ORION
冷熱と真空でイノベーション
Innovating with Thermal Control and Vacuum

ORION Dry Vacuum Pump / Blower

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

Jan. 2020 | D-VG02
ORION Dry Vacuum Pump / Blower Catalog

Striving to Make Products that Move You

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

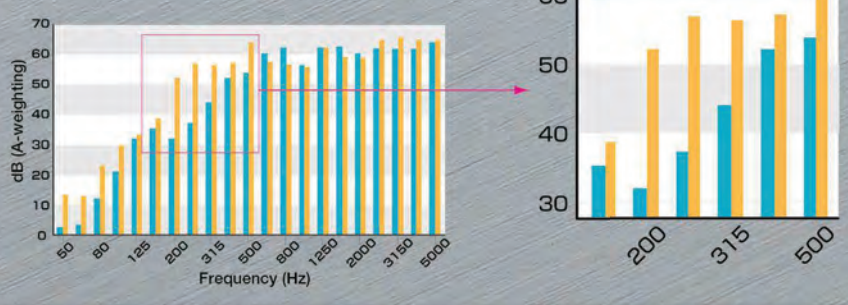
Reduced Annoying Low Frequency Noise

Long Life

Vane Life Increased 30%
(compared to previous models)

LOW NOISE 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**

ign 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, 01B models) (Excluding models with single-phase motors)
- Easy Vane Replacement (KHF14 • KHF20)
- 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

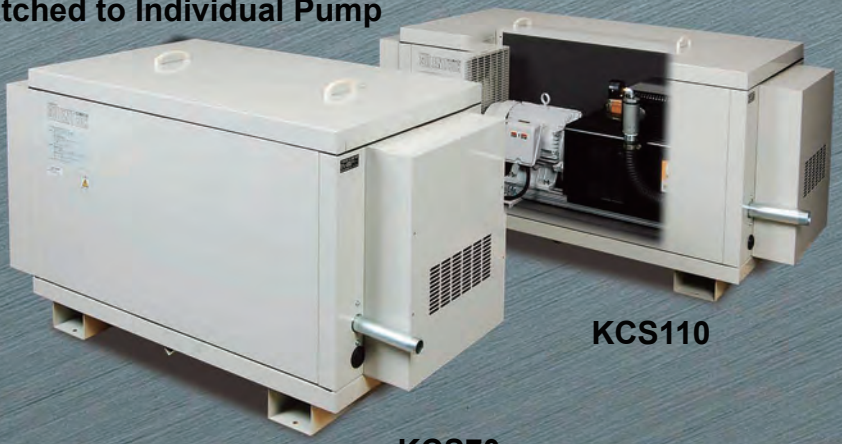
Heat Output from Enclosed Pumps Cooled via Water-Cooled Condenser. Zero-Level Heat Output!

Silent Box

KCS series

5 to 10 dB Noise Reduction

Matched to Individual Pump



KCS70

KCS110

KCS21A,31A,61A

Index

Model Nomenclature / Functioning Principles / Sample Applications

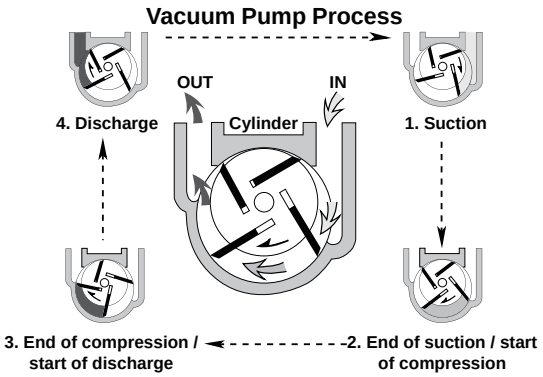
Oil-Free Rotary Vane Vacuum Pump that Meets Your Clean Work Needs

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

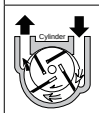
● Utilize Vacuum • Vacuum Spec. (Suction Air)

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"

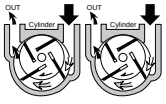
● Vacuum/Blower Spec.

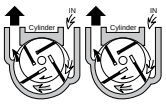
Construction	Mark	Designation	Operation
		VB	Simultaneously utilizes the intake and exhaust sides of the pump. This is called "1-Cylinder VB Spec."

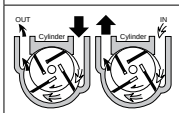
* Construction diagrams are of the KRF Series of pumps.

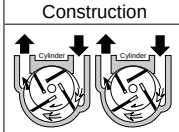
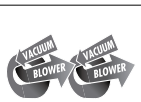
Please refer to page 3 for model descriptions.

● 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.

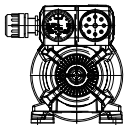
Model Nomenclature

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

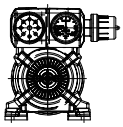
KRF □□ - □□ - □□

Model Name

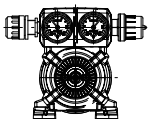
Type of Pump:
V: Vacuum



B: Blower

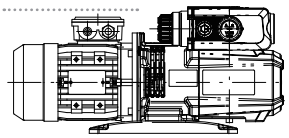


VB: Vacuum/Blower

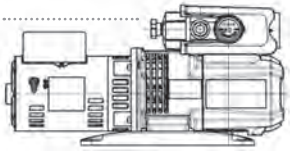


04A, 08A, 15A, 25A, 40A, 70, 110
Pump Flow Capacity m^3/h

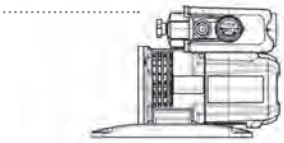
01: Three-Phase Motor



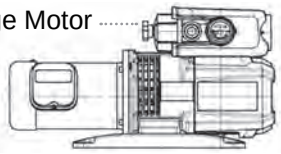
02: Single-Phase Motor



03: No Motor



04: 400 V Class, 6 Voltage Motor



CBF □□□□ - □□□□ - □□

Model Name

01: Three-Phase Motor
03: No Motor
04: 400 V Class, 6 Voltage Motor

Pump Configuration
VBVB: Vacuum/Blower
Vacuum/Blower
VB: Vacuum/Blower
VV: Vacuum/Vacuum
BB: Blower/Blower

2nd Pump Flow Capacity m^3/h

1st Pump Flow Capacity m^3/h

KHF □□ - □□ - □□

Model Name

01: Three-Phase Motor
02: Single-Phase Motor
04: CE Marking Rated Motor

Pump Configuration
V: Wide Range
VH: High Vacuum Only

08, 14, 20
Pump Flow Capacity m^3/h

Model Nomenclature

CBXP □□ □□ □ - □□ - □□

Model Name

02: Casters
03: Casters, Hour meter

Type of Pump:
V: Vacuum
B: Blower
VB: Vacuum/Blower

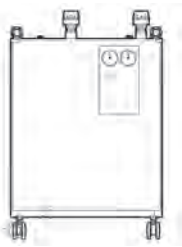
Model Revision Number

2nd Pump Flow Capacity m^3/h

1st Pump Flow Capacity m^3/h

Hour meter

03



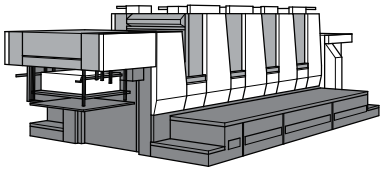
02, 03

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.

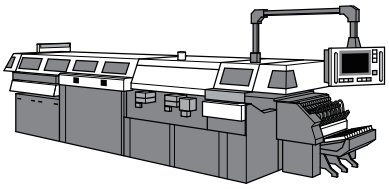


CBF Series Combination Pump

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.

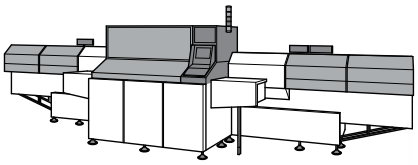
(These pumps are built into the installed machine.)

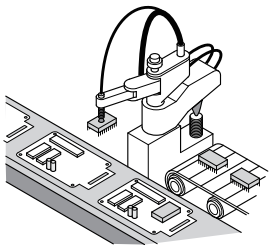
KHA Series

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.





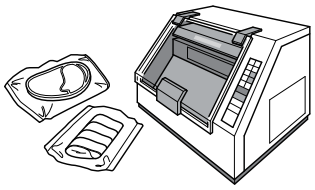
(These pumps are built into the installed machine.)

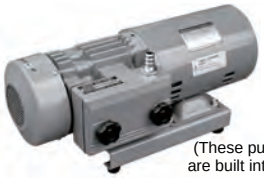
KHA Series

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.



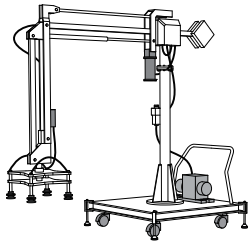


(These pumps are built into the packaging machine.)

KHH Series

Vacuum Lift

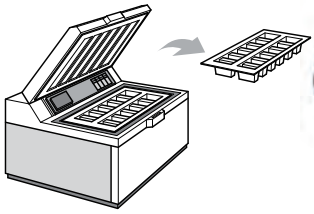
The vacuum generated from the vacuum pump is applied to vacuum pads that pick up and transport the work.



KRF Series

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

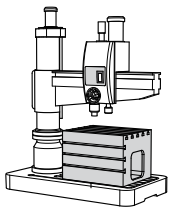
A thin flat film is placed on the forming machine and an instantaneous burst of vacuum is applied inside the mold, which draws the film over the shape of the mold. (Materials Used: PP filler, expanded PP, A-PET, PS-based, PSP-based, etc.)



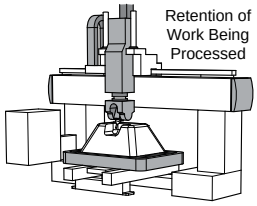
KHF Series

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.



Vacuum Source for Work Retention on Drilling Machines



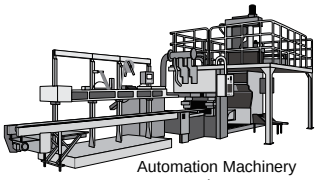
Retention of Work Being Processed

Vacuum Source for Work Retention on Trimming Machines

KRF Series

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.

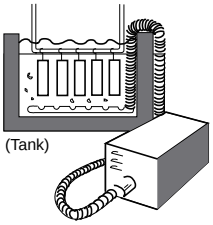


Automation Machinery Equipment

KRF Series

Liquid Agitation and Aeration

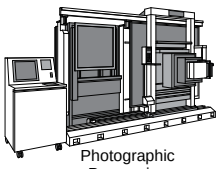
A pipe with small holes is placed at the bottom of the tank. Air from a blower is sent to the pipe, and the rising air agitates and aerate the liquid in the tank.



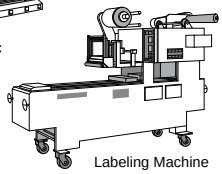
(Tank)

Other Applications

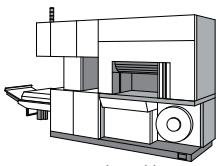
- Photographic Processing ● Insertion Machinery
- Packaging Machines ● Computer Applications
- Paper Counter ● Labeling Machine ● Parts Feeder
- Dust Gas Sampling ● Air Bearing ● Oxygen Production
- Medical / Health Care Equipment ● Business Machinery
- Other Automation Machinery Equipment
- Please contact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



Photographic Processing



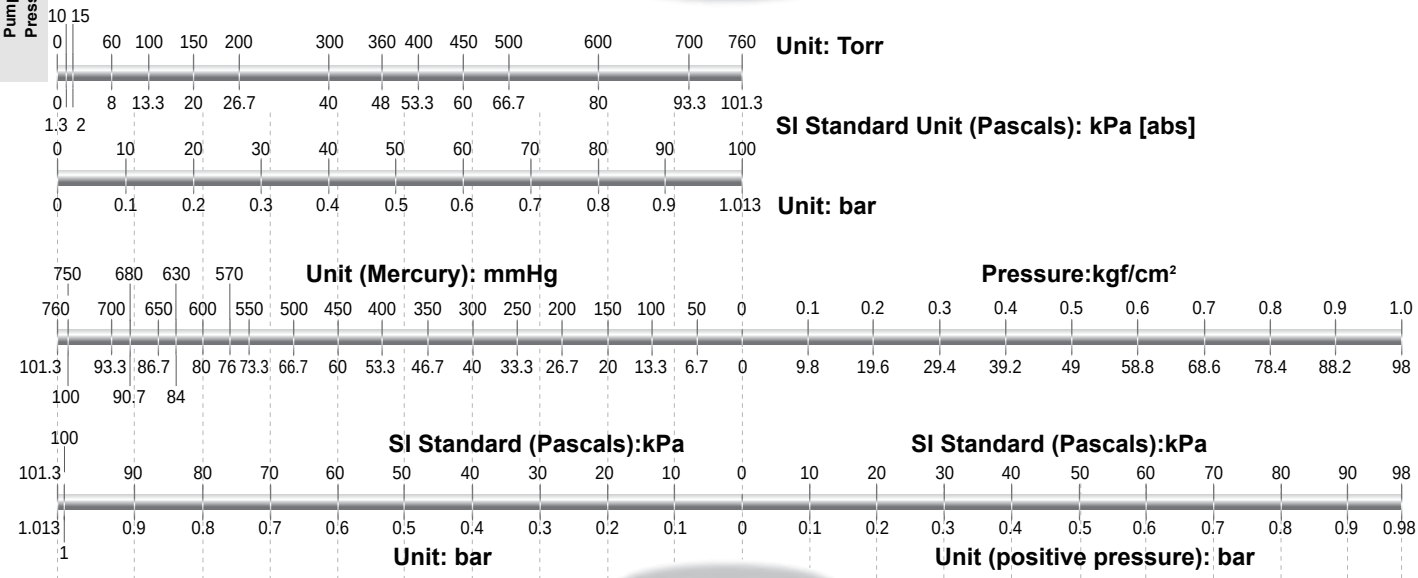
Labeling Machine



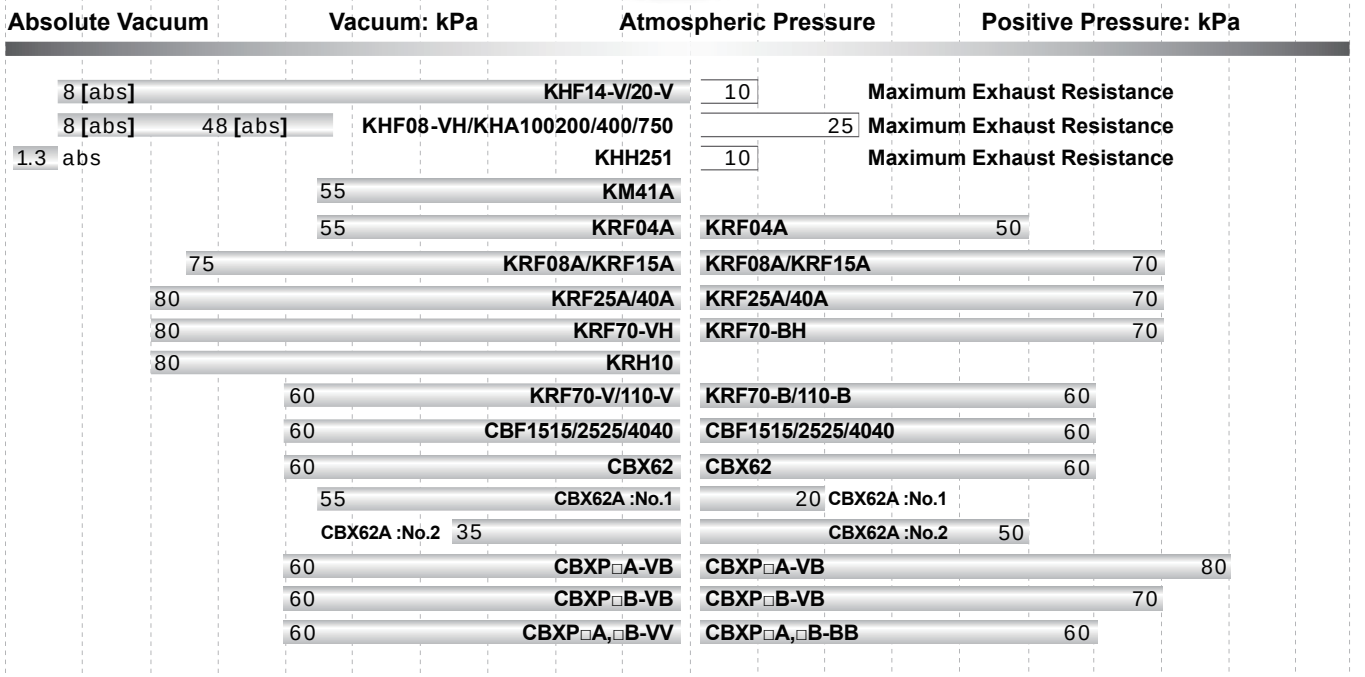
Automated Machinery Equipment

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

Pressure Units Comparison Chart



Pump Pressure Guide



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:

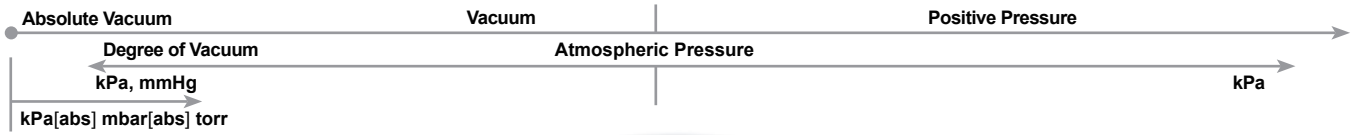
The continuous degree of vacuum of the KRF40A would be in the range of **80-5.9 = 74.1 kPa.**

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/cm²	psi	mbar
1 kPa	→	1	1.02×10^{-2}	1.45×10^{-1}	10
1 kgf/cm²	→	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

From	To	cfm	m³/h	L/min	L/s	m³/s
1 cfm (ft³/min)	→	1	1.6992	28.32	0.472	4.72×10^{-4}
1 m³/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 m³/s	→	2119	3600	60000	1000	1

Model List

Model	Specification	Applications	Model (Three-Phase 200 V)	Continuous operative vacuum (kPa) Operational (maximum)	Designed pumping capacity L/min (50 Hz)	Three-Phase Motor 50 Hz 200 V	Three-Phase Motor 60 Hz 200-220 V	Single-Phase Motor 50/60 Hz 100 V 200 V	Without Motor	Other Voltage, 3-Phase Motor 400 V Class	CE Marking	UL *2	RoHS Directive	Gauge	Controller	Operational Sound Silent Box Without	Operational Sound Silent Box With	Page
KRF08A 	V	• Printing / Binding • Automation • Analytical instruments • Packaging *Vacuum requirement 55 – 80 kPa • Blower for aeration, dust/water blowoff (air knife), etc. *Discharge pressure requirement 50 – 70 kPa	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		
KRF15A 	V		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		
KRF25A 	V		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		
KRF40A 	V		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		
KRF70 	V		70-V-01B	60	1130	○	○ *1	—	○	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		
KRF110 	V		110-V-01B	60	1850	○	○ *1	—	○	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		
KHA100 		• Chip inserter • Small parts assembly • Photographic Processing • Packaging • Food processing • Vacuum forming *Vacuum requirement 60 – 93 kPa	100-301 Photo:400	From ultimate pressure to 48 (abs)	55	○	○	○	—	MTO	—	MTO	—	Option	Option	60 / 61	47 / 51	P30
KHF08 			08-VH-01 08-VH-04 (CE)	From ultimate pressure to 48 (abs)	125	○	○	MTO	MTO	MTO	○ 04 model	MTO	—	Option	Option	64 / 67		P28
KHF14 			14-V-01 14-V-04 (CE)	Overall range	230	○	○	MTO	MTO	MTO	○ 04 model	MTO	—	Option	Option	66 / 68		P28
KHF20 			20-V-01A 20-V-04 (CE)	Overall range	340	○	○	MTO	MTO	MTO	○ 04 model	MTO	—	Option	Option	67 / 69		P28

* The model number will differ depending on the model specification: single-phase motor / models without motor. *1 230 V standard compatible. *2 Equipped with UL listed motor.

* ○ 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.

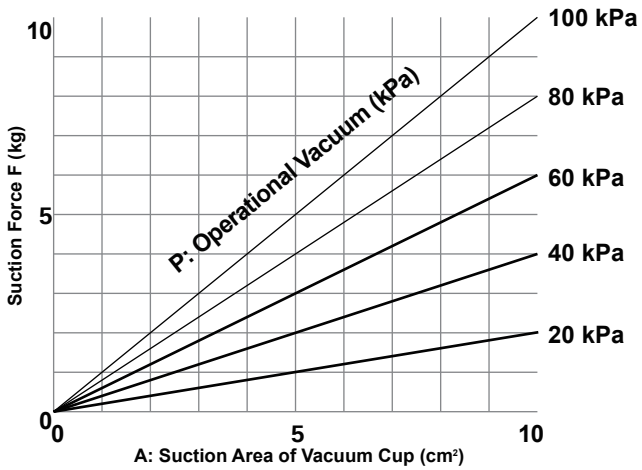
In the case of vacuum lifting, a comparison of grabbing force along with the degree of vacuum, and the size of the area being grabbed.

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

Note: The precise formula is F=A × P / 98.1 kPa, but for practical use, we assume 101.3 kPa ≈ 1 gkf/cm^2.

F: Suction force (kg)
A: Suction area of vacuum cup (cm^2)
P: Operational vacuum (kPa)

Graphed, the relationship between these variables is as below:



Conversion formulas of pressure related units:

A	B		
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

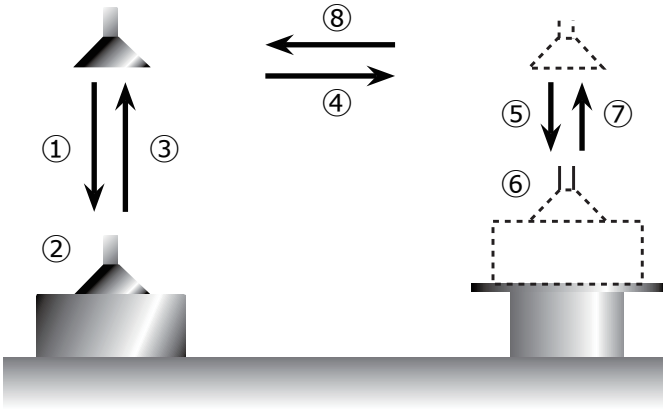
Lifting and Conveying Objects

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 kg
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 $^1/_2$B×300 cm (from pump to vacuum cup.)
Vacuum cup volume: 100 cm^3



(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.

$$F = 25\ kg \quad P = 50\ kPa$$

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 cm^2

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 cm^2 (50.7×2.)

*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 (Inner volume of pipes) + V2 (Inner volume of vacuum cup:100 cm^3)
(I.D. of 1 1/2B is 4.16 cm)

$$V=\pi\times\left(\frac{4.16}{2}\right)^2\times300+100=4175\ cm^3\ (4.2\ L)$$

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

Pipe A	Pipe B	Inside Diameter cm	Cross Section cm^2	Pipe A	Pipe B	Inside Diameter cm	Cross Section cm^2
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).

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

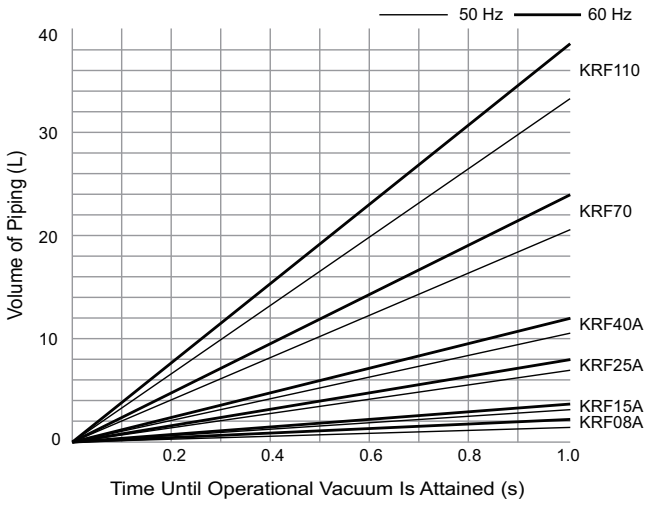
S: Flow demand (L/min)
V: Piping inner volume 4.2 L
⊿t: Time to grab 0.6 s

P0: Ultimate vacuum of pump 90 kPa
P1: Initial pressure inside pipes 0 kPa
P2: Vacuum (Suction force) 50 kPa

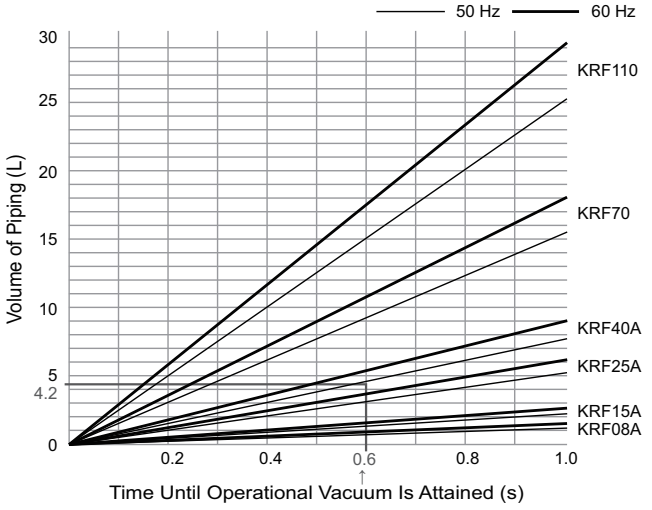
341 L/min is figured from the above.
From the above equation we conclude that the required flow demand is **341** L/min.
On the vacuum performance graph (Graph 5) we select the point at the intersection of the flow rating of **341** and on the horizontal axis, the midpoint between P1 and P2, which is 25. The nearest line above this point indicates **KRF40A** is a suitable model.

Graphs for Pump Selection

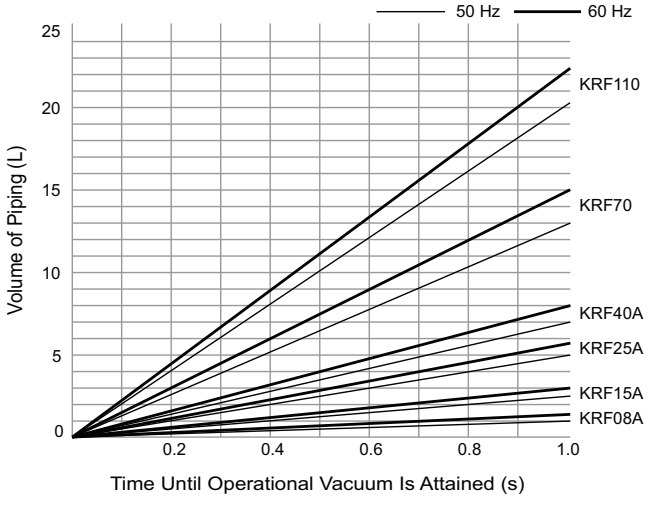
Graph 1 (at 40 kPa)



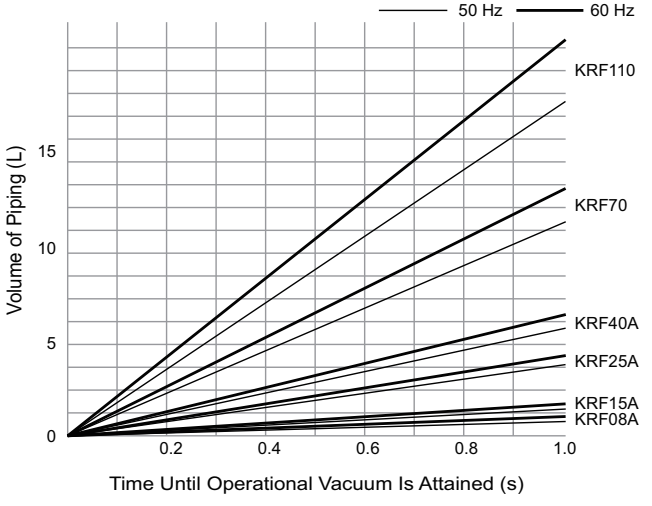
Graph 2 (at 50 kPa)



Graph 3 (at 55 kPa)



Graph 4 (at 60 kPa)



Regarding Pressure Loss

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

ΣPi = p1 + p2 + p3 + p4 + … + pn pi:pressure loss of each pipe

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

pi: 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)
⊿t : Time to grab 0.6 s
P0: Ultimate vacuum of pump (kPa)
P1: Initial pressure inside pipes (kPa)
P2: Vacuum (suction force) (kPa)

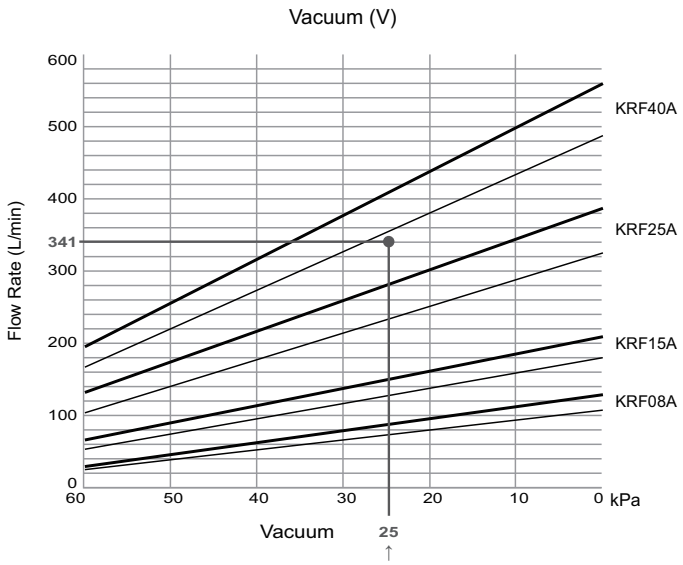
$$S = \frac{138.2 \times V}{\Delta t} \times \log \frac{P_0 - P_1}{P_0 - P_2}$$

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 P1 and P2	At intermediate point between pressure drop and P2

Vacuum Controller Is Not Used		
S	No pressure loss	With pressure loss
	At P1	At pressure drop

Graph 5 (Performance curve)



Model List

Standard Optional

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: Separated	Drive: Direct-coupled	Compound Gauge: Type D	Compound Gauge: Type A	Main equipment: Vacuum Controller	Main equipment: Pressure Controller	Main equipment: Filter Case	Main equipment: Oil Separator	Main equipment: Water Separator	Main equipment: Clean Filter	Main equipment: After Cooler	Main equipment: 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	■
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				■

*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 – 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

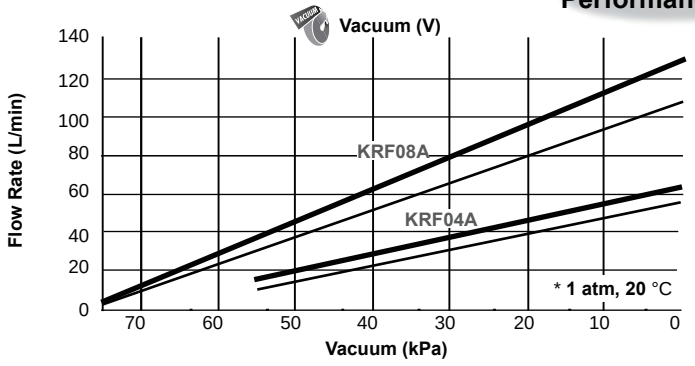
Single-Phase Motor / 3-Phase Motor

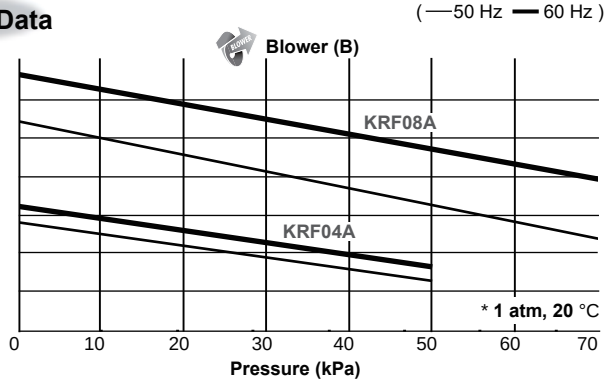
Model	Designed Pumping Capacity		Ultimate Vacuum		Continuous Operating Vacuum		Continuous Operating Pressure		Piping Connection Size	Voltage						Standard Motor Current Rating A						Noise Level		Motor	Mass	
										Single-Phase (02A)			3-Phase (01)			Single-Phase (02A)			3-Phase (01)						
										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				
	L/min *2		kPa(min.) *3		kPa (max.) *4		kPa (max.) *4			3 phase(04)*5						3 phase(04)*5									kg	
										380 V	400 V	415 V	400 V	440 V	460 V	380 V	400 V	415 V	400 V	440 V	460 V	dB*6		kW	Single-Phase	3-Phase
	50 Hz	60 Hz	50 Hz	60 Hz	Recom.	Max.	Recom.	Max.		50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	50 Hz	60 Hz			
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 @ 1.4A. 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.**

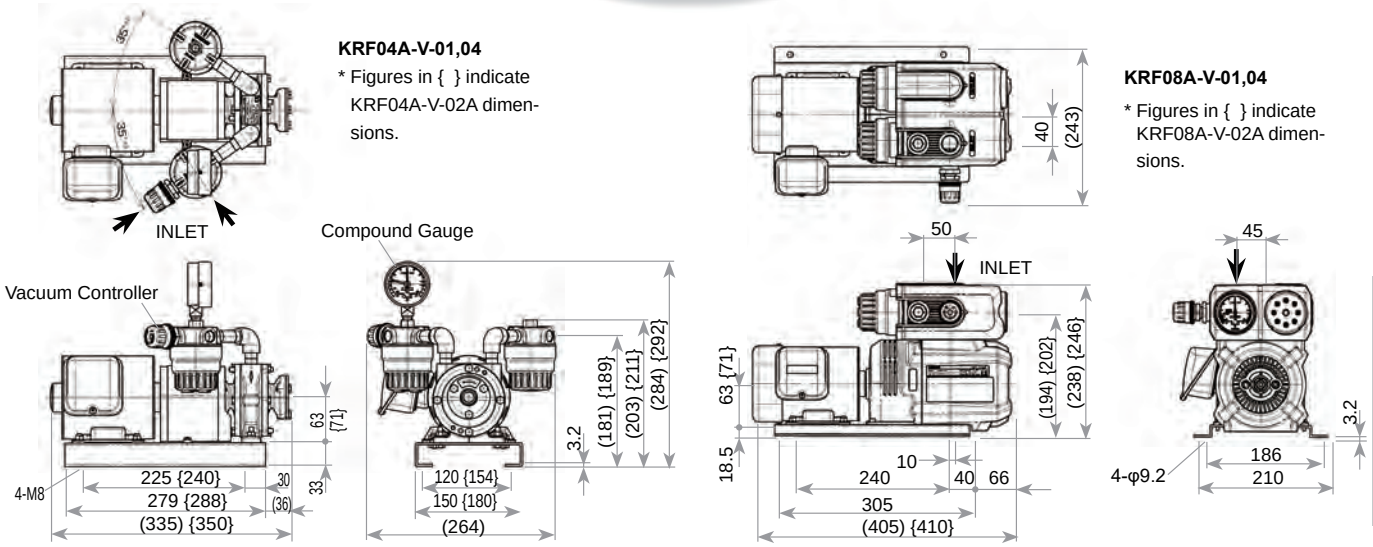
Performance Data

(—50 Hz ━60 Hz)





External Dimensions (Units:mm)

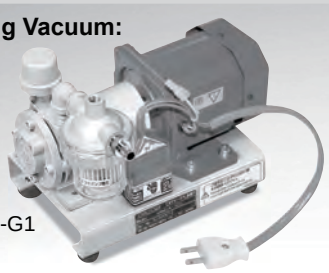


KRF04A-V-01,04
* Figures in { } indicate KRF04A-V-02A dimensions.

KRF08A-V-01,04
* Figures in { } indicate KRF08A-V-02A dimensions.

Compact KM Model

Continuous Operating Vacuum:
55 kPa or lower
Flow Rate:
29 L/min (60 Hz)



KM41A-101-G1

KM Features

- **Free rotor drive -- no side adjustment necessary.**
- **Easy Maintenance**
- **Oil-free pumps operate without oil so your working environment and equipment stay free from oil contamination.**
- **Can be hooked up directly to rubber or vinyl hoses.**

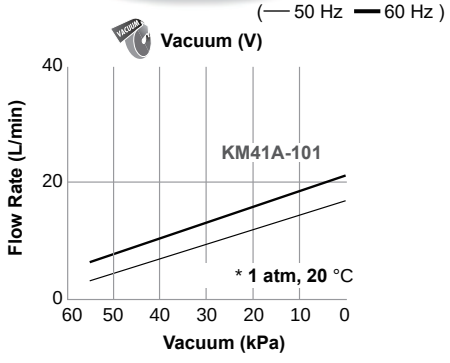
KM Specifications

Single-Phase 3-Phase

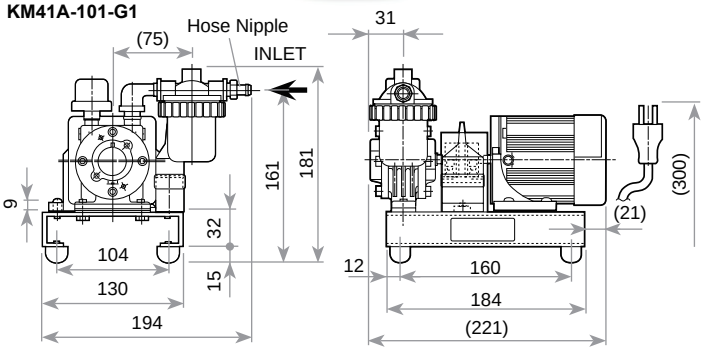
Model	Designed Pumping Capacity		Ultimate Vacuum		Continuous Operating Vacuum	Piping Connection Size	Voltage				Standard motor current rating A				Noise Level		Motor	Mass	
							Single phase		3 phase		Single phase		3 phase						
	L/min *1		kPa (min.) *2		kPa (max.) *3		100 V	100/200 V	200 V	220 V	100 V	200 V	200 V	220 V	dB*4			kg	
	50 Hz	60 Hz	50 Hz	60 Hz			50/60 Hz			60 Hz	50/60 Hz			60 Hz	50 Hz	60 Hz	kW	Single-Phase	3-Phase
KM41-A-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. *** For detailed specifications, please refer to the specifications sheet.**

Performance Data



External Dimensions (Units:mm)



Standard Pump KRF Series

reddot design award winner 2006

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
280,685 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

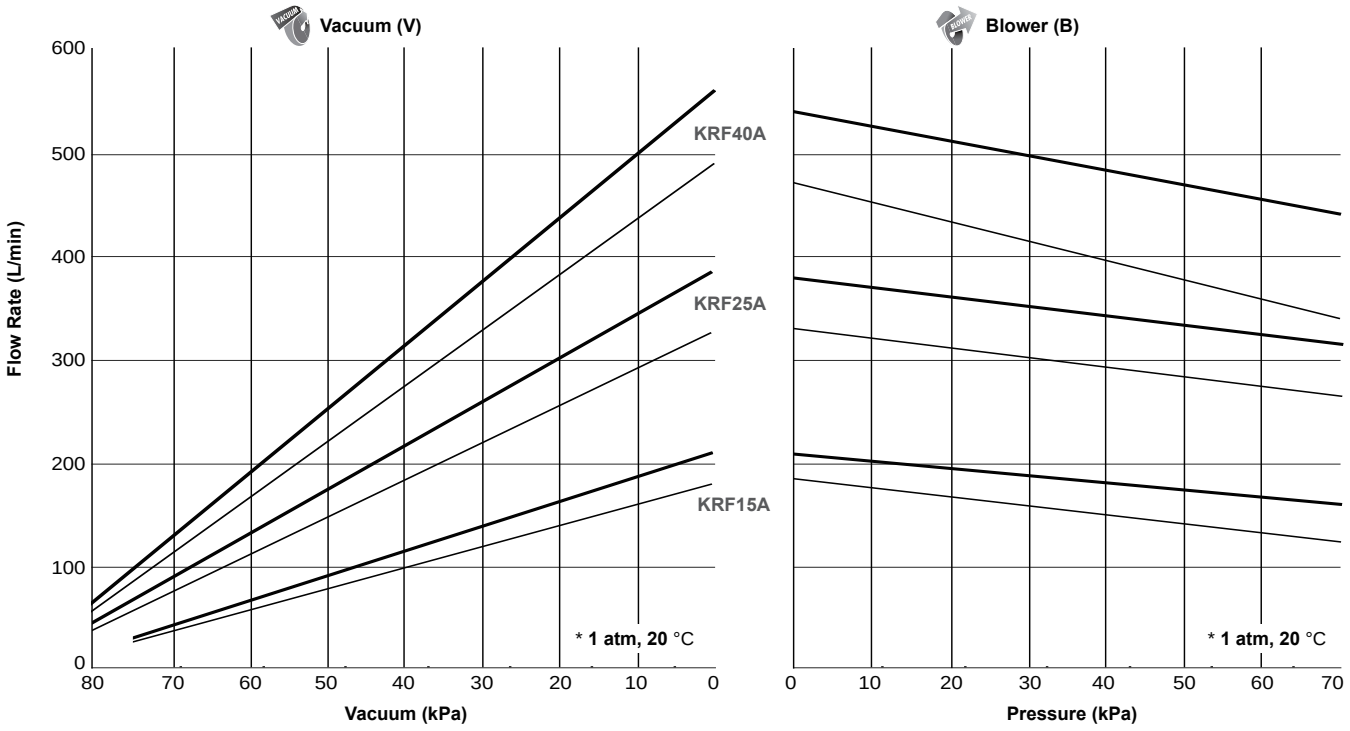
Single-Phase Motor 3-Phase Motor

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	
										Single-Phase (02)			3-Phase (01B)			Single-Phase (02)			3-Phase (01B)						
										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										
	L/min*2		kPa*3		kPa*4		kPa*4			380 V	400 V	415 V	400 V	440 V	460 V	380 V	400 V	415 V	400 V	440 V	460 V	dB*6			kg	
	50 Hz	60 Hz	50 Hz	60 Hz	Recom.	Max.	Recom.	Max.		50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	50 Hz	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	50 Hz	60 Hz	kW	Single-Phase	3-Phase
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 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 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.**

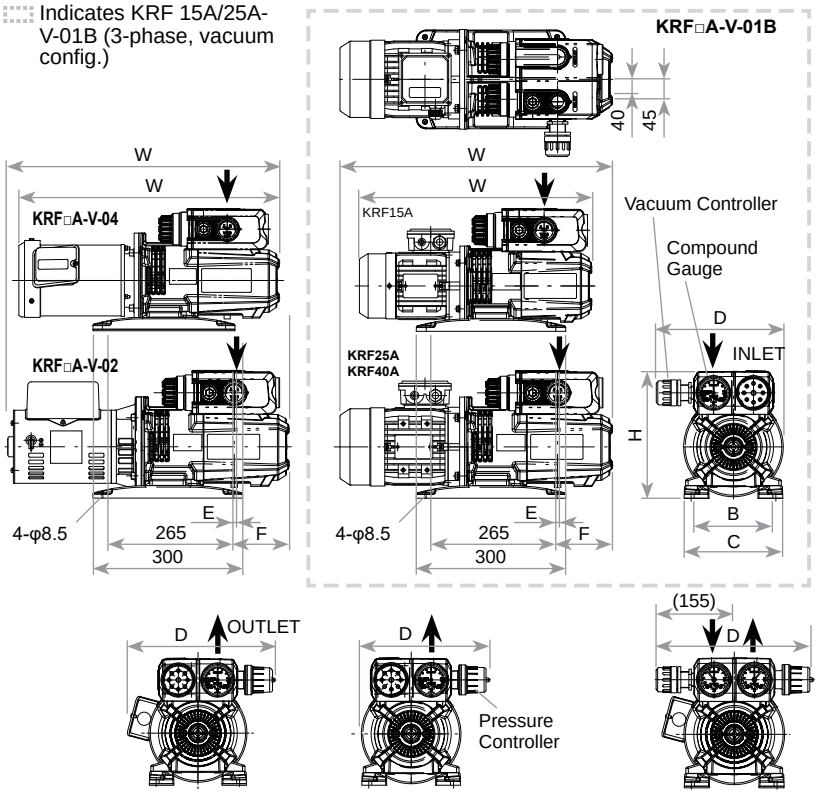
Performance Data

(── 50 Hz ━ 60 Hz)



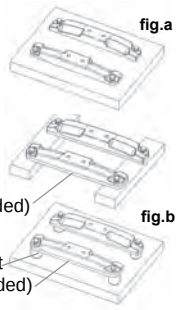
External Dimensions (Units:mm)

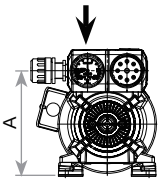
Indicates KRF 15A/25A-V-01B (3-phase, vacuum config.)

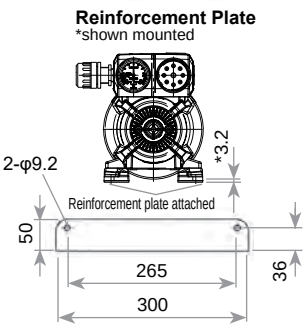


Reinforcement Plate

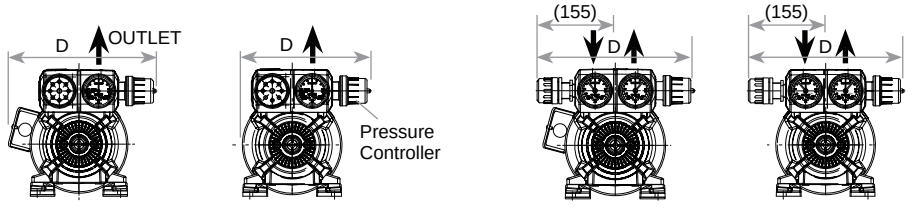
Installation Notes:
Install on a flat and level surface that covers the entire base and as in fig.a. For cases like fig.b where the surface is not continuous, install with additional reinforcing as shown to avoid warping of the base plates.







Reinforcement Plate Detail



KRF□A-B-04B **KRF□A-B-01B/02** **KRF□A-VB-04B** **KRF□A-VB-01B/02**

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 KRF Series -- Heavy Duty Model

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

Continuous Operating Vacuum
60 kPa or less (V / B / VB)
Continuous Operating Pressure
80 kPa or less (VH / BH / VBH)
Flow Rate
1350 – 2200 L/min (60 Hz)
CE Marking Certification *1

KRF70-V-01B

KRF110-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 10% with newly developed vane blade material. (compared with conventional models)**

Applications

- **Vacuum source for electronics and automotive manufacturing related facilities and equipment.**
- **Vacuum source for printing equipment, book making equipment, packaging equipment, automation equipment, etc.**

Specifications

3-Phase Motor

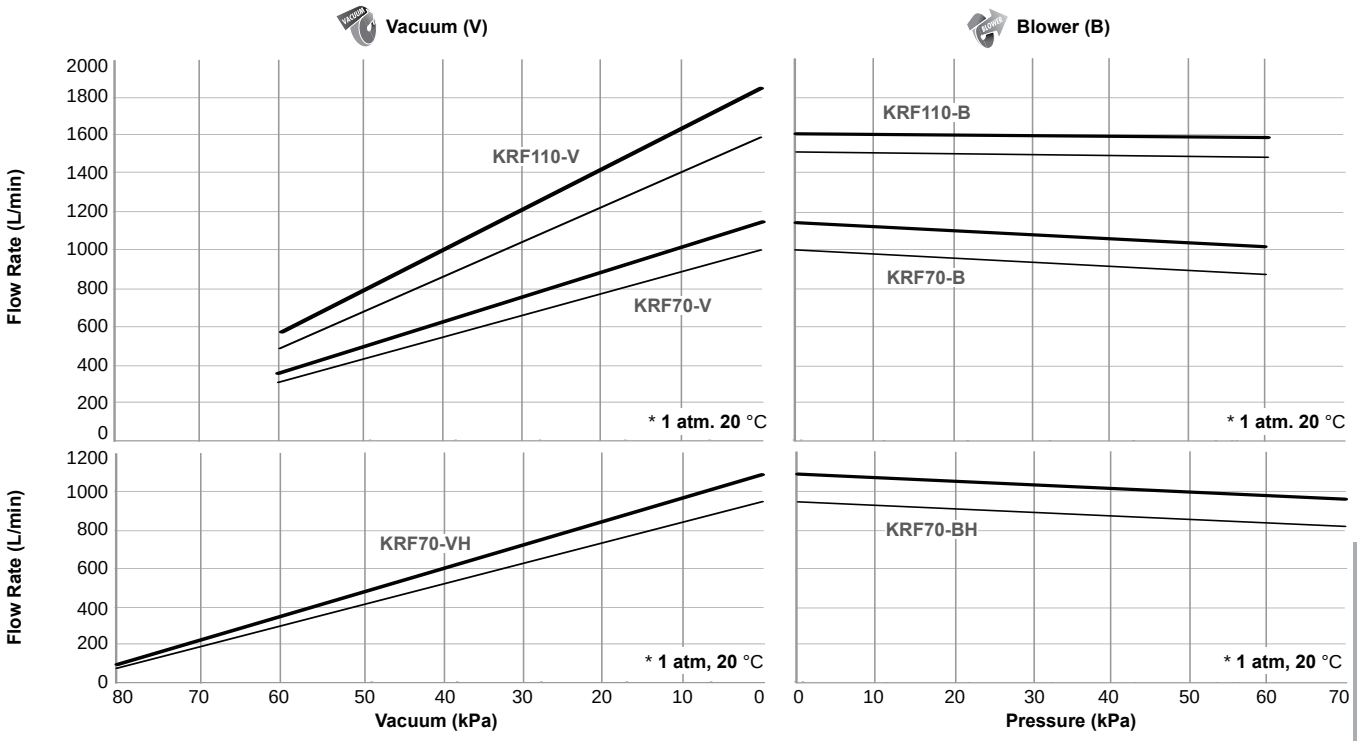
Model	Designed Pumping Capacity		Ultimate Vacuum	Continuous Operating Vacuum	Continuous Operating Pressure	Piping Connection Size	Voltage					Standard Motor Current Rating A					Noise level		Motor	Mass
							3-Phase (01B)					3-Phase (01B)								
							200V			220V	230V	200V			220V	230V				
							50/60Hz			60Hz	60Hz	50/50Hz			60Hz	60Hz				
							3-Pase (04B)*5					3-Phase (04B)*5								
	L/min*2		kPa (min.) *3	kPa (max.) *4	kPa (max.) *4		380 V	400 V	415 V	440 V	460 V	380 V	400 V	415 V	440 V	460 V	dB*6			
	50 Hz	60 Hz					50 Hz	50/60 Hz	50 Hz	60 Hz	60 Hz	50 Hz	50/60 Hz	50 Hz	60 Hz	60 Hz	50 Hz	60 Hz	kW	kg
KRF70-□-□																				
V-01B	1130	1350	90	60	—	Rc 1		○		○	○		10.6/10.0				9.6	9.6	67	68	2.2	94
V-04B	1130	1350	90	60	—	Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	67	68	2.2	94
VH-01B	1130	1350	90	80	—	Rc 1		○		○	○		10.6/10.0				9.6	9.6	73	74	2.2	94
VH-04B	1130	1350	90	80	—	Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	73	74	2.2	94
B-01B	1130	1350	—	—	60	Rc 1		○		○	○		10.6/10.0				9.6	9.6	74	76	2.2	94
B-04B	1130	1350	—	—	60	Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	74	76	2.2	94
BH-01B	1130	1350	—	—	70	Rc 1		○		○	○		10.6/10.0				9.6	9.6	74	76	2.2	94
BH-04B	1130	1350	—	—	70	Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	74	76	2.2	94
VB-01A	1130	1350	—	60 or less altogether		Rc 1		○		○	○		10.6/10.0				9.6	9.6	67	68	2.2	94
VB-04B	1130	1350	—	60 or less altogether		Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	67	68	2.2	94
VBH-01B	1130	1350	—	80 or less altogether		Rc 1		○		○	○		10.6/10.0				9.6	9.6	73	74	2.2	94
VBH-04B	1130	1350	—	80 or less altogether		Rc 1	–	○	–	○	○	–	5.3/5.0	–			4.8	4.8	73	74	2.2	94
KRF110-□-□																				
V-01B	1850	2200	90	60	—	Rc 1 1/4		○		○	○		16.6/15.6				14.8	14.8	74	75	3.7	131
V-04B	1850	2200	90	60	—	Rc 1 1/4	○	○	○	○	○	8.5	8.3/7.8	8.3			7.4	7.4	74	75	3.7	131
B-01B	1850	2200	—	—	60	Rc 1 1/4		○		○	○		16.6/15.6				14.8	14.8	76	77	3.7	131
B-04B	1850	2200	—	—	60	Rc 1 1/4	○	○	○	○	○	8.5	8.3/7.8	8.3			7.4	7.4	76	77	3.7	131
VB-01B	1850	2200	—	60 or less altogether		Rc 1 1/4		○		○	○		16.6/15.6				14.8	14.8	74	75	3.7	131
VB-04B	1850	2200	—	60 or less altogether		Rc 1 1/4	○	○	○	○	○	8.5	8.3/7.8	8.3			7.4	7.4	74	75	3.7	131

*1 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 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). *** For detailed specifications, please refer to the specifications sheet.**

- Pumps with a continuous degree of vacuum of 80 to 100 kPa are also available.
- Blowers with a continuous degree of exhaust of 100 to 150 kPa are also available.

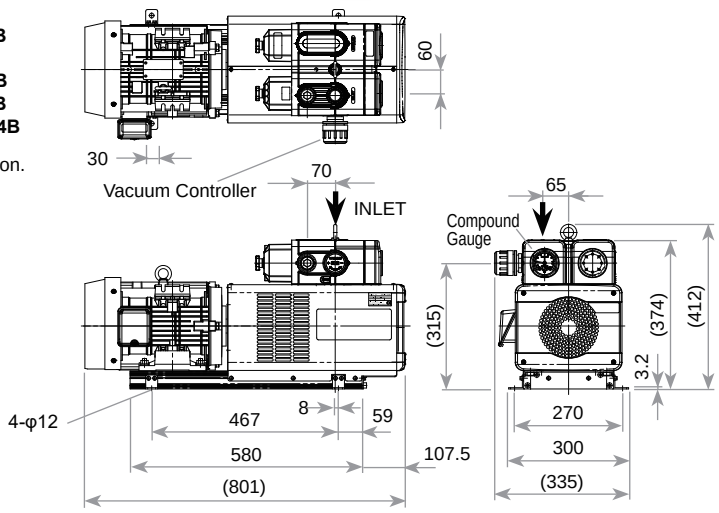
Performance Data

(── 50 Hz ━━ 60 Hz)

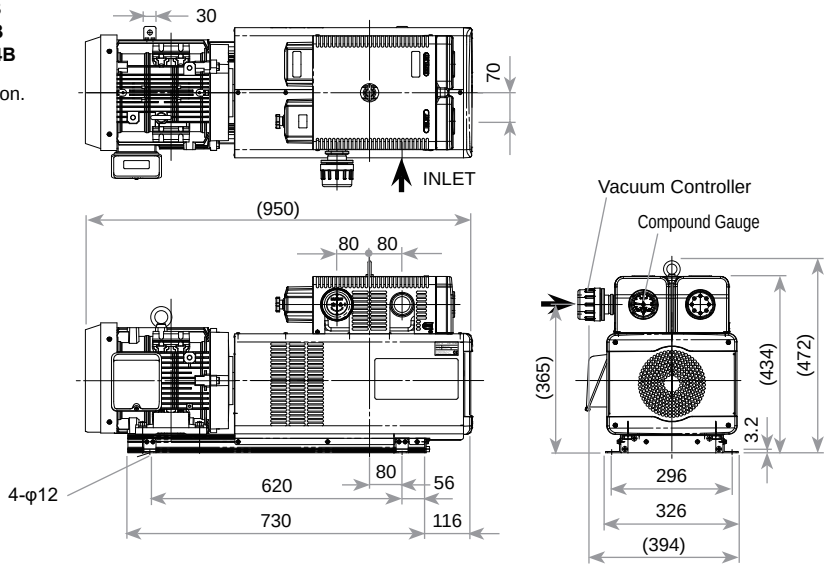


External Dimensions (units: mm)

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 Type)
Flow Rate
280,685 L/min (60 Hz)
CE Marking Certification*1

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.**

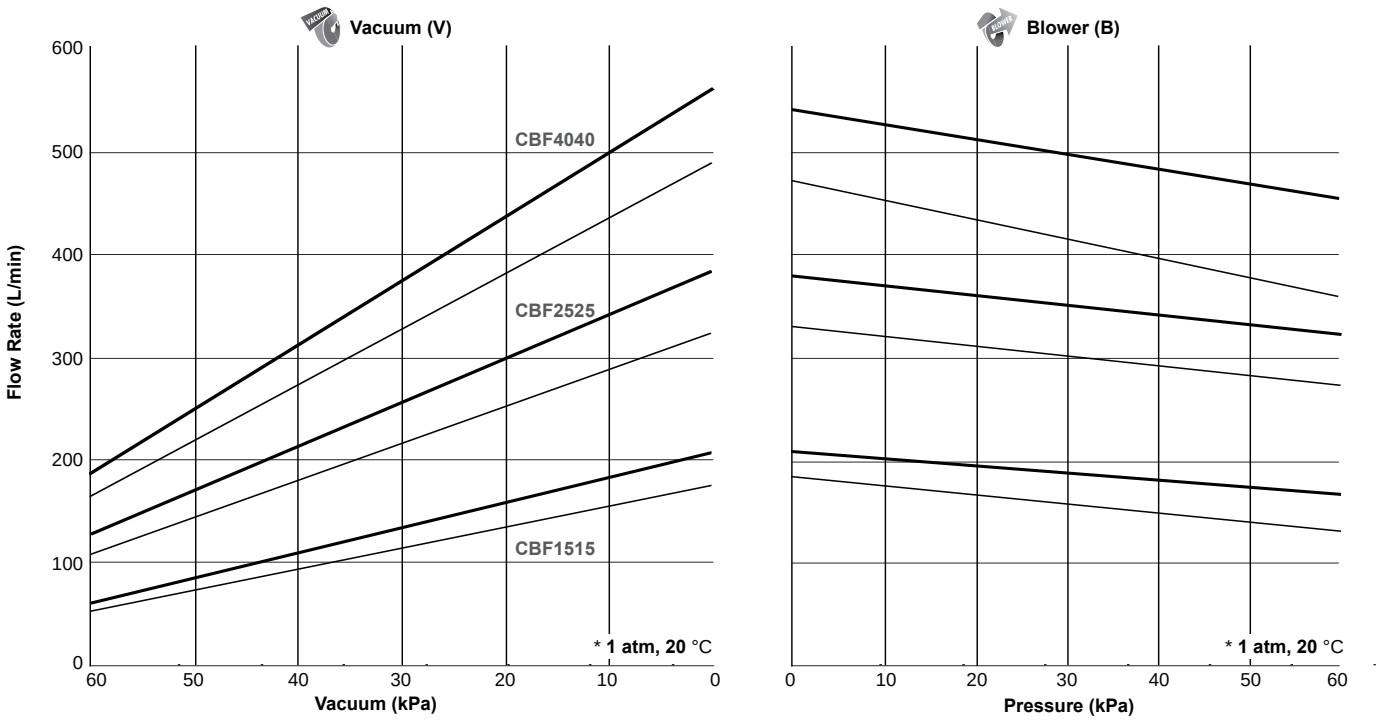
Specifications

Model	Designed Pumping Capacity L/min*1 Pump 1 50 Hz	Pump 1 60 Hz	Pump 2 50 Hz	Pump 2 60 Hz	Continuous Operating Vacuum kPa (max.) *2	Continuous Operating Pressure kPa (max.) *2	Continuous Combined Operating Vacuum & Pressure kPa Recom.	Max.	Piping Connection Size	Voltage 3-Phase (01B) 200 V 50/60 Hz 3-Phase (04B)*3 380 V 50 Hz	400 V 50/60 Hz	415 V 50 Hz	220 V 60 Hz	230 V 60 Hz	440 V 60 Hz	460 V 60 Hz	Standard Motor Current Rating A 3-Phase (01B) 200 V 50/50 Hz 3-Phase (04B)*3 380 V 50 Hz	400 V 50/60 Hz	415 V 50 Hz	220 V 60 Hz	230 V 60 Hz	440 V 60 Hz	460 V 60 Hz	Noise Level dB*4		Motor Three-phase (01) 200 V, (04) 400 V kW	Mass kg
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)	—	—	*5	*6	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)	—	—	*5	*6	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)	—	—	*5	*6	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

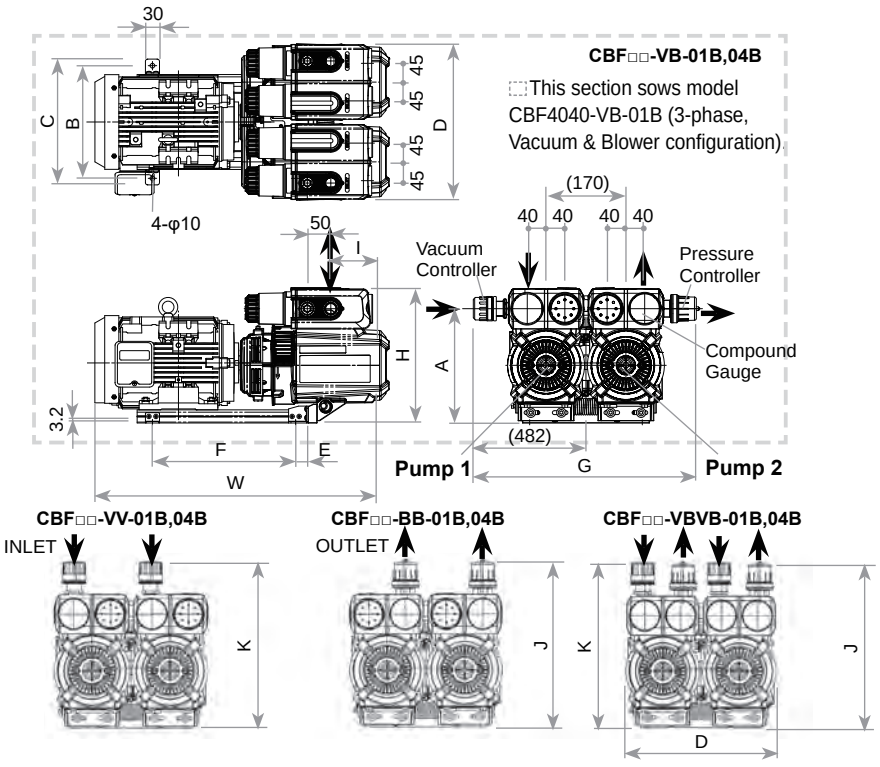
*1 Designed pumping capacity: Theoretical value calculated from cylinder volume. Refer to "Performance Data" for actual flow rate. *2 Operable range of vacuum (pressure). *3 "04" models are special order items. *4 Operating noise measured on a new pump with an ORION recommended motor running at normal 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)



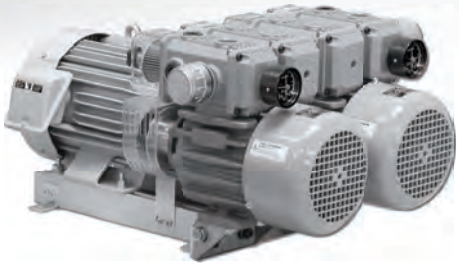
External Dimensions (Units:mm)



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
(CBX-□-01B not included)
Continuous Operating Pressure: 60 kPa or less
(CBX□-□-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.**

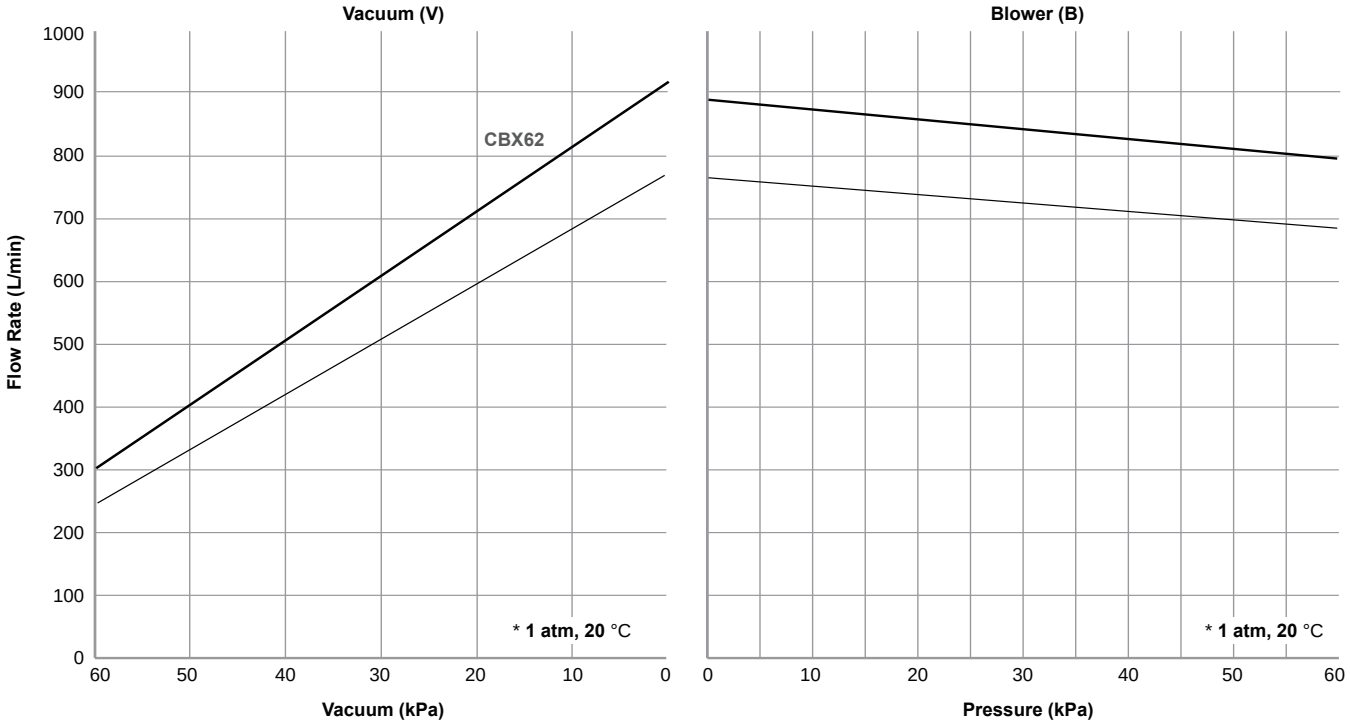
Specifications

Model	Designed Pumping Capacity L/min*1				Continuous Operating Vacuum	Continuous Operating Pressure	Piping Connection Size	Motor Voltage			Standard Motor Current Rating A			Noise Level		Motor	Mass
								3-Phase			3-Phase			dB *3			
	Pump 1		Pump 2		kPa (max.) *2	kPa (max.) *2		200 V	220 V	230 V	200 V	220 V	230 V	50 Hz	60 Hz		kg
	50 Hz	60 Hz	50 Hz	60 Hz				50/60 Hz	60 Hz	60 Hz	50/60 Hz	60 Hz	60 Hz	3-Phase		kW	3-Phase
CBX□-01B-□ (V, B specifications)																	
62-01B-G1	935	1115	935	1115	60	60	Rc 1	○	○	○	15.4/14.4	13.6	13.6	78	79	3.7	112
CBX□-A-01B-□ (VB, VB specifications)																	
62-A-01B-G1	935	1115	935	1115	55/35 *4	20/50 *4	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.**

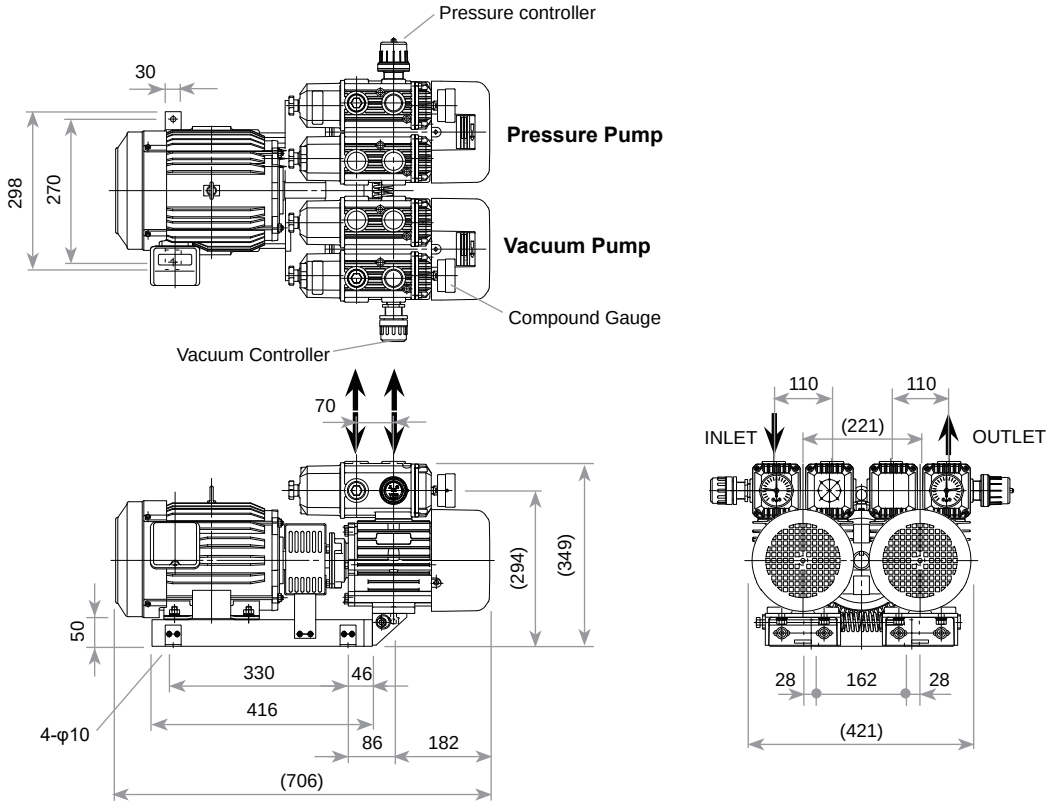
Performance Data

(── 50 Hz ━━ 60 Hz)



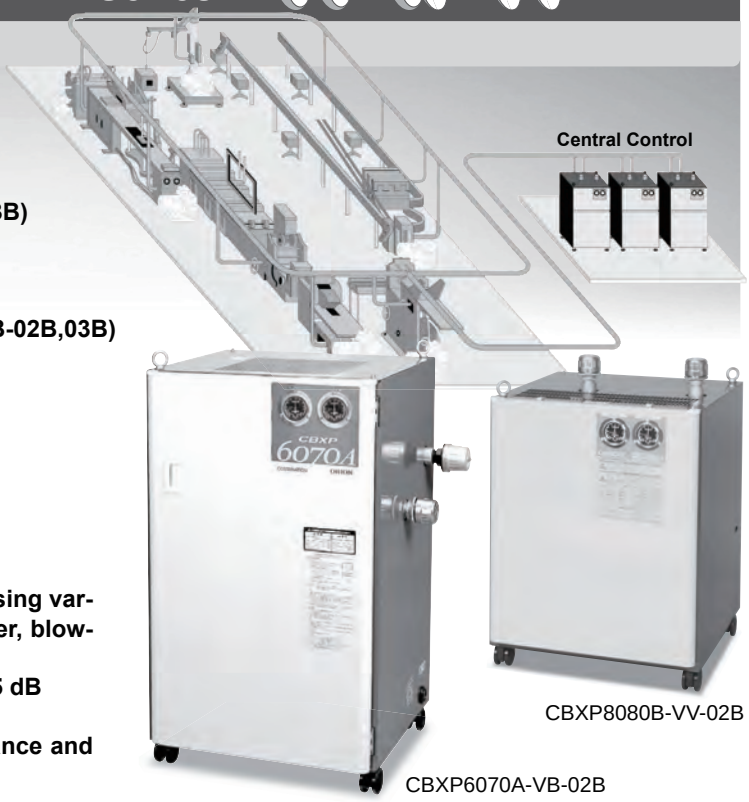
External Dimensions (Units:mm)

CBX62-01B-G1
CBX62-A-01B-G1



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: 1115–2200 L/min (60 Hz)



CBXP8080B-VV-02B

CBXP6070A-VB-02B

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

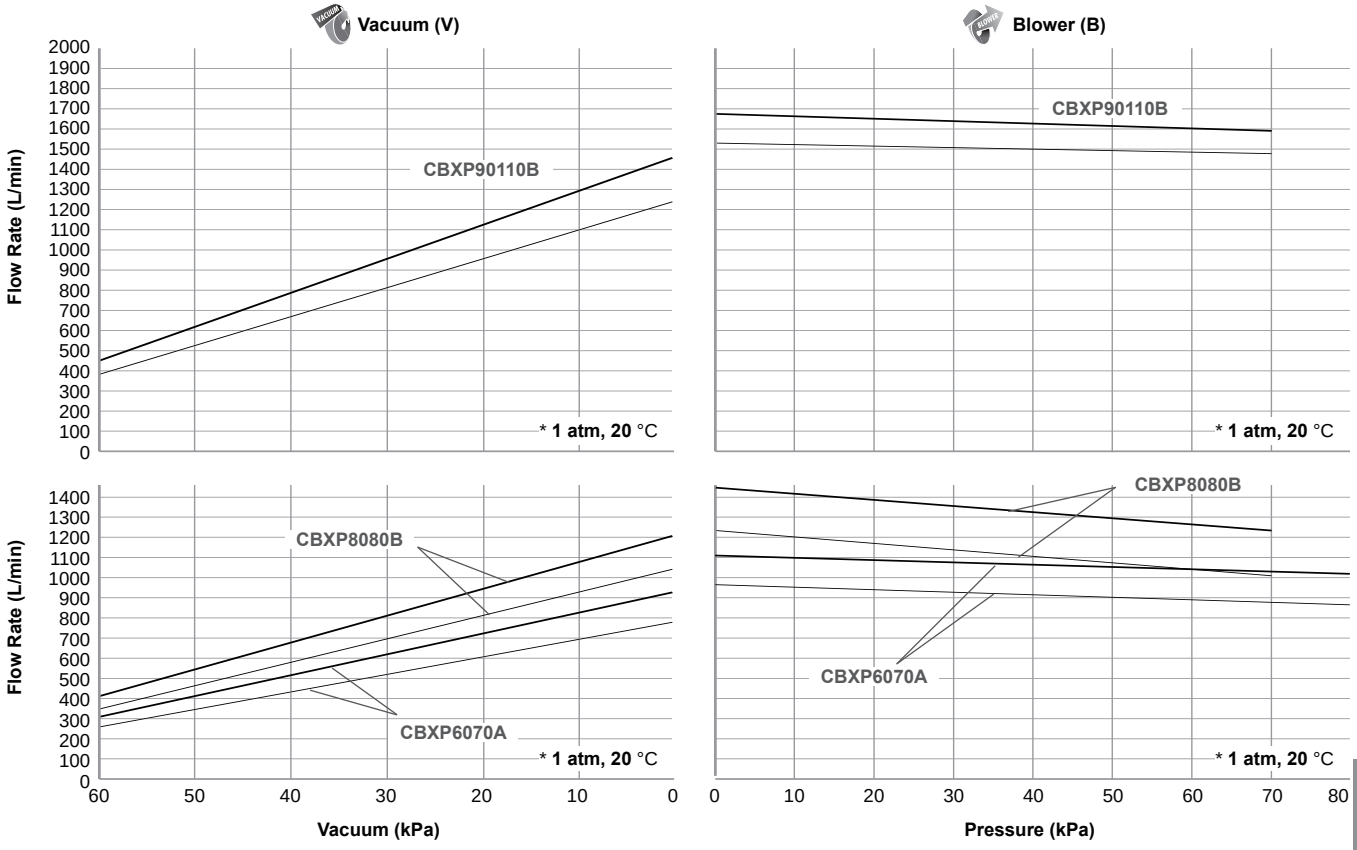
Model	Designed Pumping Capacity L/min *2				Continuous Operating Vacuum kPa (max.) *3		Continuous Operating Pressure kPa (max.) *3		Piping Connection Size		Voltage	Standard Motor Current Rating A	Noise Level		Motor	Mass
											3-Phase	3-Phase				
	Pump 1		Pump 2		Pump 1	Pump 2	Pump 1	Pump 2			200 V	200 V	dB *4			kg
	50 Hz	60 Hz	50 Hz	60 Hz					Inlet	Outlet	50/60 Hz	50/60 Hz	50 Hz	60 Hz	kW	3-Phase
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.**

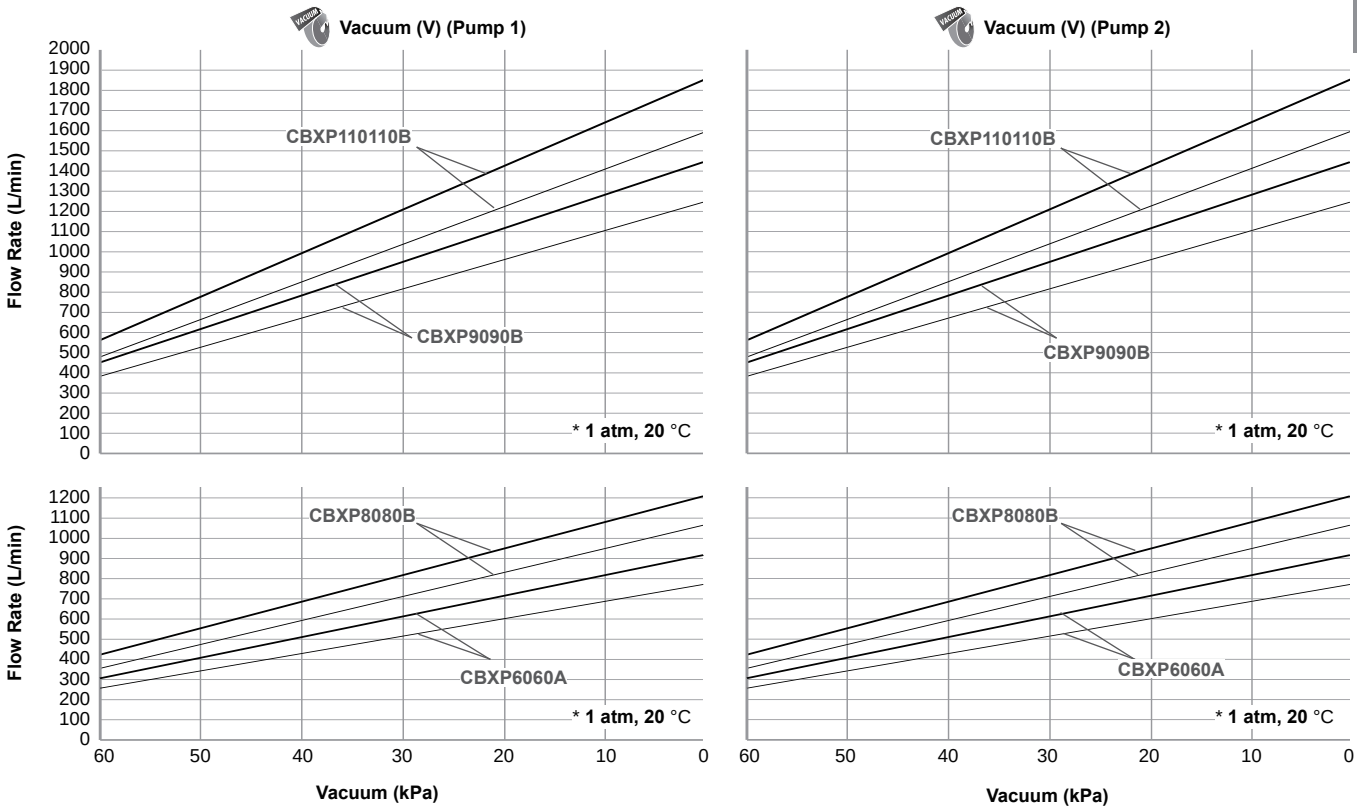
Performance Data

(── 50 Hz ━ 60 Hz)

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



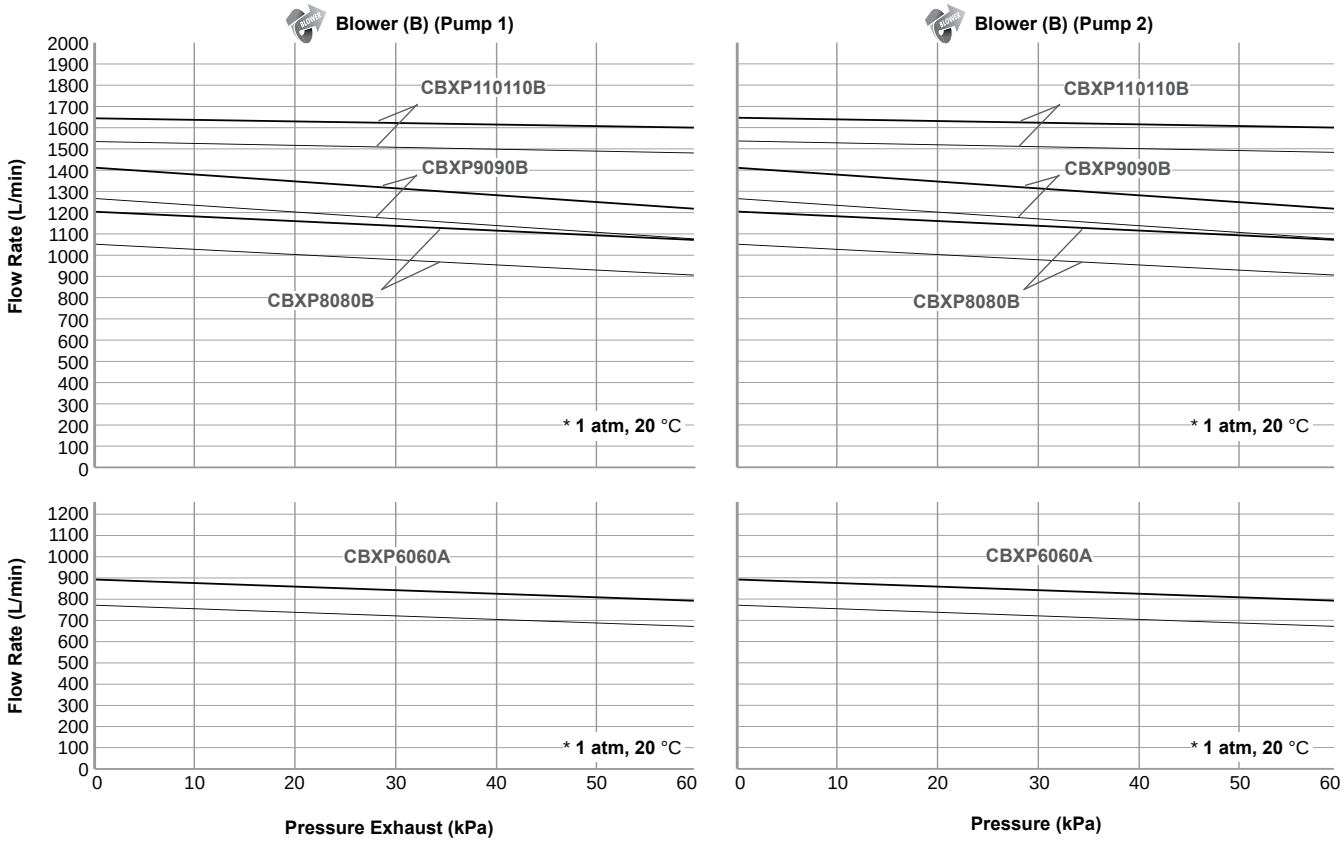
CBXP□□□□A-VV-02B, CBXP□□□□B-VV-02B,03B



Performance Data

(— 50 Hz ━ 60 Hz)

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

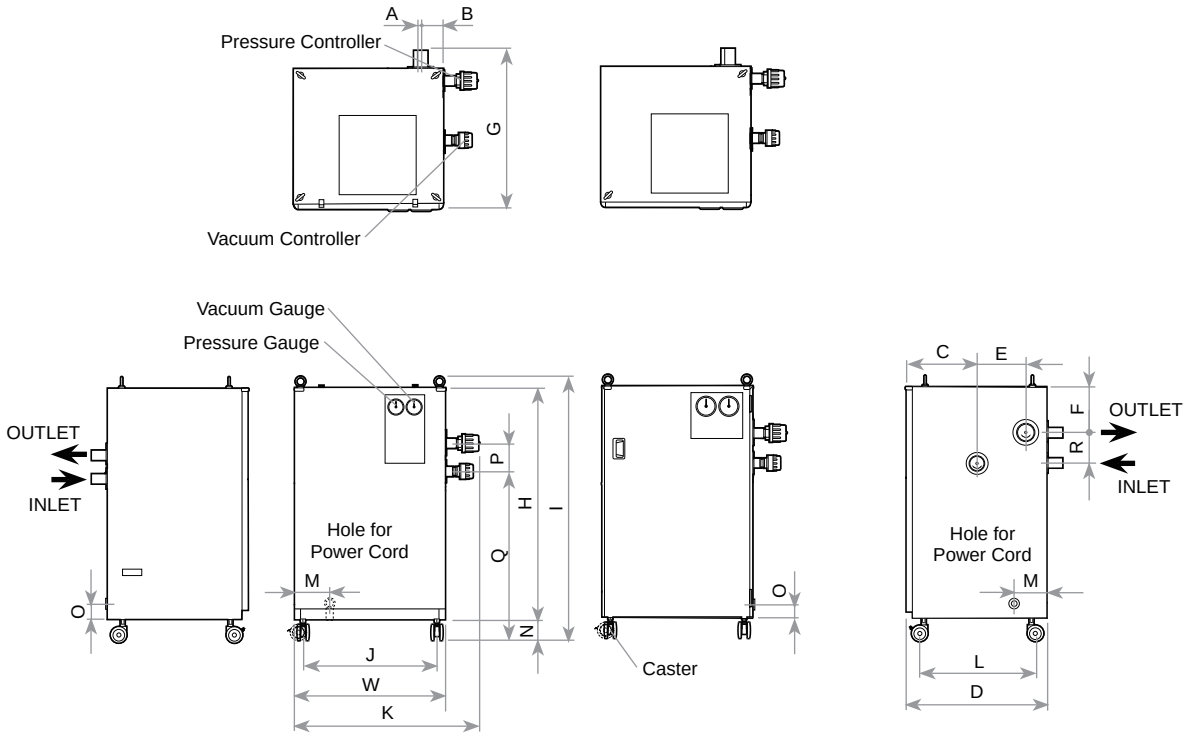


External Dimensions (Units:mm)

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	684	532	560	(280)	(90)	(236)	(15)	(128)	(607)
CBXP8080B-VV-02B, 03B				(293)	(74)	(232)	(19)	(93)	(620)
CBXP9090B-VV-02B, 03B	750	565	730	(390)	(100)	(265)	(38)	(105)	(630)
CBXP110110B-VV-02B, 03B		583				(364)			(627)
CBXP6060A-BB-02B	684	532	560	(280)	(190)	(236)	(15)	(128)	(607)
CBXP8080B-BB-02B, 03B				(293)	(194)	(232)	(19)	(93)	(620)
CBXP9090B-BB-02B, 03B	750	565	730	(390)	(240)	(264)	(38)	(105)	(630)
CBXP110110B-BB-02B, 03B		583				(364)			(627)

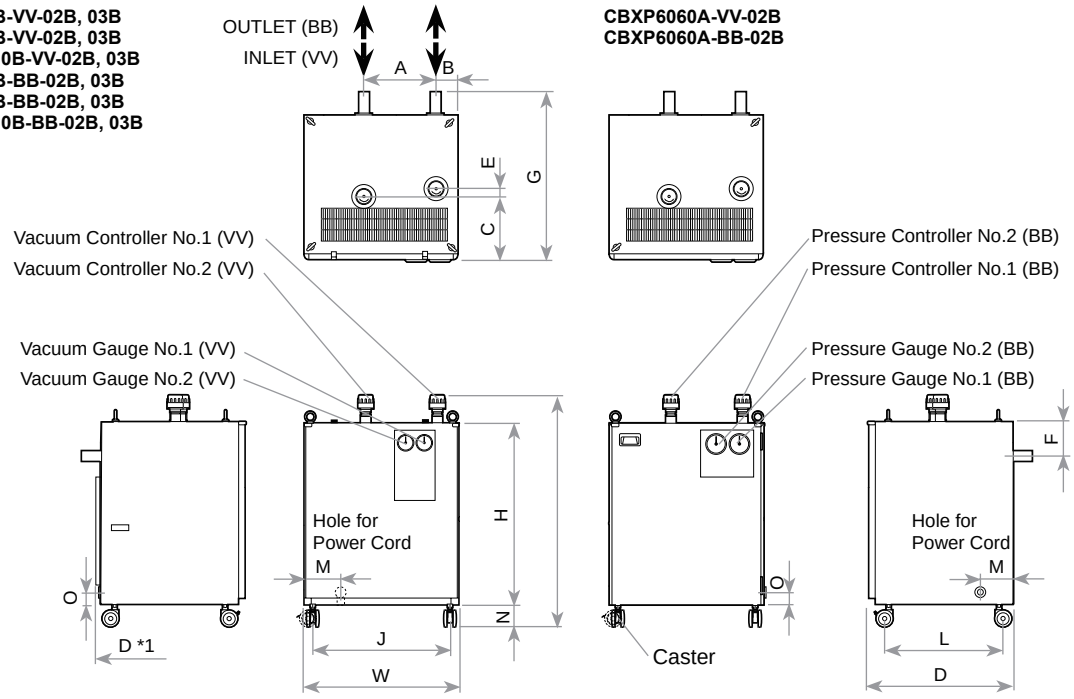
Model	I	J	K	L	M	N	O	P	Q	R
CBXP6070A-VB-02B	(1000)	510	(671)	450	86.2	(65)	42	(98)	(621)	(98)
CBXP8080B-VB-02B, 03B	(1051)	610	(794)	451	157	(78)	61	(109)	(672)	(109)
CBXP90110B-VB-02B, 03B	(1090)	660	(843)	480				(94)	(722)	(94)
CBXP6060A-VV-02B	(836)	510	—	450	86	(65)	42	—	—	—
CBXP8080B-VV-02B, 03B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

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**

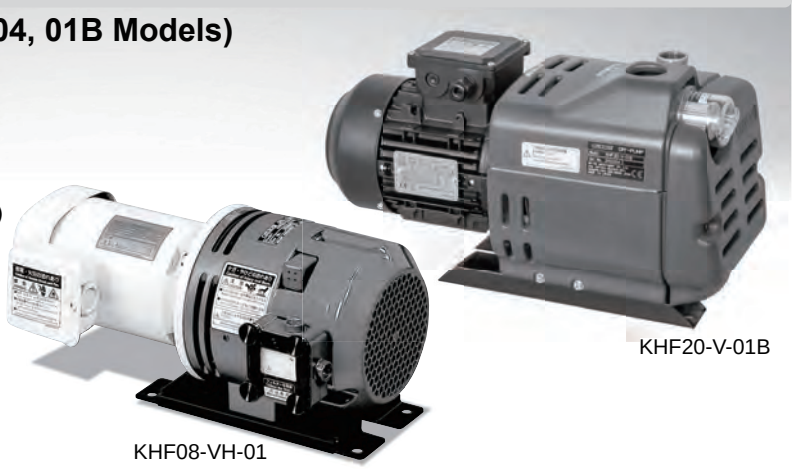
Direct Drive High Vacuum KHF Series

CE Certification Standard (04, 01B Models)

Ultimate Pressure:
8 kPa [abs]

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

Flow Rate:
150 – 400 L/min (60 Hz)



KHF20-V-01B

KHF08-VH-01

Features

- **Meets CE certification standards. (04 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

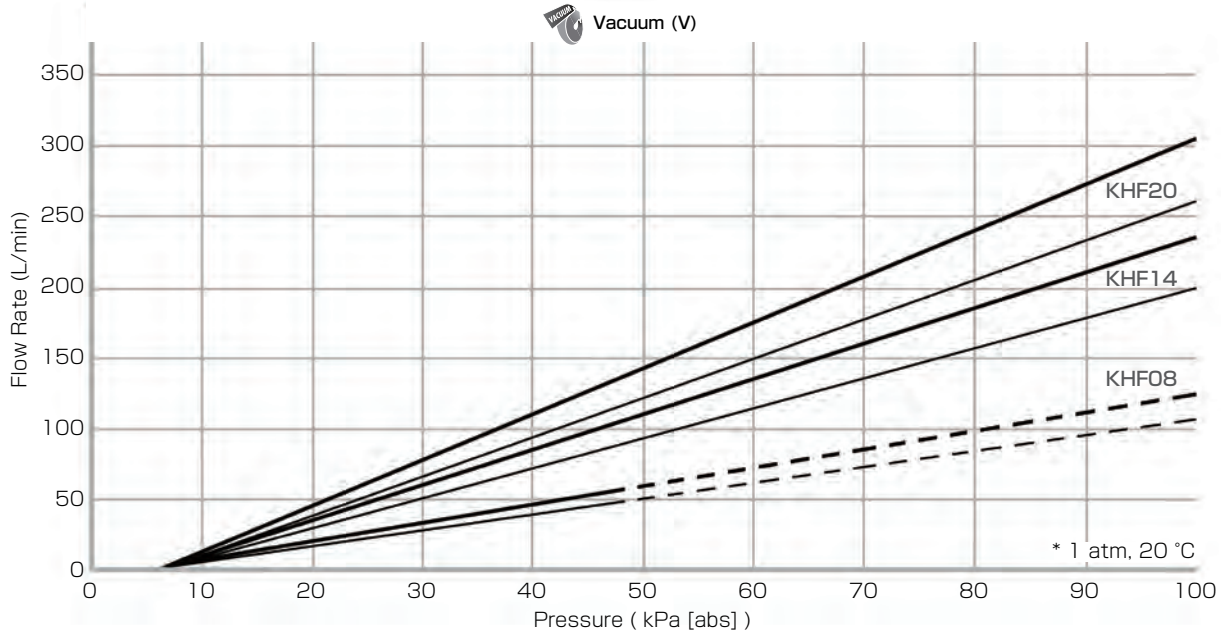
Single-Phase 3-Phase Model

Model	Designed Pumping Capacity L/min *1		Ultimate Pressure kPa [abs] (max.) *2	Operating Pressure Range kPa [abs]	Piping Connection Size	Voltage			Standard Motor Current Rating A			Noise Level (dB)*3		Motor kW	Mass kg	
						Single-Phase	3-Phase		Single-Phase (02)	3-Phase (01,01B)(04)						
						100/200 V	200 V	220 V	100/200 V	200 V	220 V					
	50 Hz	60 Hz				50/60 Hz		60 Hz	50/60 Hz		60 Hz	50 Hz	60 Hz		Single-Phase	3-Phase
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(CE)	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.**

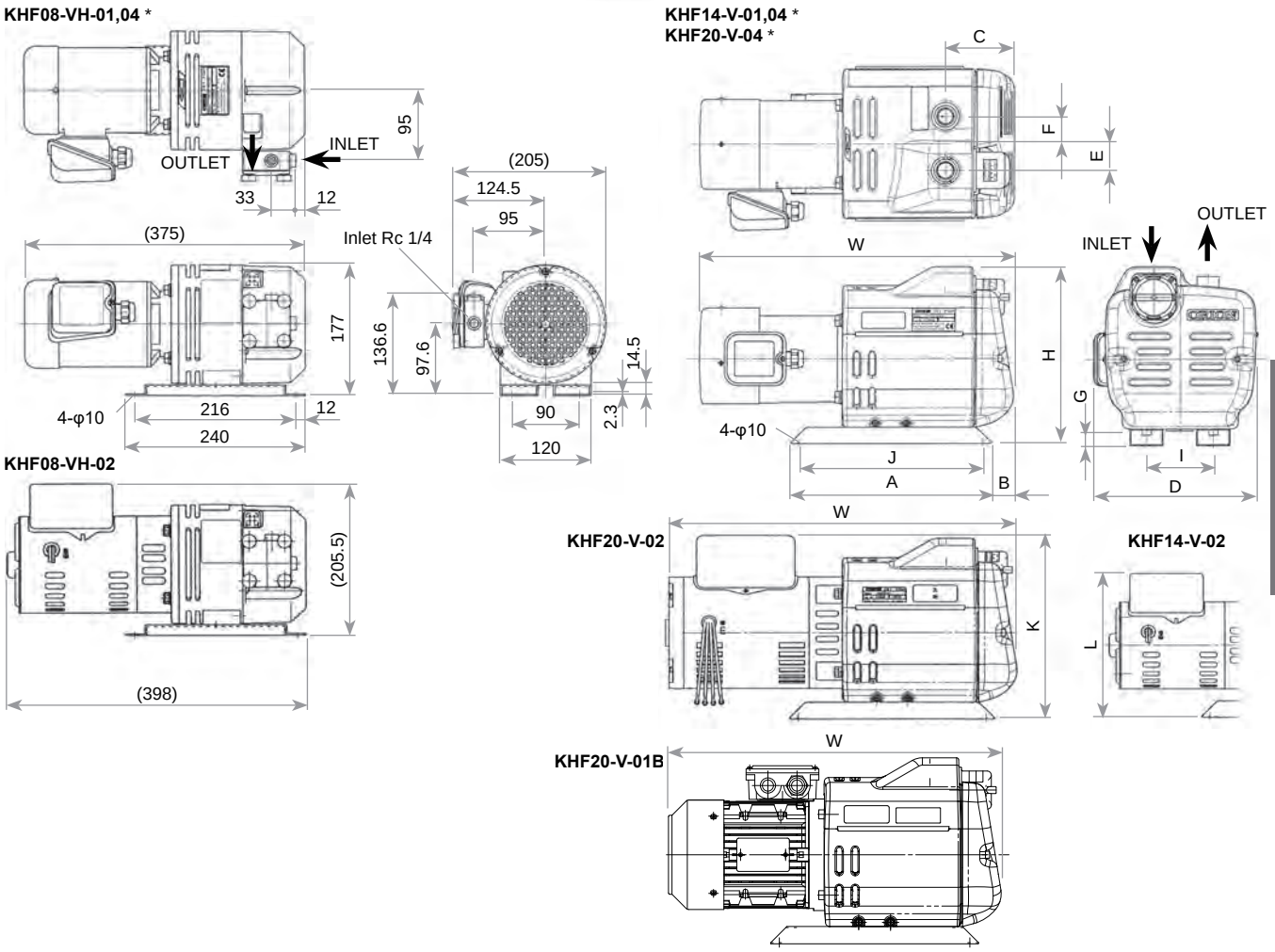
Performance Data

(— 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)



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.**

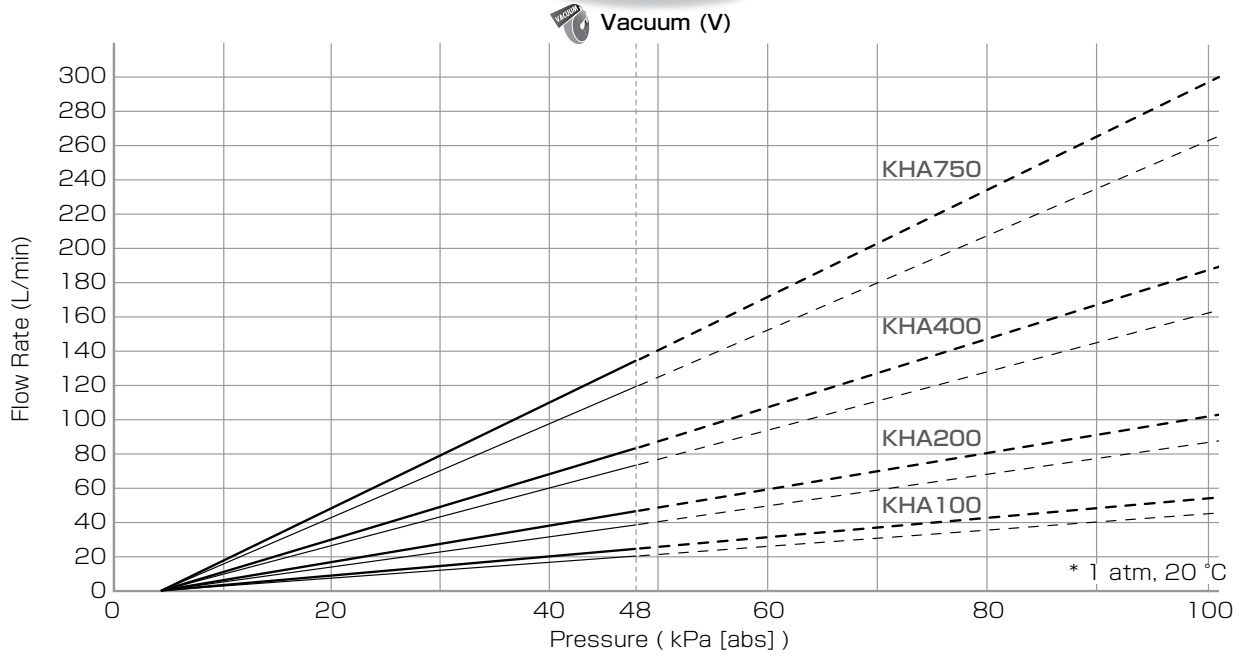
Specifications

Model	Designed Pumping Capacity L/min *1		Ultimate Pressure kPa [abs] (max.) *2	Piping Connection Size	Voltage 3-Phase		Standard Motor Current Rating A 3-Phase		Noise Level (dB)*3		Motor kW	Mass kg
					200 V	220 V	200 V	220 V				
	50 Hz	60 Hz			50/60 Hz	60 Hz	50/60 Hz	60 Hz	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. *** For detailed specifications, please refer to the specifications sheet.**

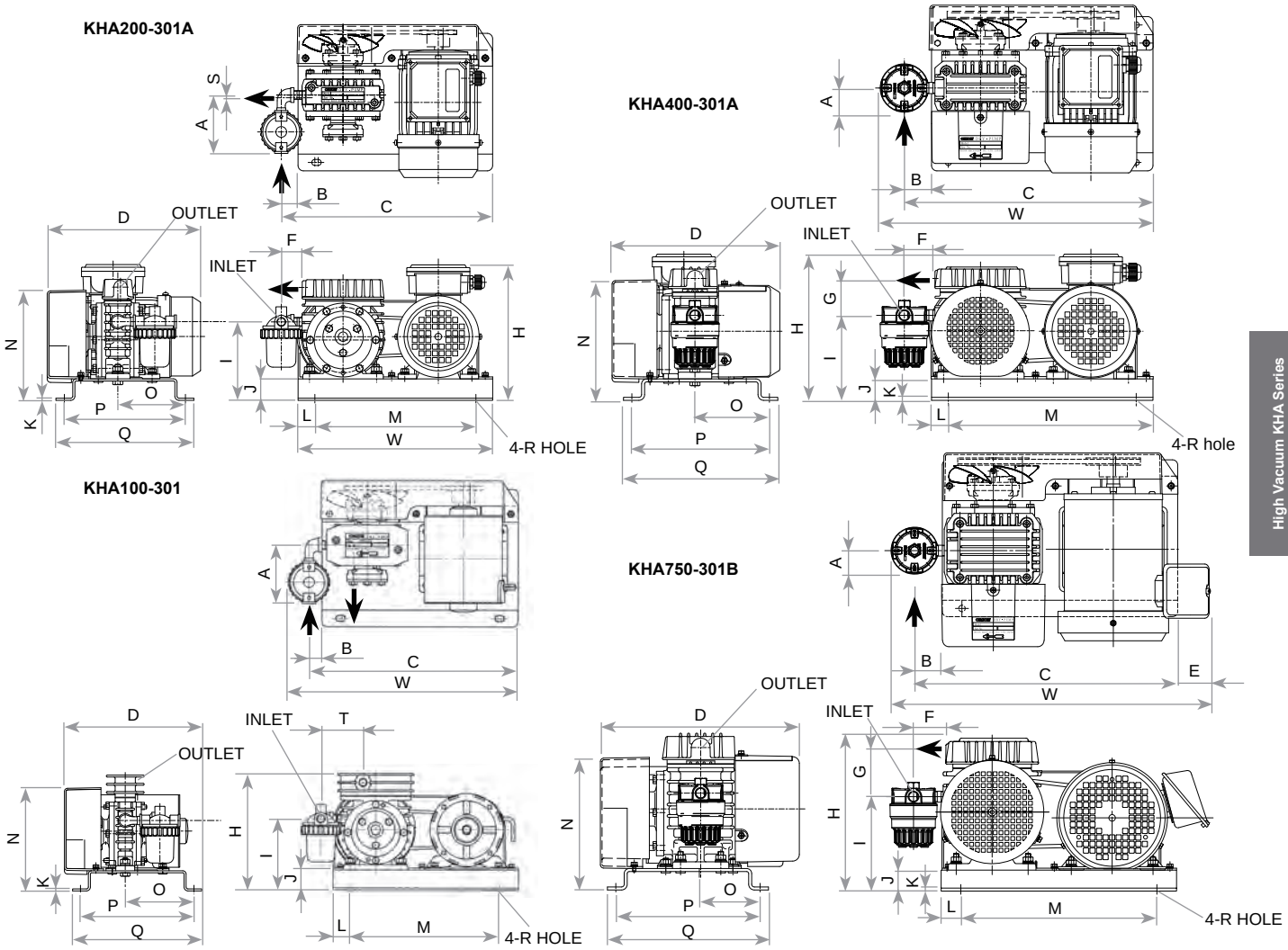
Performance Data

(— 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)



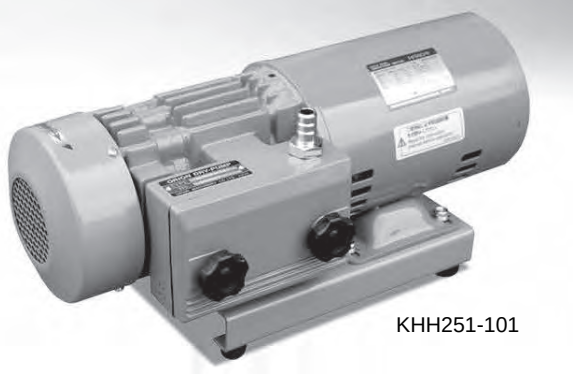
Model	H	D	W	A	B	C	E	F	G *	I	J	K	L	M	N	O	P	Q	R	S*	T*
KHA100-301-G1	(184)	(218)	(340)	(87)	(19)	309	—	—	57.5	112	32	3.2	25	240	164	109	180	205	5 R4.5	—	66
KHA200-301A-G1	(202)	(228)	(346)	(87)	(25)	315	—	(31)	51.4	117	32	3.2	25	240	164	100.5	180	205		4	—
KHA400-301A-G1	(218)	(250)	(407)	33.5	(41)	370.5	—	(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)



KHH251-101

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.**

Specifications

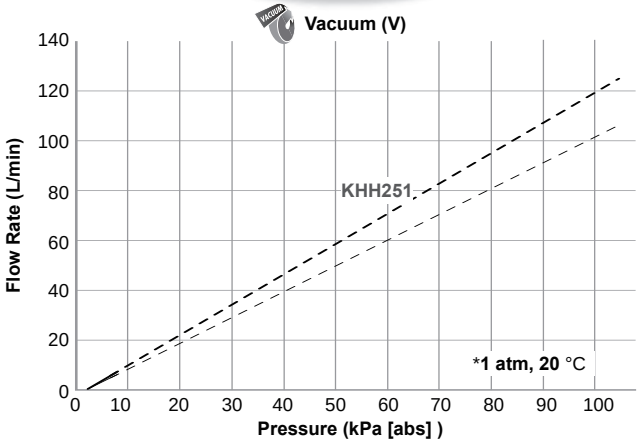
Single-Phase

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

● Pumps with higher degrees of vacuum are also available.
Please see page 53 of this catalog for details.

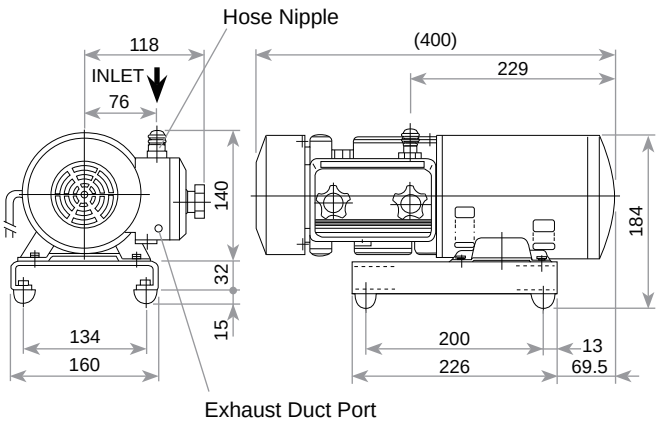
Performance Data



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

External Dimensions (Units:mm)

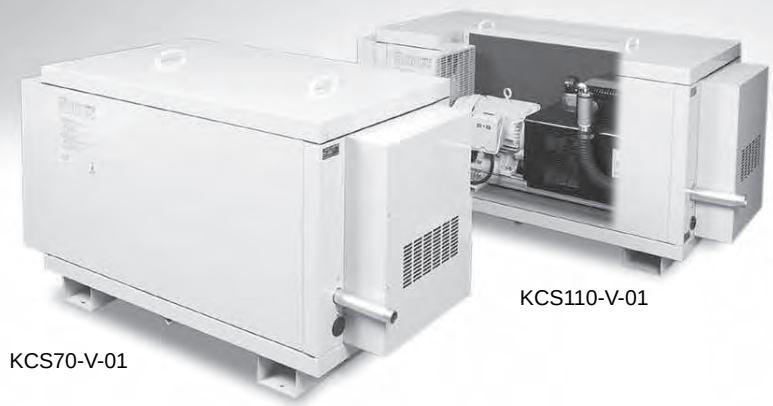
KHH251-101



Silent Box KCS Series

Soundproofing Box for Dry Pumps

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



KCS70-V-01

KCS110-V-01

KCS31A-0123

KCS61A-0123

Features

- **5 – 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	Ventilation Fan Motor	Mass	Included Accessories
		Single-Phase	3-Phase					
		100/200 V	200 V	220 V				
		50/60 Hz	50/60 Hz	60 Hz	°C	W	kg	
KHA Series/ **KCS21A-0□□1**	Rp 3/4	○	○		0 – 35	11/15.5	21	Connection & fitting parts
KRF08A • KRF15A/ **KCS31A-0□□3**	Rp 3/4	○	○		0 – 35	11/15.5	22	Connection & fitting parts
KRF25A • KRF40A KHA750 • 750A/ **KCS61A-0□□1 • 3**	Rp 3/4	○	○		0 – 35	11/15.5	32	Connection & fitting parts
KRF70/ **KCS70-□-01,01A**	R1	—	○		0 – 35	25	75	Connection & fitting parts
KRF110/ **KCS110-□-01**	R1 1/4	—	○		0 – 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 additional connection & fitting parts set (not included.)
*Optional caster set available on request 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

KCS□A− 0□□□

Silent Box

Pump Sub-Type
21: High vacuum KHA100,200,400 models.
31: Standard KRF08A, KRF15A models.
61: Standard KRF25A, KRF40A models and high vacuum KHA750,750A models.

Pump Configuration
1: Vacuum (V) or Pressure (B)
2: Vacuum and pressure (VB)

Model of Pump to Be Installed
1 KHA
3 KRF

Voltage
1: Single-Phase 100 V
2: Single-Phase 200 V
3-Phase 200 V
3-Phase 220 V

KCS□−□

Silent Box

Pump Sub-Type
70: Standard KRF70
110: Standard KRF110

Pump Configuration
V: Vacuum(V)
B: pressure(B)
VB: Vacuum and Pressure (VB)

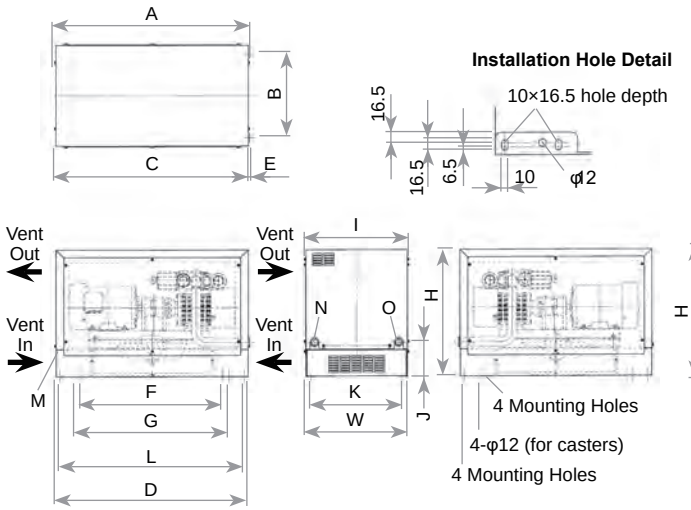
Model List

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	Single-Phase 200 V 50/60 Hz
		KHA100-301 KHA200-301, 301A *1 KHA400-301, 301A	3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz
	KCS21A-0221	KHA400A-101	Single-Phase 200 V 50/60 Hz
		KHA100A-301 KHA200A-301, 301A *1 KHA400A-301, 301A	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
		KRF08A, 15A-V-02, B-02	Single-Phase 200 V 50/60 Hz
	KCS31A-0213	KRF08A, 15A-VB-02	Single-Phase 100 V 50/60 Hz
	KCS31A-0223	KRF08A, 15A-VB-01 KRF15A-VB-01A	3-Phase 200 V 50/60 Hz, 3-Phase 220 V 60 Hz
		KRF08A, 15A-VB-02	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 optional installation kit.	3-Phase 200 V 50/60 Hz 3-Phase 220 V 60 Hz
KCS61A Series for Standard KRF25A • 40A Pumps	KCS61A-0113	KRF25A-V-02, B-02	Single-Phase 100 V 50/60 Hz
	KCS61A-0123	KRF25A-V-02, B-02	Single-Phase 200 V 50/60 Hz
		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-0223	KRF25A-VB-02	Single-Phase 200 V 50/60 Hz
		KRF25A-VB-01, 01A, 01B *2 KRF40A-VB-01, 01A, 01B *2	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.

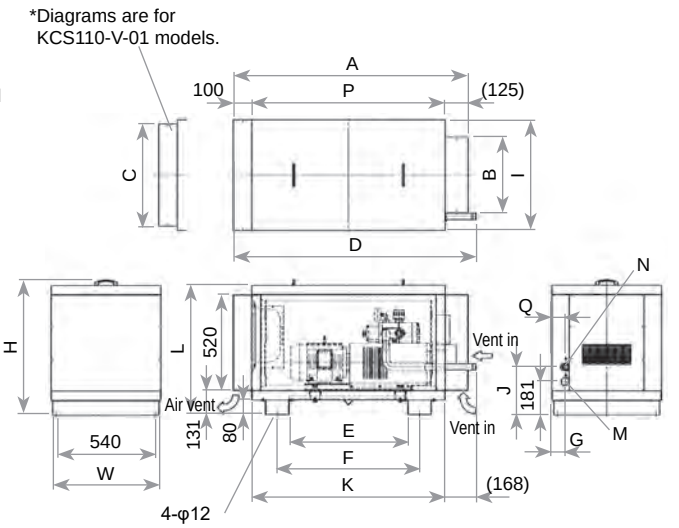
External Dimensions (Units:mm)

KCS21A
KCS31A
KCS61A



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

*Diagrams are for KCS70-V-01 models.



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	(733)	(1328)	580	1285	410	—	(650)	780	72	(600)	260	1060	(702)
110-V-01		(1480)		1435		600	(800)	930	92	(640)	286	1210	

Model KCS	M	N	O	P	Q
21A-0111	(φ19) 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	(φ19) 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					
31A-0223					
61A-0121	(φ19) 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	(φ28) Power Cord Hole	INLET R1	—	1060	76
110-V-01		INLET R1 1/4		1210	82

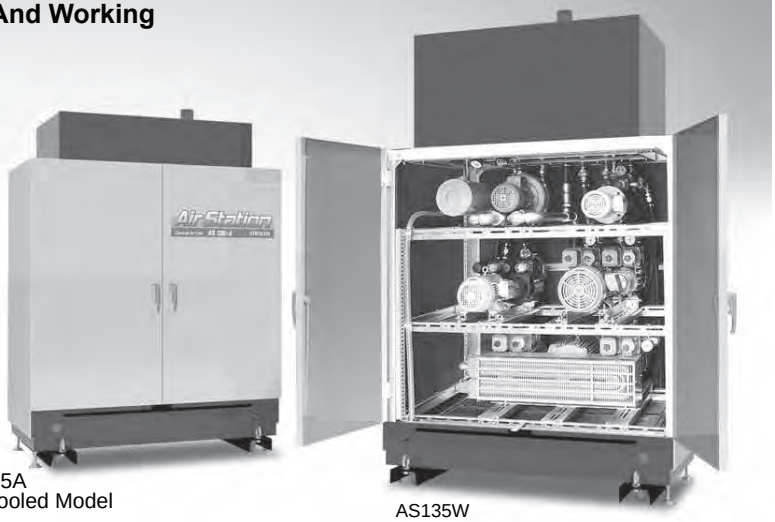
*Please consult your dealer for the exact dimensions of KCS70-B-01 (VB-01) ,B-01A (VB-01A) and KCS110-B-01 (VB-01) models.
*See specifications sheet for further details.

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

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

■ Water Separator RA41 • RA42

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

Photo:RA41

Applications

- **Food Packaging Machines**
- **Automated Machinery**
- **Energy Saving Machinery**

Specifications

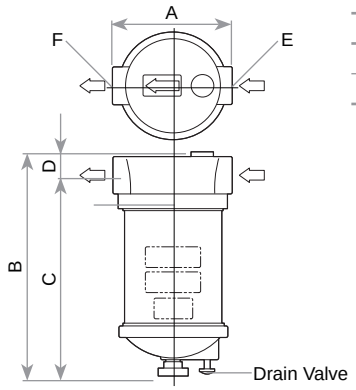
Model	Air Processing Capacity	Operative Vacuum	Air temp. at Inlet	Ambient Air Temp.	Water Separation Efficiency	Water Collection Capacity	Inlet/Outlet Port Diameter	Mass	Applicable Pump Model
	L/min (max.)	kPa	°C	°C	%	cc		kg	
RA41	235 – 560	0 – 80	0 – 40	0 – 40	95	100	Rc3/4	1.0	KRF15A,25A,40A
RA42	235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

■ 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

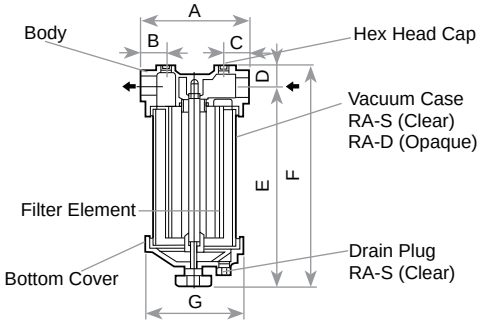
Model		Air Processing Capacity *1	Working Vacuum	Working Pressure	Inlet Air Temp.	Ambient Air Temp.	Collection Efficiency *2	Inlet/ Outlet Port Dia.	Pressure Drop Meas. Port Dia.	Initial Pressure Drop	Mass
		L/min	kPa (max.)	kPa (max.)	℃ (max.)	℃ (max.)	μm			kPa (max.)	kg
Vacuum Filter	RA-53S-G1	210	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	KRF08A • KRF15A	Protects pumps from oil mist entering pump.	EM-250S
	RA-54S-G1	KRF25A		EM-500S
	RA-55S-G1	KRF40A		EM-750S
	RA-56S-G1	KRF70		EM-1500S
	RA-57S-G1	KRF110		EM-1500S
Exhaust Filter	RA-53D-G1	KRF08A • KRF15A	Removes dust particles from pump exhaust air. (Removes 99% of particles 0.3 μm and larger.)	EM-250Z
	RA-54D-G1	KRF25A		EM-500Z
	RA-55D-G1	KRF40A		EM-750Z
	RA-56D-G1	KRF70		EM-1500Z
	RA-57D-G1	KRF110		EM-1500Z

External Dimensions (Units:mm)

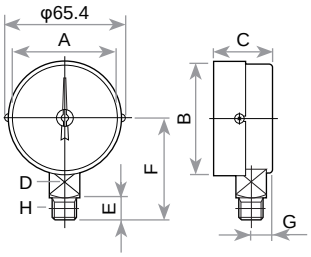


Model	A	B	C	D	E	F	G
RA-53S • D-G1	130	30	30	24	246	270	φ113
RA-54S • D-G1	170	35	35	24	329	353	φ154
RA-55S • D-G1	170	35	35	24	559	583	φ154
RA-56S • D-G1	195	42	42	33	806	839	φ181
RA-57S • D-G1	195	42	42	33	806	839	φ181

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, DA Series after-cooler, compound gauges.)

■ Type A Compound Gauge

Special for KRF04A models



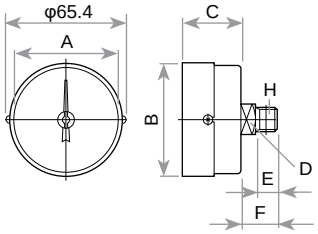
Specifications

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



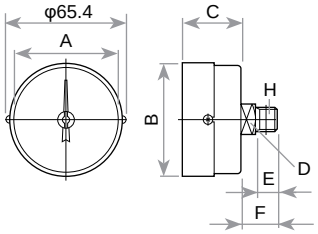
Specifications

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

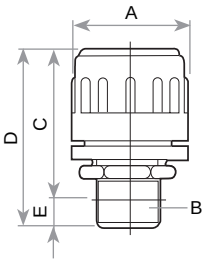
Part Number	Type	Range	Pressure Reading	Units
04100289010	Type D	Vacuum • Pressure	100	kPa

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



E: Screw Depth

External Dimensions (Units:mm)

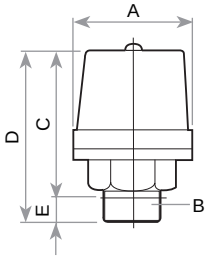
Model		VC10	VC32	VC63 • VC63B *1	VC81	VC100B
Part Number	KRF/CBF	–	03000445020	03040718020	03101299010	03000205020	03044148020
	Others	04005005010	03000445010	03040718010	–	03000205010	03044148010
A		φ28	φ35	φ52		φ62	φ78
B		R1/8	R 3/8 *2	R 3/4		R1	R1 1/4
C		66	54	78		83	107
D		70	60	87		94	120
E		4	6	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



E: Screw Depth

External Dimensions (Units:mm)

Model		PC32	PCA6	PCA8	PCA10
Part Number	KRF/CBF	04000450030	–	–	–
	Others	04000450010	03000445020	03040718020	03101299010
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

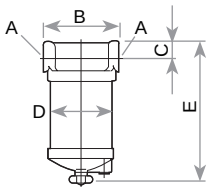
* **Please use a commercially available bushing if an R3/4 connection is required.**

Accessories

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



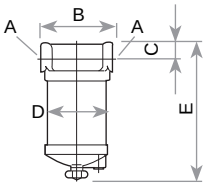
External Dimensions (Units:mm)

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	30 μm
RA22	Rc 1	140	27.5	φ114	265	30 μm

■ Oil Separator (For intake air)

*Not for separating oil mist

RA31 RA32



External Dimensions (Units:mm)

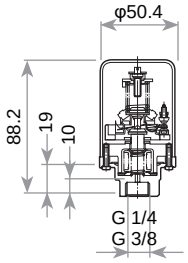
Model	A	B	C	D	E
RA31	Rc 3/4	120	25	φ89	220
RA32	Rc1	140	27.5	φ114	265

■ 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

External Dimensions (Units:mm)



Specifications

Model	SVS-1
Switch Voltage Rating	250 Vac 5 A, 125 V 10 A
Port Tap Size	G1/4, G3/8
Body Material	Zinc die-cast, stainless steel
Pressure Cell Type	Stainless steel bellows, copper phosphate bellows
Cover	Polycarbonate

Range	Adjustable Range	Differential Pressure	Set Point Tolerance	Maximum Working Pressure	Standard Settings
	Min. to Max. kPa	Min. to Max. kPa	kPa	MPa	Lower to Upper Limit kPa
A	0 to 40	2.6 to 13.3	±1.3	0.49	20 to 26.7
B	40 to 66.7	6.7 to 40	±1.3	0.49	53.3 to 60
C	66.7 to 100	6.7 to 53.3	±1.3	0.49	80 to 86.7

⚠ 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, benzine, 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 Precaustions 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.

⚠ WARNING

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

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

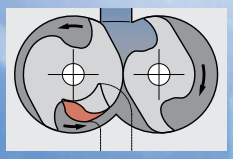
[Motor Output: 1.5 to 11 kW]

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/cm^2)! 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

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

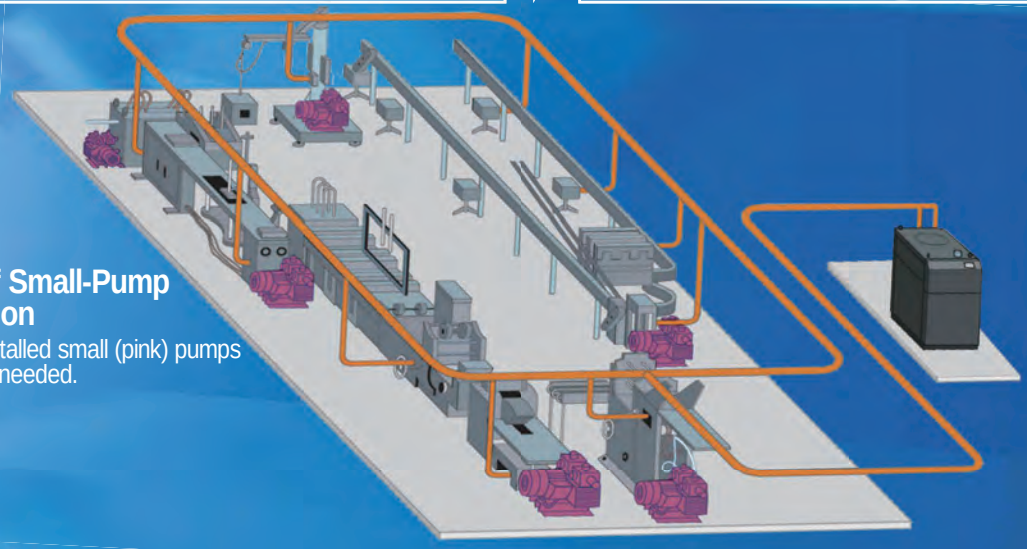
Consolidated Small-Diaphragm Pumps

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.

ORION MACHINERY CO.,LTD.

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D-VG05

Products by ORION

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

Photo : Dry Pump KRFSeries

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)
- Dehumidifier
- Food Processing and Preserving Equipment
- 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
- Percision Water Chiller (Precision control of water temperature)
- In-Line Type Temperature Inspection Equipment
- Thermal Fresh (Precision control of temperature and humidity)
- Others

Photo : Precision Air Processor PAP10A1-K

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.

ORION Machinery Co., ltd is an ISO Certified, Quality Management and Environmental Management company.

PERRY JOHNSON REGISTRARS, INC.

UKAS MANAGEMENT SYSTEMS 0105

ISO 9001
ISO 14001

What is the ISO certification system?

ISO (International Organization for Standardization) is an established body that stipulates and certifies ISO9001 and ISO14001 directives. ISO9001 stipulates a system of Quality Management that ensures customer satisfaction and trust in a company's products and services which it provides. ISO14001 stipulates a system of Environmental Management whereby production and business activities are carried out in an environmentally conscious manner.

For Orders and Inquiries:

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This catalog contains product specifications as of Jan. 2020.

- 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.

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