IBS PRODUCTS

Diaphragm Pump

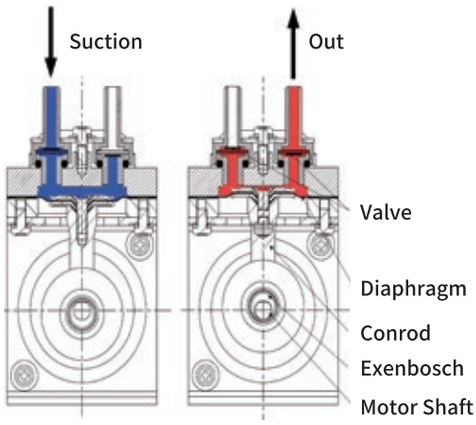
Metal Bellows Pump

Operating in flow control field for 20 years

IBS Group as professionals in the fluid control field proposes best solutions for customer needs.

Diaphragm Pump

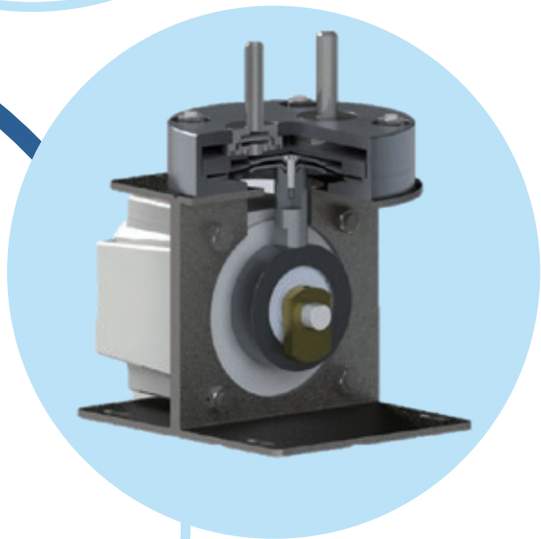
Diaphragm pump is a membrane type positive displacement pump using rubber and fluororesin. It can be used as a vacuum pump and compressor.



Structure

When the connecting rod reciprocates due to the eccentric cam between the motor shaft and the bearing, a variable position is given to the diaphragm, and the valve opens and closes to suck in and discharge fluid.

Features



●The compact and lightweight design makes it easy to integrate the instrument, making it ideal for sampling gas analysis.

●Our unique design ensures a long service life of the valve and diaphragm, and the overall airtightness of the pump is also highly designed.

●The gas contact (liquid) part has a fluororesin or stainless steel structure depending on the specification, and can be used even in environments that require corrosion resistance.

●The suction and exhaust ports (IN/OUT) are tube connections, and can be used for retractable fittings.
(Screw-in fittings are also available)

●Vibration reduction, high temperature, and explosion-proof specifications added.

●It is also compatible with gas-liquid mixed fluids and can be used as a liquid (self-priming type).

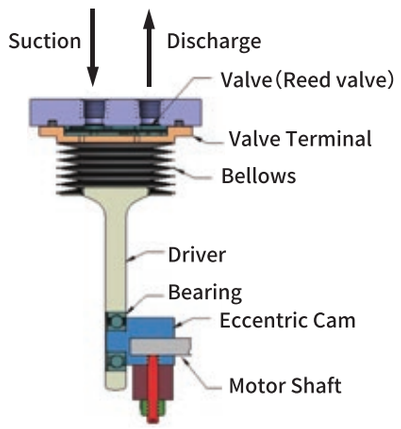
●It can be designed and manufactured according to various requirements and applications. Examples: Compatible with high-end models with improved airtightness, shut-off leakage to the outside

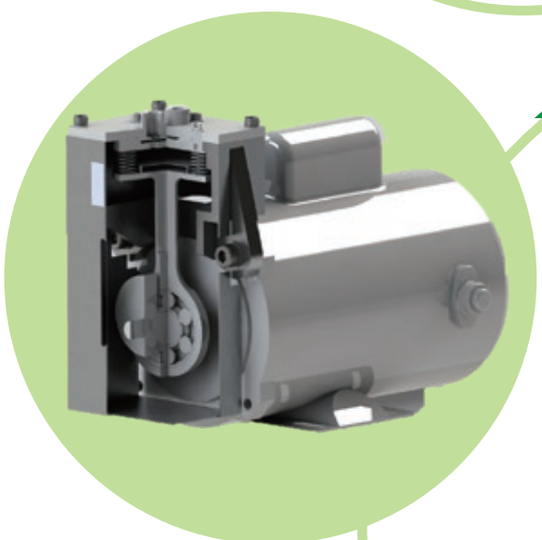
Metal Bellows Pump

Metal Bellows Pump is a positive displacement pump takes advantage of the flexible stainless steel bellows diaphragm. It can be used as a vacuum pump for gas and a booster compressor. ※Not available with liquids.

Structure

The eccentric cam between the motor shaft and the bearing causes the driver to reciprocate, causing the bellows to expand and contract, opening and closing the reed valve, and sucking in or discharging fluid gases. The combination of bellows for complete fluid gas sealing, a drive unit with welded drivers with oil-free sealed ball bearings, and an exquisitely molded high-performance reed valve allows metal bellows pumps to operate for nearly infinite cycles without degrading performance.





Features

●Excellent tightness
The welded bellows and the hermetic housing construction allow suction and discharge in extremely airtight conditions.
Helium leak rate：$1x10^{-6}$～$1x10^{-0}$ Pa･m³/sec

●No contamination
The bellows and reed valves, which are gas contact parts, have no structural wear and no contamination with fluid gases.

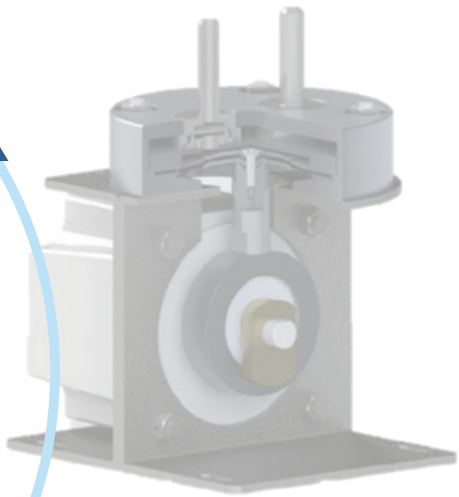
●High corrosion resistance
The material of the gas contact part is 300 series stainless steel, which is resistant to deterioration and corrosion.Teflon or Viton gaskets are used for the valve gaskets, and if an aluminum O-ring (gasket) is selected as an option, all parts in contact with the gas can be made into a metal structure.

●Long lifespan
The bellows and valves in motion are designed and manufactured at stress levels below the endurance limits of the materials used, allowing them to withstand nearly infinite operating cycles. Proprietary manufacturing facilities, unified welding processes, and welding technologies for aerospace and nuclear quality control requirements ensure reliable, stable, and high-performance product performance.

●Special specifications
We design and manufacture special specification pumps by modifying standard pumps according to various requirements and applications.
Motors (explosion-proof, variable speed, special voltage), double-structure bellows containment (double containment), gasket material change are available.

Application examples

Diaphragm Pump



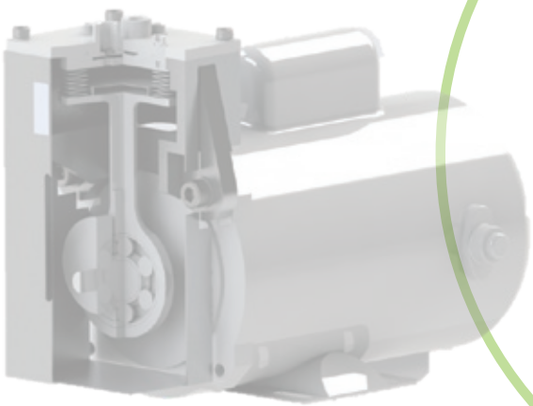
●Sampling related
Oximeter, ozone monitor, dew point meter, glove box, atmospheric analyzers, exhaust gas analyzer, gas detector, particle counter, various gas analyzers

●Liquid delivery related
Inkjet printers, cleaning equipment, beauty equipment, various water supply, cleaning drainage lines

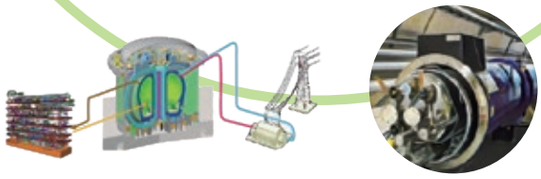
●Medical-related
Dental equipment, sterilizers, endoscope cleaning equipment, various specimen testing and analysis equipment

●Other
Laser machines, process gas transfer, gas circulation pump

Metal Bellows Pump



●Sampling of oximeters, atmospheric analyzers, exhaust gas analyzers
●Sampling of radioactivity monitoring and analysis equipment for nuclear power plants and research
●Circulation and storage system of radioisotope elements (tritium)
●Treatment process of toxic and expensive gases (rare gases)
● Pressurization of drinking water in commercial aircraft
●Transfer and storage of semiconductor process gases (fluorine, special hydrogen)
●Gas purifier for excimer laser
●Cryogenic and superconducting related (helium), dilution refrigerator (helium-3), Hydrogen treatment, ammonia gas transfer, circulation
●Cooling line of accelerator for medical PET diagnostic



The contents of this brouchure are subject to change without notice.

Contents

■Diaphragm Pump

■Metal Bellows Pump

Cautions

- For your appropriate use and safety, read the instruction manual before use.
- If a malfunction or abnormality of the products in this brochure causes a serious accident in the system, install appropriate protective equipment to prevent the accident. Perform regular maintenance.
- Do not use the product under conditions or environments not described in the instruction manual.

Diaphragm Pump Model / Performance

Model

Our diaphragm pump is determined and indicated by the combination of pump capacity and pump specifications.

・Pump capacity：FD-2～FD-15DC(Max discharge flow rate 2.0～15.0L/min)

High-temperature(HT) ： Pump head can be raised to 150~180°C (standard model up to 60°C)
Explosion-proof(XP) ： Equipped with explosion-proof d2G4 standard motor
Liquid specification(L) ： Available to use as a liquid pump
Speed control(S) ： Rotation speed control (variable speed) with external input voltage available
200/220V Motor(E) ： Single-phase 200V and 220V motors

Standard specification	High-temperature (HT)	Explosion-proof (XP)	Liquid specification (L)	Speed control(Variable speed) (S)	200 / 220V Motor (E)
FD-2 / FD-2DC	FD-2HT		FD-2DCL FD-2HTL（OP）	FD-2S（OP）/ FD-2HTS（OP）	
FD-5 / FD-5DC		FD-5XP	FD-5L / FD-5DCL FD-5XPL（OP）	FD-5DC	FD-5E（OP）
FD-15 / FD-15DC	FD-6HT / FD-10HT FD-10DCHT	FD-15XP		FD-15DC FD-10DCHT	FD-15E（OP）
FD-2N / FD-2NDC			FD-2NL(OP) FD-2NDCL(OP)	FD-2NS(OP)	
FDL-10 / FDL-20			FDL-10 / FDL-20		

Performance

For details, refer to the performance curve diagram (P7~19) of each model.

Model	Max discharge flow rate (L/min)	Max vacuum (kPaG)	Max discharge pressure (kPaG)	
FD-2/FD-2DC	2.0	-50.0	65.0	
FD-5/FD-5DC	5.0/8.0	-50.0	65.0	
FD-15/FD-15DC	15.0	-70.0	200.0	
FD-2HT	2.0	-50.0	65.0	
FD-6HT/FD-10HT	6.0/10.0	-40.0/-50.0	60.0/100.0	
FD-10DCHT	10.0	-50.0	100.0	
FD-5XP	5.0	-50.0	65.0	
FD-15XP	15.0	-70.0	200.0	
FD-2N/FD-2NDC	2.0	-50.0	65.0	
FDL-10/FDL-20	12.0/20.0	3m(Suction lift)	400.0	※Liquid Specifications
FD-2DCL	0.5	-30.0	100.0	※Liquid Specifications
FD-5L/FD-5DCL	1.2	-30.0	60.0/100.0	※Liquid Specifications

Note1 The max discharge flow rate is the air flow rate when the pressure on the suction and the discharge side of the pump are atmospheric pressure (1atm, 20°C).
When the standard air flow rate is (1atm, 0°C, NL/min), the value is approximately 7% less than the maximum discharge flow.
Note2 The max vacuum is when the pump discharge side is atmospheric.
Note3 The max discharge pressure is when the pump suction side is atmospheric. If the discharge side is set to a cut-off operation, the pressure will continue to rise, protect it with a relief valve.

Diaphragm Pump
FD-2/FD-2DC

AC Motor | DC Motor | Liquid

Features

- ■Significantly reduced vibration compared to conventional models (LVM-10/DCP-20)
- ■Optional screw-in connection added
- ■DC motor uses a brushless motor, and the FD-2S model can operate at variable speed as standard feature

Specifications

	FD-2	FD-2DC
Max discharge flow rate	2.0L/min(60Hz)以上	2.0L/min
Max vaccum	-50.0kPaG	
Max discharge pressure	65.0kPaG	
Connection tube size	ϕ6.35mm	
Mount shape	Standard or Z type	
Suction temp range	0～60℃	
Ambient environment	Temp：0～40℃ / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	DC24V(STD) / DC12V
Rated current	0.15A	0.12A(24V) / 0.27A(12V)
Rated speed	2350 / 2750RPM	2950RPM
Output	2.5W	3W
Insulation grade	E	
Weight	0.52kg(Z type：0.54kg)	0.38kg(Z type：0.40kg)

Option

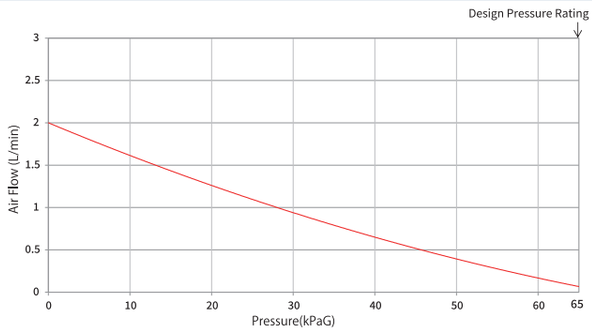
Connection ：ϕ6mm、ϕ4mm, Rc1/8, Barb joint(O.D.ϕ4.2mm), Flareless joint
Diaphragm ：FKM+PTFE, Silicon(+PTFE), EPDM(+PTFE), CR(+PTFE), PTFE based
Valve ：PTFE, EPDM
Oring ：Silicon, EPDM, CR, FFKM, Kalrez
Motor ：Variable speed DC24V Motor(FD-2S)
Others ：Anti-vibration stand, power supply unit (AC), harness processing, rotating part safety cover (standard mount only), external volume regulator (FD-2S)

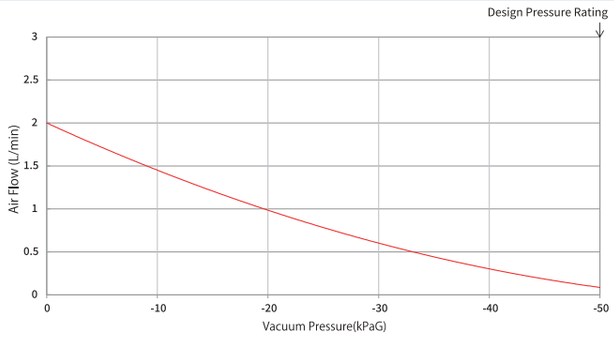
※Consult us for other specifications.

Wetted parts

Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM(STD)
Valve	FKM(STD)
Oring	FKM(STD)
Others	SUS304

Performance curve | FD-2/FD-2DC

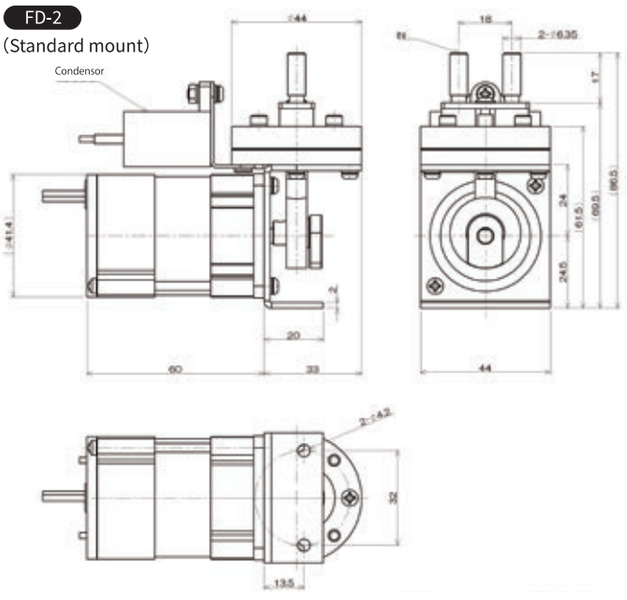




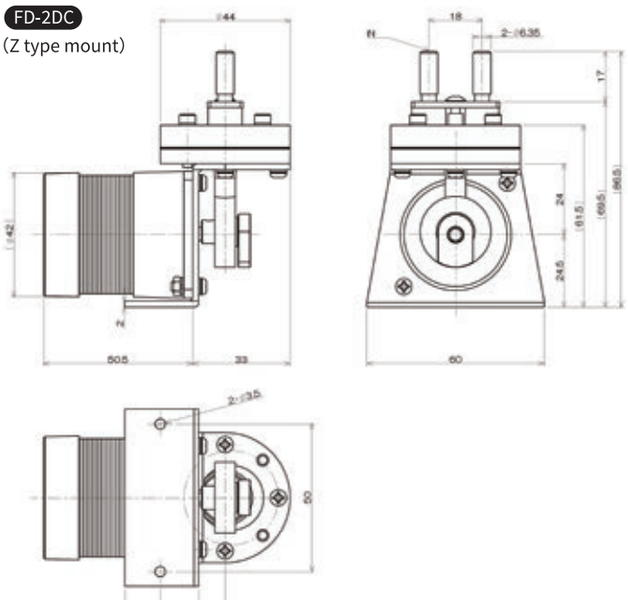
Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.（FD-2）
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm

FD-2
(Standard mount)



FD-2DC
(Z type mount)

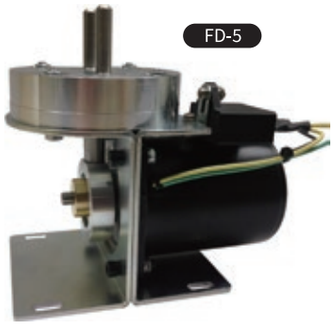


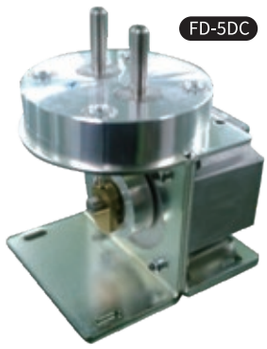
Diaphragm Pump
FD-5/FD-5DC

AC Motor | Liquid
DC Motor

Features

- ■Improved corrosion resistance with standard features
- ■DC motor uses a brushless motor, variable speed operation as standard features and alarm output available
- ■Optional screw-in connection added





Specifications | FD-5 FD-5DC

Max discharge flow rate	5.0L/min(60Hz)以上	8.0L/min
Max vaccum	-50.0kPaG	
Max discharge pressure	65.0kPaG	
Connection Tube Size	ϕ6.35mm	ϕ8mm
Suction temp range	0～60°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	DC24V
External driving		External input voltage DC0～5V PWM Conrol External Volume Adjustment
Rated current	0.25A	1.5A
Rated speed	1200/1450RPM	2200RPM
Output	6W	27W
Insulation	E	
Weight	1.7kg	1.1kg

Option

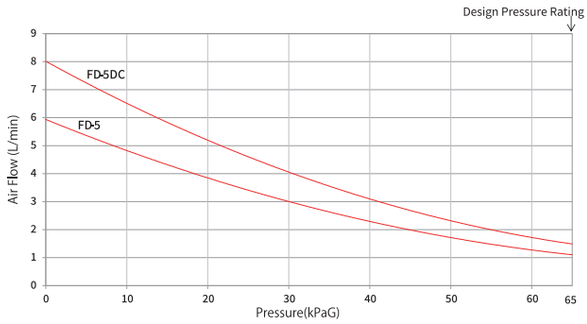
Connection : Rc1/4, Flareless joint
Diaphragm : FKM, Silicon(+PTFE), EPDM(+PTFE), CR(+PTFE)
Valve : FKM, EPDM
Oring : Silicon, EPDM, CR, FFKM
Motor : AC200/220V(FD-5E)
Others : Anti-vibration stand, power supply unit (AC), harness processing, external volume regulator (DC)

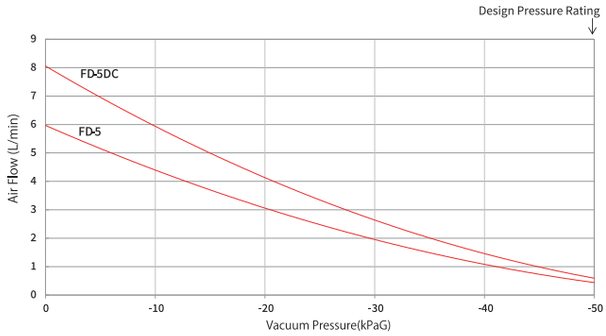
※Consult us for other specifications.

Wetted parts

Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM+PTFE(STD)
Valve	PTFE(STD)
Oring	FKM(STD)
Others	SUS304

Performance curve | FD-5/FD-5DC

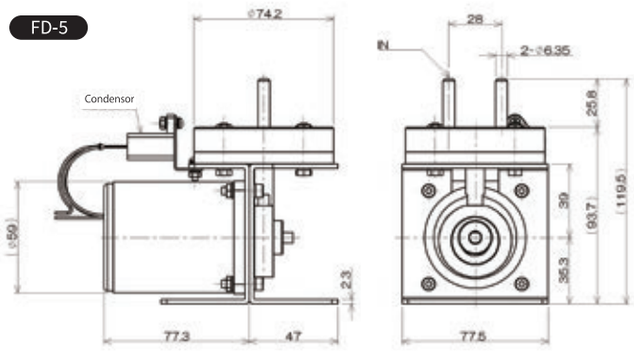


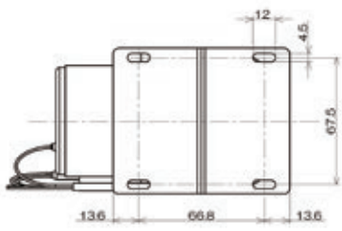


Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.(FD-5)
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

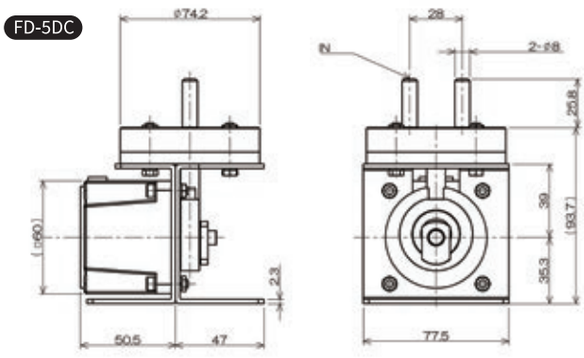
Dimensions | Unit：mm

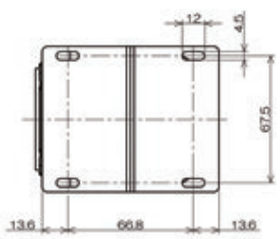
FD-5





FD-5DC





NEW

Diaphragm Pump
FD-15/FD-15DC

AC Motor | DC Motor | Gas

Features

- High airtight, best use for boosting and circulating gases
- DC motor uses a brushless motor, variable speed operation as standard features and alarm output available

FD-15

FD-15DC

Specifications | FD-15 FD-15DC

Max discharge flow rate	15.0L/min (60Hz)	15.0L/min
Max vaccum	-70.0kPaG	
Max discharge pressure	200.0kPaG	
Connection	Rc1/4	
Suction temp range	0～60°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	DC24V
External driving		External input voltage DC0～5V PWM Conrol External Volume Adjustment
Rated currenct	0.6A	1.5A
Rated speed	1250 / 1550RPM	2200RPM
Output	25W	27W
Insulation	E	
Weight	2.7kg	1.3kg

Option

Connection	：Flareless joint , VCR joint, One-touch joint
Diaphragm	：FKM, CR, PTFE coated※1, PTFE based※1
Valve	：EPDM, FKM, CR
Oring	：FKM, CR, FEP, FFKM
Cap, Pump head	：A5052
Motor	：AC200/220V(FD-15E)
Others	：Anti-vibration stand, power supply unit (AC), harness processing, external volume regulator (DC)

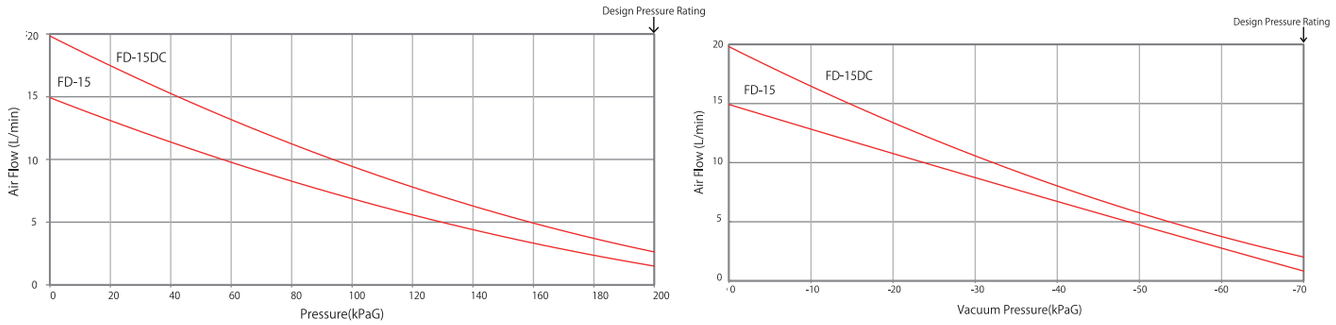
Wetted parts

Cap	SUS304(STD)
Pump head	SUS304(STD)
Diaphragm	EPDM(STD)
Valve	PTFE (STD)
Oring	EPDM(STD)
Others	SUS304

※ Consult us for other specifications.

※1 When using the diaphragm made of PTFE, the specifications(performances) would be different from the standard one.

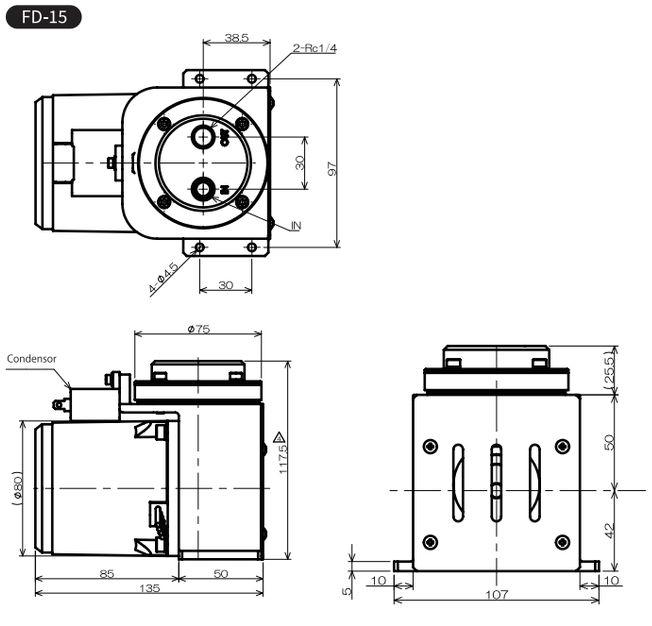
Performance curve | FD-15/FD-15DC



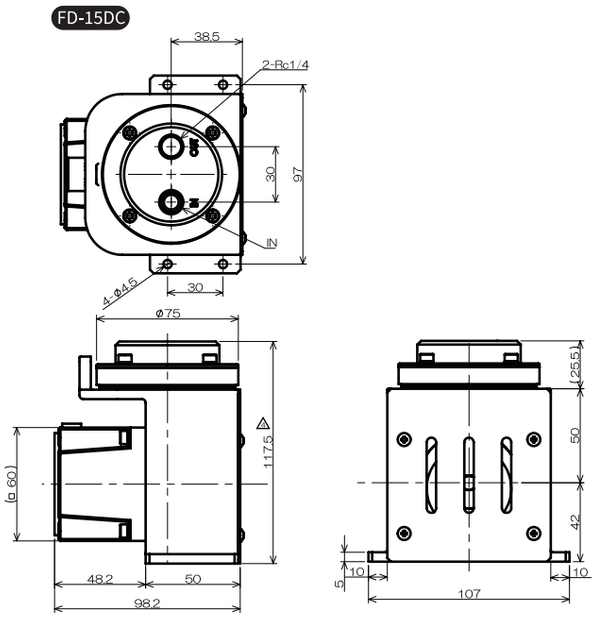
Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times. (FD-15)
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm

FD-15



FD-15DC



Diaphragm Pump
FD-2HT

AC Motor | Gas
DC Motor | Liquid〈OP〉

Features

- ■Improved corrosion resistance with standard features
- ■Available to use with hot gases up to 150°C
- ■DC motor uses a brushless motor

Specifications | FD-2HT

Max discharge flow rate	2.0L/min
Max vaccum	-50.0kPaG
Max discharge pressure	65.0kPaG
Connection Tube Size	ϕ6.35mm
Suction temp range	0～150°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Rated power supply voltage	DC24V（STD） / DC12V
Rated current	0.12A（24V） / 0.27A（12V）
Rated speed	2950RPM
Output	3W
Insulation	E
Weight	0.60kg

Option

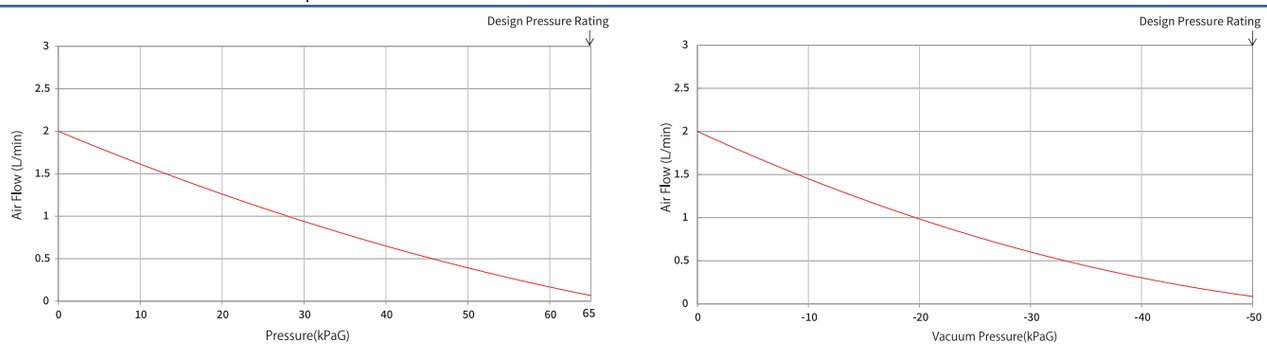
Connection ：ϕ6mm, ϕ4mm, Rc1/8, Barb joint(O.D.4.2mm), Flareless joint
Diaphragm ：PTFE based
Oring ：PTFE
Motor ：AC100V, Variable speed DC24V Motor(FD-2HTS)
Others ：Liquid specification(FD-2HTL), Anti-vibration stand, power supply unit (AC), harness processing,

※Consult us for other specifications.

Wetted parts

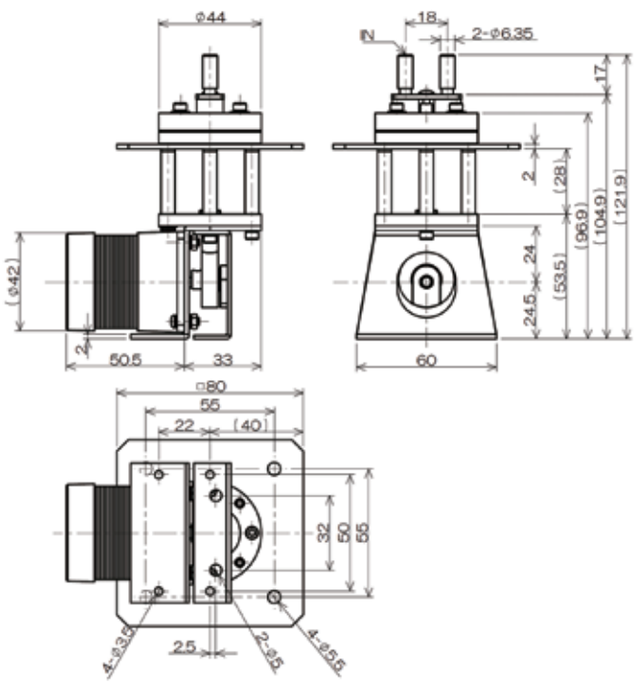
Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM+PTFE（STD）
Valve	PTFE（STD）
Oring	Kalrez #4079
Others	SUS304

Performance curve | FD-2HT



Note)The above is the air flow rate.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



NEW Diaphragm Pump for High temperature AC Motor Gas
FD-6HT/FD-10HT

Features
- High airtight, best use for gas transfer and circulation
- Improved corrosion resistance with standard features, available to use with hot gases up to 180°C

Specifications | FD-6HT FD-10HT

Max discharge flow rate	6.0L/min (60Hz)	10.0L/min (60Hz)
Max vaccum	-40.0kPaG	-50.0kPaG
Max discharge pressure	60.0kPaG	100.0kPaG
Connection	Rc1/4	
Suction temp range	0～180°C	
Ambient Environment	Temp：0～40°C / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	
Rated current	0.6A	
Rated speed	1250 / 1550RPM	
Output	25W	
Insulation	E	
Weight	3.1kg	

Option

Connection : Flareless joint , VCR joint, One-touch joint
Diaphragm : PTFE coated※1
Motor : AC200/220V, explosion-proof(FD-6HTXP/FD-10HTXP)
Others : Anti-vibration stand, power cord, harness processing

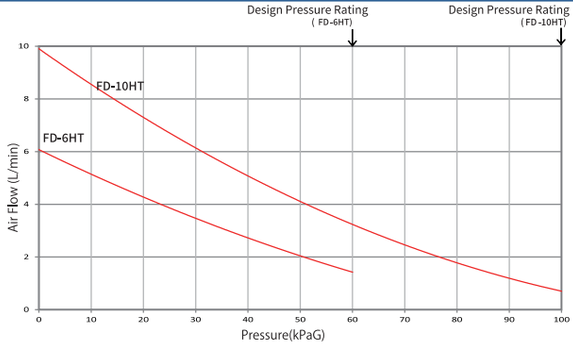
※ Consult us for other specifications.

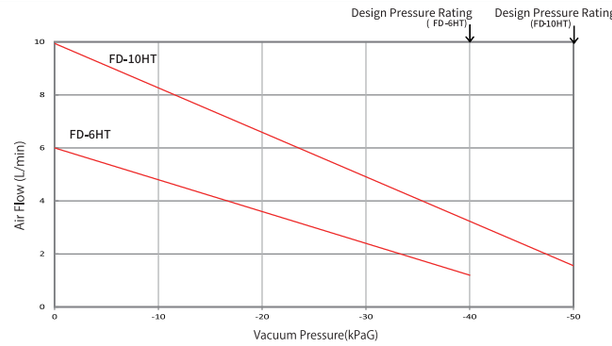
※1 When using the diaphragm made of PTFE, the specifications(performances) would be different from the standard one.

Wetted parts

Cap	SUS304
Pump head	SUS304
Diaphragm	PTFE
Valve	PTFE
Oring	FEP
Others	SUS304

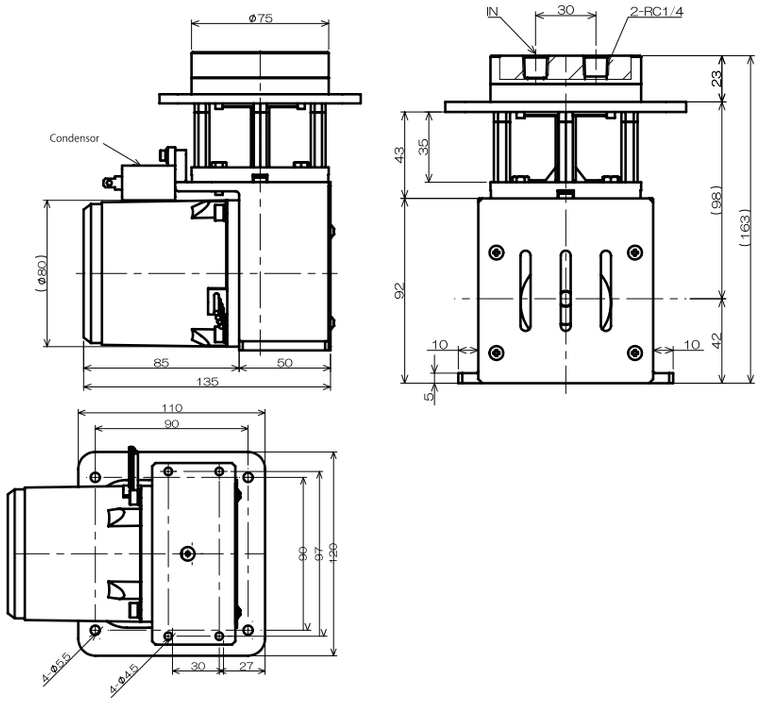
Performance curve | FD-6HT/FD10-HT





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



NEW Diaphragm Pump for High temperature DC Motor Gas
FD-10DCHT

Features
- ■High airtight, best use for gas transfer and circulation
- ■Improved corrosion resistance with standard features, available to use with hot gases up to 150°C
- ■DC motor uses a brushless motor, variable speed operation

Specifications | FD-10DCHT

Max discharge flow rate	10.0L/min
Max vaccum	-50.0kPaG
Max discharge pressure	100.0kPaG
Connection	Rc1/4
Suction temp range	0～180°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Rated power supply voltage	DC24V
External driving	External input voltage DC0～5V PWM Conrol External Volu,e Adjustment
Rated current	1.5A
Rated speed	2200RPM
Output	27W
Insulation	E
Weight	2.0kg

Option

Connection ：Flareless joint , VCR joint, One-touch joint
Diaphragm ：PTFE coarted※1
Others ：Anti-vibration stand, harness processing, external volume regulator

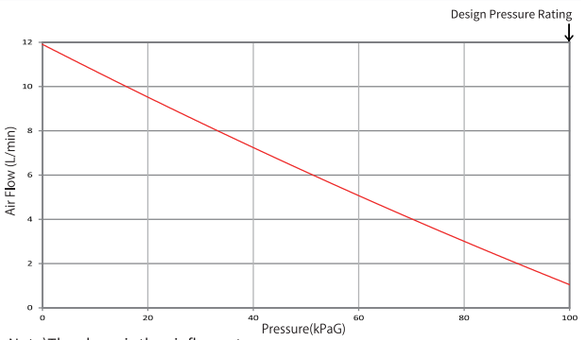
※ Consult us for other specifications.

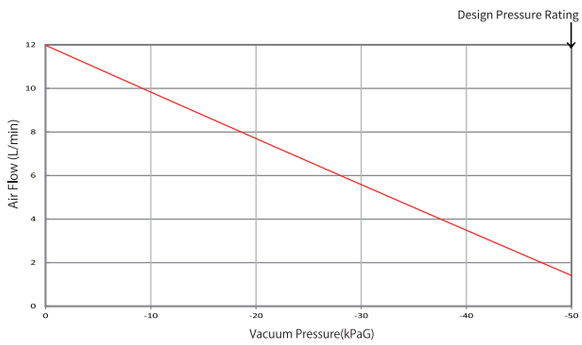
※1 When using the diaphragm made of PTFE, the specifications(performances) would be different from the standard one.

Wetted parts

Cap	SUS304
Pump head	SUS304
Diaphragm	PTFE
Valve	PTFE
Oring	FEP
Others	SUS304

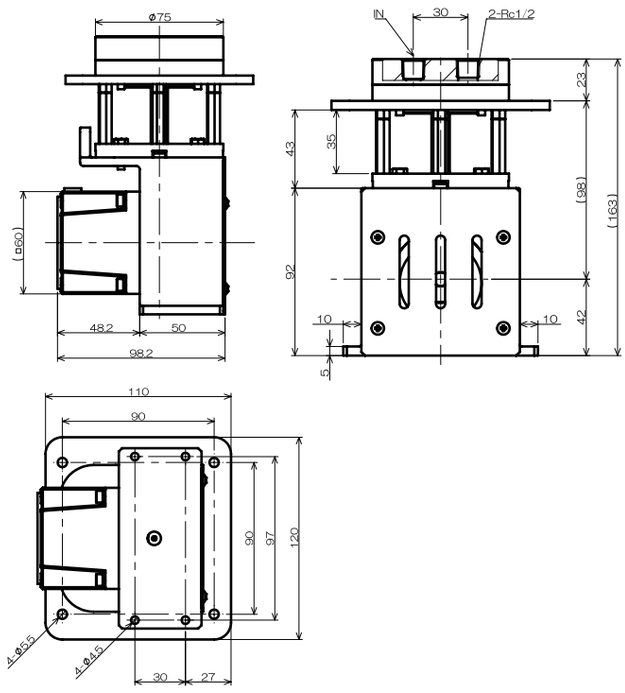
Performance curve | FD-10DCHT





Note)The above is the air flow rate.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Diaphragm Pump for Explosion-proof FD-5XP

Explosion -Proof | Gas | Liquid〈OP〉

Features
- ■Explosion-proof(d2G4)
- ■Compact / Lightweight

Specifications | FD-5XP

Max discharge flow rate	5.0L/min(60Hz)
Max vaccum	-50.0kPaG
Max discharge pressure	65.0kPaG
Connection tube size	ϕ6.35mm
Suction temp range	0～60°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Rated power supply voltage	AC100V 50/60Hz
Explosion-proof type	Explosion-proof type d2G4
Rated current	0.6A
Rated speed	1200/1450RPM
Output	25W
Insulation	E
Weight	5.7kg

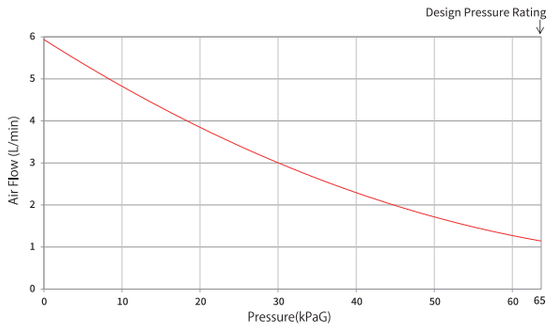
Option

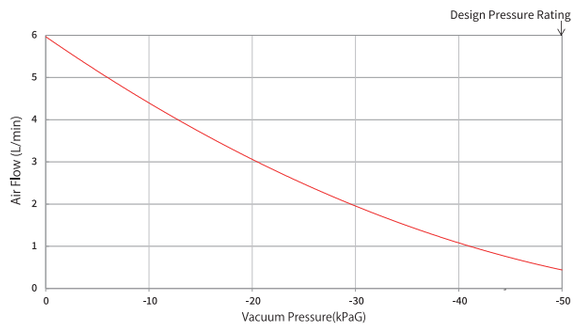
Connection ：ϕ8mm, Rc1/4, Flareless joint
Diaphragm ：FKM, Silicon(+PTFE), EPDM(+PTFE), CR(+PTFE)
Valve ：FKM, EPDM
Oring ：Silicon, EPDM, CR, FFKM
Motor ： AC200, 230V(FD-5XPE)
Others ： Liquid specification(FD-5XPL), Anti-vibration stand
※Consult us for other specifications.

Wetted parts

Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM+PTFE(STD)
Valve	PTFE(STD)
Oring	FKM(STD)
Others	SUS304

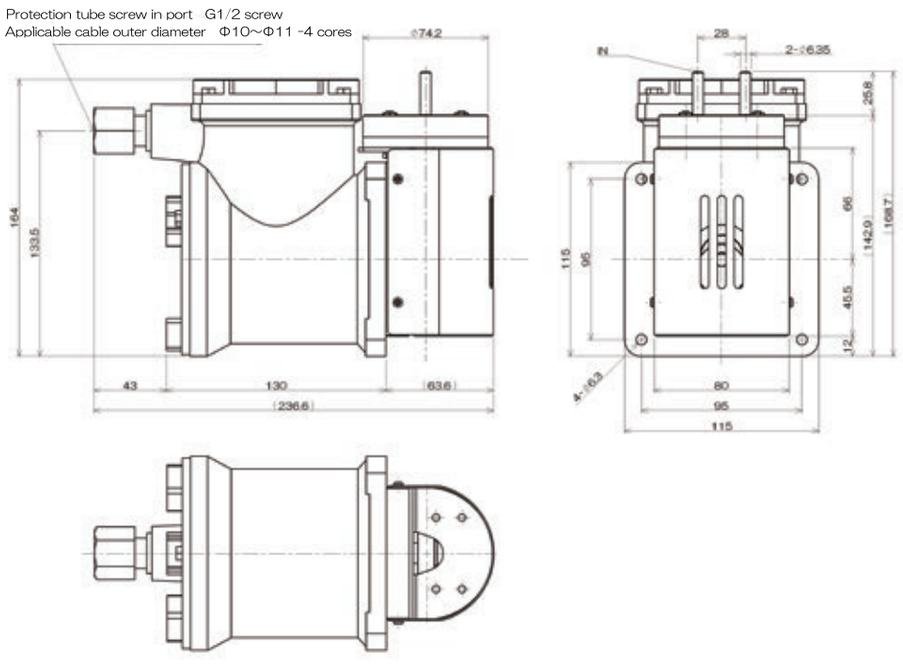
Performance curve | FD-5XP





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized

Dimensions | Unit：mm



NEW

Diaphragm Pump for Explosion-proof FD-15XP

Explosion -Proof | Gas

Features

- ■High airtight, best use for gas transfer and circulation
- ■Explosion-proof(d2G4)
- ■Compact / Lightweight

Specifications | FD-15XP

Max discharge flow rate	15.0L/min（60Hz）
Max vaccum	-70.0kPaG
Max discharge pressure	200.0kPaG
Connection	Rc1/4
Suction temp range	0～60°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Rated power supply voltage	AC100V 50/60Hz
Explosion-proof type	Explosion-proof d2G4
Rated current	0.6A
Rated speed	1200 / 1450RPM
Output	25W
Insulation	E
Weight	6.7kg

Option

Connection ：Flareless joint , VCR joint, One-touch joint
Diaphragm ：FKM, CR, PTFE coated※1,PTFE based※1
Valve ：EPDM, FKM, CR
Oring ：FKM, CR, FEP, FFKM
Motor ：AC200, 230V(FD-15XPE)
Others ：Anti-vibration stand, power code, capacitor mounting bracket

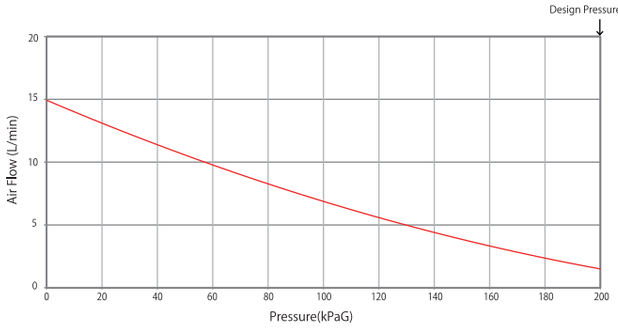
※ Consult us for other specifications.

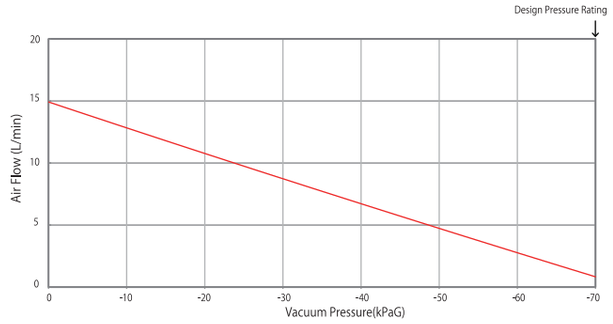
※1 When using the diaphragm made of PTFE, the specifications(performances) would be different from the standard one.

Wetted parts

Cap	SUS304
Pump head	SUS304
Diaphragm	EPDM(STD)
Valve	PTFE（STD）
Oring	EPDM(STD)
Others	SUS304

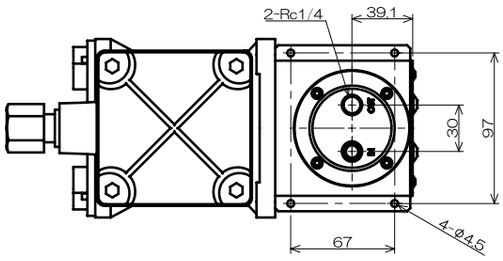
Performance curve | FD-15XP



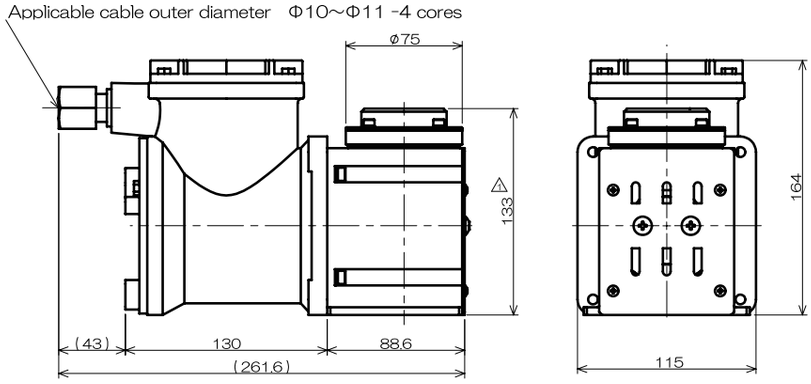


Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Protection tube screw in port G1/2 screw
Applicable cable outer diameter Φ10～Φ11 -4 cores



Diaphragm Pump
FD-2N/FD-2NDC

AC Motor | Gas
DC Motor | Liquid〈OP〉

Features
- Low-cost / Lightweight
- DC motor uses a brushless motor

Specification | FD-2N FD-2NDC

Max discharge flow rate	2.0L/min(60Hz)	2.0L/min
Max vaccum	-50.0kPaG	
Max discharge pressure	65.0kPaG	
Connection tube size	ϕ4.8mm	
Mount shape	Standard or Z	
Suction temp range	0～60°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	DC24V(STD) / DC12V
Rated current	0.15A	0.12A(24V) / 0.27A(12V)
Rated speed	2350 / 2750RPM	2950RPM
Output	2.5W	3W
Insulation	E	
Weight	0.44kg(Ztype：0.46kg)	0.30kg(Ztype：0.32kg)

Option

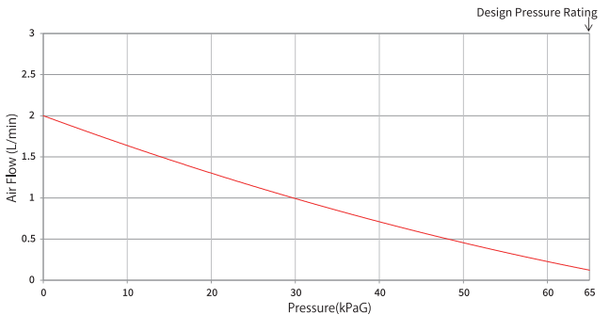
Connection ： ϕ4.8mm(SUS304), Barb joint(O.D.ϕ4.2mm)
Diaphragm ： FKM(+PTFE), Silicon(+PTFE), EPDM(+PTFE),CR(+PTFE)
Valve ： PTFE, EPDM
Oring ： Silicon, EPDM, CR
Motor ： Variable speed DC24V Motor(FD-2NS)
Others ： Liquid specification(FD-2NL/FD-2NDCL), anti-vibration stand, power code(AC), harness processing, rotating part safety cover(standard mount only)

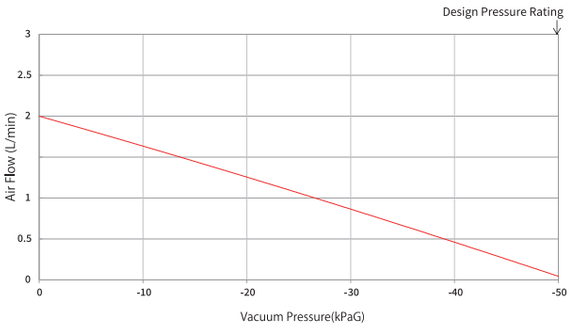
※Consult us for other specifications

Wetted parts

Pump head	CM3001(66Nylon/Reinforced)
Connection tube	Aluminum
Diaphragm	CR(STD)
Valve	FKM(STD)
Oring	FKM(STD)
Others	SUS304

Performance curve | FD-2N/FD-2NDC

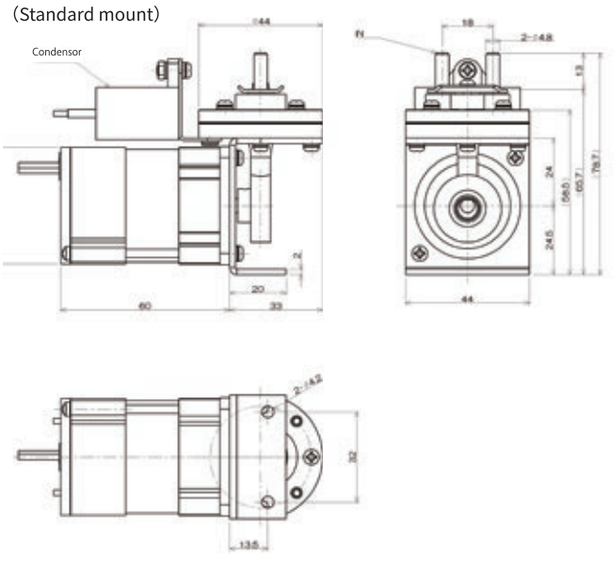




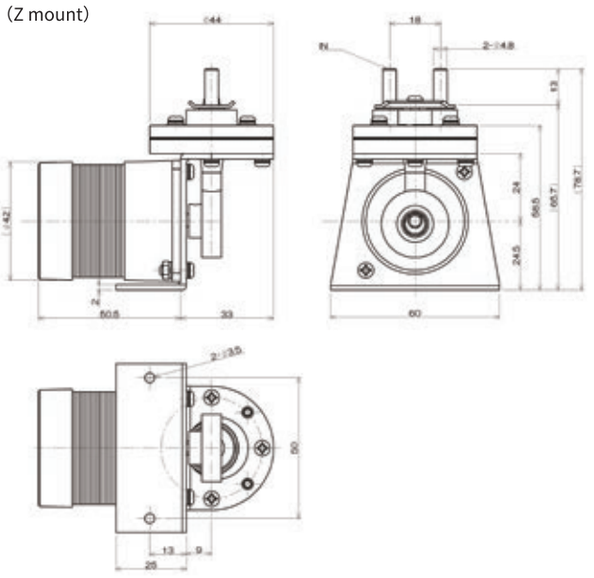
Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.(FD-2N)
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm

FD-2N
(Standard mount)



FD-2NDC
(Z mount)



NEW

Diaphragm Pump for Liquid
FDL-10 / FDL-20

▶Low-Pulsation/Low-Vibration/Low-Noise
Greatly reduced pulsation with compact and multiple diaphragm

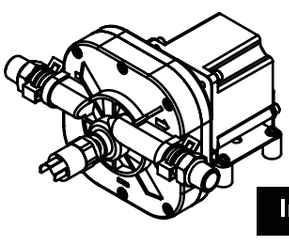
▶Self-Priming: 3m (Suction Lift)
Available maximum operating (discharge) pressure is up to 400kPaG

▶Highly Corrosion-Resistant
Thermoplastic resin, thermoplastic elastomer standard,
O-ring can be changed to other materials

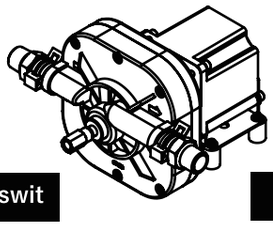
▶Variable Speed Function (Standard Feature)
Flow rate variable by external driving control

▶Alarm Detection Function (Standard Feature)
Overload (Overcurrent), Overvoltage, Undervoltage, Overheat

▶Options
- AC Motor(Single-phase / Three-phase)
- Changeable connection position to 90° or 180°
- Internal pressure Switch, Internal relief valve
  External volume adjustment unit



Internal pressure swit



Internal relief valve

NEW Diaphragm Pump for Liquid specification FDL-10/FDL-20

AC Motor DC Motor Liquid

■DC motor uses a brushless motor, variable speed operation as standard features and alarm output available

Specification | FDL-10 FDL-20

Max discharge flow rate	12.0L/min	20.0L/min
Suction lift (self-priming)	3m	
Max discharge pressure	400.0kPaG	
Connection	R1/2	
Suction temp range	0～70°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Rated current	DC24V(STD)	
External driving	External input voltage DC0～5V PWM Conrol External Volume Adjustment	
Rated current	6A	
Rated speed	1000RPM	1900RPM
Output	125W	
Insulation	E	
Weight	2.5kg	

Option

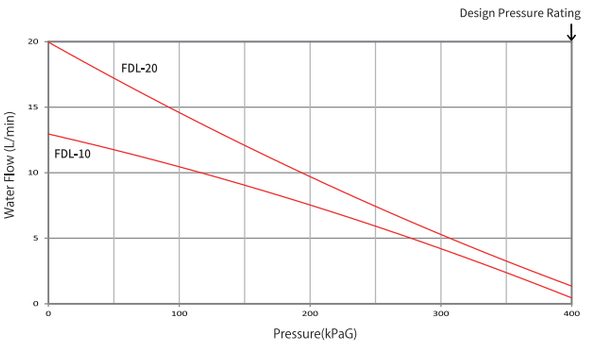
Connection ： Quick fasteners 12.7
Oring ： FKM,FFKM,FEP,AFLAS,NEXUS
Motor ： AC100/110V,200/220V
Others ： Pressure switch, built-in relief valve, anti-vibration stand power cord (AC), harness processing, external volume regulator (DC)

※Consult us for other specifications.

Wetted parts

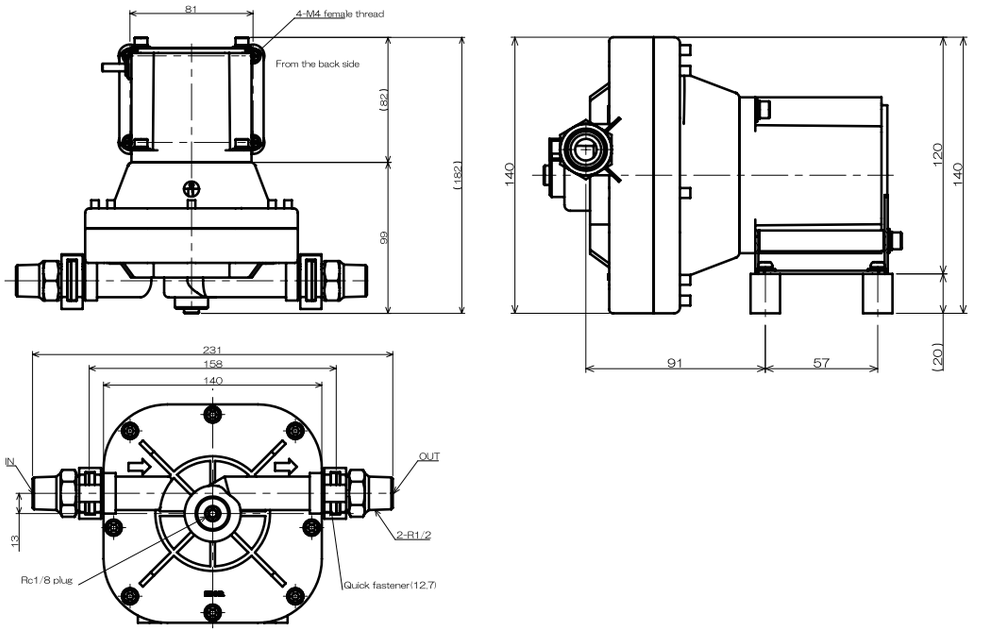
Pump head	PPS(Thermoplastics)
Diaphragm	Thermoplastic elastomers
Valve assembly	Thermoplastic elastomers / PPS
Oring	EPDM(STD)

Performance curve | FDL-10/FDL-20



Note)The above is the water flow rate.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Diaphragm Pump for Liquid specification
FD-2DCL

DC Motor | Liquid

Features

■Best use for transferring corrosive fluids
(cleaning fluids and printer inks)
■Internal brushless motor,
variable speed operation is available as standard features

Specifications | FD-2DCL

Max dischargeg flow rate	0.5L/min
Max vaccum	-30.0kPaG
Max discharge pressure	100.0kPaG
Connection tube	ϕ6.35mm
Mount shape	Z(STD)
Suction temp range	0～60°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Rated power supply voltage	DC24V
External driving control	External input voltage DC 0～5V
Rated current	0.46A
Rated speed	3500RPM
Output	9W
Insulation	E
Weight	0.40kg

Option

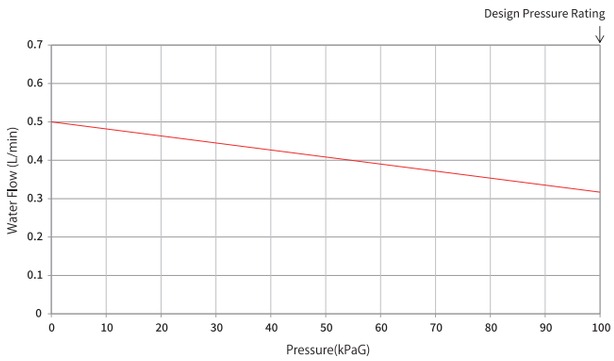
Connection ：ϕ6mm, ϕ4mm, Barb joint Rc1/8(O.D.ϕ4.2mm), Flareless joint
Diaphragm ：Silicon(+PTFE), PTFE based
Oring ：Silicon, EPDM, CR
Motor ：DC12V
Others ：Anti-vibration stand, harness processing, rotating part safety cover(standard mount only), external volume regulator

※Consult us for other specifications.

Wetted parts

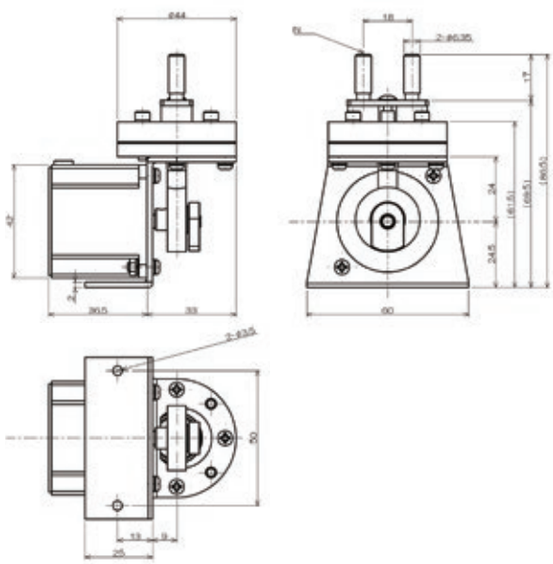
Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM+PTFE（STD）
Valve	PTFE（STD）
Oring	FKM（STD）
Others	SUS304

Performance curve | FD-2DCL



Note)The above is the water flow rate.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm

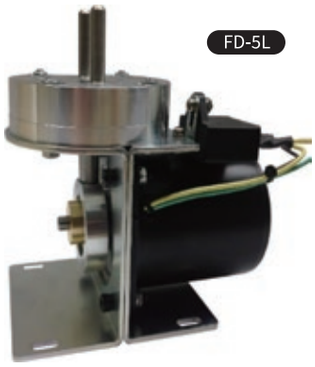


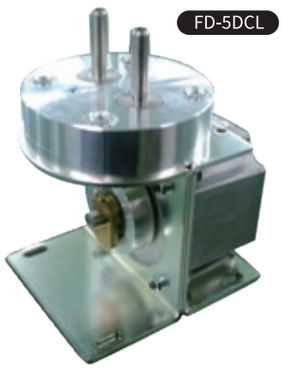
Diaphragm Pump for Liquid specification
FD-5L/FD-5DCL

AC Motor
DC Motor | Liquid

Features

■Best use for transferring corrosive fluids (cleaning fluids and printer inks)
■DC motor uses a brushless motor, variable speed operation as standard features and alarm output available.





Specifications | FD-5L FD-5DCL

Max discharge flow rate	1.2L/min	
Max vaccum	-30.0kPaG	
Max discharge pressure	60.0kPaG	100.0kPaG
Connection tube	ϕ8mm	
Suction temp range	0～60°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Rated power supply voltage	AC100V 50/60Hz	DC24V
External driving		External input voltage DC0～5V PWM Control
Rated current	0.25A	2.2A
Rated speed	1200 / 1450RPM	1000RPM
Output	6W	35W
Insulation	E	
Weight	1.7kg	1.1kg

Option

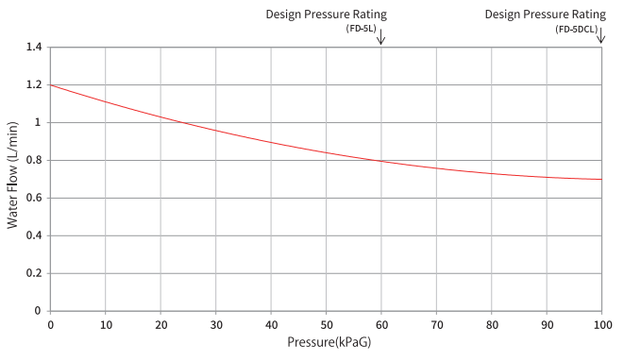
Connection : Rc1/4, Flareless joint
Diaphragm : Silicon(+PTFE), PTFE based
Oring : Silicon, EPDM, CR, FFKM
Motor : AC200/220V, explosion-proof motor
Others : Anti-vibration stand,power code(AC), harness processing rotating part safety cover, external volume regulator(DC)

※Consult us for other specifications.

Wetted parts

Pump head	SUS304
Connection tube	SUS304
Diaphragm	FKM+PTFE（STD）
Valve	PTFE（STD）
Oring	FKM（STD）
Others	SUS304

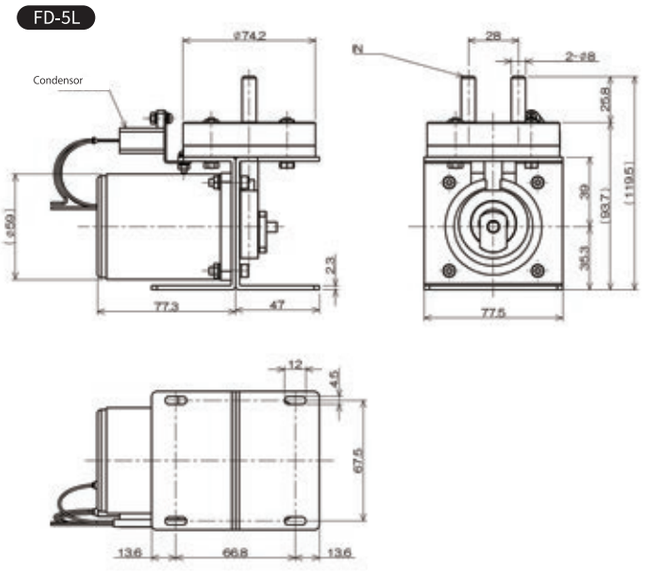
Performance curve | FD-5L/FD-5DCL



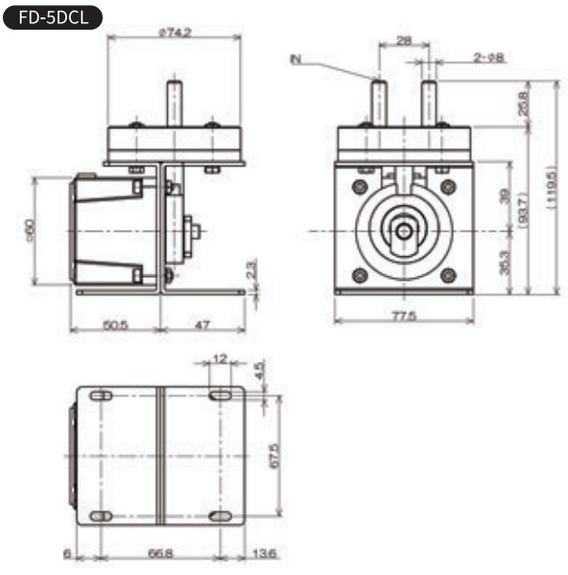
Note)The above is the water flow rate.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm

FD-5L



FD-5DCL



Metal Bellows Pump Model / Performance

Parts Number

The Parts Number of Betal Bellows Pump is determined depending on the combination of pump capacity and pump specificatioons.

- Pump capacity: MB-10 to MB-602 (Max discharge flow 2.8 to 170.0 L / min)
- Pump specifications: MB-10- "XX" to MB-602- "XX" (No need "XX" for Standard.)

High Temperature（HT）	: The pump and Motor are split, and the pump head can be heated up to 230 ° C (Up to 80 ° C for Standard).
High Pressure（HP）	: IN/OUT is avairable for 275.0kPaG or over. Max 690.0 kPaG
Double Containment（DC）	: Double bellows configulation
Explosion Proof Motor（XP）	: NEC code / NEMA standard ClassI GroupD, ClassII GroupF, G hydrogen explosion proof/IEC, Ex db IIC are coverd
230V Motor（E）	: Single Phase 230V Motor (220V/240V depending on the model)

Standard Specifications	High Temperature (HT)	High Pressure (HP)	Double Containment (DC)	Explosion Proof Motor (XP)	230V Motor (E)
MB-10,MB-21,MB-41					MB-10E,MB-21E,MB-41E
MB-111,MB-151			MB-151DC	MB-111XP,MB-151XP	※2
MB-118,MB-158	MB-118HT,MB-158HT				MB-118E,MB-158E
MB-302	MB-302HT			MB-302XP	※2
MB-601 Single ※1		MB-601HP Single	MB-601DC Single	MB-601XP Single	※2
MB-601	MB-601HT	MB-601HP	MB-601DC	MB-601XP	※2
MB-602				MB-602XP	※2

※1 The model that modified 2 heads of MB-602 to 1 head.
※2 230V is standard.（115/230V）
※3 Any combination is avairable. Example) MB-601HT-HP-DC-XP, etc.
※4 Not reflected in Parts Number depending on specifications such as Aluminum O-rings (gaskets), VCR connections and various motors (Three Phase, Variable Speed), etc.

Performance

For more details, check Performance Curve for each model (P19-P29).

Parts Number	Max discharge flow rate (L/min)	Max vacuum (kPaG)	Max discharge pressure (kPaG)
MB-10	2.8	-16.8	27.5
MB-21	5.6	-40.5	69.0
MB-41	11.0	-50.5	69.0
MB-118,MB-118HT	28.0	-64.0	159.0
MB-158,MB-158HT	40.0	-74.5	172.0
MB-111	28.0	-64.0	159.0
MB-151,MB-151DC	40.0	-74.5	275.0
MB-302,MB-302HT	85.0	-74.5	275.0
MB-601 Single,MB-601HP Single,MB-601DC Single	70.0	-74.5	275.0
MB-601,MB-601HT,MB-601DC Series	70.0	-94.5	275.0
MB-601,MB-601HT,MB-601DC Parallel	140.0	-74.5	275.0
MB-601HP Series	70.0	-94.5	690.0
MB-601HP Parallel	140.0	-74.5	275.0
MB-602 Series	85.0	-84.5	275.0
MB-602 Parallel	170.0	-74.5	275.0

Note 1 The max discharge flow rate is the air flow rate when IN and OUT pressure is at atmospheric pressure (1 atm, 20 ° C). When the standard air flow rate is (1atm, 0 °C, NL / min), the value is about 7% less than the Max Flow.

Note 2 The max Vacuum is the value when OUT side is at atmospheric pressure.

Note 3 The max discharge pressure is the value when IN side is at atmospheric pressure. When OUT side is set to the cut-off operation, please use relief valves in order to protect diaphragm pump because the pressure will continue to increase .

Note 4 The withstand voltage of MB-601HP Single is 700kPaG. It is avairable for circulation of step-up compressors (atmospheric pressure or over on IN/OUT side).

Note 5 Helium Leak Rate:
Standard values for MB-10, MB-21, MB-41: 1×10^{-6} Pa・m³/sec
Other standard values : 1×10^{-8} Pa・m³/sec
Special specification value(OP) : 1×10^{-10} Pa・m³/sec

Wetted Surface/ Replacement Parts / Connection and operation for 2 Head Pump

Wetted Surface

The material of the part that comes into contact with the fluid gas (Gas Wetted Part) is composed of the following.

Cap（Pump Head）	： 300 Series S.S.（AISI Standard）※It can be used SUS300 Series depend on the specification
Bellows	： AM350*（AMS5548/Equivalent to SUS633）：Cr-Ni-Mo Alloy/Semi Austenitic Stainless Steel
Valve（Reed、Plate）	： 300 Series S.S.（AISI Standard）
Valve Gaskets	： Teflon、Viton、Aluminum（O-ring Seal Type）
O-ring（Backup）	： Viton、Silicon、Kalrez、Aluminum

※S.S. is astand for "Stainless Steel".

Replacement Parts

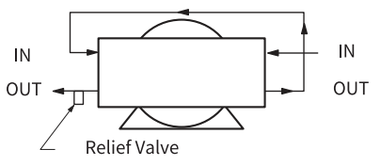
Metal Bellows Pumps can be used for an infinite number of cycles, but appropriate replacement for parts is required in the following case, such as when wrong handling, when excessive pollution occurs in the system, when contamination into bellows, when deterioration progress by corrosive fluids. See the table below for replacement parts by model.

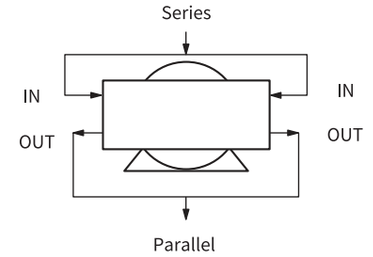
Parts Number	Valve	Bellows (Drive Unit)	Driver	Drive Stand	Motor
MB-10,MB-21,MB-41,MB-111 MB-151,MB-118,MB-158	1 piece	1 piece			1 piece
MB-118HT,MB-158HT	1 piece	1 piece		1 piece ※	1 piece
MB-302, MB-601 Single MB-601HP Single	1 piece	1 piece	1 piece		1 piece
MB-302HT	1 piece	1 piece	1 piece	1 piece ※	1 piece
MB-601,MB-601HP,MB-602	2 pieces	2 pieces	2 pieces		1 piece
MB-601HT	2 pieces	2 pieces	2 pieces	1 piece ※	1 piece
MB-151DC,MB-601DC Single	1 piece	1 piece	1 piece		1 piece
MB-601DC	2 pieces	2 pieces	2 pieces		1 piece

※Drive Stand is replaced with Unit, but replacement of only bearings, snap rings, washers, etc. is also avairable.

Connection and Operation for 2 Head Pump

2 Head Pumps such as MB-601 and MB-602 are operated by connecting Pump Heads in series or in parallel.





■ Series connection

When piping is connected from the outlet/discharge side of the first-stage pump head to the inlet/suction side of the second-stage pump head, it becomes a series connection. For vacuum pump applications, the side to be vacuumed is connected to the inlet/suction side of the first stage, and for step-up compressor applications, the side to boost is piped to the outlet/discharge side of the second stage. When the pump is operated in series, high vacuum attainment can be obtained in vacuum pump applications and high flow rates under high pressure can be obtained in boost compressor applications.

* When used as a booster compressor, the pump is operated with the outlet/discharge side of the second stage pump head closed. This can cause extreme pressure loads on the second level bellows, causing bellows breakage. As a preventive measure, it is recommended to install a relief valve on the outlet/discharge side.

■Parallel connection

If the inlet/suction side and outlet/discharge side of each pump head are connected in parallel, parallel connection is achieved. When operated in parallel, high flow rates can be obtained at low vacuum in vacuum pump applications and high flow rates at low pressures in boost compressor applications.

Performance Curve / Model Selection

Performance Curve

The flow rate conditions for the Performance Curve in this catalog are 1 atm, 20 ° C, air flow rate, and 60 Hz.

- When the standard of air flow rate is (1atm, 0 °C, NL / min), the value is reduced by about 7%.
- If the Operation Temperature is not 20 ° C, the flow rate will be 273 + XX ° C / 273 times.
- If the fluid gas is not air, the flow rate will change.
- Performance Curve: Flow rate-Pressure (when IN side of the pump is at atmospheric pressure)
- Performance Curve: Flow rate-Vacuum pressure (when OUT side of the pump is at atmospheric pressure)

Model Selection

To select the Pump Model, check the flow rate with Performance Curve of each model according to Case A and Case B below.

■Case A

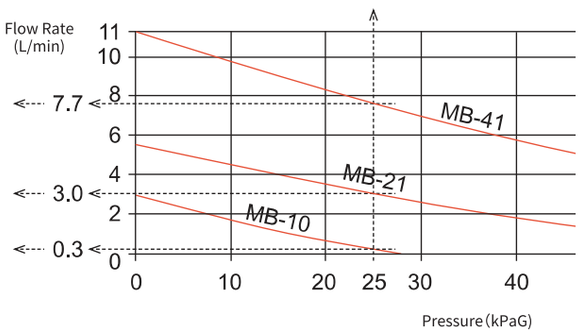
If either IN or OUT side is at atmospheric pressure, check the flow rate using Performance Curve of each model to determine Parts Number.

[Example] When pressure 25 (kPaG) and vacuum pressure is 0 (kPaG) (atmospheric pressure), the required flow rate is 6 L / min .

1. Draw a perpendicular line from pressure 25 (kPaG) on Performance Curve graph of MB-10, MB-21, MB-41.

2. Draw a parallel line to the left from the point where the perpendicular and the curve intersect, and find that flow rate is 0.3L / min, 3.0L / min and 7.7L / min.

3. Select MB-41 since the required flow rate is 6 L / min.



■Case B

If IN side and OUT side are under vacuum and over atmospheric pressure, check the flow rate according to the following procedure.

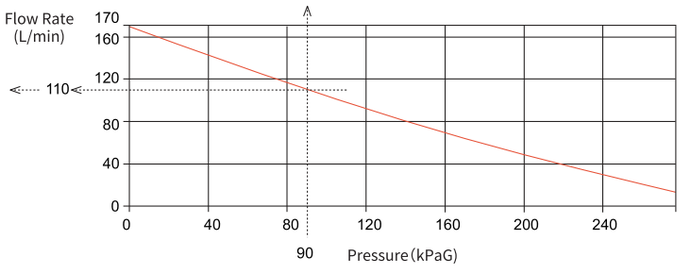
[Example] When pressure is 90 (kPaG) and vacuum pressure is -25 (kPaG), the required flow rate is 30 L / min.

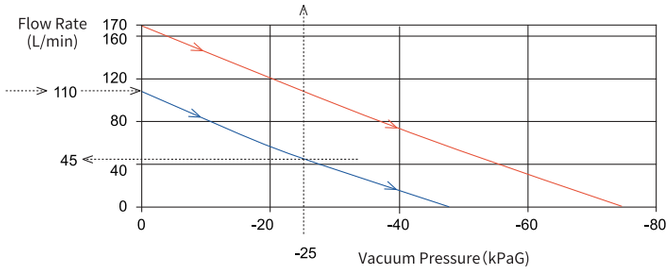
1. MB-302, MB-602, MB-601 are selected, excluding the models that cannot obtain the required flow rate of 30 L / min under the conditions of pressure 90 (kPaG) and vacuum pressure -25 (kPaG).

2. Considering the flow rate that decreases due to the pressure load on each IN/OUT side, MB-302 is deficiency in performance. This is why MB-601 and MB-602 are selected.
If no need special specifications (for High Temperature, Double Containment, Aluminum O-ring, etc.)
in the usage conditions of fluid gas here, select MB-602.

3. Draw a perpendicular line from pressure 90 (kPaG) on Performance Curve graph of MB-602. Draw a parallel line to the left from the point where the perpendicular and the curve intersect, and find that flow rate is 110 L / min.

4. Draw a line parallel to the curve from the point of flow rate 110L / min on Performance Curve graph of MB-602. Next, in the same way as in 3, draw a perpendicular line from the vacuum pressure -25 (kPaG), and draw a parallel line to the left from the point where it intersects the curve, can find that flow rate is 45 L / min. Then MB-602 is selected since it meets required flow rate 30 L /min.
(MB-302 does not meet required flow rate since flow rate of MB-302, 45/2 = 22.5 L / min, is half of MB-602.)





【Attention】
For detailed flow rate calculation and special specifications, please contact us after filling in the detailed items on the design data sheet (P31).

Metal Bellows Pump
MB-10 / MB-21 / MB-41

AC Motor | Gas

Features ■Compact, lightweight

Specification | MB-10 MB-21 MB-41

Max discharge flow rate	2.8L/min(60Hz)	5.6L/min(60Hz)	11.0L/min(60Hz)
Max vaccum	-16.8kPaG	-40.5kPaG	-50.5kPaG
Max discharge pressure	27.5kPaG	69.0kPaG	
Helium leak rate	1×10^{-6} Pa·m³/sec		
Connection	1/8 NPTFemale		
Suction temp range	0～80°C		
Ambient environment	Temp：0～40°C / Humid：RH85%		
Motor	Shading type		
Rated power supply voltage	Single Phase AC115V 50/60Hz		
Rated current	1.7/2.3A		
Rated speed	2500/3000RPM		
Output	1/40HP		
Insulation	B		
Weight	2.8kg		

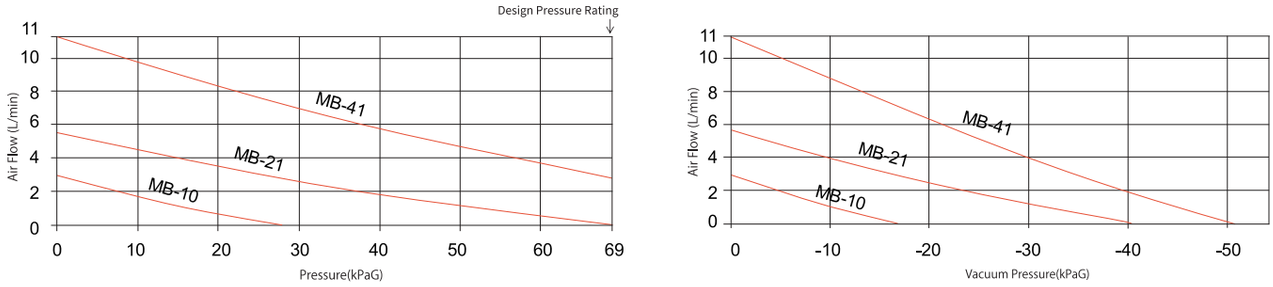
Option

Connnection ：VCR connection
Oring ：Aluminum Oring(Gasket)
Motor ：AC220/240V, DC24V

Wetted parts

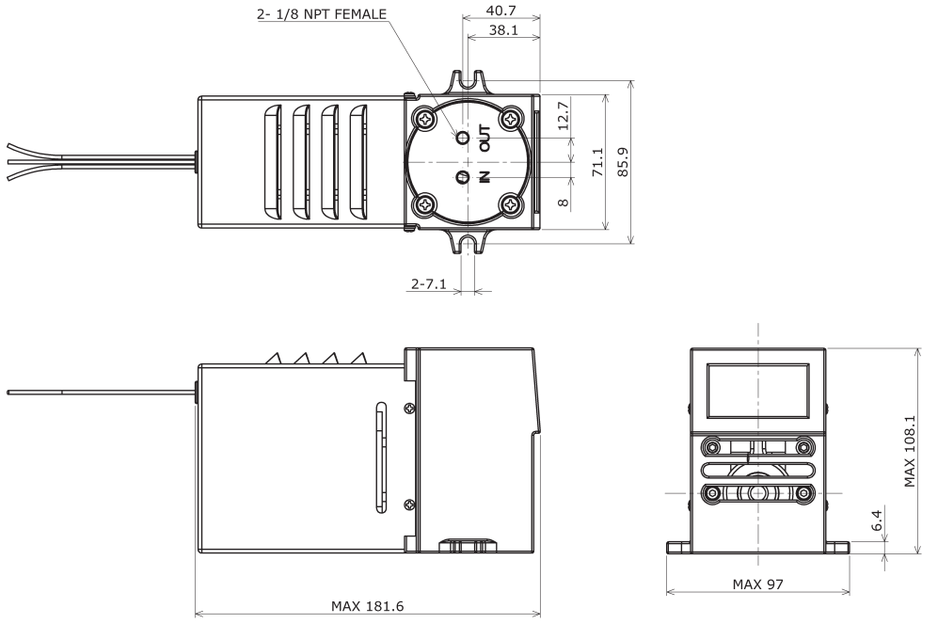
Cap	303 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Viton or Teflon
Oring	Viton
Others	300 Series S.S.

Performance curve | MB-10 / MB-21 / MB-41



Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump
MB-118 / MB-158

AC Motor | Gas

Specifications | MB-118 MB-158

Max discharge flow rate	28.0L/min(60Hz)	40.0L/min(60Hz)
Max vaccum	-64.0kPaG	-74.5kPaG
Max discharge pressure	159.0kPaG	172.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec	
Connection	1/4 NPT Female	
Suction temp range	0～80°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Motor	Open type	
Rated power supply voltage	Single phase AC115V 50/60Hz	
Rated current	1.7/1.4A	
Rated speed	1425/1725RPM	
Output	1/10HP	
Insulation	B	
Weight	6.4kg	

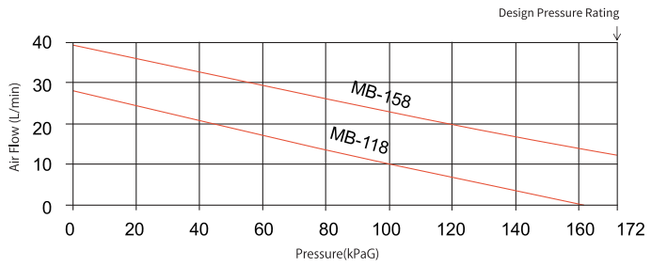
Option

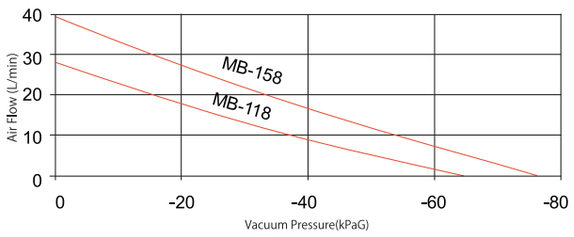
Connection： VCR Connection
Oring ： Aluminum Oring(gasket)
Motor ： AC230V, DC24V
Others ： Condensor cover

Wetted parts

Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Viton or Teflon
Oring	
Others	300 Series S.S.

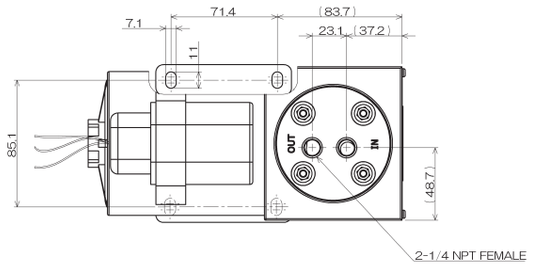
Performance curve | MB-118 / MB-158

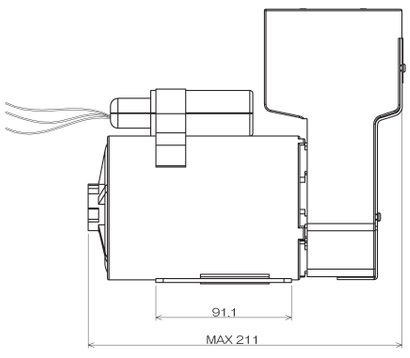


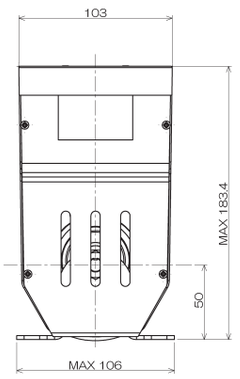


Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm







Metal Bellows Pump
MB-111 / MB-151

AC Motor | Gas | Explosion-proof〈OP〉

Specifications | MB-111 MB-151

Max discharge flow rate	28.0L/min(60Hz)	40.0L/min(60Hz)
Max vaccum	-64.0kPaG	-74.5kPaG
Max discharge pressure	159.0kPaG	275.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec	
Connection	1/4 NPTFemale	
Suction temp range	0～80°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Motor	Open type	
Rated power supply voltage	Single phase AC115/230V 50/60Hz	
Rated current	5.4/2.7A	
Rated spped	1425/1725RPM	
Output	1/4HP	
Insulation	B	
Weight	12.7kg	

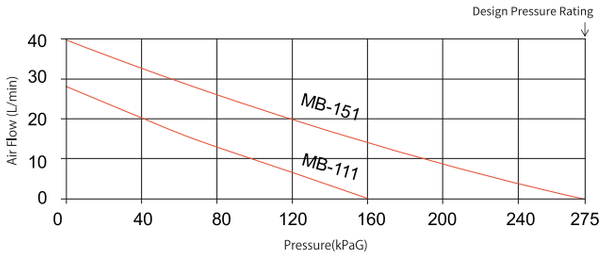
Option

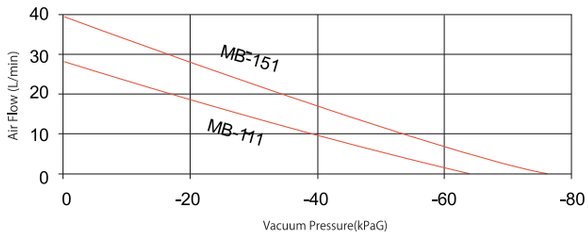
Connection ：VCR connection
Oring ：Aluminum Oring(Gasket)
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：High-pressure type, double containment type

Wetted parts

Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Viton or .Teflon
Oring	Viton
Others	300 Series S.S.

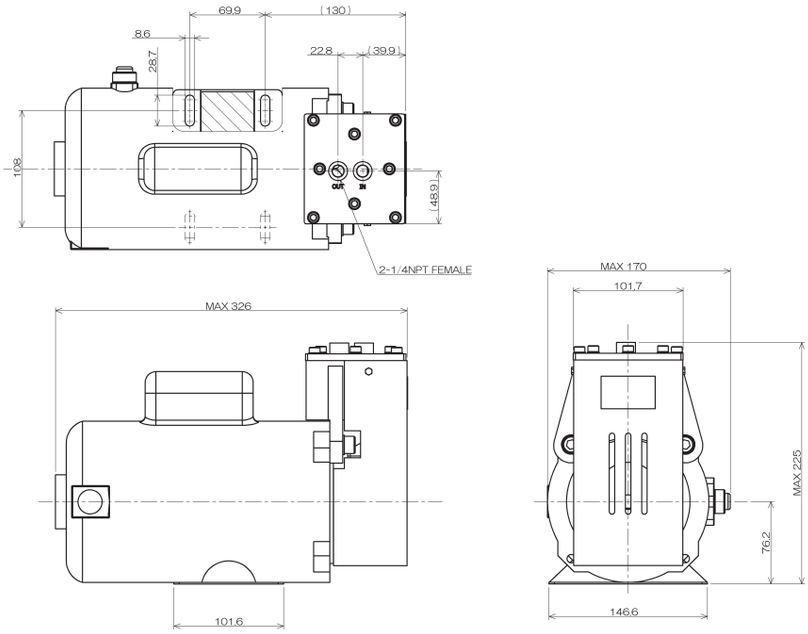
Performance curve | MB-111 / MB-151





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump
MB-302

AC Motor | Gas | Explosion-proof〈OP〉

Specifications | MB-302

Max discharge flow rate	85.0L/min (60Hz)
Max vaccum	-74.5kPaG
Max discharge pressure	275.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec
Connection	3/8 NPT Female
Suction temp range	0～80°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor	Open type
Rated power supply voltage	Single phase AC115/230V 50/60Hz
Rated currenct	6.6/3.3A
Rated speed	2850/3450RPM
Output	1/2HP
Insulation	B
Weight	12.7kg

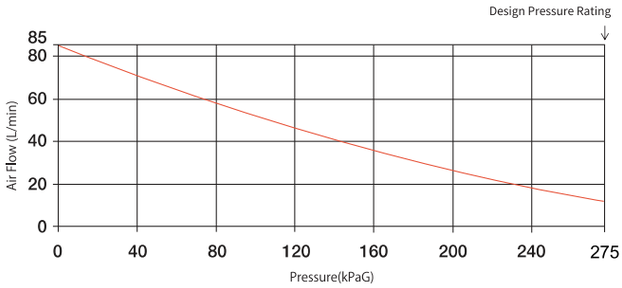
Option

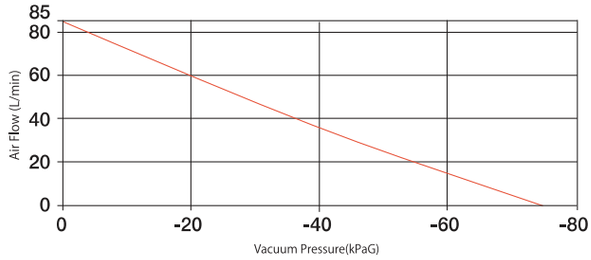
Connections ：VCR connection
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor

Wetted parts

Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Viton or Teflon
Oring	Viton (No O-ring when using Viton gasket)
others	300 Series S.S.

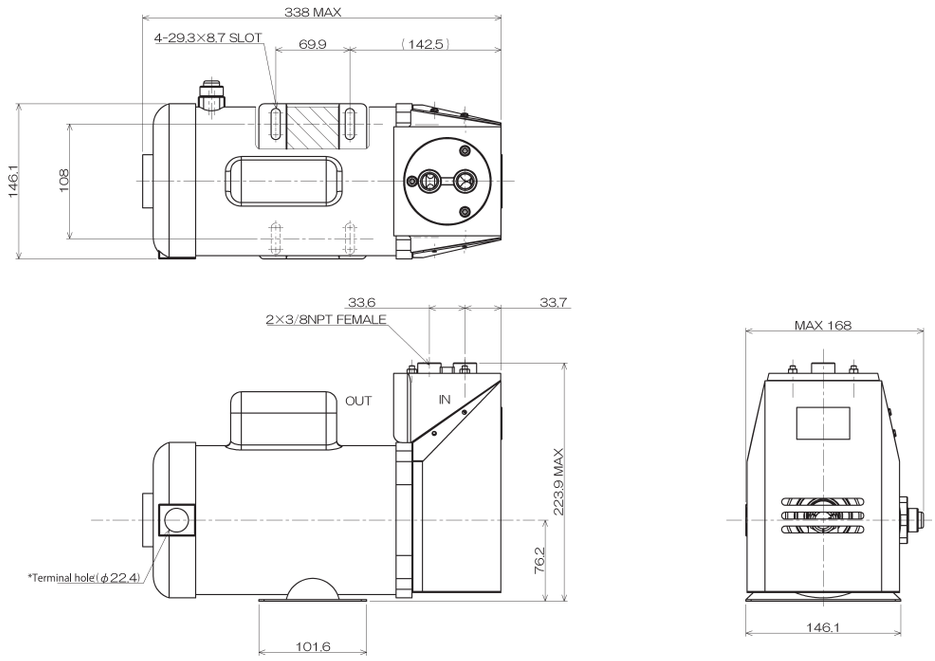
Performance curve | MB-302





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump
MB-601

AC Motor | Gas | Explosion-proof〈OP〉

Specifications | MB-601

Max discharge flow rate	140.0L/min (60Hz)
Max vaccum	-74.5kPaG
Max discharge pressure	275.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec
Connection	3/8 NPT Female
Suction temp range	0～80°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor type	Open type
Rated power supply voltage	Single phase AC115/230V 50/60Hz
Rated current	11/5.5A
Rated speed	1425/1725RPM
Output	3/4HP
Insulation	B
Weight	26.0kg

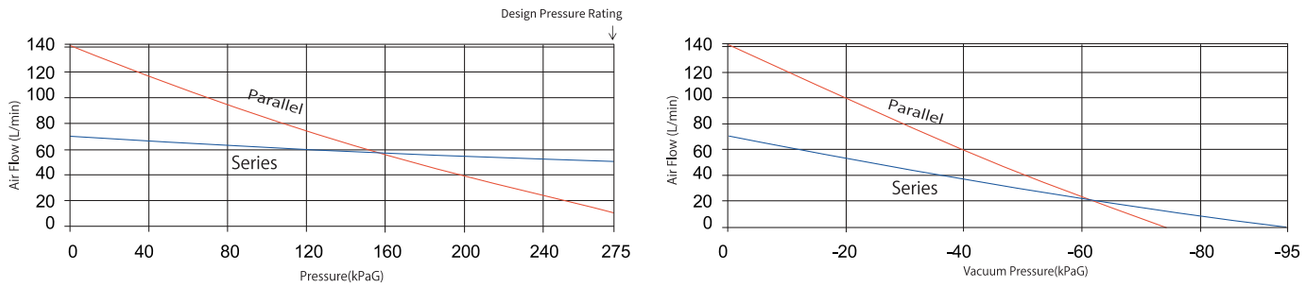
Option

Connections ：VCR connection
Oring ：Aluminum Oring(gasket)
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：High-pressure type, double-containment type, Single-head type, 2-head series/parallel connection

Wetted parts

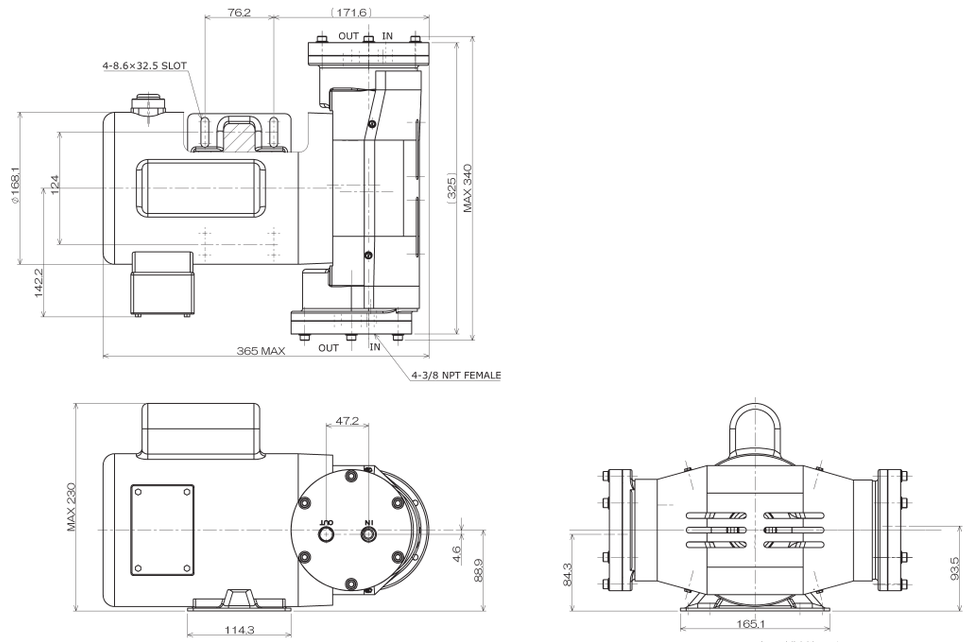
Cap	SUS304
Bellows	AM350
Valve	300 Series S.S.
Valve Gasket	Viton or Teflon
Oring	Viton
Others	300 Series S.S.

Performance curve | MB-601



Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump
MB-602

AC Motor | Gas | Explosion-proof〈OP〉

Specifications | MB-602

Max discharge flow rate	170.0L/min (60Hz)
Max vaccum	-74.5kPaG
Max discharge pressure	275.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec
Connection	3/8 NPTFemale
Suction temp range	0～80°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor	Open type
Rated power supply voltage	Single phase AC115/230V 50/60Hz
Rated current	6.6/3.3A
Rated speed	2850/3450RPM
Output	1/2HP
Insulation	B
Weight	15.4kg

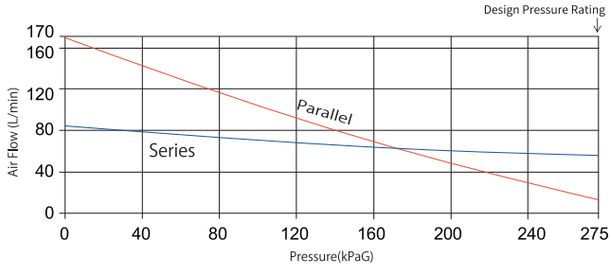
Option

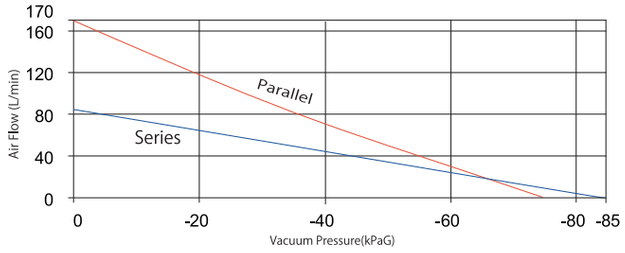
Connections ：VCR Connecion
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：2-head series/parallel connection

Wetted parts

Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve Gasket	Viton or Teflon
Oring	Viton (No O-ring when using Viton gasket)
Others	300 Series S.S.

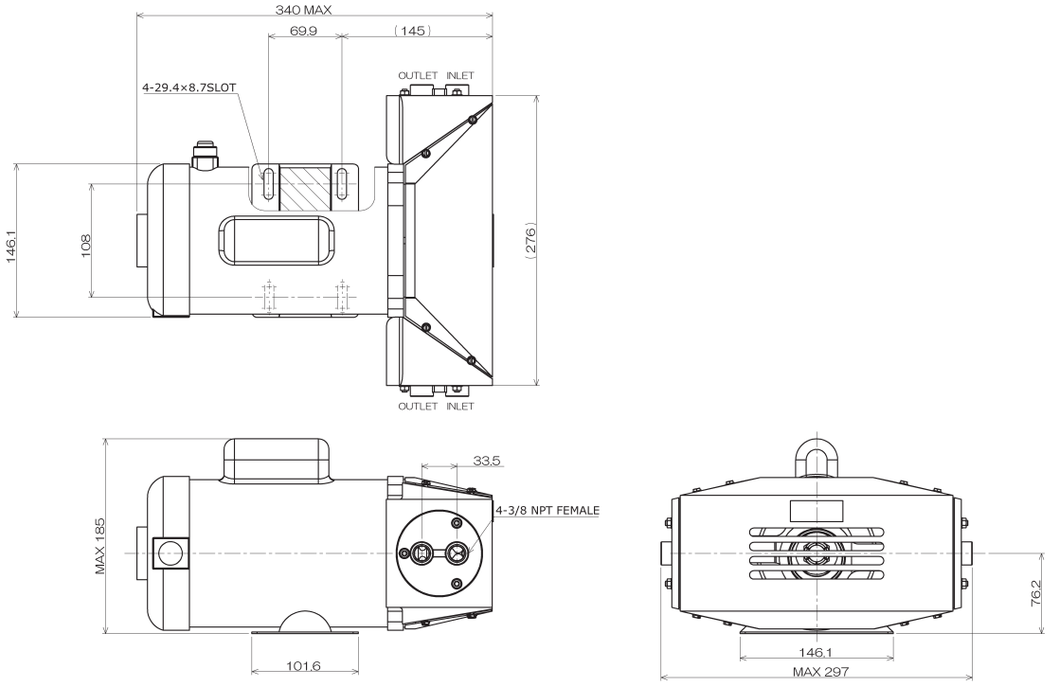
Performance curve | MB-602





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump for High temperature
MB-118HT / MB-158HT

AC Motor | Gas | Explosion-proof〈OP〉

Features ■Available to use with hot gases up to 230°C

Specifications | MB-118HT MB-158HT

Max discharge flow rate	28.0L/min(60Hz)	40.0L/min(60Hz)
Max vaccum	-64.0kPaG	-74.5kPaG
Max discharge pressure	159.0kPaG	172.0kPaG
Helium leak rate	1×10^{-8} Pa･m³/sec	
Connection	1/4 NPTFemale	
Suction temp range	40～230°C	
Ambient environment	Temp：0～40°C / Humid：RH85%	
Motor	Open type	
Rated power supply voltage	Single phase AC115/230V 50/60Hz	
Rated current	5.4/2.7A	
Rated speed	1425/1725RPM	
Output	1/4HP	
Insulation	B	
Weight	12.0kg	

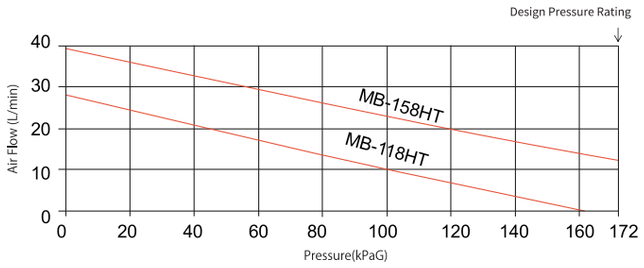
Option

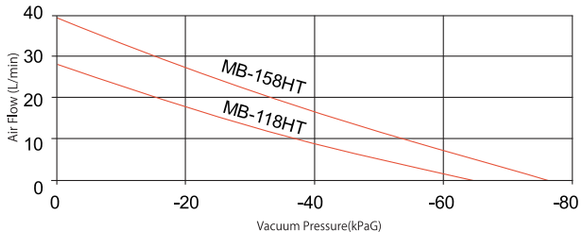
Connections ：VCR connection
Oring ：Aluminum Oring(gasket)
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：Base plate

Wetted parts

Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Teflon
Oring	Kalrez #4079
Others	300 Series S.S.

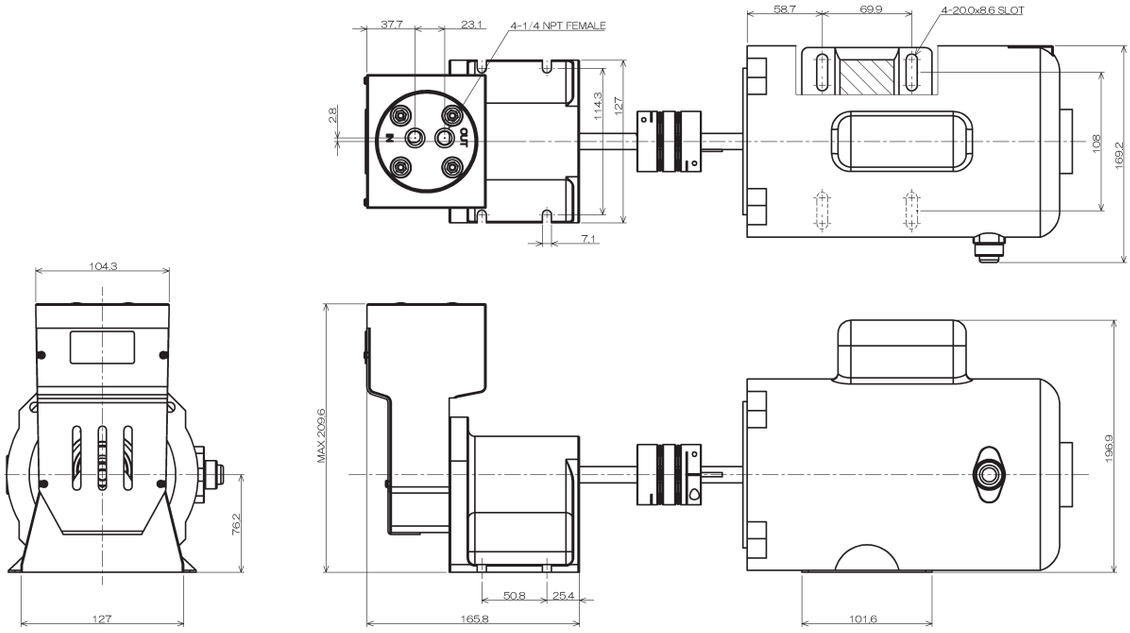
Performance curve | MB-118HT / MB-158HT





Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump for High temperature MB-302HT

AC Motor | Explosion-proof〈OP〉 | Gas

Features ■Available to use with hot gases up to 230°C

Specifications | MB-302HT

Max discharge flow rate	85.0L/min (60Hz)
Max vaccum	-74.5kPaG
Max discharge pressure	275.0kPaG
Helium leak rate	1×10^{-8} Pa·m³/sec
Connection	3/8 NPT Female
Suction temp range	40～230°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor	Open type
Rated power supply voltage	Single phase AC115/230V 50/60Hz
Rated current	6.6/3.3A
Rated speed	2850/3450RPM
Output	1/2HP
Insulation	B
Weight	17.0kg

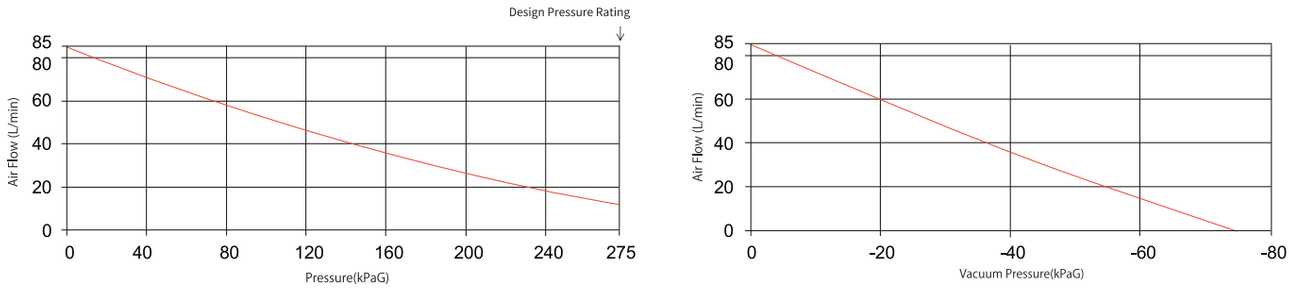
Option

Connections : VCR connection
Motor : Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others : Base plate

Wetted parts

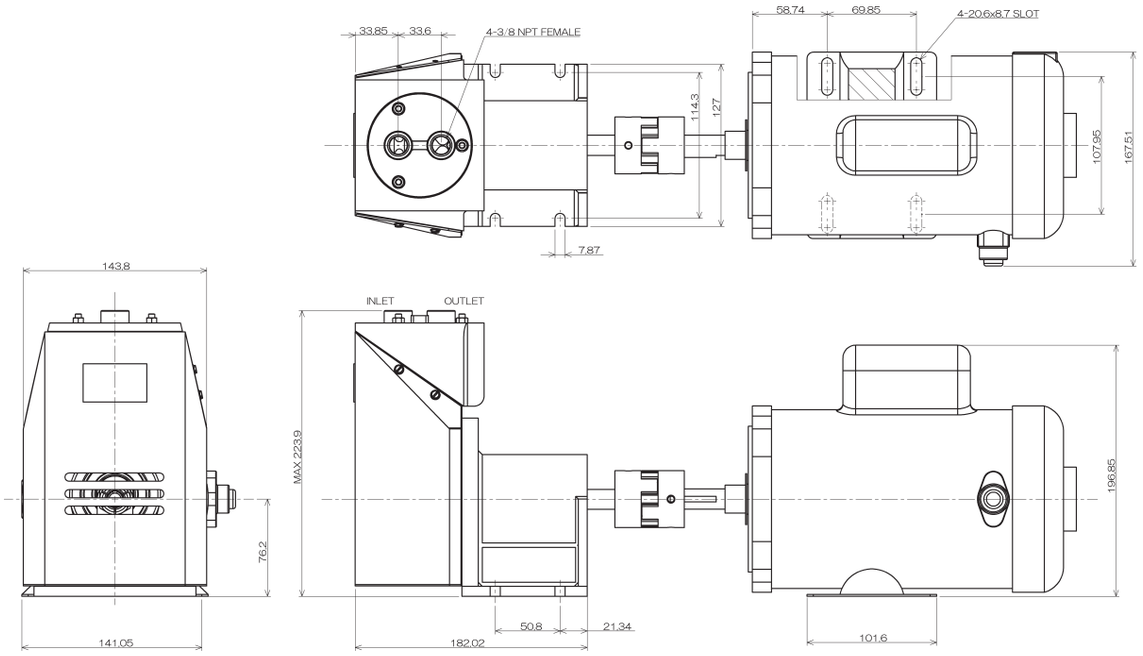
Cap	304 S.S.
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Teflon
Oring	Kalrez #4079
Others	300 Series S.S.

Performance curve | MB-302HT



Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump for High temperature
MB-601HT

AC Motor | Gas | Explosion-proof〈OP〉

Features ■Available to use with hot gases up to 230°C

Specifications | MB-601HT

Max discharge flow rate	140.0L/min (60Hz)
Max vaccum	-74.5kPaG
Max discharge pressure	275.0kPaG
Helium leak rate	1×10^{-8} Pa・m³/sec
Connection	3/8 NPTFemale
Suction temp range	40～230°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor	Open type
Rated power supply voltage	Single phase AC115/230V 50/60Hz
Rated current	11/5.5A
Rated speed	1425/1725RPM
Output	3/4HP
Insulation	B
Weight	31.0kg

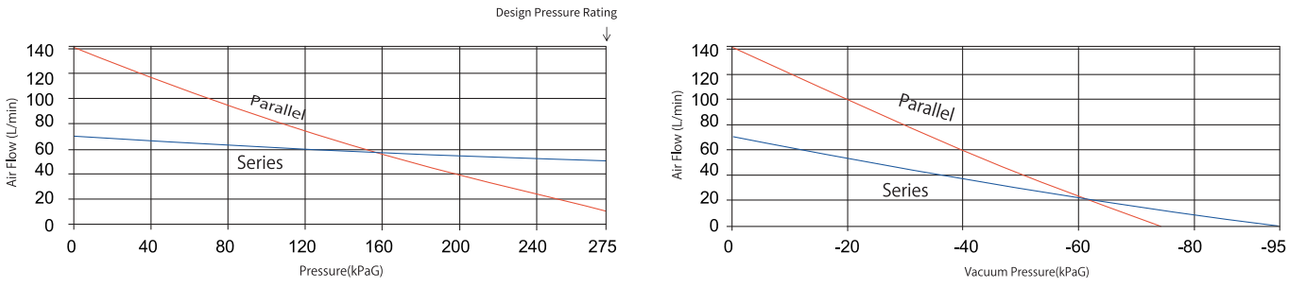
Option

Connections : VCR connection
Oring : Aluminum Oring(gasket)
Motor : Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others : Double-containment type, single-head type 2-head series/parallel connection, base plate

Wetted parts

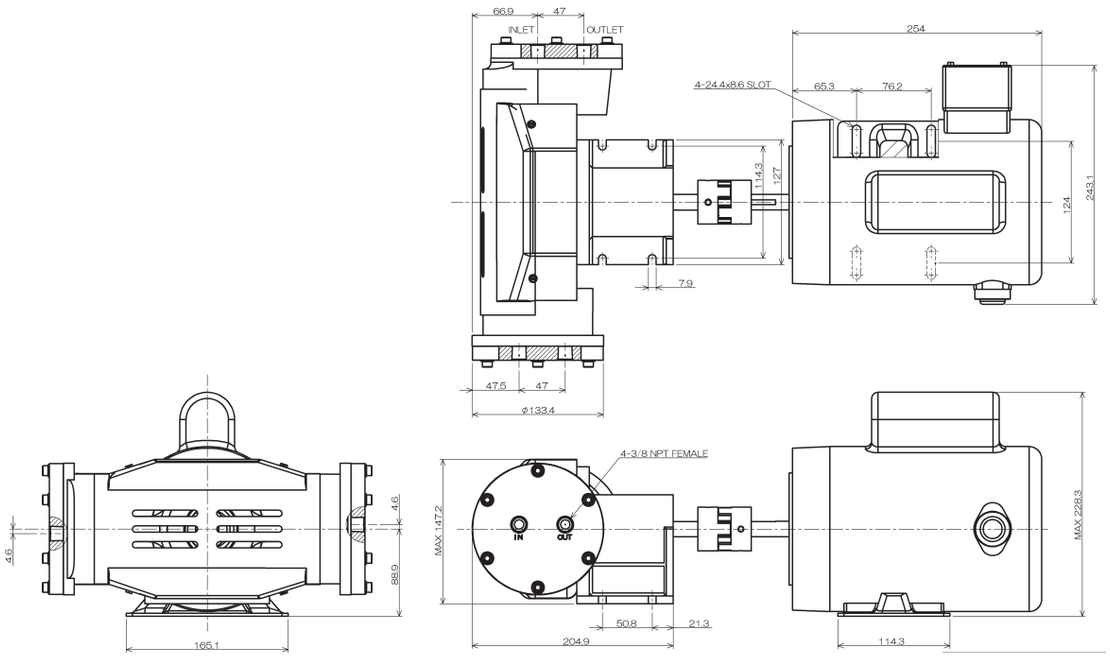
Cap	SUS304
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Teflon
Oring	Kalrez #4079
Others	300 Series S.S.

Performance curve | MB-601HT



Note)The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.

Dimensions | Unit：mm



Metal Bellows Pump for High pressure MB-601HP

AC Motor | Explosion-proof〈OP〉 | Gas

Features ■Can be used for boosting and circulation applications of 275 kPaG or more, which shall not be handled by the standard type.

Specifications | MB-601HP

Max discharge flow rate	70.0L/min(60Hz)
Max vaccum	-90.0kPaG
Max discharge pressure	690.0kPaG
Helium leak rate	1×10^{-8} Pa･m³/sec
Connection	3/8 NPTFemale
Suction temp range	0～80°C
Ambient environment	Temp：0～40°C / Humid：RH85%
Motor	TEFC
Rated power supply voltage	Single phaseAC115/230V 50 or 60Hz
Rated current	15/7.5A(50Hz) 18/9.9A(60Hz)
Rated speed	1425/1725RPM
Output	1.5HP
Insulation	F
Weight	34.0kg(50Hz) 31.0kg(60Hz)

※This is the data when connected in series with 2-heads.

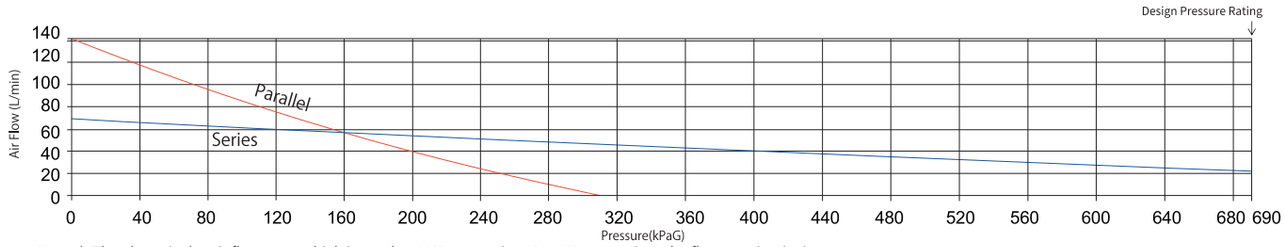
Option

Connections ：VCR connection
Oring ：Aluminum Oring(gasket)
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：Single-head, 2-head series/parallel connection

Wetted parts

Cap	SUS304
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Viton or Teflon
Oring	Viton
Others	300 Series S.S.

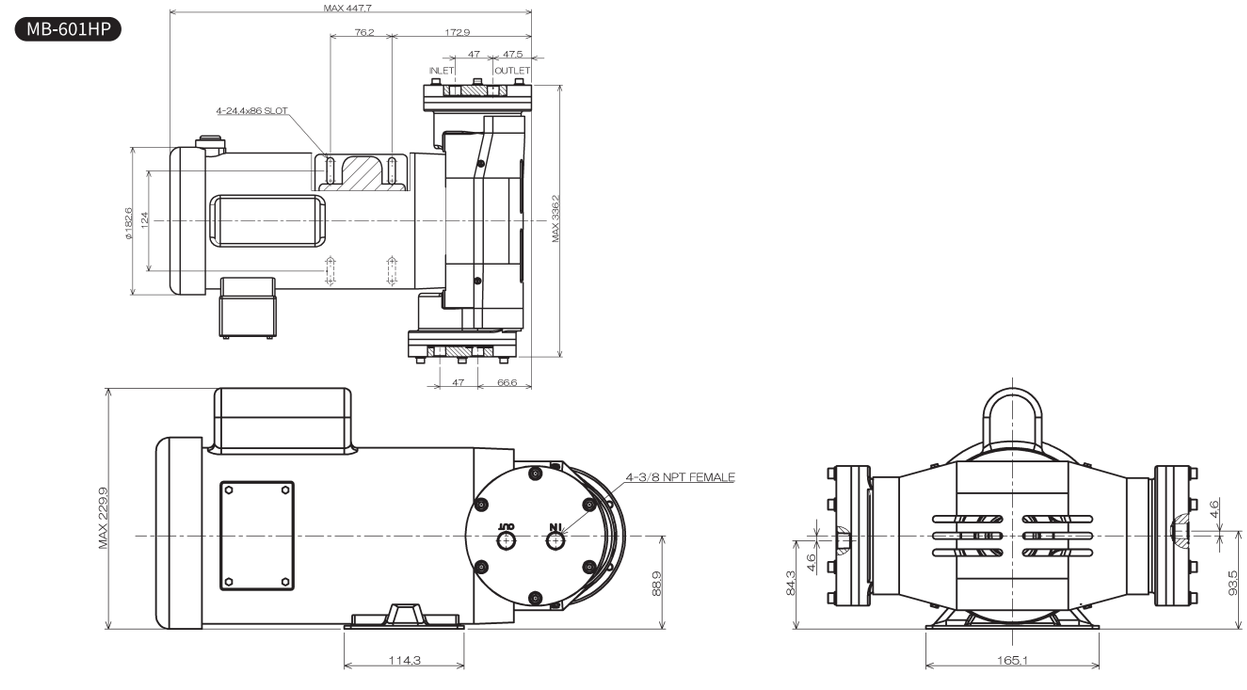
Performance curve | MB-601HP



Note1) The above is the air flow rate, which is used at 60Hz operation. At 50Hz operation, the flow rate is 5/6 times.
Start the pump under atmospheric pressure (101.33 kPa ±10 kPa). It may not work if started in pressurized or depressurized.
Depending on the pipe diameter and pipe connection method at the time of use, the flow value may differ from the catalog performance curve.
Note 2) The above vacuum attainment is equivalent to that of the standard MB-601.
Note 3) For the performance curve of the MB-601HP single, refer to the standard MB-601 (half flow rate) in this catalog. For a single head, the maximum operating (discharge) pressure is up to 275.0 kPaG.

Dimensions | Unit：mm

MB-601HP



Metal Bellows Pump for Double-containment
MB-151DC / MB-601DC

AC Motor | Explosion-proof〈OP〉 | Gas

Features

■Double bellows construction completely shuts off leakage to the outside
■ With the leak sensor function, in the unlikely event that the bellows is damaged, system shutdown at the same time as an alarm
■Solve problems such as leakage of radioactive and dangerous gases and loss of rare and expensive gases

Specifications | MB-151DC MB-601DC

Max discharge flow rate	40.0L/min(60Hz)	140.0L/min(60Hz)
Max vaccum	-74.5kPaG	
Max discharge pressure	275.0kPaG	
Helium leak rate	1×10^{-8} Pa･m³/sec	
Connection	1/4inch VCR female	1/2inch VCR female
Suction temp range	0～80°C	
Ambient environment	Temp：0～40°C / Humid：RH85%以下	
Motor	Open type	
Rated power supply voltage	Single phase AC115/230V 50/60Hz	
Rated	5.4/2.7A	11/5.5A
Rated speed	1425/1725RPM	
Output	1/2HP	3/4HP
Insulation	B	

Option

Connections ：VCR connection
Motor ：Three phase motor, explosion-proof motor, variable speed motor, TEFC Motor
Others ：High-temperature type(MB-601HT-DC), high-pressure type (MB-601HP-DC), single-head type, 2-head series/parallel connection

Wetted parts

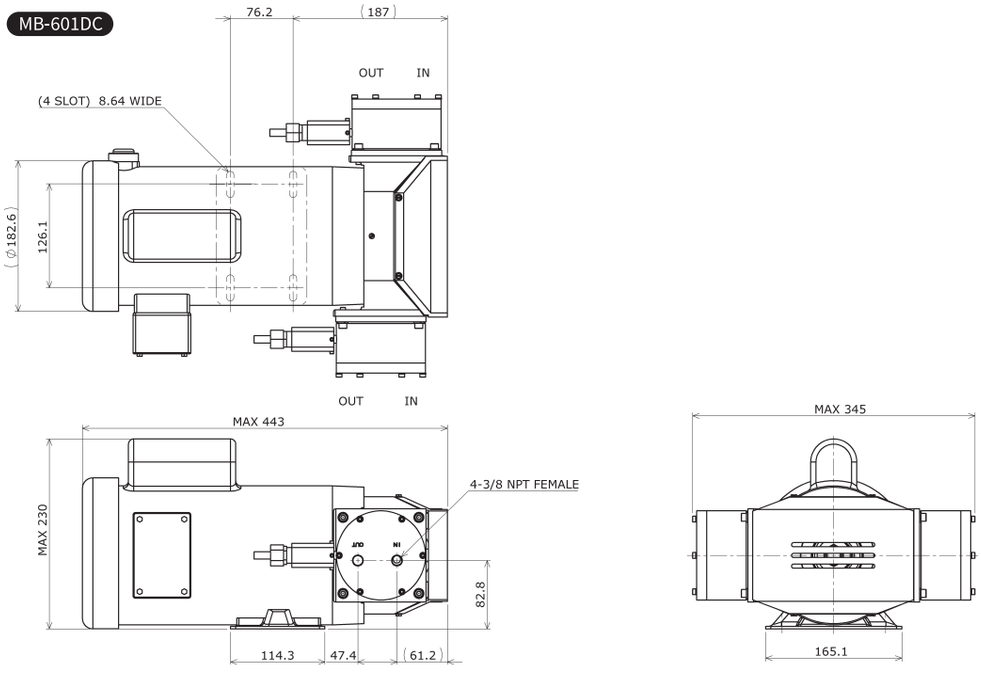
Cap	SUS304
Bellows	AM350
Valve	300 Series S.S.
Valve gasket	Aluminum
Oring	Aluminum
その他	300 Series S.S.

Performance curve | MB-151DC / MB-601DC

See standard MB-151 (P25), MB-601 (P27).

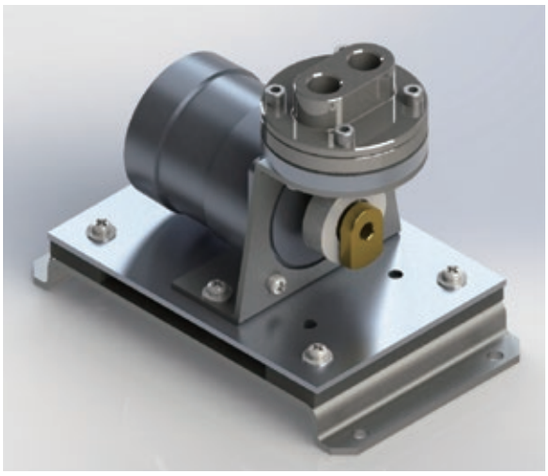
*When MB-601DC single head, the flow rate is halved.

Dimensions | Unit：mm

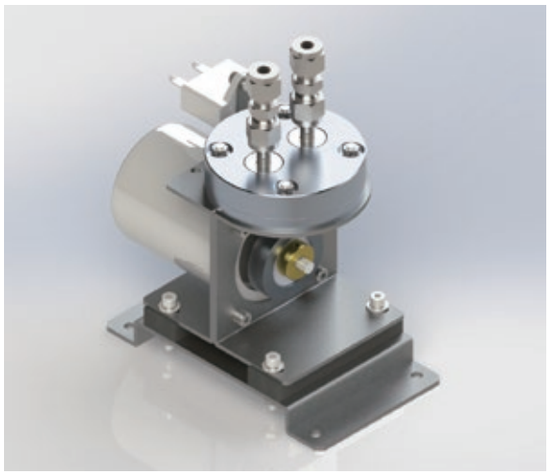


Application examples

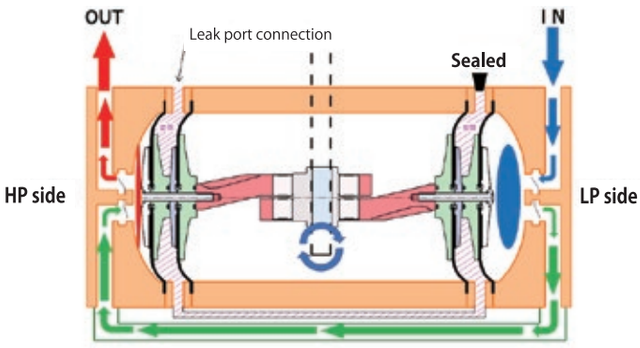
Threaded /Anti-vibration stand



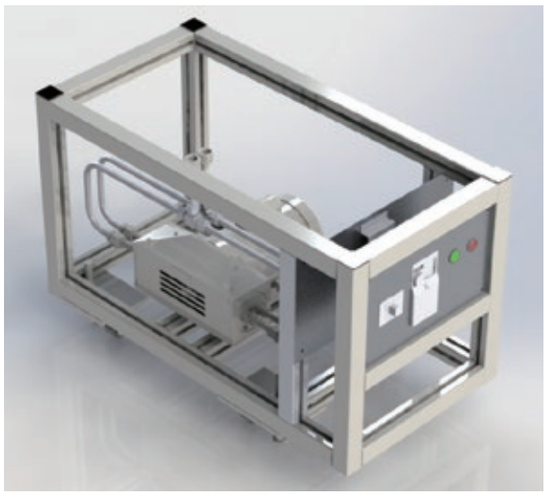
Flareless joint/Anti-vibration stand



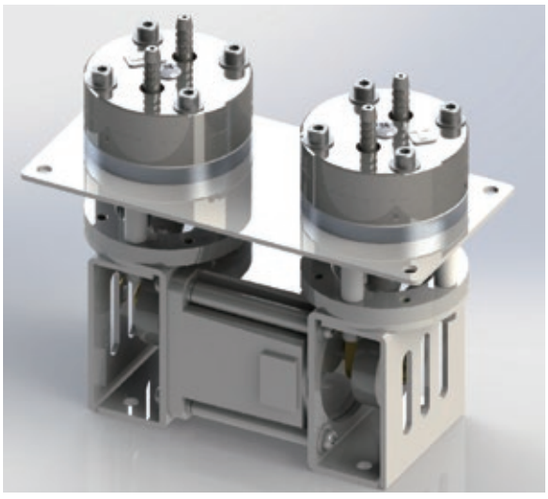
Double diaphragm

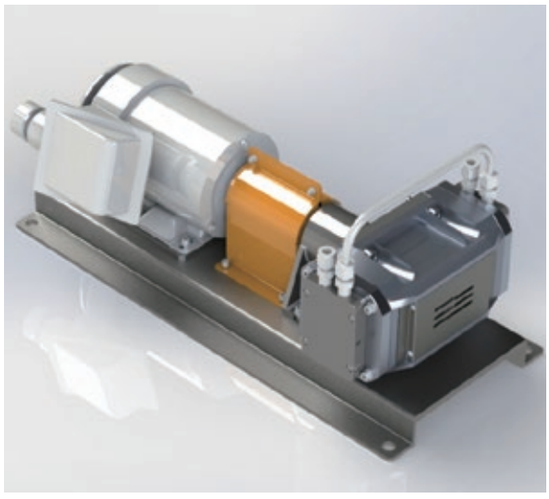


Inverter unit



Others





We continue to improve the flow rate of gas and liquid pumps.
Also it is available to support electrical control systems including pressure/flow control.
Contact us for your request.

Design datasheet

IBS INC.

Email us to https://www.ask-ibs.jp/contact/

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Contact information

Date: M____ /D____ /Y_____	Company:
Department:	Contact person:
TEL	FAX
E-mail	

Usage Environment

1. Ultimate user

2. Application

3. Equipment

4. Required flow rate

_____ ☐ SL/min ☐ NL/min

5. Pressure

IN/Vacuum pressure (atmospheric pressure)_____ ☐kPaG ☐MPaG ☐barG

OUT/Pressure (atmospheric pressure)_____ ☐kPaG ☐MPaG ☐barG

Proof pressure _____ ☐kPaG ☐MPaG ☐barG

6. Temperature

Fluid temperature (pump inlet) _____ ☐°C ☐°F

Ambient temperature _____ ☐°C ☐°F

7. Usage fluid

☐Gas ☐Liquid Composition _____ % Relative humidity _____ %RH

8. Power supply

AC ☐Single phase ☐Three phase _____ V

Variable(inverter) _____

Explosion-proof _____

Others _____

DC ☐12V ☐24V ☐24V variable speed

*DC voltage is only available for diaphragm pumps (some metal bellows pumps are also available)

☐With plug ☐With connector ☐Others

9. Pump inlet/outlet connection

☐Standard _____ ☐Swagelok joint _____ ☐VCR joint _____ ☐Others _____

10. Wetted part materials

●Diaphragm pump

Diaphragm ☐Standard☐others _____

Valve ☐Standard☐others _____

Oring ☐Standard☐others _____

Others _____

●Metal bellows pump

Valve gasket ☐Viton ☐Teflon ☐Aluminum Oring(gasket)

Oring ☐Standard ☐others _____

thers _____

11. Option

☐Anti-vibration stand ☐Rotating part safety cover
☐Double diaphragm ☐Double bellows
☐Inverter unit ☐Pressure/Flow rate control unit

※Consult us for other requirements.

12. Other requirements

IBS INC.

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