifications.



Air Ejector KE Series (Built to order item)

KE25 • 60

Degree of vacuum: 80 kPa
Intake Volume: 20 to 50 L/min



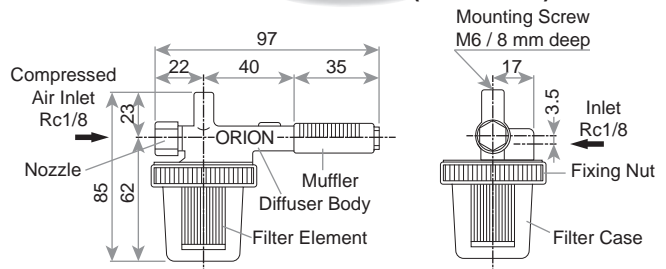
Features

1. Necessary vacuum can easily be obtained using excess compressed air from a factory air compressor.
2. High Performance, Trouble-Free, and Reliable.
3. Lightweight, Inexpensive and Economical with Minimum Installation Space.

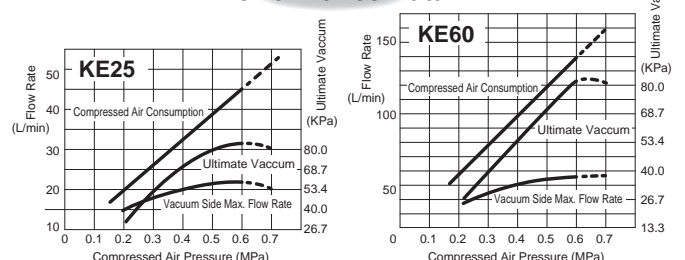
Specifications

	KE25	KE60
Applicable Fluid	Oil-Free Compressed Air	
Working Pressure Range	MPa	0 to 0.6
Operating Temperature Range	°C	0 to 50 (No Condensation)
Nozzle Diameter	mm	0.9 1.6
Degree of vacuum	kPa	80
Intake Volume	L/min	20 50
Consumption	L/min	40 120
Compressed Air Pressure	MPa	0.5
Filter Efficiency	µm	30
Pipng Connection Size		Rc1/8
Mass	g	150

External Dimensions (Units:mm)



Performance Data





Accessory (Sold Separately)

■ Water Separator RA41 • RA42

Water drop separation efficiency of 95%. Removing water from vacuum air expands the function of dry pumps.

Applications

- Food Packaging Machines
- Automated Machinery
- Energy Saving Machinery



Photo:RA41

Specifications

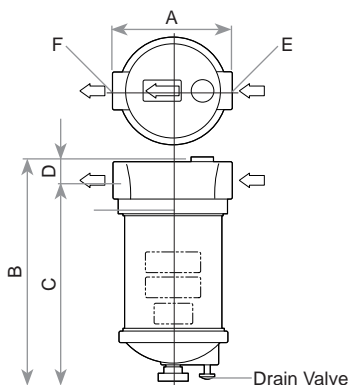
Model	Air Processing Capacity	Operative Vacuum	Air temp. at Inlet	Ambient Air Temp.	Water Separation Efficiency	Water Collection Capacity	Inlet/Outlet Port Diameter	Mass	Applicable Pump Model
	L/min (max.)	kPa	°C	°C	%	cc		kg	
RA41	235 to 560	0 to 80	0 to 40	0 to 40	95	100	Rc3/4	1.0	KRF15A,25A,40A
RA42	235 to 1150	0 to 80	0 to 40	0 to 40	95	230	Rc1	1.7	KRF70

* Stated air processing capacity at an intake degree of vacuum of 0 kPa. * Stated vacuum pressures are gauge pressure values. * Since the life of the filter element depends on conditions of use, change the element when pressure loss is noticed during use. * Water drop collection efficiency refers to the rate of removal of over-saturated moisture (water drip, etc.) flowing into the water separator. Water drop separation efficiency (%)=Removed water drop quantity (g) ÷ total water drop quantity (g) which has flown into the channel × 100. * Water collection capacity is the maximum amount of water that can be collected at one time.

Precautions for Use

- (1) These models are for use with dry pump air intake purposes only. If they are used for purposes other than for dry pump air intake, the product may break and possibly cause injuries.
- (2) Use with simplified rust proofed dry pumps (R type). If the standard type or the high vacuum type (H type) are used, more rusting may occur inside the pump which can lead to pump trouble.
- (3) After ending daily operation, make a no-load run with the pump fully opened to atmospheric pressure for about 10 minutes in order to prevent rusting inside the pump. Failure to do so may lead to rusting of the inside surfaces of the pump which can lead to pump damage.
- (4) When water accumulates up to the allowable water storage quantity, set the degree of vacuum inside the container to 0 kPa (atmospheric pressure) and drain the water through the drain valve. If the water accumulation exceeds the allowable water storage quantity, the accumulated water will be blown into the pump during pump pulsations thus possibly damaging the pump.

External Dimensions (Units:mm)



Model	A	B	C	D	E	F
RA41	120	217	(192)	25	INLET Rc 3/4	OUTLET Rc 3/4
RA42	140	264	(236)	28	INLET Rc 1	OUTLET Rc 1



Accessory (Sold Separately)

■ Clean Filter RA-S • RA-D Series

Helps prevent trouble due to oil mist and exhaust carbon.

RA-S (Oil mist collection filter)

RA-D (Exhaust carbon collection filter)

Features

- High Collection Efficiency
- Low Pressure Drop
- Low Cost



Photo:RA-S

Photo:RA-D

Specifications

Model	Air Processing Capacity *1	Working Vacuum	Working Pressure	Inlet Air Temp.	Ambient Air Temp.	Collection Efficiency *2	Inlet/Outlet Port Dia.	Pressure Drop Meas. Port Dia.	Initial Pressure Drop	Mass	
											L/min
Vacuum Filter	RA-53S-G1	210	100	—	40	40	—	Rc3/4	Rc1/4	5.5	1.5
	RA-54S-G1	440	100	—	40	40	—	Rc3/4	Rc1/4	5.5	2.5
	RA-55S-G1	770	100	—	40	40	—	Rc3/4	Rc1/4	5.5	3.5
	RA-56S-G1	1670	100	—	40	40	—	Rc1	Rc1/4	5.5	6.5
	RA-57S-G1	1670	100	—	40	40	—	Rc1 1/4	Rc1/4	5.5	6.5
Exhaust Filter	RA-53D-G1	210	—	70	80	40	99% of particles 0.3 μm and larger	Rc3/4	Rc1/4	5	2.0
	RA-54D-G1	440	—	70	80	40		Rc3/4	Rc1/4	5	3.0
	RA-55D-G1	770	—	70	80	40		Rc3/4	Rc1/4	5	4.5
	RA-56D-G1	1670	—	70	80	40		Rc1	Rc1/4	5	9.0
	RA-57D-G1	1670	—	70	80	40		Rc1 1/4	Rc1/4	5	9.0

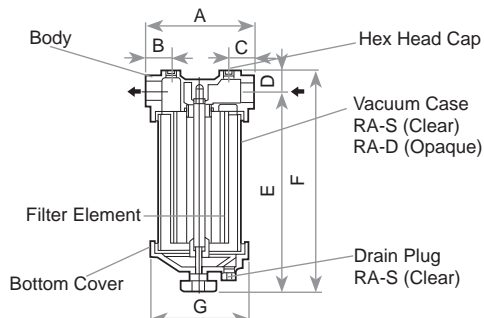
*1 The air processing capacity shown indicates the actual flow rate.

*2 The intake filter is a special oil-mist removal filter. The filter cannot be used to filter substances such as liquid oil or other non-oil substances. Please consult your dealer with any questions.

Pump/Filter Compatibility

Model	Applicable Pump	Use	Filter Element
Vacuum Filter	RA-53S-G1	Protects pumps from oil mist entering pump.	EM-250S
	RA-54S-G1		EM-500S
	RA-55S-G1		EM-750S
	RA-56S-G1		EM-1500S
	RA-57S-G1		EM-1500S
Exhaust Filter	RA-53D-G1	Removes dust particles from pump exhaust air.	EM-250Z
	RA-54D-G1		EM-500Z
	RA-55D-G1		EM-750Z
	RA-56D-G1		EM-1500Z
	RA-57D-G1		EM-1500Z

External Dimensions (Units:mm)



Model	A	B	C	D	E	F	G
RA-53S • D-G1	130	30	30	24	246	270	φ113
RA-54S • D-G1	170	35	35	24	329	353	φ154
RA-55S • D-G1	170	35	35	24	559	583	φ154
RA-56S • D-G1	195	42	42	33	806	839	φ181
RA-57S • D-G1	195	42	42	33	806	839	φ181

Accessory (Sold Separately)

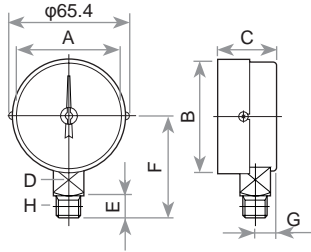
Note: The following Accessory (Sold Separately) are for use only with the specified ORION pumps. Do not use on other non-specified equipment. (Vacuum controller, pressure controller, filter, oil separator, DA Series after-cooler, compound gauges.)

■ **Type A Compound Gauge**

Max. Pressure Dial (Red)



Special for KRF04A models



Specifications

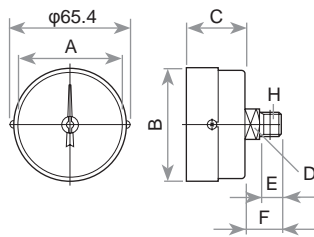
Part Number	Type	Range	Pressure Reading	Units
04102121010	Type A	Vacuum • Pressure	100	kPa

External Dimensions (Units:mm)

A	B	C	D	E	F	G	H
φ58 (Visible part)	φ63	33	□ 17	12	56	11.5	R1/4 (PT1/4)

■ **Type D (CBF use) Compound Gauge**

Max. Pressure Dial (Red)



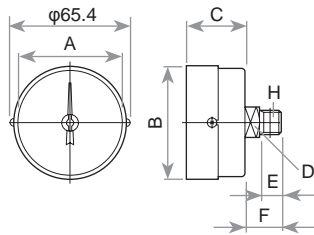
Specifications

Part Number	Type	Range	Pressure reading	Units
04100705010	Type D	Vacuum • Pressure	100	kPa

External Dimensions (Units:mm)

A	B	C	D	E	F	G	H
φ58 (Visible part)	φ63	33	□ 17	12	20	—	R1/4 (PT1/4)

■ **Type D (KRF use) Compound Gauge**



Specifications

Part Number	Type	Range	Pressure Reading	Units
04100289010	Type D	Vacuum • Pressure	100	kPa

External Dimensions (Units:mm)

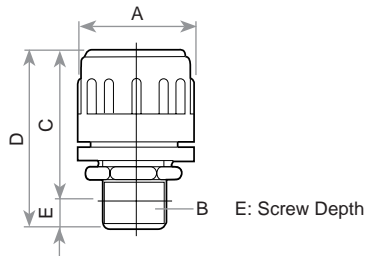
A	B	C	D	E	F	G	H
φ58 (Visible part)	φ63	33	□ 17	12	20	—	R1/4 (PT1/4)

■ **Vacuum Controller**



VC10

VC81



External Dimensions (Units:mm)

Model	VC10	VC32	VC63 • VC63B *1	VC81	VC100B
Part Number	KRF/CBF Others	— 04000445020 04000445010	03040718020 03040718010	03101299010 — 03000205010	03000205020 03044148020 03044148010
A	φ28	φ35	φ52	φ62	φ78
B	R1/8	R 3/8 *2	R 3/4	R1	R1 1/4
C	66	54	78	83	107
D	70	60	87	94	120
E	4	6	9	11	13

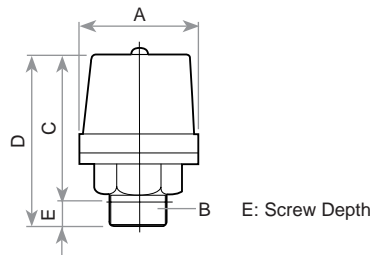
*1 VC63B is for KRF40 and CBF4040 pumps only.

*2 Please use a commercially available bushing if an R3/4 connection is required.

■ **Pressure Controller**



PCA8



External Dimensions (Units:mm)

Model	PC32	PCA6	PCA8	PCA10
Part Number	KRF/CBF Others	04000450030 04000450010	— 03000049010	— 03000048010 03001482010
A	φ35	φ60	φ70	φ82
B	R3/8 *	R 3/4	R 1	R1 1/4
C	54	80	72	107
D	60	89	103	120
E	6	9	11	13

* Please use a commercially available bushing if an R3/4 connection is required.

Accessory (Sold Separately)



Accessory (Sold Separately)

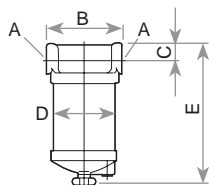
Note: The following accessories are for use only with the specified ORION pumps. Do not use on other non-specified equipment. (Vacuum controller, pressure controller, filter, oil separator, compound gauges.)

■ Filter (For intake air)



RA10

RA11



External Dimensions (Units:mm)

Model	A	B	C	D	E	Filter Capacity
RA10	Rc 3/8	90	34	φ80	182	10 μm
RA11	Rc 3/4	120	25	φ89	220	10 μm
RA22	Rc 1	140	27.5	φ114	265	10 μm

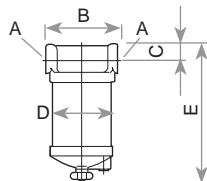
■ Oil Separator (For intake air)

*Not for separating oil mist



RA31

RA32



External Dimensions (Units:mm)

Model	A	B	C	D	E
RA31	Rc 3/4	120	25	φ89	220
RA32	Rc1	140	27.5	φ114	265

■ Vacuum Switch

* Switch-pressure set at factory. Please specify pipe tap size (G1/4 or G3/8) as well as desired ON and OFF pressure settings when ordering.

* Ordered pressure settings can be set within one of 3 pressure ranges (A,B,C).

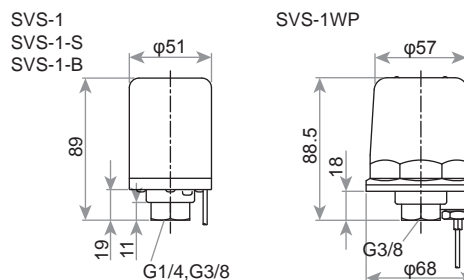


SVS-1
SVS-1-S
SVS-1-B



SVS-1WP

External Dimensions (Units:mm)



Specifications

Model	SVS-1	SVS-1-S SVS-1(SUS)	SVS-1-B SVS-1(BSBM)	SVS-1WP
Voltage Rating	AC250V/2.5A , AC125V/5A			
Body Material	Zinc die-Casting (ZDC2)	Stainless steel (SUS-304·SUS-316)	Brass (C3604BD·Nickel plating)	Zinc die-Casting (ZDC2)
Pressure Cell Type	Phosphor bronze bellows	Stainless steel bellows	Phosphor bronze bellows	
Packing	NBR	FPM	NBR	
Port tap Size	G1/4 or G3/8 to be specified when ordering.			G3/8
Cover	Polycarbonate			Aluminum die-casting

Range	Adjustable Range	Differential Pressure	Set Point Tolerance	Maximum Working Pressure	Standard Settings
	Min. to Max. KPa	Min. to Max. KPa	KPa	KPa	Lower to Upper Limit KPa
A	0 to 40	2.7 to 13.3	±1.3	500	20 to 27
B	40 to 67	6.7 to 40			53 to 60
C	67 to 100	6.7 to 50			80 to 87



SAFETY PRECAUTIONS

Danger/Warning Precautions to Consider Before Use

Before selecting and adopting a dry pump, be sure to read the catalog carefully to check and confirm all the contents such as features, specifications, operating conditions and precautions to make sure the selected type matches your application, purpose, and expected performance before determining your final selection, and also be sure to use the dry pump properly within the ranges of the specifications.

DANGER

Indicates an imminently hazardous situation that, if the product is misused, may bring about death or serious injury to the operator.



Keep away from flammable fumes or explosive gases.

Ensure the product is not exposed to, nor is in the vicinity of flammable fumes or explosive gases as doing so may lead to fire or explosion.

WARNING

Indicates a potentially hazardous situation that, if the product is misused, may bring about death or serious injury to the operator.



Product Use Limitations

- (1) If the unit is to be used as part of critical installations, safety devices and backup systems which can be switched to should be put into place to ensure that serious accidents or losses do not occur in the event that the unit should break down or malfunction.
- (2) This product is designed and produced as a commodity for general manufacturing. Accordingly, the warranty does not apply to nor cover the following applications. However, in cases where the customer/user takes full responsibility and confirms the performance of the equipment in advance, and takes necessary safety precautions, please consult with ORION and we will consider if use of the unit in the desired application is appropriate.
 - ① Atomic energy, aviation, aerospace, railway works, shipping, vehicles (cars and trucks), medical applications, transportation applications, and/or any applications where it might have a great effect on human life or property.
 - ② Electricity, gas, or water supply systems, etc. where high levels of reliability and safety are demanded.



Do not operate with blocked exhaust piping. (Pressure (B) and/or Combination (VB) pumps)

Do not operate when the pressure controller is completely closed or when the exhaust piping is blocked. Doing so may result in increased pressure and temperatures within the piping and could result in burst piping or damage to the pump.



Do not wash filter element with organic solvents.

When cleaning the filter element, do not use organic solvents such as thinner, alcohol, benzene, gasoline, or kerosene. Doing so may result in an explosion or fire.



Do not remove product covers during operation.

Do not operate the product while covers are removed. Doing so may result in serious injury to hands or other injuries as the fan, coupling, pulley and belt rotate at high speeds.



Do not put hands near rotating parts.

Doing so can result in serious injury to, or loss of a hand.



Ensure power cord is not damaged.

Do not damage, bend, pull, or bind the power cord. Do not place heavy objects on it nor let it get caught or pinched. Doing so may damage the cord which could result in electric shock or fire.



Keep this product away from water.

Do not pour water over this product nor use water to clean it. Furthermore, do not install where it may be exposed to water or other liquids. Doing so could result in electric shock or fire.



Be alert of possible electric shock.

Do not touch electrical parts such as the power cord with damp hands. Also do not operate switches with damp hands. Doing so might result in an electric shock.



Do not modify this product.

Modification of the product may result in injury, electric shock, or fire.



SAFETY PRECAUTIONS

Danger/Warning Precautions to Consider Before Use

Before selecting and adopting a dry pump, be sure to read the catalog carefully to check and confirm all the contents such as features, specifications, operating conditions and precautions to make sure the selected type matches your application, purpose, and expected performance before determining your final selection, and also be sure to use the dry pump properly within the ranges of the specifications.



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Be sure to properly ground the product.

Ensure the product is properly grounded from either the grounding screw inside the terminal box or at the lower part of the frame of the motor. Improper or lack of grounding may result in electric shock.



Installation of this product must be done by qualified personnel.

If improperly installed, the product may fall down or drop resulting in personal injury, electric shock, or fire.



Do not continue to operate this product if it is not working normally.

Stop operation if product does not function normally. Then remove the power cord or shut off the main power supply and consult with your dealer or a qualified repair company. Continued operation of the product when not operating properly can result in electric shock or fire.



Shut off the main power supply before cleaning, maintenance and inspection.

Shut off the main power supply before cleaning, maintenance and inspection, and clearly post a sign on the power supply switch to indicate it is under maintenance. Failure to do so may result in electric shock or personal injury. Consult with a specialized company for maintenance and inspection.



Inspect the power plug periodically.

If the product is operated with a power plug, periodically inspect the power plug and confirm it is not covered with dust. The power plug must be fully inserted into its socket such that there is no gap between the plug and socket. If the power plug is covered with dust or not fully inserted, it may cause electric shock or fire.



Be sure to install protective devices.

Consult with a specialized company to install an earth leakage breaker. Failure to do so may cause electric shock or fire. Also, install an overload protection device (thermal relay). Operation without such devices may cause malfunction due to overload or result in fire.



Always have 2 or more people when installing/moving equipment over 25 kg.

When installing or moving equipment over 25 kg, always lift and move using at least 2 people. And when lifting/moving, do not hold onto the motor control box, filter case, or controller. Dropping equipment may result in injury, damage to the equipment or improper function.



Always use a proper restraining tie-down belt to lift/move equipment over 50 kg.

When moving equipment over 50 kg, always use a tie-down belt to prevent dropping equipment. Not properly securing equipment when moving can lead to injury.



Use eye bolts properly.

When using eye bolts, hang the product from 2 points and ensure the cable angle at each point is at least 60 degrees to the base. Failure to handle properly may result in the product overturning or falling down.



Do not use the product outside.

The product is intended for indoor operation only. If the product is used outside and is exposed to wind or rain, the motor may suffer damage to the insulation which may result in electric shock or fire.



Make sure caster stoppers are locked.

After installation is complete, lock the stoppers on the front casters. Failure to do so may lead to the product shifting or falling over which may result in personal injury or damage to the product.

CAUTION

Indicates a critical situation that, if the product is misused, may bring about injury to the operator or damage to the product.



Do not operate the product outside the voltage range specified on the motor.

Operation with any voltage other than the rated voltage specified for the motor may result in failure or accident.



Do not sit on, lean on, or place objects on the product.

Do not place heavy objects or objects containing water on the product. Do not sit or climb on the product. Doing so can result in injuries due to falls. If water spills on the product, rust or damage to insulation may result which could lead to ground leakage or electric shock.



Do not use the product beyond its specified pressure rating.

Using the product beyond its specified pressure rating may shorten the life and/or cause damage or failure of the product.



Burn Warning

Do not touch areas around the pump, the surface of the aftercooler the exhaust port, or the piping surface on the exhaust side. These surfaces may be hot and cause burns if touched.



Inspect the earth leakage breaker periodically.

Periodically check the earth leakage breaker to ensure it is working correctly. Failure of this device may lead to electric shock or a short circuit.



Install check valve.

Be sure to install a check valve in a horizontal position within 50 cm of the suction (or exhaust port) of the pump in order to avoid reverse-rotation by residual pressure when stopping the pump. Failure to do so may result in injury or malfunction of pump. (Not necessary for KM41A, KYP, KHA, KHH, and KHF models.)



Shut off the main power supply when not in use for extended periods.

When not used for extended periods, shut off main power supply. Failure to do so may result in electric shock, due to degradation of insulation, or fire due to electrical leakage.



To unplug, do not pull on cable – pull the plug itself.

When used with a power plug, remove the plug by grasping the plug and pulling it out. Removing the plug by pulling on the cord may result in partial separation of the core wire which can lead to heating and deterioration.



Ensure wiring does not come into contact with motor frame.

Install wiring such that wires do not come into contact with the motor frame, otherwise heat from the motor may melt wire insulation or pose a fire risk.



Wear protective gear and clothing when performing cleaning and maintenance.

In order to prevent burns, wear gloves when maintaining or cleaning. Failure to wear protective gear may result in burns or other injury due to contact with hot motor surfaces.



Wear protective gear and clothing when moving equipment.

When moving equipment, wear non-slip gloves and safety-shoes. Not wearing protective clothing while moving equipment may result in injury.



Continuous operation is recommended.

Product lifetime may be significantly reduced, or deterioration or malfunction of the product could result if start/stop frequencies are high (cycles of 5 minutes or less).



Do not wrap gauges or controllers with sealing tape.

When installing gauges or controllers, do not apply sealing tape on part threads. Doing so may dent, or warp the threads and may also lead to improper operation.

(Vaneless Pump)
Oil-Free Vacuum Pumps and Blowers

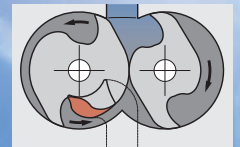
[Motor Output: 1.5 to 11 kW]

Power-Saving Vacuum!

Multi-Unit Control & Inverter Control for Up To 84% in Energy Savings!

Basic Model with Advanced Performance Specifications

We've achieved a vacuum pump that uses less energy with our newly developed non-contact high efficiency rotor. And of course, it's Oil-Free! Our non-contact rotor offers improved sound and reduced noise levels. Harsh low frequency noise (especially around 300 Hz and below) has been greatly reduced.



Using digital analysis technology, we have achieved the optimum curve in our newly developed, high efficiency non-contact rotor.

Vacuum pumps create vacuum by moving air out from a particular space. Our newly developed high efficiency rotor makes no contact with the cylinder, which reduces energy losses, and no oil inside the pump gives you economical clean air. In addition, an improved level of maintenance has also been achieved. Blower spec. up to 100 kPa (0.1 MPa, 1 kgf/cm²)! Our oil-free blower provides the clean air to best improve your working environment.



We've added inverter control to our basic models, yielding inverter models that offer even greater energy savings.



eco speed control

Energy saving mechanism that automatically adapts motor speed to changes in air consumption.



Why not give Energy-Saving Vacuum Pumps a try?

Case Study of Vacuum Power-Savings

* Based on 6,000 operating hours per year.

1 PCB Packaging

Consolidated Small-Diaphragm Pumps

Power-saving gains from inverter and multi-unit control, plus reduced factory air-processing loads due to relocation adds up to power-savings greater than 80%!

51%
Power Savings

Before Change

Power Consumption Total: 90 kW

240 small 200 W pumps spread around the factory.

After Change

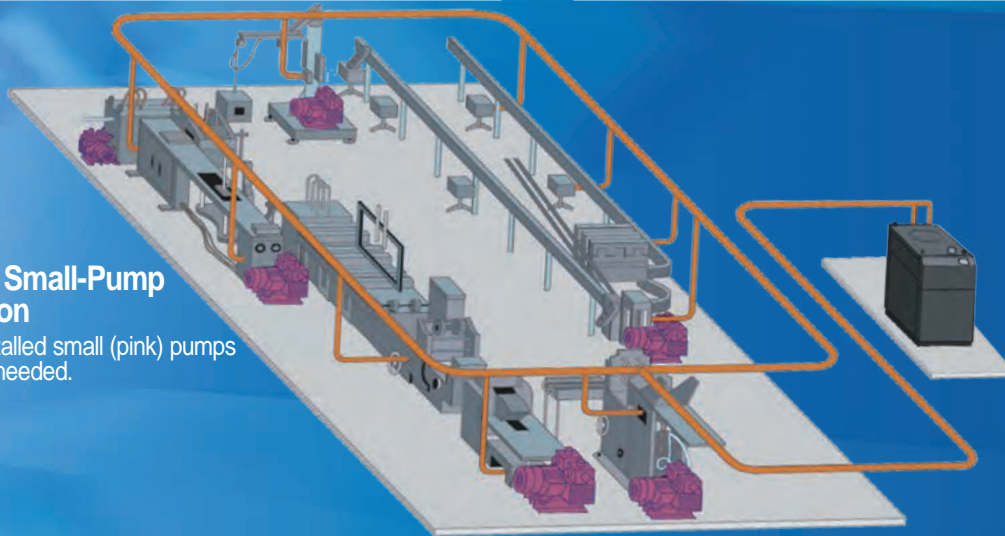
Power Consumption Total: 44 kW

Reduction: 56 kW

Change to 4 KCE620A units with Multi-Unit Control, and these pumps moved to a machine room.

Example of Small-Pump Consolidation

* Previously installed small (pink) pumps are no longer needed.



2 Paper Package Manufacture

Rotary Vane Pump Consolidation

Change to Inverter + Multi-Unit Control System. Consolidating the installation site also consolidates maintenance tasks. Noise reduction due to the pump case design has greatly reduced operating noise.

52%
Power Savings

Before Change

Power Consumption Total: 92.6 kW

41 constant-speed vacuum pumps (KRA models)

After Change

Power Consumption Total: 44 kW

Reduction: 48.6 kW

Change to 4 KCE620A units.

High Maintenance Cost



And spread across the factory.

× 41



Inverter Vacuum Pump

One-Location Maintenance Means Reduced Manpower!

Please see our website or specialized catalog for details.

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D-VG05

Dairy Equipment

Products

- Milking Equipment
- Refrigerating Equipment
- Feeding Equipment
- Animal Waste Treatment Equipment



Photo:
Milking Unit Automated
Transportation Equipment
Carry Robo UCA30A

Vacuum Pumps and Related Equipment

Products

- Oil Free Vacuum Pump / Blower
- Dry Pump
(Oil-free rotary vane vacuum pump)
- Silent Box
(Dry pump soundproofing enclosure)
- Clean Filter



Photo :
Oil Free Vacuum Pump / Blower
KCE620F-VH

Heating Equipment

Products

- Jet Heater BRITE
(Infrared heater)
- Jet Heater HP
(Portable warm air heater)
- Jet Heater HS
(Convection warm air heater)



Photo : Jet Heater
BRITE
HRR480B-S

Refrigerating Equipment

Products

- Inverter Chiller
- Unit Cooler
(Fluid circulation refrigeration unit)
- Free Cooling Chiller
- Dehumidifier
- Others



Photo :
DC Inverter Chiller
RKE3750B-V

Compressed Air Equipment

Products

- Air Dryer
(Refrigerated compressed air dryer)
- Heatless Air Dryer
(Adsorption type compressed air dryer)
- Air Filter
(Compressed air purification equipment)
- Others



Photo :
DC Inverter Air Dryer
RAXE1100B-SE

Precision Air Processor

Products

- Precision Air Processor
- Precision Water Chiller
(Precision control of water temperature)
- Fresh Eco Cube
(Outside-Air Processor)
- Others



Photo : Precision Air Processor
PAP10C-W



**Safety
Precautions**

Please read the Operating Manual thoroughly and operate the product accordingly.
For specialists in installation and wiring of ORION equipment, please consult your ORION dealer.
Choose the ORION product that best suits your needs. Please do not use any product in a manner for which it was not intended. Doing so may lead to product damage or failure.

Continually developing a complete and trustworthy nation-wide network of expedient sales and service everywhere, anytime.



PERRY JOHNSON
REGISTRARS, INC.

ISO9001 / ISO14001 obtained
at Main Plant, Koshoku Plant
and Chitose Plant.



Orion Supports the SDGs

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This catalog contains product specifications as of May 2023.

- Actual product colors may vary slightly from catalog.
- The structure or specifications of products contained in this catalog are subject to change without prior notice.