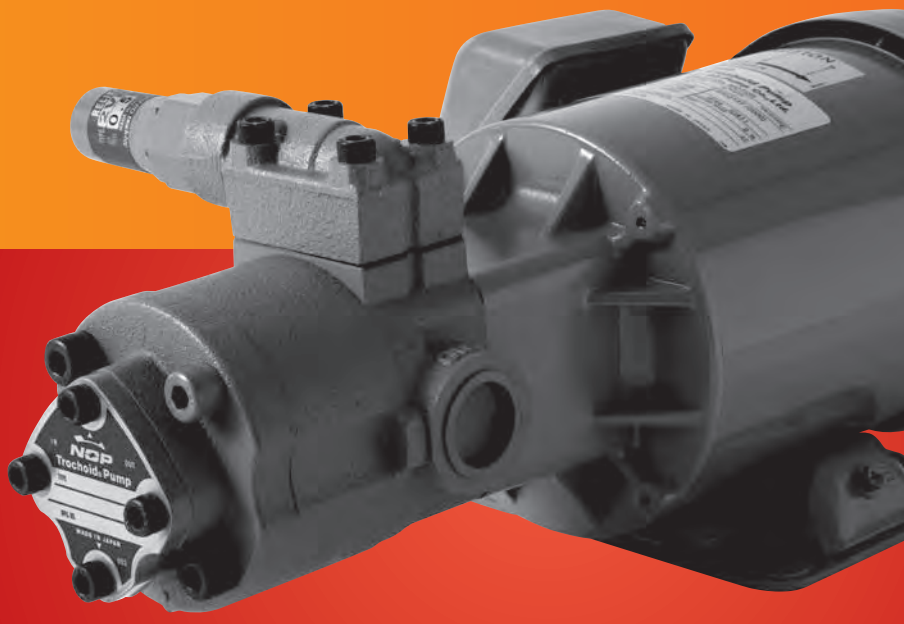
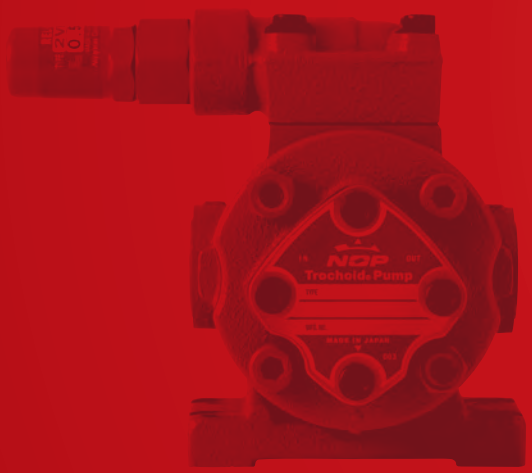
Trochoid™ Pump

Products Guide





NOP®

Nippon Oil Pump Co., Ltd.

Select a pump

Specifications

Instructions of Trochoid™ Pump

Trochoid™ Pump, Lunary™ Pump Quick Reference Guide

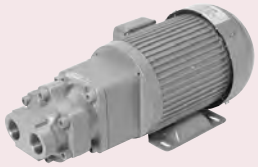
Select a satandard pump

Compact Models

1ME

P16

3MF



P71

2MY

P32

Easy to attach and replace

Models with single-phase motor

1ME S

P18

2ME S

P34

Select a pump for a fluid

For cutting fluid

2MY-2HWM
(Basic model)

P38

2MY-S Filter

(With suction filter)

Cartridge type
(Easy to replace)

Element type
(Reusable)

P40

For high temperature oil

1A-VF
(Small flow rate)

P24

N3H-VF/VH
(Medium flow rate)

P78

2HB-VF/VH
(Small to medium flow rate)

P54

1ME200SH-1MAVB-BT
(High temperature edible oil)

P20

Select a pump for applications

More compact

Double filters
(To increase productivity)

P47

Dual pump
(To recover oil with a single unit)

P49

To cool oil

1PS

P129

To cleen oil

MICRO TOP

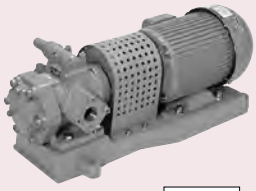
P127

To attach a motor for specific use

1MB

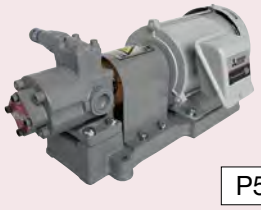
P22

3MB



P78

2MB



P51

4MB

P90/P95

To use only a pump

1A/1HG
(Small flow rate)

P24

N3F/N3H
(Medium flow rate)

P75/P78

2HB/2.5HGA
(Small to medium flow rate)

P54/P66

4AM/4A
(Large flow rate)

P90/P95

To convey fuel oils (Kerosen,diesel oil, heavy oil)

2HT
For low velosity oils

P54

2MB-2HT

P51

GD MB-GD
For spray combustion

P120

To convey high viscosity oil

3V/3MB-3V

P81

GPL/MB-GPL

P100

To transfer oil in the same direction regardless of its rotation direction

1RA **2RA** **3RD**

P105/P111

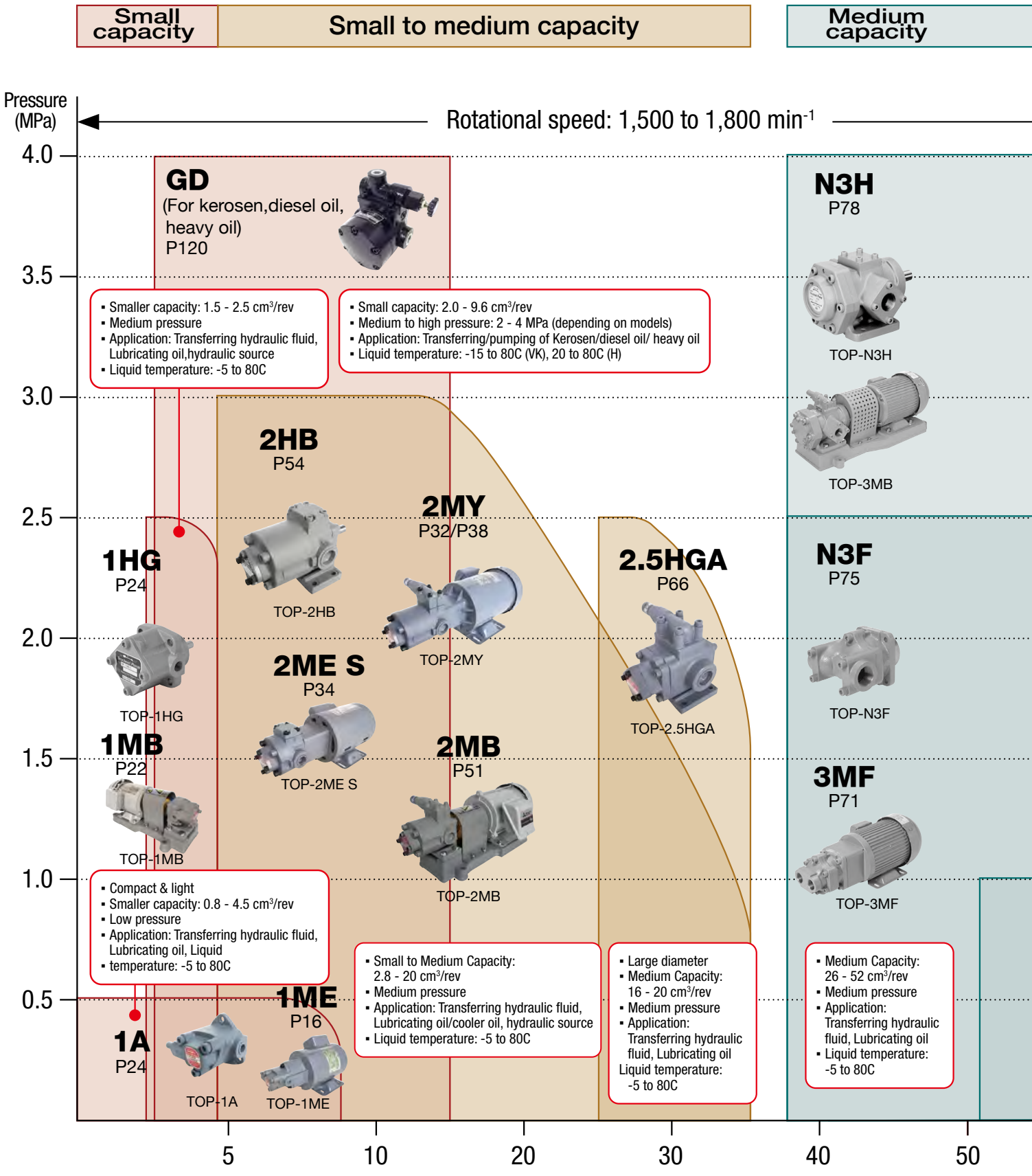
To use only a valve

2VB/2VD/2VBD/
3VB/3VBD/
4VBP/4VBPD

P115

Trochoid™ Pump, Lunary™ Pump Performance Distribution Map

The pumps are classified based on the discharge flow rate and pressure in the following chart.
Please refer to the applicable pages for further information.



Large capacity

Test oil: ISO-VG46 at 40C

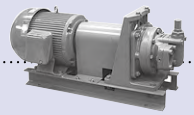
Rotational speed: 1,000 to 1,200 min^{-1}

- Medium Capacity: 26 - 65 cm^3/rev
- Medium to high pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

- Large Capacity: 115.5 - 280.5 cm^3/rev
- Medium pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 120C

4AM
P90

TOP-4AM



TOP-4MB

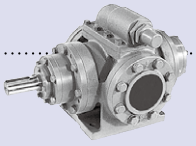
- Large Capacity: 349.8/580.8 cm^3/rev
- Small pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 120C

- High viscosity
- Large Capacity: 150/200/250 cm^3/rev
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

GPL/MB-GPL
Lunary® Pump
P100
(960-1750min^{-1})

GPL

4A
P95



TOP-4A

3V
P81

TOP-3V

- High viscosity
- Medium Capacity: 39 - 65 cm^3/rev
- Medium pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

100 200 300 400 500 600

Flow rate (L/min)

Trochoid™ Pump, Lunary™ Pump Oil Compatibility Table

- The following table describes the examples of typical oils used in applications in the past, which is not an assurance of the recommended models, the specifications and the product life. It is rare, though some additives and other elements contained in oils may cause a trouble to the pump, so please inquire with the oil manufacturer about the comptibility with your oil before use.
- For operating environments, please refer to the instruction manuals and specifications of Trochoid™ Pump, Lunary™ Pump.

	Oil / Model	Industrial lubricating oil	Hydraulic oil	Gear oil	Turbine oil	Engine oil	Trque converter oil	Spindle oil
Small capacity	1A	○	○	○	○	○	○	×
	1A-VV (Special specification)	○	○	×	○	×	×	×
	1HG	○	○	○	○	○	○	□
	1HG-VV (Special specification)	○	○	×	×	×	×	□
	GD	×	×	×	×	×	×	×
Small to medium capacity	2HB	○	○	○	○	○	○	□
	2HB-VV (Special specification)	○	○	X	○	○	X	□
	2HT	×	×	×	×	×	×	×
	2HW	×	×	×	×	×	×	×
	2.5HGA	○	○	○	○	○	○	□
	2.5HGA-VV (Special specification)	○	○	○	○	○	○	□
Medium capacity	N3F	○	○	○	○	○	○	□
	N3F-VV (Special specification)	○	○	○	○	○	○	□
	N3H	○	○	○	○	○	○	□
	N3H-VV (Special specification)	○	○	○	○	○	×	×
	3V	○	○	○	○	○	○	×
	3V-VV (Special specification)	○	○	○	○	○	○	×
Large capacity	4AM	○	○	○	○	○	○	□
	4A	○	○	○	○	○	○	□
	GPL(Lunary™ Pump)	○	○	○	○	×	×	×
Reversible	1RA	○	○	○	○	×	×	×
	2RA	○	○	○	○	×	×	×
	3RD	○	○	○	○	×	×	×
	4RD	○	○	○	○	×	×	×

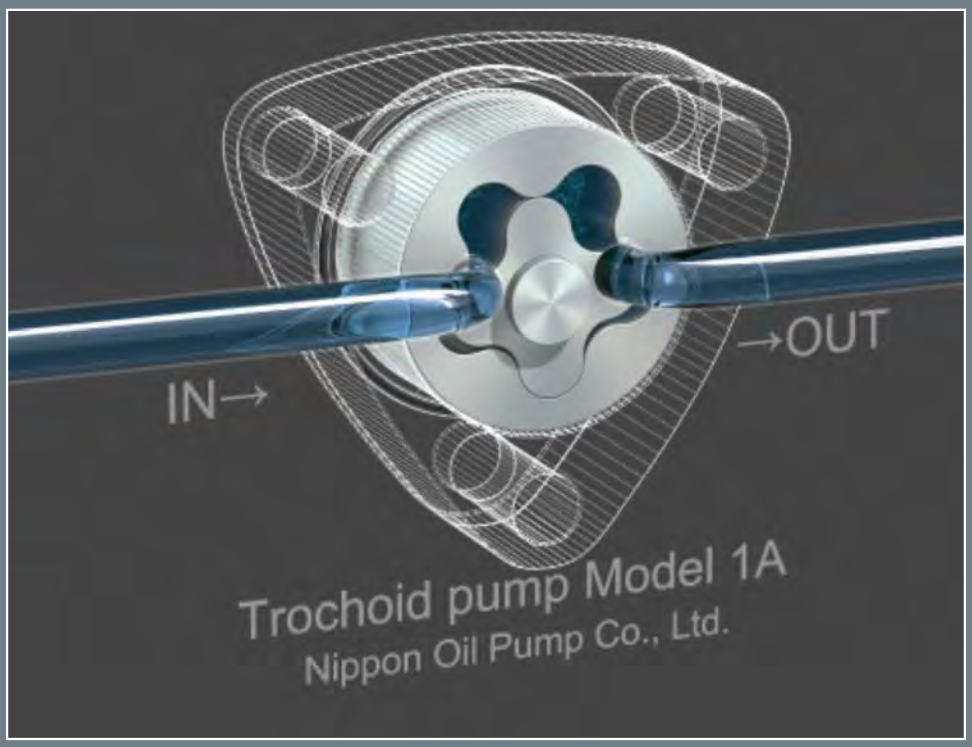
○: The oil was used in the past with the pump following the specifications listed in the pump's catalog.
●: The oil was used in the past with the pump under 0.7MPa in discharge pressure. (The pump has a limit in discharge pressure)
□: The oil was used in the past with the pump under 0.5MPa in discharge pressure. (The pump has a limit in discharge pressure)
×: Unavailable.

- For special specifications, refer to P. 131. Please contact us for more information.
- We can provide Trochoid™ Pump specifically designed for diesel oil, kerosene, heavy oil. Please contact us for more information.

Silicone oil	Coocking oil	Quenching oil	Insulating/ Electric insulating oil	Metal cutting fluid (Straight oil/ Water soluble)	Diesel oil	Kerosene	Heavy oil
○	○	×	○	×	×	×	×
○	○	X	○	×	×	×	×
○	○	●	□	×	×	×	×
X	○	●	□	X	●	X	●
×	×	×	×	×	○	○	○
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	×	×	×	X	○	○	○
×	×	×	×	○	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	●	×	●
○	○	●	□	×	×	×	×
○	○	×	□	×	●	×	●
×	○	×	×	×	×	×	×
×	○	×	×	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	○	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×

How Trochoid™ Pump works

Trochoid pump has an inner rotor and outer rotor coming into contact each other and create gap in between. As the pump rotate, the volume of the gap expands and shrinks continuously. Expansion of the gap creates vacuum and fluid is drawn into the pump and as the gap shrinks, compression occurs and fluid is pumped out.



While being proud of providing the best quality products, NOP is the world's top manufacturer of Trochoid™ Pump*[1] in terms of the production volume.

*[1]Trochoid™ Pump with integrated motor

■ High performance

- We manufacture high quality products sticking to our MADE IN JAPAN policy from the procurement to production.

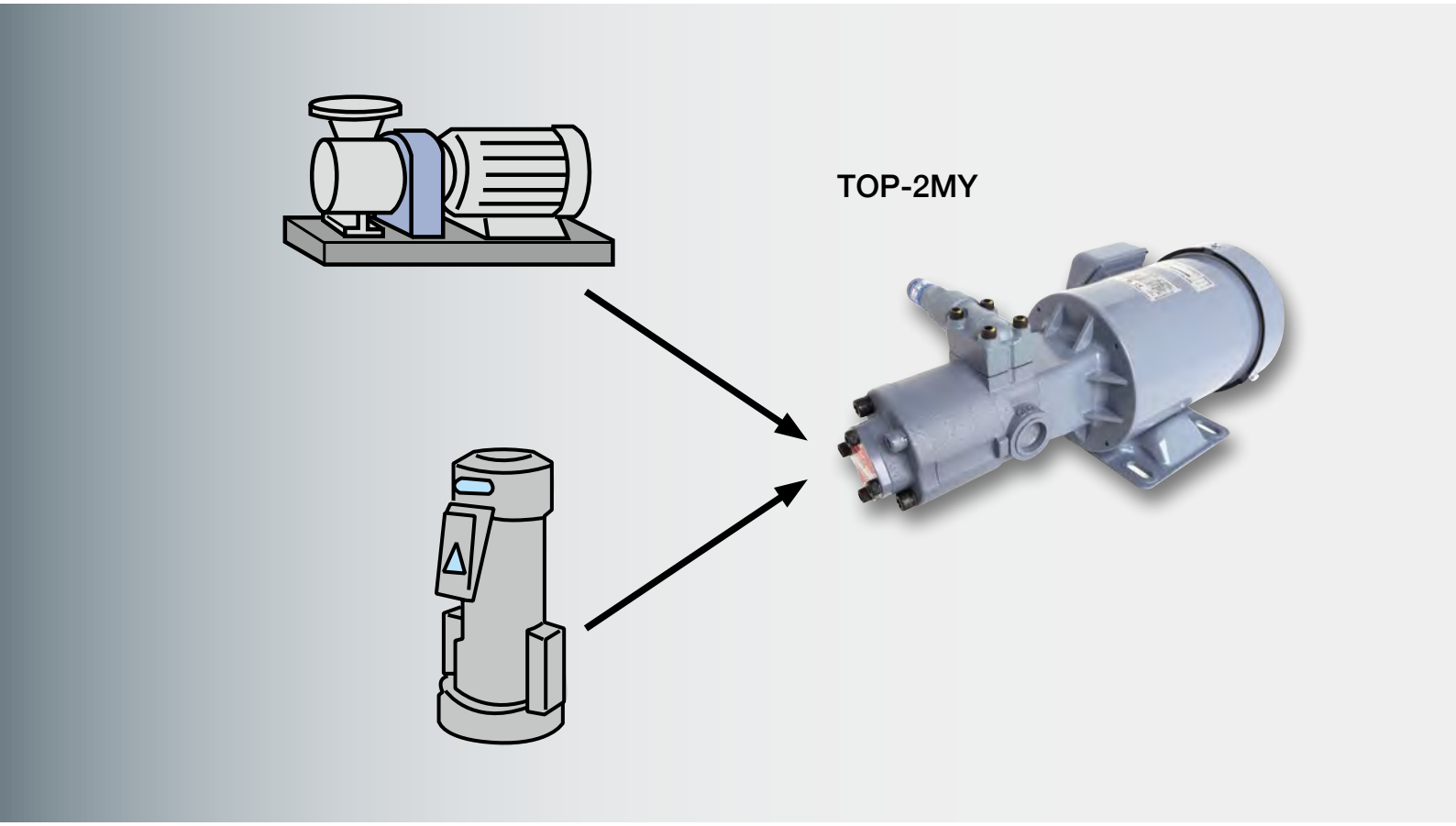
■ Wide variety of models for various applications

- Several pump sizes can be offered on your needs.
- You can select a pump by oil types and oil temperature in your system.
- Our product lineup is over 8000 models.

■ Stable delivery times

- We manufacture pumps in-house using reliable parts procured in Japan, which satisfies our costomer's need.
- We will observe the promised delivery date with confidence.
- Our on-time delivery rate of the standard models reaches 98%.

Features of Trochoid™ Pump



1. Compact size

- Trochoid™ Pump is an internal gear pump, which is more compact than other pump type models for the same capacity.
- The compactness of Trochoid™ Pump allows more flexibility in designing customer's application system.

2. Self-primimg

- Trochoid™ Pump is a displacement pump, which does not require priming oil.

3. Low noise and low pulsation

- Trochoid™ Pump's noise and pulsation caused by the gear meshing are low.

4. Long product life

- The high precision rotor and parts minimize wear and extend the product life.

5. Various lineup

- As Trochoid™ Pump has a simple structure, we can offer various models of Trochoid™ Pump simply by changing the inner rotor and seals on the pump.
- You can select a pump from our various lineup to satisfy your needs.

Note: Trochoid™ Pump may not be able to achieve the full performance if some object enters into the pump.

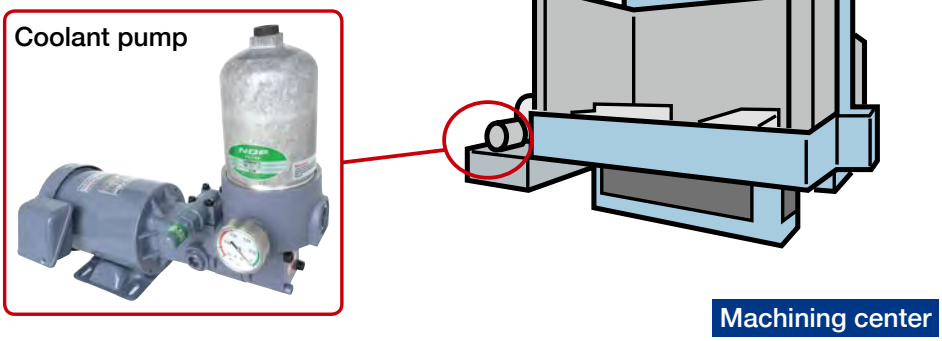
Application and Example Usage of Trochoid™ Pump

Machine Tool

Lubrication, cooling, and recovery of sliding parts (spindle, gear, bed , etc.)

Supply of coolant flluid (cutting oil)

- Machining center
- Lathe
- Drilling machine
- Milling machine
- Others



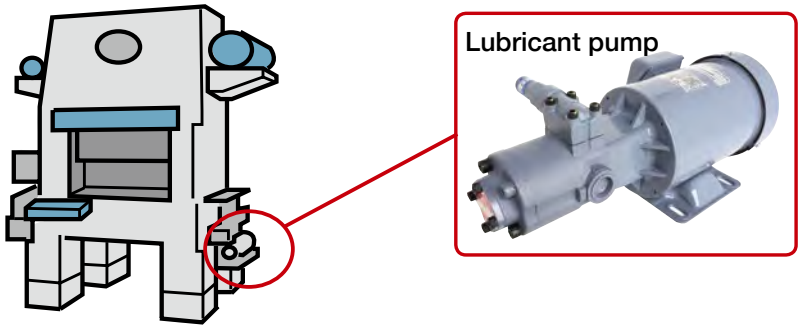
Machining center

Industrial machinery

Lubrication, cooling, and filtration for gear and sliding parts

Hydraulic source for hydraulic equipment

- Press machine
- Compressor
- Printing machine
- Hydraulic unit
- Decelerator
- Speed-up gear
- Oil filtration device
- Others

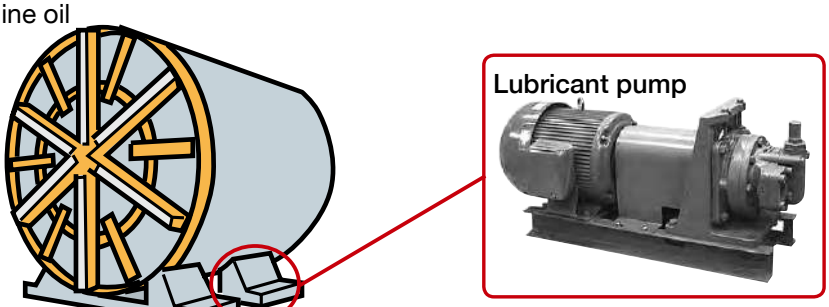


Press machine

Construction, Civil engineering, and Agricultural machine

Lubrication for rotating parts,supply of engine oil

- Shield machine
- Crane
- Cruching machine
- Road roller
- Mowing machine
- Others

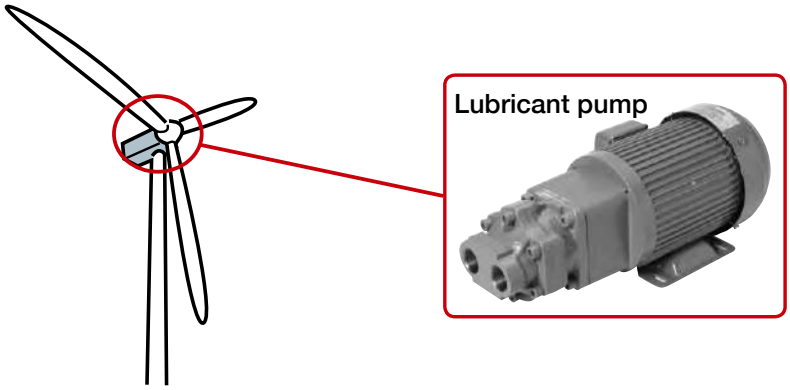


Shield machine

Environmental equipment

Lubricating oil, fuel oil supply, filtration

- Incineration system
- Power-generation facility
- Waste oil fueling device
- Others



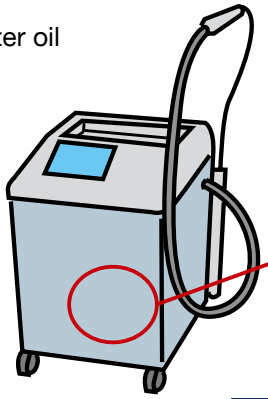
Wind-power generator

■ Automotive

Exchange/supply of engine oil, torque converter oil

Hydraulic source for hydraulic equipment

- Engine oil changer
- Test machine
- Car lifter
- Others



Oil exchanger

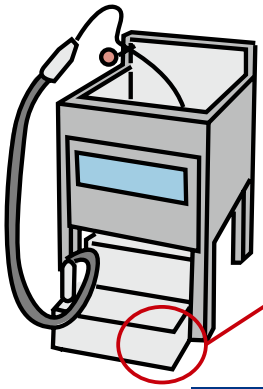
Oil recovery and supply pump

■ Food

Transfer and filteration of edible oil

Hydraulic source for hydraulic equipment

- Frying oil filtration machine
- Homogenizer (Disperser, emulsifier)
- Others



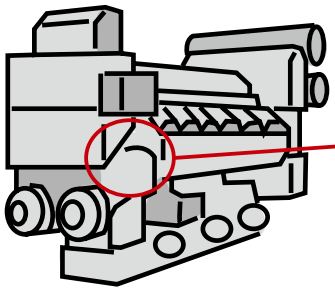
Frying oil filtration machine

Oil recovery and supply pump

■ Ship

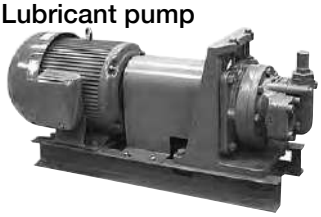
Transfer of lubrication oil and fuel oils

- Disel engine
- Emulsion production device
- Others



Diesel engine

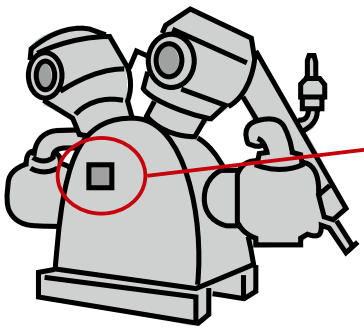
Lubricant pump



■ Others

Lubrication for steel making and forging machine

- Lubrication for air conditioner
- Compressor



Compressor

Lubricant pump

Flowchart for Selecting Trochoid™ Pump

Outline of the flowchart

STEP 1 Select a pump

- **Select a pump considering the flow rate and discharge pressure.**

Search a pump that matches your specification from the performance distribution map. (pp.4 to5)

If you find the pump from the map, refer to the assaingned pages.

Example: 2HB ⟶ P54

Hint

Some oils or using oils at certain temprerature affect the pump performance, and the pump might not be able to achieve the specified value.

Under the following conditions, the max. discahge pressure is limited to 0.7 MPa.

· Oil temperature≥ 80C
· Oil viscosity≤ 10 mm^2/s

STEP 2 Choose the seal material

- **Four types of seal materials (rubber materials) are available.**

· Choose by temperature

The suitable seal materials vary by oil temperature

Oil temperature

0 to 80C	**NBR** (Standard specification)
81 to 120C	**FKM**
121 to 200C	**PTFE**

Note: FKM is standard material for 2HT, 2HW, 4A and 4AM.

Hint

The max.discharge pressure is limited to 0.7 MPa when a oil temperature is over 80C.

· Choose by oil type.

Refer to “Trochoid™ Pump, Lunary™ Pump Oil Compatibility Table”. (P6)

If you can't find a suitable seal materials for your oil in the table, please ask your oil manufacturer for the suitable oil.

Oil type

General mineral oil	**NBR** (Standard specification)
Others	**FKM / PTFE**

STEP 3 Check the required power of a motor

- **Check the required power of a moter on the performance table to ensure that the motor matches your specification.**

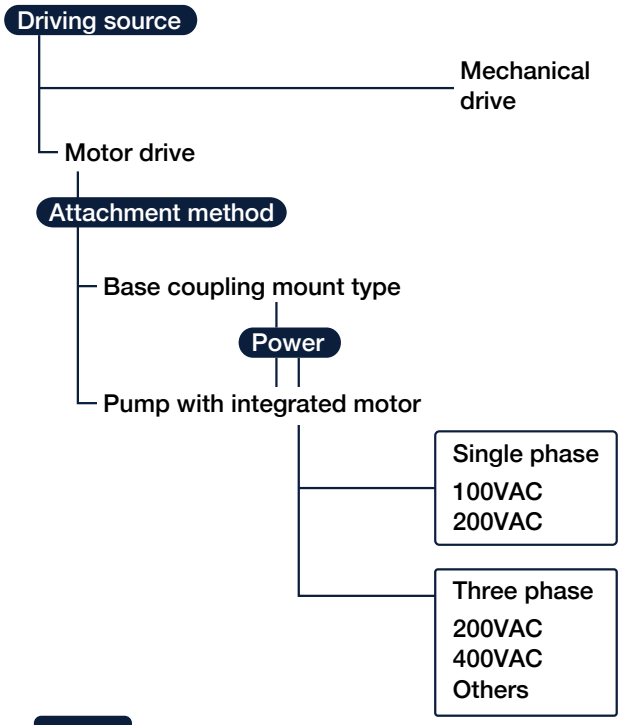
The values on the performance distribution map were measured based on the oil viscocity of 46 mm^2/s.

Hint

Oil viscosity and rotational speed affect the pump performance.

Select the power of motor with an adequate margin.

STEP 4 Select a driving force of the pump



Hint

Pump with integrated motor:
1AM, 2HBM and N3F series can be attached to an integrated motor. 2HB and N3F have outdoor and safety increased explosion-proof models.

Base-coupling mount type:
It can be attached to a motor of flame-proof or other special specifications.

The above describes an outline for selecting pump. For your safety, please read through **the Trochoid™ Pump instruction manual.**

NPO's Response to Motor Efficiency Regulations and Safety Standards

◎: Standard ○: Available △: Negotiable ×: Incompatible - : N/A

Regulations and Standards	Category	Japan	EU		China		USA		
		Efficiency	Safety	Efficiency	Safety	Efficiency	Safety	Efficiency	Marks
		Top Runner	CE	IE3	CCC	GB2	UL	NEMA Premium (IE3)	Equivalent to IE3
Pump with integrated motor (1ME, 2MY, 3MY series Except for single-phase models)	Under 750W	—	○	—	×	—	△	—	—
	750W and over	◎	◎	◎	×	×	○	×	◎
Marks			CE standards:Motors of 200V/400V are available.		Only available in base-coupling mount type		UL standards:Motors of 200V/400V are available.		
Base-coupling mount type (1MB,2MB,3MB,4MB series)	Under 750W	—	○	—	△	—	○	—	—
	750W and over	◎	○	◎	○	○	○	○	○
Marks			The voltage and other specifications may differ depending on the motor manufacturer.		The voltage and other specifications may differ depending on the motor manufacturer.		The voltage and other specifications may differ depending on the motor manufacturer.		

- The above information were current as of Sep. 01 2017. The information including specifications of the value and others may be different from the current one.
- Single-phase motors do not conform to USA motor efficiency regulations.
- The motors we offer are designed for japanese market. If you request an estimate for other countries, please provide the specifications you require in details.

Precautions for the dedicated motor for Trochoid™ Pump

1. Be sure to observe the following precautions to operate products properly and safely.
2. Do not attempt to disassemble or modify the motor as this can result in product failure, an accident or personal injury.
3. Do not hit the shaft, when installing the motor in your system. Abnormal sound might occur.
4. Be sure to turn off the power before installation, wiring, and inspection.
5. Do not pull and pinch the wire leads.
6. Do not ride on the motor or drop it as this can result in product failure or an accident.
7. Do not use the motor in locations exposed to direct sunshine and/or subjected to splashing water.
8. Do not install in locations subject to excessive vibration, shock and in the presence of flammable gas and corrosive gas.
9. Do not leave any flammable materials near the motor.
10. Never touch the rotating part of the motor while it is running.
11. Do not touch the motor while it is running and for some time after it stops, as it may become hot.
12. Be sure to power off immediately to stop operation if you find any abnormalities.
13. Do not use the damaged motor.

How To Check the Nameplate of Trochoid™ Pump

When placing an order, please choose from the following pump types.

1. Pump with an integrated motor
2. Pumphead

Motor

Pump with an integrated motor

Motor specifications

1. Pump with an integrated motor

TOP-1ME200-12MAVB

==========

Motor specification

Power: 0.2kW
Voltage: 200/220
Phase: Three phase
Pole: Four poles

Pumphead

2. Pumphead

TYPE: TOP-12MAVB (Model No.)

S/N: XXXXXXXXXXX (Serial No.)

1ME

(WITH INTEGRATED 3-PHASE MOTOR)

Model Numbering System

TOP-1ME75 – ① – ②MA③ ④ – ⑤

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Attachement
1 : Horizontal
2 : Flange

Model
Note: Pump integrated with motor
10/11/12

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV: Special material

Note: Do not submerge TOP-IME75-2 under liquid. Install the pump with the motor side facing up.

Model Numbering System

TOP-1ME① – ②MA③ ④ – ⑤

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Motor Output
100/200

Model
Note: Pump integrated with motor
10/11/12/13

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV: Special material

Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}				Motor speed 60Hz 1800min^{-1}			
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
		75W	100W	200W		75W	100W	200W
TOP-10MA	1.2	0.5	0.5	0.5	1.4	0.4	0.5	0.5
TOP-11MA	2.2	0.5	0.5	0.5	2.7	0.3	0.5	0.5
TOP-12MA	3.7	0.2	0.5	0.5	4.5	0.1	0.3	0.5
TOP-13MA	6.7	–	0.2	0.5	8.1	–	0.1	0.5

• Test oil: ISO-VG46/Oil temperature: 40C
Note: There are no models in 1ME series compatible with Increased safety standard and with terminal box attached on the other side. For outdoor use, please consult us.

Motor Specifications

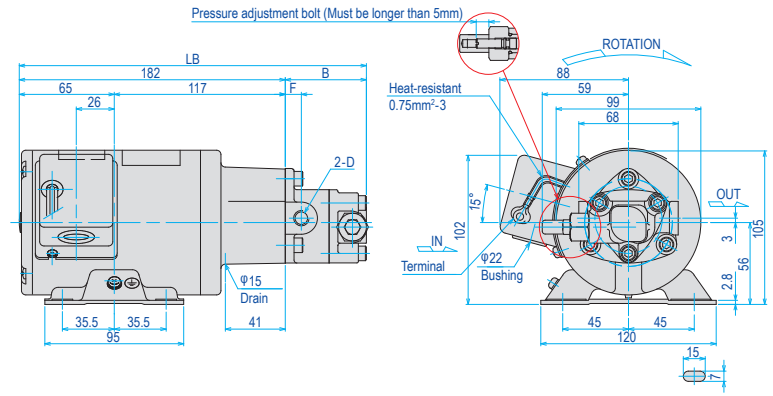
•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation •Protection level IP44

Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
75-1 (Horizontal)	4	Cont	200 200 220	50 60 60	1390 1660 1690	0.60 0.55 0.57	380 400 400 440	50 50 60 60	1360 1380 1650 1680	0.27 0.27 0.25 0.24	5.0
75-2 (Flange)	4	Cont	200 200 220	50 60 60	1390 1660 1690	0.60 0.55 0.57	380 400 400 440	50 50 60 60	1390 1390 1680 1690	0.30 0.28 0.28 0.28	5.5
100	4	Cont	200 200 220	50 60 60	1430 1720 1730	0.65 0.60 0.60	380 400 400 440	50 50 60 60	1430 1440 1710 1735	0.35 0.35 0.31 0.31	7.0
200	4	Cont	200 200 220	50 60 60	1410 1690 1710	1.15 1.10 1.05	380 400 400 440	50 50 60 60	1420 1430 1710 1720	0.60 0.60 0.54 0.55	7.0

Any disassembly or alteration of the product will void the warranty.

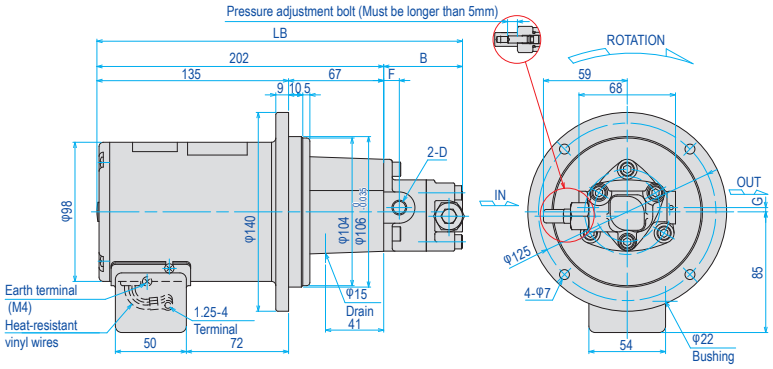
■ Dimensions (Typical) for 1ME

Model : TOP-1ME75-1-1∗MAVB-∗∗



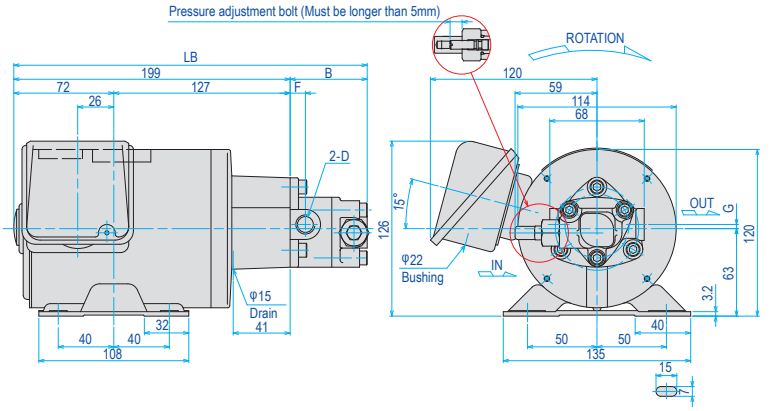
Item / Model	LB	B	D	F
10	231.5	49.5	Rc 1/8	11
11	231.5	49.5	Rc 1/8	11
12	237.5	55.5	Rc 1/4	11

Model : TOP-1ME75-2-1∗MAVB-∗∗



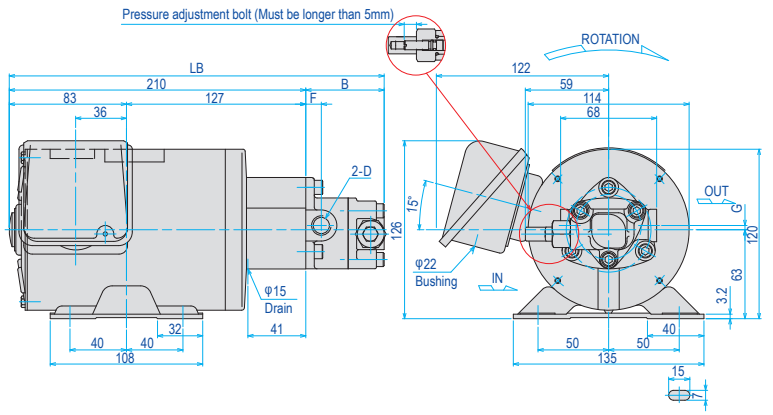
Item / Model	LB	B	D	F	G
10	251.5	49.5	Rc 1/8	11	3
11	251.5	49.5	Rc 1/8	11	3
12	257.5	55.5	Rc 1/4	11	3

Model : TOP-1ME100-1∗MAVB-∗∗



Item / Model	LB	B	D	F	G
10	248.5	49.5	Rc 1/8	11	3
11	248.5	49.5	Rc 1/8	11	3
12	254.5	55.5	Rc 1/4	11	3
13	269.5	70.5	Rc 3/8	14	5.5

Model : TOP-1ME200-1∗MAVB-∗∗



Item / Model	LB	B	D	F	G
10	259.5	49.5	Rc 1/8	11	3
11	259.5	49.5	Rc 1/8	11	3
12	265.5	55.5	Rc 1/4	11	3
13	280.5	70.5	Rc 3/8	14	5.5

1ME S

(WITH INTEGRATED SINGLE-PHASE MOTOR)

■ Model Numbering System

TOP-1ME①S – ②MA③ – ④

Motor Output
75/200

Model
Note: Pump integrated with motor
10/11/12/13

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV: Special material

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}			Motor speed 60Hz 1800min^{-1}		
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)	
		75W	200W		75W	200W
TOP-10MA	1.2	0.5	0.5	1.4	0.4	0.5
TOP-11MA	2.2	0.5	0.5	2.7	0.3	0.5
TOP-12MA	3.7	0.2	0.5	4.5	0.1	0.5
TOP-13MA	6.7	–	0.5	8.1	–	0.5

• Test oil: ISO-VG46/Oil temperature: 40C
Note: 1ME series is not increased safety type and the position of terminal box can not be changed. For outdoor use, please consult us.

■ Motor Specifications •Single-phase induction motor •Class E insulation •Protection level IP22

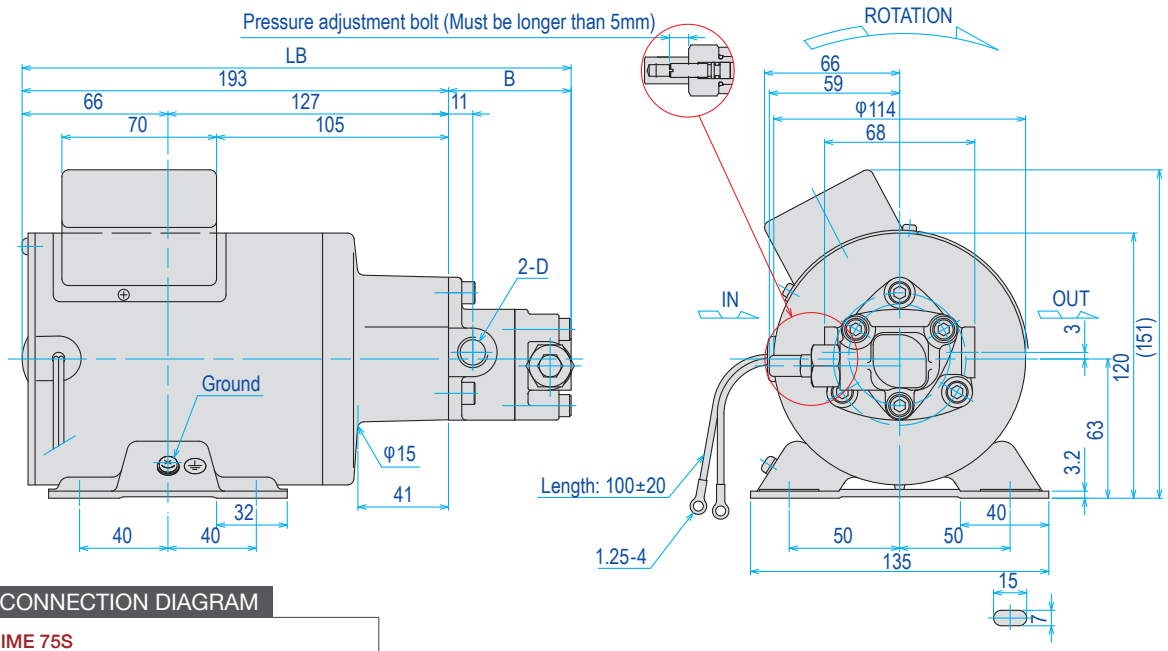
Output (W)	Number of poles (P)	Rating	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Approx. Weight (Kg)
75	4	Cont	100	50 60	1430 1730	2.0 1.6	5.9
200	4	Cont	100	50 60	1450 1740	6.4 5.2	9.0
			200	50 60	1450 1740	3.2 2.6	

• IME75S is a condenser-operating type.
• IME200 is a condenser-starting type.

Any disassembly or alteration of the product will void the warranty.

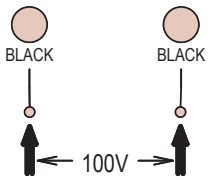
■ Dimensions (Typical) for 1ME S

Model : TOP-1ME75S-1∗MAVB-∗∗



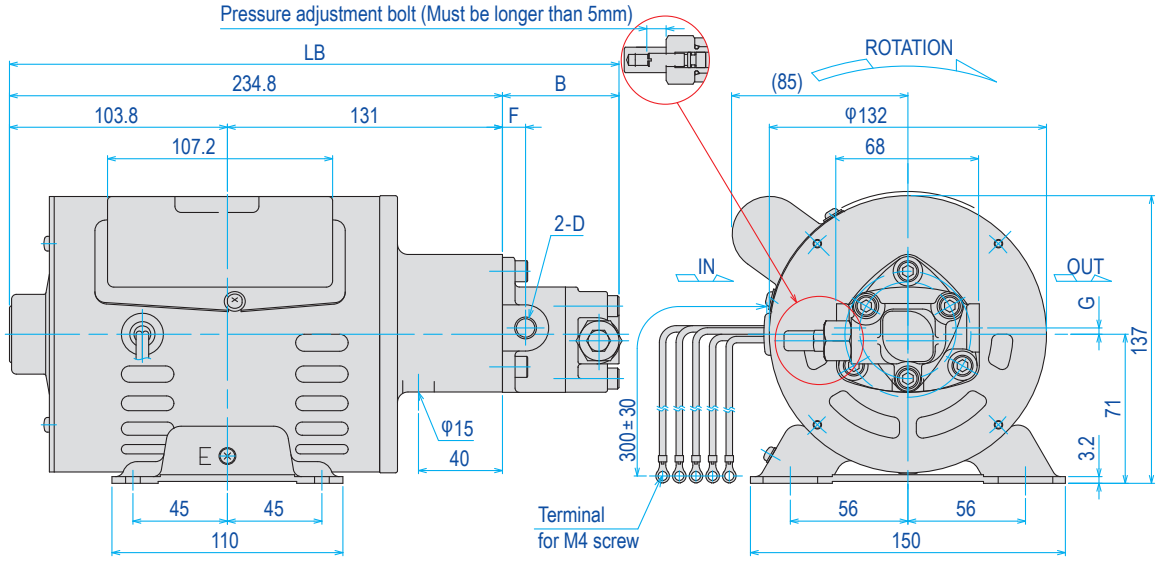
CONNECTION DIAGRAM

IME 75S



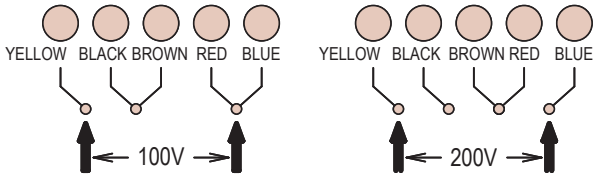
Item / Model	LB	B	D
10	242.5	49.5	Rc 1/8
11	242.5	49.5	Rc 1/8
12	248.5	55.5	Rc 1/4

Model : TOP-1ME200S-1∗MAVB-∗∗



CONNECTION DIAGRAM

IME 200S



Item / Model	LB	B	D	F	G
10	284.3	49.5	Rc 1/8	11	3
11	284.3	49.5	Rc 1/8	11	3
12	290.3	55.5	Rc 1/4	11	3
13	305.3	70.5	Rc 3/8	14	5.5

1ME S

(WITH INTEGRATED SINGLE-PHASE MOTOR FOR EDIBLE OIL AT HIGH TEMPERATURE)

■ Model Numbering System (FOR CONTINUOUS OPERATION)

TOP-1ME200SH – ①MA② – BT

Model
Note: Pump integrated with motor
10/11/12/13

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

■ Model Numbering System (FOR 30 MINUTE RATING)

TOP-1ME200S – 001 – ①MA② – BT

Model
Note: Pump integrated with motor
10/11/12/13

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}		Motor speed 60Hz 1800min^{-1}	
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa) 200W	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa) 200W
TOP-10MA	1.2	0.5	1.4	0.5
TOP-11MA	2.2	0.5	2.7	0.5
TOP-12MA	3.7	0.5	4.5	0.5
TOP-13MA	6.7	0.5	8.1	0.5

• Test oil: ISO-VG46/Oil temperature: 40C
Note: There are no models in 1ME series compatible with Increased safety standard and with terminal box attached on the other side.
Note: Fluoro rubber is used for seal material.

■ Motor Specifications •Single-phase induction motor •Class E insulation •Protection level IP22

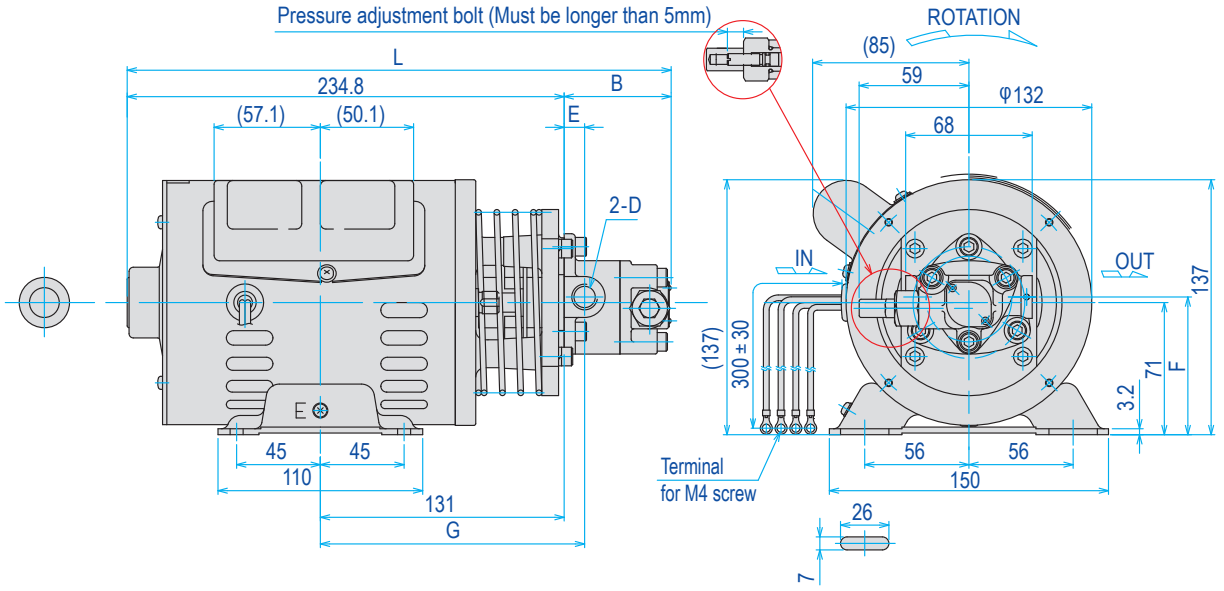
Output (W)	Number of poles (P)	Rating	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Approx. Weight (Kg)
200SH	4	Cont	100	50 60	1450 1740	6.4 5.2	10
			200	50 60	1450 1740	3.2 2.6	
200S-001	4	30 Minute	100	50 60	1450 1740	6.4 5.2	8
			200	50 60	1450 1740	3.2 2.6	

• IME200S, 200SH is a condenser-starting type.

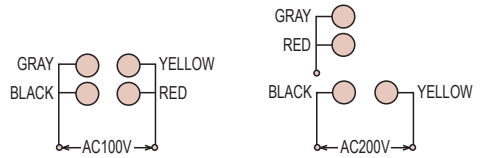
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 1ME S (FOR EDIBLE OIL AT HIGH TEMPERATURE)

Model : TOP-1ME200SH-1*MAVB-BT

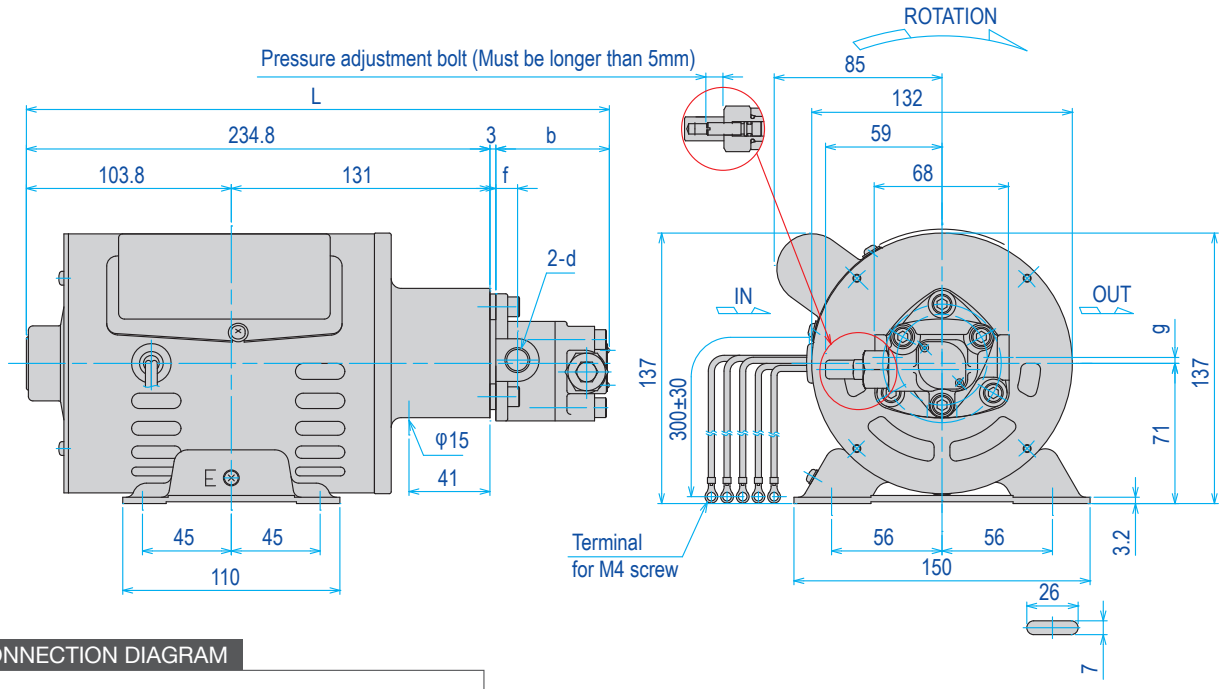


CONNECTION DIAGRAM

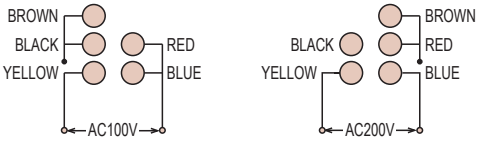


Item / Model	L	B	D	E	F	G
10	286.3	51.5	Rc 1/8	11	74	142
11	286.3	51.5	Rc 1/8	11	74	142
12	292.3	57.5	Rc 1/4	11	74	142
13	307.3	72.5	Rc 3/8	14	76.5	145

Model : TOP-1ME200S-001*MAVB-BT



CONNECTION DIAGRAM



Item / Model	L	b	d	f	g
10	289.3	51.5	Rc 1/8	11	3
11	289.3	51.5	Rc 1/8	11	3
12	295.3	57.5	Rc 1/4	11	3
13	310.3	72.5	Rc 3/8	14	5.5

1MB

(BASE-COUPLING MOUNT TYPE)

■ Model Numbering System

TOP-1MB① ② – ③HG④I – ⑤

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
200/400

Model
11/12

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VV

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressur (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-11HG	1.5	2.2	2.7	2.5	3000	1.4
TOP-12HG	2.5	3.7	4.5	2.5	2500	1.5

• Test oil: ISO-VG46/Oil temperature: 40C

■ Motor Specifications

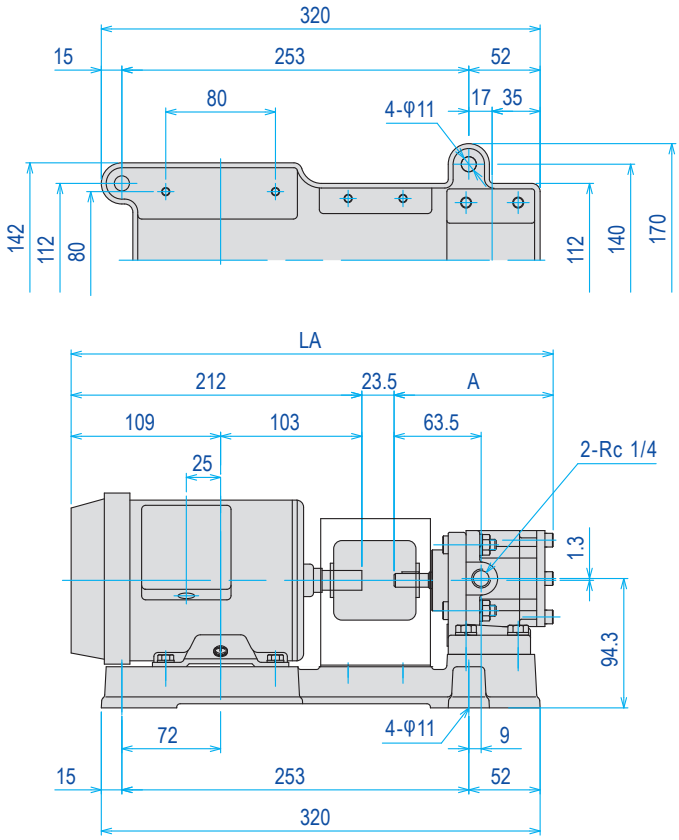
•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation •Protection level IP44

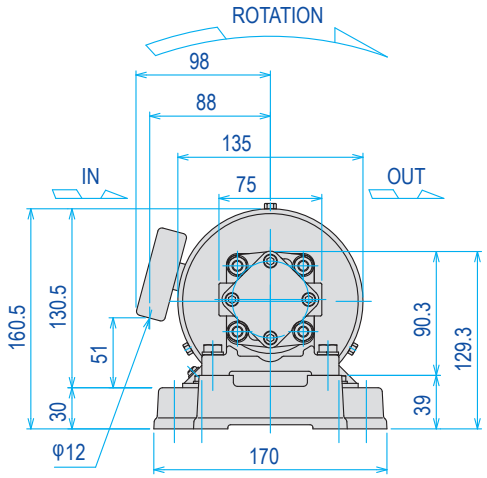
Output (W)	Model	Number of poles (P)	Rating	200V class				400V class			
				Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)
200	1MBT200	4	Cont	200 200 220	50 60 60	1410 1690 1710	1.3 1.2 1.2	400 400 440	50 60 60	1410 1690 1710	0.6 0.55 0.55
	1MBM200	4	Cont	200 200 220	50 60 60	1400 1690 1700	1.26 1.1 1.1	400 400 440	50 60 60	1400 1690 1700	0.63 0.55 0.55
400	1MBT400	4	Cont	200 200 220	50 60 60	1400 1680 1710	2.2 2.0 2.0	400 400 440	50 60 60	1400 1680 1710	1.1 1.0 1.0
	1MBM400	4	Cont	200 200 220	50 60 60	1410 1690 1700	2.2 2.0 2.0	400 400 440	50 60 60	1410 1690 1700	1.1 1.0 1.0

Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 1MB

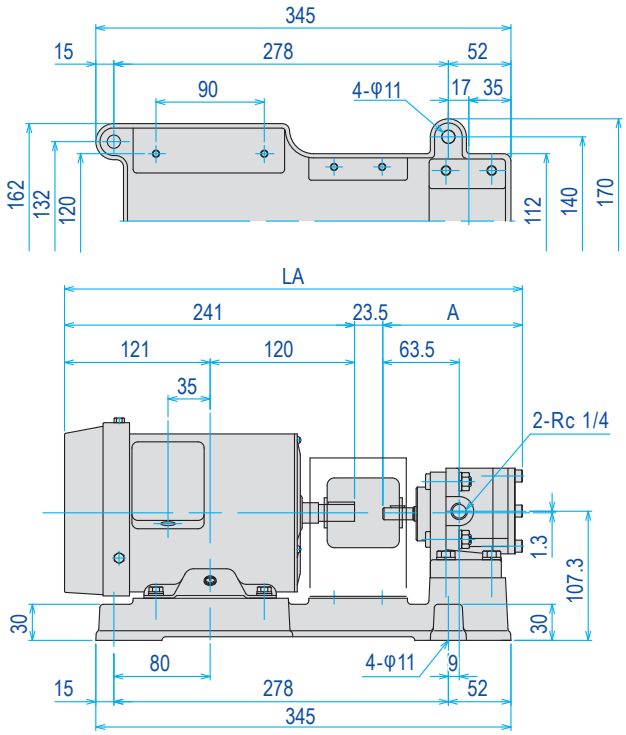
Model : TOP-1MBT200-1*HGI-**

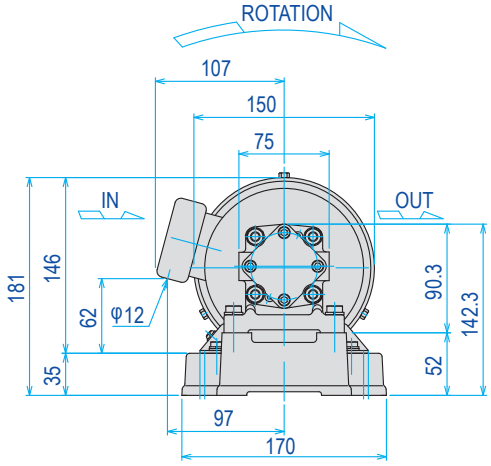




Item / Model	LA	A
11	346.5	111
12	351.5	116

Model : TOP-1MBT400-1*HGI-**





Item / Model	LA	A
11	375.5	111
12	380.5	116

1A/1MA/1HG

(PUMPHEAD)

1A

1MA

1HG

■ Model Numbering System

TOP-1①A② ③ – ④

Model
10A/11A/
12A/13A

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VV/US

(FOR CUPLED WITH 1ME MOTOR)

■ Model Numbering System

TOP-1①MA② ③ – ④

Model
10MA/11MA/
12MA/13MA

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
(Set pressure: Cracking 0.3 MPa)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VV/US

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-10A	0.8	1.2	1.4	0.5	3000	0.5 (0.8)
TOP-11A	1.5	2.2	2.7	0.5	2000	0.5 (0.8)
TOP-12A	2.5	3.7	4.5	0.5	1800	0.6 (0.9)
TOP-13A	4.5	6.7	8.1	0.5	1800	0.8 (1.1)

• Test oil: ISO-VG46/Oil temperature: 40C
• Values in ( ) show approx. weights of the pump when the valve is attached.

(HIGH PRESSURE TYPE)

■ Model Numbering System

TOP-1①HG② ③ – ④

Motor Size
11HG/12HG

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Attachment
Non: No angle plate
I: With angle plate

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VV

■ Specifications

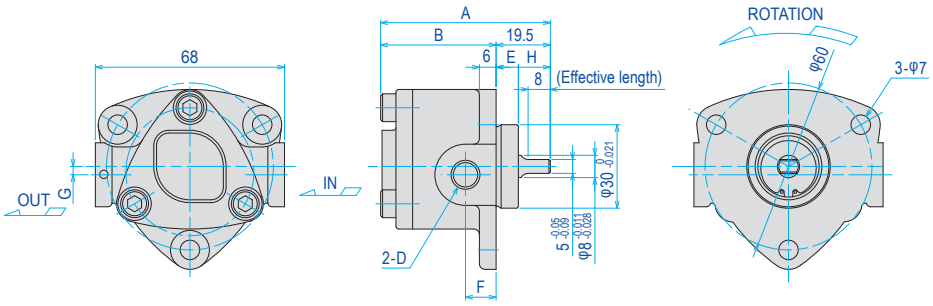
Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-11HG	1.5	2.2	2.7	2.5	3000	1.4
TOP-12HG	2.5	3.7	4.5	2.5	2500	1.5

• Test oil: ISO-VG46/Oil temperature: 40C

Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 1A

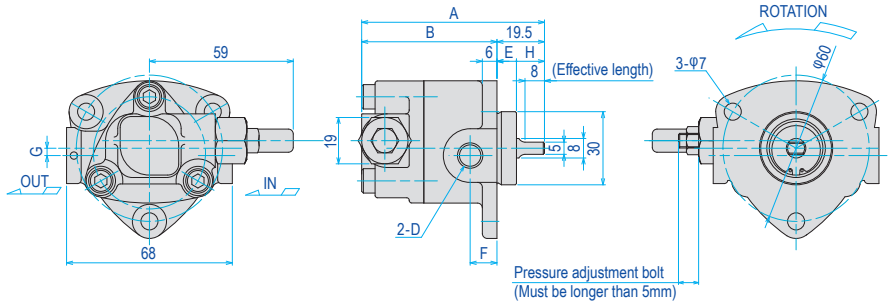
Model : TOP-1∗A-∗∗



Item / Model	A	B	D	E
10	55	35.5	Rc 1/8	8
11	55	35.5	Rc 1/8	8
12	61	41.5	Rc 1/4	8
13	76	56.5	Rc 3/8	5

Item / Model	F	G	H
10	11	3	11.5
11	11	3	11.5
12	11	3	11.5
13	14	5.5	14.5

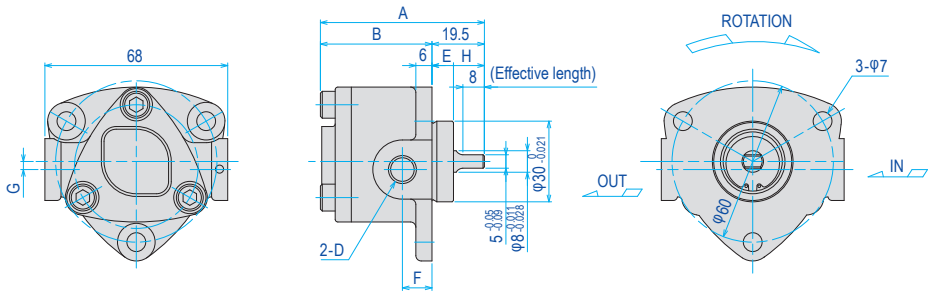
Model : TOP-1∗AVB-∗∗



Item / Model	A	B	D	E
10	69	49.5	Rc 1/8	8
11	69	49.5	Rc 1/8	8
12	75	55.5	Rc 1/4	8
13	90	70.5	Rc 3/8	5

Item / Model	F	G	H
10	11	3	11.5
11	11	3	11.5
12	11	3	11.5
13	14	5.5	14.5

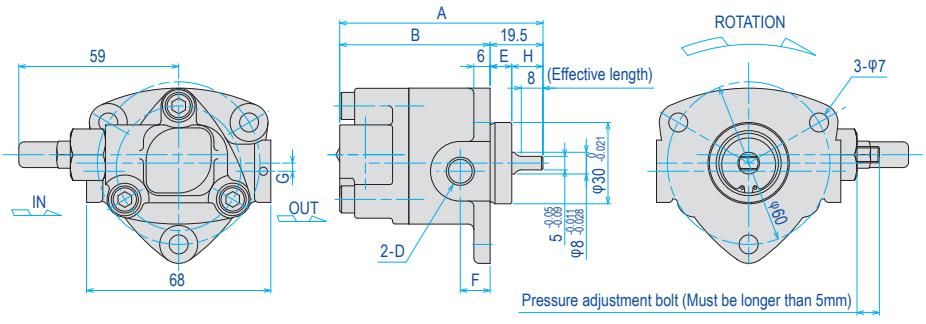
Model : TOP-1∗AR-∗∗



Item / Model	A	B	D	E
10	55	35.5	Rc 1/8	8
11	55	35.5	Rc 1/8	8
12	61	41.5	Rc 1/4	8
13	76	56.5	Rc 3/8	5

Item / Model	F	G	H
10	11	3	11.5
11	11	3	11.5
12	11	3	11.5
13	14	5.5	14.5

Model : TOP-1∗ARVB-∗∗

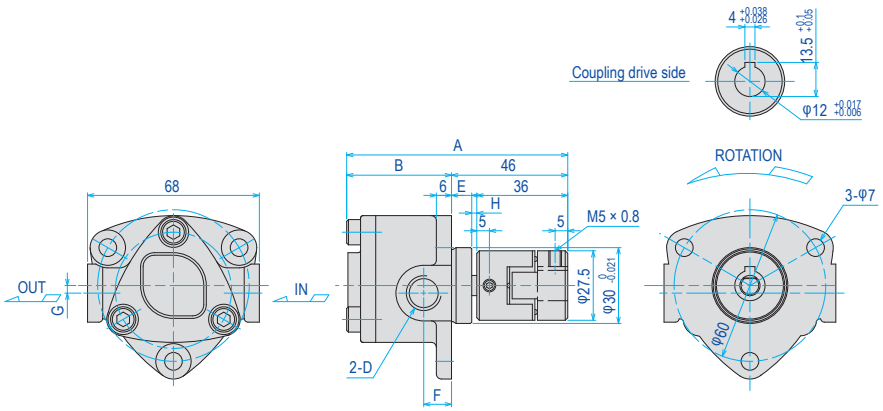


Item / Model	A	B	D	E
10	69	49.5	Rc 1/8	8
11	69	49.5	Rc 1/8	8
12	75	55.5	Rc 1/4	8
13	90	70.5	Rc 3/8	5

Item / Model	F	G	H
10	11	3	11.5
11	11	3	11.5
12	11	3	11.5
13	14	5.5	14.5

■ Dimensions (Typical) for 1MA

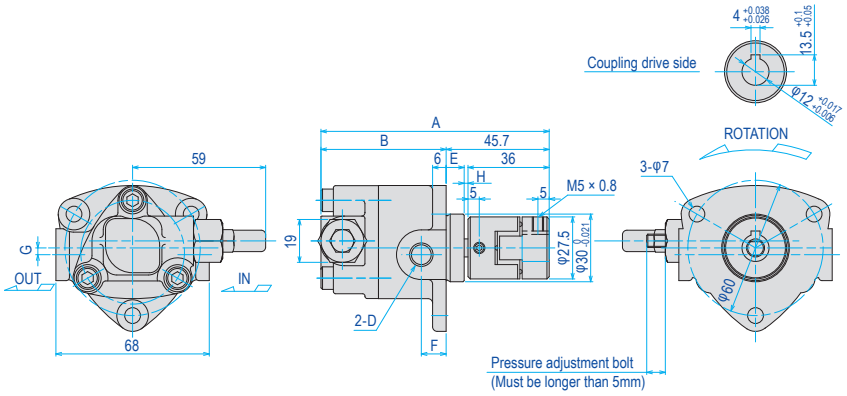
Model : TOP-1∗MA-∗∗



Model \ Item	A	B	D	E
10	81.5	35.5	Rc 1/8	8
11	81.5	35.5	Rc 1/8	8
12	87.5	41.5	Rc 1/4	8
13	102.5	56.5	Rc 3/8	5

Model \ Item	F	G	H
10	11	3	2
11	11	3	2
12	11	3	2
13	14	5.5	5

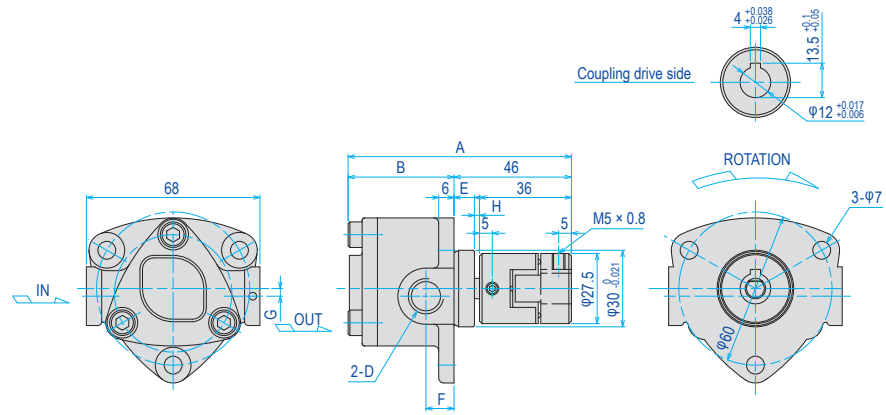
Model : TOP-1∗MAVB-∗∗



Model \ Item	A	B	D	E
10	95.2	49.5	Rc 1/8	8
11	95.2	49.5	Rc 1/8	8
12	101.2	55.5	Rc 1/4	8
13	116.2	70.5	Rc 3/8	5

Model \ Item	F	G	H
10	11	3	1.7
11	11	3	1.7
12	11	3	1.7
13	14	5.5	4.7

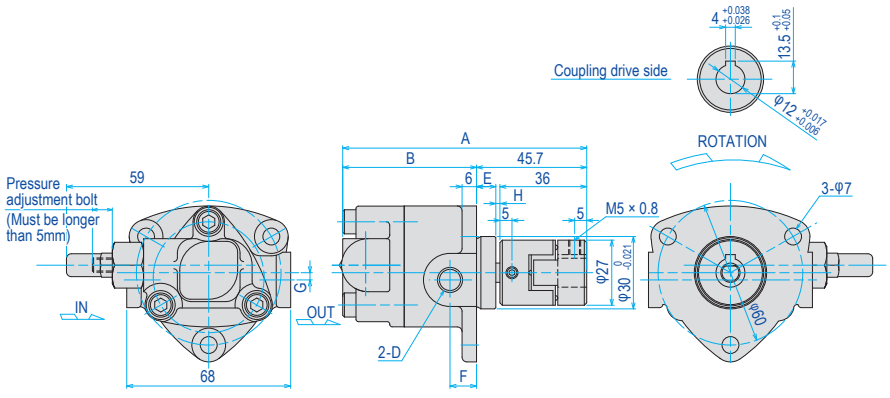
Model : TOP-1∗MAR-∗∗



Model \ Item	A	B	D	E
10	81.5	35.5	Rc 1/8	8
11	81.5	35.5	Rc 1/8	8
12	87.5	41.5	Rc 1/4	8
13	102.5	56.5	Rc 3/8	5

Model \ Item	F	G	H
10	11	3	2
11	11	3	2
12	11	3	2
13	14	5.5	5

Model : TOP-1∗MARVB-∗∗



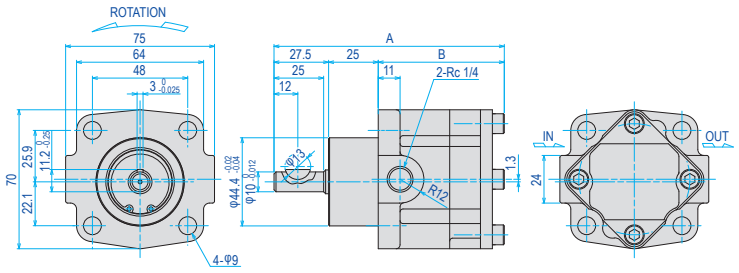
Model \ Item	A	B	D	E
10	95.2	49.5	Rc 1/8	8
11	95.2	49.5	Rc 1/8	8
12	101.2	55.5	Rc 1/4	8
13	116.2	70.5	Rc 3/8	5

Model \ Item	F	G	H
10	11	3	1.7
11	11	3	1.7
12	11	3	1.7
13	14	5.5	4.7

Any disassembly or alteration of the product will void the warranty.

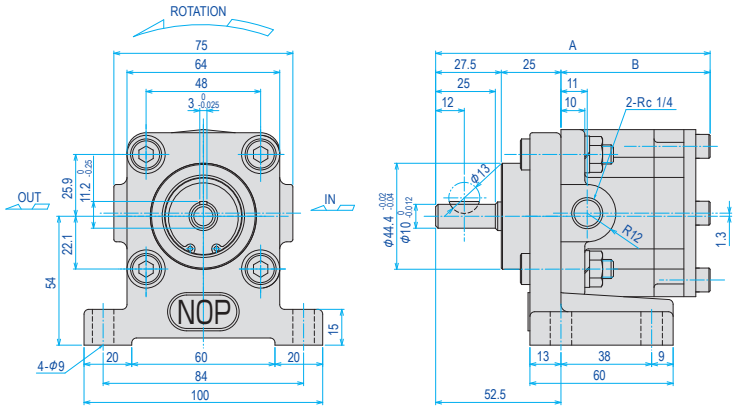
■ Dimensions (Typical) for 1HG

Model : TOP-1∗HG-∗∗



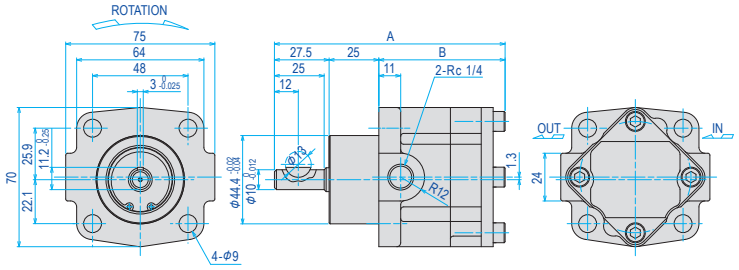
Model \ Item	A	B
11	111	58.5
12	116	63.5

Model : TOP-1∗∗HGI-∗∗



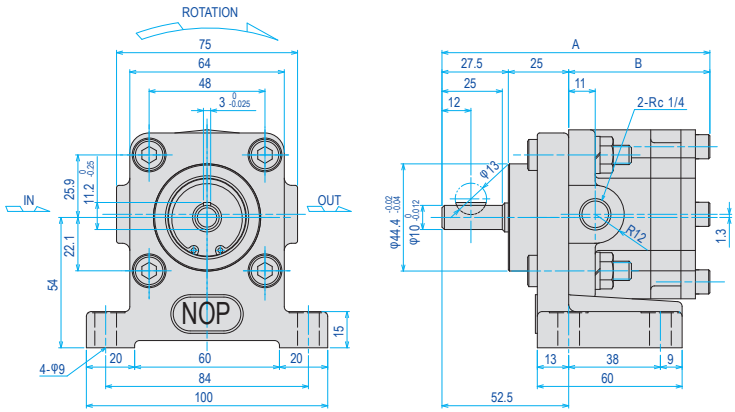
Model \ Item	A	B
11	111	58.5
12	116	63.5

Model : TOP-1∗HGR-∗∗



Model \ Item	A	B
11	111	58.5
12	116	63.5

Model : TOP-1∗HGRI-∗∗



Model \ Item	A	B
11	111	58.5
12	116	63.5

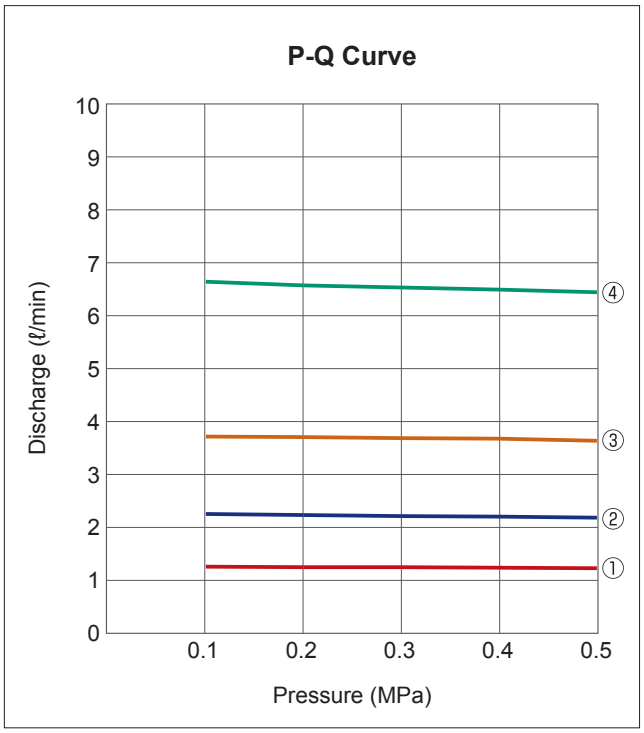
1A/1MA Performance Curve

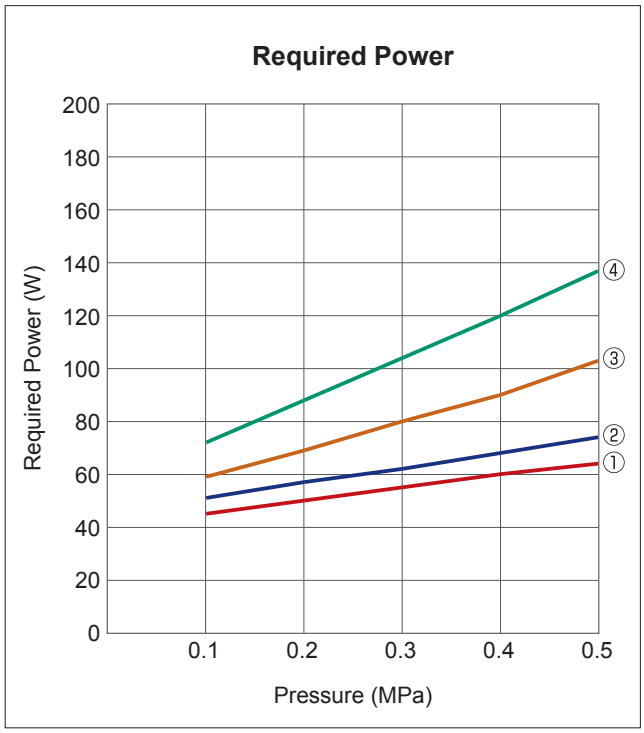
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①10A　②11A　③12A　④13A





Item / Model	Discharge (ℓ/min) Pressure (MPa) 0.1	0.2	0.3	0.4	0.5	Required Power (W) Pressure (MPa) 0.1	0.2	0.3	0.4	0.5
TOP-10A	1.24	1.23	1.23	1.22	1.21	45	50	55	60	64
TOP-11A	2.24	2.22	2.20	2.19	2.17	51	57	62	68	74
TOP-12A	3.71	3.70	3.68	3.67	3.63	59	69	80	90	103
TOP-13A	6.65	6.58	6.54	6.50	6.45	72	88	104	120	137

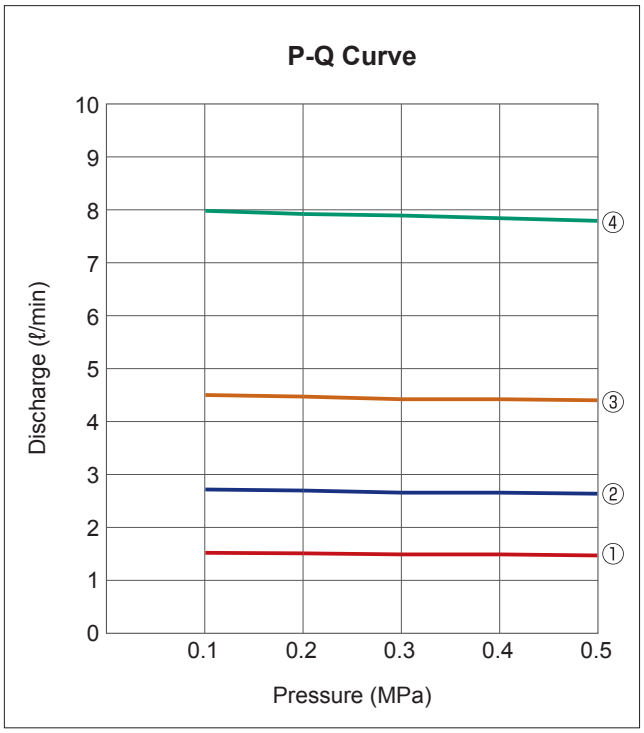
Any disassembly or alteration of the product will void the warranty.

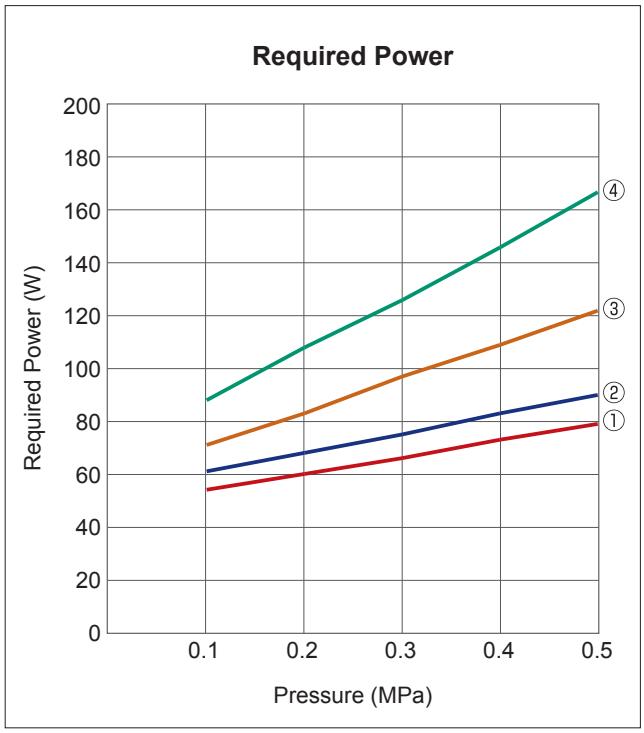
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①10A　②11A　③12A　④13A





Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-10A	1.51	1.50	1.48	1.48	1.46	54	60	66	73	79
TOP-11A	2.71	2.69	2.65	2.65	2.63	61	68	75	83	90
TOP-12A	4.50	4.47	4.42	4.42	4.40	71	83	97	109	122
TOP-13A	7.99	7.98	7.85	7.85	7.80	88	108	126	146	167

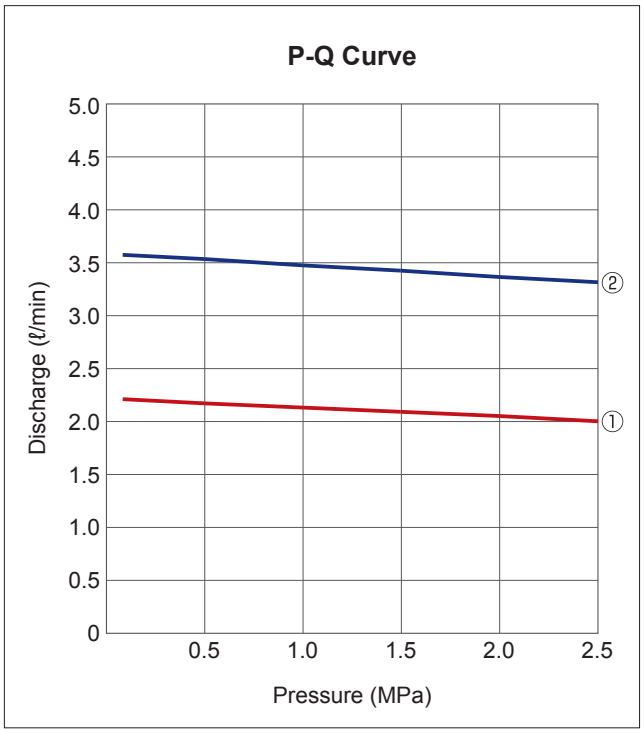
1HG Performance Curve

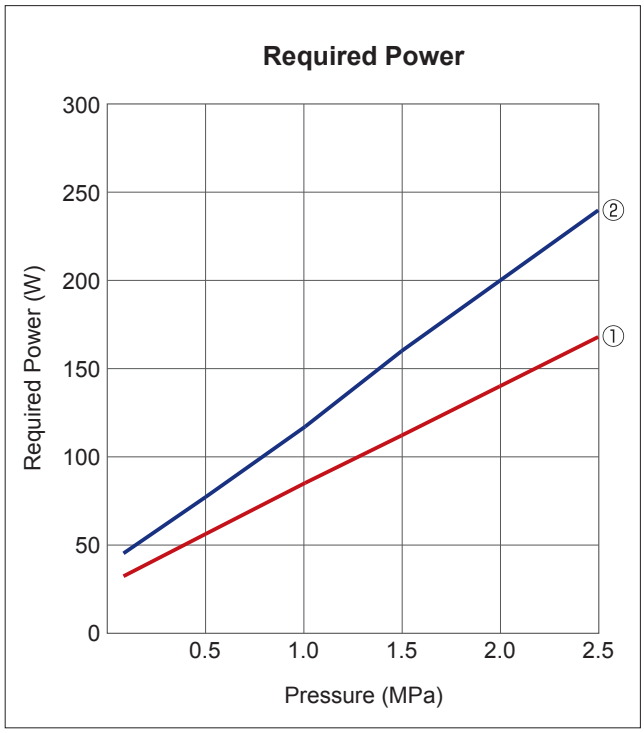
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①11HG　②12HG





Item / Model	Discharge (ℓ/min) Pressure (MPa)						Required Power (W) Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
TOP-11HG	2.21	2.17	2.13	2.09	2.05	2.00	32	56	85	112	140	168
TOP-12HG	3.58	3.54	3.48	3.43	3.37	3.32	45	77	117	160	200	240

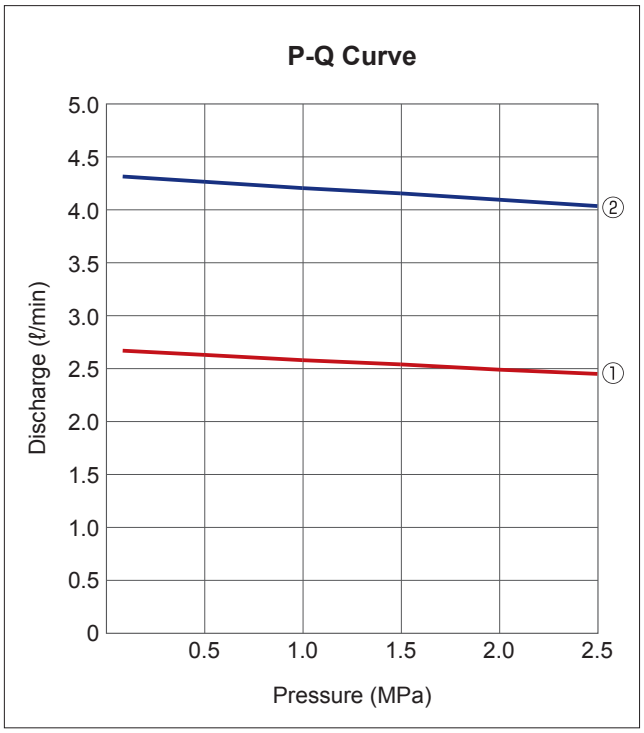
Any disassembly or alteration of the product will void the warranty.

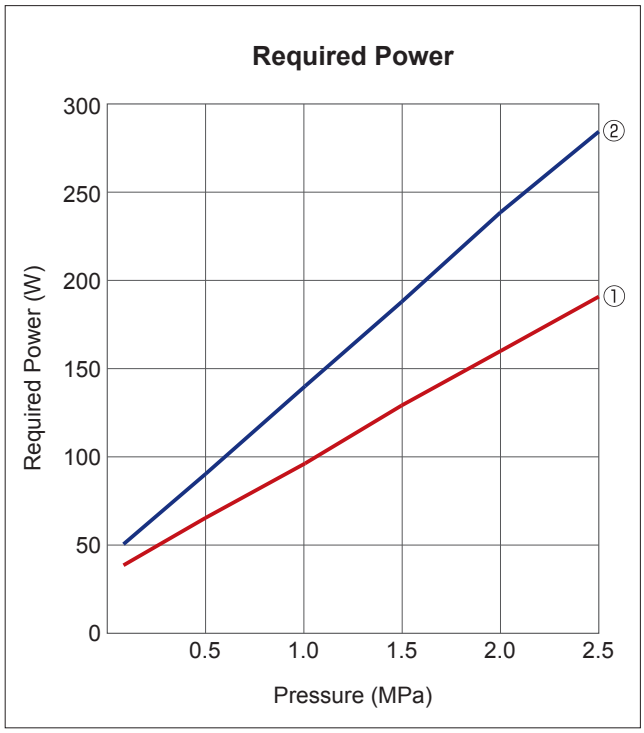
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①11HG　②12HG

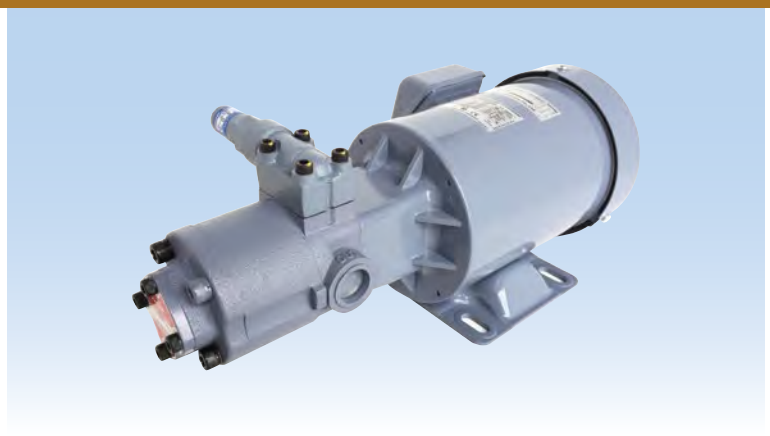




Item / Model	Discharge (ℓ/min) Pressure (MPa)						Required Power (W) Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
TOP-11HG	2.67	2.63	2.58	2.54	2.49	2.45	38	65	96	129	160	191
TOP-12HG	4.32	4.27	4.21	4.16	4.10	4.04	50	90	140	188	239	285

2MY-2HBM

(WITH INTEGRATED 3-PHASE MOTOR)



■ Model Numbering System (For General Lubricant Oil)

TOP-2MY① – ②HBM③ ④ ⑤ – ⑥

Motor Output
200/400/
750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
203/204/206/208/
210/212/216/220

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/US/UT

Relief Valve Set Pressure
Note: Indicated at the end of model number in 0.1 MPa units

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-203HBM	4.2	1.7	3.0	3.0	3.0	5.0	1.3	3.0	3.0	3.0
TOP-204HBM	6.0	1.2	3.0	3.0	3.0	7.2	0.9	2.3	3.0	3.0
TOP-206HBM	9.0	0.7	1.8	2.5	2.5	10.8	0.5	1.4	2.5	2.5
TOP-208HBM	12.0	0.5	1.3	2.5	2.5	14.4	0.3	1.0	2.3	2.5
TOP-210HBM	15.0	0.4	1.1	2.5	2.5	18.0	0.3	0.9	2.0	2.5
TOP-212HBM	18.0	0.3	0.9	2.0	2.0	21.6	–	0.7	1.6	2.0
TOP-216HBM	24.0	0.2	0.7	1.5	1.5	28.8	–	0.5	1.2	1.5
TOP-220HBM	30.0	–	0.4	1.2	1.2	36.0	–	0.3	0.9	1.2

• Test oil: ISO-VG46/Oil temperature: 40C
• TOP-2HB series is the updated model of TOP-2HA series. It is compatible with the old model in mounting dimensions and performance. Only the port thread type was changed from "G" to "Rc" type.

■ Motor Specifications

•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation (200W, 400W)
•Class F insulation (750W, 1500W) •Protection level IP44

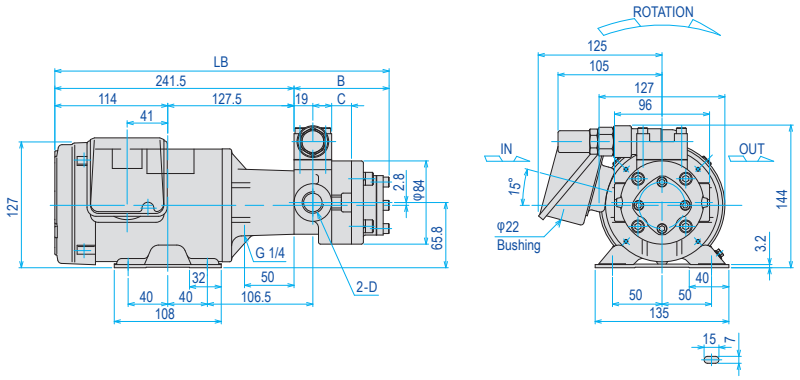
Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
200	4	Cont	200 200 220	50 60 60	1440 1720 1730	1.34 1.12 1.17	380 400 400 440	50 50 60 60	1440 1440 1720 1740	0.64 0.67 0.56 0.58	6.5
400	4	Cont	200 200 220	50 60 60	1420 1710 1730	2.20 1.93 1.95	380 400 400 440	50 50 60 60	1420 1430 1710 1730	1.08 1.11 0.96 0.97	9.0
750	4	Cont	200 200 220	50 60 60	1440 1720 1740	3.30 3.10 3.00	400 400 440	50 60 60	1440 1730 1760	1.77 1.61 1.57	14.0
1500	4	Cont	200 200 220	50 60 60	1450 1740 1750	6.90 6.20 6.00	400 400 440	50 60 60	1450 1740 1750	3.40 3.10 3.00	22.0

• Please consult us when ordering outdoor-type, increased safety-type, spcecial vlotage type or one with CE marking, terminal box attched on the other side, or other special motors.
• 750W and 1500W motors comly with requirements of IE3, CE marking and class F insulation.
Note: Please consult us if motor other than for standard volatage is required.

Any disassembly or alteration of the product will void the warranty.

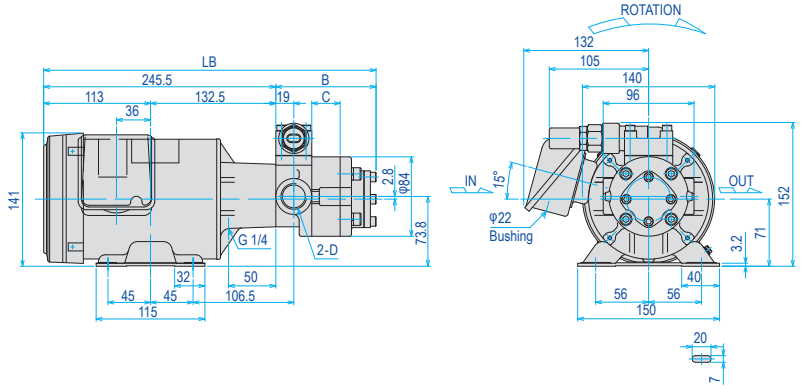
■ Dimensions (Typical) for 2MY-2HBM

Model : TOP-2MY200-2**HBMVB-**



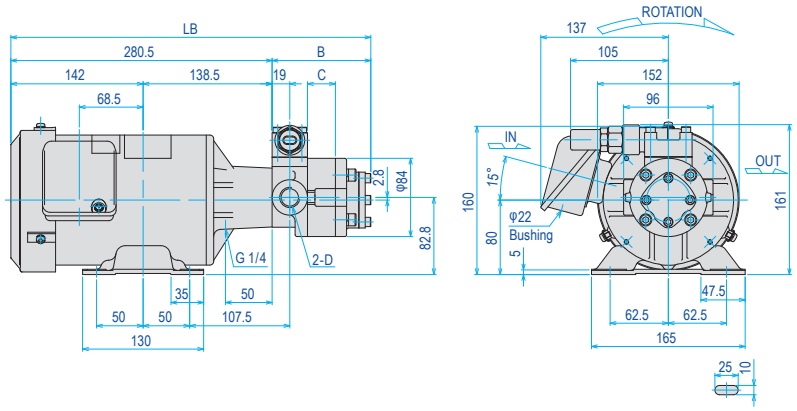
Item / Model	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	
210	342.5	101	25	Rc 3/4
212	347.5	106	30	
216	357.5	116	40	

Model : TOP-2MY400-2**HBMVB-**



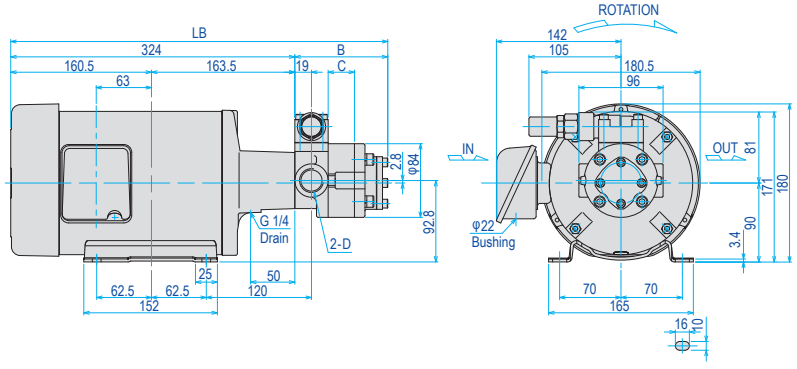
Item / Model	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	
210	346.5	101	25	Rc 3/4
212	351.5	106	30	
216	361.5	116	40	
220	371.5	126	50	

Model : TOP-2MY750-2**HBMVB-** IE3



Item / Model	LB	B	C	D
203	363.5	83	7	Rc 1/2
204	366.5	86	10	
206	371.5	91	15	
208	376.5	96	20	
210	381.5	101	25	Rc 3/4
212	386.5	106	30	
216	396.5	116	40	
220	406.5	126	50	

Model : TOP-2MY1500-2**HBMVB-** IE3



Item / Model	LB	B	C	D
203	407	83	7	Rc 1/2
204	410	86	10	
206	415	91	15	
208	420	96	20	
210	425	101	25	Rc 3/4
212	430	106	30	
216	440	116	40	
220	450	126	50	

2ME S

(WITH INTEGRATED SINGLE-PHASE MOTOR)

■ Model Numbering System

TOP-2ME①S – ②HBM③ ④ ⑤ – ⑥ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

① Motor Output
200/400/750

② Model
Note: Pump integrated with motor
203/204/206/208/
210/212/216/220

③ Port Type
Non: Rc (Standard)
G: G

④ Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

⑤ Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

⑥ Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV: Special material

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}				Motor speed 60Hz 1800min^{-1}			
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
		200W	400W	750W		200W	400W	750W
TOP-203HBM	4.2	1.7	3.0	3.0	5.0	1.3	3.0	3.0
TOP-204HBM	6.0	1.2	3.0	3.0	7.2	0.9	2.3	3.0
TOP-206HBM	9.0	0.7	1.8	2.5	10.8	0.5	1.4	2.5
TOP-208HBM	12.0	0.5	1.3	2.5	14.4	0.3	1.0	2.3
TOP-210HBM	15.0	0.4	1.1	2.5	18.0	0.3	0.9	2.0
TOP-212HBM	18.0	0.3	0.9	2.0	21.6	–	0.7	1.6
TOP-216HBM	24.0	0.2	0.7	1.5	28.8	–	0.5	1.2
TOP-220HBM	30.0	–	0.4	1.2	36.0	–	0.3	0.9

• Test oil: ISO-VG46/Oil temperature: 40C

■ Motor Specifications

•Single-phase induction motor •Open drip-proof •condenser-starting type
•Class E insulation (200W 400W) •Class F insulation (750W) •Protection level IP22

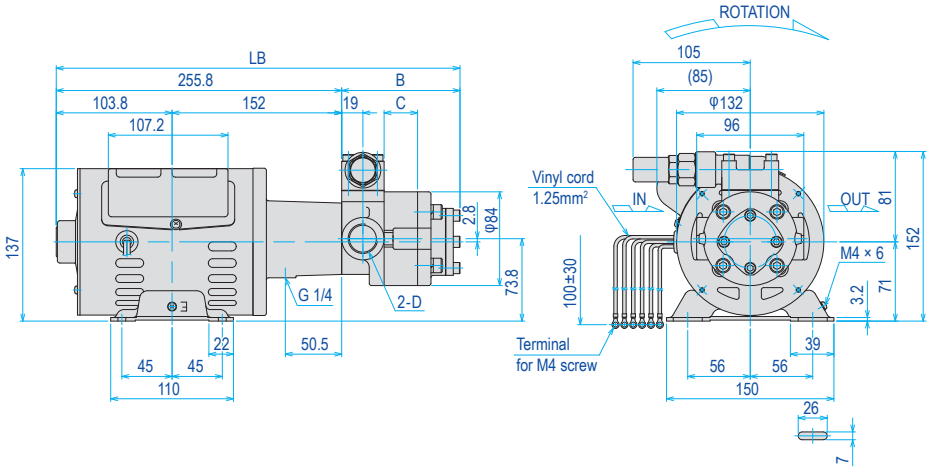
Output (W)	Number of poles (P)	Rating	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Approx. Weight (Kg)
200	4	Cont	100	50 60	1450 1740	6.4 5.2	9
			200	50 60	1450 1740	3.2 2.6	
400	4	Cont	100	50 60	1410 1690	8.8 8.0	13
			200	50 60	1410 1690	4.4 4.0	
750	4	Cont	100	50 60	1420 1710	11.0 10.6	16
			200	50 60	1420 1710	5.5 5.3	

Note: There are no models compatible with Increased safety and outdoor use in 2ME series.

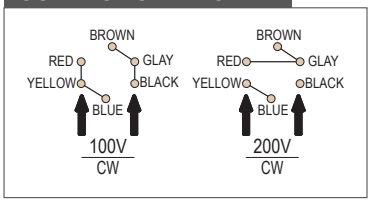
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 2ME S

Model : TOP-2ME200S-2**HBMVB-**

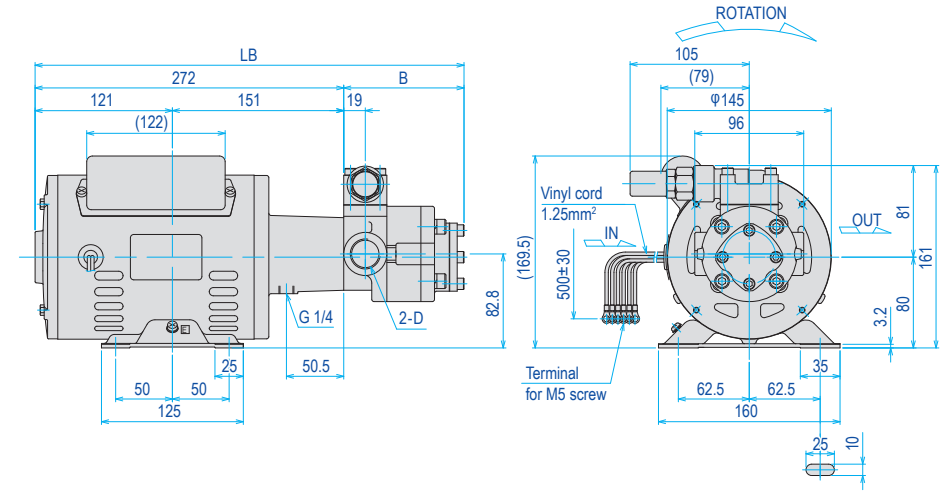


CONNECTION DIAGRAM

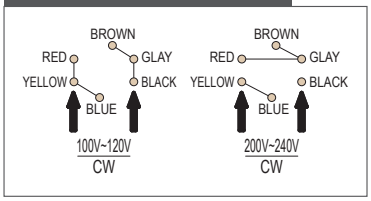


Item / Model	LB	B	C	D
203	338.8	83	7	Rc 1/2
204	341.8	86	10	
206	346.8	91	15	
208	351.8	96	20	
210	356.8	101	25	Rc 3/4
212	361.8	106	30	
216	371.8	116	40	

Model : TOP-2ME400S-2**HBMVB-**

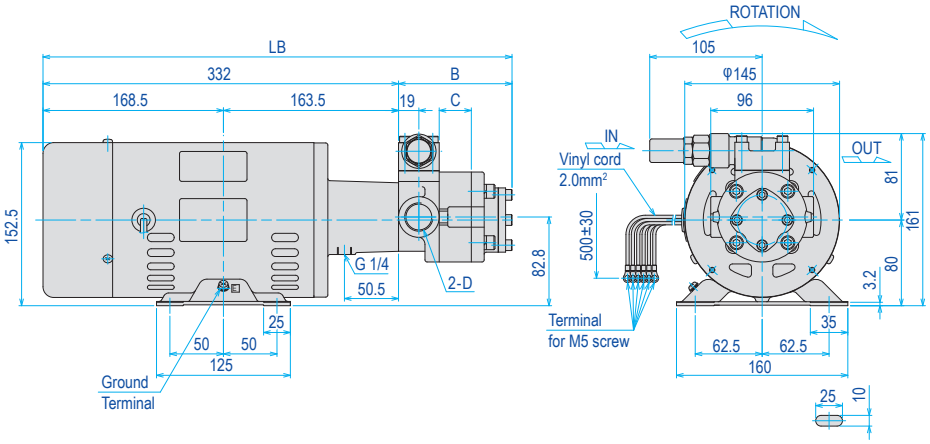


CONNECTION DIAGRAM

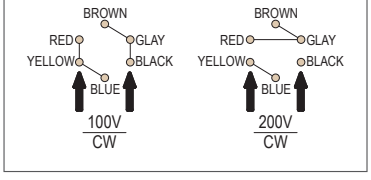


Item / Model	LB	B	C	D
203	355	83	7	Rc 1/2
204	358	86	10	
206	363	91	15	
208	368	96	20	
210	373	101	25	Rc 3/4
212	378	106	30	
216	388	116	40	
220	398	126	50	

Model : TOP-2ME750S-2**HBMVB-**



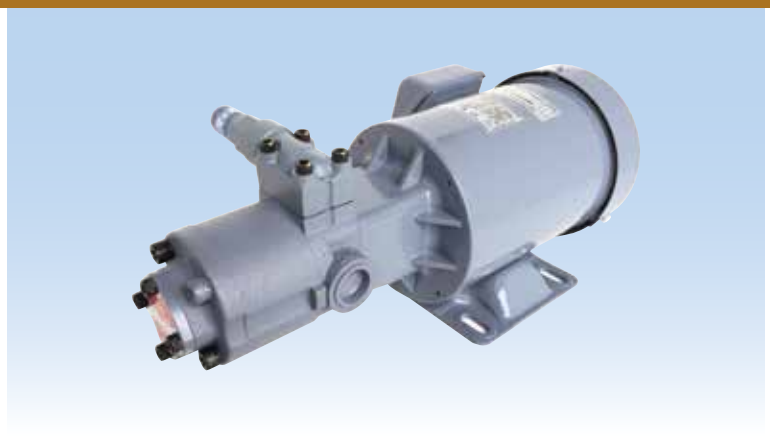
CONNECTION DIAGRAM



Item / Model	LB	B	C	D
203	415	83	7	Rc 1/2
204	418	86	10	
206	423	91	15	
208	428	96	20	
210	433	101	25	Rc 3/4
212	438	106	30	
216	448	116	40	
220	458	126	50	

2MY-2HTM

(WITH INTEGRATED 3-PHASE MOTOR)



■ Model Numbering System (For Diesel Oil Kerosene Heavy Oil)

TOP-2MY① – ②HTM③ ④ ⑤ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Output
200/400/
750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
203/204/206/208/
210/212/216/220

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-203HTM	4.2	0.7	0.7	0.7	0.7	5.0	0.7	0.7	0.7	0.7
TOP-204HTM	6.0	0.7	0.7	0.7	0.7	7.2	0.7	0.7	0.7	0.7
TOP-206HTM	9.0	0.7	0.7	0.7	0.7	10.8	0.6	0.7	0.7	0.7
TOP-208HTM	12.0	0.6	0.7	0.7	0.7	14.4	0.4	0.7	0.7	0.7
TOP-210HTM	15.0	0.5	0.7	0.7	0.7	18.0	0.3	0.7	0.7	0.7
TOP-212HTM	18.0	0.4	0.7	0.7	0.7	21.6	0.2	0.7	0.7	0.7
TOP-216HTM	24.0	0.3	0.7	0.7	0.7	28.8	–	0.6	0.7	0.7
TOP-220HTM	30.0	–	0.6	0.7	0.7	36.0	–	0.5	0.7	0.7

• Test oil: ISO-VG2/Oil temperature: 40C

■ Motor Specifications

•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation (200W, 400W)
•Class F insulation (750W, 1500W) •Protection level IP44

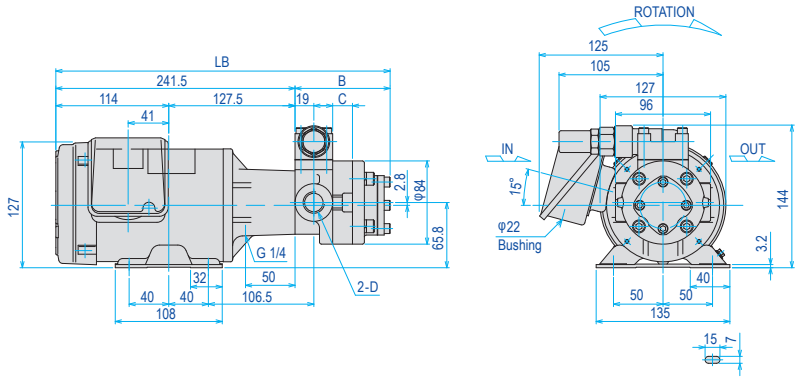
Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
200	4	Cont	200 200 220	50 60 60	1440 1720 1730	1.34 1.12 1.17	380 400 400 440	50 50 60 60	1440 1440 1720 1740	0.64 0.67 0.56 0.58	6.5
400	4	Cont	200 200 220	50 60 60	1420 1710 1730	2.20 1.93 1.95	380 400 400 440	50 50 60 60	1420 1430 1710 1730	1.08 1.11 0.96 0.97	9.0
750	4	Cont	200 200 220	50 60 60	1440 1720 1740	3.30 3.10 3.00	400 400 440	50 60 60	1440 1730 1760	1.77 1.61 1.57	14.0
1500	4	Cont	200 200 220	50 60 60	1450 1740 1750	6.90 6.20 6.00	400 400 440	50 60 60	1450 1740 1750	3.40 3.10 3.00	22.0

• Please consult us when ordering outdoor-type, increased safety-type, spcecial vlotage type or one with CE marking, terminal box attched on the other side, or other special motors.
• 750W and 1500W motors comly with requirements of IE3, CE marking and class F insulation. *Please consult us if motor other than for standard volatage is required.

Any disassembly or alteration of the product will void the warranty.

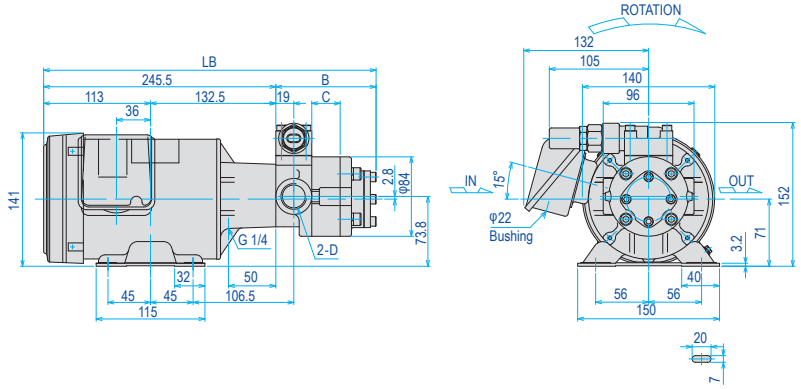
■ Dimensions (Typical) for 2MY-2HTM

Model : TOP-2MY200-2**HTMVB



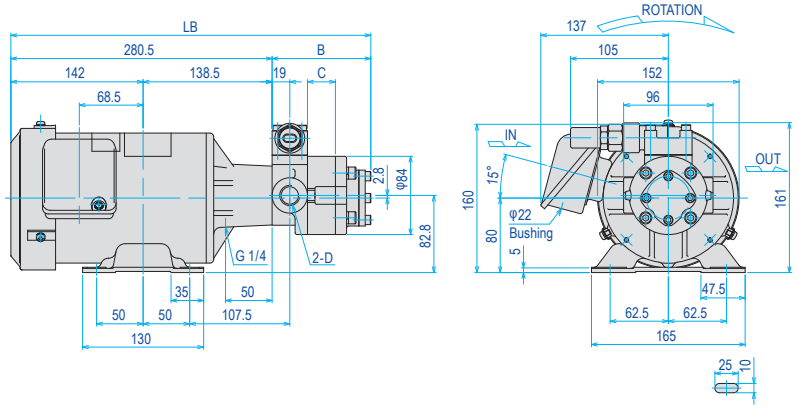
Item / Model	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	
210	342.5	101	25	Rc 3/4
212	347.5	106	30	
216	357.5	116	40	

Model : TOP-2MY400-2**HTMVB



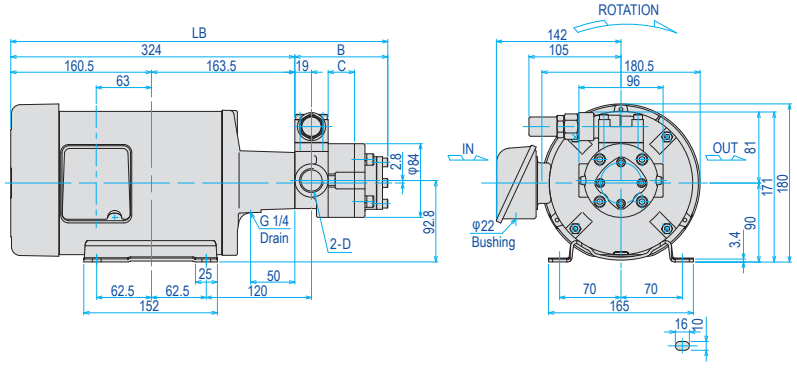
Item / Model	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	
210	346.5	101	25	Rc 3/4
212	351.5	106	30	
216	361.5	116	40	
220	371.5	126	50	

Model : TOP-2MY750-2**HTMVB IE3



Item / Model	LB	B	C	D
203	363.5	83	7	Rc 1/2
204	366.5	86	10	
206	371.5	91	15	
208	376.5	96	20	
210	381.5	101	25	Rc 3/4
212	386.5	106	30	
216	396.5	116	40	
220	406.5	126	50	

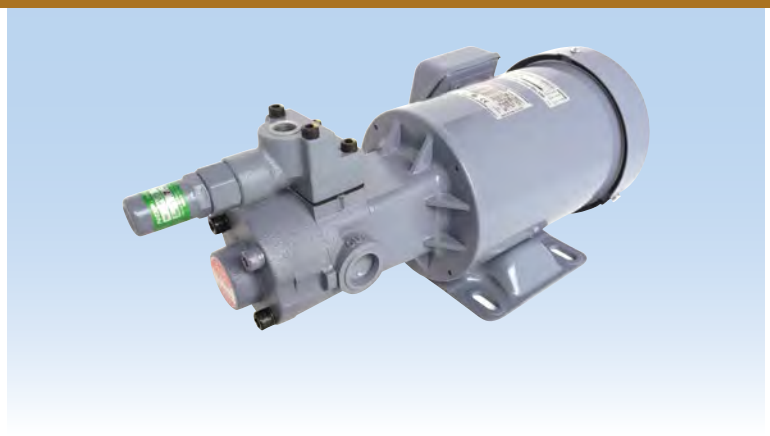
Model : TOP-2MY1500-2**HTMVB IE3



Item / Model	LB	B	C	D
203	407	83	7	Rc 1/2
204	410	86	10	
206	415	91	15	
208	420	96	20	
210	425	101	25	Rc 3/4
212	430	106	30	
216	440	116	40	
220	450	126	50	

2MY-2HWM

(WITH INTEGRATED 3-PHASE MOTOR)



■ Model Numbering System (For Metal Cutting Fluid)

TOP-2MY① – ②HWM③ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Output
200/400/750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
204/206/208/210/
212/216/220

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-204HWM	6.0	1.2	2.0	2.0	2.0	7.2	1.0	2.0	2.0	2.0
TOP-206HWM	9.0	0.8	1.8	2.0	2.0	10.8	0.6	1.6	2.0	2.0
TOP-208HWM	12.0	0.6	1.4	2.0	2.0	14.4	0.4	1.2	2.0	2.0
TOP-210HWM	15.0	0.4	1.2	2.0	2.0	18.0	0.3	1.0	1.9	2.0
TOP-212HWM	18.0	0.3	1.0	2.0	2.0	21.6	0.2	0.8	1.6	2.0
TOP-216HWM	24.0	0.2	0.8	1.5	2.0	28.8	–	0.6	1.2	2.0
TOP-220HWM	30.0	–	0.6	1.2	1.5	36.0	–	0.5	1.0	1.5

• Test oil: ISO-VG2/Oil temperature: 40C
• There is no "203" model for models for 2HW series. (metal cutting fluid)

■ Motor Specifications

•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation (200W, 400W)
•Class F insulation (750W, 1500W) •Protection level IP44

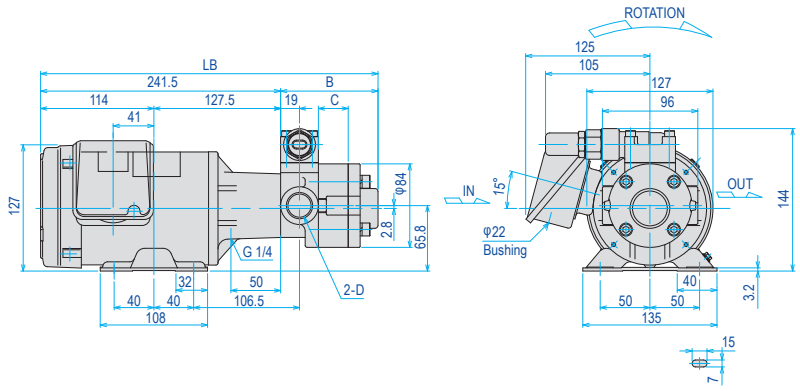
Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
200	4	Cont	200 200 220	50 60 60	1440 1720 1730	1.34 1.12 1.17	380 400 400 440	50 50 60 60	1440 1440 1720 1740	0.64 0.67 0.56 0.58	6.5
400	4	Cont	200 200 220	50 60 60	1420 1710 1730	2.20 1.93 1.95	380 400 400 440	50 50 60 60	1420 1430 1710 1730	1.08 1.11 0.96 0.97	9.0
750	4	Cont	200 200 220	50 60 60	1440 1720 1740	3.30 3.10 3.00	400 400 440	50 60 60	1440 1730 1760	1.77 1.61 1.57	14.0
1500	4	Cont	200 200 220	50 60 60	1450 1740 1750	6.90 6.20 6.00	400 400 440	50 60 60	1450 1740 1750	3.40 3.10 3.00	22.0

• Please consult us when ordering outdoor-type, increased safety-type, spcecial vlotage type or one with CE marking, terminal box attched on the other side, or other special motors.
• 750W and 1500W motors comly with requirements of IE3, CE marking and class F insulation. *Please consult us if motor other than for standard volatage is required.

Any disassembly or alteration of the product will void the warranty.

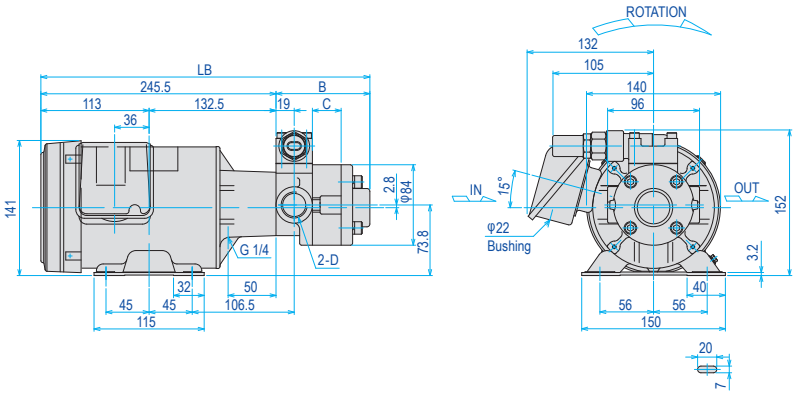
■ Dimensions (Typical) for 2MY-2HWM

Model : TOP-2MY200-2**HWMVB



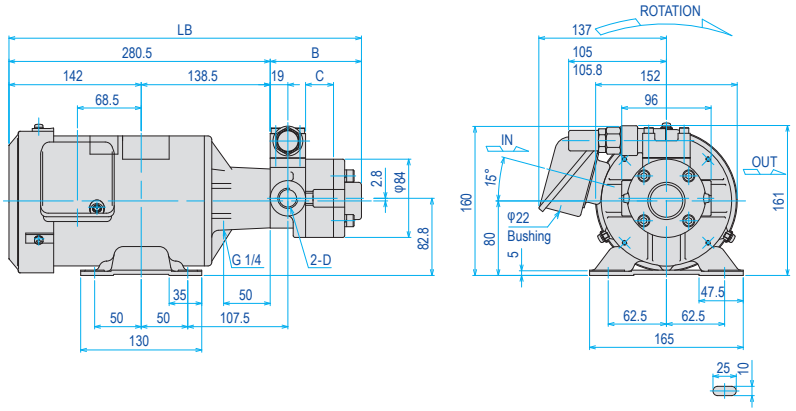
Model \ Item	LB	B	C	D
204	319.5	73	10	Rc 1/2
206	324.5	83	15	
208	329.5	88	20	
210	334.5	93	25	Rc 3/4
212	339.5	98	30	
216	349.5	108	40	

Model : TOP-2MY400-2**HWMVB



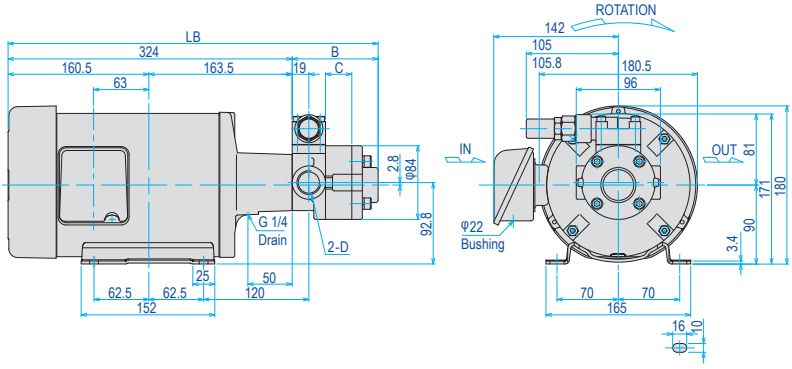
Model \ Item	LB	B	C	D
204	323.5	78	10	Rc 1/2
206	328.5	83	15	
208	333.5	88	20	
210	338.5	93	25	Rc 3/4
212	343.5	98	30	
216	353.5	108	40	
220	363.5	118	50	

Model : TOP-2MY750-2**HWMVB IE3



Model \ Item	LB	B	C	D
204	358.5	78	10	Rc 1/2
206	363.5	83	15	
208	368.5	88	20	
210	373.5	93	25	Rc 3/4
212	378.5	98	30	
216	388.5	108	40	
220	398.5	118	50	

Model : TOP-2MY1500-2**HWMVB IE3



Model \ Item	LB	B	C	D
204	402	78	10	Rc 1/2
206	407	83	15	
208	412	88	20	
210	417	93	25	Rc 3/4
212	422	98	30	
216	432	108	40	
220	442	118	50	

2MY-S Filter

(WITH INTEGRATED 3-PHASE MOTOR)

2HBMP

2HWMP

■ Model Numbering System

TOP-2MY① – ②H③MPVB④ – ⑤ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Output
200/400/
750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
203 (For general lubricant oil only)/
204/206/208/210

Fluid Type
B: General lubricant oil
W: Metal-cutting fluid

Filter Options
Non: Cartridge-type
E: Element-type

Filter Mesh Size
15: 150 mesh
10: 100 mesh (Available only for Element-type)
06: 60 mesh (Available only for Element-type)

■ Specifications (For General Lubricant Oil)

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-203HBMPVB (E)	4.2	1.7	2.5	2.5	2.5	5.0	1.3	2.5	2.5	2.5
TOP-204HBMPVB (E)	6.0	1.2	2.5	2.5	2.5	7.2	0.9	2.3	2.5	2.5
TOP-206HBMPVB (E)	9.0	0.7	1.8	2.5	2.5	10.8	0.5	1.4	2.5	2.5
TOP-208HBMPVB (E)	12.0	0.5	1.3	2.5	2.5	14.4	0.3	1.0	2.3	2.5
TOP-210HBMPVB (E)	15.0	0.4	1.1	2.5	2.5	18.0	0.3	0.9	2.0	2.5

• Test oil: ISO-VG46/Oil temperature: 40C
• Visocisty range of pumped liquid is 2-50mm^2/sec. The vacuum gauge will indicate over the green zone If pumped fluid exceeds the permissible viscosity range.

■ Specifications (For Metal Cutting Fluid)

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-204HWMPVB (E)	6.0	1.2	2.0	2.0	2.0	7.2	1.0	2.0	2.0	2.0
TOP-206HWMPVB (E)	9.0	0.8	1.8	2.0	2.0	10.8	0.6	1.6	2.0	2.0
TOP-208HWMPVB (E)	12.0	0.6	1.4	2.0	2.0	14.4	0.4	1.2	2.0	2.0
TOP-210HWMPVB (E)	15.0	0.4	1.2	2.0	2.0	18.0	0.3	1.0	1.9	2.0

• Test oil: ISO-VG2/Oil temperature: 40C • There is no"203" model for metal cutting fluid.
• Visocisty range of pumped liquid is 2-50mm^2/sec. The vacuum gauge will indicate over the green zone If pumped fluid exceeds the permissible viscosity range.

■ Filter options for "Clean hat" series

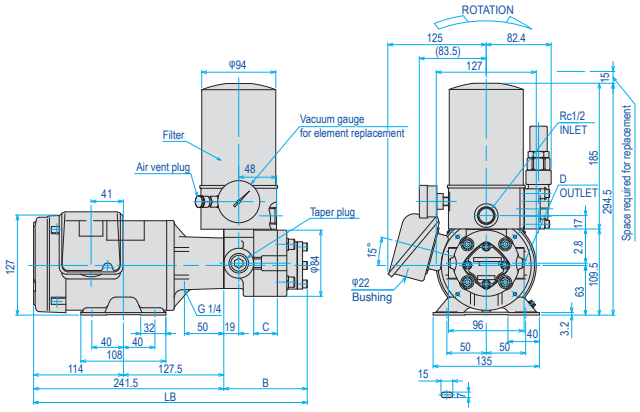
Filter Type	Model Name	Mesh Size
Cartridge for 2HBMPVB Cartridge for 2HWMPVB	**F913-3-150W**	**150**
Element for 2HBMPVBE Element for 2HWMPVBE	**351-04-60W** **351-04-100W** **351-04-150W**	**60** **100** **150**
Element for 2HWNPE	**351-06-60W** **351-06-100W** **351-06-150W**	**60** **100** **150**

Note: Please specify the model number when ordering filters.
Note: If you also need to purchase O ring in the element case, order "G75" type for the filter of which model number begins with "351-04", and order "G95" type if it begins with "351-06".

Any disassembly or alteration of the product will void the warranty.

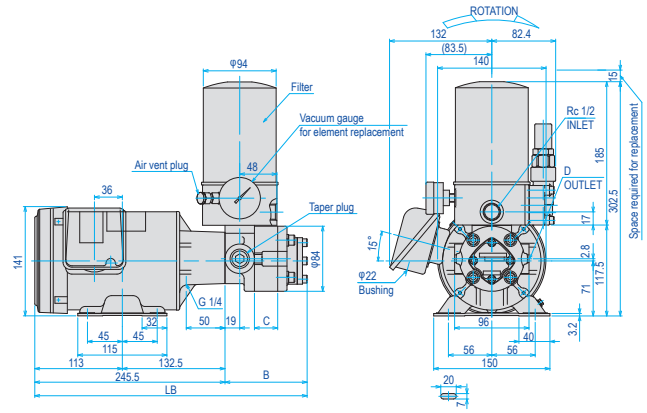
■ Dimensions (Typical) for 2MY-S Filter (Cartridge-type, For General Lubricant Oil)

Model : TOP-2MY200-2**HBMPVB



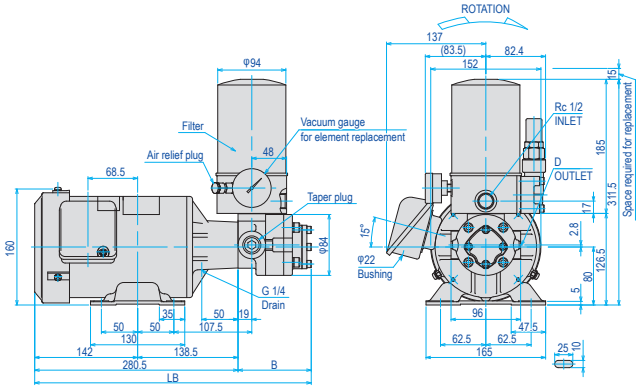
Model \ Item	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	
210	342.5	101	25	Rc 3/4

Model : TOP-2MY400-2**HBMPVB



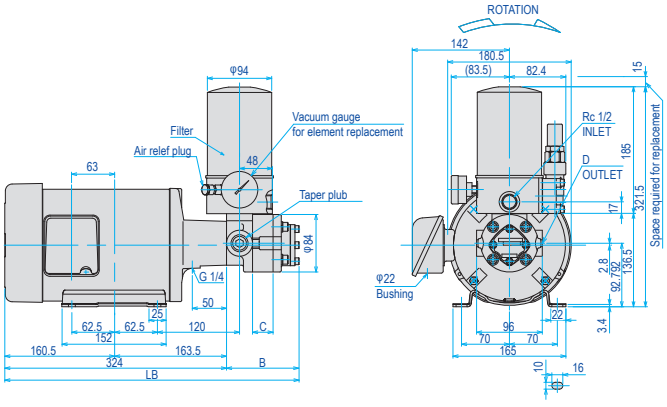
Model \ Item	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	
210	346.5	101	25	Rc 3/4

Model : TOP-2MY750-2**HBMPVB IE3



Model \ Item	LB	B	D
203	363.5	83	Rc 1/2
204	366.5	86	
206	371.5	91	
208	376.5	96	
210	381.5	101	Rc 3/4

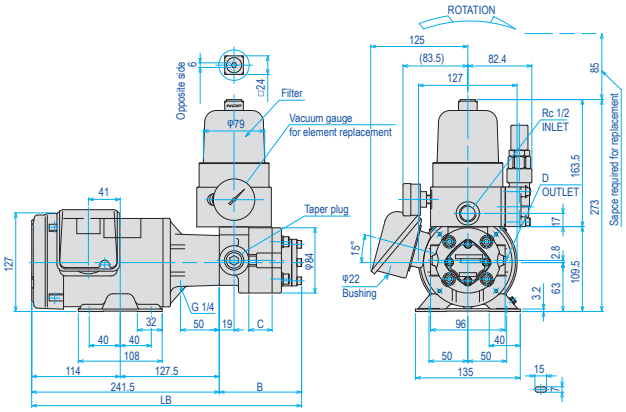
Model : TOP-2MY1500-2**HBMPVB IE3



Model \ Item	LB	B	C	D
203	407	83	7	Rc 1/2
204	410	86	10	
206	415	91	15	
208	420	96	20	
210	425	101	25	Rc 3/4

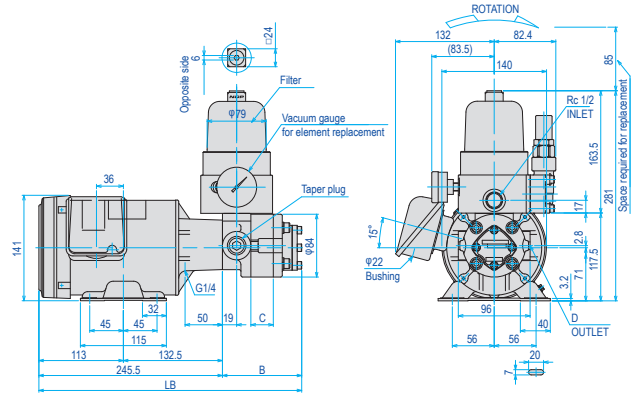
■ Dimensions (Typical) for 2MY-S Filter (Element-type, For General Lubricant Oil)

Model : TOP-2MY200-2**HBMPVBE



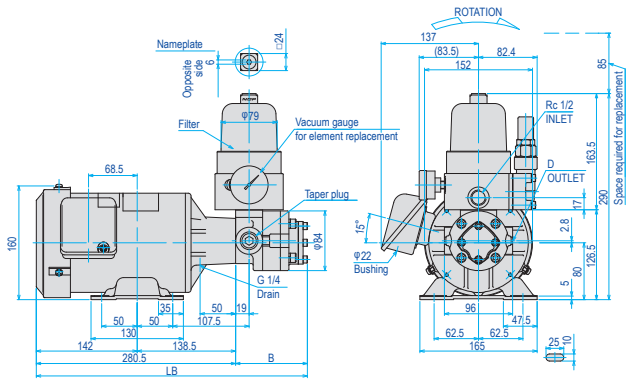
Item / Model	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	
210	342.5	101	25	Rc 3/4

Model : TOP-2MY400-2**HBMPVBE



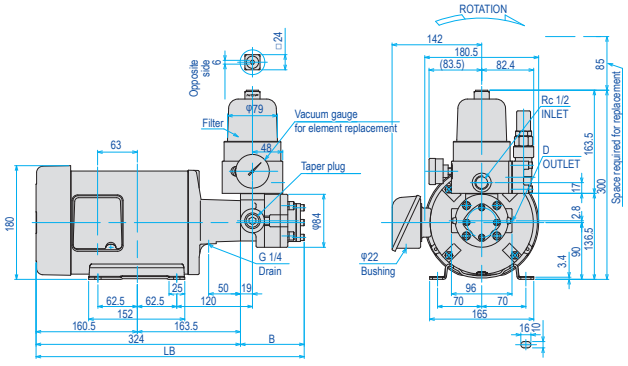
Item / Model	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	
210	346.5	101	25	Rc 3/4

Model : TOP-2MY750-2**HBMPVBE IE3



Item / Model	LB	B	D
203	363.5	83	Rc 1/2
204	366.5	86	
206	371.5	91	
208	376.5	96	
210	381.5	101	Rc 3/4

Model : TOP-2MY1500-2**HBMPVBE IE3

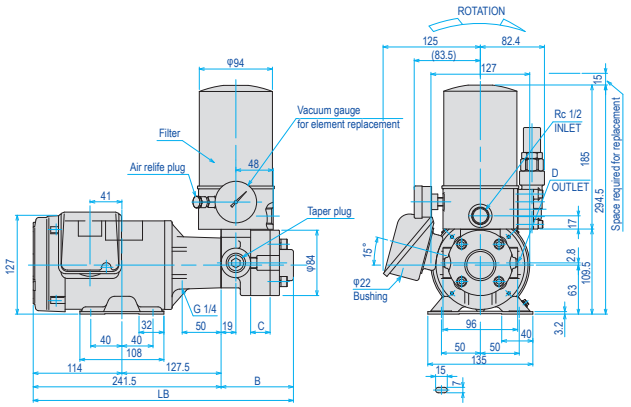


Item / Model	LB	B	D
203	407	83	Rc 1/2
204	410	86	
206	415	91	
208	420	96	
210	425	101	Rc 3/4

Any disassembly or alteration of the product will void the warranty.

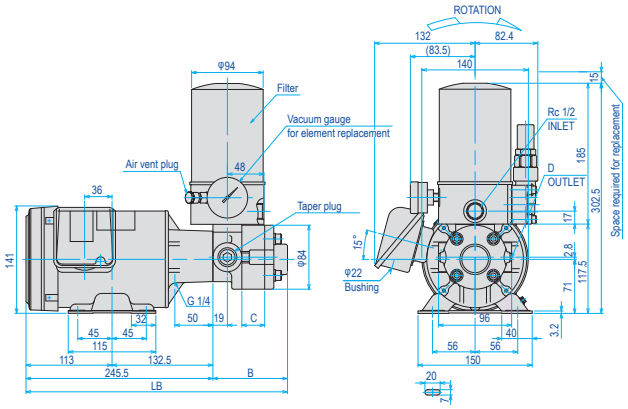
■ Dimensions (Typical) for 2MY-S Filter (Cartridge-type, For Metal Cutting Fluid)

Model : TOP-2MY200-2**HWMPVB



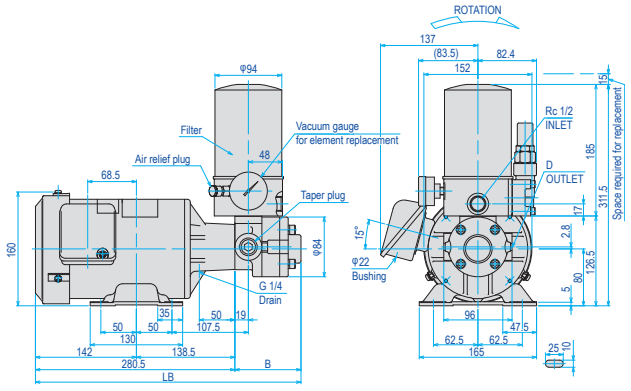
Item / Model	LB	B	C	D
204	319.5	78	10	Rc 1/2
206	324.5	83	15	
208	329.5	88	20	
210	334.5	93	25	Rc 3/4

Model : TOP-2MY400-2**HWMPVB



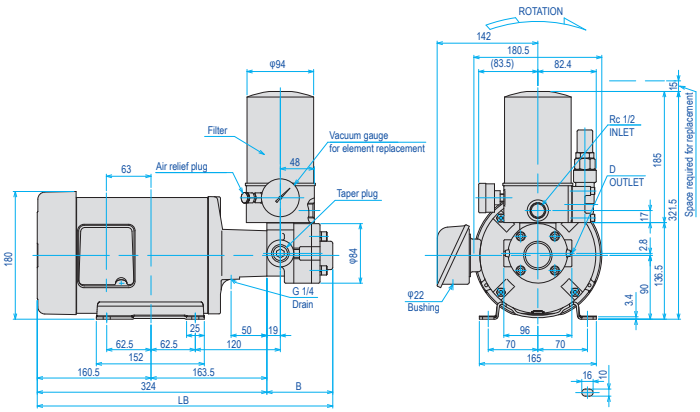
Item / Model	LB	B	C	D
204	323.5	78	10	Rc 1/2
206	328.5	83	15	
208	333.5	88	20	
210	338.5	93	25	Rc 3/4

Model : TOP-2MY750-2**HWMPVB IE3



Item / Model	LB	B	D
204	358.5	78	Rc 1/2
206	363.5	83	
208	368.5	88	
210	373.5	93	Rc 3/4

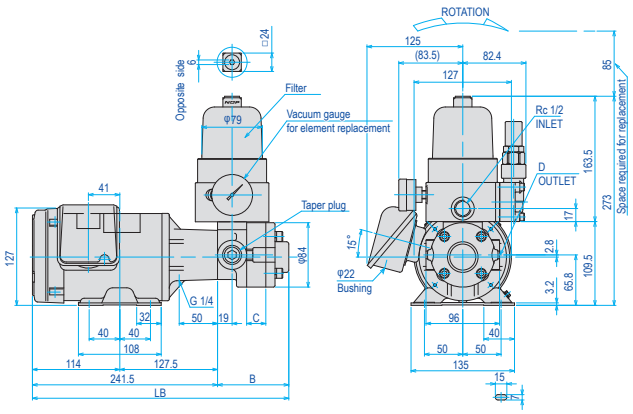
Model : TOP-2MY1500-2**HWMPVB IE3



Item / Model	LB	B	D
204	402	78	Rc 1/2
206	407	83	
208	412	88	
210	417	93	Rc 3/4

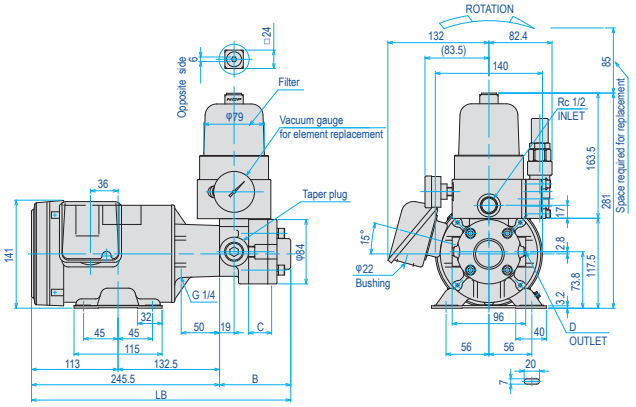
■ Dimensions (Typical) for 2MY-S Filter (Element-type, For Metal Cutting Fluid)

Model : TOP-2MY200-2**HWMPVBE



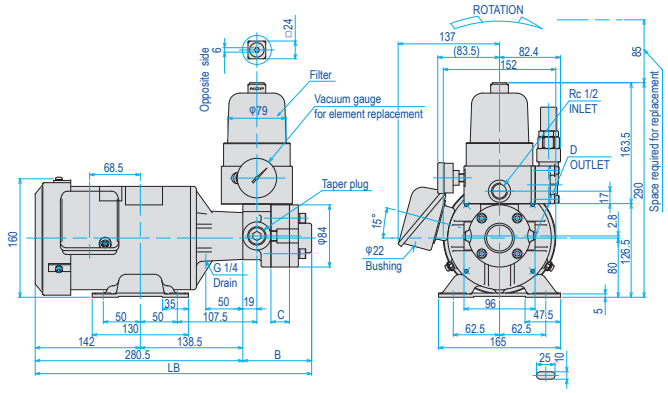
Item / Model	LB	B	C	D
204	319.5	78	10	Rc 1/2
206	324.5	83	15	
208	329.5	88	20	
210	334.5	93	25	Rc 3/4

Model : TOP-2MY400-2**HWMPVBE



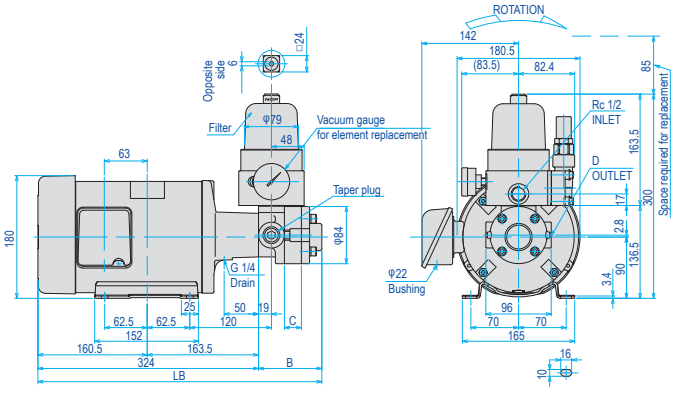
Item / Model	LB	B	C	D
204	323.5	78	10	Rc 1/2
206	328.5	83	15	
208	333.5	88	20	
210	338.5	93	25	Rc 3/4

Model : TOP-2MY750-2**HWMPVBE IE3



Item / Model	LB	B	C	D
204	358.5	78	10	Rc 1/2
206	363.5	83	15	
208	368.5	88	20	
210	373.5	93	25	Rc 3/4

Model : TOP-2MY1500-2**HWMPVBE IE3



Item / Model	LB	B	C	D
204	402	78	10	Rc 1/2
206	407	83	15	
208	412	88	20	
210	417	93	25	Rc 3/4

Any disassembly or alteration of the product will void the warranty.

2MY-S Filter

(WITH INTEGRATED 3-PHASE MOTOR)

■ Model Numbering System (For Metal Cutting Fluid)

TOP-2MY① – ②HWNPEVB – ③ – ④

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Motor Output
200/400/
750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
212/216/220

Relief Valve Set Pressure
Note: Indicated at the end of model number in 0.1 MPa units

Filter Mesh Size (Avaiable only for Element-type)
15: 150 mesh
10: 100 mesh
06: 60 mesh

■ Specifications

Model \ Item	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-212HWNPEVB	18.0	0.3	1.0	2.0	2.0	21.6	–	0.8	1.6	2.0
TOP-216HWNPEVB	24.0	0.2	0.8	1.5	2.0	28.8	–	0.6	1.2	2.0
TOP-220HWNPEVB	30.0	–	0.6	1.2	1.5	36.0	–	0.5	1.0	1.5

• Test oil: ISO-VG2/Oil temperature: 40C
• Visocisty range of pumped liquid is 2-50mm^2 /sec. The vacuum gauge will indicate over the green zone If pumped fluid exceeds the permissible viscosity range.

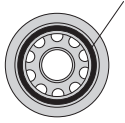
Safety precautions for the cartridge replacement

Before replacing the cartridges, make sure that there is no oil remaining inside the cartridge. You can drain the oil by loosening the air suction plug on the side of suction port (Indicated on yellow label on the case)

Note: ①Loosen the adjustment knob and hold it for 10 seconds. ②Replace the cartridges. ③After the replacment is complete, tighten the adjustment knob back in place.

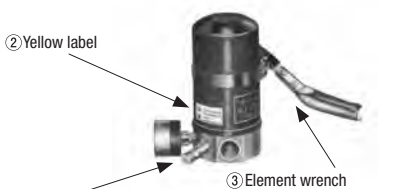
The oil remaining inside the cartridge will be released to the tank through the suction line. This process normally takes about 10 seconds before the oil is completely drained from the cartridge. Note: Make sure no check valve is installed on the suction line.

The cartridge is removable with hands by rotating it counter-clockwise and if it is still too tight, use element wrench (Available in a shop or from us). When you replace with new cartridge, tighten the cartridge onto the screw on subplate. Cartridge may draw air if it is not tight. You can tighten the cartridge more tightly by using element wrench.



Note: Do not damage O ring in the element or it may draw air.

2HBMPVB (Cartiridge type)

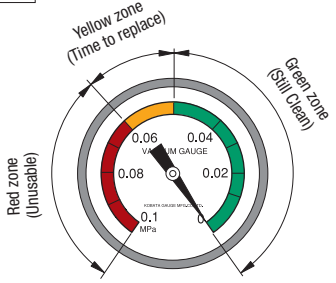


When to replace cartridge and clean element

·For cartrige type, replace the cartridges when the pointer on the pressure gauge indicates the yellow zone. Cartridge is installable and removable easily with hands.

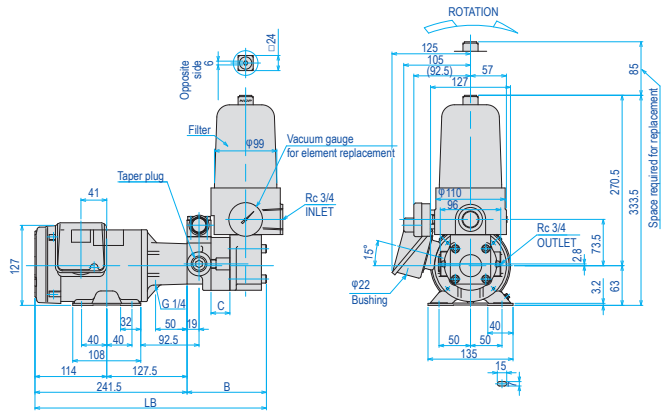
·For element type, rotate the element and remove it from the element case and clean it when the pointer on the pressure gauge indicates the yellow zone.

Vacuume gauge



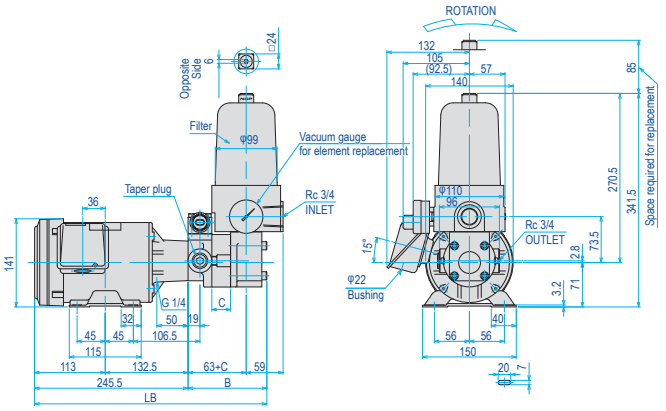
■ Dimensions (Typical) for 2MY-S Filter (Element-type, For Metal Cutting Fluid)

Model : TOP-2MY200-2**HWNPEVB



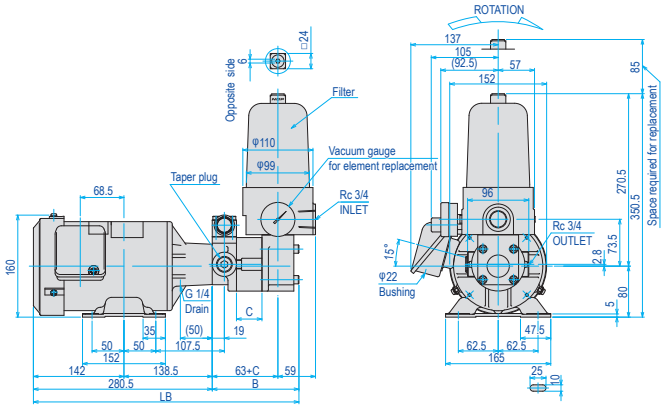
Item / Model	LB	B	C
212	367.5	126	30
216	377.5	136	40

Model : TOP-2MY400-2**HWNPEVB



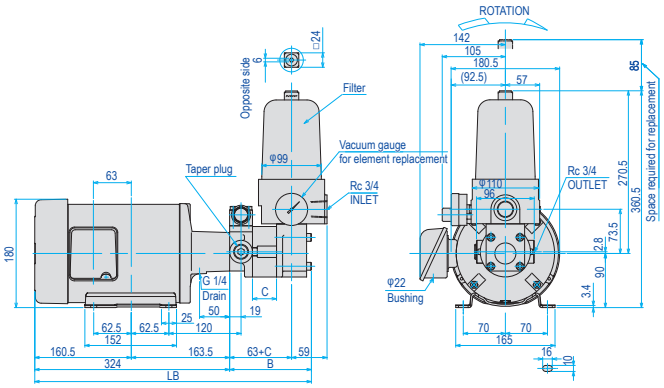
Item / Model	LB	B	C
212	371.5	126	30
216	381.5	136	40
220	391.5	146	50

Model : TOP-2MY750-2**HWNPEVB IE3



Item / Model	LB	B	C
212	406.5	126	30
216	416.5	136	40
220	426.5	146	50

Model : TOP-2MY1500-2**HWNPEVB IE3



Item / Model	LB	B	C
212	450	126	30
216	460	136	40
220	470	146	50

Any disassembly or alteration of the product will void the warranty.

2MY-W Filter

(WITH INTEGRATED 3-PHASE MOTOR)

■ Model Numbering System (For Metal Cutting Fluid)

TOP-2MY① – ②HWMDPVDE-005 – ③

Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Motor Output
200/400/750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
204/206/208/
210/212

Filter Mesh Size
15: 150 mesh
10: 100 mesh
06: 60 mesh

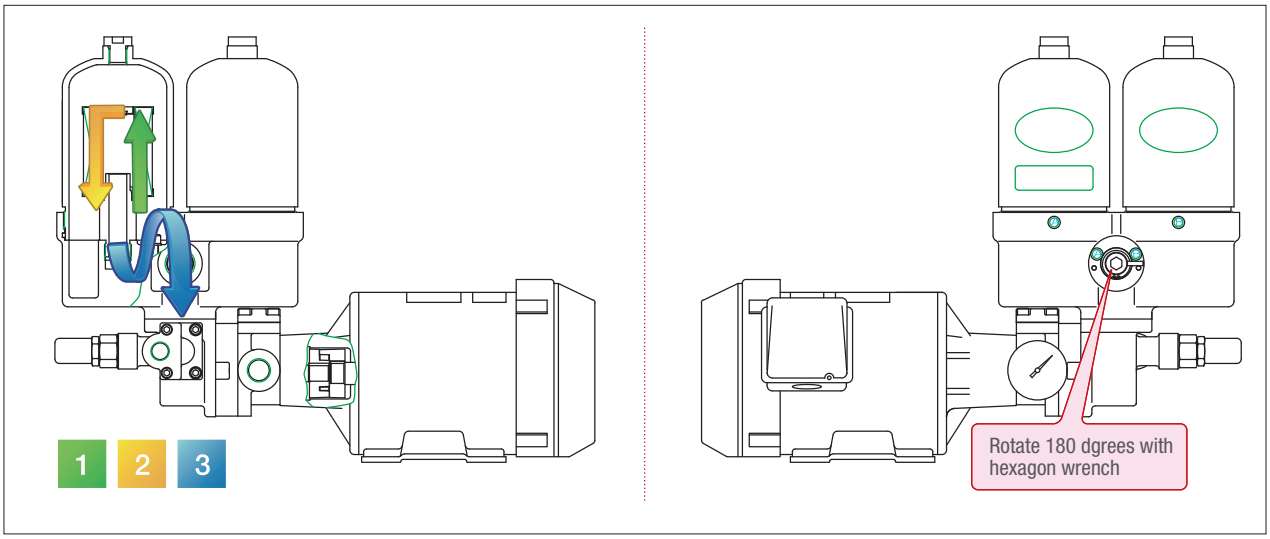
• Model no. of element filter is "351-04-*W". "*" indicates mesh size. Choose one from 60/100/150.

■ Specifications (For Metal Cutting Fluid)

Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-204HWMDPVDE	6.0	1.2	2.0	2.0	2.0	7.2	1.0	2.0	2.0	2.0
TOP-206HWMDPVDE	9.0	0.8	1.8	2.0	2.0	10.8	0.6	1.6	2.0	2.0
TOP-208HWMDPVDE	12.0	0.6	1.4	2.0	2.0	14.4	0.4	1.2	2.0	2.0
TOP-210HWMDPVDE	15.0	0.4	1.2	2.0	2.0	18.0	0.3	1.0	1.9	2.0
TOP-212HWMDPVDE	18.0	0.3	1.0	2.0	2.0	21.6	–	0.8	1.6	2.0

• Test oil: ISO-VG2/Oil temperature: 40C
• Visocisty range of pumped liquid is 2-50mm^2 /sec. The vacuum gauge will indicate over the green zone If pumped fluid exceeds the permissible viscosity range.

Flow of oil inside the filter

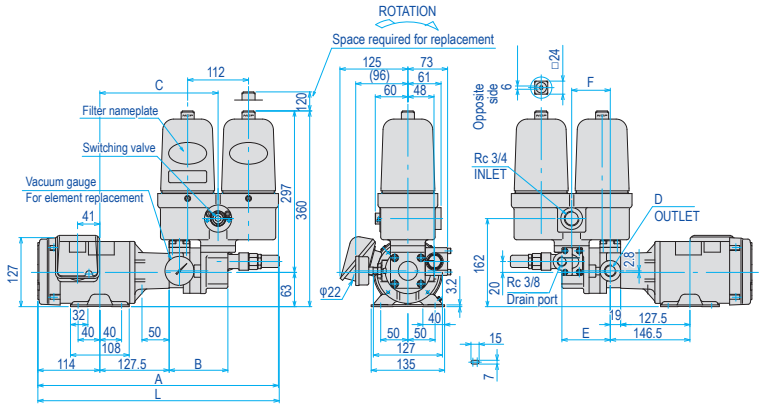


How to switch between filters

■ Dimensions (Typical) for 2MY-S Filter (Element-type For Metal Cutting Fluid)

* "Drain port Rc 3/8" is provided to drain liquid from relief valve.

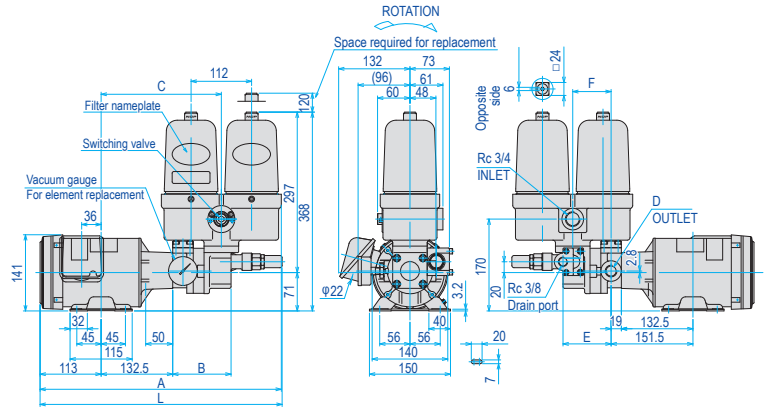
Model : TOP-2MY200□-2**HWMDPVDE-005



Model \ Item	L	A	B	C
204	434	432.5	98	207.5
206	439	437.5	103	212.5
208	444	442.5	108	217.5
210	449	447.5	113	222.5

Model \ Item	D	E	F
204	Rc 1/2	79	61
206		84	66
208		89	71
210	Rc 3/4	94	76

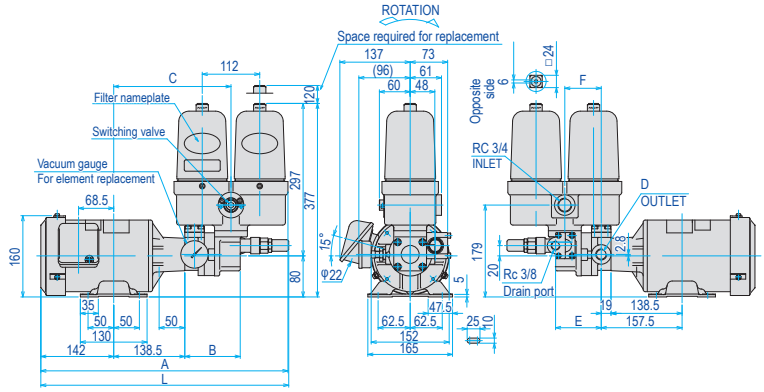
Model : TOP-2MY400□-2**HWMDPVDE-005



Model \ Item	L	A	B	C
204	438	436.5	98	212.5
206	443	441.5	103	217.5
208	448	446.5	108	222.5
210	453	451.5	113	227.5
212	458	456.5	118	232.5

Model \ Item	D	E	F
204	Rc 1/2	79	61
206		84	66
208		89	71
210	Rc 3/4	94	76
212		99	81

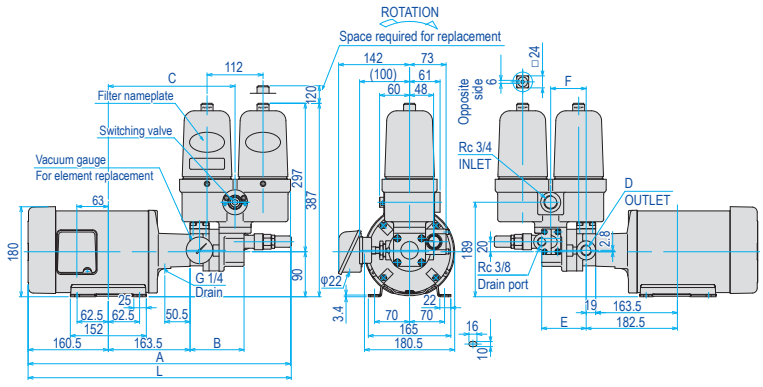
Model : TOP-2MY750-2**HWMDPVDE-005 IE3



Model \ Item	L	A	B	C
204	473	471.5	98	218.5
206	478	476.5	103	223.5
208	483	481.5	108	228.5
210	488	486.5	113	233.5
212	493	491.5	118	238.5

Model \ Item	D	E	F
204	Rc 1/2	79	61
206		84	66
208		89	71
210	Rc 3/4	94	76
212		99	81

Model : TOP-2MY1500-2**HWMDPVDE-005 IE3



Model \ Item	L	A	B	C
204	516.5	515	98	243.5
206	521.5	520	103	248.5
208	526.5	525	108	253.5
210	531.5	530	113	258.5
212	536.5	535	118	263.5

Model \ Item	D	E	F
204	Rc 1/2	79	61
206		84	66
208		89	71
210	Rc 3/4	94	76
212		99	81

Any disassembly or alteration of the product will void the warranty.

2MY-2HBM+2HB

(DUAL PUMP WITH INTEGRATED 3-PHASE MOTOR)

TOP-2MY① – ②HBM③ Relief Valve Set Pressure + ②HB③ Relief Valve Set Pressure

Motor Output
200/400/750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
Note: Pump integrated with motor
203/204/206/208/
210/212/216/220

Note: Indicated at the end of model number in 0.1 MPa units

Relief Valve
Non: No valve
VB: With VB Valve

Model
Note: Pump integrated with motor
203/204/206/208/
210/212/216/220

Note: Indicated at the end of model number in 0.1 MPa units

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

■ Specifications

Model \ Item	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})
		1500min^{-1}	1800min^{-1}		
TOP-203HBM+203HB	2.8+2.8	4.2+4.2	5.0+5.0	1.0×1.0	1800
TOP-204HBM+204HB	4.0+4.0	6.0+6.0	7.2+7.2	1.0×1.0	1800
TOP-206HBM+206HB	6.0+6.0	9.0+9.0	10.8+10.8	1.0×1.0	1800
TOP-208HBM+208HB	8.0+8.0	12.0+12.0	14.4+14.4	1.0×1.0	1800
TOP-210HBM+210HB	10.0+10.0	15.0+15.0	18.0+18.0	0.9×0.9	1800
TOP-212HBM+212HB	12.0+12.0	18.0+18.0	21.6+21.6	0.7×0.7	1800
TOP-216HBM+216HB	16.0+16.0	24.0+24.0	28.8+28.8	0.5×0.5	1800
TOP-220HBM+220HB	20.0+20.0	30.0+30.0	36.0+36.0	0.4×0.4	1800

■ Motor Specifications

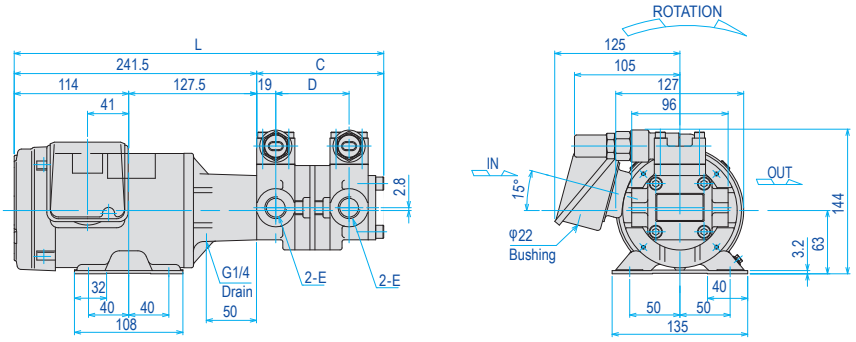
•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation (200W, 400W)
•Class F insulation (750W, 1500W) •Protection level IP44

Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
200	4	Cont	200 200 220	50 60 60	1440 1720 1730	1.34 1.12 1.17	380 400 400 440	50 50 60 60	1440 1440 1720 1740	0.64 0.67 0.56 0.58	6.5
400	4	Cont	200 200 220	50 60 60	1420 1710 1730	2.20 1.93 1.95	380 400 400 440	50 50 60 60	1420 1430 1710 1730	1.08 1.11 0.96 0.97	9.0
750	4	Cont	200 200 220	50 60 60	1440 1720 1740	3.30 3.10 3.00	400 400 440	50 60 60	1440 1730 1760	1.77 1.61 1.57	14.0
1500	4	Cont	200 200 220	50 60 60	1450 1740 1750	6.90 6.20 6.00	400 400 440	50 60 60	1450 1740 1750	3.40 3.10 3.00	22.0

• Please consult us when ordering outdoor-type, increased safety-type, spcecial vlotage type or one with CE marking, terminal box attched on the other side, or other special motors.
• 750W and 1500W motors comly with requirements of IE3, CE marking and class F insulation. *Please consult us if motor other than for standard volatage is required.

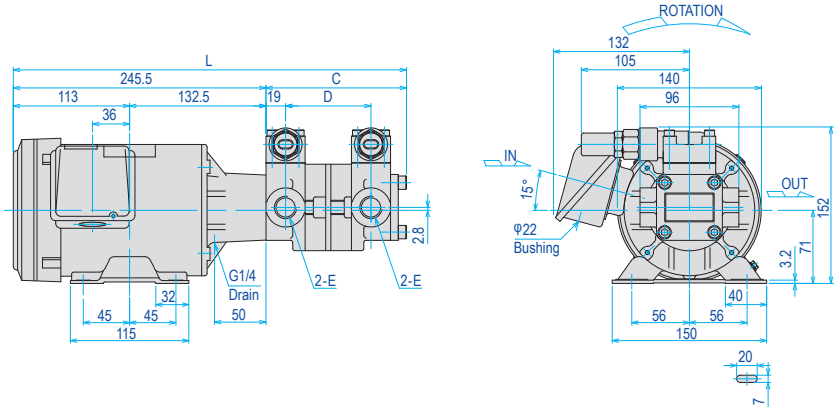
■ Dimensions (Typical) for 2MY-2HBM+2HB

Model : TOP-2MY200-2**HBMVB+2**HBVB



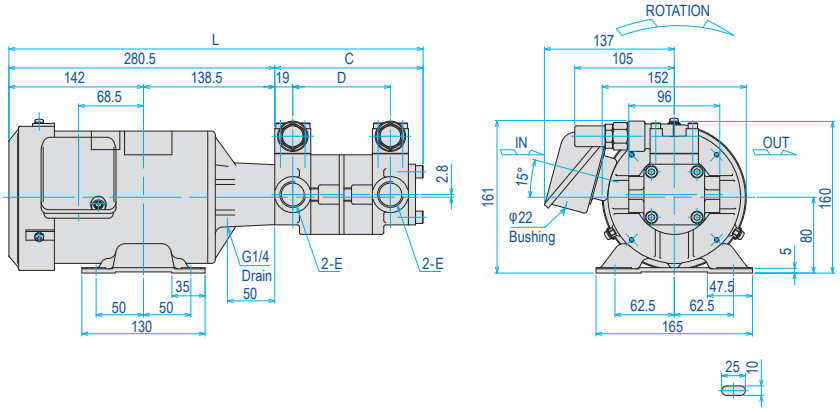
Item / Model	L	C	D	E
203	352	110.5	57	Rc 1/2
204	358	116.5	63	
206	368	126.5	73	

Model : TOP-2MY400-2**HBMVB+2**HBVB



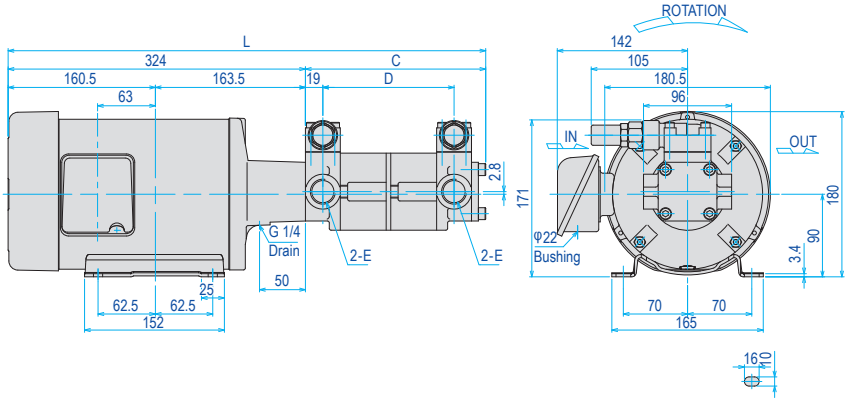
Item / Model	L	C	D	E
203	356	110.5	57	Rc 1/2
204	362	116.5	63	
206	372	126.5	73	
208	382	136.5	83	
210	392	146.5	93	Rc 3/4
212	402	156.5	103	
216	422	176.5	123	
216	442	196.5	143	

Model : TOP-2MY750-2**HBMVB+2**HBVB IE3



Item / Model	L	C	D	E
203	391	110.5	57	Rc 1/2
204	397	116.5	63	
206	407	126.5	73	
208	417	136.5	83	
210	427	146.5	93	Rc 3/4
212	437	156.5	103	
216	457	176.5	123	
216	477	196.5	143	

Model : TOP-2MY1500-2**HBMVB+2**HBVB IE3



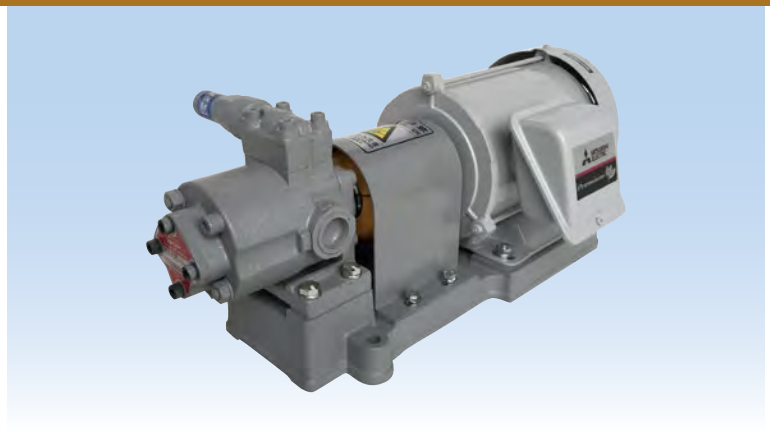
Item / Model	L	C	D	E
203	434.5	110.5	57	Rc 1/2
204	440.5	116.5	63	
206	450.5	126.5	73	
208	460.5	136.5	83	
210	470.5	146.5	93	Rc 3/4
212	480.5	156.5	103	
216	500.5	176.5	123	
216	520.5	196.5	143	

Any disassembly or alteration of the product will void the warranty.

2MB

(BASE-COUPLING MOUNT TYPE)

2HB 2HT



■ Model Numbering System (For General Lubricant Oil)

TOP-2MB① ② – ③HB④ ⑤ ⑥ – ⑦

Relief Valve Set Pressure — If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.
Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
200/400/750/
1500/2200
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
203/204/206/208/
210/212/216/220

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VH/VV/US/UT

■ Model Numbering System (For Diesel Oil Kerosene Heavy Oil)

TOP-2MB① ② – ③HT④ ⑤ ⑥

Relief Valve Set Pressure — If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.
Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
200/400/750/1500
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

Model
203/204/206/208/
210/212/216/220

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve

■ Specifications

Model \ Item	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1500min^{-1} Max. pressure for motor output (MPa) 200W	400W	750W	1500W	2200W	Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min^{-1} Max. pressure for motor output (MPa) 200W	400W	750W	1500W	2200W
TOP-203HB	4.2	1.7	3.0	3.0	3.0	3.0	5.0	1.3	3.0	3.0	3.0	3.0
TOP-204HB	6.0	1.2	3.0	3.0	3.0	3.0	7.2	0.9	2.3	3.0	3.0	3.0
TOP-206HB	9.0	0.7	1.8	2.5	2.5	2.5	10.8	0.5	1.4	2.5	2.5	2.5
TOP-208HB	12.0	0.5	1.3	2.5	2.5	2.5	14.4	0.3	1.0	2.3	2.5	2.5
TOP-210HB	15.0	0.4	1.1	2.5	2.5	2.5	18.0	0.3	0.9	2.0	2.5	2.5
TOP-212HB	18.0	0.3	0.9	2.0	2.0	2.0	21.6	–	0.7	1.6	2.0	2.0
TOP-216HB	24.0	0.2	0.7	1.5	1.5	1.5	28.8	–	0.5	1.2	1.5	1.5
TOP-220HB	30.0	–	0.4	1.2	1.2	1.2	36.0	–	0.3	0.9	1.2	1.2

• Test oil : ISO-VG46/Oil temperature : 40C
• TOP-2HB is the updated series of TOP-2HA. It is also compatible with old series in performance and mounting dimensions. Only the port type was changed from G to Rc type.

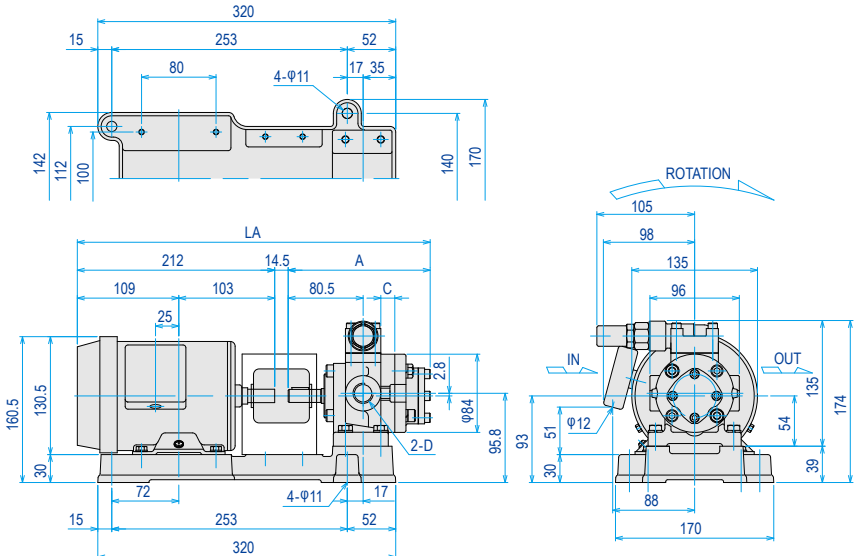
■ Specifications

Model \ Item	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1500min^{-1} Max. pressure for motor output (MPa) 200W	400W	750W	Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min^{-1} Max. pressure for motor output (MPa) 200W	400W	750W
TOP-203HT	4.2	0.7	0.7	0.7	5.0	0.7	0.7	0.7
TOP-204HT	6.0	0.7	0.7	0.7	7.2	0.7	0.7	0.7
TOP-206HT	9.0	0.7	0.7	0.7	10.8	0.6	0.7	0.7
TOP-208HT	12.0	0.6	0.7	0.7	14.4	0.4	0.7	0.7
TOP-210HT	15.0	0.5	0.7	0.7	18.0	0.3	0.7	0.7
TOP-212HT	18.0	0.4	0.7	0.7	21.6	–	0.7	0.7
TOP-216HT	24.0	0.3	0.7	0.7	28.8	–	0.6	0.7
TOP-220HT	30.0	–	0.6	0.7	36.0	–	0.5	0.7

• Test oil: ISO-VG2/Oil temperature: 40C

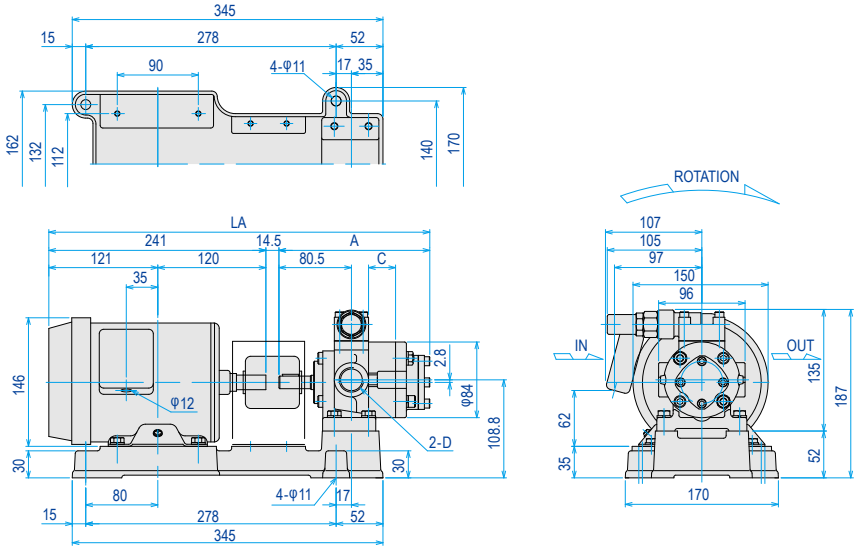
■ Dimensions (Typical) for 2MB

Model : TOP-2MBT200-2**HBVB-** / TOP-2MBT200-2**HTVB



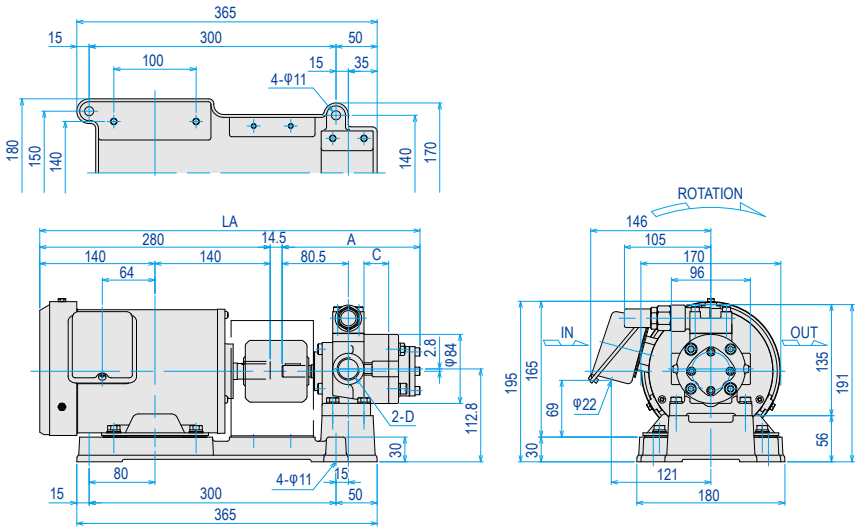
Item / Model	LA	A	C	D
203	371	144.5	7	Rc 1/2
204	374	147.5	10	
206	379	152.5	15	
208	384	157.5	20	
210	389	162.5	25	Rc 3/4
212	394	167.5	30	
216	404	177.5	40	

Model : TOP-2MBT400-2**HBVB-** / TOP-2MBT400-2**HTVB



Item / Model	LA	A	C	D
203	400	144.5	7	Rc 1/2
204	403	147.5	10	
206	408	152.5	15	
208	413	157.5	20	
210	418	162.5	25	Rc 3/4
212	423	167.5	30	
216	433	177.5	40	
220	443	187.5	50	

Model : TOP-2MBT750-2**HBVB-** IE3 / TOP-2MBT750-2**HTVB IE3

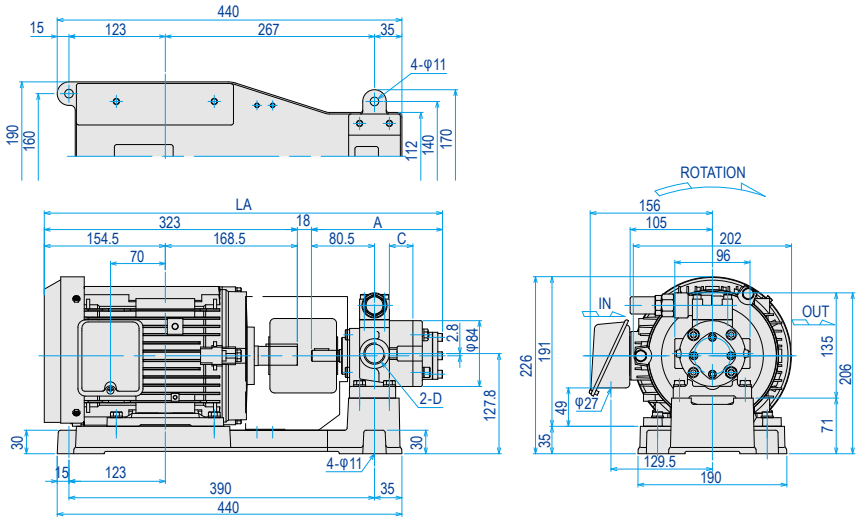


Item / Model	LA	A	C	D
203	439	144.5	7	Rc 1/2
204	442	147.5	10	
206	447	152.5	15	
208	452	157.5	20	
210	457	162.5	25	Rc 3/4
212	462	167.5	30	
216	472	177.5	40	
220	482	187.5	50	

Any disassembly or alteration of the product will void the warranty.

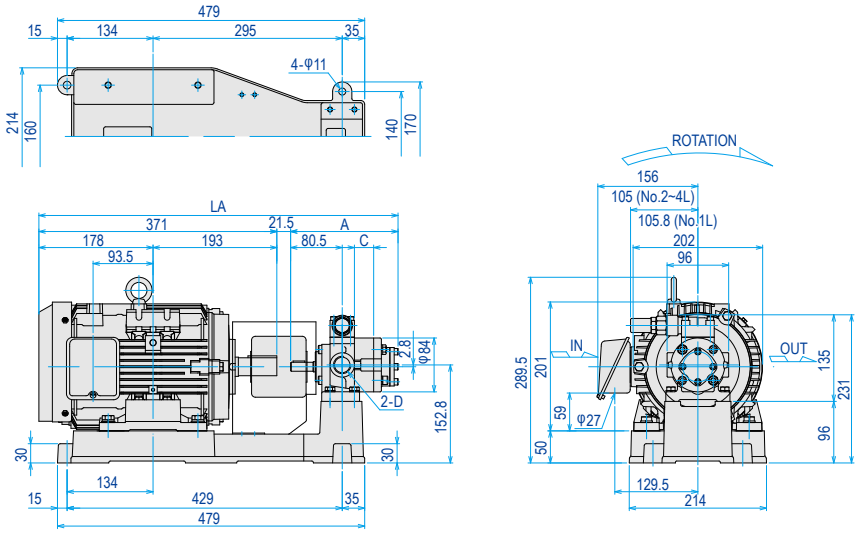
■ Dimensions (Typical) for 2MB

Model : TOP-2MBT1500-2HBVB-** IE3 / TOP-2MBT1500-2**HTVB IE3**



Item / Model	LA	A	C	D
203	485.5	144.5	7	Rc 1/2
204	488.5	147.5	10	
206	493.5	152.5	15	
208	498.5	157.5	20	
210	503.5	162.5	25	Rc 3/4
212	508.5	167.5	30	
216	518.5	177.5	40	
220	528.5	187.5	50	

Model : TOP-2MBT2200-2HBVB-** IE3 / TOP-2MBT2200-2**HTVB IE3**



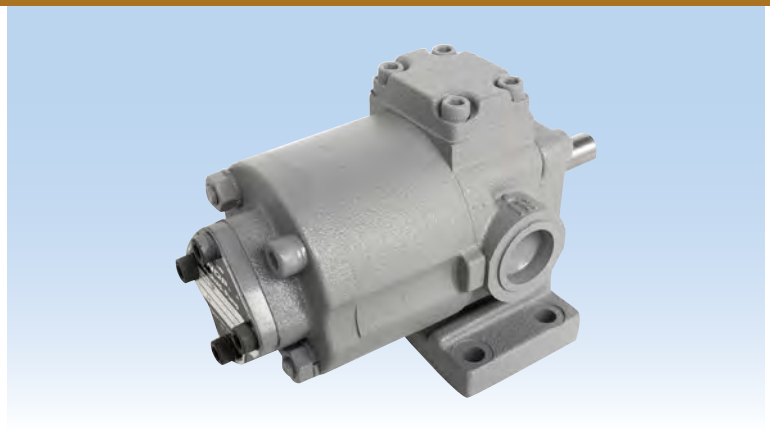
Item / Model	LA	A	C	D
203	500	144.5	7	Rc 1/2
204	540	147.5	10	
206	545	152.5	15	
208	550	157.5	20	
210	555	162.5	25	Rc 3/4
212	560	167.5	30	
216	570	177.5	40	
220	580	187.5	50	

2HB/2HT

(PUMPHEAD)

2HB

2HT



■ Model Numbering System (For General Lubricant Oil)

TOP-①HB② ③ ④ ⑤ – ⑥ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
203/204/
206/208/
210/212/
216/220

Attachment
Non: Angle plate
F: Square flange

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VF/VH/VV/US/UT

■ Model Numbering System (For Low Viscosity Oil Diesel Oil Kerosene Heavy Oil)

TOP-①HT② ③ ④ ⑤ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
203/204/206/208/
210/212/216/220

Attachment
Non: Angle plate
F: Square flange

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve
(External return-type)

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-203HB	2.8	4.2	5.0	3.0	3000	3.5 (3.9)
TOP-204HB	4.0	6.0	7.2	3.0	3000	3.6 (4.0)
TOP-206HB	6.0	9.0	10.8	2.5	2500	3.8 (4.2)
TOP-208HB	8.0	12.0	14.4	2.5	2500	4.0 (4.4)
TOP-210HB	10.0	15.0	18.0	2.5	2500	4.1 (4.6)
TOP-212HB	12.0	18.0	21.6	2.0	2000	4.3 (4.7)
TOP-216HB	16.0	24.0	28.8	1.5	1800	4.6 (5.1)
TOP-220HB	20.0	30.0	36.0	1.2	1800	5.0 (5.5)

• Test oil: ISO-VG46/Oil temperature: 40C • Values in ( ) show approx. weights of the pump when the valve is attached.
• TOP-2HB is the updated series of TOP-2HA. It is also compatible with the old series in performance and mounting dimensions. Only the port thread type was changed from G to Rc type.

■ Specifications

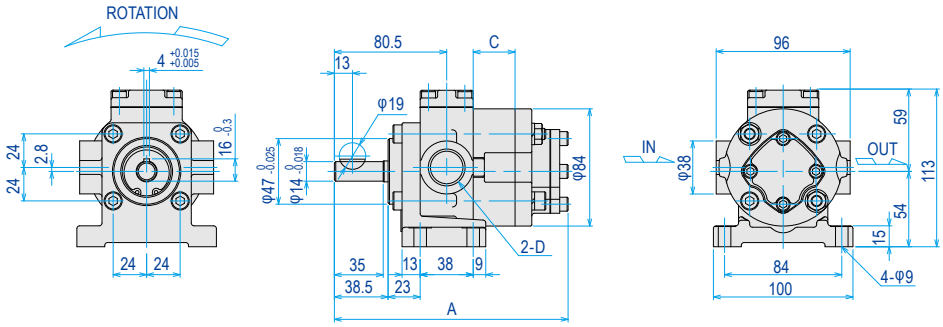
Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-203HT	2.8	4.2	5.0	0.7	1800	3.5 (3.9)
TOP-204HT	4.0	6.0	7.2	0.7	1800	3.6 (4.0)
TOP-206HT	6.0	9.0	10.8	0.7	1800	3.8 (4.2)
TOP-208HT	8.0	12.0	14.4	0.7	1800	4.0 (4.4)
TOP-210HT	10.0	15.0	18.0	0.7	1800	4.1 (4.6)
TOP-212HT	12.0	18.0	21.6	0.7	1800	4.3 (4.7)
TOP-216HT	16.0	24.0	28.8	0.7	1800	4.6 (5.1)
TOP-220HT	20.0	30.0	36.0	0.7	1800	5.0 (5.5)

• Test oil: ISO-VG2/Oil temperature: 40C
• Values in ( ) show approx. weights of the pump when the valve is attached.

Any disassembly or alteration of the product will void the warranty.

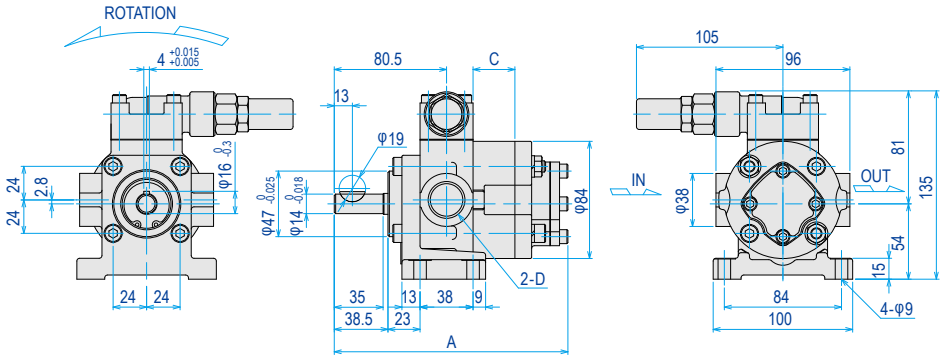
■ Dimensions (Typical) for 2HB/2HT

Model : TOP-2**HB-** / TOP-2**HT



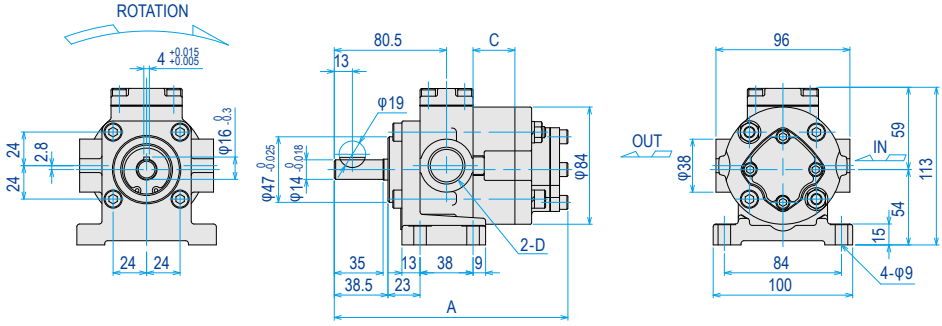
Item / Model	A	C	D
203	144.5	7	Rc 1/2
204	147.5	10	
206	152.5	15	
208	157.5	20	
210	162.5	25	Rc 3/4
212	167.5	30	
216	177.5	40	
220	187.5	50	

Model : TOP-2**HBVB-** / TOP-2**HTVB



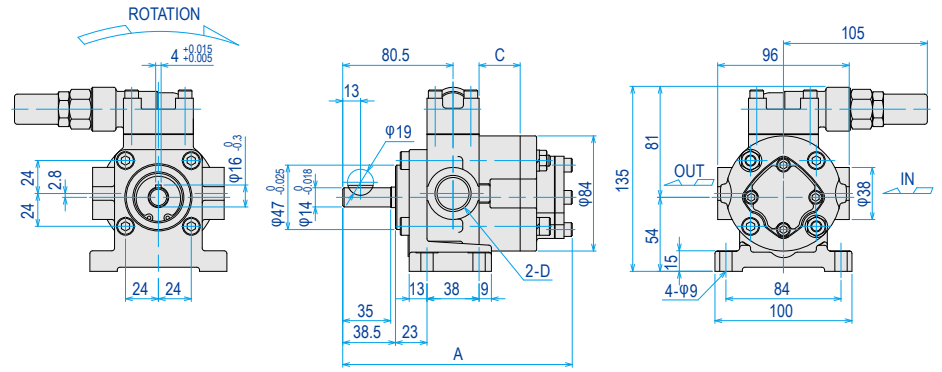
Item / Model	A	C	D
203	144.5	7	Rc 1/2
204	147.5	10	
206	152.5	15	
208	157.5	20	
210	162.5	25	Rc 3/4
212	167.5	30	
216	177.5	40	
220	187.5	50	

Model : TOP-2**HBR-** / TOP-2**HTR



Item / Model	A	C	D
203	144.5	7	Rc 1/2
204	147.5	10	
206	152.5	15	
208	157.5	20	
210	162.5	25	Rc 3/4
212	167.5	30	
216	177.5	40	
220	187.5	50	

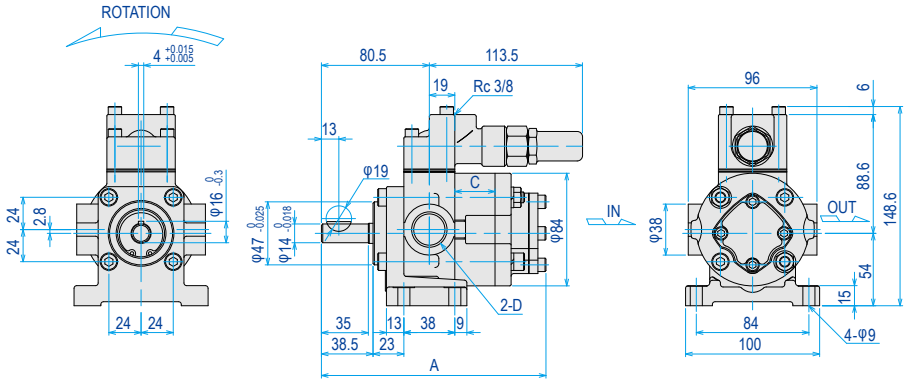
Model : TOP-2**HBRVB-** / TOP-2**HTRVB



Item / Model	A	C	D
203	144.5	7	Rc 1/2
204	147.5	10	
206	152.5	15	
208	157.5	20	
210	162.5	25	Rc 3/4
212	167.5	30	
216	177.5	40	
220	187.5	50	

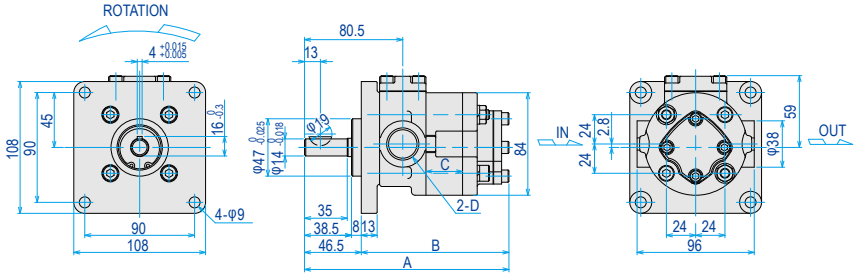
■ Dimensions (Typical) for 2HB/2HT

Model : TOP-2**HBVD-** / TOP-2**HTVD



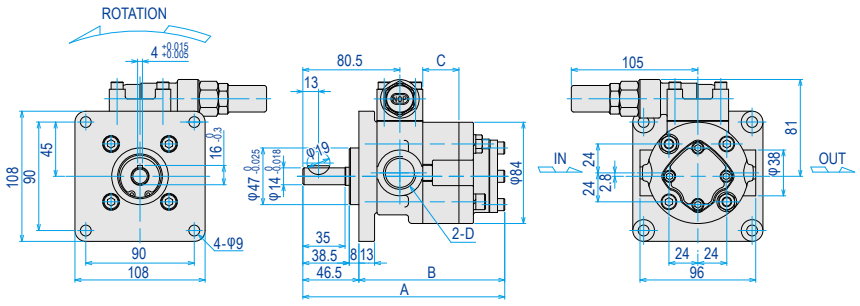
Item / Model	A	C	D
203	144.5	7	Rc 1/2
204	147.5	10	
206	152.5	15	
208	157.5	20	
210	162.5	25	Rc 3/4
212	167.5	30	
216	177.5	40	
220	187.5	50	

Model : TOP-2**HBF-** / TOP-2**HTF



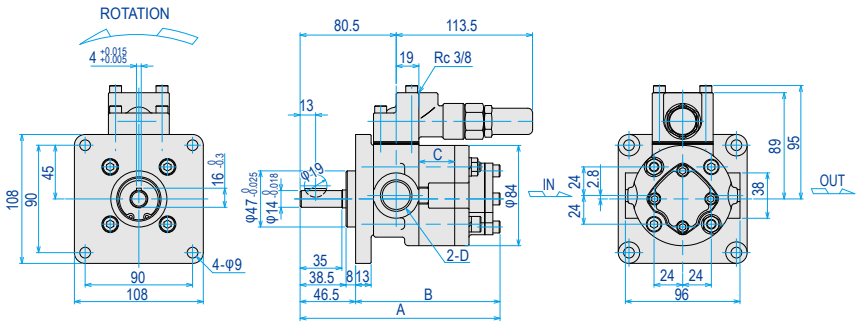
Item / Model	A	B	C	D
203	144.5	98	7	Rc 1/2
204	147.5	101	10	
206	152.5	106	15	
208	157.5	111	20	
210	162.5	116	25	Rc 3/4
212	167.5	121	30	
216	177.5	131	40	
220	187.5	141	50	

Model : TOP-2**HBFVB-** / TOP-2**HTFVB



Item / Model	A	B	C	D
203	144.5	98	7	Rc 1/2
204	147.5	101	10	
206	152.5	106	15	
208	157.5	111	20	
210	162.5	116	25	Rc 3/4
212	167.5	121	30	
216	177.5	131	40	
220	187.5	141	50	

Model : TOP-2**HBFVD-** / TOP-2**HTFVD



Item / Model	A	B	C	D
203	144.5	98	7	Rc 1/2
204	147.5	101	10	
206	152.5	106	15	
208	157.5	111	20	
210	162.5	116	25	Rc 3/4
212	167.5	121	30	
216	177.5	131	40	
220	187.5	141	50	

Any disassembly or alteration of the product will void the warranty.

2HBM/ 2HTM/2HWM

(PUMPHEAD FOR 2MY-MOTOR)

3.0 2HBM

3.0 2HTM

2.0 2HWM

■ Model Numbering System

TOP-①H②M③④⑤–⑥ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
203/204/
206/208/
210/212/
216/220

B: General Lubricant Oil
T: Low Viscosity Oil, Diesel Oil/Kerosene/ Heavy Oil

Port Type
Non: Rc (Standard)
G: G

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve (External return-type)

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/US/UT
Note: ⑥ (Seal & Gasket Options) will be blank if selecting the option "T" for ② ("T" type has no material option)

■ Model Numbering System (For Metal-Cutting Fluid)

TOP-①HWM② ③ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
203/204/206/208/
210/212/216/220

Port Type
Non: Rc (Standard)
G: G

Relief Valve
Non: No valve
VB: With VB Valve
VD: With VD Valve (External return-type)

Note: 2HBM and 2HWM series come with 2MY coupling and screws for the attachment.

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-203HBM	2.8	4.2	5.0	3.0	3000	2.5 (3.2)
TOP-204HBM	4.0	6.0	7.2	3.0	3000	2.6 (3.3)
TOP-206HBM	6.0	9.0	10.8	2.5	2500	2.8 (3.5)
TOP-208HBM	8.0	12.0	14.4	2.5	2500	3.0 (3.7)
TOP-210HBM	10.0	15.0	18.0	2.5	2500	3.1 (3.8)
TOP-212HBM	12.0	18.0	21.6	2.0	2000	3.3 (4.0)
TOP-216HBM	16.0	24.0	28.8	1.5	1800	3.7 (4.4)
TOP-220HBM	20.0	30.0	36.0	1.2	1800	4.0 (4.7)

- Test oil: ISO-VG46/Oil temperature: 40C
- Values in ( ) show approx. weights of the pump when the valve is attached.
- TOP-2HB is the updated series of TOP-2HA. TOP-2HB is also compatible with the old series in performance and mounting dimensions. Only the port thread type was changed from G to Rc type.

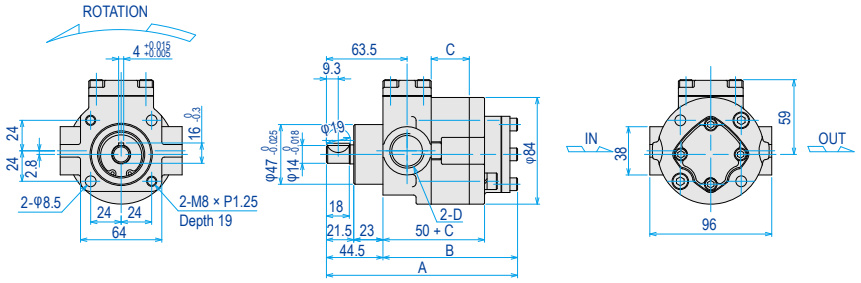
■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-204HWM	4.0	6.0	7.2	2.0	1800	2.6 (3.3)
TOP-206HWM	6.0	9.0	10.8	2.0	1800	2.8 (3.5)
TOP-208HWM	8.0	12.0	14.4	2.0	1800	3.0 (3.7)
TOP-210HWM	10.0	15.0	18.0	2.0	1800	3.1 (3.8)
TOP-212HWM	12.0	18.0	21.6	2.0	1800	3.3 (4.0)
TOP-216HWM	16.0	24.0	28.8	2.0	1800	3.7 (4.4)
TOP-220HWM	20.0	30.0	36.0	1.5	1800	4.0 (4.7)

- Test oil: ISO-VG2/Oil temperature: 40C
- Values in ( ) show approx. weights of the pump when the valve is attached.

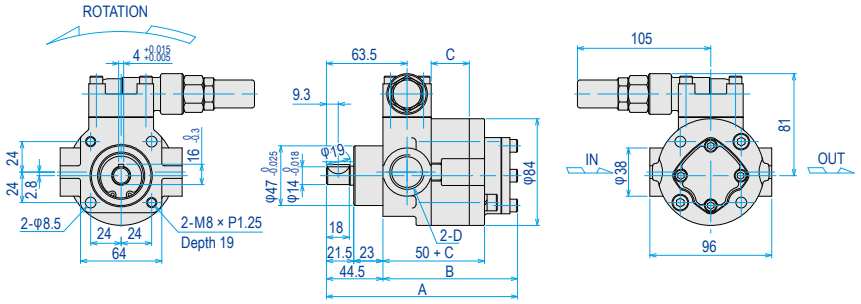
■ Dimensions (Typical) for 2HBM/2HTM/2HWM

Model : TOP-2**HBM-** / TOP-2**HTM



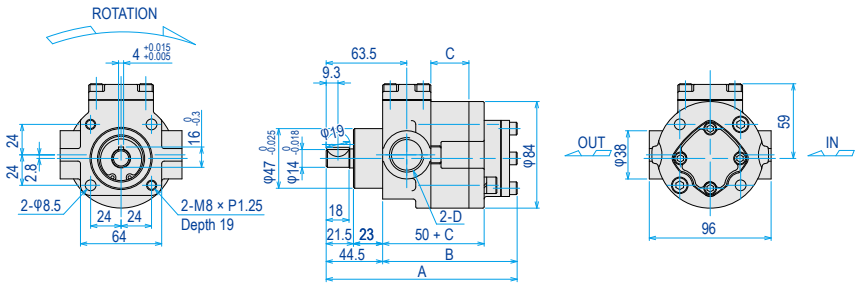
Item / Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	
210	145.5	101	25	Rc 3/4
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

Model : TOP-2**HBMVB-** / TOP-2**HTMVB



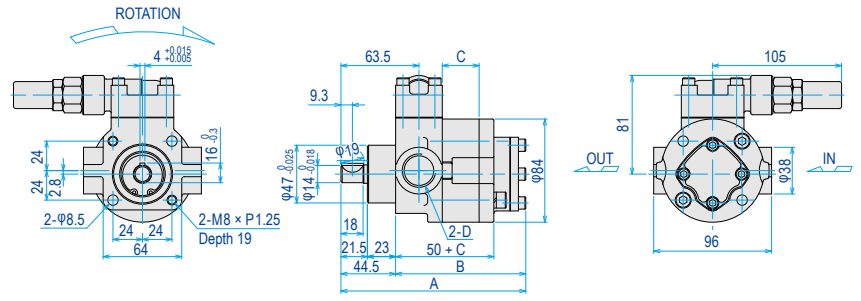
Item / Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	
210	145.5	101	25	Rc 3/4
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

Model : TOP-2**HBMR-** / TOP-2**HTMR**



Item / Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	
210	145.5	101	25	Rc 3/4
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

Model : TOP-2**HBMRVB-** / TOP-2**HTMRVB**

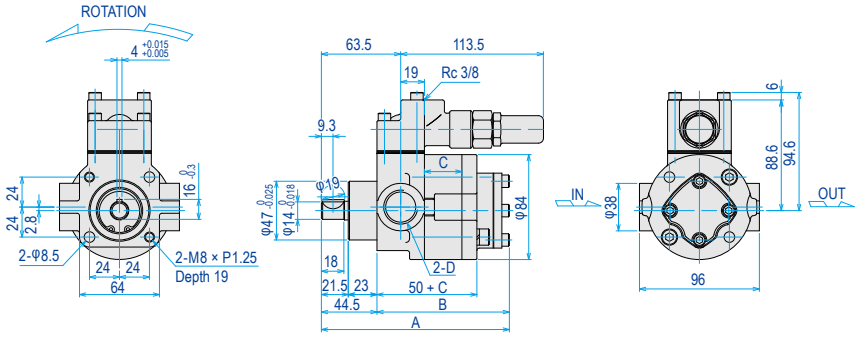


Item / Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	
210	145.5	101	25	Rc 3/4
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

Any disassembly or alteration of the product will void the warranty.

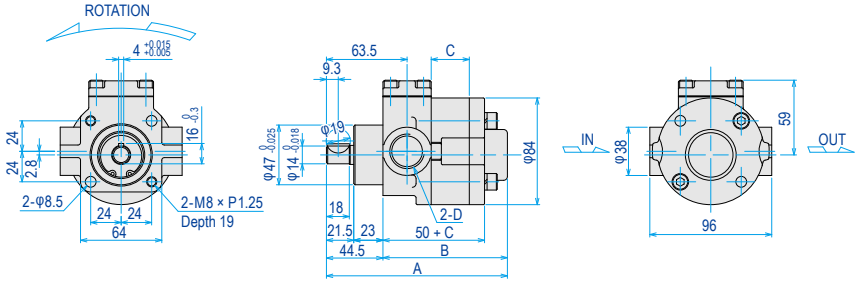
■ Dimensions (Typical) for 2HBM/2HTM/2HWM

Model : TOP-2**HBMVD-** / TOP-2**HTMVD



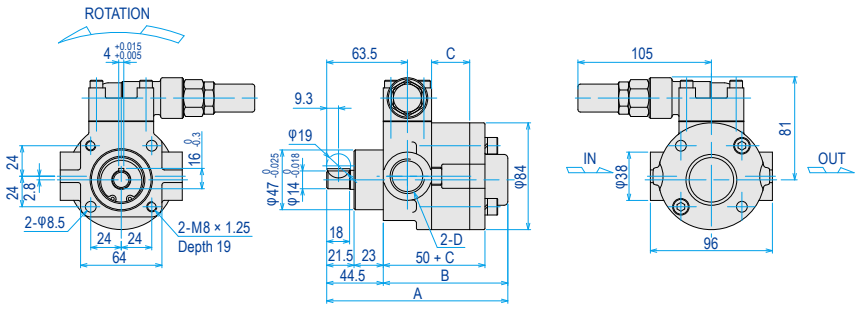
Item / Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	
210	145.5	101	25	Rc 3/4
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

Model : TOP-2**HWM



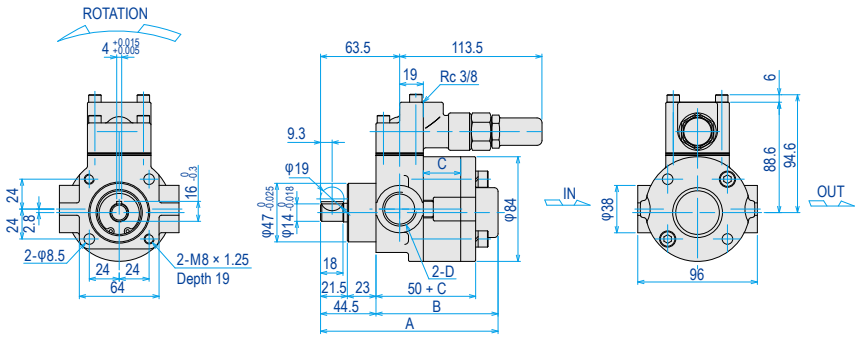
Item / Model	A	B	C	D
204	122.5	78	10	Rc 1/2
206	127.5	83	15	
208	132.5	88	20	
210	137.5	93	25	Rc 3/4
212	142.5	98	30	
216	152.5	108	40	
220	162.5	118	50	

Model : TOP-2**HWMVB



Item / Model	A	B	C	D
204	122.5	78	10	Rc 1/2
206	127.5	83	15	
208	132.5	88	20	
210	137.5	93	25	Rc 3/4
212	142.5	98	30	
216	152.5	108	40	
220	162.5	118	50	

Model : TOP-2**HWMVD



Item / Model	A	B	C	D
204	122.5	78	10	Rc 1/2
206	127.5	83	15	
208	132.5	88	20	
210	137.5	93	25	Rc 3/4
212	142.5	98	30	
216	152.5	108	40	
220	162.5	118	50	

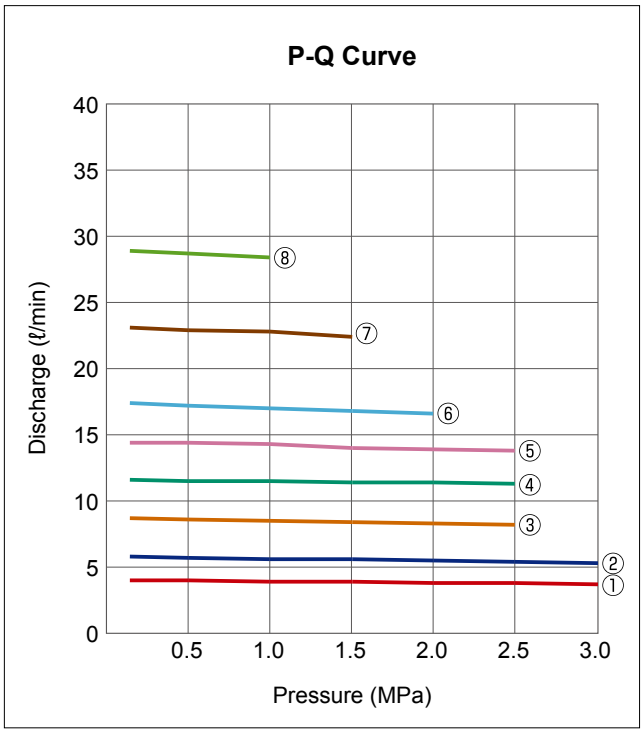
2HB(M) Performance Curve

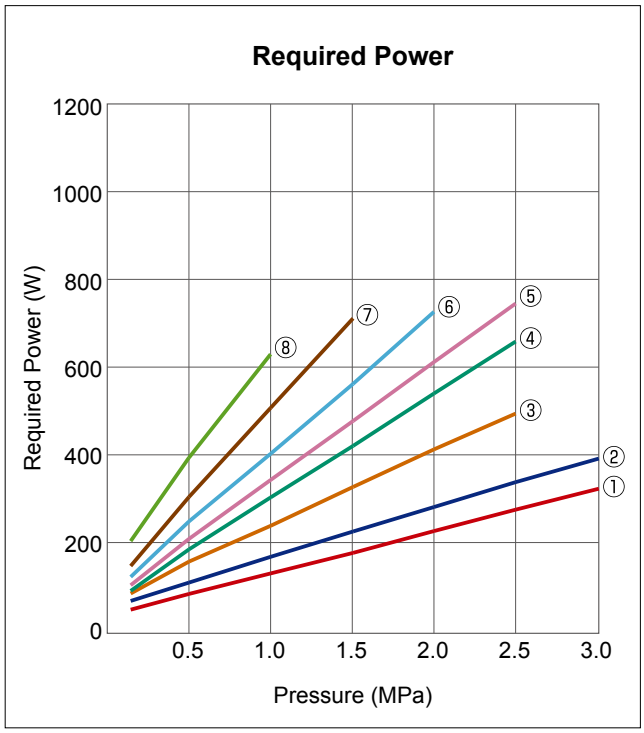
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①203HB　②204HB　③206HB　④208HB
⑤210HB　⑥212HB　⑦216HB　⑧220HB





Item / Model	Discharge (ℓ/min) Pressure (MPa)							Required Power (W) Pressure (MPa)						
	0.1	0.5	1.0	1.5	2.0	2.5	3.0	0.1	0.5	1.0	1.5	2.0	2.5	3.0
TOP-203HB	4.0	4.0	3.9	3.9	3.8	3.8	3.7	48	84	131	178	228	277	325
TOP-204HB	5.8	5.7	5.6	5.6	5.5	5.4	5.3	68	110	169	227	283	340	394
TOP-206HB	8.7	8.6	8.5	8.4	8.3	8.2		85	158	240	329	415	497	
TOP-208HB	11.6	11.5	11.5	11.4	11.4	11.3		91	186	305	423	543	662	
TOP-210HB	14.4	14.4	14.3	14.0	13.9	13.8		104	210	345	480	615	749	
TOP-212HB	17.4	17.2	17.0	16.8	16.6			123	250	405	565	730		
TOP-216HB	23.1	22.9	22.8	22.4				148	306	510	715			
TOP-220HB	28.9	28.7	28.4					205	396	633				

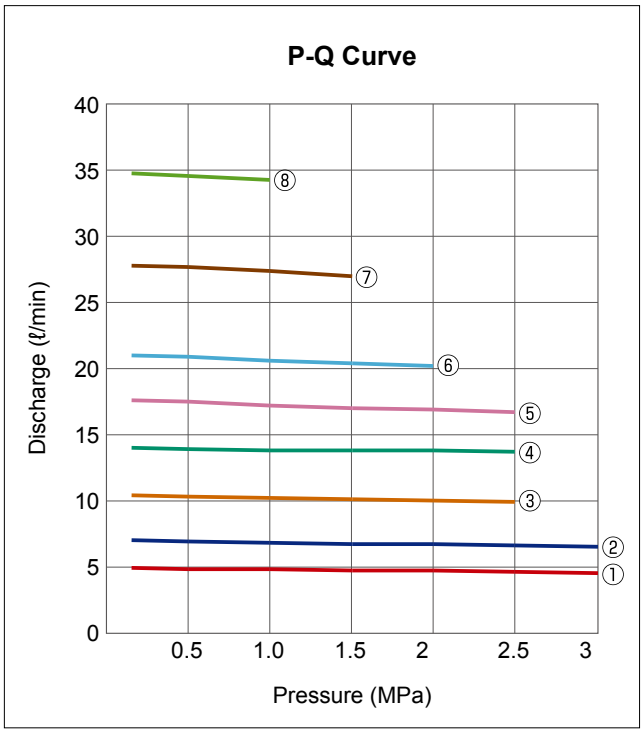
Any disassembly or alteration of the product will void the warranty.

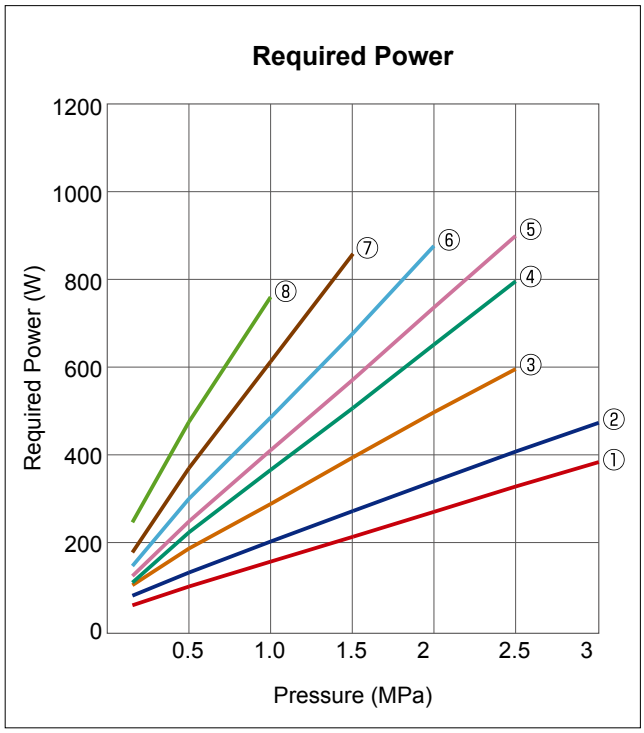
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①203HB　②204HB　③206HB　④208HB
⑤210HB　⑥212HB　⑦216HB　⑧220HB





Item / Model	Discharge (ℓ/min) Pressure (MPa)							Required Power (W) Pressure (MPa)						
	0.1	0.5	1.0	1.5	2.0	2.5	3.0	0.1	0.5	1.0	1.5	2.0	2.5	3.0
TOP-203HB	4.9	4.8	4.8	4.7	4.7	4.6	4.5	58	101	158	215	272	330	386
TOP-204HB	7.0	6.9	6.8	6.7	6.7	6.6	6.5	80	133	204	274	342	410	476
TOP-206HB	10.4	10.3	10.2	10.1	10.0	9.9		104	188	290	397	500	599	
TOP-208HB	14.0	13.9	13.8	13.8	13.8	13.7		110	225	368	510	655	800	
TOP-210HB	17.6	17.5	17.2	17.0	16.9	16.7		125	250	413	575	740	904	
TOP-212HB	21.0	20.9	20.6	20.4	20.2			148	302	488	681	881		
TOP-216HB	27.8	27.7	27.4	27.0				179	372	616	863			
TOP-220HB	34.8	34.6	34.3					248	478	764				

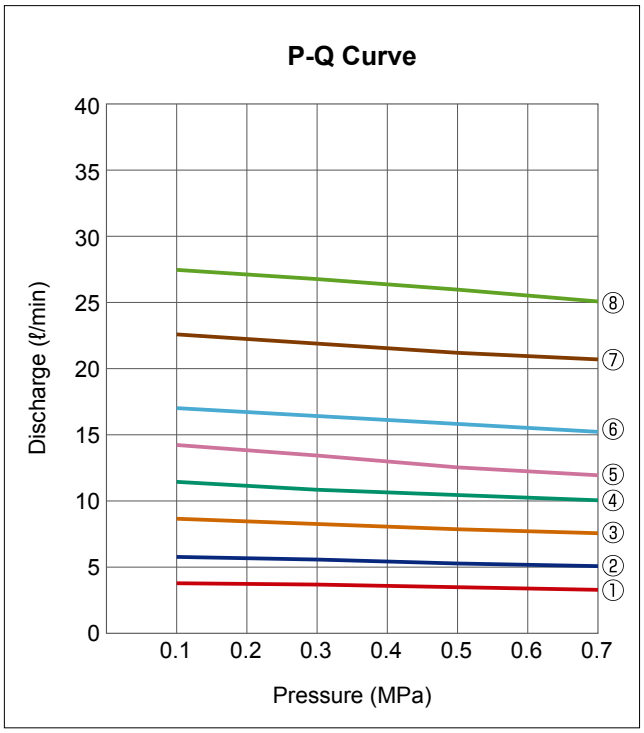
2HT(M) Performance Curve

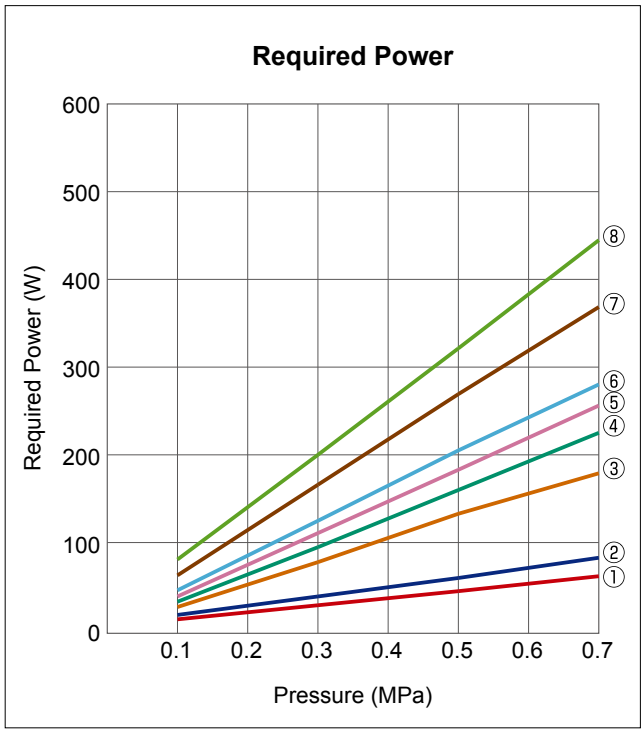
Test Oil: ISO-VG2　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①203HT ②204HT ③206HT ④208HT
⑤210HT ⑥212HT ⑦216HT ⑧220HT





Item / Model	Discharge (ℓ/min) Pressure (MPa)				Required Power (W) Pressure (MPa)			
	0.1	0.3	0.5	0.7	0.1	0.3	0.5	0.7
TOP-203HT	3.7	3.6	3.4	3.2	15	31	47	64
TOP-204HT	5.7	5.5	5.2	5.0	20	41	62	85
TOP-206HT	8.6	8.2	7.8	7.5	29	80	135	181
TOP-208HT	11.4	10.8	10.4	10.0	35	97	162	227
TOP-210HT	14.2	13.4	12.5	11.9	41	113	185	258
TOP-212HT	17.0	16.4	15.8	15.2	48	127	207	282
TOP-216HT	22.6	21.9	21.2	20.7	65	168	271	370
TOP-220HT	27.5	26.8	26.0	25.1	83	202	323	446

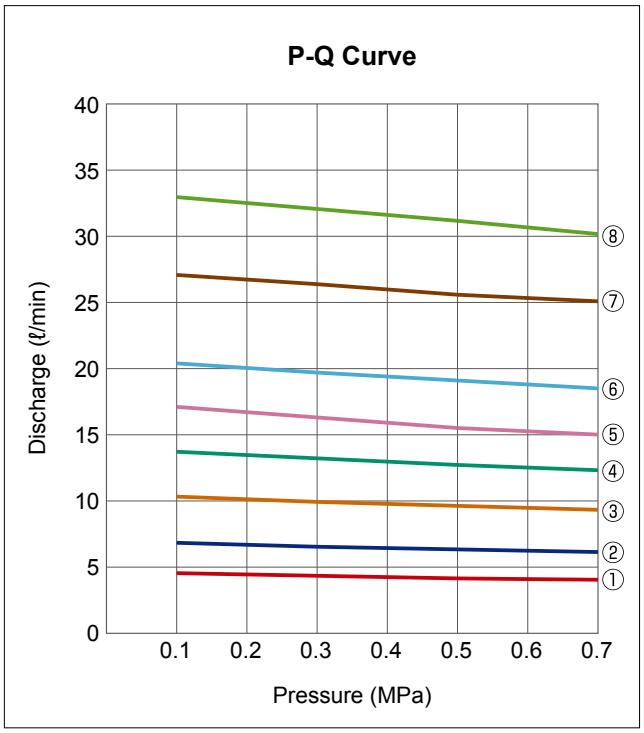
Any disassembly or alteration of the product will void the warranty.

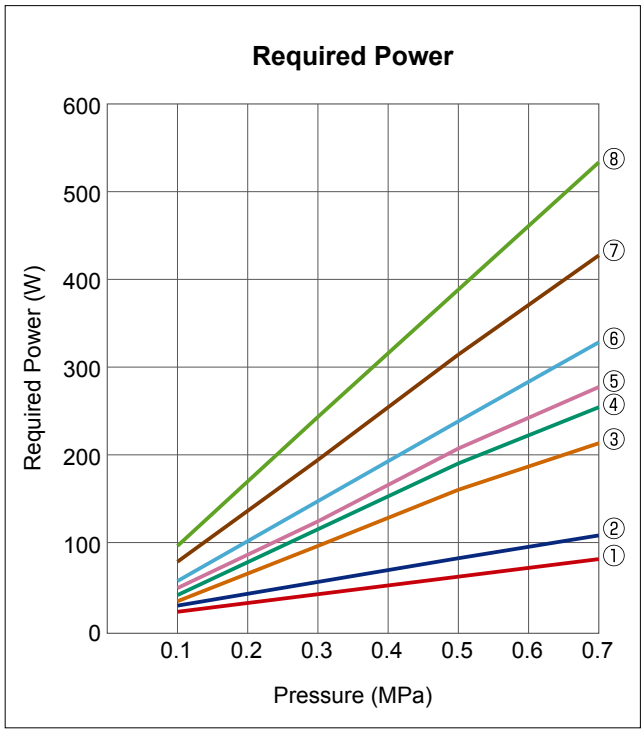
Test Oil: ISO-VG2　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①203HT　②204HT　③206HT　④208HT
⑤210HT　⑥212HT　⑦216HT　⑧220HT





Item / Model	Discharge (ℓ/min) Pressure (MPa)				Required Power (W) Pressure (MPa)			
	0.1	0.3	0.5	0.7	0.1	0.3	0.5	0.7
TOP-203HT	4.5	4.3	4.1	4.0	23	43	63	83
TOP-204HT	6.8	6.5	6.3	6.1	30	57	84	110
TOP-206HT	10.3	9.9	9.6	9.3	35	98	162	215
TOP-208HT	13.7	13.2	12.7	12.3	42	117	192	256
TOP-210HT	17.1	16.3	15.5	15.0	50	126	209	279
TOP-212HT	20.4	19.7	19.1	18.5	58	149	240	330
TOP-216HT	27.1	26.4	25.6	25.1	80	196	316	429
TOP-220HT	33.0	32.1	31.2	30.2	98	245	390	535

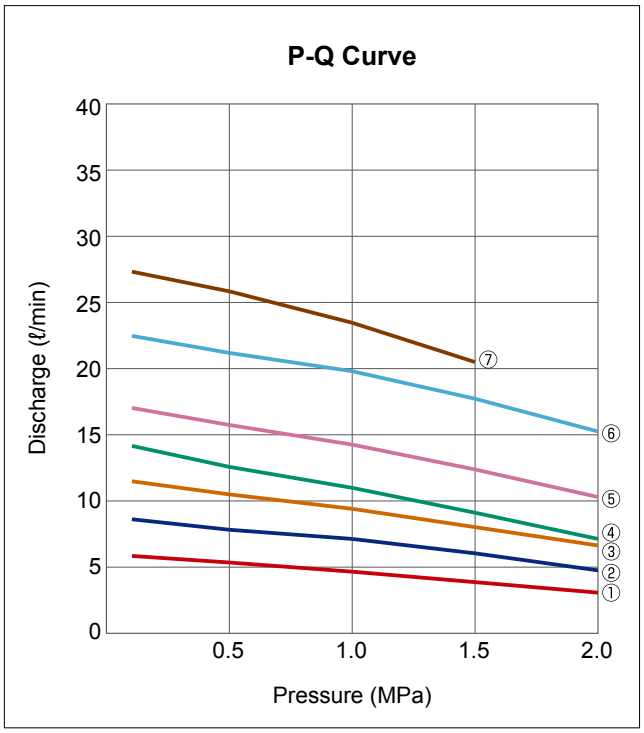
2HW(M) Performance Curve

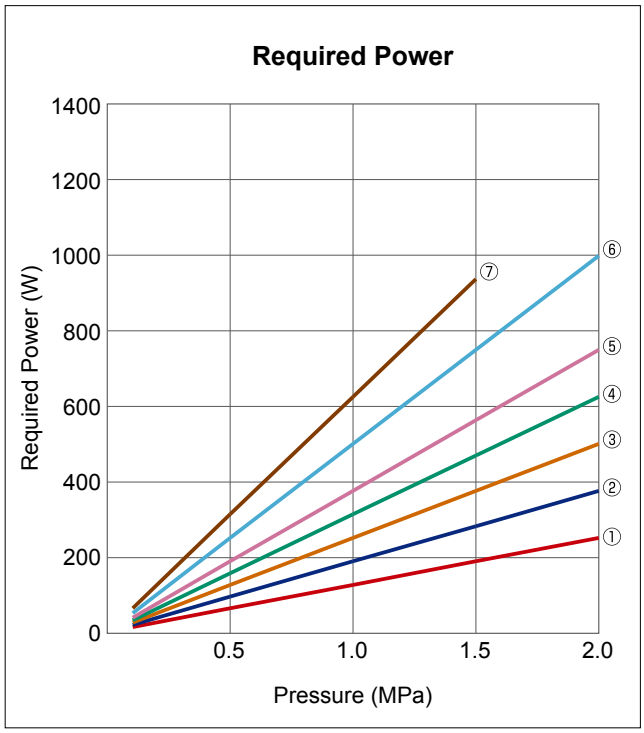
Test Oil: ISO-VG2　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①204HWM　②206HWM　③208HWM　④210HWM
⑤212HWM　⑥216HWM　⑦220HWM





Item / Model	Discharge (ℓ/min) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0	Required Power (W) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0
TOP-204HWM	5.7	5.2	4.5	3.7	2.9	13	63	125	188	250
TOP-206HWM	8.5	7.7	7.0	5.9	4.6	19	94	188	281	375
TOP-208HWM	11.4	10.4	9.3	7.9	6.5	25	125	250	375	500
TOP-210HWM	14.1	12.5	10.9	9.0	7.0	31	156	313	469	625
TOP-212HWM	17.0	15.7	14.2	12.3	10.2	38	188	375	563	750
TOP-216HWM	22.5	21.2	19.8	17.7	15.2	50	250	500	750	1000
TOP-220HWM	27.4	25.9	23.5	20.5		63	313	625	938	

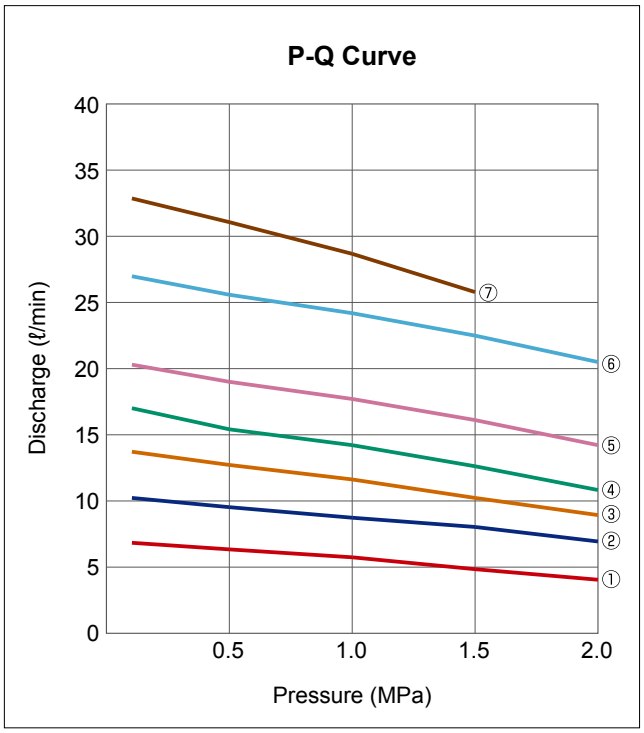
Any disassembly or alteration of the product will void the warranty.

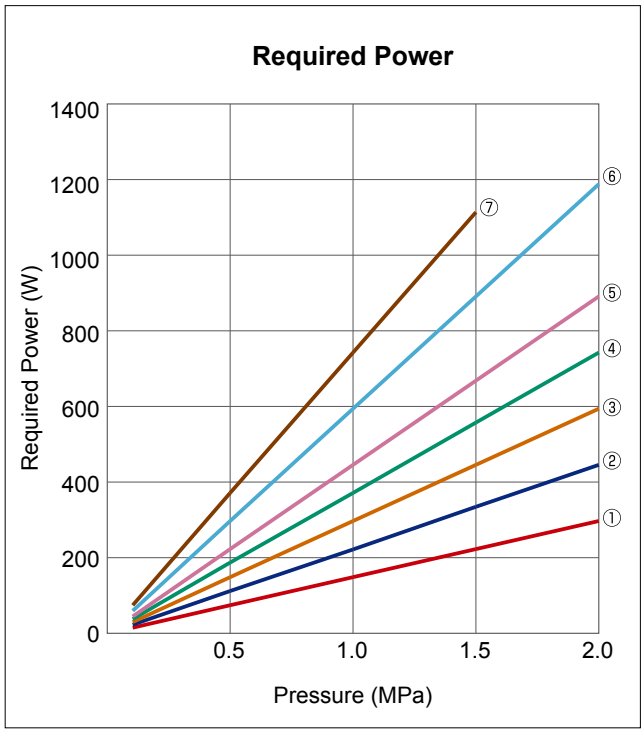
Test Oil: ISO-VG2　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①204HWM　②206HWM　③208HWM　④210HWM
⑤212HWM　⑥216HWM　⑦220HWM





Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.5	1.0	1.5	2.0	0.1	0.5	1.0	1.5	2.0
TOP-204HWM	6.8	6.3	5.7	4.8	4.0	15	75	150	225	300
TOP-206HWM	10.2	9.5	8.7	8.0	6.9	23	113	224	338	450
TOP-208HWM	13.7	12.7	11.6	10.2	8.9	30	150	300	450	600
TOP-210HWM	17.0	15.4	14.2	12.6	10.8	38	189	375	563	750
TOP-212HWM	20.3	19.0	17.7	16.1	14.2	45	225	450	675	900
TOP-216HWM	27.0	25.6	24.2	22.5	20.5	60	300	600	900	1200
TOP-220HWM	32.9	31.1	28.7	25.8		75	375	750	1125	

2.5HGA

(PUMPHEAD)

■ Model Numbering System

TOP-①HGA②③④ – ⑤ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
2516/2520

Attachment
Non: Angle plate
F: Square flange

Rotation Direction
Note: When viewed from pump shaft end
Non: Counter-clockwise
R: Clockwise

Relief Valve
Non: No valve
VB: With VB Valve

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF

■ Specifications

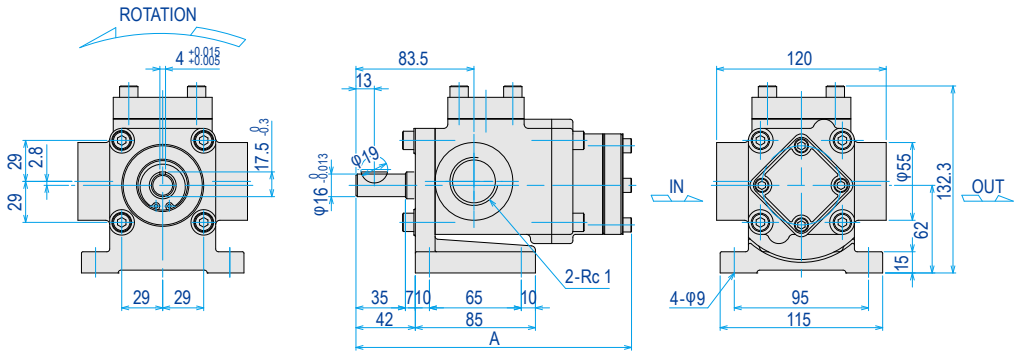
Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-2516HGA	16	24	28.8	2.5	2500	6.9 (7.5)
TOP-2520HGA	20	30	36.0	2.0	2000	7.2 (7.7)

• Test oil: ISO-VG46/Oil temperature: 40C
• Values in ( ) show approx. weights of the pump when valve is attached.

Any disassembly or alteration of the product will void the warranty.

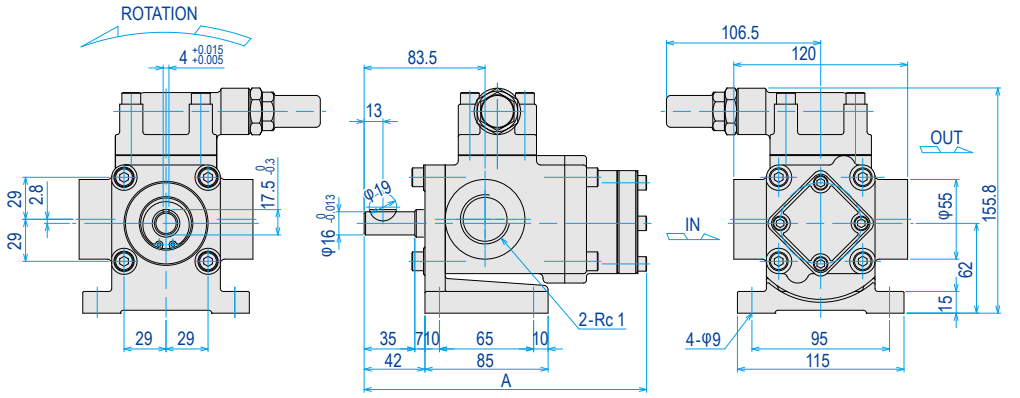
■ Dimensions (Typical) for 2.5HGA

Model : TOP-25**HGA-**



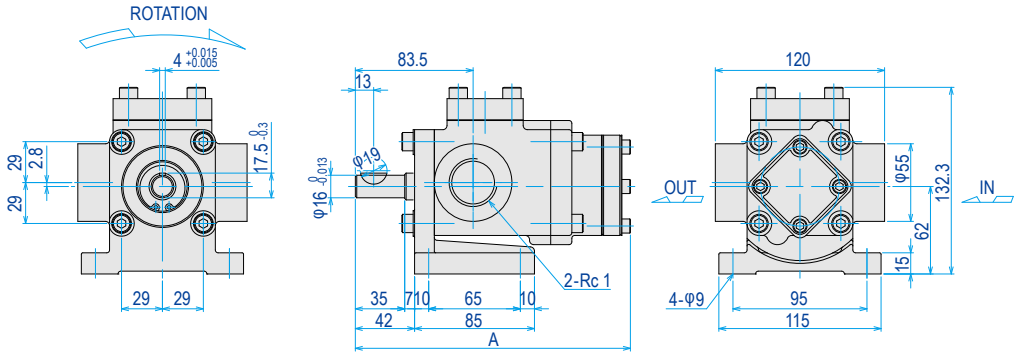
Item / Model	A
2516	195
2520	201

Model : TOP-25**HGAVB-**



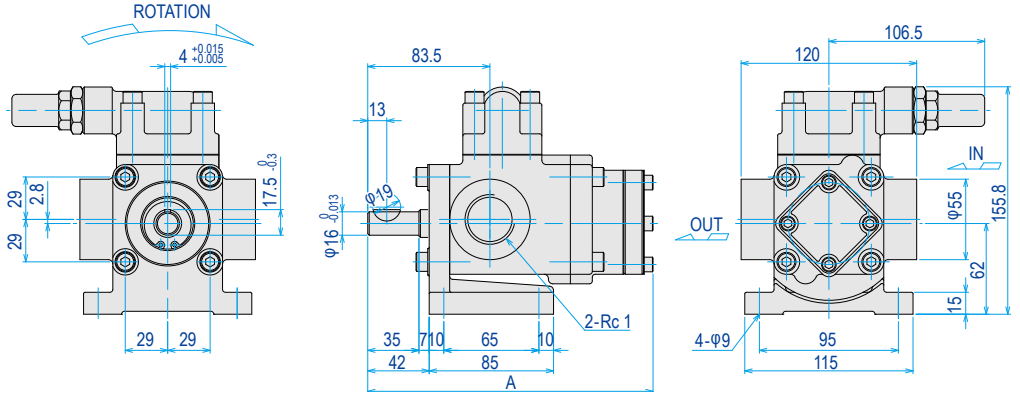
Item / Model	A
2516	195
2520	201

Model : TOP-25**HGAR-**



Item / Model	A
2516	195
2520	201

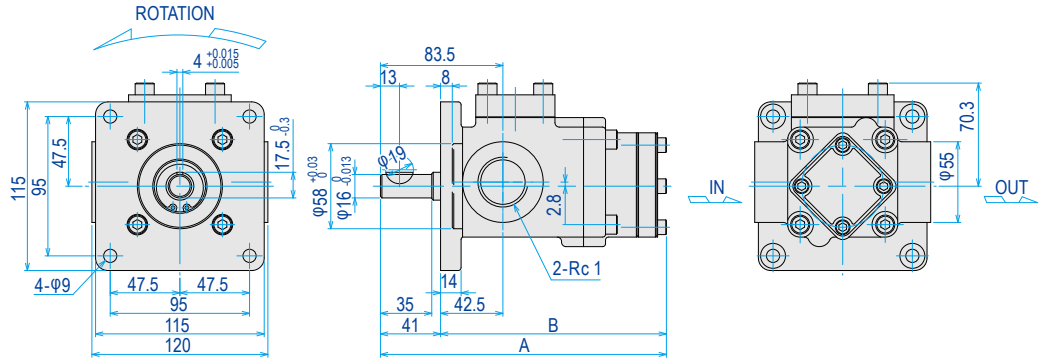
Model : 25**HGARVB-**



Item / Model	A
2516	195
2520	201

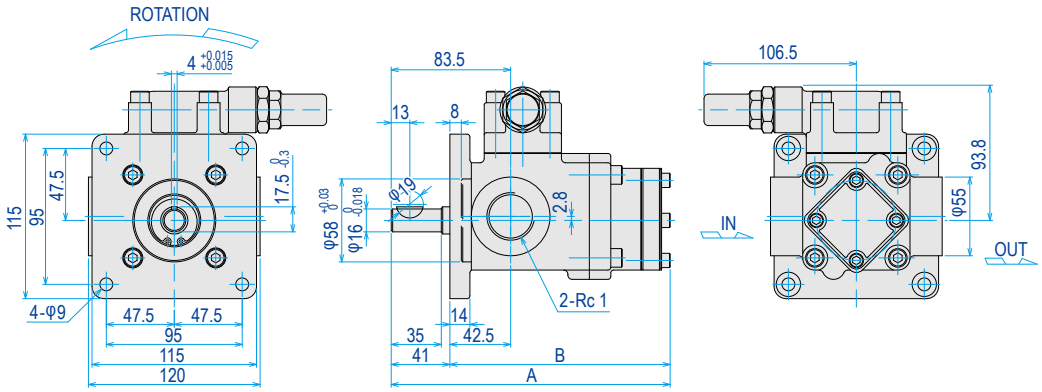
■ Dimensions (Typical) for 2.5HGA

Model : TOP-25**HGAF-**



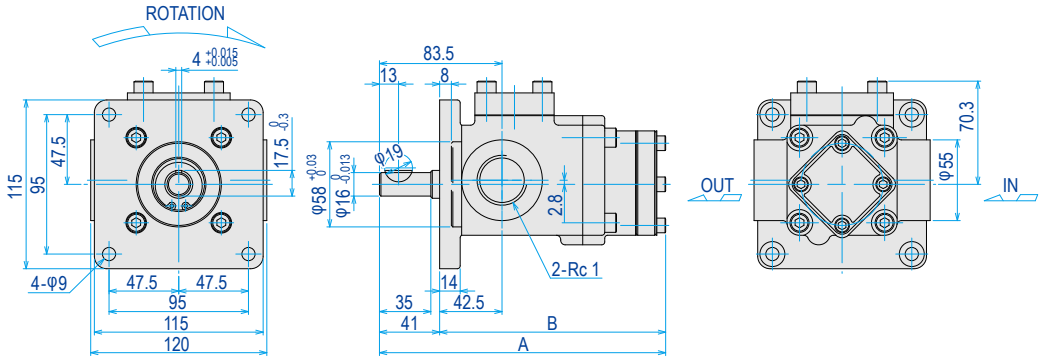
Item / Model	A	B
2516	195	154
2520	201	160

Model : TOP-25**HGAFVB-**



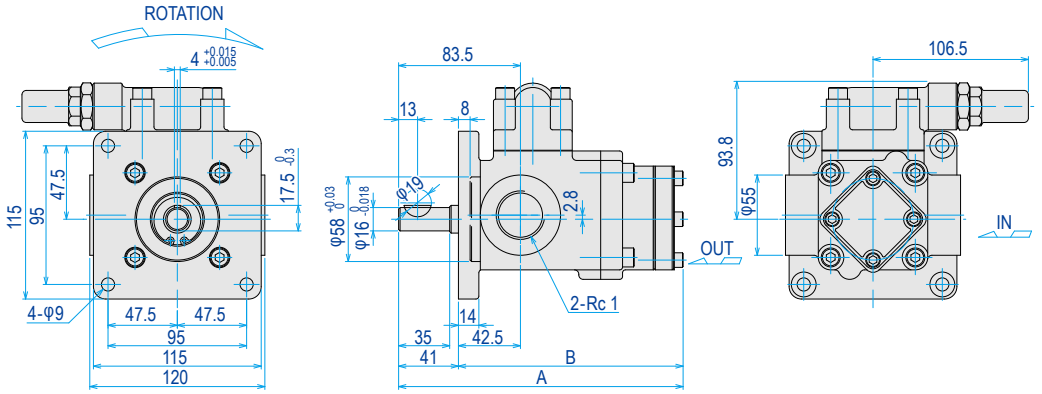
Item / Model	A	B
2516	195	154
2520	201	160

Model : TOP-25**HGAFR-**



Item / Model	A	B
2516	195	154
2520	201	160

Model : TOP-25**HGAFRVB-**



Item / Model	A	B
2516	195	154
2520	201	160

Any disassembly or alteration of the product will void the warranty.

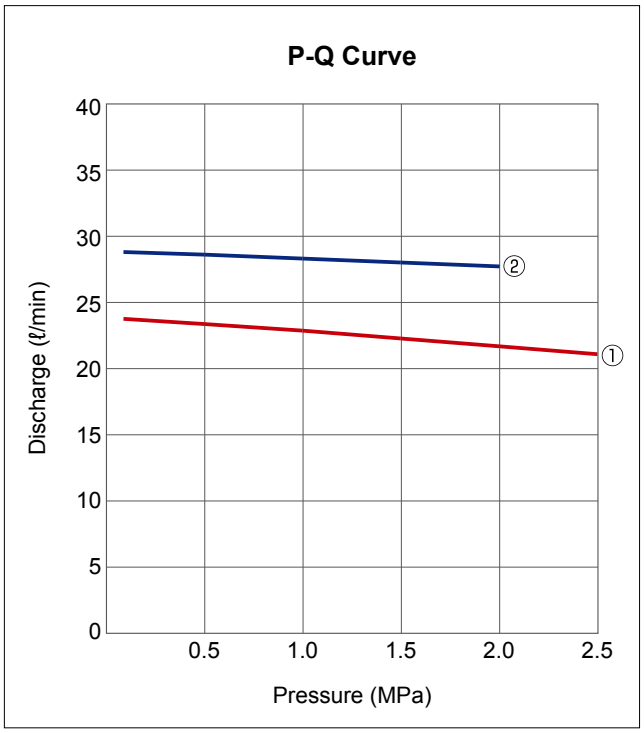
2.5HGA Performance Curve

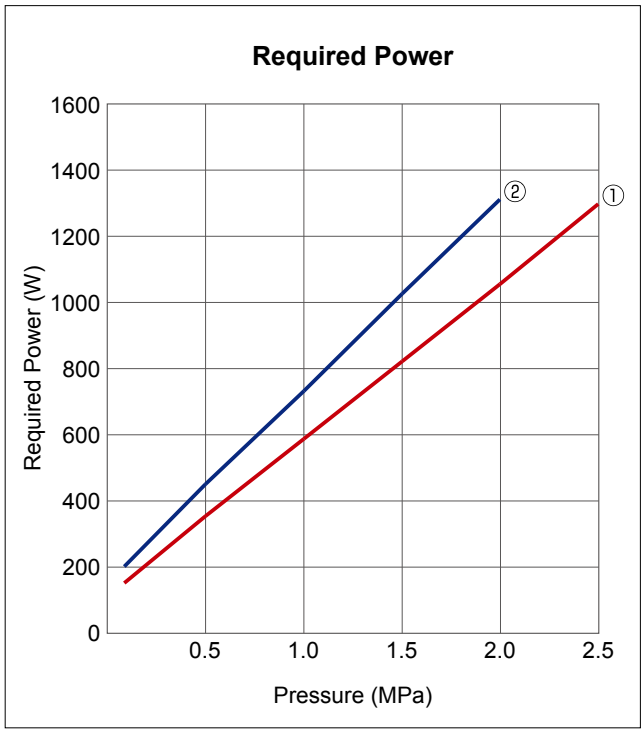
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①2516HGA　②2520HGA





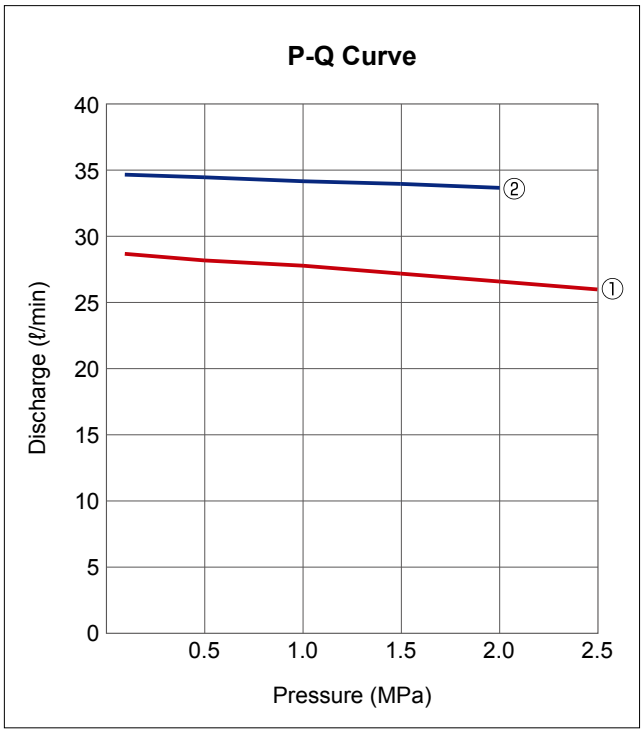
Item / Model	Discharge (ℓ/min) Pressure (MPa)						Required Power (W) Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
TOP-2516HGA	23.8	23.4	22.9	22.3	21.7	21.1	150	353	587	822	1056	1299
TOP-2520HGA	28.9	28.7	28.4	28.1	27.8		200	450	732	1027	1313	

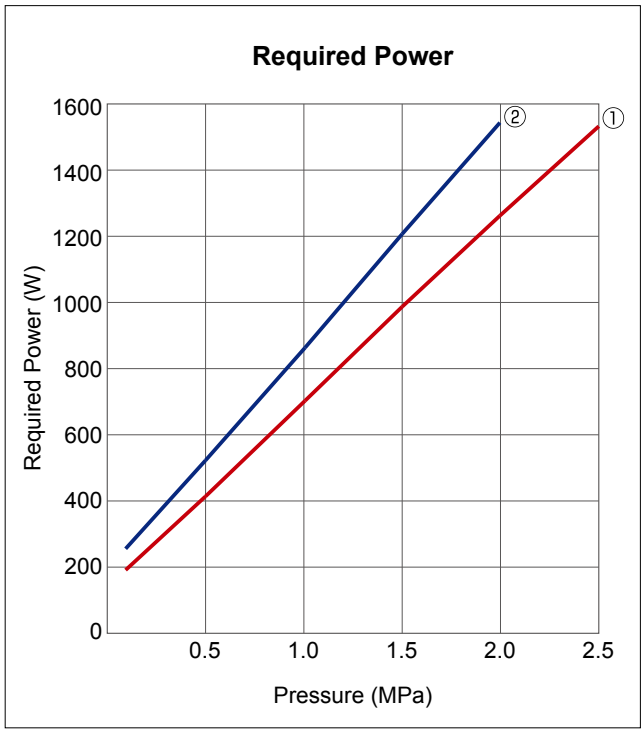
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note: As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①2516HGA　②2520HGA





Item / Model	Discharge (ℓ/min) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0	2.5	Required Power (W) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0	2.5
TOP-2516HGA	28.7	28.2	27.8	27.2	26.6	26.0	185	410	702	989	1267	1540
TOP-2520HGA	34.7	34.5	34.2	34.0	33.7		250	520	864	1211	1551	

Any disassembly or alteration of the product will void the warranty.

3MF

(WITH INTEGRATED 3-PHASE MOTOR)

■ Model Numbering System

TOP-3MF① – N② ③ ④ ⑤ – ⑥

Relief Valve Set Pressure — If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.
Note: Indicated at the end of model number in 0.1 MPa units

Motor Output
750/1500/2200
Note: "IE3" is added at the end of model no.

Model
320/330/340

Pump cover options
FA: Port parallel to pump shaft
FB: Port perpendicular to pump shaft

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

Relief Valve
Non: No valve
VB: With VB Valve
Note: "FB" has no valve option

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV: Sepcial material

■ Specifications

Note: The value"*" can not always be achieved as it is subject to individual operating conditions and specifications.

Model \ Item		Motor speed 50Hz 1500min^{-1}				Motor speed 60Hz 1800min^{-1}			
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
			750W	1500W	2200W		750W	1500W	2200W
TOP-N320	**FA FA VB FB**	39.0	0.4	1.3	2.1	46.8	0.2	1.0	1.7
TOP-N330	**FA FA VB FB**	58.5	0.1	0.8	1.3	70.2	—	0.6	1.0
TOP-N340	**FA FA VB FB**	78.0	—	0.5	0.9	93.6*	—	0.3	0.6

• Test oil: ISO-VG46/Oil temperature: 40C
• TOP-N3F is the updated series of TOP-3F. It is also compatible with old series in performance and mounting dimensions.

■ Motor Specifications

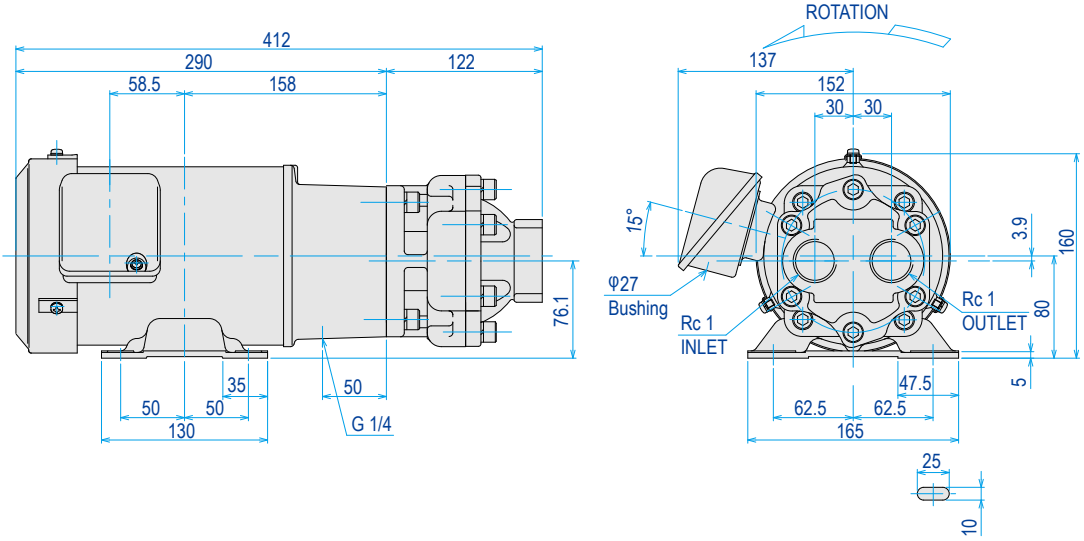
•3-phase squirrel-cage induction motor •Totally enclosed •Class F insulation •Protection level IP44

Output (W)	Number of poles (P)	Rating	200V class				400V class				Approx. Weight (Kg)
			Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min^{-1})	Current (A)	
750	4	Cont	200 200 220	50 60 60	1440 1720 1740	3.3 3.1 3.0	400 400 440	50 60 60	1440 1730 1760	1.77 1.61 1.57	18.0
1500	4	Cont	200 200 220	50 60 60	1450 1740 1750	6.9 6.2 6.0	400 400 440	50 60 60	1450 1740 1750	3.40 3.10 3.00	24.0
2200	4	Cont	200 200 220	50 60 60	1460 1750 1760	10.6 9.4 9.2	400 400 440	50 60 60	1460 1750 1760	5.30 4.70 4.60	39.0

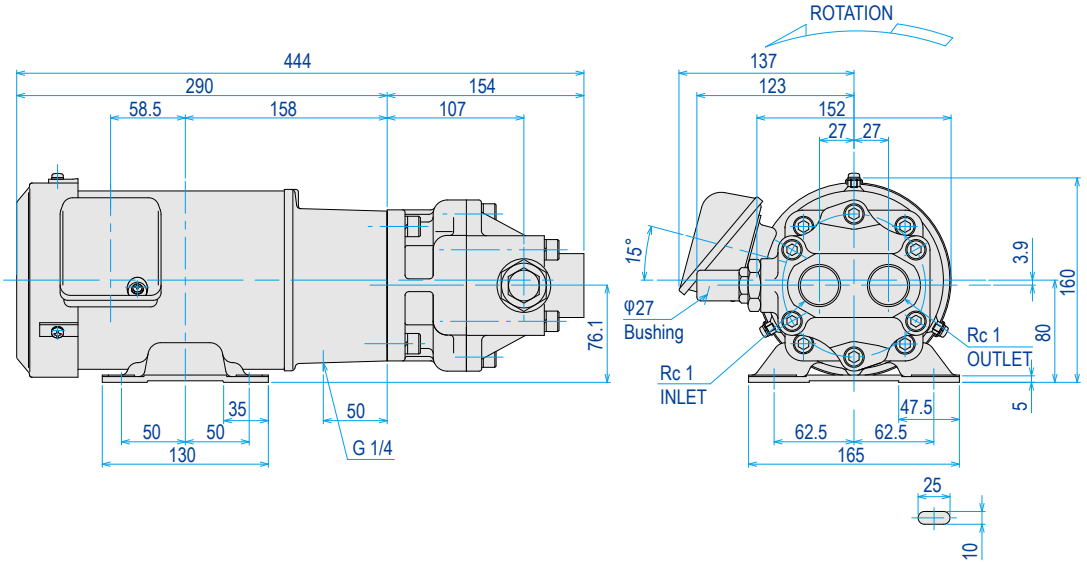
• Please consult us when ordering outdoor-type, increased safety-type, spcecial vlotage type or one with CE marking, terminal box attched on the other side, or other special motors.
• This series comlies with requirements of IE3, CE marking and class F insulation. Note: Please consult us if motor other than for standard volatage is required.

■ Dimensions (Typical) for 3MF

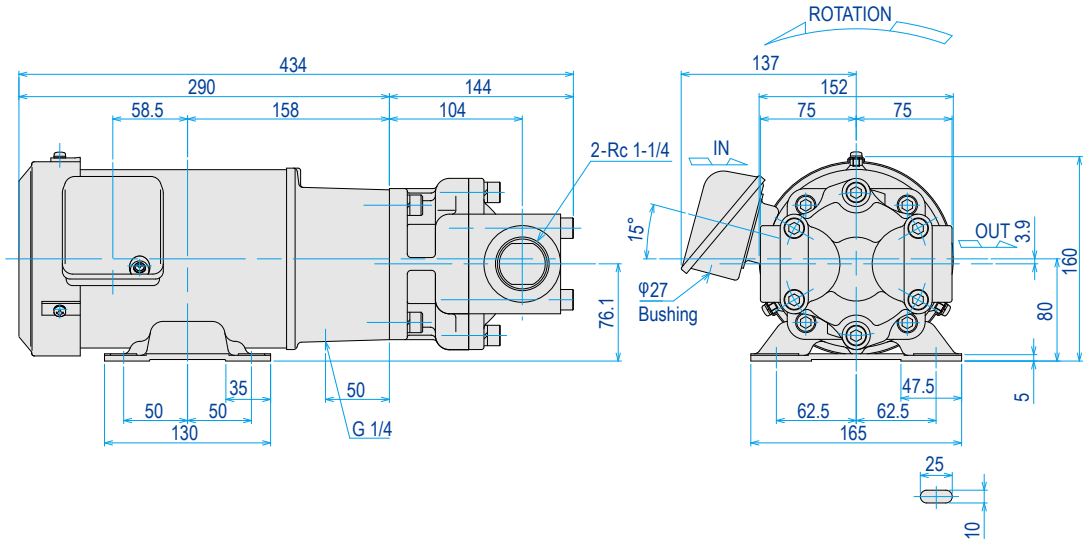
Model : TOP-3MF750-N3**FA-** IE3



Model : TOP-3MF750-N3**FAVB-** IE3



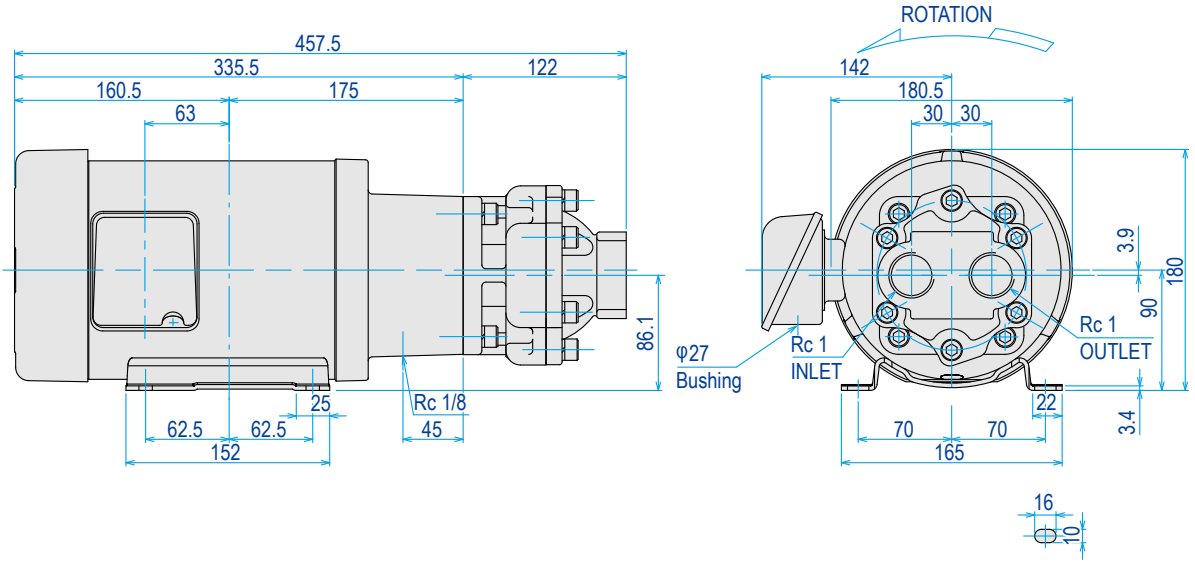
Model : TOP-3MF750-N3**FB-** IE3



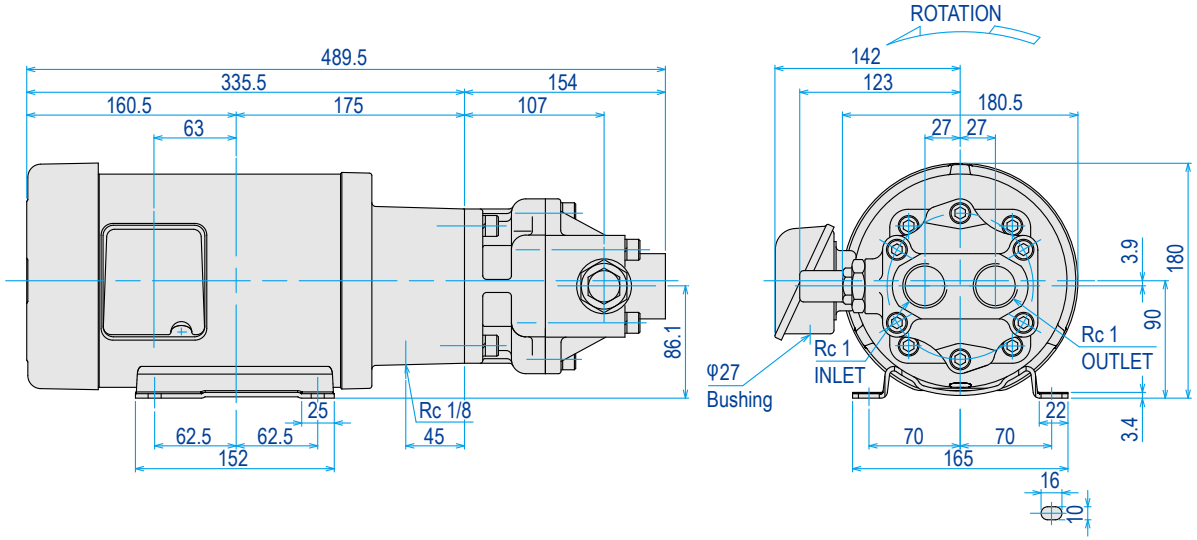
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 3MF

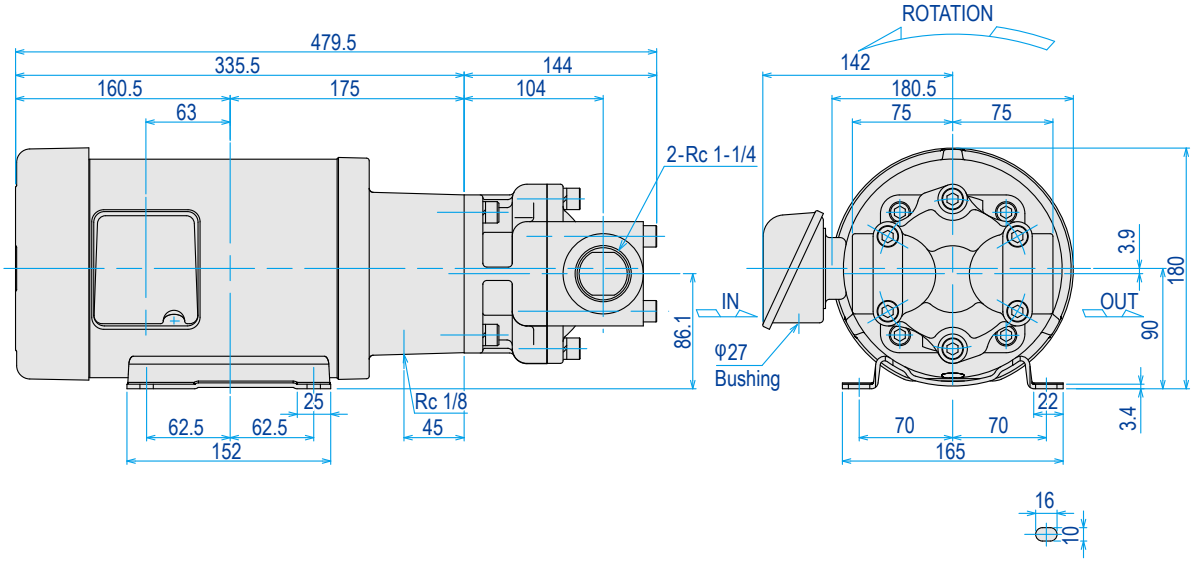
Model : TOP-3MF1500-N3**FA-** IE3



Model : TOP-3MF1500-N3**FAVB-** IE3

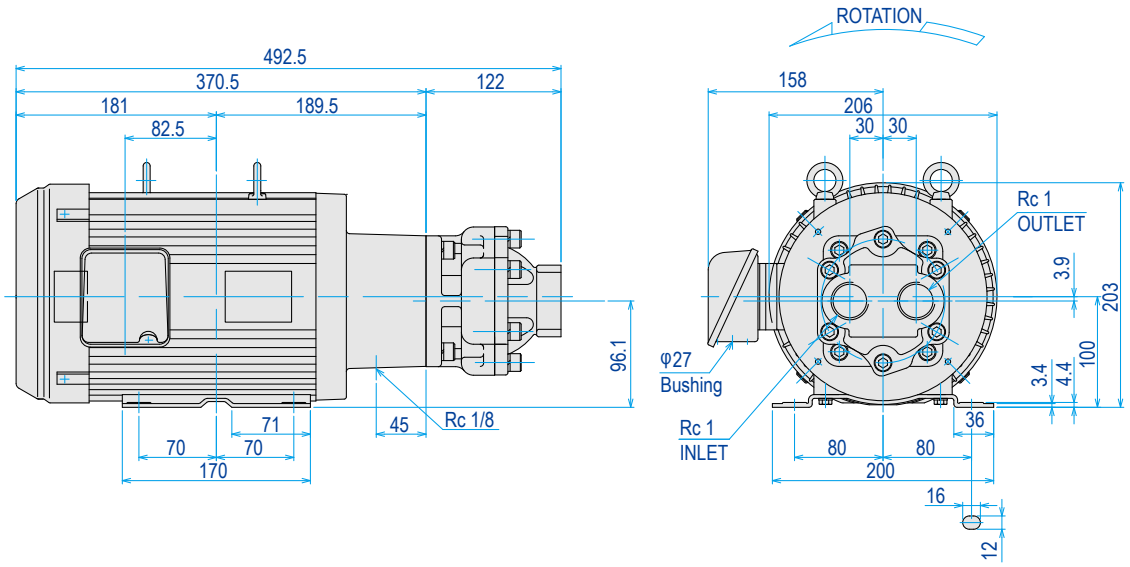


Model : TOP-3MF1500-N3**FB-** IE3

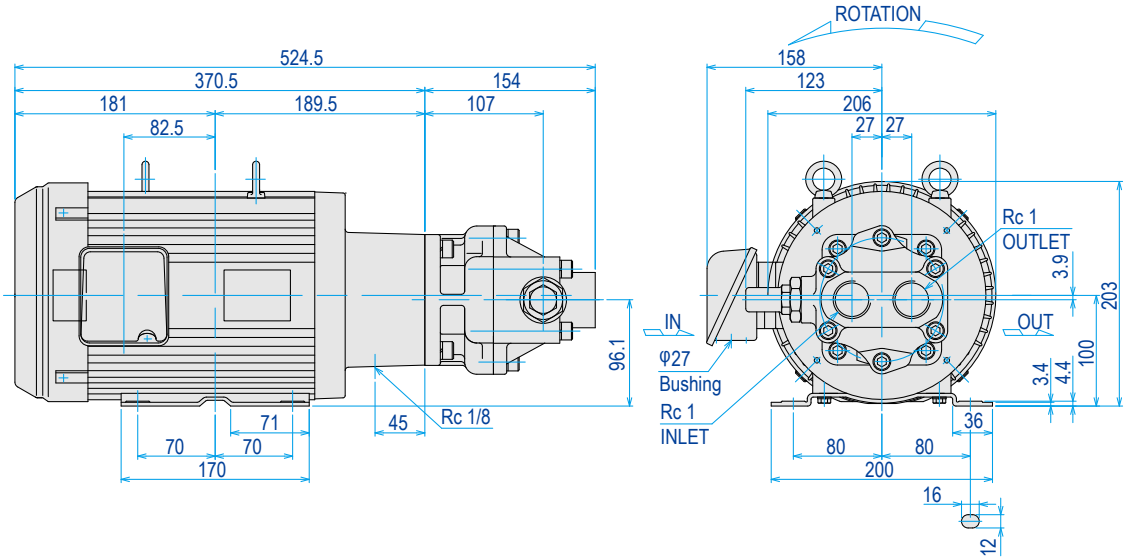


■ Dimensions (Typical) for 3MF

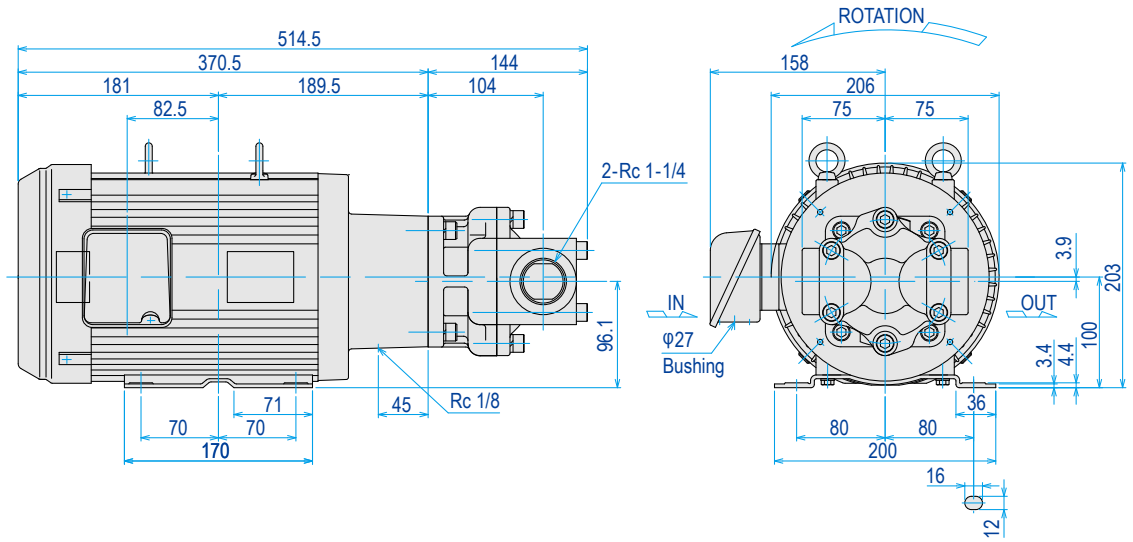
Model : TOP-3MF2200-N3**FA-** IE3



Model : TOP-3MF2200-N3**FAVB-** IE3



Model : TOP-3MF2200-N3**FB-** IE3



Any disassembly or alteration of the product will void the warranty.

N3F

(PUMPHEAD)

■ Model Numbering System

TOP-N① ② ③ ④ ⑤ – ⑥ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
320/330/340/

Pump cover options
FA: Port parallel to pump shaft
FB: Port perpendicular to pump shaft

Shaft Type
M: Standard
Non: For coupled with 3MF motor

Rotation Direction
Note: When viewed from pump shaft end
Non: Clockwise
L: Counter-clockwise

Relief Valve
("FB" has no valve option)
Non: No valve
VB: With VB Valve

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF
Note: "VF"is unavailable if you select "Non" for ③

■ Specifications

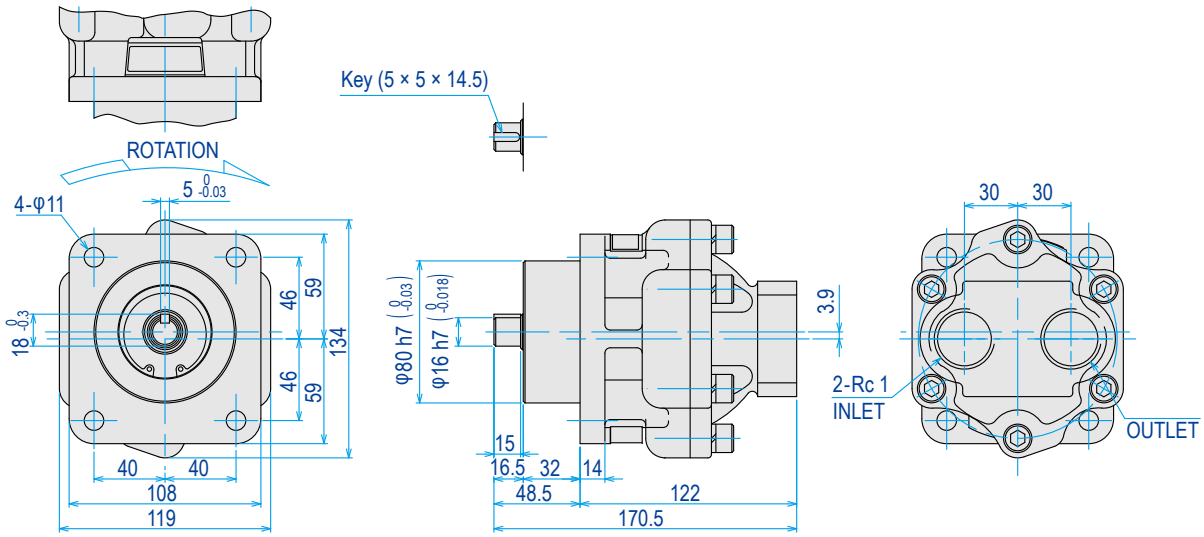
Note: The value"*" can not always be achieved as it is subject to individual operating conditions and specifications.

Model \ Item		Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
			1500min^{-1}	1800min^{-1}			
TOP-N320	**FAM**	26	39.0	46.8	2.5	1800	8.0
	FAMVB						10.5
	FBM						9.0
TOP-N330	**FAM**	39	58.5	70.2	2.5*	1800	8.0
	FAMVB						10.5
	FBM						9.0
TOP-N340	**FAM**	52	78.0	93.6*	2.0*	1800*	8.0
	FAMVB						10.5
	FBM						9.0

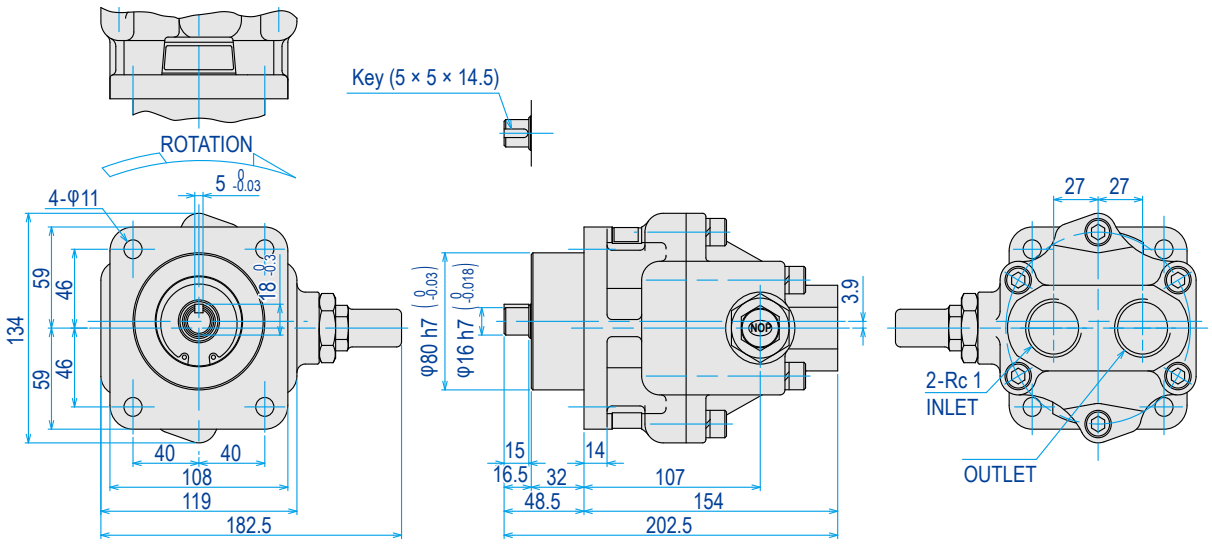
- Test oil: ISO-VG2/Oil temperature: 40C
- TOP-N3F is the updated series of TOP-3F. It is also compatible with the old series in performance and mounting dimensions.
- N3FAM and N3FBM can not be mounted on 3MF motors.

■ Dimensions (Typical) for N3F

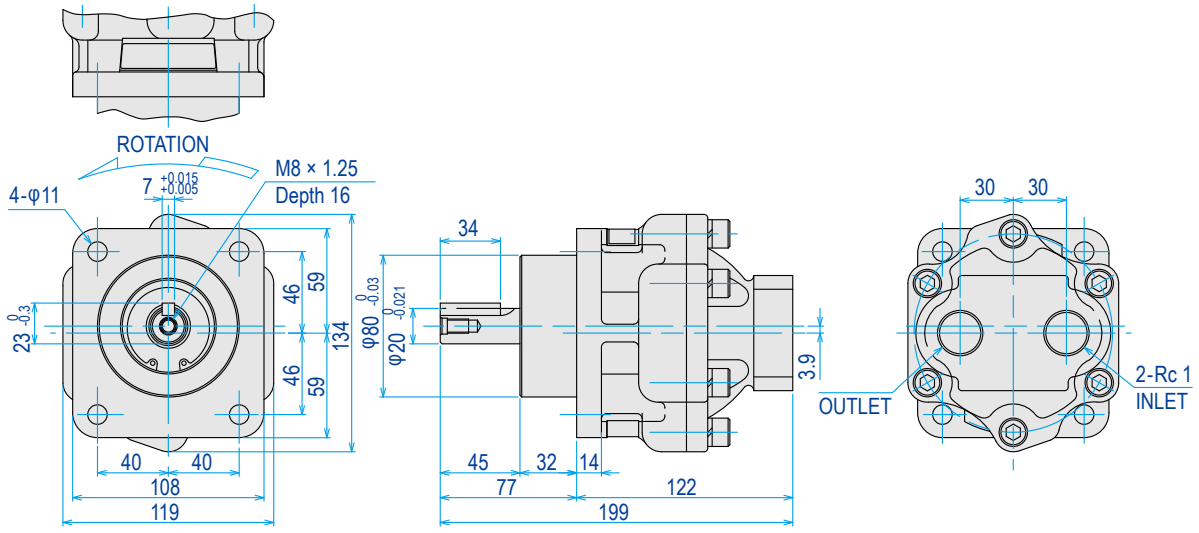
Model : TOP-N3**FA-**



Model : TOP-N3**FAVB-**



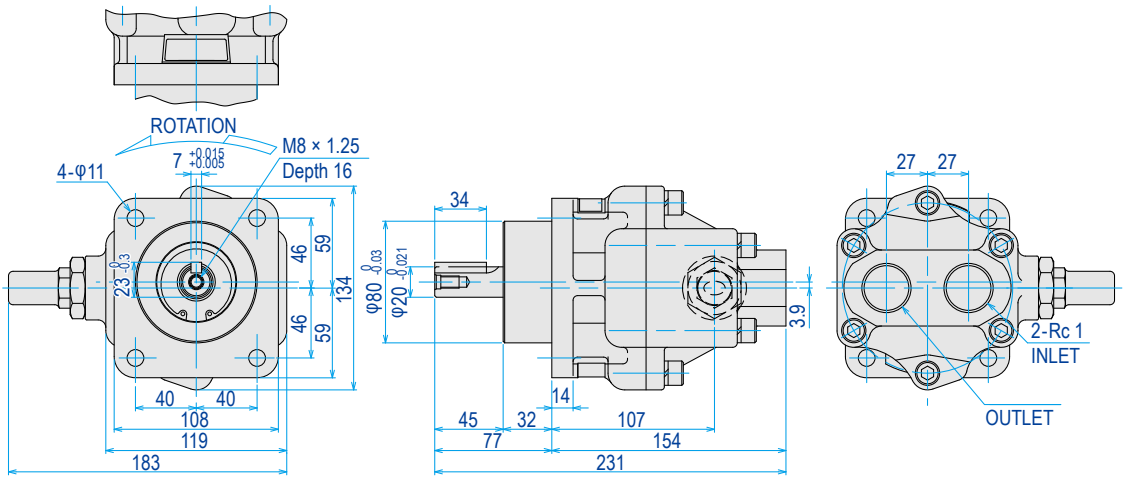
Model : TOP-N3**FAML-**



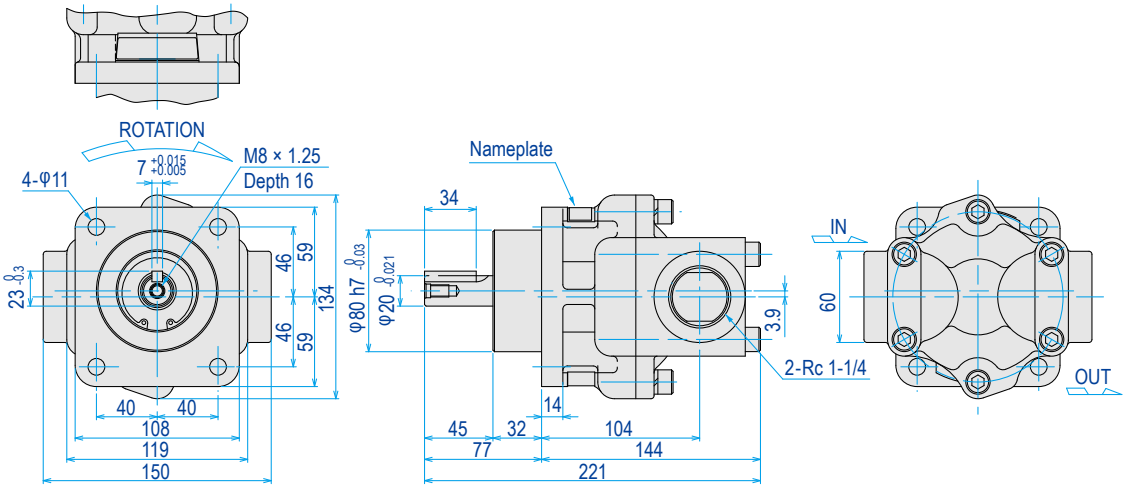
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for N3F

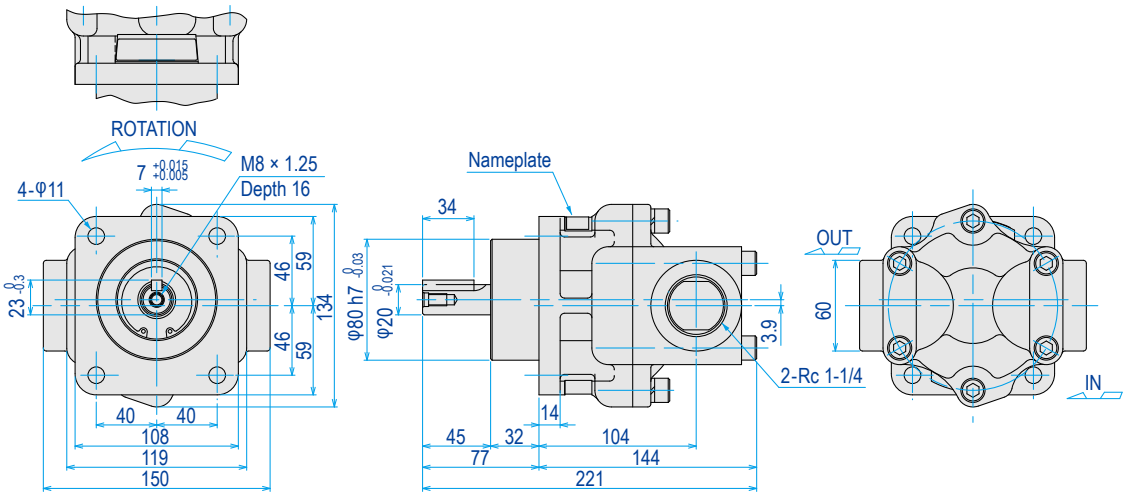
Model : TOP-N3**FAMLVB-**



Model : TOP-N3**FBM-**



Model : TOP-N3**FBML-**

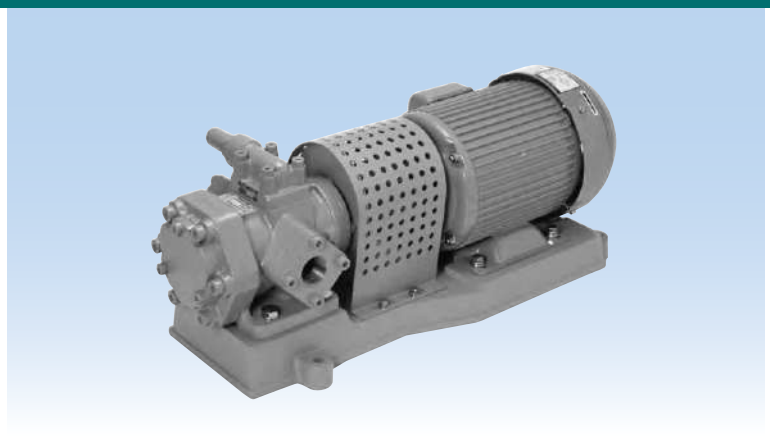


3MB-N3H

(BASE-COUPLING MOUNT TYPE)

N3H

(PUMPHEAD)



■ Model Numbering System (For General Lubricant Oil)

TOP-3MB① ② – ③ ④ ⑤ – ⑥ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
1500/2200/3700/5500
Note: "IE3" is added at the end of model no.

Model
N320H/N330H/N340H/N350H

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

Relief Valve
Non: No valve
VB: With VB Valve*1

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF*2/VH*2/UT

*1 Set pressure of relief valve is limited to below 3.0MPa
*2 Maximum set pressure is 0.7MPa if you select "VF" or "VH" for ⑥

■ Model Numbering System (Pumphead)

TOP-① H ② ③ – ④ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
N320/N330/N340/N350

Rotation Direction
Note: When viewed from pump shaft
Non: Clockwise
L: Counter-clockwise

Relief Valve
Non: No valve
VB: With VB Valve*1

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF*2/VH*2/UT

*1 Set pressure of relief valve is limited to below 3.0MPa
*2 Maximum set pressure is 0.7MPa if you select "VF" or "VH" for ⑥

■ Specifications

Note: The value"*" can not always be achieved as it is subject to individual operating conditions and specifications.

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-N320H	26.0	39.0	46.8	4.0	1800	14.8 (15.4)
TOP-N330H	39.0	58.5	70.2	4.0*	1800	14.9 (15.5)
TOP-N340H	52.0	78.0	93.6	3.0*	1800	14.9 (15.5)
TOP-N350H	65.0	97.5	117.0	2.0*	1800	15.6 (16.2)

• Test oil: ISO-VG46/Oil temperature: 40C • Values in ( ) show approx. weights of the pump when the valve is attached.
• TOP-N3H is the updated series of TOP-3H. It is also compatible with the old series in performance and mounting dimensions.

■ Specifications

Note: The value"*" can not always be achieved as it is subject to individual operating conditions and specifications.

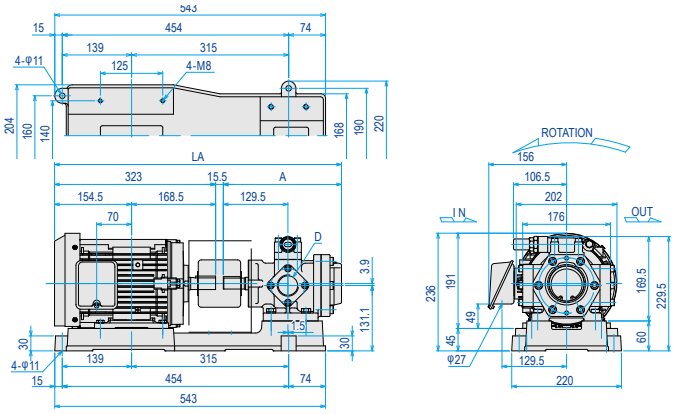
Item / Model	Motor speed 50Hz 1500min^{-1}					Motor speed 60Hz 1800min^{-1}				
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
		1500W	2200W	3700W	5500W		1500W	2200W	3700W	5500W
TOP-N320H	39.0	1.3	2.2	4.0	4.0	46.8	1.0	1.7	3.2	4.0
TOP-N330H	58.5	0.8	1.4	2.6	4.0*	70.2	0.5	1.0	2.1	3.3
TOP-N340H	78.0	0.5	0.9	1.8	3.0*	93.6	0.3	0.6	1.4	2.3
TOP-N350H	97.5	0.3	0.7	1.4	2.0*	117.0	0.1	0.4	1.0	1.8

• Test oil: ISO-VG46/Oil temperature: 40C
• TOP-N3H is the updated series of TOP-3H. It is also compatible with the old series in performance and mounting dimensions.

Any disassembly or alteration of the product will void the warranty.

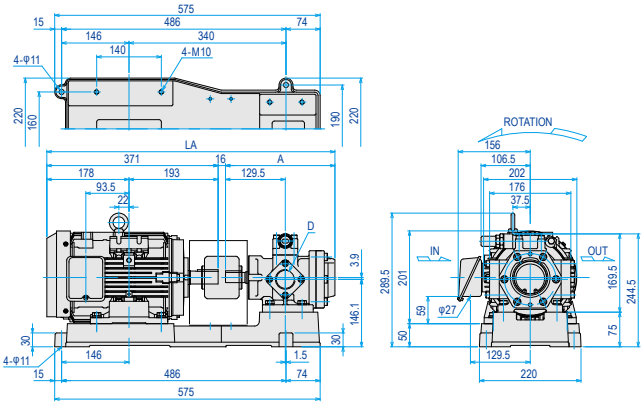
■ Dimensions (Typical) for 3MB-N3H

Model : TOP-3MBT1500-N3**HVB-** IE3



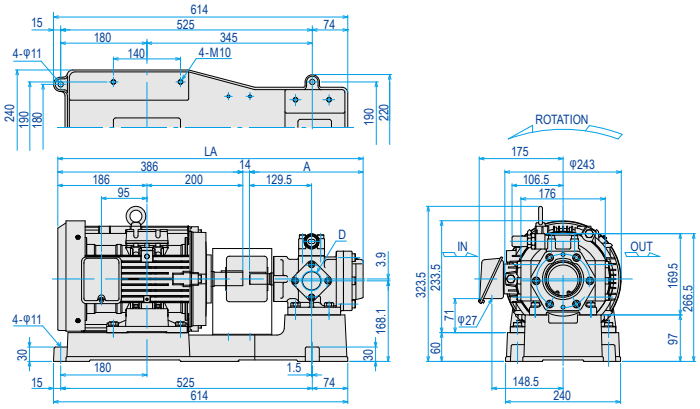
Item / Model	LA	A	D	
			INLET	OUTLET
320	575.5	237	Rc 1	Rc 1
330	575.5	237	Rc 1 1/4	
340	575.5	237		
350	585.5	247		

Model : TOP-3MBT2200-N3**HVB-** IE3



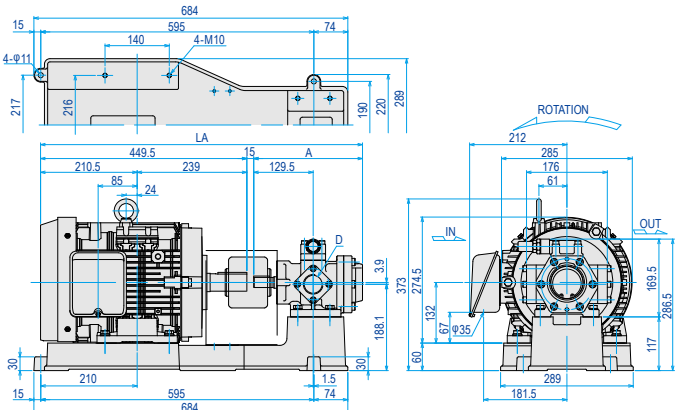
Item / Model	LA	A	D	
			INLET	OUTLET
320	624	237	Rc 1	Rc 1
330	624	237	Rc 1 1/4	
340	624	237		
350	634	247		

Model : TOP-3MBT3700-N3**HVB-** IE3



Item / Model	LA	A	D	
			INLET	OUTLET
320	637	237	Rc 1	Rc 1
330	637	237	Rc 1 1/4	
340	637	237		
350	647	247		

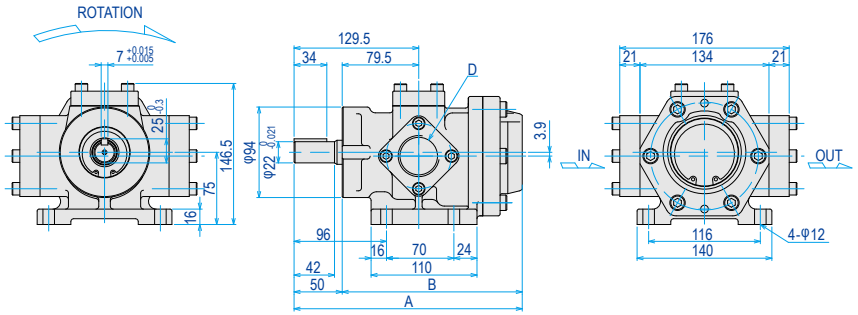
Model : TOP-3MBT5500-N3**HVB-** IE3



Item / Model	LA	A	D	
			INLET	OUTLET
320	701.5	237	Rc 1	Rc 1
330	701.5	237	Rc 1 1/4	
340	701.5	237		
350	711.5	247		

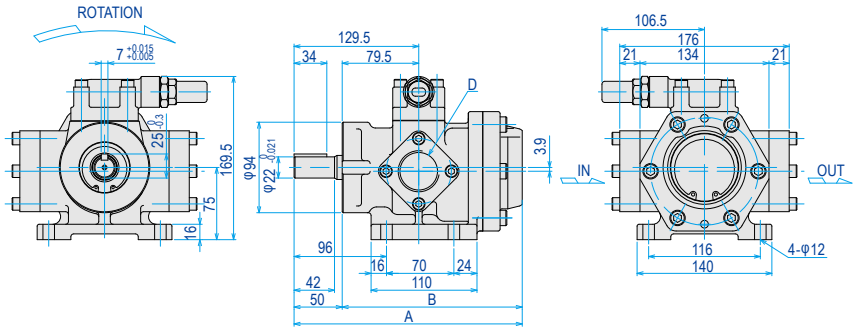
■ Dimensions (Typical) for N3H

Model : TOP-N3**H-**



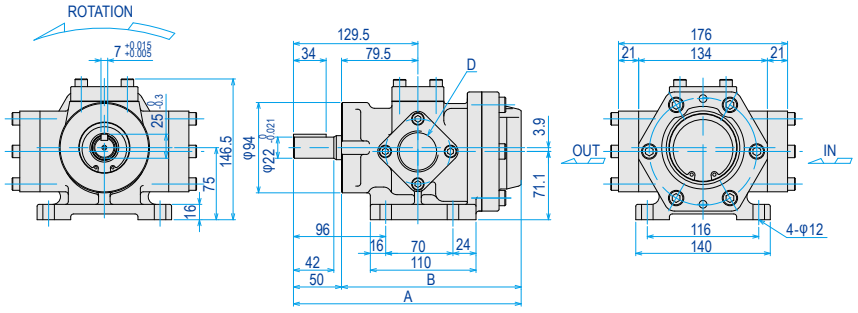
Item / Model	A	B	D	
			INLET	OUTLET
320	237	187	Rc 1	Rc 1
330	237	187	Rc 1 1/4	
340	237	187		
350	247	197		

Model : TOP-N3**HVB-**



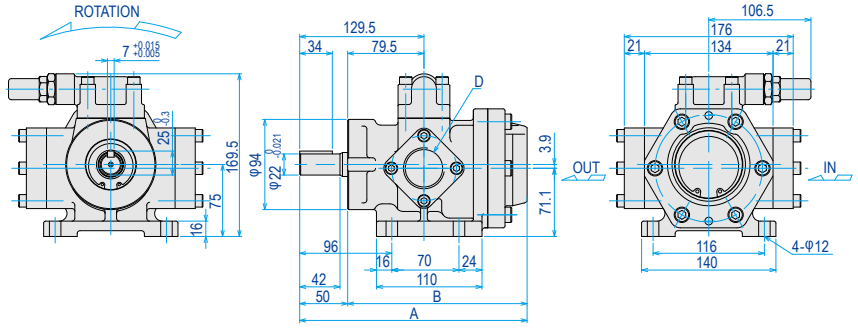
Item / Model	A	B	D	
			INLET	OUTLET
320	237	187	Rc 1	Rc 1
330	237	187	Rc 1 1/4	
340	237	187		
350	247	197		

Model : TOP-N3**HL-**



Item / Model	A	B	D	
			INLET	OUTLET
320	237	187	Rc 1	Rc 1
330	237	187	Rc 1 1/4	
340	237	187		
350	247	197		

Model : TOP-N3**HLVB-**



Item / Model	A	B	D	
			INLET	OUTLET
320	237	187	Rc 1	Rc 1
330	237	187	Rc 1 1/4	
340	237	187		
350	247	197		

Any disassembly or alteration of the product will void the warranty.

3MB-3V

(BASE-COUPLING MOUNT TYPE)

3V

(PUMPHEAD)

For Transfering High Viscosity Oil

■ Model Numbering System (For General Lubricant Oil)

TOP-3MB① ② – ③ ④ ⑤ – ⑥ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
2200/3700/5500
Note: "IE3" is added at the end of model no.

Model
330V/340V/350V

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

Relief Valve
Non: No valve
VB: With VB Valve

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF

■ Model Numbering System (Pumphead)

TOP-① ② ③ ④ – ⑤ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
330V/340V/350V

Attachment
Non: Angle plate
F: Square flange

Rotation Direction
Note: When viewed from pump shaft end
Non: Clockwise
L: Counter-clockwise

Relief Valve
Non: No valve
VB: With VB Valve

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material
VV/VF

Note: For transfering oil with high viscosity (46-2000mm^2/sec), such as high viscosity lubricant oil or gear oil

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1500min^{-1}	1800min^{-1}			
TOP-330V	39.0	58.5	70.2	1.0	1800	19.3 (20.7)
TOP-340V	52.0	78.0	93.6	1.0	1800	19.5 (20.9)
TOP-350V	65.0	97.5	117.0	1.0	1800	19.3 (20.7)

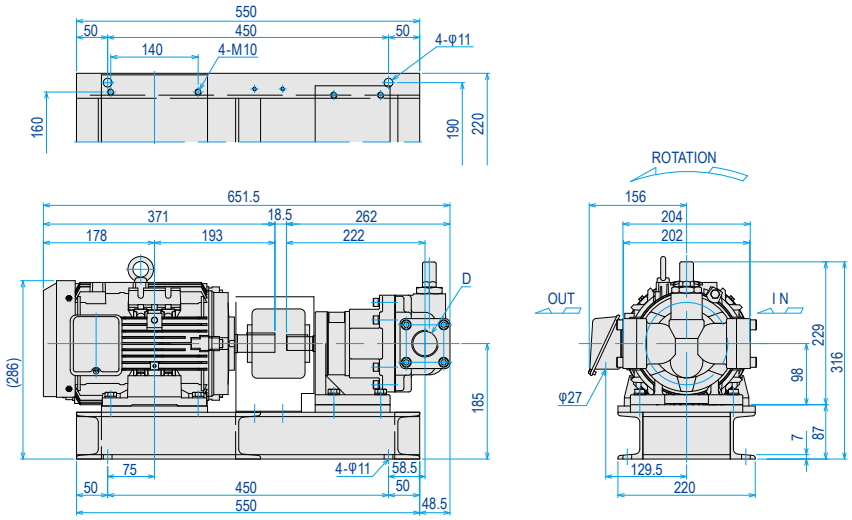
• Test oil: ISO-VG46/Oil temperature: 40C
• Values in ( ) show approx. weights of the pump when the valve is attached.

■ Specifications

Item / Model	Motor speed 50Hz 1500min^{-1}				Motor speed 60Hz 1800min^{-1}			
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
		2200W	3700W	5500W		2200W	3700W	5500W
TOP-330V	58.5	1.0	1.0	1.0	70.2	0.7	1.0	1.0
TOP-340V	78.0	0.6	1.0	1.0	93.6	0.4	1.0	1.0
TOP-350V	97.5	0.4	1.0	1.0	117.0	0.2	0.7	1.0

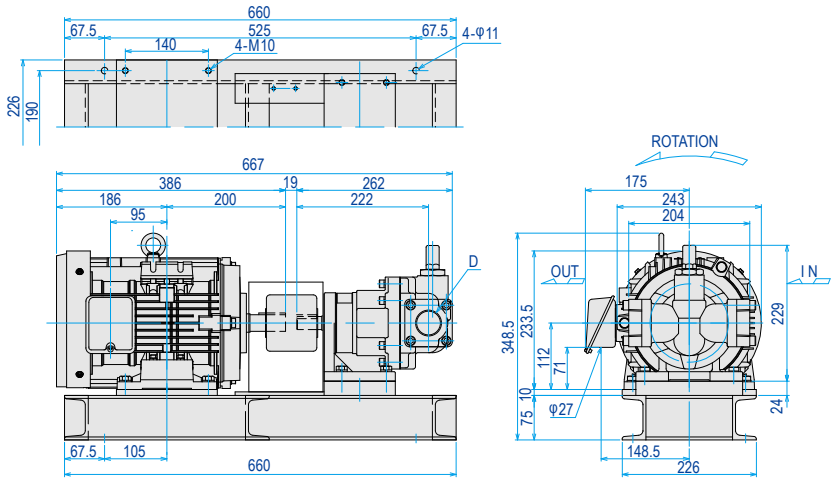
■ Dimensions (Typical) for 3MB-3V

Model : TOP-3MBT2200-3**VVB-** IE3



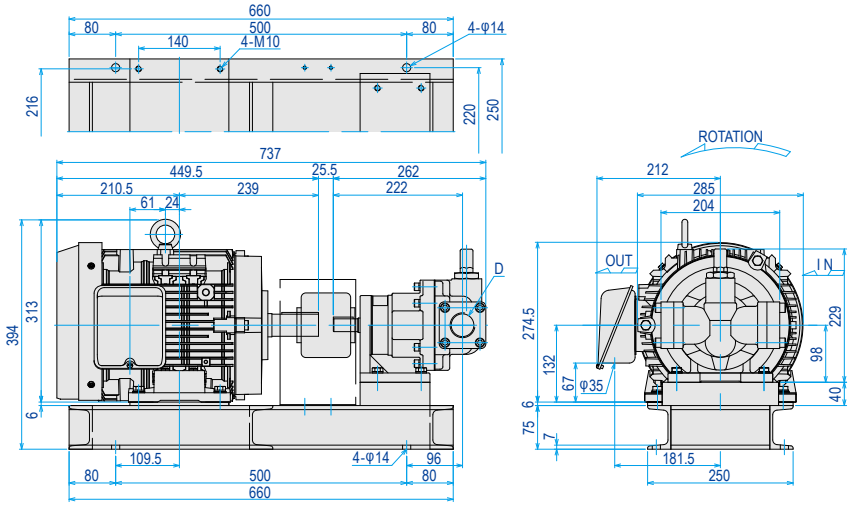
Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Model : TOP-3MBT3700-3**VVB-** IE3



Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Model : TOP-3MBT5500-3**VVB-** IE3

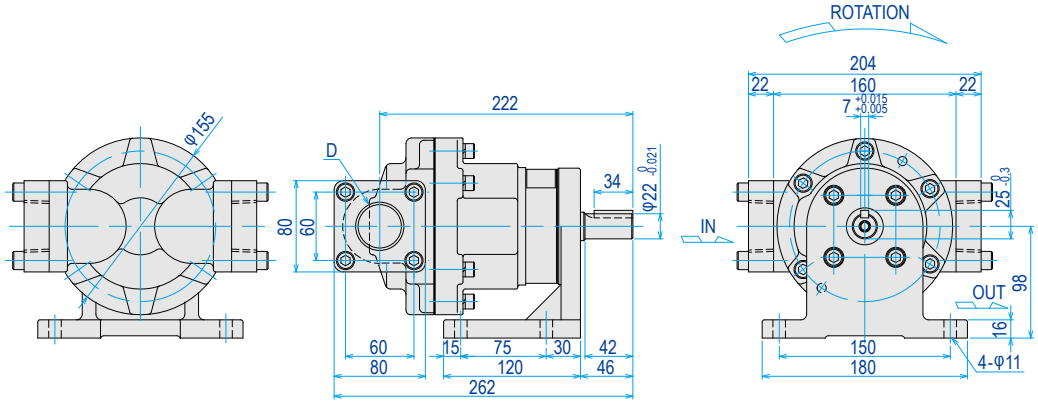


Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Any disassembly or alteration of the product will void the warranty.

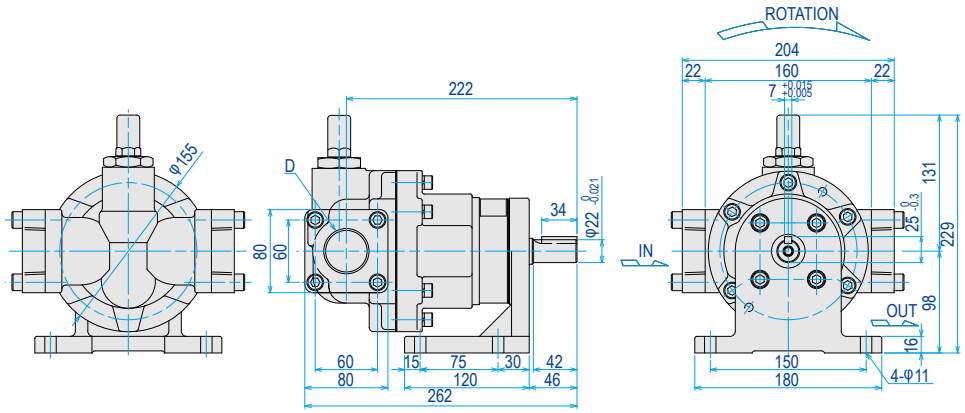
■ Dimensions (Typical) for 3V

Model : TOP-3**V-**



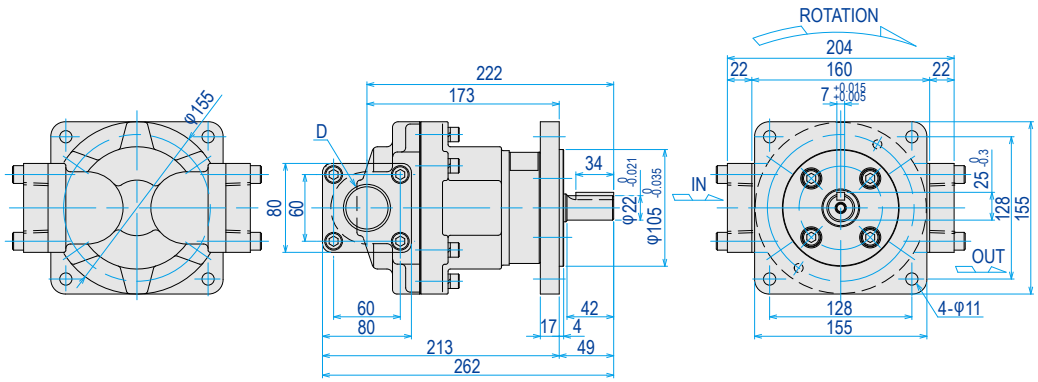
Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Model : TOP-3**VVB-**



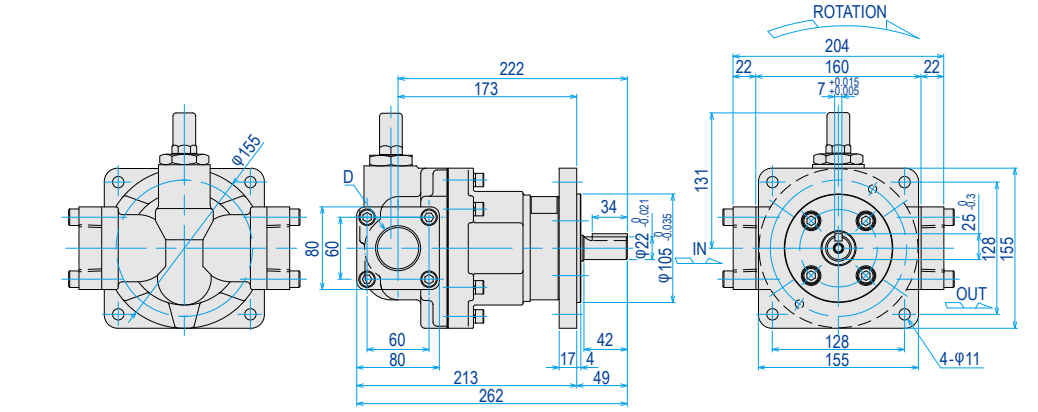
Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Model : TOP-3**VF-**



Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

Model : TOP-3**VFVB-**



Item / Model	D	
	INLET	OUTLET
330	Rc 1 1/4	Rc 1 1/4
340	Rc 1 1/2	
350		

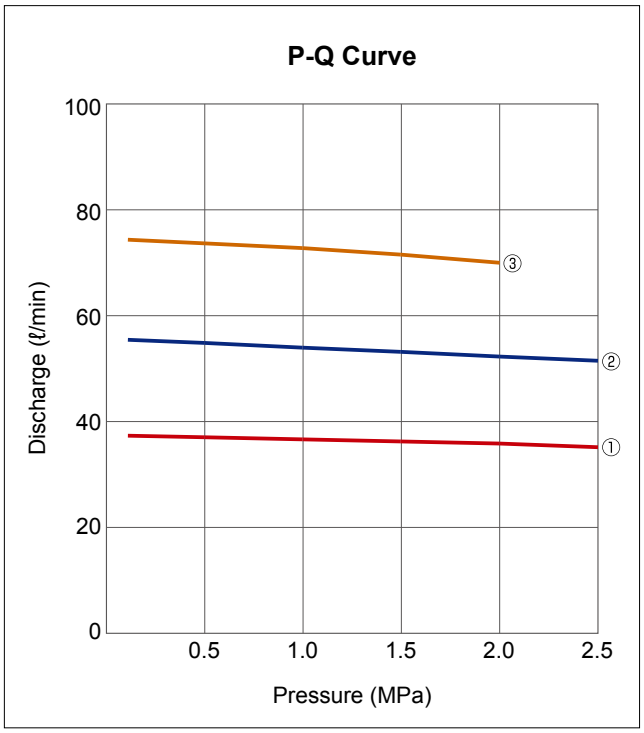
N3F Performance Curve

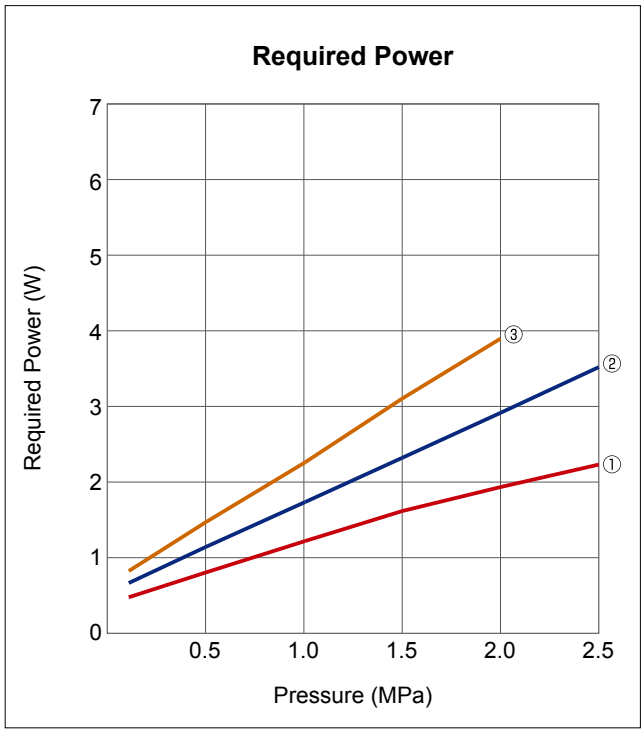
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①N320F　②N330F　③N340F





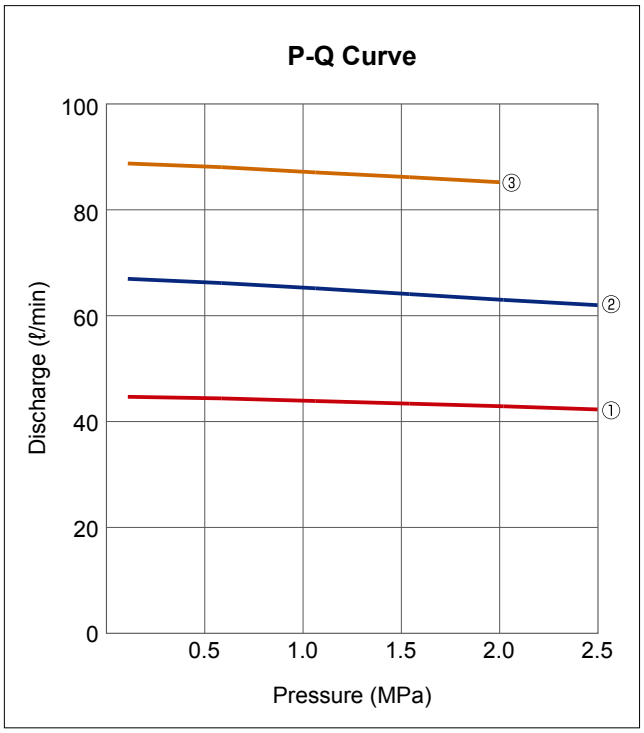
Item / Model	Discharge (ℓ/min) Pressure (MPa)						Required Power (W) Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
TOP-N320F	37.2	36.9	36.5	36.1	35.7	35.0	0.45	0.78	1.20	1.60	1.92	2.22
TOP-N330F	55.5	54.9	54.0	53.2	52.3	51.5	0.64	1.12	1.72	2.31	2.91	3.52
TOP-N340F	74.6	73.9	73.0	72.1	70.2		0.80	1.45	2.25	3.10	3.90	

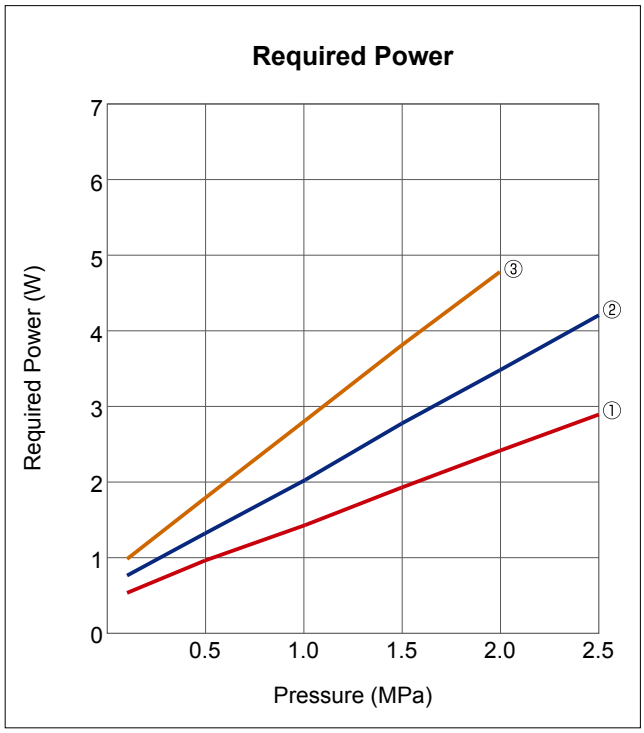
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①N320F　②N330F　③N340F





Item / Model	Discharge (ℓ/min) Pressure (MPa)						Required Power (W) Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
TOP-N320F	44.9	44.6	44.1	43.6	43.1	42.5	0.55	0.98	1.45	1.95	2.44	2.92
TOP-N330F	67.3	66.5	65.5	64.4	63.3	62.3	0.78	1.34	2.05	2.80	3.51	4.24
TOP-N340F	89.2	88.5	87.5	86.6	85.6		1.00	1.81	2.84	3.84	4.82	

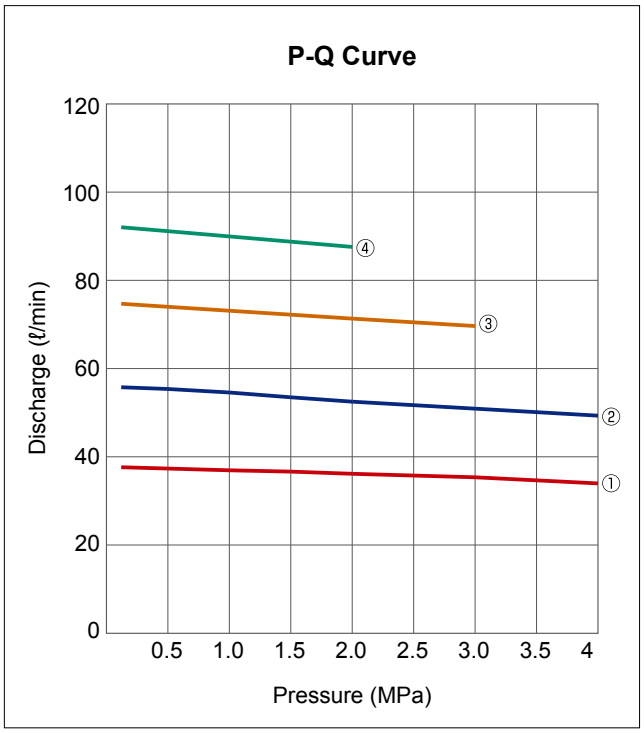
N3H Performance Curve

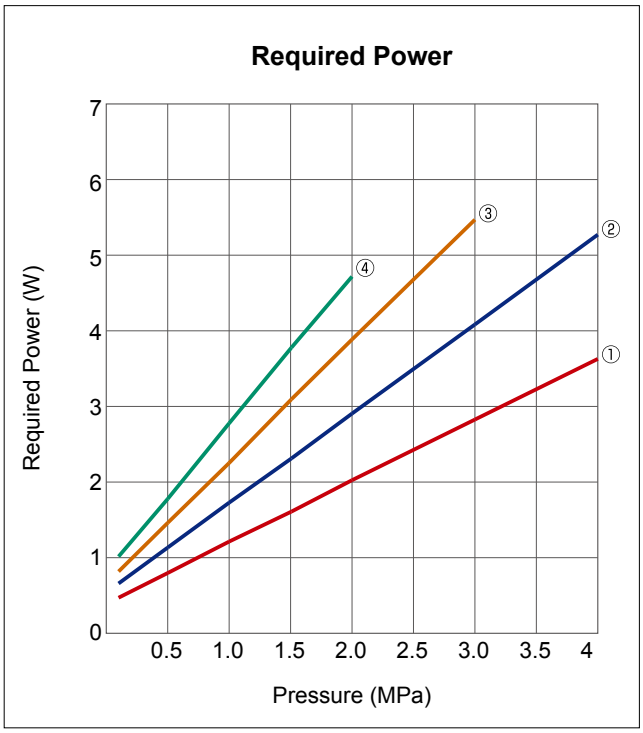
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①N320H　②N330H　③N340H　④N350H





Item / Model	Discharge (ℓ/min) Pressure (MPa)							Required Power (W) Pressure (MPa)						
	0.1	0.5	1.0	1.5	2.0	3.0	4.0	0.1	0.5	1.0	1.5	2.0	3.0	4.0
TOP-N320H	37.2	36.9	36.5	36.2	35.7	34.9	33.5	0.45	0.78	1.20	1.60	2.02	2.83	3.64
TOP-N330H	55.5	55.1	54.3	53.2	52.2	50.6	49.0	0.64	1.12	1.72	2.31	2.91	4.10	5.30
TOP-N340H	74.6	73.9	73.0	72.1	71.2	69.5		0.80	1.45	2.25	3.10	3.90	5.50	
TOP-N350H	92.1	91.2	90.0	88.8	87.6			1.00	1.77	2.78	3.79	4.74		

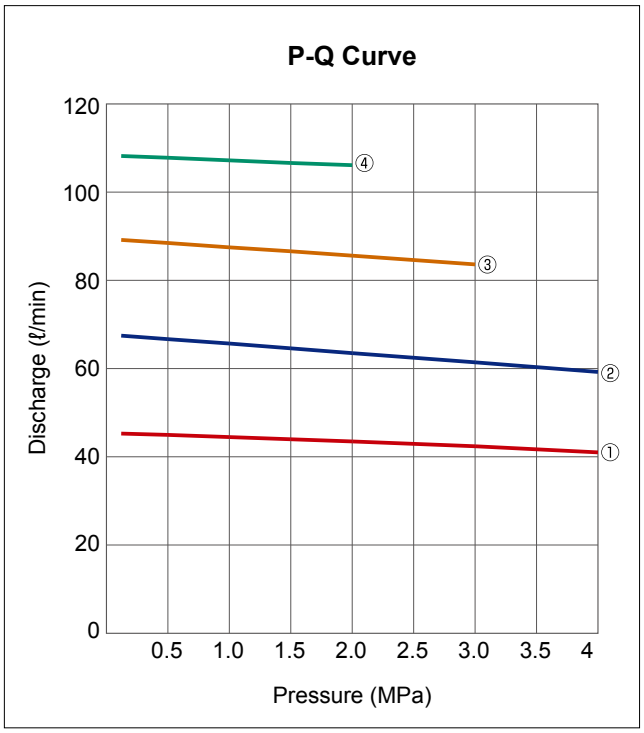
Any disassembly or alteration of the product will void the warranty.

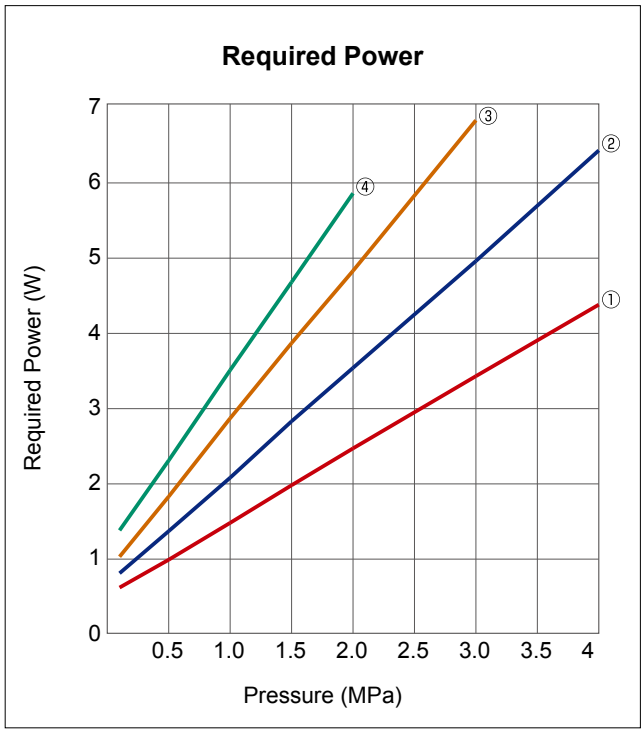
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①N320H　②N330H　③N340H　④N350H





Item / Model	Discharge (ℓ/min) Pressure (MPa)							Required Power (W) Pressure (MPa)						
	0.1	0.5	1.0	1.5	2.0	3.0	4.0	0.1	0.5	1.0	1.5	2.0	3.0	4.0
TOP-N320H	44.9	44.6	44.1	43.6	43.1	42.0	40.6	0.59	0.96	1.45	1.95	2.44	3.40	4.35
TOP-N330H	67.3	66.5	65.5	64.4	63.3	61.2	59.0	0.78	1.34	2.05	2.80	3.51	4.93	6.40
TOP-N340H	89.2	88.5	87.5	86.6	85.6	83.6		1.00	1.80	2.84	3.84	4.80	6.80	
TOP-N350H	108.4	108.0	107.4	106.8	106.3			1.35	2.28	3.48	4.65	5.83		

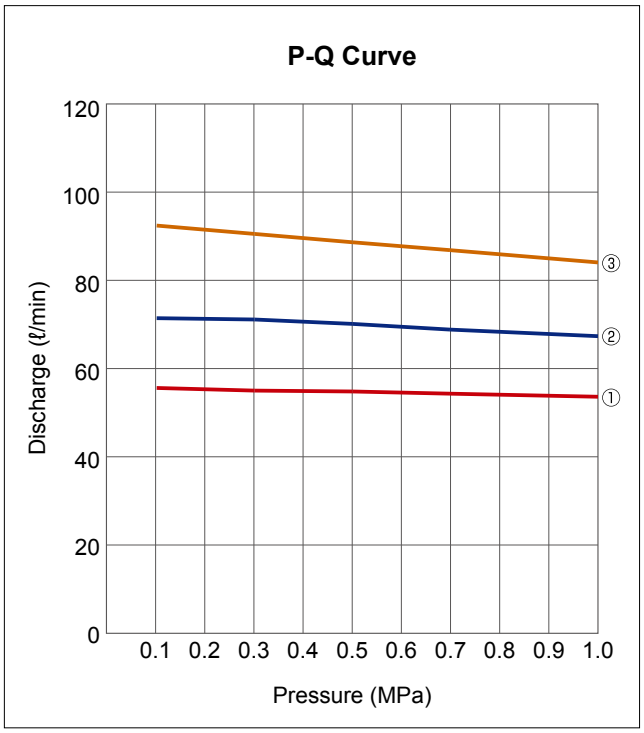
3V Performance Curve

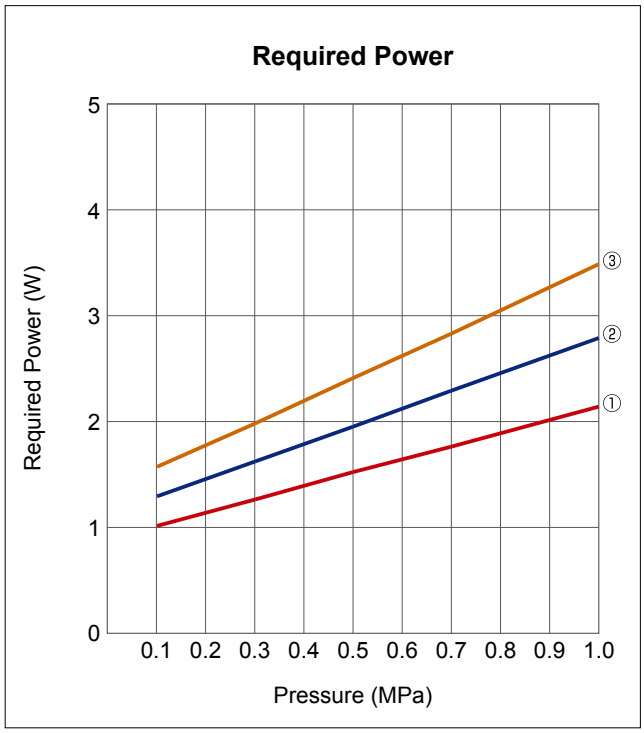
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①330V　②340V　③350V





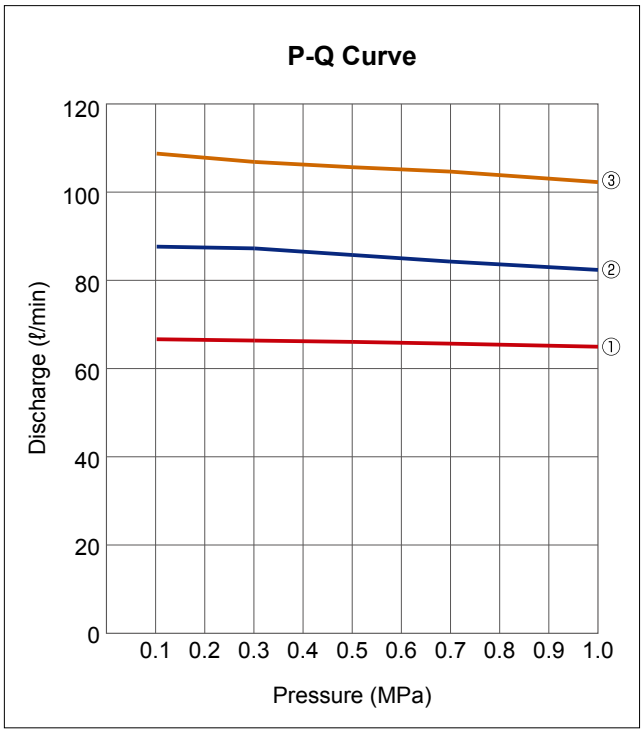
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
TOP-330V	56.2	55.6	55.4	54.9	54.2	1.01	1.26	1.52	1.76	2.14
TOP-340V	72.1	71.8	70.8	69.5	68.0	1.29	1.62	1.95	2.29	2.79
TOP-350V	93.2	91.3	89.4	87.6	84.8	1.57	1.98	2.41	2.83	3.49

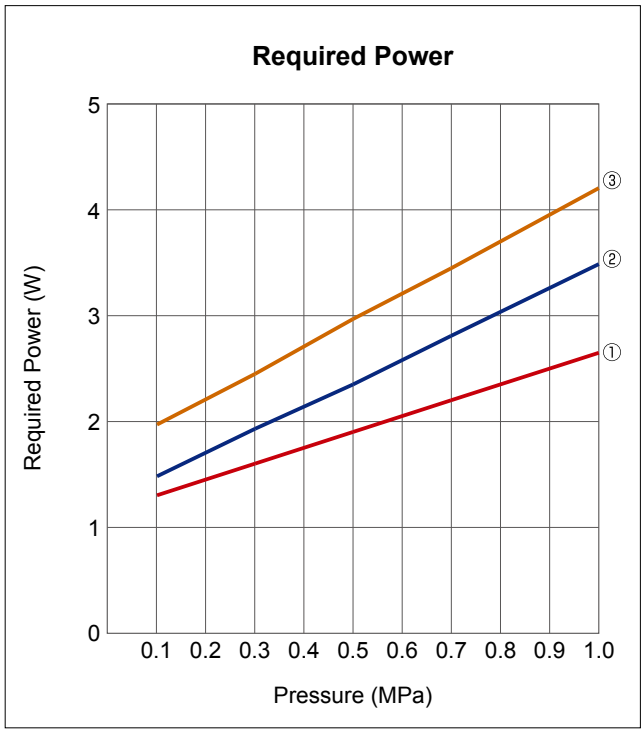
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①330V　②340V　③350V





Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
TOP-330V	67.3	67.0	66.7	66.3	65.6	1.30	1.60	1.90	2.20	2.65
TOP-340V	88.4	88.0	86.5	85.0	83.1	1.48	1.93	2.35	2.81	3.49
TOP-350V	109.6	107.7	106.5	105.5	103.1	1.97	2.45	2.97	3.45	4.21

4MB-4AM

(BASE-COUPLING MOUNT TYPE)

4AM

(PUMPHEAD)

■ Model Numbering System (For General Lubricant Oil)

TOP-4MB① ②–6–③ ④VB – ⑤ Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
3700/
5500/
7500
Note: "IE3" is added at the end of model no.

Model
4100AMI/
4130AMI/
4150AMI/
4200AMI/
4250AMI

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material (fluororubber)
VH: Special material

■ Model Numbering System (Pumphead)

TOP-① ② ③VB – ④ Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
4100AM/
4130AM/
4150AM/
4200AM/
4250AM

Attachment
Non: No angle plate
I: Angle plate

Rotation Direction
Note: When viewed from pump shaft end
Non: Clockwise (Standard)
L: Counter-clockwise

Seal & Gasket Options
(See P131 for "Seal and gasket material option list")
Non: Standard material (fluororubber)
VH: Special material

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
TOP-4100AM	115.5	2.0	1800	28.0
TOP-4130AM	148.5	2.0	1800	30.0
TOP-4150AM	171.6	2.0	1500	31.0
TOP-4200AM	231.0	2.0	1500	34.0
TOP-4250AM	280.5	2.0	1200	42.0

• Test oil: ISO-VG2/Oil temperature: 40C
• Add 9 Kg to the total weight if angle plate option is selected.

■ Specifications

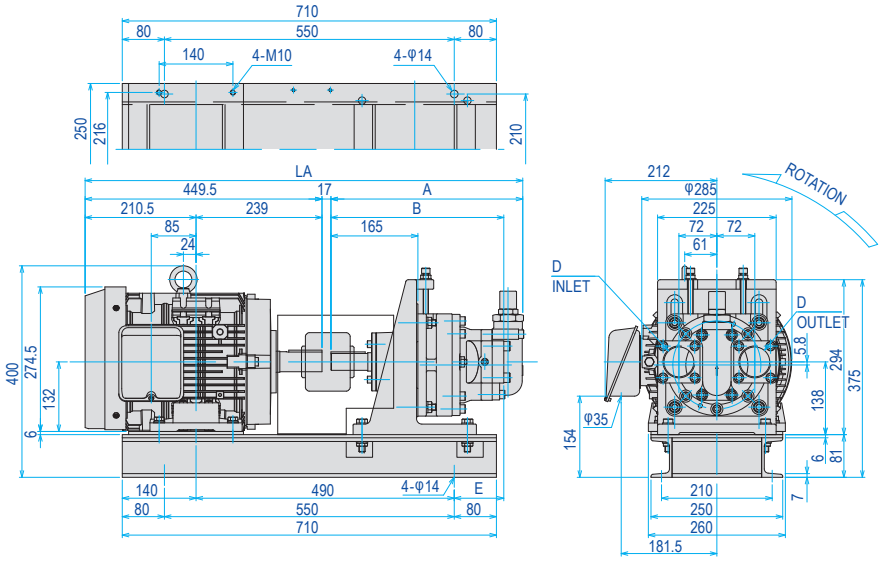
Item / Model	Motor speed 50Hz 1000min^{-1}				Motor speed 60Hz 1200min^{-1}			
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
		3700W	5500W	7500W		3700W	5500W	7500W
TOP-4100AM	115.5	1.1	2.0	2.0	138.6	0.8	1.5	2.0
TOP-4130AM	148.5	0.8	1.5	2.0	178.2	0.6	1.1	1.6
TOP-4150AM	171.6	0.7	1.3	1.4	205.9	0.4	0.9	1.2
TOP-4200AM	231.0	0.4	0.8	1.1	277.2	0.2	0.6	0.7
TOP-4250AM	280.5	–	0.6	0.9	336.6	–	0.4	0.6

• Test oil: ISO-VG46/Oil temperature: 40C
• Number of poles : 6P

Any disassembly or alteration of the product will void the warranty.

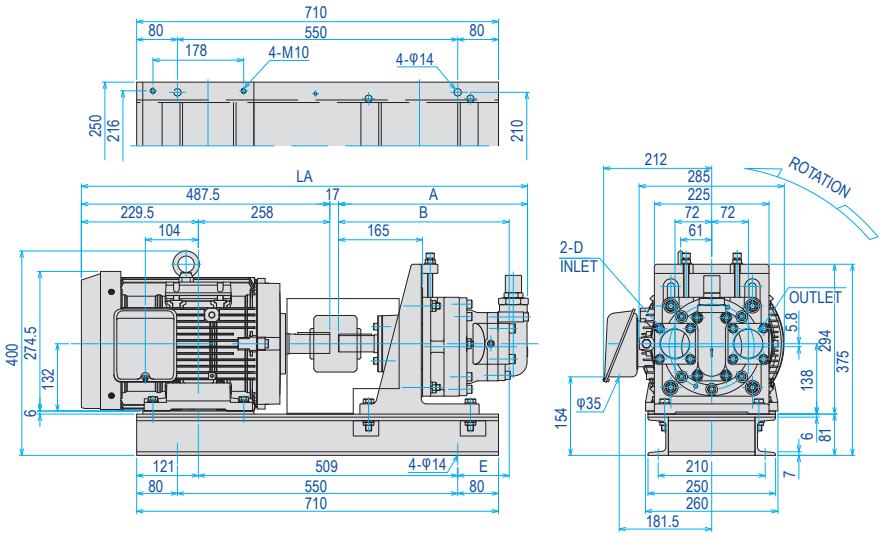
■ Dimensions (Typical) for 4MB-4AM

Model : TOP-4MBT3700-6-4***AMIVB-** IE3



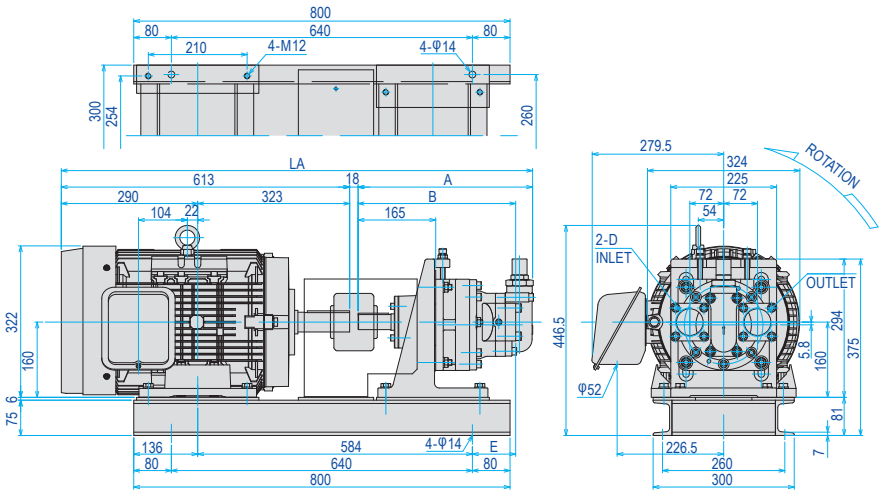
Item / Model	LA	A	B	D	E
4100	820.5	354	318	Rc 1-1/2	84
4130	830.5	364	328	Rc 2	94
4150	837.5	371	335		101
4200	855.5	389	353		119

Model : TOP-4MBT5500-6-4***AMIVB-** IE3



Item / Model	LA	A	B	D	E
4100	858.5	354	318	Rc 1-1/2	84
4130	868.5	364	328	Rc 2	94
4150	875.5	371	335		101
4200	893.5	389	353		119
4250	908.5	404	368		134

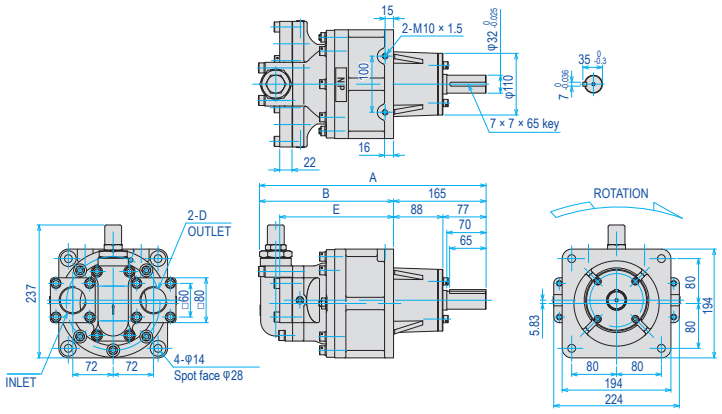
Model : TOP-4MBT7500-6-4***AMIVB-** IE3



Item / Model	LA	A	B	D	E
4100	985	354	318	Rc 1-1/2	75
4130	995	364	328	Rc 2	85
4150	1002	371	335		92
4200	1020	389	353		110
4250	1035	404	368		125

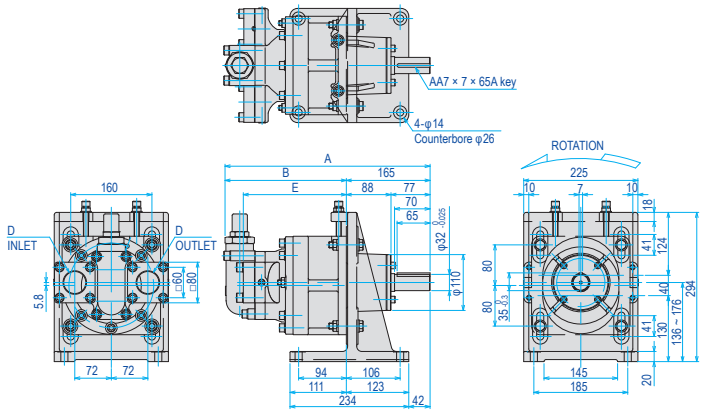
■ Dimensions (Typical) for 4AM

Model : TOP-4***AMVB-**



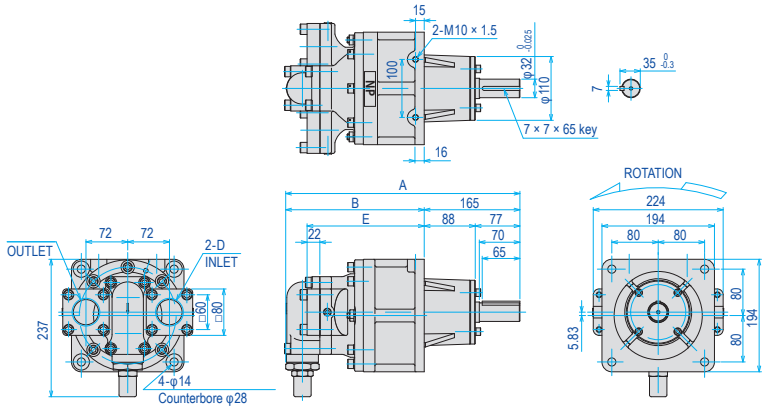
Model \ Item	A	B	D	E
4100	354	189	Rc 1-1/2	153
4130	364	199	Rc 2	163
4150	371	206		170
4200	389	224		188
4250	404	239		203

Model : TOP-4***AMIVB-**



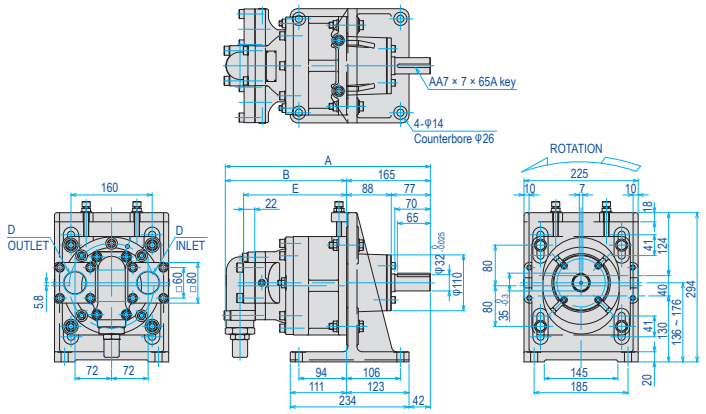
Model \ Item	A	B	D	E
4100	354	189	Rc 1-1/2	153
4130	364	199	Rc 2	163
4150	371	206		170
4200	389	224		188
4250	404	239		203

Model : TOP-4***AMLVB-**



Model \ Item	A	B	D	E
4100	354	189	Rc 1-1/2	153
4130	364	199	Rc 2	163
4150	371	206		170
4200	389	224		188
4250	404	239		203

Model : TOP-4***AMILVB-**



Model \ Item	A	B	D	E
4100	354	189	Rc 1-1/2	153
4130	364	199	Rc 2	163
4150	371	206		170
4200	389	224		188
4250	404	239		203

Any disassembly or alteration of the product will void the warranty.

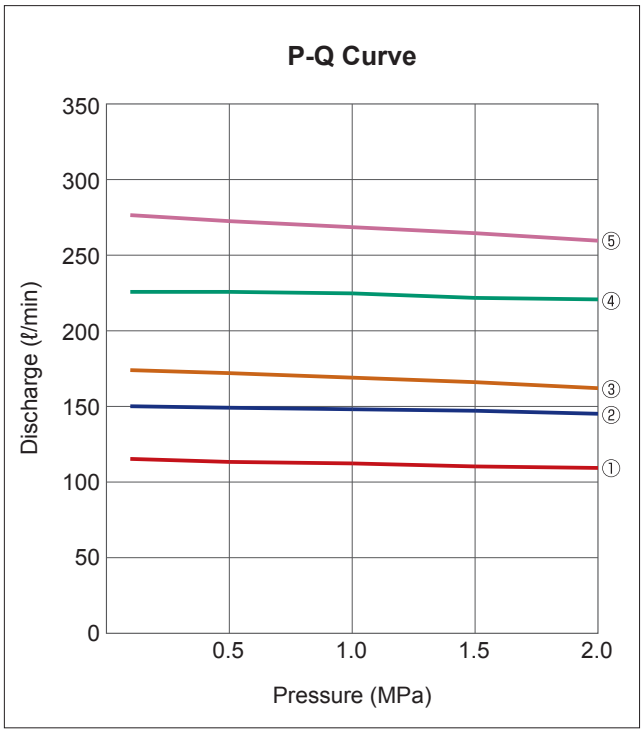
4AM Performance Curve

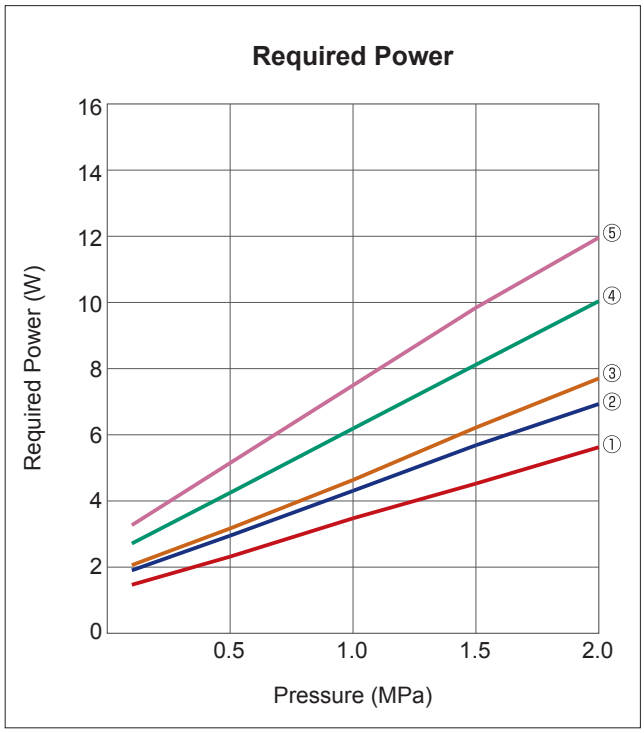
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

960 min^{-1}

①4100AM　②4130AM　③4150AM　④4200AM　⑤4250AM





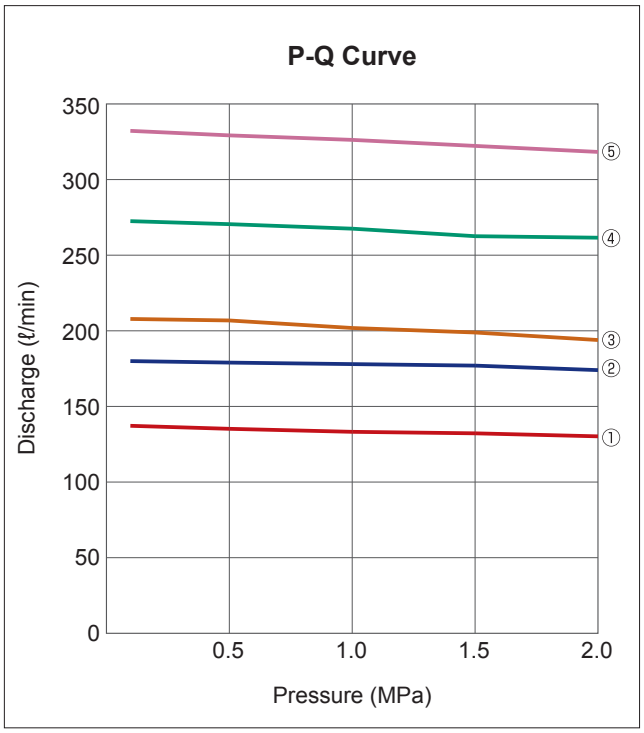
Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.5	1.0	1.5	2.0	0.1	0.5	1.0	1.5	2.0
TOP-4100AM	115	113	112	110	109	1.40	2.26	3.43	4.49	5.60
TOP-4130AM	150	149	148	147	145	1.84	2.90	4.27	5.66	6.92
TOP-4150AM	174	172	169	166	162	2.00	3.12	4.60	6.20	7.70
TOP-4200AM	226	226	225	222	221	2.66	4.21	6.17	8.12	10.06
TOP-4250AM	277	273	269	265	260	3.22	5.12	7.49	9.86	12.00

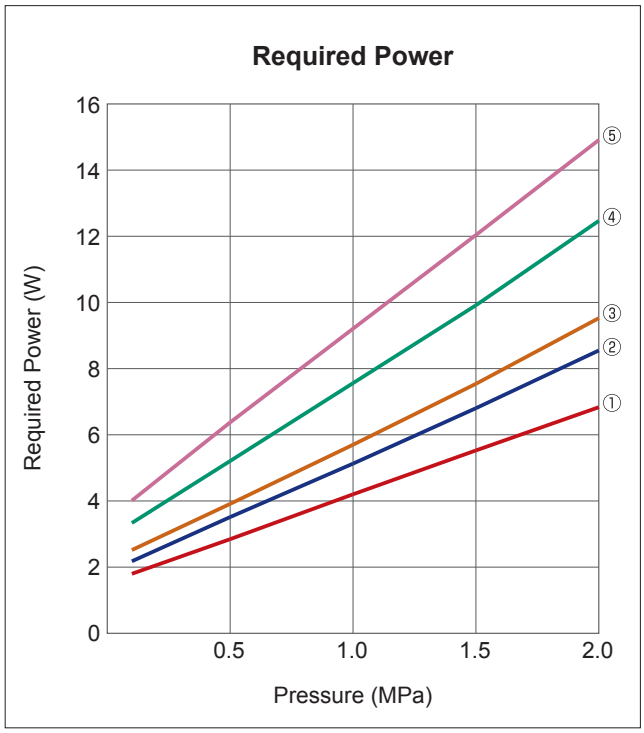
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1160 min^{-1}

①4100AM　②4130AM　③4150AM　④4200AM　⑤4250AM





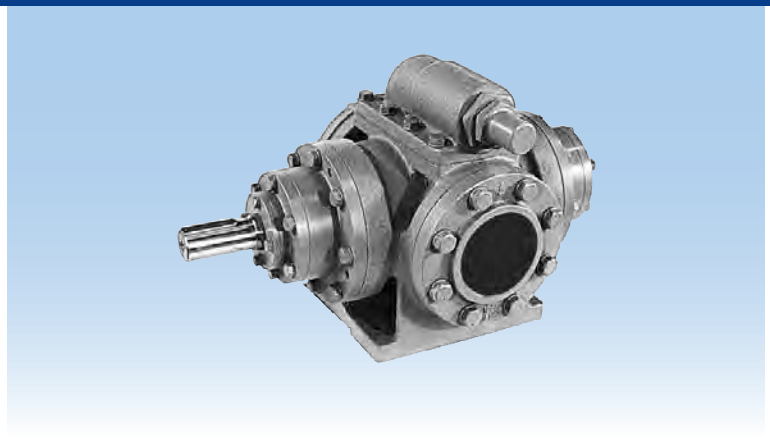
Item / Model	Discharge (ℓ/min) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0	Required Power (W) Pressure (MPa) 0.1	0.5	1.0	1.5	2.0
TOP-4100AM	137	135	133	132	130	1.78	2.83	4.19	5.52	6.83
TOP-4130AM	180	179	178	177	174	2.16	3.50	5.12	6.80	8.55
TOP-4150AM	208	207	202	199	194	2.50	3.90	5.64	7.44	9.53
TOP-4200AM	273	271	268	263	262	3.32	5.20	7.56	9.92	12.48
TOP-4250AM	333	330	327	323	319	4.00	6.37	9.21	12.05	14.93

4MB-4A

(BASE-COUPLING MOUNT TYPE)

4A

(PUMPHEAD)



■ Model Numbering System (For General Lubricant Oil)

TOP-4MB① ②–6–③ ④VB

Relief Valve Set Pressure

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Note: Indicated at the end of model number in 0.1 MPa units

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
5500/7500/
11000/15000
Note: "IE3" is added at the end of model no.

Model
4300A/4500A

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

■ Model Numbering System (Pumphead)

TOP-① ②VB

Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
4300A/4500A

Rotation Direction
Note: When viewed from pump shaft end
Non: Clockwise
L: Counter-clockwise

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
TOP-4300AVB	349.8	1.0	1200	120.0
TOP-4500AVB	580.8	1.0	1200	125.0

• Test oil: ISO-VG46/Oil temperature: 40C

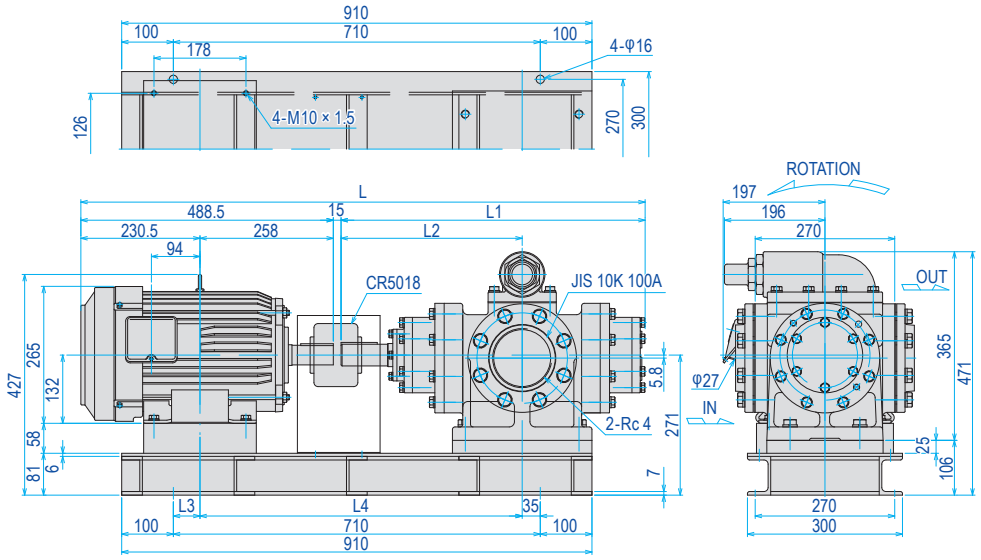
■ Specifications

Item / Model	Motor speed 50Hz 1000min^{-1}				Motor speed 60Hz 1200min^{-1}			
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		
		5500W	7500W	11000W		5500W	7500W	11000W
TOP-4300AVB	349.8	0.6	0.9	1.0	419.7	0.4	0.7	1.0
TOP-4500AVB	580.8	0.2	0.4	0.7	696.9	0.1	0.2	0.5

• Test oil: ISO-VG46/Oil temperature: 40C
• Number of poles : 6P

■ Dimensions (Typical) for 4MB-4A

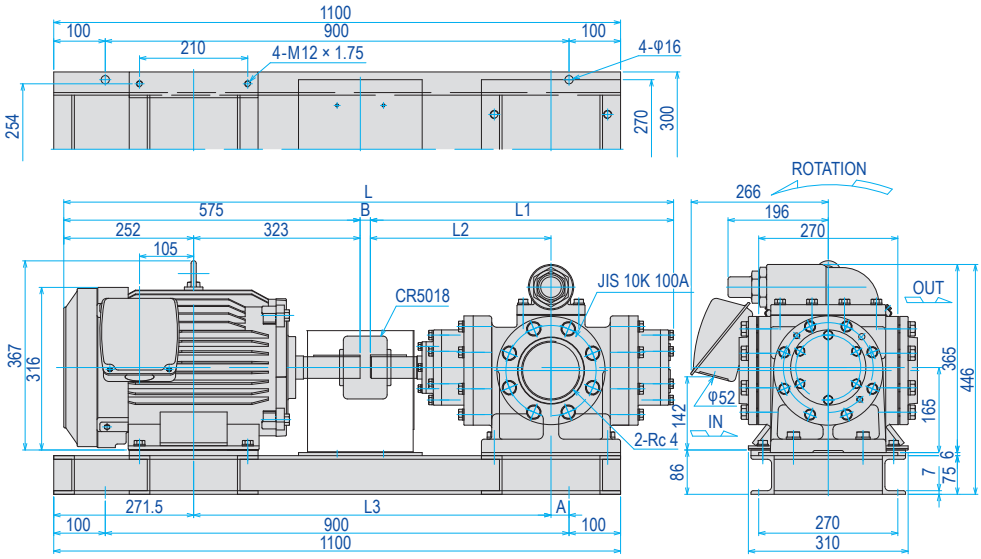
Model : TOP-4MBM5500-6-4***AVB IE3



Item / Model	L	L1	L2
4300	1021.9	518.4	315.5
4500	1091.9	588.4	350.5

Item / Model	L3	L4
4300	86.5	588.5
4500	51.5	623.5

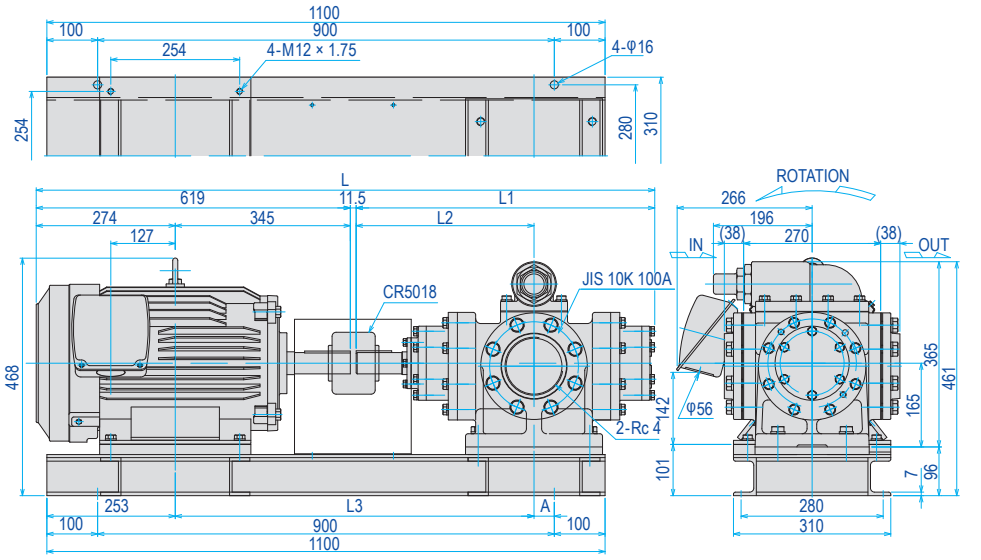
Model : TOP-4MBM7500-6-4***AVB IE3



Item / Model	L	L1	L2
4300	1108.4	518.4	315.5
4500	1183.4	588.4	350.5

Item / Model	L3	A	B
4300	653.5	75	15
4500	693.5	35	20

Model : TOP-4MBM11000-6-4***AVB IE3



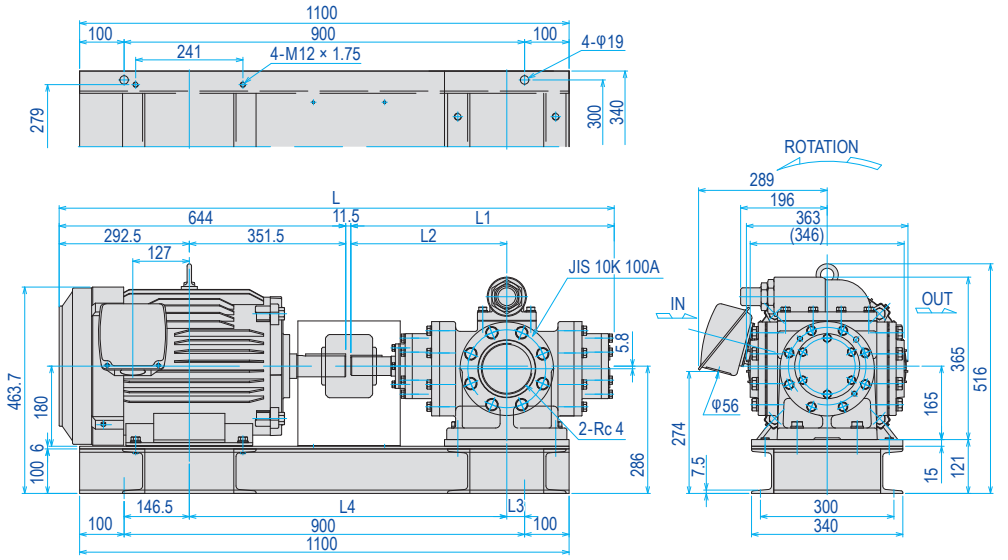
Item / Model	L	L1	L2
4300	1148.9	518.4	315.5
4500	1218.9	588.4	350.5

Item / Model	L3	A
4300	672	75
4500	707	40

Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 4MB-4A/4A

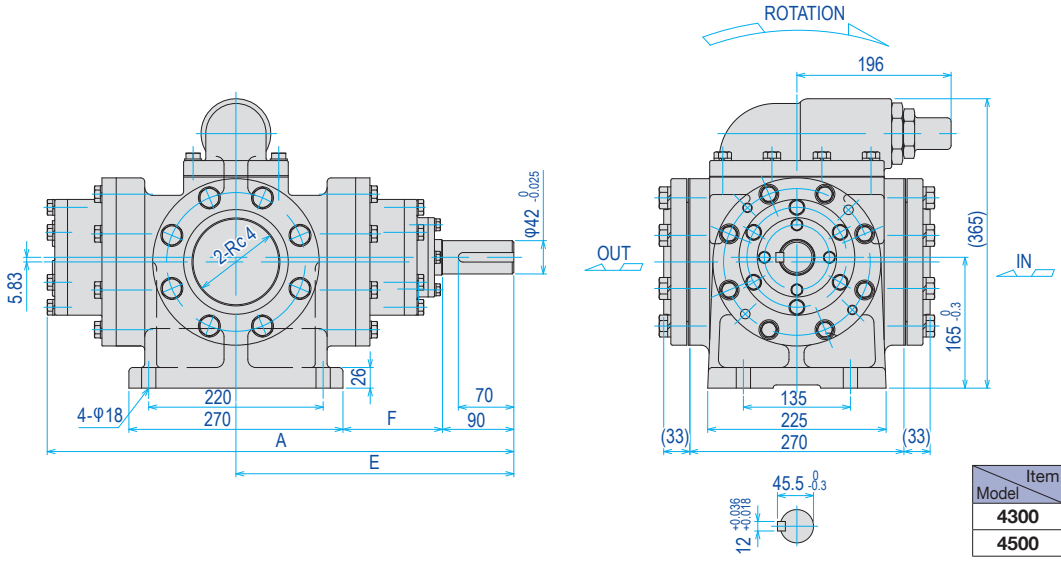
Model : TOP-4MBM15000-6-4***AVB IE3



Item / Model	L	L1	L2
4300	1173.9	518.4	315.5
4500	1243.9	588.4	350.5

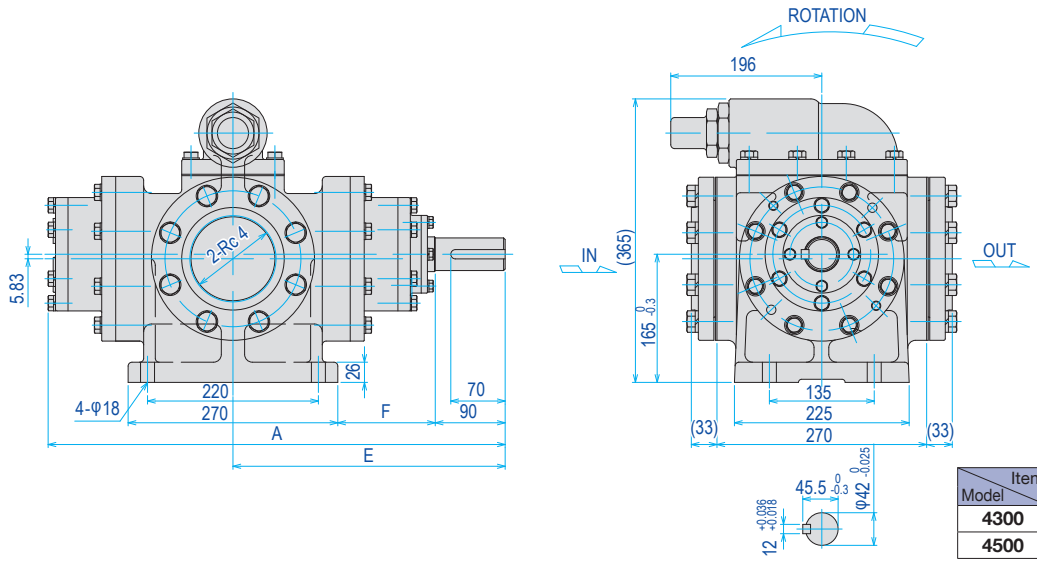
Item / Model	L3	L4
4300	75	678.5
4500	40	713.5

Model : TOP-4***AVB



Item / Model	A	E	F
4300	518.4	315.5	90.5
4500	588.4	350.5	125.5

Model : TOP-4***ALVB



Item / Model	A	E	F
4300	518.4	315.5	90.5
4500	588.4	350.5	125.5

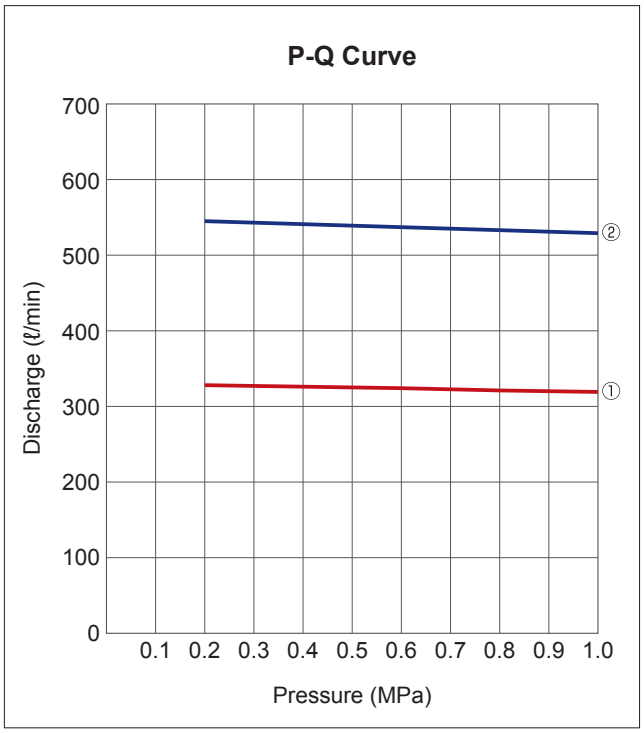
4A Performance Curve

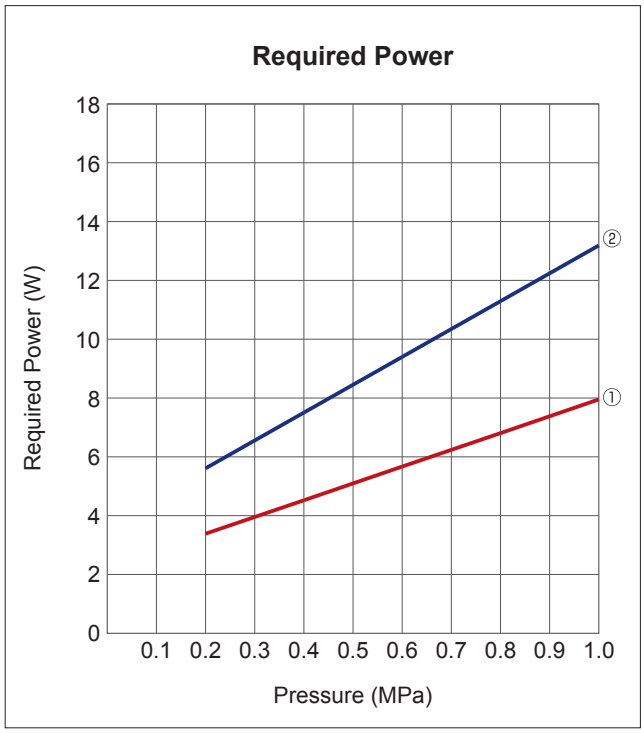
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

960 min^{-1}

①4300AVB　②4500AVB





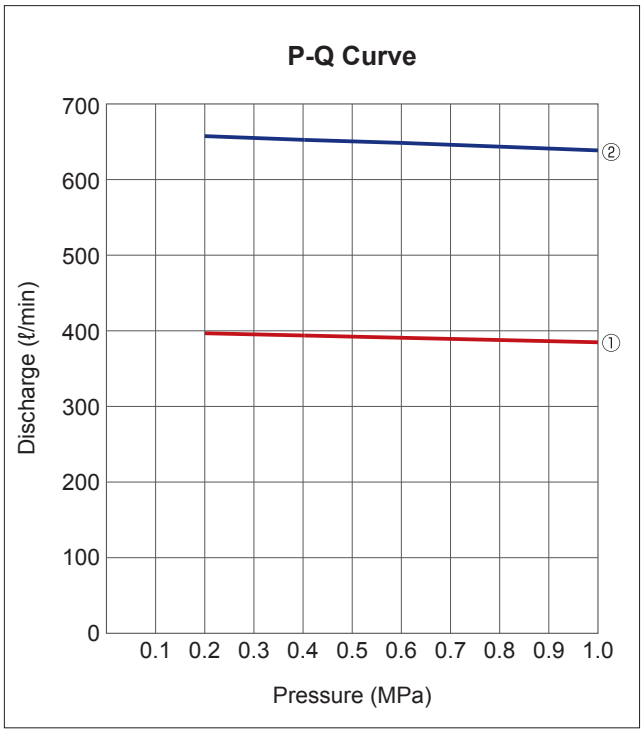
Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.2	0.4	0.6	0.8	1.0	0.2	0.4	0.6	0.8	1.0
TOP-4300AVB	328	326	324	321	319	3.37	4.51	5.66	6.80	7.95
TOP-4500AVB	546	542	538	534	530	5.60	7.50	9.40	11.30	13.20

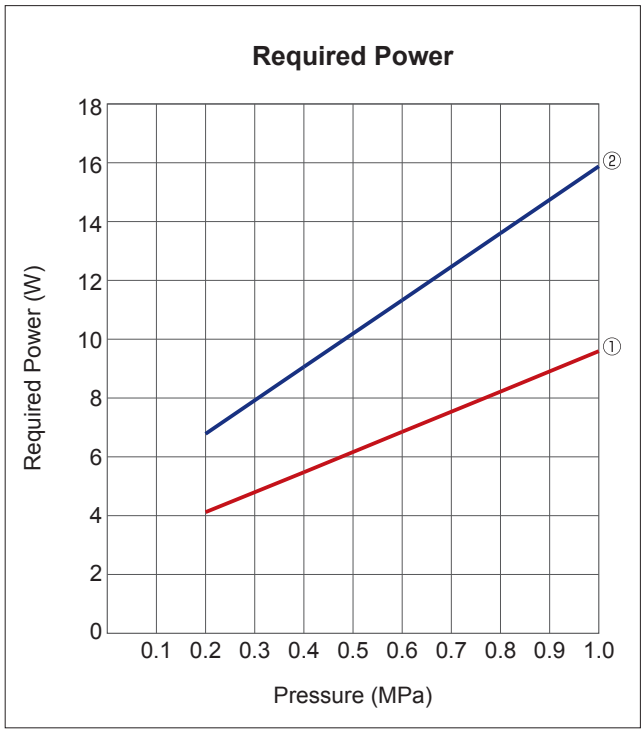
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1160 min^{-1}

①4300AVB　②4500AVB





Item / Model	Discharge (ℓ/min) Pressure (MPa) 0.2	0.4	0.6	0.8	1.0	Required Power (W) Pressure (MPa) 0.2	0.4	0.6	0.8	1.0
TOP-4300AVB	397	394	391	388	385	4.07	5.44	6.83	8.21	9.60
TOP-4500AVB	659	654	650	645	640	6.76	9.06	11.35	13.65	15.95

MB-GPL

(BASE-COUPLING MOUNT TYPE)

GPL

(PUMPHEAD)

■ Model Numbering System (For General Lubricant Oil)

MB① ② – 6 – GPL – ③ ④VB

Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Motor Manufacturer
M (Mitsubishi)
T (Toshiba)

Motor Output
3700/5500/7500
Note: "IE3" is added at the end of model no.

Model
150l/200l/250l

Rotation Direction
Note: When viewed from pump shaft end (motor side)
Non: Clockwise
L: Counter-clockwise

■ Model Numbering System (Pumphead)

GPL-① ② ③VB

Relief Valve Set Pressure

Note: Indicated at the end of model number in 0.1 MPa units

Model
150/200/250

Attachment
I: Angle plate
F: No angle plate

Rotation Direction
Note: When viewed from pump shaft end
Non: Clockwise
L: Counter-clockwise

Note: For transfering oil with high viscosity (46-2000mm^2/sec), such as high viscosity lubricant oil or gear oil

■ Specifications

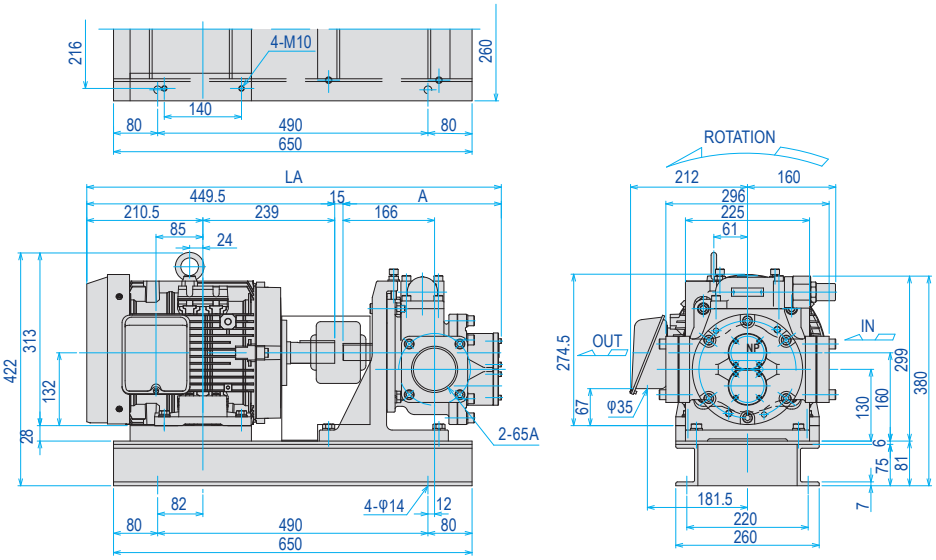
Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. Weight (Kg)
		1000min^{-1}	1200min^{-1}			
GPL-150VB	150	150	180	1.0	1800	29.0
GPL-200VB	200	200	240	1.0	1800	30.0
GPL-250VB	250	250	300	1.0	1800	32.0

• Test oil: ISO-VG46/Oil temperature: 40C
• Add 13 Kg to the total weight if you select angle plate option.

Any disassembly or alteration of the product will void the warranty.

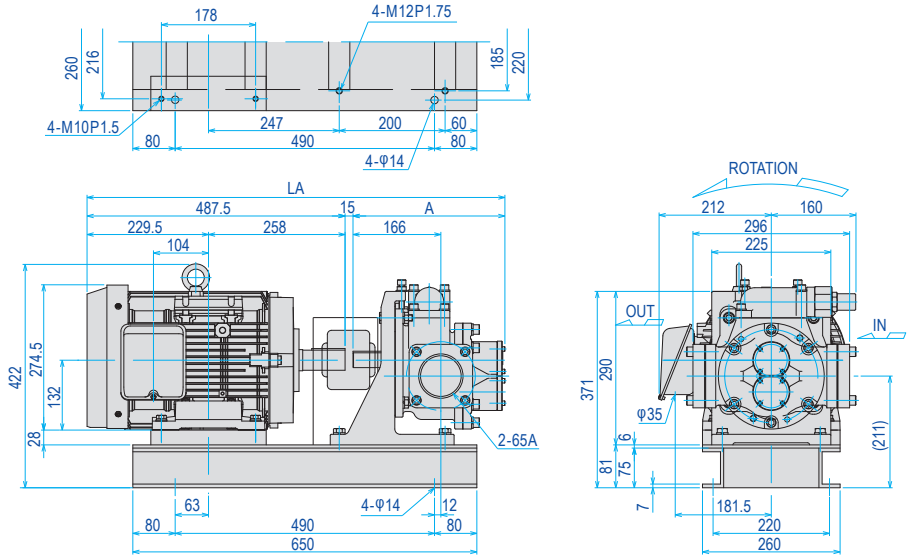
■ Dimensions (Typical) for MB-GPL

Model : TOP-MBT3700-6-GPL-★★★IVB IE3



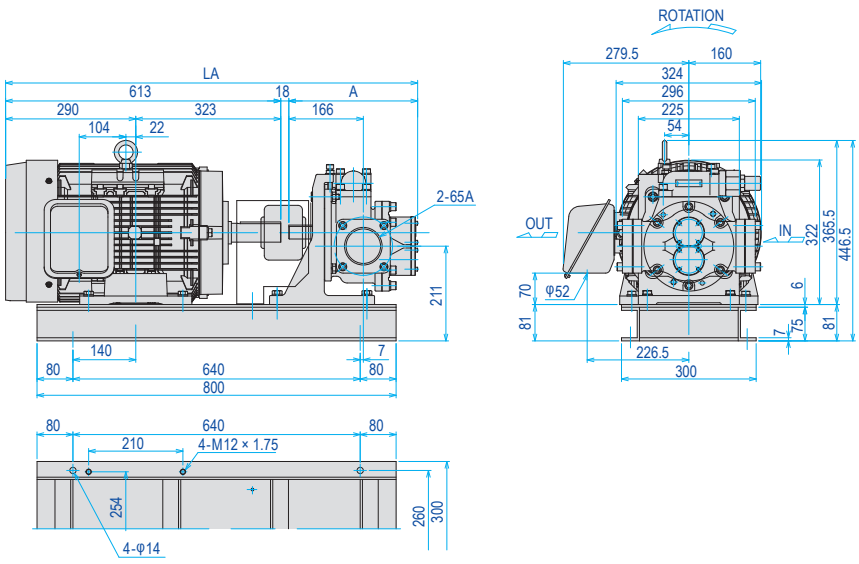
Item / Model	LA	A
150	732.5	268
200	751.5	287
250	770.5	306

Model : TOP-MBT5500-6-GPL-★★★IVB IE3



Item / Model	LA	A
150	770.5	268
200	789.5	287
250	808.5	306

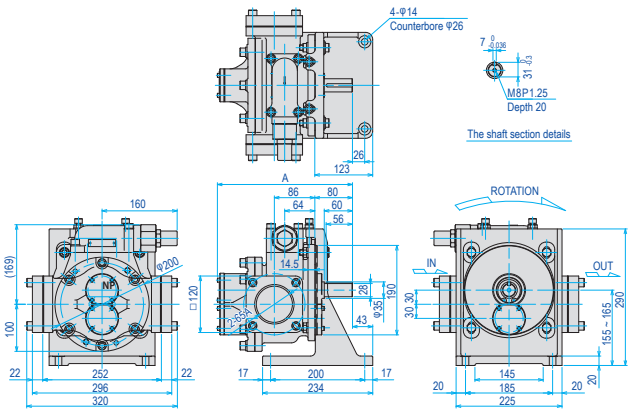
Model : TOP-MBT7500-6-GPL-★★★IVB IE3



Item / Model	LA	A
150	899	268
200	918	287
250	937	306

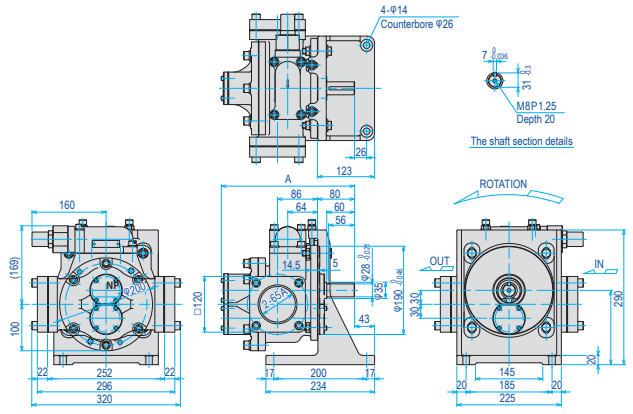
■ Dimensions (Typical) for GPL

Model : TOP-GPL-✱✱✱IVB



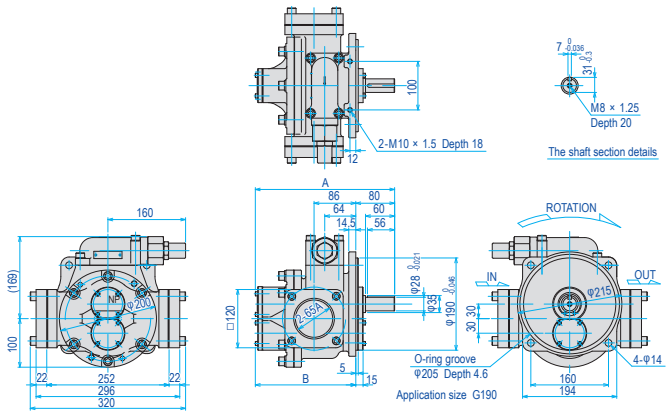
Model \ Item	A
150	268
200	287
250	306

Model : TOP-GPL-✱✱✱ILVB



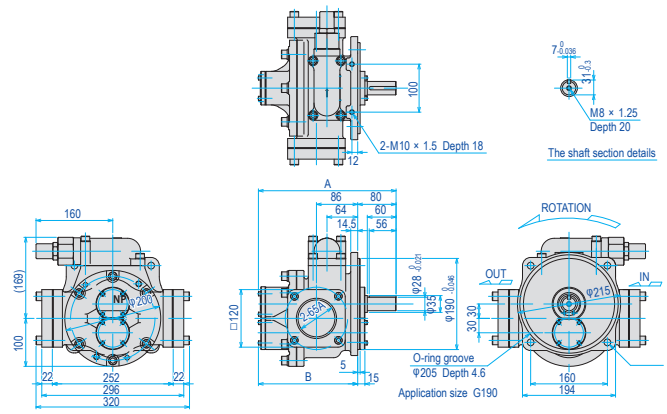
Model \ Item	A
150	268
200	287
250	306

Model : TOP-GPL-✱✱✱FVB



Model \ Item	A	B
150	268	188
200	287	207
250	306	226

Model : TOP-GPL-✱✱✱FLVB



Model \ Item	A	B
150	268	188
200	287	207
250	306	226

Any disassembly or alteration of the product will void the warranty.

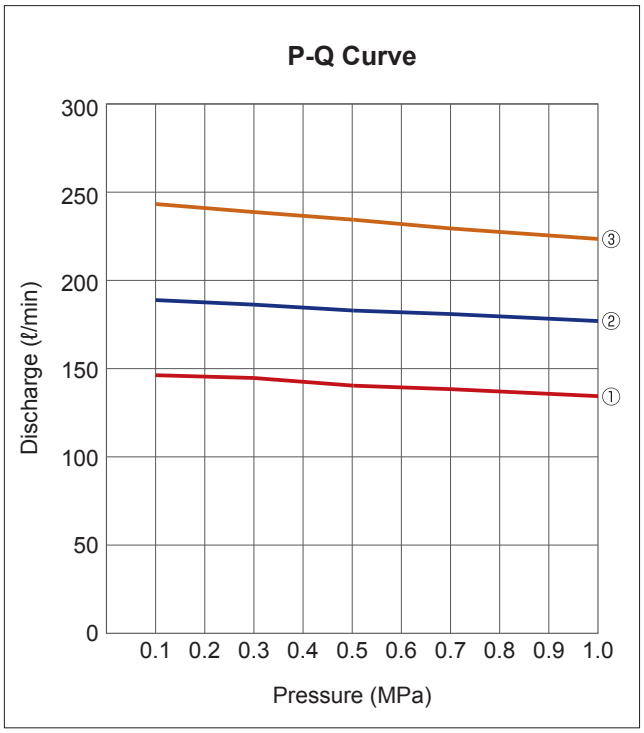
GPL Performance Curve

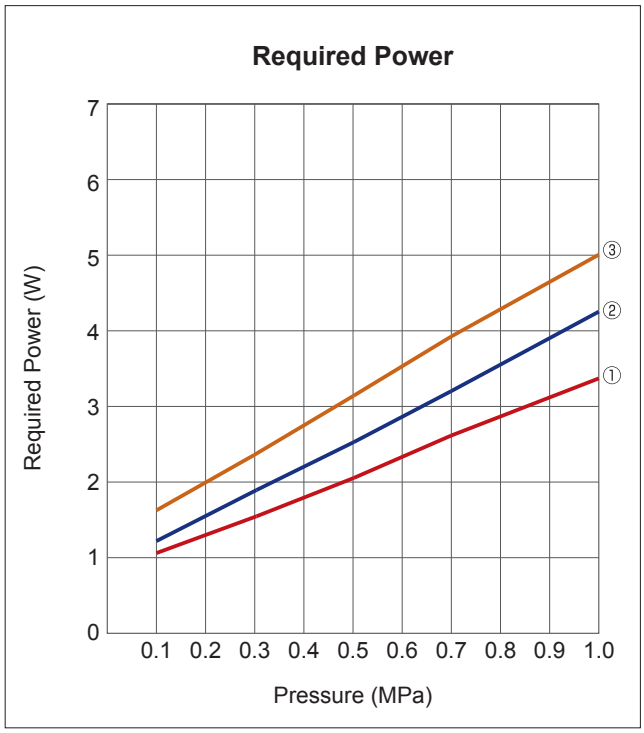
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

960 min^{-1}

①GPL-150VB　②GPL-200VB　③GPL-250VB





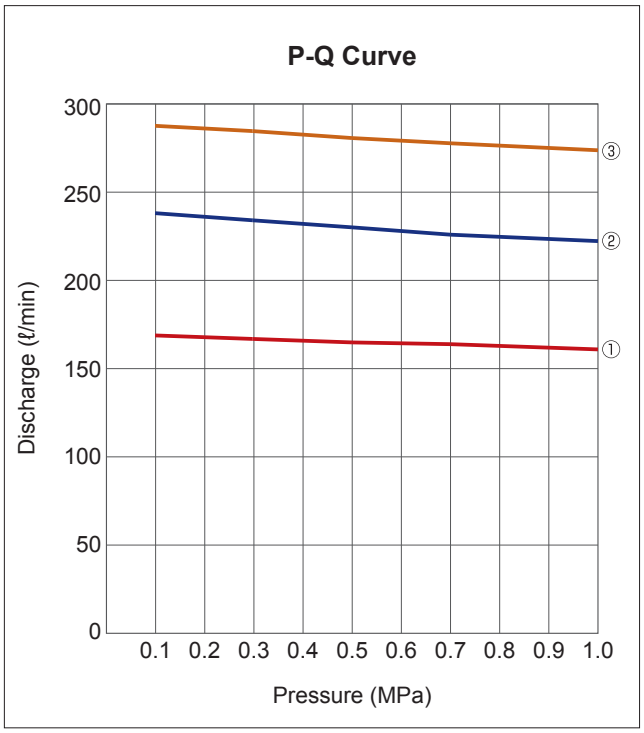
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
GPL-150VB	147	144	141	139	135	1.05	1.54	2.03	2.65	3.38
GPL-200VB	190	186	184	182	178	1.21	1.89	2.53	3.21	4.27
GPL-250VB	245	239	236	231	225	1.62	2.33	3.15	4.00	5.03

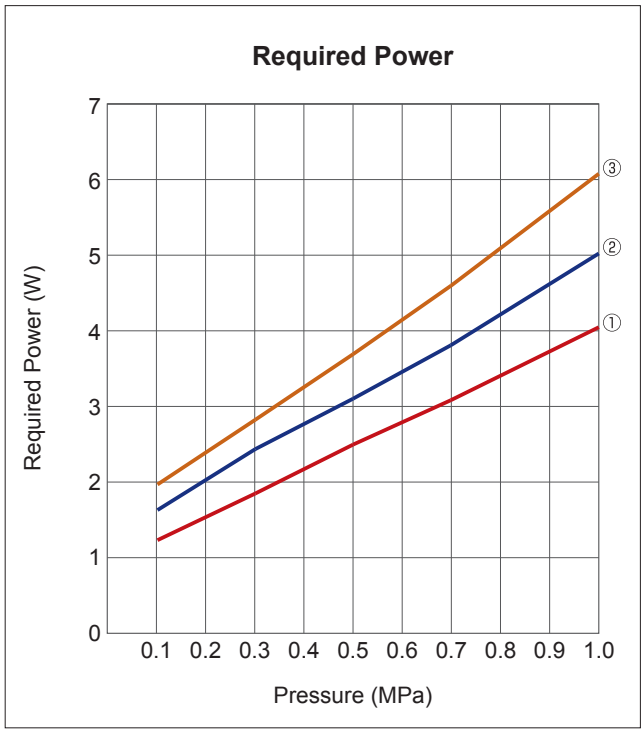
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1160 min^{-1}

①GPL-150VB　②GPL-200VB　③GPL-250VB





Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
GPL-150VB	169	167	165	164	161	1.22	1.84	2.49	3.08	4.05
GPL-200VB	239	232	229	227	223	1.62	2.43	3.10	3.81	5.03
GPL-250VB	289	286	282	279	275	1.96	2.82	3.64	4.55	6.09

1RA

(PUMPHEAD, REVERSIBLE)

2RA

(PUMPHEAD, REVERSIBLE)

■ Model Numbering System (For General Lubricant Oil)

TOP-1RA – ①

Model
100/200/300

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max.pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg)
		1500min^{-1}	1800min^{-1}			
TOP-1RA-100	1.1	1.6	2.0	0.5	2000	1.1
TOP-1RA-200	1.8	2.7	3.2	0.5	2000	1.2
TOP-1RA-300	2.5	3.7	4.5	0.5	2000	1.3

• Test oil: ISO-VG46/Oil temperature: 40C

■ Model Numbering System (For General Lubricant Oil)

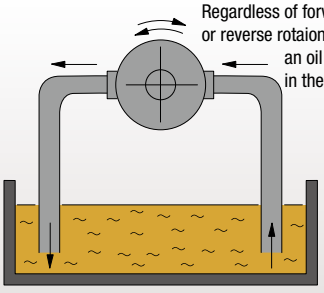
TOP-2RA – ①

Model
4C/8C/12C

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max.pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg)
		1500min^{-1}	1800min^{-1}			
TOP-2RA-4C	4.0	6.0	7.2	0.5	2000	3.9
TOP-2RA-8C	8.0	12.0	14.4	0.5	2000	4.2
TOP-2RA-12C	12.0	18.0	21.6	0.5	1800	4.5

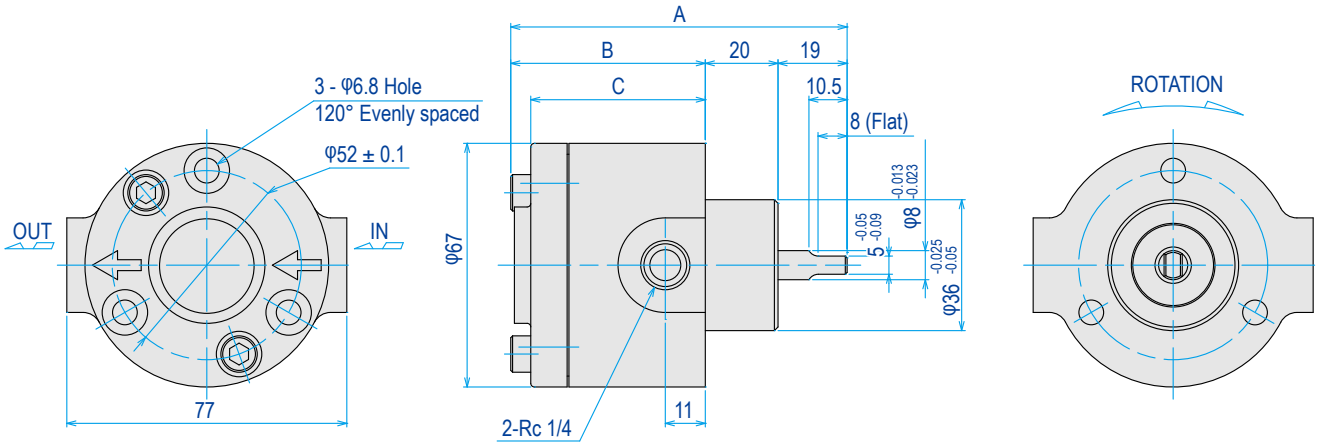
• Test oil: ISO-VG46/Oil temperature: 40C



When the pump rotation is reversed, a reversing ring within which rotors are mounted will also rotate following the rotation direction by 180° degrees and thereby reverse the eccentricity of the pump. Because of that, pumping flow direction always stay the same regardless of its rotation direction.

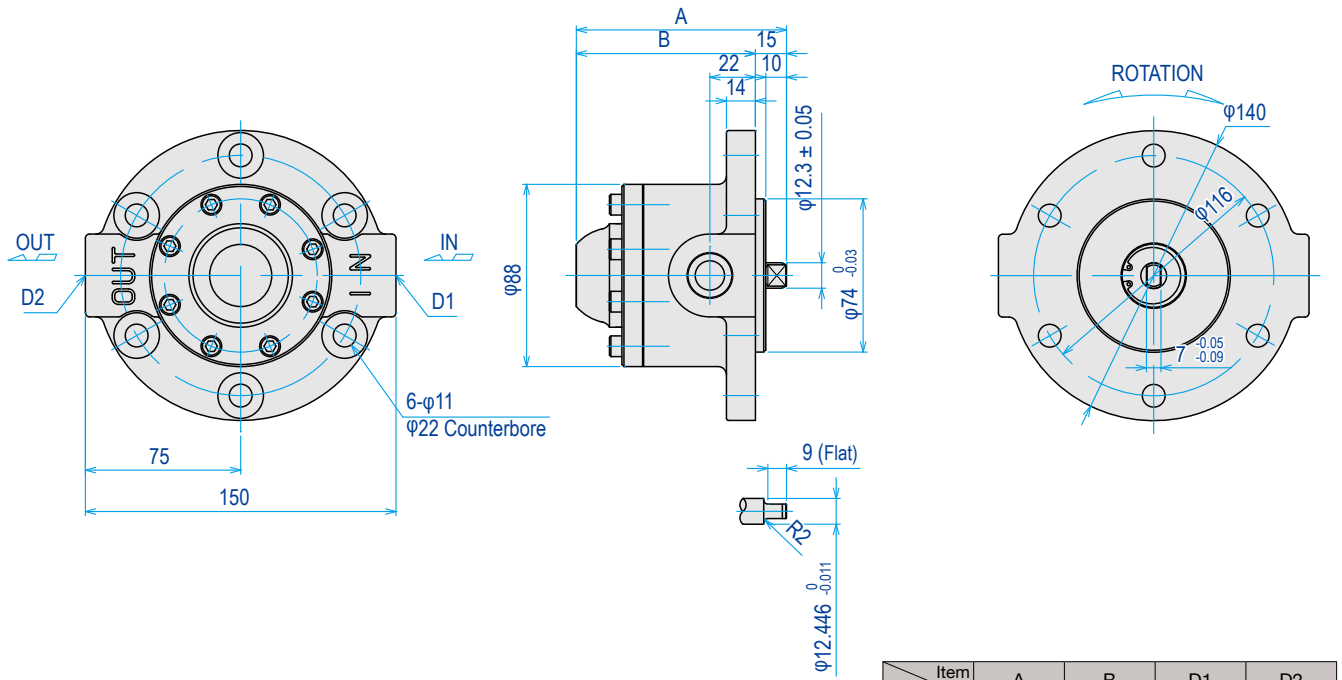
■ Dimensions (Typical) for 1RA/2RA

Model : TOP-1RA✱✱✱



Item / Model	A	B	C
100	84.5	45.5	40
200	88.5	49.5	44
300	92.5	53.5	48

Model : TOP-2RA-✱C



Item / Model	A	B	D1	D2
100	91.5	76.5	Rc 1/2	Rc 3/8
200	101.5	86.5	Rc 3/4	Rc 1/2
300	111.5	96.5	Rc 3/4	Rc 3/4

Any disassembly or alteration of the product will void the warranty.

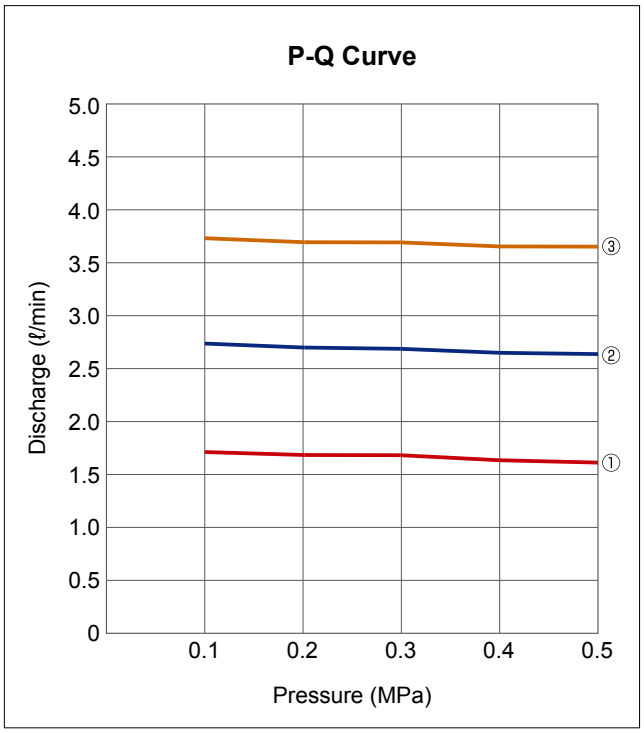
1RA Performance Curve

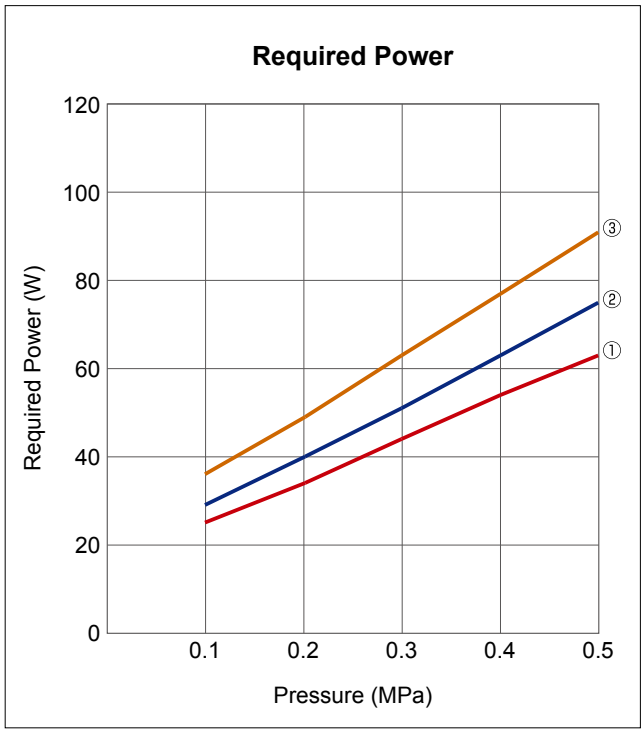
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①1RA-100　②1RA-200　③1RA-300





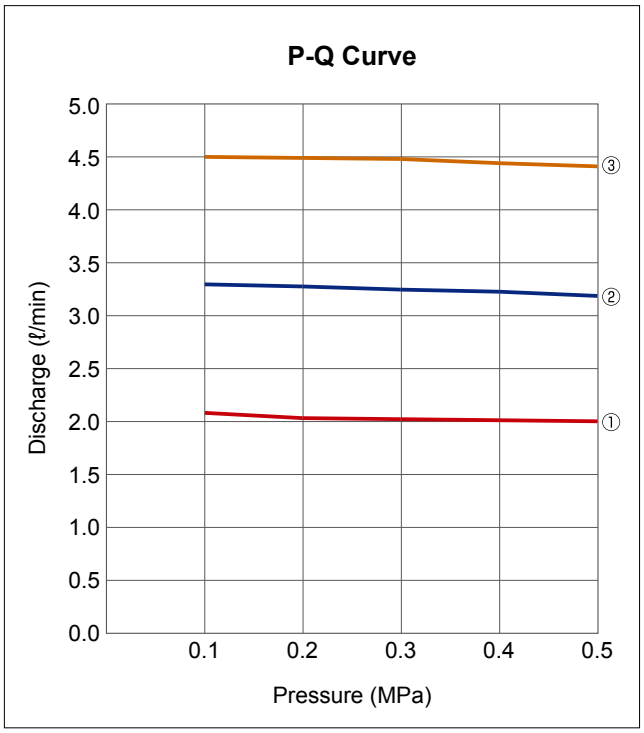
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-1RA-100	1.69	1.68	1.66	1.63	1.59	25	34	44	54	63
TOP-1RA-200	2.72	2.70	2.67	2.65	2.62	29	40	51	63	75
TOP-1RA-300	3.72	3.70	3.68	3.66	3.64	36	49	63	77	91

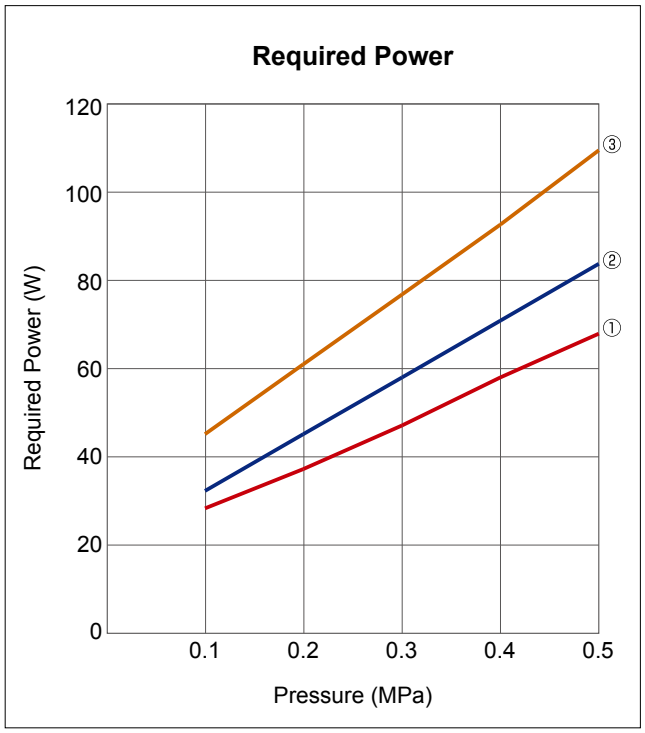
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①1RA-100　②1RA-200　③1RA-300





Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-1RA-100	2.08	2.03	2.02	2.01	2.00	28	37	47	58	68
TOP-1RA-200	3.30	3.28	3.25	3.23	3.19	32	45	58	71	84
TOP-1RA-300	4.51	4.50	4.49	4.45	4.42	45	61	77	93	110

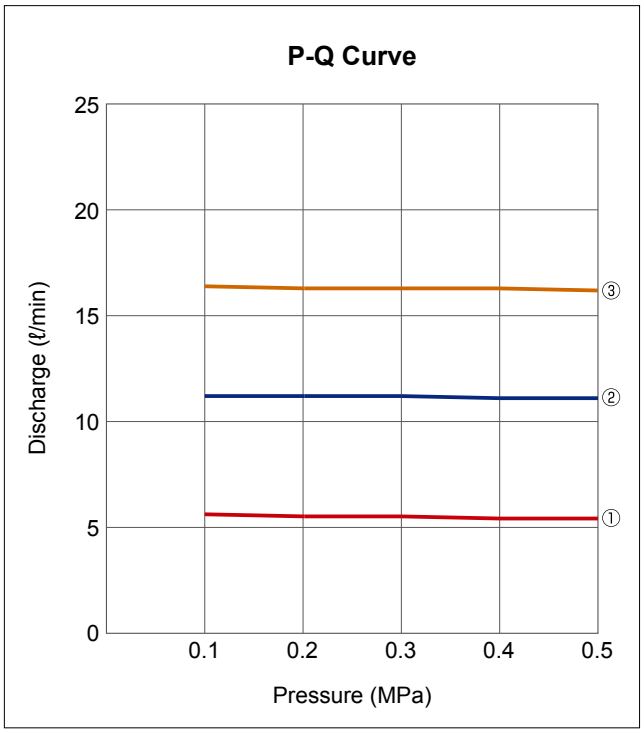
2RA Performance Curve

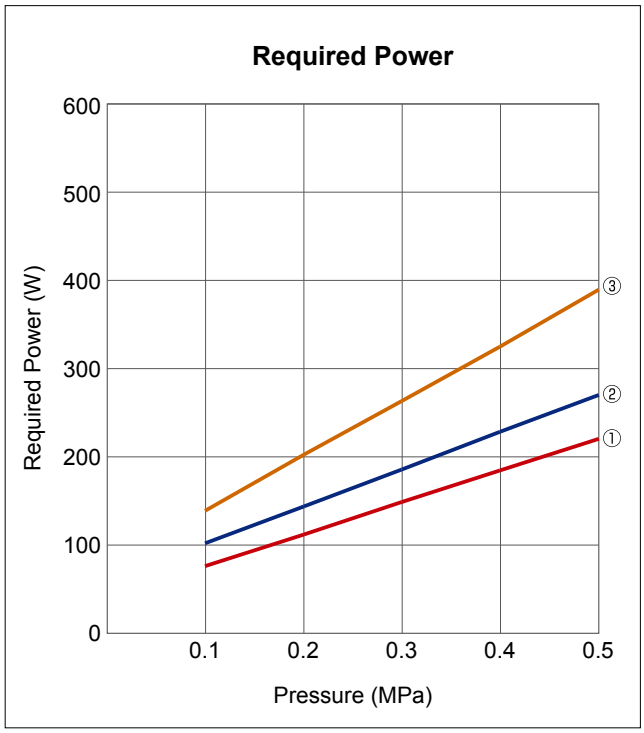
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①2RA-4C　②2RA-8C　③2RA-12C





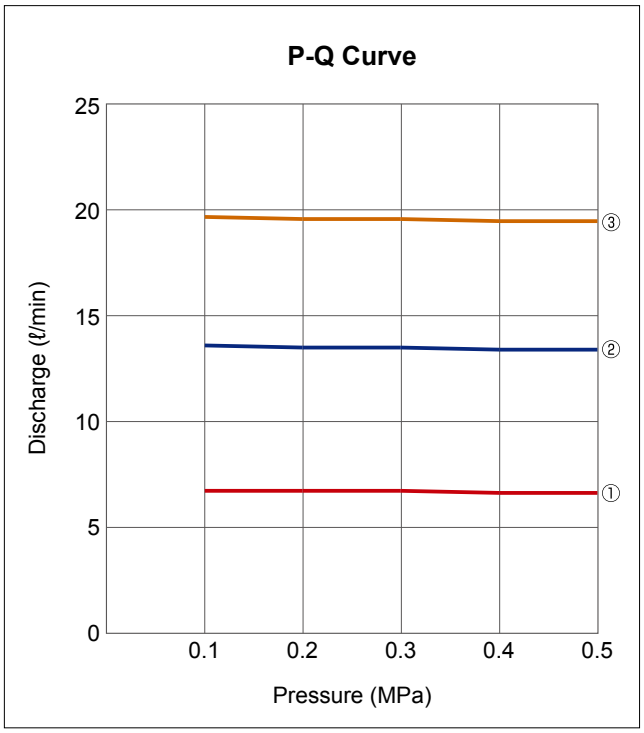
Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-2RA-4C	5.6	5.5	5.5	5.4	5.4	75	111	148	184	220
TOP-2RA-8C	11.2	11.2	11.2	11.1	11.1	101	143	185	228	270
TOP-2RA-12C	16.4	16.3	16.3	16.3	16.2	138	202	263	325	390

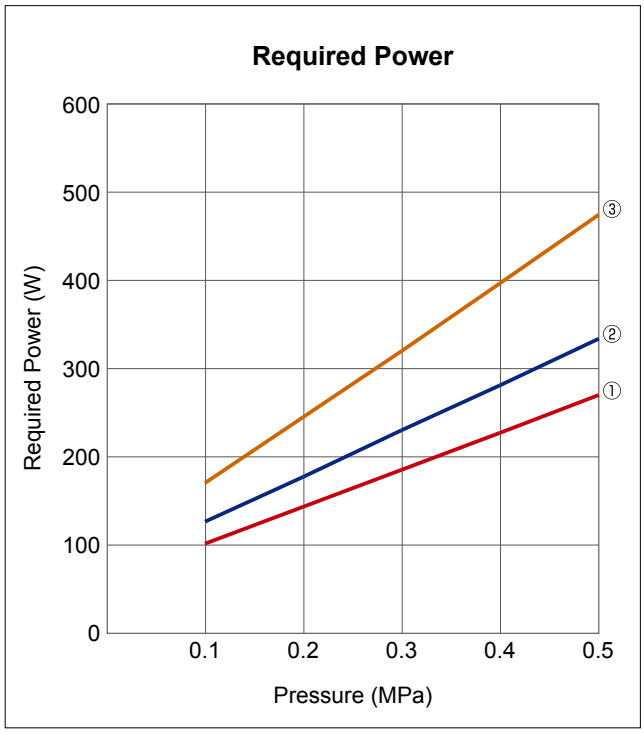
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①2RA-4C　②2RA-8C　③2RA-12C





Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-2RA-4C	6.7	6.7	6.7	6.6	6.6	101	143	185	227	270
TOP-2RA-8C	13.6	13.5	13.5	13.4	13.4	126	177	230	281	334
TOP-2RA-12C	19.7	19.6	19.6	19.5	19.5	170	245	320	397	475

3RD

(PUMPHEAD, REVERSIBLE)

4RD

(PUMPHEAD, REVERSIBLE)

■ Model Numbering System (For General Lubricant Oil)

TOP-3RD – ①

Model
10T/15T/20T/25T/30T

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg)
		1000min^{-1}	1200min^{-1}			
TOP-3RD-10T	13.0	13.0	15.6	0.5	1800	10.0
TOP-3RD-15T	19.5	19.5	23.4	0.5	1800	10.0
TOP-3RD-20T	26.0	26.0	31.2	0.5	1800	10.5
TOP-3RD-25T	32.5	32.5	39.0	0.5	1800	11.0
TOP-3RD-30T	39.0	39.0	46.8	0.5	1800	11.5

• Test oil: ISO-VG320/Oil temperature: 40C

■ Model Numbering System (For General Lubricant Oil)

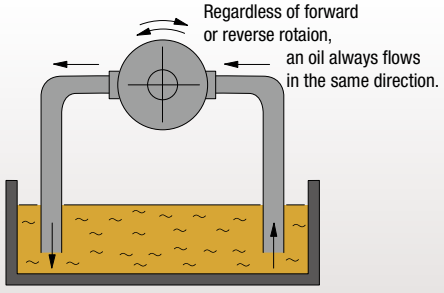
TOP-4RD – ①

Model
100

■ Specifications

Item / Model	Theoretical displacement (cm^3/rev)	Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg)
TOP-4RD-100	100	0.5	1000	30.5

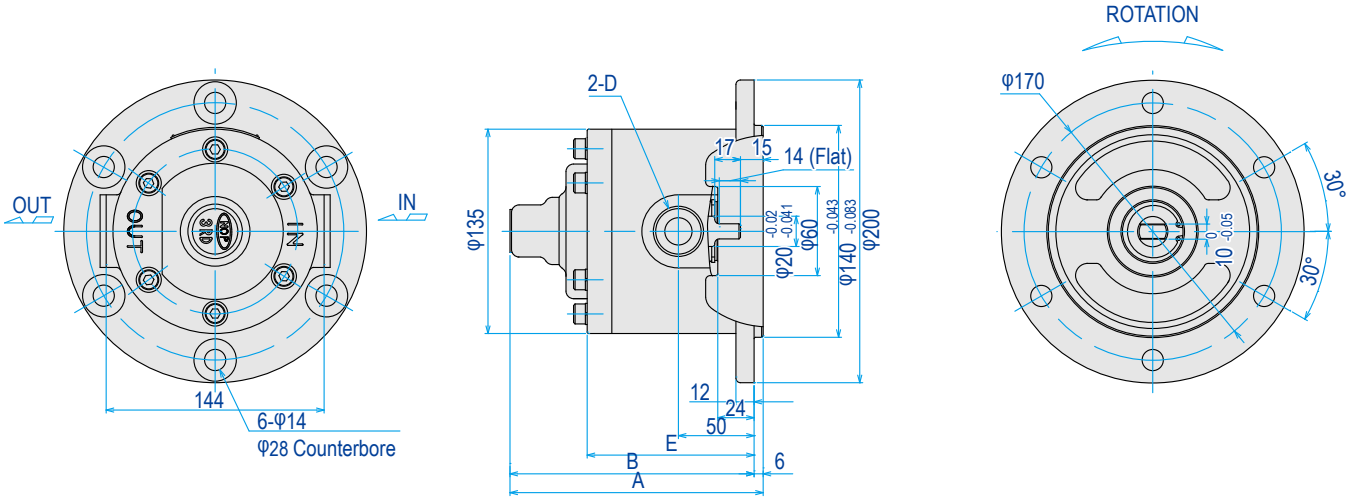
• Test oil: ISO-VG46/Oil temperature: 40C



When the pump rotation is reversed, a reversing ring within which rotors are mounted will also rotate following the rotation direction by 180° degrees and thereby reverse the eccentricity of the pump. Because of that, pumping flow direction always stay the same regardless of its rotation direction.

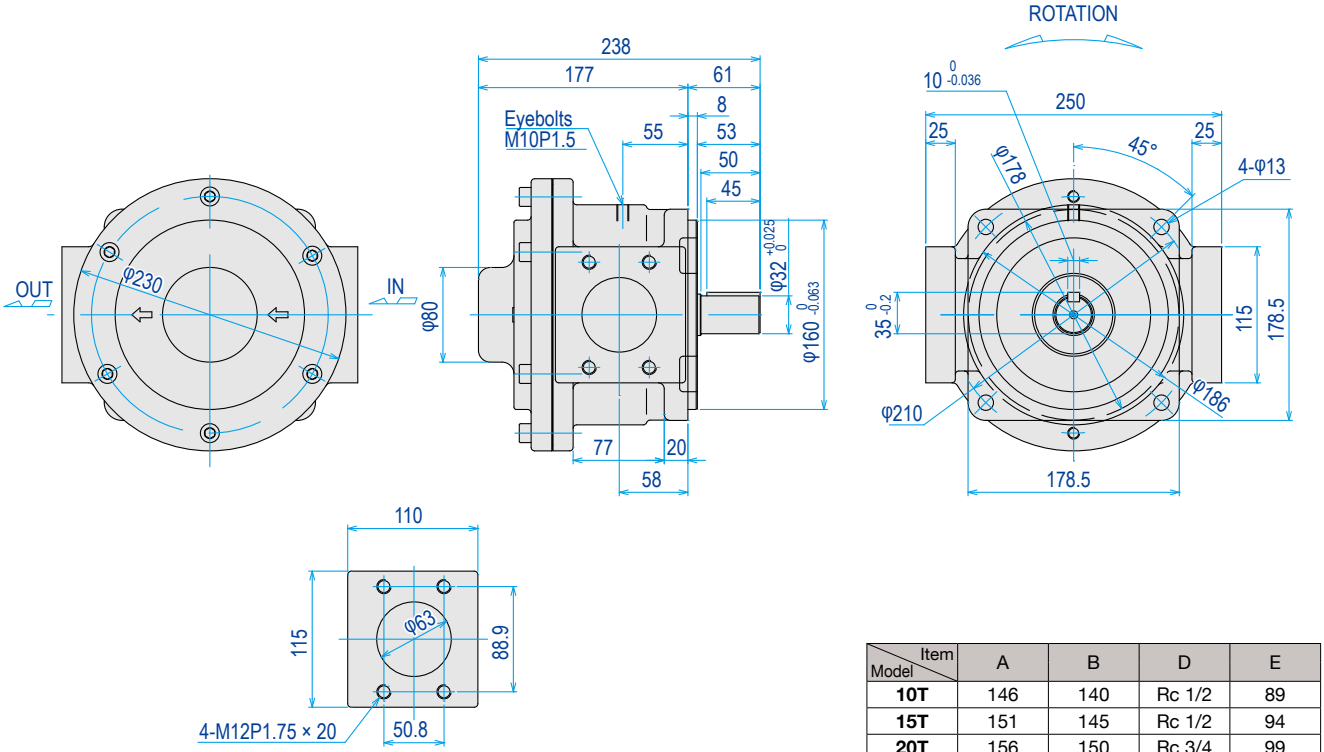
■ Dimensions (Typical) for 3RD/4RD

Model : TOP-3RD-**T



Model \ Item	A	B	D	E
10T	146	140	Rc 1/2	89
15T	151	145	Rc 1/2	94
20T	156	150	Rc 3/4	99
25T	161	155	Rc 3/4	104
30T	166	160	Rc 1	109

Model : TOP-4RD-100



Model \ Item	A	B	D	E
10T	146	140	Rc 1/2	89
15T	151	145	Rc 1/2	94
20T	156	150	Rc 3/4	99
25T	161	155	Rc 3/4	104
30T	166	160	Rc 1	109

Any disassembly or alteration of the product will void the warranty.

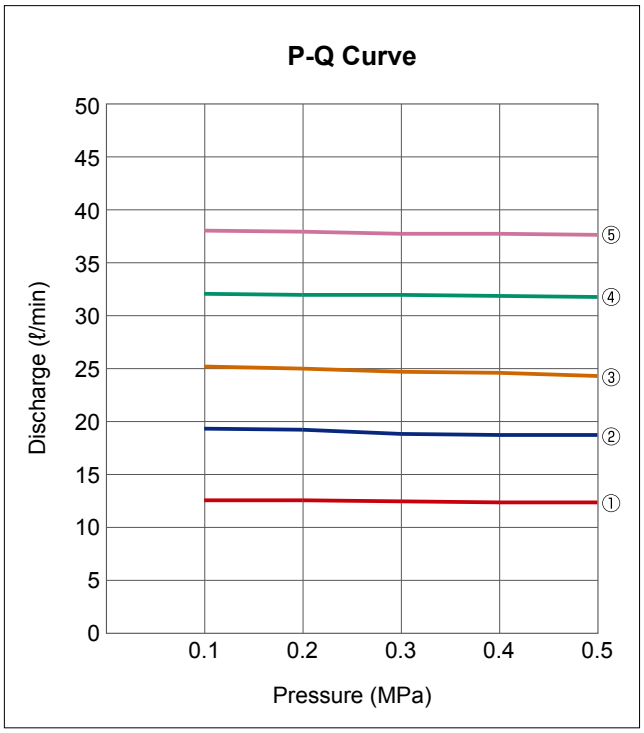
3RD Performance Curve

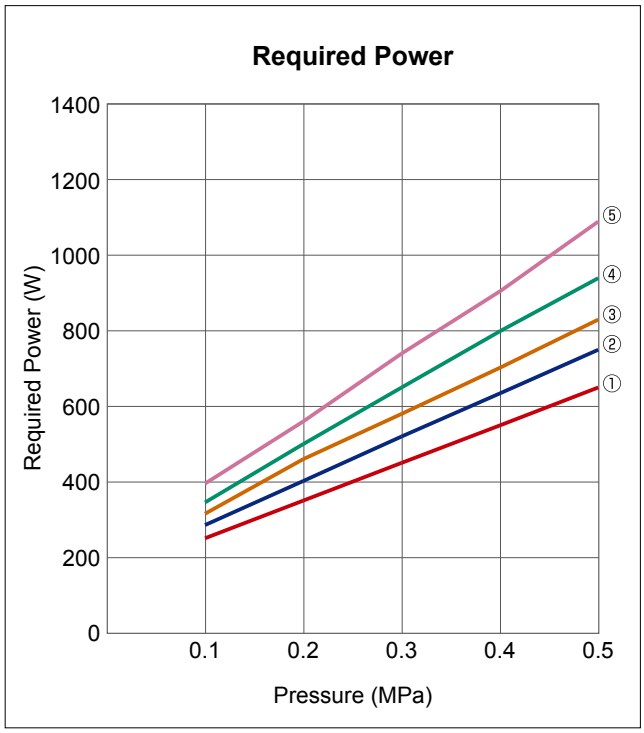
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

960 min^{-1}

①3RD-10T　②3RD-15T　③3RD-20T　④3RD-25T　⑤3RD-30T





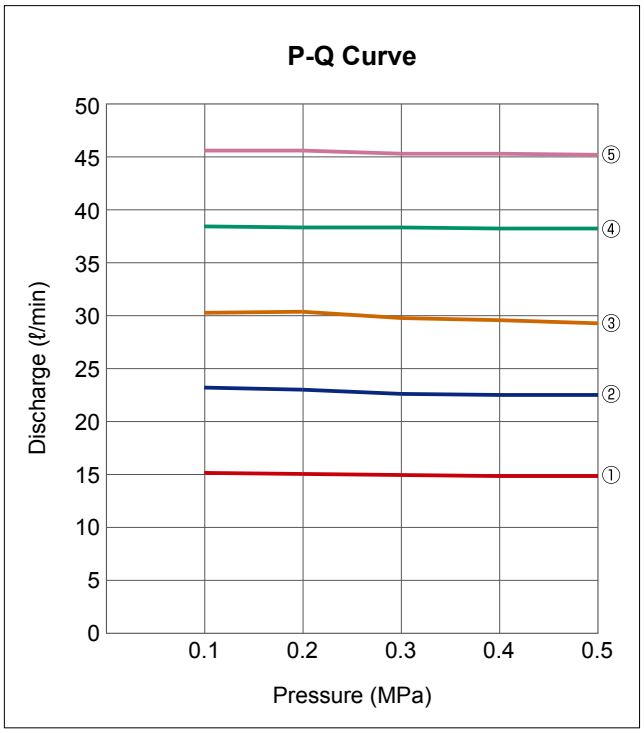
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-3RD-10T	12.5	12.5	12.4	12.3	12.3	250	350	450	550	650
TOP-3RD-15T	19.3	19.2	18.8	18.7	18.7	285	402	520	635	750
TOP-3RD-20T	25.2	25.0	24.7	24.6	24.3	315	460	580	703	830
TOP-3RD-25T	32.1	32.0	32.0	31.9	31.8	345	500	650	800	940
TOP-3RD-30T	38.1	38.0	37.8	37.8	37.7	395	560	740	906	1090

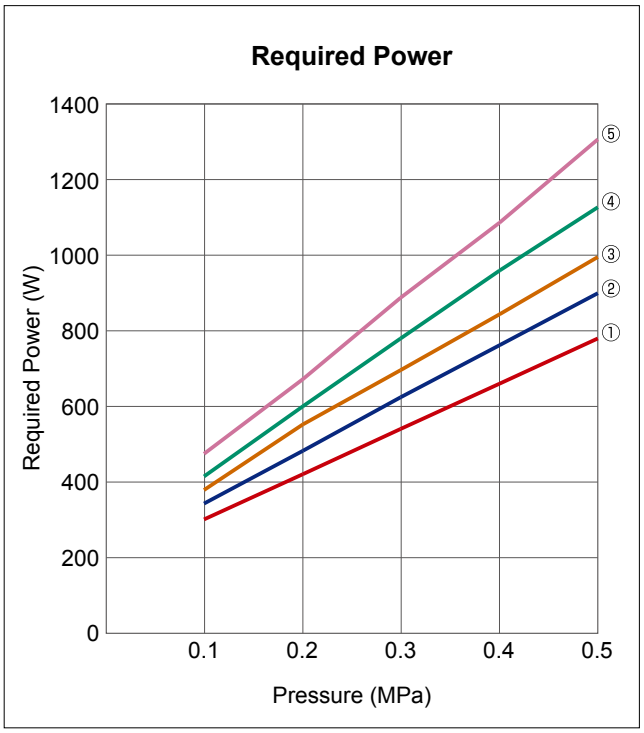
Test Oil: ISO-VG46　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1160 min^{-1}

①3RD-10T　②3RD-15T　③3RD-20T　④3RD-25T　⑤3RD-30T





Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
TOP-3RD-10T	15.1	15.0	14.9	14.8	14.8	300	420	540	660	780
TOP-3RD-15T	23.2	23.0	22.6	22.5	22.5	342	482	624	762	900
TOP-3RD-20T	30.3	30.4	29.8	29.6	29.3	378	552	696	844	996
TOP-3RD-25T	38.5	38.4	38.4	38.3	38.3	414	600	780	960	1128
TOP-3RD-30T	45.7	45.7	45.4	45.4	45.3	474	672	888	1087	1308

RELIEF VALVES

■ Model Numbering System (For General Lubricant Oil)

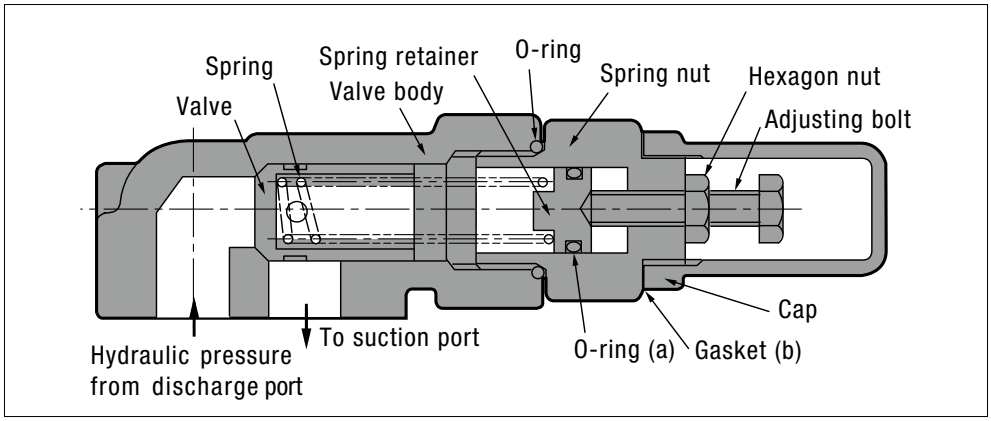
TOP-① ② Relief valve setting pressure*

* The relief valve pressure is set at cracking pressure.

Model
2VB (36ℓ/min)/
2VD (36ℓ/min)/
3VB (117ℓ/min)/
4VBP (340ℓ/min)
(Max.flow rate)

Attachment
Non: Directly attached on Torochoid pump.
D: Attached on valve stand (for pipe attachments)
Note: Valve stand (D) is not available for TOP-2VD.

■ Internal Structure



Note: O-ring (a) is not included if you select 2VB, 2VBD, 2VD, 3VB, 3VBD with spring No.1, only gascket (b) is included.
Refer to the dimensions on pp116-117.

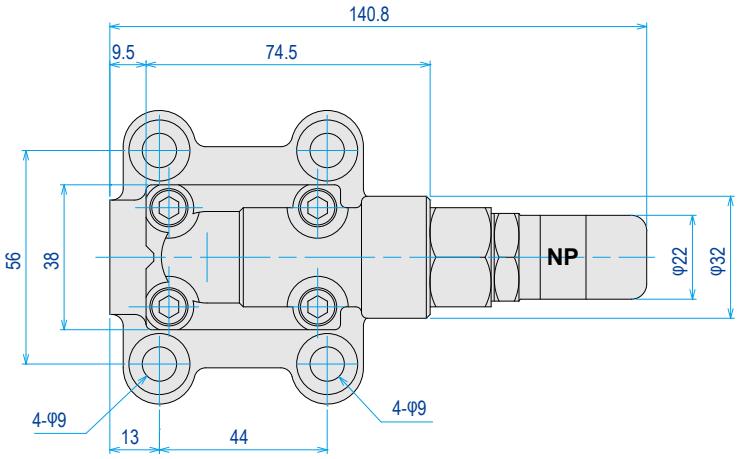
■ Adjusting Pressure Range of Relief Valve

Spring No.	Adjusting pressure range (Cracking pressure) MPa		
	2VB	3VB	4VBP
1L	0.08~0.25	0.08~0.25	0.15~0.25
2L	0.26~0.50	0.26~0.55	0.26~0.49
3L	0.51~1.19	0.56~1.30	0.50~0.80
4L	1.20~2.50	1.31~1.70	0.81~2.00
5L	—	1.71~2.49	—
6L	—	2.50~3.00	—

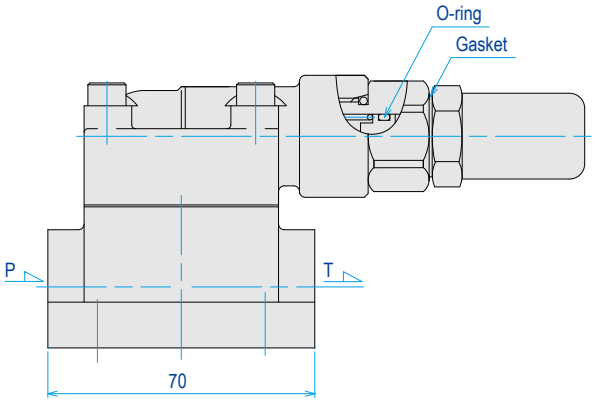
Note: Cracking pressure: Pressure at which a valve starts to operate

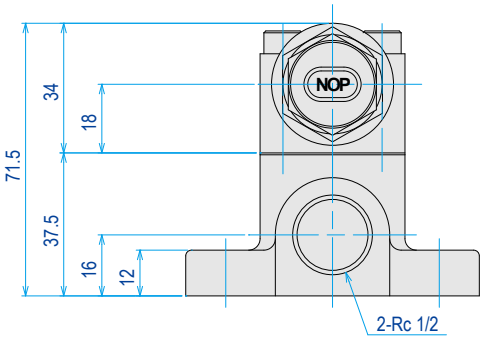
■ Dimensions (Typical) for RELIEF VALVES

Model : TOP-2VBD

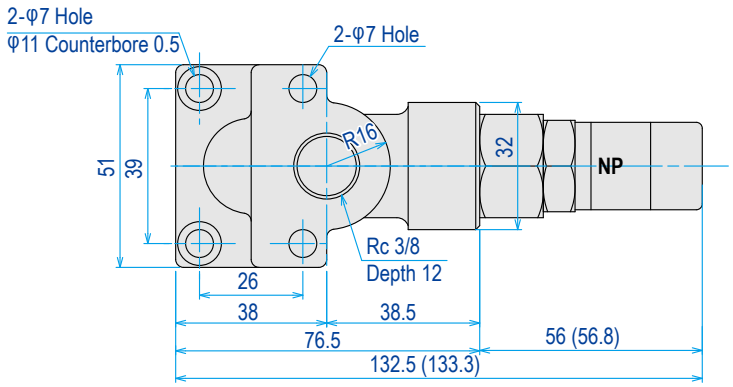


Spring No.	Pressure range (MPa)	Seal & Gasket
No.1L	0.08~0.25	Gasket (b)
No.2L	0.26~0.50	O-ring (a) P10
No.3L	0.51~1.19	
No.4L	1.20~2.50	



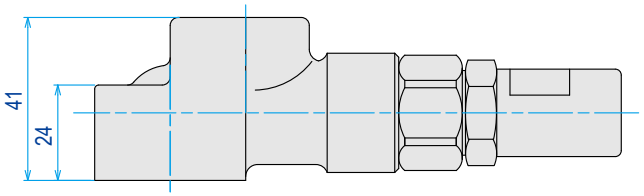


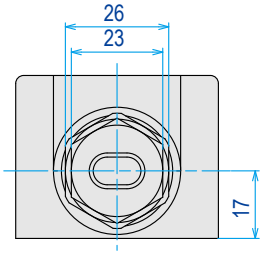
Model : TOP-2VD

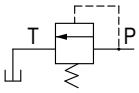


The values in ( ) show the dimensions for spring No.1

Spring No.	Pressure range (MPa)
No.1L	0.08~0.25
No.2L	0.26~0.50
No.3L	0.51~1.19
No.4L	1.20~2.50



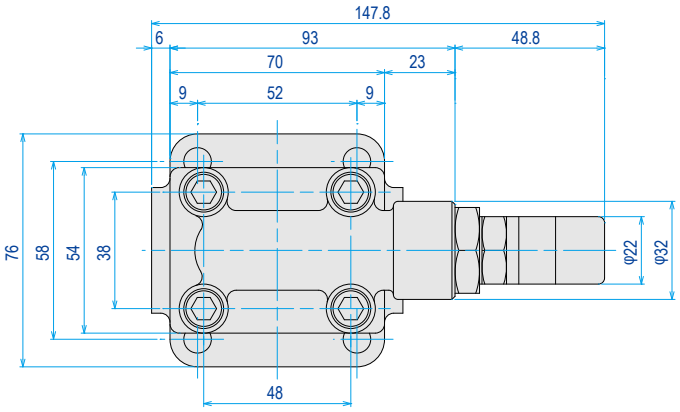




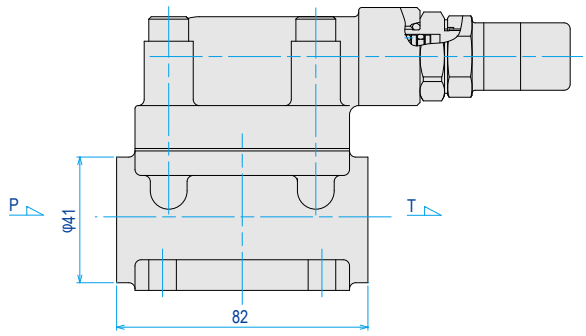
Any disassembly or alteration of the product will void the warranty.

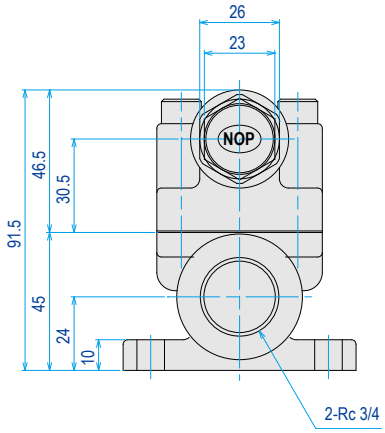
■ Dimensions (Typical) for RELIEF VALVES

Model : TOP-3VBD



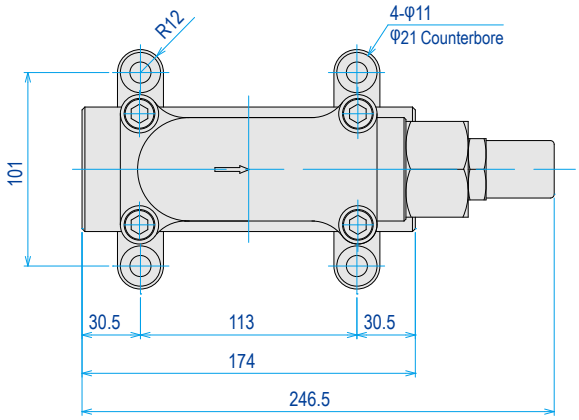
Spring No.	Pressure range (MPa)	Seal & Gasket
No.1L	0.08~0.25	Gasket (b)
No.2L	0.26~0.55	O-ring (a) P10
No.3L	0.56~1.30	
No.4L	1.31~1.70	
No.5L	1.71~2.49	
No.6L	2.50~3.00	

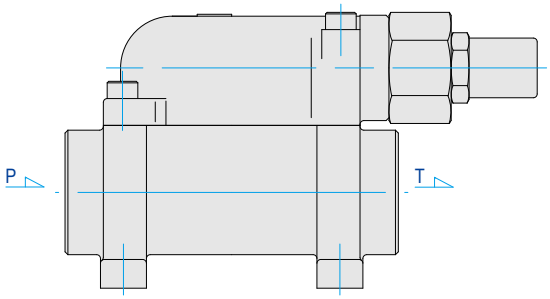


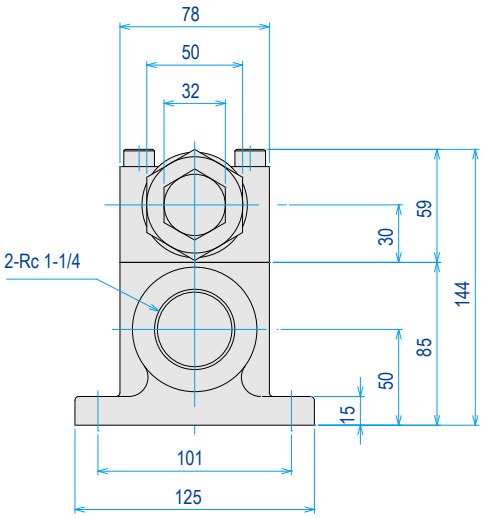


Model : TOP-4VBPD

Spring No.	Pressure range (MPa)
No.1L	0.15~0.25
No.2L	0.26~0.49
No.3L	0.50~0.80
No.4L	0.81~2.00



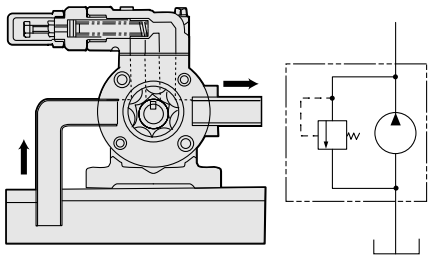




How to install a Torochoid pump relief valve properly in a pump system

Internal return (as a safety valve)

VB Type

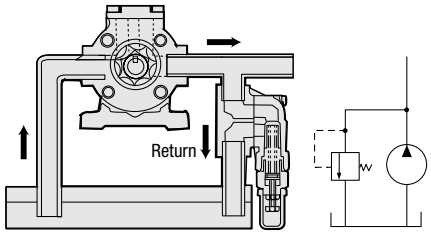


The valve is used as a safety valve to lower pressure instantly during oil transfer, which is attached to the pump directly.

If the valve is being activated constantly and/or the discharge port is being closed completely for a long time in the system, air bubles, large noise and oil temperature increase might occur. In such a case, we recommend external return type as shown below.

External return (as a safety valve/pressure control valve)

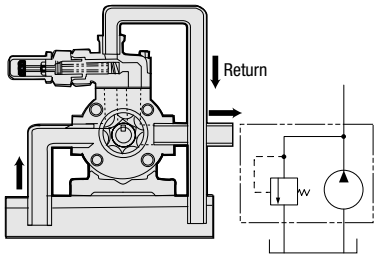
VBD Type



The valve is used as a pressure control valve for hydraulic oil or circulation oil lubricating system, which is installed with a sub plate.

The VB type valve with a sub plate is installed in a bypass curcuit of the system. It is the most suitable for the system bypassing the full flow for a longtime and/or using the valve constantly as the pressure control valve.

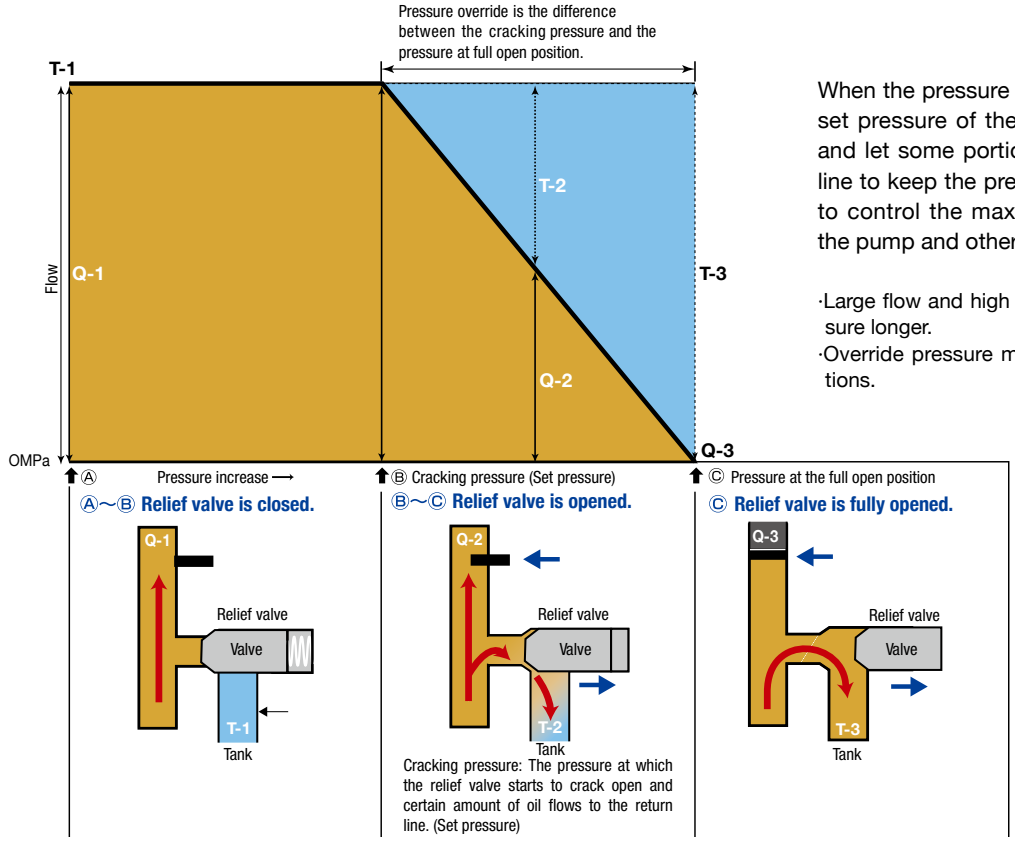
2VD Type



This is the same as the system above except for using a valve attached to Trochoid Pump 2HB directly.

- Be sure to attach a plate to block the suction line when 2VD type is installed.
- Be sure to connect the return line to the oil tank.

Operational description



When the pressure in a hydraulic circuit reaches the set pressure of the valve, the valve starts to open and let some portion or all of oil flow to the return line to keep the pressure in the system constant or to control the maximum pressure, which protects the pump and other devices

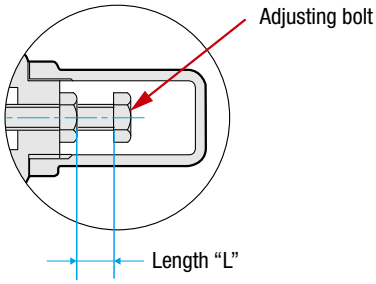
- Large flow and high viscosity of oil make override pressure longer.
- Override pressure might vary depending on the conditions.

Any disassembly or alteration of the product will void the warranty.

How to adjust the pressure

1. Remove the cap.
2. Loosen the hexagon nut.
3. To increase the set pressure, turn the adjusting bolt to the right.
   To lower the set pressure, turn the adjusting bolt to the left.
4. Tighten the hexagon nut to fix.
5. Reinstall the removed cap.

   Note: If selecting the model with spring No.1, be careful not to damage the gasket when tightening the cap with the tightening torque of 13N•m.



*Set pressure: The pressure at which the relief valve starts to crack open (Cracking pressure) Refer to Ⓑ in the operation chart described on the previous page.

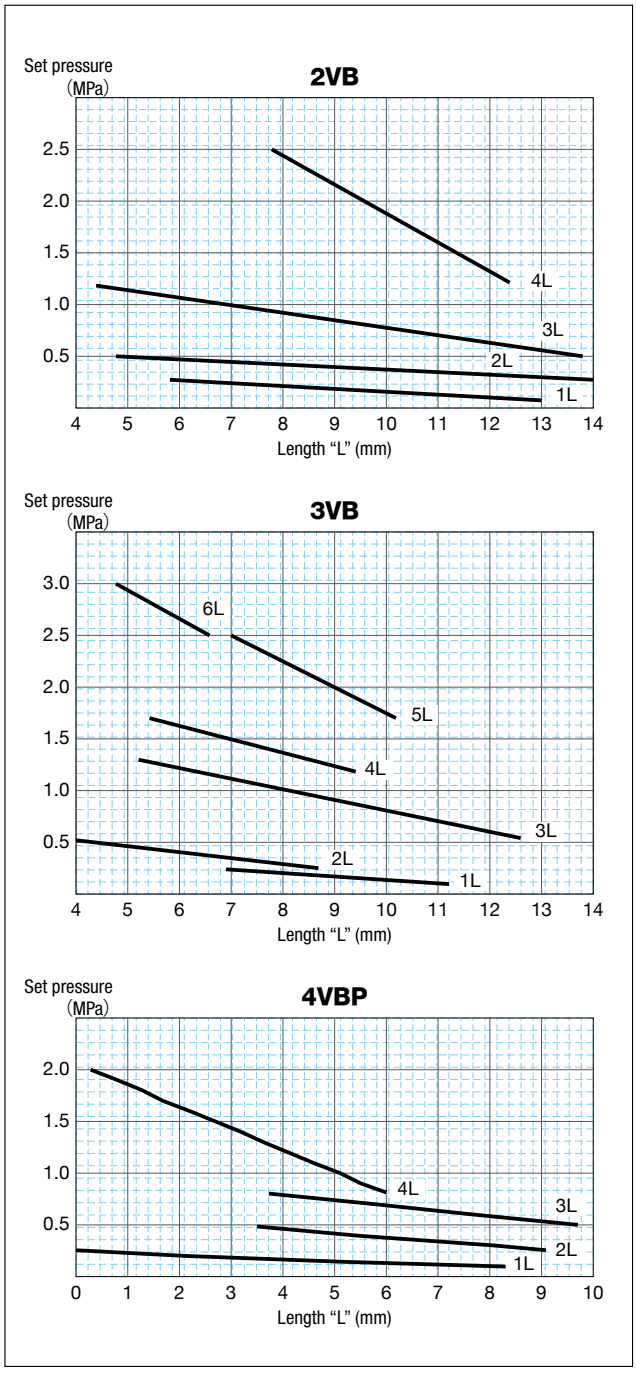
Instructions for selecting a relief valve

1. Check the allowable maximum pressure of the motor and pump.
2. Check whether the devices in the system require protection.

Note: Trochoid pump is a positive-displacement pump, which requires a relief valve to prevent unusual pressure rise.

●Length of an adjusting bolt and set pressure*

You can get a rough idea of the set pressure by referring to the length of adjusting bolt on the table below.



The tables above only show the typical values of the set pressure.

MB-GD

(BASE-COUPLING MOUNT TYPE)

GD

(PUMPHEAD)

■ Model Numbering System

TOP-MB① ② – GD – ③ ④ ⑤

If motor other than for 200V 50Hz/200-220V 60Hz is required, please specify your desired vlotage and frequency.

Motor manufacturer
M: Mitsubishi
T: Toshiba

Motor output
750/1500
Note: IE3 is added at the end of the model no.

Model
202/203/204/
206/208/210

Oil type
VK: Diesel oil/Karosene/Heavy oil A
H: Heavy oil B/Heavy oil C

Rotation direction
Note: When viewed from the pump shaft end (motor side)
Blank: Clockwise
L: Counter clockwise

Note: For outdoor use, safety-increased explosion-proof model, a motor for specific voltage or others, contact us for details.

■ Model Numbering System

TOP-GD – ① ② ③

Model
202/203/204/
206/208/210

Oil type
VK: Diesel oil/Karosene/Heavy oil A
H: Heavy oil B/Heavy oil C

Rotation direction
Note: When viewed from the pump shaft end (motor side)
Blank: Clockwise
L: Counter clockwise

■ Specifications

Item / Model		Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)		Max. revolution (min^{-1})	Approx. weight. (kg)
			1500min^{-1}	1800min^{-1}	VK**	H***		
202VK	202H	2.0	3.0	3.6	2.0	4.0	3600	6.4
203VK	203H	2.8	4.2	5.0	2.0	4.0	3600	6.5
204VK	204H	3.6	5.4	6.4	2.0	4.0	3600	6.7
206VK	206H	5.6	8.4	10.0	2.0	4.0	3600	7.3
208VK	208H	7.6	11.4	13.6	2.0	4.0	1800	7.6
210VK	210H	9.6	14.4	17.2	2.0	4.0	1800	8.1

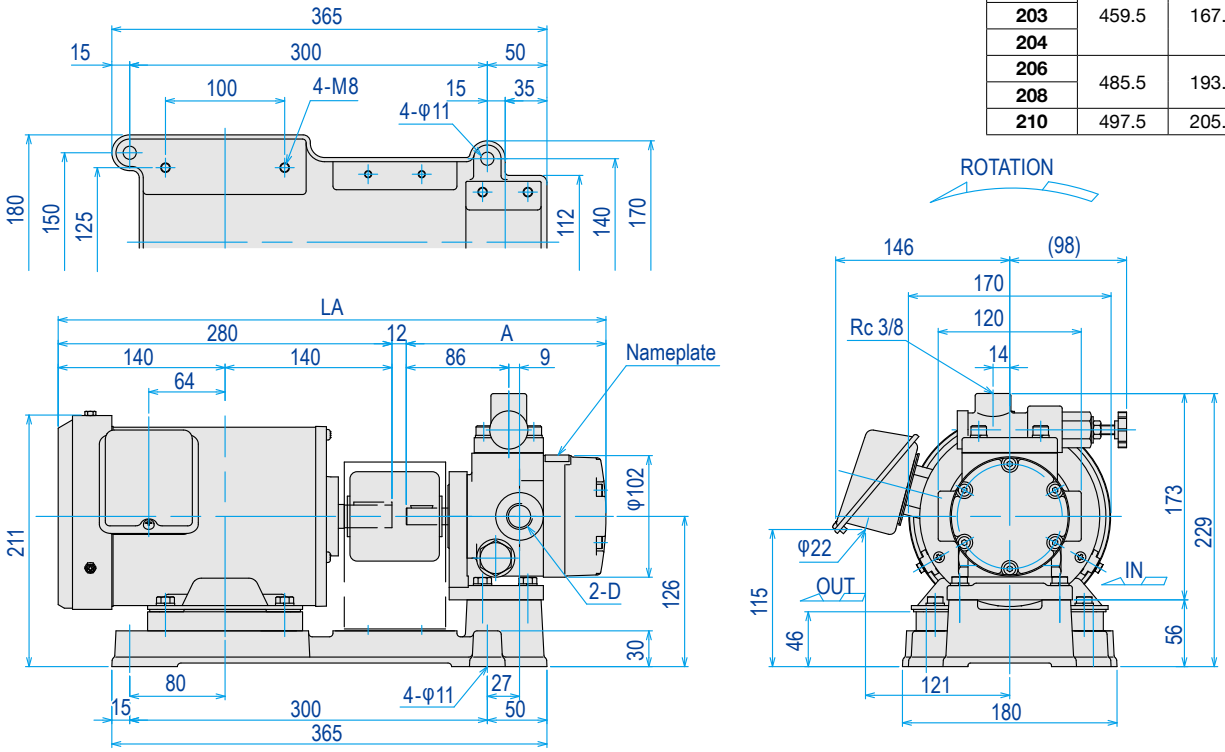
**VK: Set pressure of relief valve (fully closed) at factory is 2.0MPa/Test oil: Karosene/Oil temperature: 20C
***H: Set pressure of relief valve (fully closed) at factory is 2.5MPa/Test oil: Heavy oil B/Oil temperature: 40C

Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for MB-GD

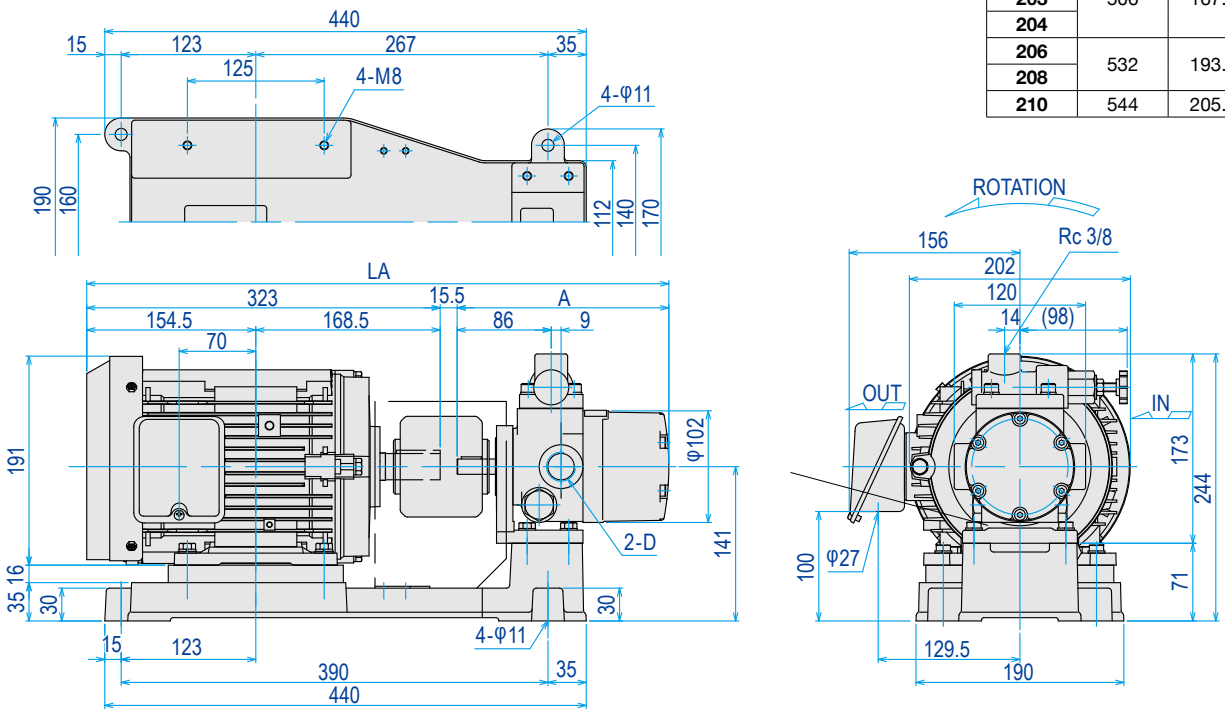
Model : TOP-MBT750-GD-2**VK IE3 / TOP-MBT750-GD-2**H IE3

Model \ Item	LA	A	D
202	459.5	167.5	Rc 1/2
203			
204			
206	485.5	193.5	Rc 3/4
208			
210	497.5	205.5	



Model : TOP-MBT1500-GD-2**VK IE3 / TOP-MBT1500-GD-2**H IE3

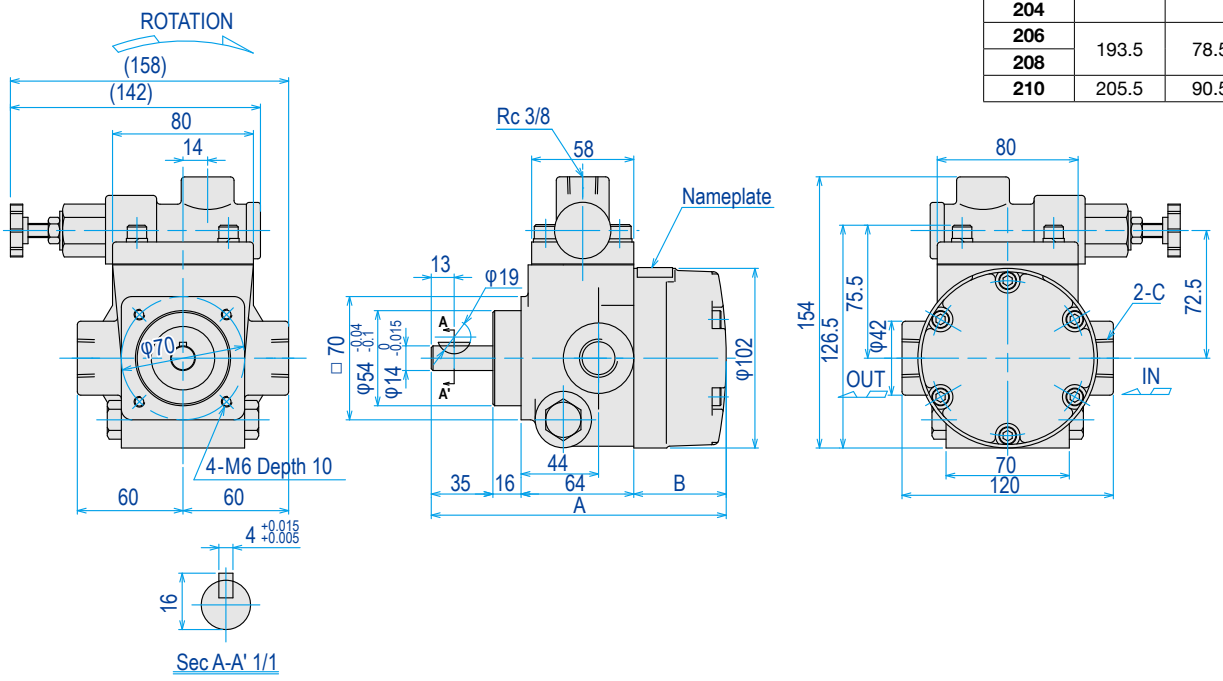
Model \ Item	LA	A	D
202	506	167.5	Rc 1/2
203			
204			
206	532	193.5	Rc 3/4
208			
210	544	205.5	



■ Dimensions (Typical) for GD

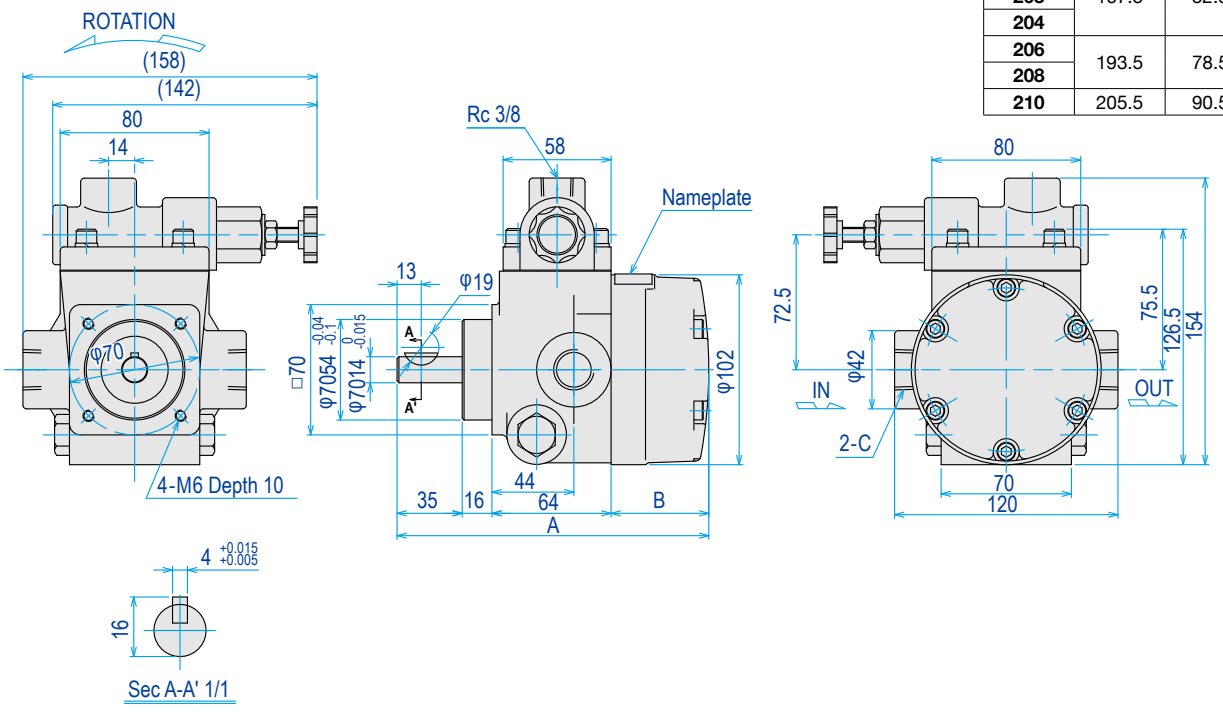
Model : TOP-GD2**VK

Model \ Item	A	B	C
202	167.5	52.5	Rc 1/2
203			
204			
206	193.5	78.5	Rc 3/4
208			
210	205.5	90.5	



Model : TOP-GD2**-VKL

Model \ Item	A	B	C
202	167.5	52.5	Rc 1/2
203			
204			
206	193.5	78.5	Rc 3/4
208			
210	205.5	90.5	



Any disassembly or alteration of the product will void the warranty.

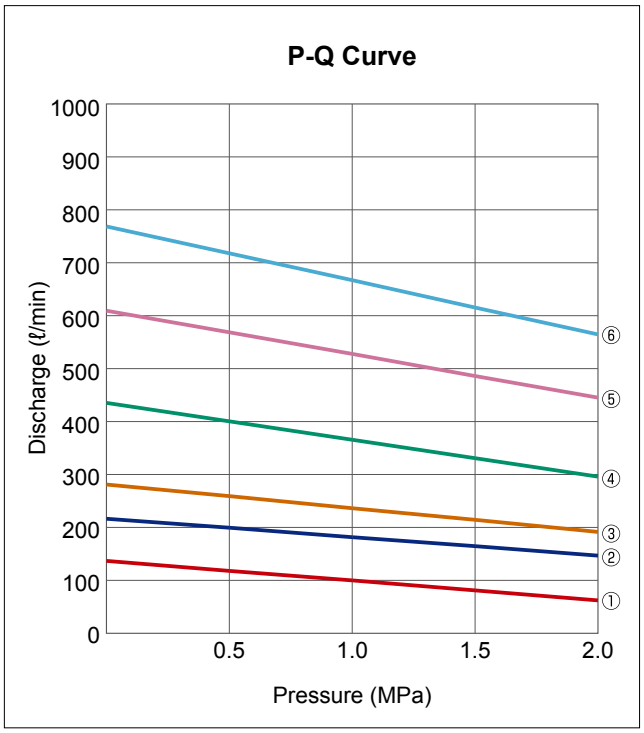
GD-VK Performance Curve

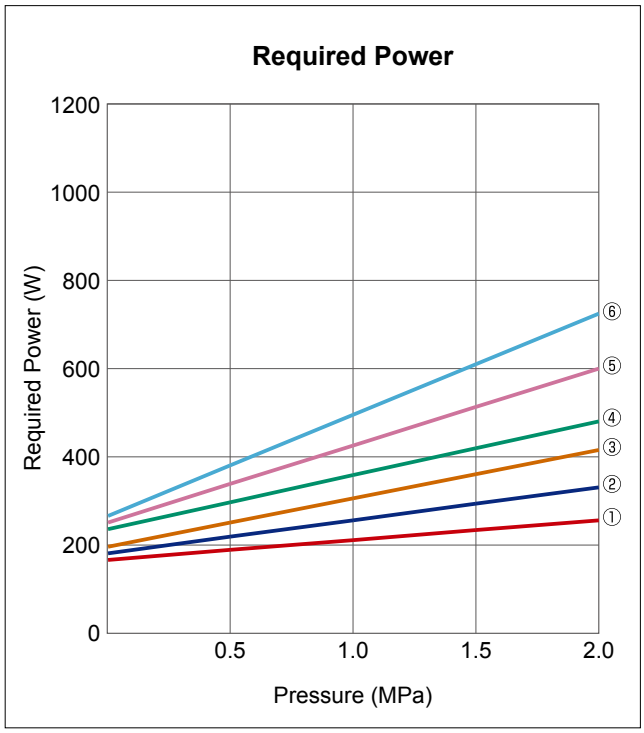
Test Oil: Karosene　Oil Temperature: 20C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①GD-202VK　②GD-203VK　③GD-204VK
④GD-206VK　⑤GD-208VK　⑥GD-210VK





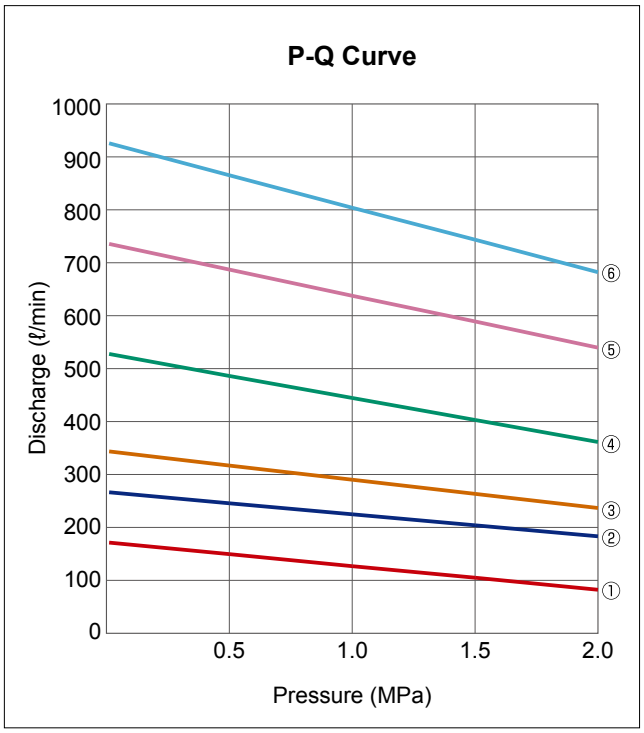
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.0	0.5	1.0	1.5	2.0	0.0	0.5	1.0	1.5	2.0
GD-202VK	140	121	103	84	65	165	188	210	233	255
GD-203VK	220	203	185	168	150	180	218	255	293	330
GD-204VK	285	263	240	218	195	195	250	305	360	415
GD-206VK	440	405	370	335	300	235	296	358	419	480
GD-208VK	615	574	533	491	450	250	338	425	513	600
GD-210VK	775	724	673	621	570	265	380	495	610	725

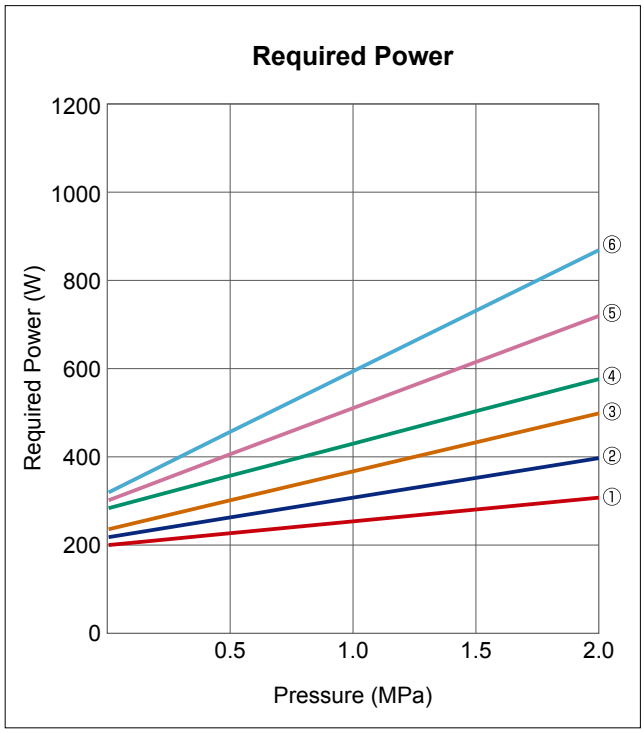
Test Oil: Karosene　Oil Temperature: 20C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①GD-202VK　②GD-203VK　③GD-204VK
④GD-206VK　⑤GD-208VK　⑥GD-210VK





Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.0	0.5	1.0	1.5	2.0	0.0	0.5	1.0	1.5	2.0
GD-202VK	168	146	123	101	78	198	225	252	279	306
GD-203VK	264	243	222	201	180	216	261	306	351	396
GD-204VK	342	315	288	261	234	234	300	366	432	498
GD-206VK	528	486	444	402	360	282	356	429	503	576
GD-208VK	738	689	639	590	540	300	405	510	615	720
GD-210VK	930	869	807	746	684	318	456	594	732	870

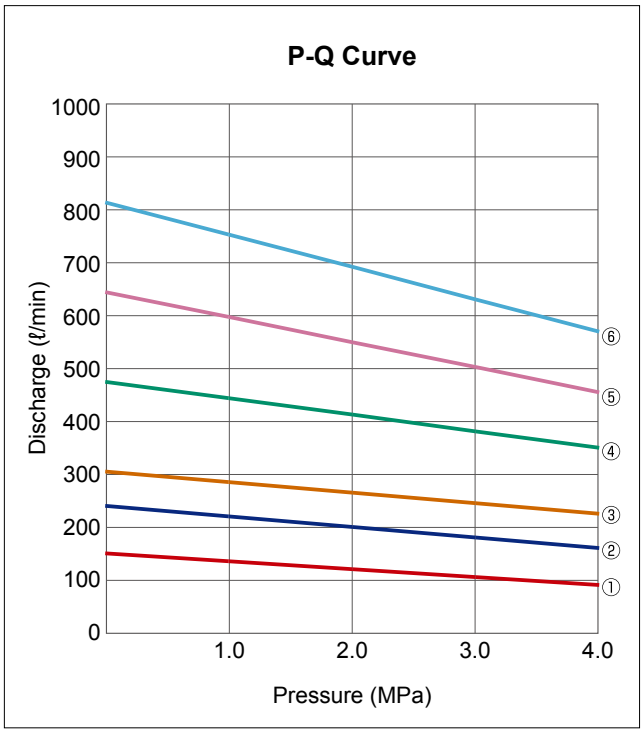
GD-H Performance Curve

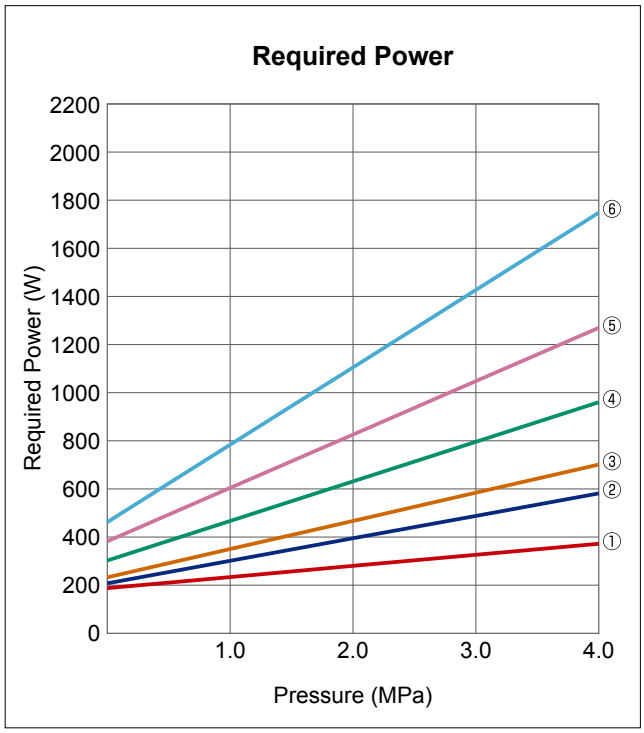
Test Oil: Heavy oil B　Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1450 min^{-1}

①GD-202H　②GD-203H　③GD-204H
④GD-206H　⑤GD-208H　⑥GD-210H





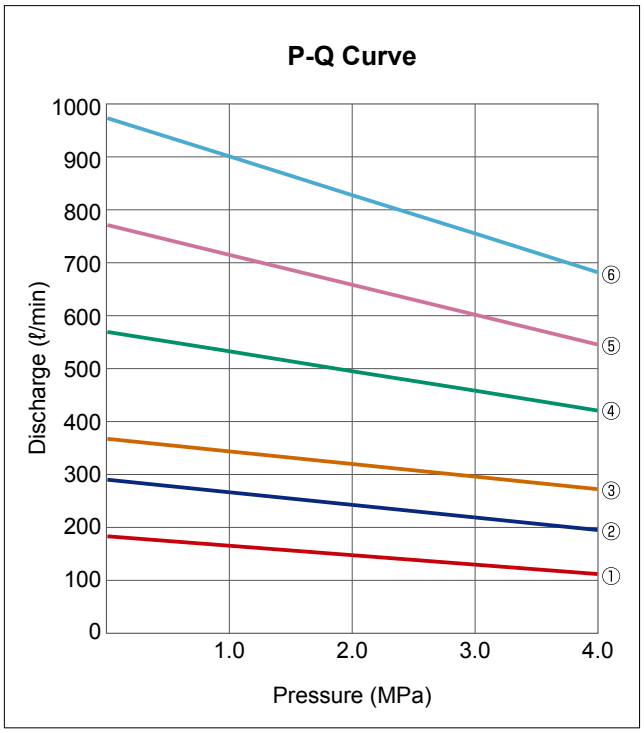
Item / Model	Discharge (ℓ/min) Pressure (MPa)					Required Power (W) Pressure (MPa)				
	0.0	1.0	2.0	3.0	4.0	0.0	1.0	2.0	3.0	4.0
GD-202H	150	135	120	105	90	185	231	278	324	370
GD-203H	240	220	200	180	160	205	299	393	486	580
GD-204H	305	285	265	245	225	230	348	465	583	700
GD-206H	475	444	413	381	350	300	465	630	795	960
GD-208H	645	598	550	503	455	380	603	825	1048	1270
GD-210H	815	754	693	631	570	460	783	1105	1428	1750

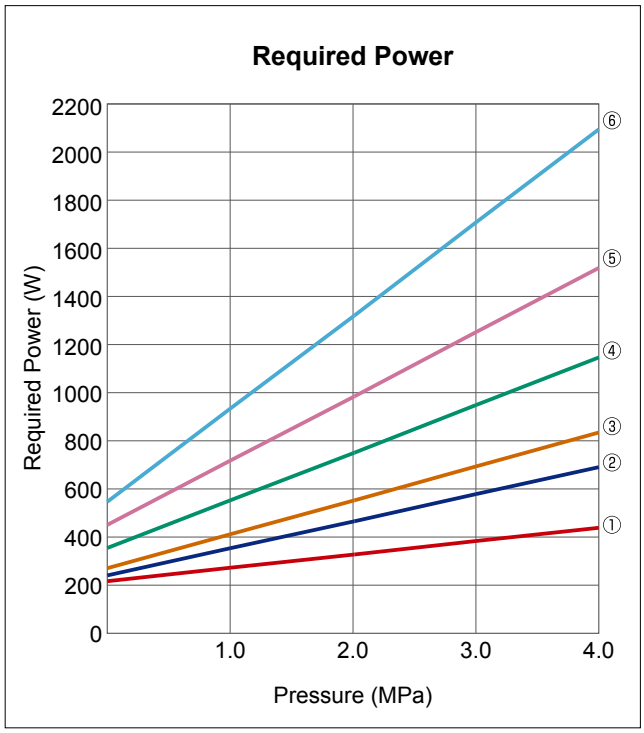
Test Oil: Heavy oil B Oil Temperature: 40C (Average)

Note : As the temperature of oil drops in winter, the viscosity also increases and so does the required power. So please be careful as you may not be able to operate the pump near the rated pressure.

1750 min^{-1}

①GD-202H ②GD-203H ③GD-204H
④GD-206H ⑤GD-208H ⑥GD-210H





Item / Model	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.0	1.0	2.0	3.0	4.0	0.0	1.0	2.0	3.0	4.0
GD-202H	180	162	144	126	108	222	278	333	389	444
GD-203H	288	264	240	216	192	246	359	471	584	696
GD-204H	366	342	318	294	270	276	417	558	699	840
GD-206H	570	533	495	458	420	360	558	756	954	1152
GD-208H	774	717	660	603	546	456	723	990	1257	1524
GD-210H	978	905	831	758	684	552	939	1326	1713	2100

Any disassembly or alteration of the product will void the warranty.

MICRO TOP

(SMALL AND HANDY SIZE OIL FILTER)

■ Model Numbering System

TFP-① – ② – 2512A – ③

Motor output
400

Motor Pressure
S100: Sngle phase 100VAC
S200: Single phase 200VAC

Filtering accuracy
00: No filter with closing lid
03: With 3μ filter
10: With 10μ filter

■ Specifications

1. Pump	Discharge capasity: 12ℓ/min/50Hz, 14.4ℓ/min/60Hz Discharge pressure: Max.0.3MPa IN OUT Rc 1/2
2. Motor	Single phase, 100/200V only, 400W
3. Filter cartridge	Operation temperarue: Max.80C Operation pressure : Max 0.5 MPa Thread diameter: 1 1/4 - 12 UNF
4. Switch	Push button switch, Power cord 2.0 m
5. Relief valve	Integrated valve Set pressure: 0.3Mpa
6.Pressure gauge	Filter in : Pressure indication Normal use: 0 to 0.3 MPa Replacement: 0.3 to 0.4 MPa (Red)
Approximate weight	15 kg
Accessories	Wired plastic hose (2m): Quantity:2 (Sunction & Discharge) Inlet Outer diameterϕ22, Outlet Outer diameterϕ18 Tube fitting for pump hose: R1/2 Pressure gauge Plug
Option	Suction strainer (100 mesh)

■ Applications

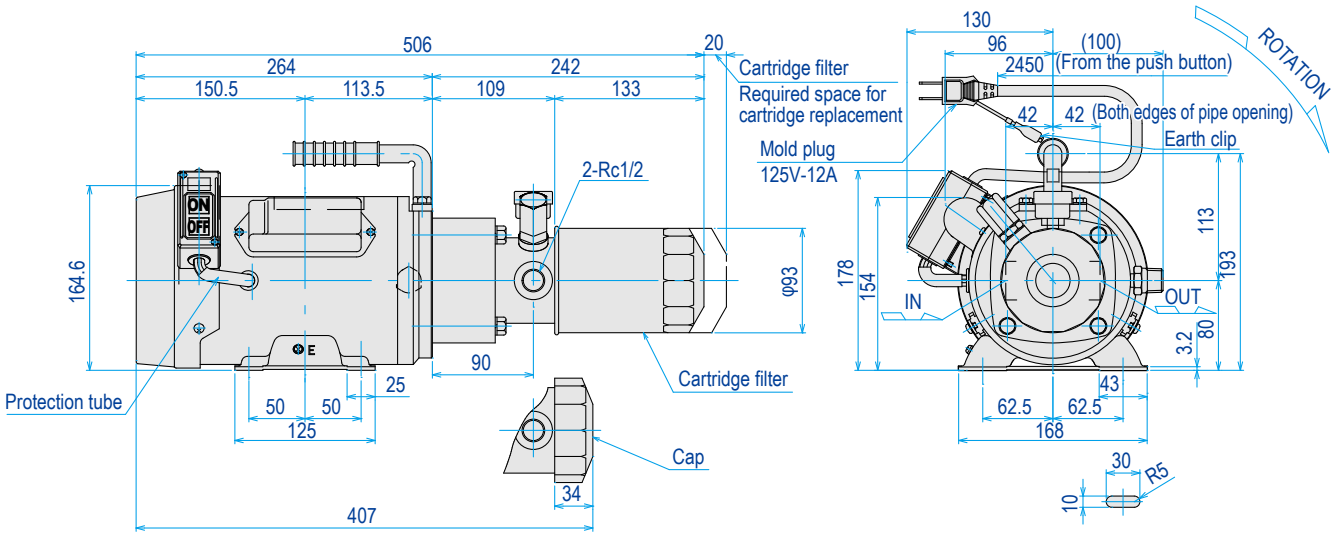
- To remove particles from oil in the hydraulic system tank
- To exchange and supply oil for construction machines and industrial vehicle
- To prevent oil deterioration and oil pollution
- For oil cleaning for other purposes

■ Features

- The filter cartridge can be replaced easily.
- Pressure gauge indicates the timing of cartridge replacement.
- Filter elements of 3μ/10μ provide sufficient cleanliness.
- One push button for operation
- Pump is the reliable Trochoid pump.
- The hand grip is attached for portable use.
- Plastic hoses for suction and discharge are provided.

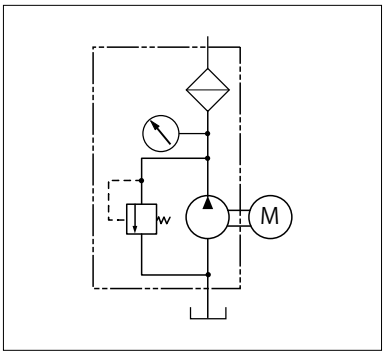
Dimensions (Typical) for MICRO TOP

Model : TFP-400-S✱✱✱-2512A-✱✱



Diagram

A filter is installed in the discharge line to filter the pumped oil. The built-in pressure gauge indicates clogs in the filter and the relief valve protects the pump and filter.

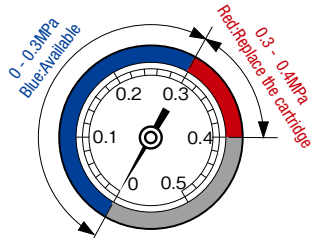


Precautions

- The used oil might be very dirty and 3μ filter may easily get clogged in such oil. Therefore clean the oil with a 10μ filter first before using a 3μ filter.
- Please install the suction filter in the suction line to protect the pump. The suction filter is optional.

Cartridge filter for replacement

- If the pressure gauge indicates the red zone, replace the cartridge filter.
  When the pressure goes up to 0.3MPa, the oil will flow backward into the pump inlet.
- The cartridge is replacable with hands.



Cartridge filter model No.

10μ	L-913-1
3μ	L-913-3

Any disassembly or alteration of the product will void the warranty.

1PS

(OIL COOLING UNIT)

■ Model Numbering System

1PS75 – 2 – 12MAVB – C①

Output
75

Model

Suffix
23: Pump on the left (When viewed from level gauge side)
24: Pump on the right (When viewed from level gauge side)

■ Applications

For cooling oil for machine tool and industrial equipment

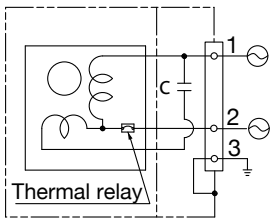
Wiring diagram

(Motor for pump)

U V W

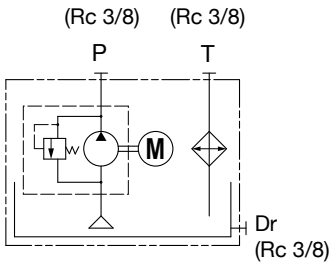
R S T
(L1) (L2) (L3)

Connection diagram



Terminal No.	1	2	3
Wire color	wihte	white	green/yellow

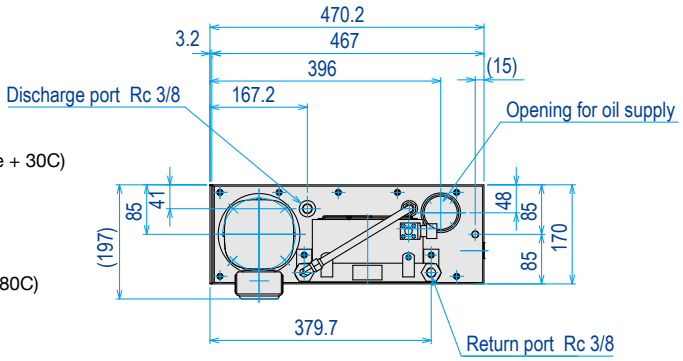
Hydraulic circuit diagram

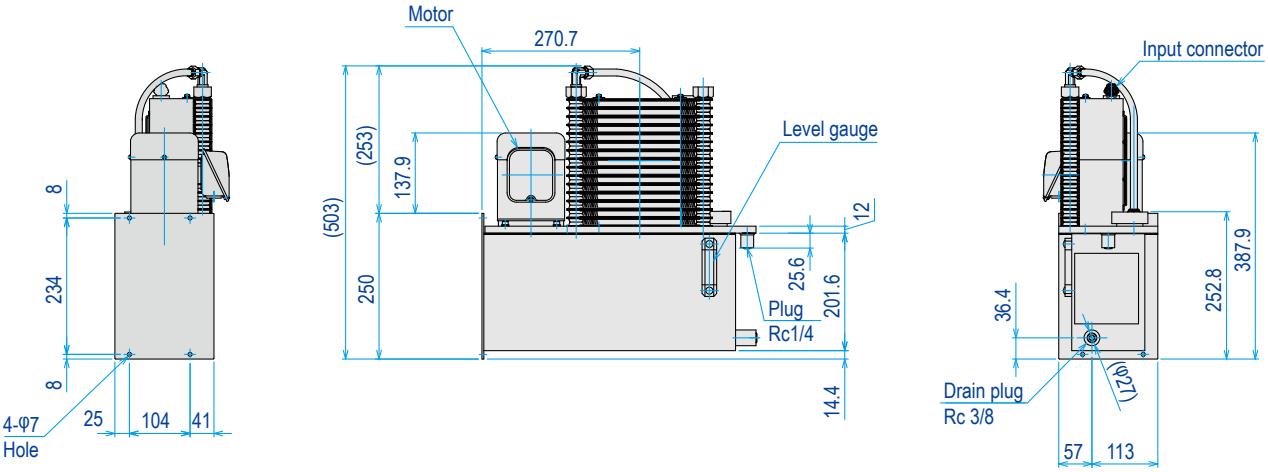


■ Dimensions (Typical) for 1PS

Model No.:1PS75-2-12MAVB-C23

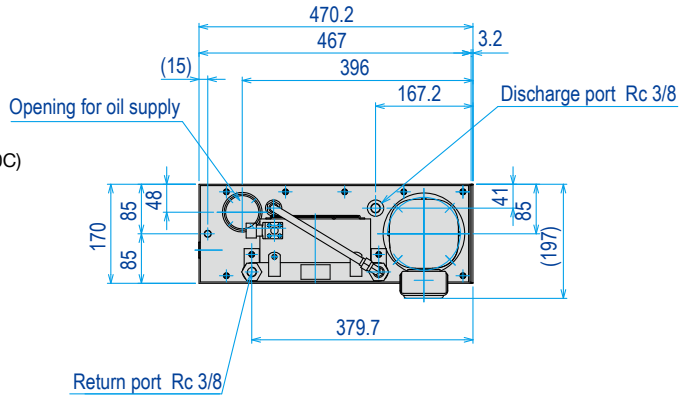
Pump model
TOP-12MAVB
Motor for pump
75W 4P 200V class
Heat exchange
Flow rate:3ℓ/min.
1170kcal/h (Room temperature + 30C)
Tank capacity
Approximately 8ℓ (at 90%)
Minimum oil quantity: 4ℓ
Viscosity range
500 mm²/s to 21 mm²/s (15 to 80C)

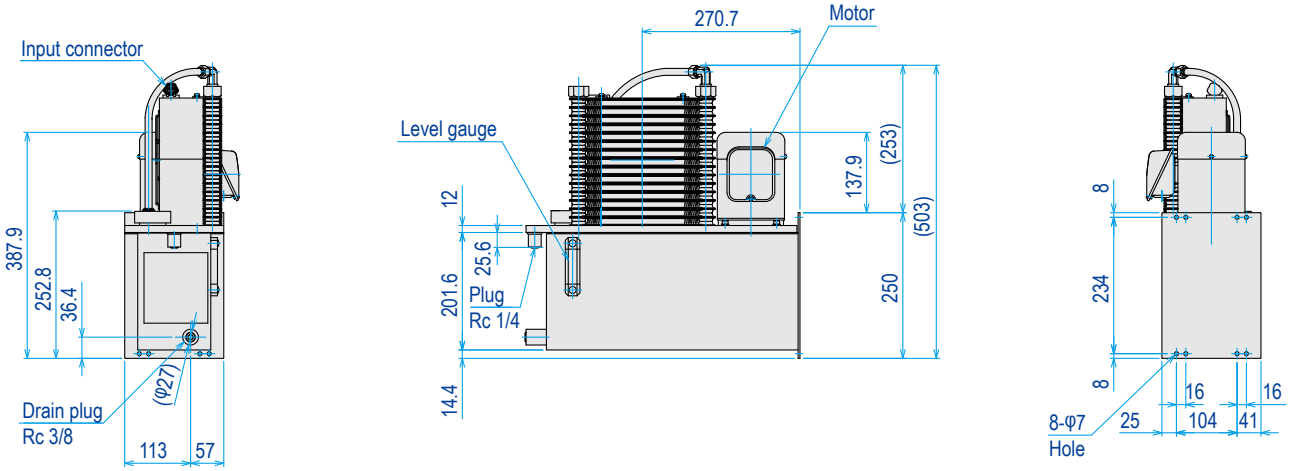




Model No.:1PS75-2-12MAVB-C24

Pump model
TOP-12MAVB
Motor for pump
75W 4P 200V class
Heat exchange
Flow rate:3ℓ/min.
1170kcal/h (Room temperature + 30C)
Tank capacity
Approximately 8ℓ (at 90%)
Minimum oil quantity: 4ℓ
Viscosity range
500 mm²/s to 21 mm²/s (15 to 80C)





Any disassembly or alteration of the product will void the warranty.

Lists of applicable seal kit, bearing, seal and gasket material options for special specification

- Unauthorized disassembling and/or modifying voids product warranty and inspection.
- Please specify a model no. of pump, MFG no. and serial no., when ordering.
- The bearing is not included in the seal kit. Please order separately.

■ Applicable seal kit list

Item / Pump model	Oil seal		O-ring		Gasket	
	Model no.	Q'ty	Model no.	Q'ty	Model no.	Q'ty
1A	SC08227	1	JASO 1033	1	–	–
1HG	TC12327	1	S38 S42	1 1	–	–
2HB	SC15357	2	S53	2	Gasket Top cover gasket	1 1
2.5HGA	SC19358	1	S65	1	Gasket Top cover gasket	1 1
N3FA N3FB	TC25528	1	G90	1	–	–
N3H	TC25528	1	G90 G60 G45	1 1 2	Gasket	1
3V	TC254511	1	G60 G115	2 1	–	–
4AM	TC355511	1	142.47×3.53 G75 S65 P38	1 1 2 2	–	–
4A	SC456812	2	142.47×3.53 G100	2 2	Flange gasket Gasket	2 1
GPL	TC355212	1	G145 P38 G45	1 2 3	Flange gasket	4
1RA	SC8227	1	38×1.5	1	–	–
2RA	TCV12.45×30×9	1	–		Metal gasket	1
3RD	TCV204011	1	–		Gasket	1

■ Applicable bearing list

Item / Pump model	Bearing	
	Model no.	Q'ty
1HG	6201	2
2HB	6202 6301	1 1
2.5HGA	6201 TAF192720	1 2
N3FA N3FB	6205 TA2225Z	2 1
N3H	6205 6305	2 1

Item / Pump model	Bearing	
	Model no.	Q'ty
4AM	6307 NA6908	2 1
4A	6309 N309	2 2
GPL	TR354830 6205	4 1
3RD	51104	1

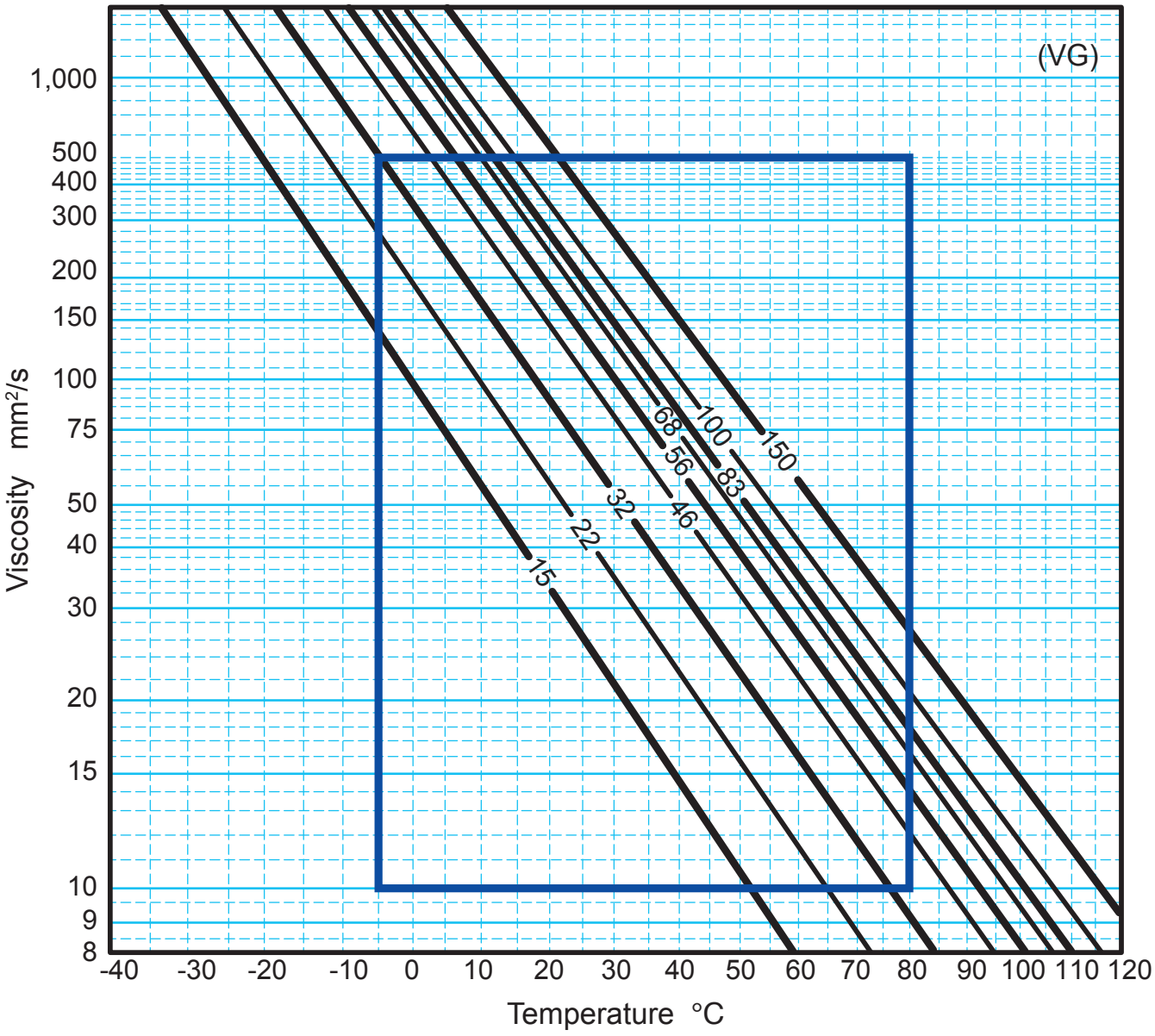
■ Seal and gasket material option list for special specification

Item / Pump model	code	Application	Oil seal	O-ring	Bearing	Gasket	Torochoid rotor
			Material name				
1A	US	For special fluid	Silicon	Silicon	—	—	Standard
	VF	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.5MPa)	FKM	FKM			Standard
	VV	For special fluid	FKM	FKM			Standard
1HG	VF	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.7MPa)	FKM	FKM	Standard		Standard
	VV	For fuel oils and specific oils. (Discharge pressure for fuel oil: up to 0.7MPa)	FKM	FKM	Standard		Standard
2HB	US	For special fluid	Silicon	Silicon	Standard	Standard	Standard
	UT	For special fluid	Teflon	Teflon square ring	Standard	Teflon sheet	Standard
	VF	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
	VV	For fuel oils and specific oils. (Discharge pressure for fuel oil: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
	VH	For high temperature (Fluid temperature: up to 200C/Discharge pressure: up to 0.7MPa)	Inside: Teflon Outside: FKM	Teflon square ring	C3	Teflon sheet	208~220 Specific rotor
N3H	UT	For special fluid	Teflon	Teflon square ring	Standard	Teflon sheet	Standard
	VF	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
	VV	For fuel oils and specific oils (Discharge pressure for fuel oil: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
	VH	For high temperature (Fluid temperature: up to 200C/Discharge pressure: up to 0.7MPa)	Teflon	FKM	C3	Teflon sheet	Specific rotor
3V	VF	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
	VV	For special fluid	FKM	FKM	Standard	Teflon sheet	Standard
4AM	VH	For high temperature (Fluid temperature: up to 200C/Discharge pressure: up to 0.7MPa)	Teflon	FKM:G75x1 FKM:S65x1 Teflon square rings	6307C3×2 NA6908×1	—	Standard

- VF and VH are unavailable for Trochoid pumps with an integrated motor, such as 1ME, 2MY, 2ME, 3MF and other models. (High temperature oil might damage the motor.)
- Ensure that the maximum discharge pressure of the pump is below 0.7MPa for VF and VH. (High temperature oil might lower its viscosity and lubricity and that may damage the pump under the high discharge pressure.)
- Fuel oils can be used with "vv". (Ensure that the maximum discharge pressure is below 0.7MPa. They have generally low-viscosity, hence and low-lubricity.)
- Teflon is a registered trademark of Du Pont de Nemour.
- The standard material of oil seal and o-ring of Trochoid pump is NBR (nitrile rubber) except 2HT, 2HW, 4AM and 4A models. If the material does not match your oil, please specify your required seal materials.

Viscosity chart

The area inside the blue box indicates the operational range of Trochoid pump.



Note: The allowable viscosity range for 3V and GPL is 46 to 2,000 mm^2/s.

Trouble shooting

- If any troubles like no oil discharge and loud noise occur soon after the installation, check the following “Quick reference of pump failure”.
- If the trouble persists, contact your local dealer or us.

■ Quick reference of pump failure

Failure	Possible causes and phenomena	Inspection method	Corrective action
Insufficient discharge or pressure Insufficient suction head	No discharge or low discharge	Measure the suction pressure with a vacuum gauge (Below -0.03Mpa: Cavitation)	Lower the oil viscosity
		Clogs in the suction pipeline Check the suction filter for clogs	Clean the suction filter
		Insufficient oil in the tank Check the oil level with eyes or an oil level gauge	Supply oil to the required level. Guideline: 3 or 4 times of discharge per min
		Check if the pump's drawing air from the pipe joints	Retighten the pipes
		The oil viscosity is too low for the operational pressure	Adjust the viscosity
		Tighten the pressure adjusting bolt of the relief valve while checking the pressure gauge No pressure rise	Clean the relief valve to remove the contaminant
		Tighten the pressure adjusting bolt of the relief valve while checking the pressure gauge The pressure rises	Increase the set pressure, because the relief valve is being activated constantly
		Incorrect rotation direction Check the direction with eyes	Correct the rotation direction
		Check the blocking in both a suction and a discharge lines	Unblock both a suction and discharge lines
			Widen both a suction and discharge lines
Oil leaks	Oil leaks from an oil seal	Incorrect rotation direction Check the direction with eyes	Repair or replace the pump
		Check if the pressure applies to the suction pipeline	Install the pump higher than liquid level (within 1 m) Pressure resistence of oil seal: Max. 0.03MPa
		Oil temperature is higher than the oil seal's heat resistance limit	Seals with special maerial can be provided (Refer to P. 131)
		The oil is not compatible with the seal materials	Replace the seal or pump
No discharge A breaker is tripped	The motor does not work	Power failure or drop in voltage	Check the power supply
		Are the breaker and/or electromagnetic switch, tripped off?	Reset the breaker and/or electromagnetic switch
		Failure of power cord or connection	Replace the cord or reconnect it
	Overload	Is the power rating adequate?	Use a motor with higher power rating or use a pump with lower capacity. If there is anything unclear, contact us, after checking the oil viscosity, operational pressure and the pipelines
	Pump cannot be rotated with a hand or rotation is not smooth	Is the oil viscosity or lubriciity proper?	Repair the pump as the rotors might get stuck with foreign object
		Is the oil dirty?	Repair or replace the pump
Loud noise Unusual noise	Suction resistance is too high (Cavitation) Suction pipe is too narrow Suction pipe is too long Motor speed is too fast Suction filter has a large resistance Oil viscosity is too high Suction lift is too high	Measure the suction pressure with a vacuum gauge (Below -0.03MPa: Cavitation)	Keep the suction pressure above -0.03 0MPa (Close to atmospheric pressure) Replace with larger pipes Make the pipe length shorter Replace with the filters less resistant Replace with oil with lower viscosity Lower the suction lift
	The pump is sucking air. (Airation)	Air bubbles in the tank? Inspect the pipes are not loose	Ensure that air doesn’t enter into the tank, pipes and the pump
		Check if the returned pipe end is under the oil	Ensure that the returned pipe end is always under the oil
	Misaligned coupling	Check the concentricity of couplings and shaft alignment	Ensure that the coupling’s concentricity is within the specified level

If your problems could not be solved by the above steps. please contact us.

Torochoid Pump Q & A

Q (Question)	A (Answer)
What is Trochoid Pump?	Outline of Trochoid Pump Torochoid Pump is an internal gear pump that rotates meshing an outer rotor (internal gear) and an inner rotor (external gear) which is accommodated in the outer rotor. The rotor tooth is formed in a shape of trochoid curve. Therefore the pump is named “Trochoid Pump” and is a registered trademark of Nippon oil pump co.,Ltd. Trochoid Pump comprises an inner and an outer rotor, a shaft, a shaft bearing and casing with a round hole which accommodates the rotors. The shaft is located in the center of the inner rotor and the outer and inner rotor are assembled eccentrically so when inner rotor rotates, the outer rotor also rotates in the same direction with a little delay. Since the number of teeth of the inner rotor is one lesser than that of the outer rotor, the volume of the gap between the inner and the outer rotors changes continuously depending on the position. So any given volume first increases, and then decreases. An increase creates a vacuum. This vacuum creates suction, As a volume decreases compression occurs. During this compression period, fluids can be pumped. Features of Trochoid Pump Torochoid Pump is an internal gear pump and the discharge rate is fixed. However, the relationship between the discharge and pressure changes in a straight line when the rotational speed is constant, and the flow rate becomes maximum when there is no pressure. The required power is linearly proportional to the pressure and hence, at the maximum pressure the motor output is maximum. Therefore, please note that operating against closed discharge may damage the pump or overload the motor.
How high does the Trochoid Pump suck up?	At a rotational speed of 1000 to 2500min^{-1} the suction head is 3m (It varies depending on the pump type) and the suction pressure has a capacity of 720mmHg or more with a vacuum gauge. If it exceeds -0.03MPa, cavitation will occur and cause troubles. In general, it is recommended that the suction head is below 1m and a suction pressure is below -0.03 MPa.
Is it possible to use the Trochoid Pump in reverse rotation and switch suction and discharge?	The trochoid Pump has the fixed directions of rotation, suction and discharge except for the reversible pumps. Therefore, to avoid mistakes, check the direction of rotation on the nameplate, before using it. The direction of rotation, suction and discharge differ depending on the pump type, so please check on the page of each model.
Pressure is applied to the suction port of Trochoid Pump. Is it all right?	The oil seal pressure resistance of Trochoid Pump is max. 0.03MPa. Make sure that it is within 0.03MPa.
Is high temperature oil available for Trochoid Pump?	The operating oil temperature range of the standard Trochoid Pump is -5 to 80C. As special types, we can offer VF type for high temperature (81 to 120C) and VH type for super high temperature (121-200C). Please check the seal and gasket material option list on P.131. Note: Please keep the temperature gap between the Trochoid Pump and the fluid within 40C to prevent heat shock. In addition to the above temperature range, please keep the viscosity of pumped liqued within the range described in the instruction manual. VH type can not be used with the models with an integrated motor like 1ME, 2MY, 2ME, 3MF, except for 1ME200SH-1 * MA (VB)-BT which can be used up to 200C.
What is the minimum rotaion speed of the Trochoid Pump?	The permissible rotational speed range of the Trochoid Pump is 500 to 1800 min^{-1}. The minimum rotation speed varies depending on the pump type and specifications, but the flow rate is proportional to the rotation speed up to 300 min^{-1}. In addition, the suction capacity will decrease as rotation speed slows down, so please make sure that the suction head is below 50 to 100cm. (It also depends on pump types and other conditions).
Is it possible to use Trochoid Pump in cold places?	Ambient temperature ranges are as follows: Trochoid pump: -20 to 40C/Trochoid pump with integrated motor: -10 to 40C
Air bubbles appear in the discharge line of the Trochoid Pump. Is it all right?	1) Air entering into the circuit (from the piping joint of the suction line). →Retighten or reconnect the piping joints. 2) Air entering into the circuit (from the oil seal). →Replace the oil seal. 3) Insufficient oil in the tank. →Replenish oil to the specified level. 4) Suction of air bubbles from the return pipe. →The return piping should be deeper than the oil surface and away from the suction piping. Provide a partition plate between the suction piping and the return piping to block air bubbles and settle the foreign objects into the tank floor.
The motor is hot. Is it all right?	Is the motor overloaded? Check the motor current value. Make sure that it is within the rated current. (Up to 60C) If it is overloaded, lower the discharge pressure or use a motor with higher power rating.
I would like to know how to wire the Motor of Trocoid Pump (integrated motor).	The wiring diagram of the motor is displayed on the terminal box of the motor. Please check the diagram before working on the wiring.
What is the reversible Trochoid Pump?	The reversible Trochoid Pump can be used for both forward and reverse rotation. The positions of inlet and outlet are always the same regardless of the direction of rotation.

Trochoid™ Pump Discontinued Products List (Standard models)

As of Sep. 20, 2018

Representative model	Production end date	Supply end date	Technical support end date	Successor model	Remarks
Trochoid™ Pump 2**HA (M)	Nov./1995	Nov./2003	Nov./2008	Trochoid™ Pump 2**HB (M)	External dimensions and mount dimensions are the same as 2 ** HB (M). The bore diameter of the new model is changed from parallel thread to tapered thread. (G type » Rc type)
2**LE (M)	Nov./1995	Nov./2000	Nov./2005	2**HB (M)	There are some differences in the appearances, but it is compatible with 2**HB(M). (Note: The material of the substitute is cast.)
3**LE	Nov./1995	Nov./2000	Nov./2005	N3**H	There are some differences in the appearances, but it is compatible with N3 ** H.
3**H	June/1997	June/2002	June/2007	N3**H	Mount dimensions are the same
1RA-*FS	Dec./2001	Dec./2006	Dec./2011	1RA-**00	Mount dimensions are the same. The number of cover tightening bolt was reduced from 3 to 2.
1**GA	Sept. /2002	Sept. /2007	Sept. /2012	N/A	Maximum discharge pressure: 7 MPa Flow rate: 2.25 to 4.5 ℓ/min
2**GA	Sept. /2002	Sept. /2007	Sept. /2012	N/A	The design-changed model was supplied by December 2013.
2**HAE (M) 2**HBE (M)	Nov./2003	Nov./2008	Nov./2013	2**HB (M)	External dimensions and mount dimensions are the same as 2**HB (M).
3**FA 3**FAVB 3**FB	Nov./2003	Nov./2008	Nov./2013	N3**FA N3**FAVB N3**FB	Mount dimensions are the same as N3 ** F.
Motor for Trochoid™ Pump 1MT*** 2MT***	June/1984	June/1989	June/1994	Motor dedicated to Trochoid™ Pump 1ME** 2ME**	Motor manufacturer was changed.
1ME75-3 1ME75-4	Dec./2002	May/2007	May/2012	N/A	Integrated into 1ME 75-2. (Position of flange is different)
Three-phase induction motor over 750 W,IE1 (compliant with motor efficiency regulations) 2MY*, 2MB*, 3MB*, 4MB*3MF*	Mar./2015	—	Feb./2020	Premium efficiency:IE3 (displayed at the end of model no.)	The change doesn't apply to explosion-proof and cold-resistant motors. (The final order of IE1 motor was accepted until September 26, 2014)
Mitsubishi Electric safety increase explosion-proof motor 2MBM, 3MBM, 4MBM, Increased safety type	Dec./2014	—	Jan./2019	Nidec Toshiba 2MB*, 3MB*, 4MB*, Increased safety type	Motor of Mitsubishi Electric is an explosion-proof type.
Three-phase induction motor over 750 W,GB3 2MB*-GB3 2MY*-GB3	May/2017	—	Apr./2022	2MB*-GB2	Due to the change of Motor Efficiency Regulations in China
Oiling machine OMN-**HVB OMN-**LVB	Jan./1995	Jan./2001	Jan./2006	N/A	Oiling machine
MLB-*	Jan./1995	Jan./2001	Jan./2006	N/A	Oiling machine
Oil cooling unit 1PS160-2-13MAVB-C18	Nov./2014	Dec./2015	Feb./2019	Oil cooling unit 1PS160-2-12MAVB-C	Resin tank » metal tank

Note:
Supply end date indicates the month when all orders for products and parts ended.
Technical support end date indicates the month when any consultation or thechnical support about the product are unavailable.

Trochoid™ Pump, Lunary™ Pump Operation Instructions [Please read all instructions before using.]

INDEX

Be aware of the safety measures and follow the indicated precautions and safety instructions.
Pay particular attention to the symbols and headings below, as there is a possibility of personal injury or property damage.

⚠ Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ Warning	Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.
⚠ Caution	Indicates an imminently hazardous situation which, if not avoided, could result in injury or damage to the pump or other equipment.

To Select a Pump

■ Required flow rate

- Please refer to the catalogs or drawings etc. (Catalog values are reference values)
- Flow rate is subject to the fluid type, temperature and discharge pressure. (The pressure and flow rate are subject to the operating conditions and environments.)
- Select a pump with a slightly higher capacity.

■ Required pressure

- Please refer to the catalogs and drawings.
  Set pressure should not exceed the maximum operating pressure and the motor output rating.

■ Set pressure of the relief valve

- The default set pressure of the relief valve is the cracking pressure*.
  Set pressure should not exceed the maximum operating pressure and the motor output rating.
  *The cracking pressure is the pressure at which the pressure in the circuit rises and the valve starts to open and a certain amount of flow is recognized. (Set pressure)
- The relief valve can be used either as a safety valve or a pressure regulator. Two types of relief valves are available according to the intended use: external return type and internal return type.

⚠ Caution	When using the internal-return type as the safety valve, do not run the pump continuously more than 30 seconds if running the pump against closed discharge. It could result in pump or motor burnout.
⚠ Caution	When using the internal-return type as a pressure control valve, do not make any settings that would allow for the relief amount to exceed 50% of the pump flow rate. This could result in abnormal pump heating or pump damage.
⚠ Caution	If an external-return type relief valve is selected, the relief oil must be returned to completely below the tank oil surface. Failure to do so might cause abnormal noise.

- Set the relief valve pressure higher than the required pressure. The relief valve system would start to be activated and return oil to the suction line long before the required discharge can be obtained, if the set pressure is lower than the required pressure.

■ Applicable liquids

- Operational liquid
  Trochoid Pumps · Lunary Pumps can be used in a wide range of applications, but be aware that they are intended to use with oils.
  ·2HT and GD series (the low viscosity type) can be used for fuel oil (excluding gasoline and other volatile oils).
  ·The 2HW series can be used for coolant liquid. Under certain temperature or environment, the product life may drastically be shortened or pump may get damaged. Please check with the supplier of coolant fluid for more information.
- The most of the pumps listed in the catalog ,except for the models for the special applications are designed to be operated in the oil of viscosity grade ISO VG46, 40C. So the specifications are also described based on this standard.
  If you use oils other than with above specifications, there may be differences in performance or durability.
- With the exception of some of the Trochoidal Pump and the Lunary Pump, we use a self-lubricating system to lubricate the sliding surface and the bearing with pumped fluid.

⚠ Caution	Using a non-lubricable liquid, a corrosive liquid, or a liquid without rust protection (water) will damage the pump. Please contact us if you use oil other than lubricating oil.
⚠ Caution	Ask the fluid manufacturer in advance for the compatibility of oil with the seal materials of the Trochoid Pump and Lunary Pump. Use of incompatible liquid may cause a leak.

- Though it is rare, a certain operating conditions, liquid, metal chips, work material and other factors might cause oil leakage and damage to the pump. Do not operate the pump in such cases.
- Please contact us if you use low viscosity oils as such oil can only be handled by special models and allowable maximum pressure is also limited.

Caution Use of considerably low viscosity oils may cause damage to the pump.

- Some fuel oils may expand the standard oil seals. Be sure to verify the specifications before using.

Caution Do not use volatile oils such as gasoline. Doing so could result in explosion or fire.

- Please contact us for more information on using fire resistant fluid. There are some seal materials which do not have duarability against them.

Ambient temperature

- Ambient temperature range for operating the Trochoid Pump and Lunary Pump: -20C to 40C.
- Ambient temperature range for operating the Motor: -10C to 40C

Caution Operation over the above temperature range may cause damage to the Trochoid Pump and Lunary Pump, and Motor. It may result in a serious accident.

Liquid temperature range for operation

- An available temperature range for the liquid is -5C to 80C. (GD-2H: 20 to 130C)
- VF: An available temperature range for the liquid is 80 to 120C.
- VH: An available temperature range for the liquid is 120 to 200C.
  Note: When you use liquid over 80C, the allowable maximum pressure is limited to 0.7MPa.
- The temperature difference between the pump and the pumped liquid should be within 40C.
- The pump and motor have the specified temperature range for operation. Take measures to operate the pump under that range.

Caution Operating outside the above range may drastically shorten the pump service life and reduce the performance and cause leaks. When using outside the above range, please contact us for more information.

Warning Operating with high temperature oil may cause severe burns from the hot pump and leaking oil.

Viscosity range for operation

- The viscosity range of the fluid is 10 to 500 mm^2/sec. Please also refer to the suction capacity on P.139.
  ·The viscosity range of 2HT series (for low viscosity oil) and 2HW series (for coolant) is 2 to 100 mm^2/sec.
- The viscosity range of the pump for high viscosity liquid (Lunary Pump 3V) is 46 to 2000 mm^2/sec.

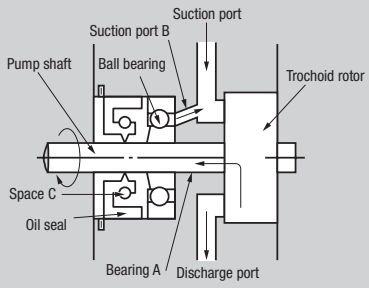
Caution Operating outside the above range may drastically shorten the pump service life and reduce the performance and cause leaks.

- Lowering the viscosity decreases the volumetric efficiency. (Discharge amount will decrease.)
- Raising the viscosity increases the required power. (Motor output will increase.)
  Note: Please take the temperature drop in winter into account when selecting the motor capacity.
- When you use low viscosity oil, the maximum operating pressure is also strictly limited. Please contact us.
- Special specifications are required if you use the pump outside the above range. So please contact us for more information.

Caution Operating with high viscosity liquid or at low-speed rotation may cause pump failure.

Check the direction of rotation

- The Trochoid pump and the Lunary pump have fixed direction of rotation and suction/discharge except for some reversible type Trochoid pump.
  Set the rotation direction of motor correctly in accordance with the direction displayed on the pump nameplate.
- The Trochoidal pump and Lunerary pump have a pressure relief hole between the pump suction (negative pressure) and the oil seal area which is provided to protect the oil seal. If the direction of rotation is incorrect, the suction and discharge positions will be switched, and the pressure will be applied to the oil seal from the hole and the oil seal will puncture and the oil will blow out.



The figure is for illustrative purpose.

- In normal operation, the pump discharges oil from the discharge port as shown in the left figure. Some oil goes through the bearing section (A) and lubricates ball bearing due to internal leakage but the oil seal prevents oil from leaking outside. When applying pressure over 0.03MPa to the Space (C), oil seal may become damaged (punctured).
- Pressure oil returns to the suction port through the small hole (B) to protect the oil seal. If the pump rotates in the opposite direction indicated on the nameplate, however, the suction and discharge will be switched, and the pressure oil will be directly applied to the oil seal through the small hole (B). In that case, the oil seal will be damaged immediately (punctured) and oil leakage will occur. A damaged (punctured) oil seal needs replacement because the lip is damaged in most cases. Please contact us for replacement.

Caution Do not operate the pump in the wrong rotation direction. If you make a mistake, the oil seal may be damaged and spout oil, resulting in an unexpected accident.

To Select a Motor

Check the required power of the pump

- Refer to the performance table on the catalog and select a power with a little higher capacity.
- The required power of the pump changes depending on the pressure, flow rate and viscosity of the fluid.
- The required power increases as the viscosity of the liquid rises.
  ·Please take the temperature drop in winter into account, when selecting the motor capacity.
- Single-phase motors do not comply with US motor efficiency regulations.

Check the voltage and frequency

- Use the power supply voltage indicated on the specification nameplate of the motor.

Caution Incorrect voltage and frequency may cause damage to the motor, abnormal pressure or flow rate.

Surroundings of the Installation Site

- Please check the surroundings of the pump installation site. Depending on the installation location, select a motor for outdoor use or safety increased explosion-proof type.

Safety Precautions

Safety Equipment

- Be sure to equip motor with an “Earth-Leakage Circuit Breaker (ELCB)” or overload protection equipment. Use this equipment only after confirming that the ratings are within the prescribed ratings stated on the motor’s nameplate.
- Be sure to comply with local electrical codes and regulations.

Caution Failure to use “Earth-Leakage Circuit Breakers(ELCB)” and overload protection equipment could result in damage to the equipment or motor burnout.

- To avoid damage to pump outlet, install a galvanometer, pressure sensor, or such other devices in the pump’s outlet line to detect dry running.
- The oil seals and packings cannot be used indefinitely.
- Install the pump in a safe location, or provide an protective cover or device to prevent personal injury or equipment damage caused by an accidental oil leaks.

Safety Measures

- Keep children or other people incapable of judging risks away from the pumps.
- Protective equipment should be installed to prevent fingers, hands or other objects from getting caught in the rotating or moving parts.

Warning Getting your fingers, hands or articles caught in the rotating or moving parts may cause unexpected injury.

- Do not touch a pump or motor during or immediately after the operations.

Warning Touching the pump or motor during the operation may result in burns.

- Some single-phase motors (IME200S, 2ME200S, 2ME400S, 2MY750S) may spark from the centrifugal switch when start-up.

Danger Do not place any flammable liquids or materials in the area surrounding the motor. Such items could catch fire.

Pump Installation

Installation position

- The pump should be installed at a position that is within 1m above or below the oil surface level.
- It is advisable to mount the pump at a position where the suction port is above the height of the oil surface level.
- Please consult us if the pump should be used outside the specification range as mentioned above.

Caution Installing the pump at a height of more than 1m above the oil surface could result in poor suction, depending on the operating conditions.

Installation Positions for the Trochoid Pump, Trochoid Pump with Motor, Trochoid Pump with Motor and Base Coupling, and Lunary Pump with Motor and Base Coupling

- There are no particular restrictions on the mounting directions when installing only the pump itself.
- When installing a Trochoid pump with a motor, the pump cannot be installed in a position higher than the motor (as seen from the horizontal position).
- When installing a Trochoid pump with a motor and a base coupling, the foundation where the base plate will be attached must be level.
- Align the attachment anchor so that it can be smoothly fitted to the base plate and the motor attachment holes.

Caution The motor may get damaged if the motor and Trochoid pump are installed incorrectly.

Caution If the installation site is not level, or if there is forcible installation in which the installation holes are not in exact alignment, the angle plate or base may get damaged or the axis may be deviated, which result in pump galling and damaging the pump.

Installation Site

The equipment should not be installed in locations with lots of dust, high or low temperatures (refer to P.137 "Ambient Temperature"). Please consult us when the equipment must be used in special surroundings (e.g. a place in which the pump will be exposed to water, place with high vibration or high humidity) other than the typical indoor installation sites.

Suction Capacities

- Set the suction head for the Trochoid and Lunary pumps within 1m when running the motor at a speed of 1,000 ~ 2,500min-1 or keep the suction pressure at the suction port within -0.03 ~ 0MPa when the port is fully filled with oil.
- Pressure on the suction side lower than -0.03MPa could result in cavitation, abnormal noise, heating, poor discharge and damage to the pump.
- Please consult us if the pump should be operated outside the specification range as mentioned above.

Caution Suction capabilities will drop when there is large resistance in the discharge line.

Caution Suction capabilities will drop significantly when air enters from the suction line.

- The pump must be mounted at a position below the oil surface level if the pump is operated at slow speed.

Pipe Arrangement

- The maximum torque allowable for tightening the screws for the Trochoid pump's pipe connections are as shown in the table below.

Diameter Rc	1/8	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2
Torque N·m	10	20	20	25	30	70	80	90

Caution The pump bore may get damaged if these values are exceeded.

Caution The excess use of seal tape or liquid sealants may reduce friction and result in over tightening, which in turn could damage the pump bore.

Pipe Connections

- Make sure that the pipe connections are securely tightened and completely sealed to prevent leaks or intake of air.
- Always be sure to use pipe supports so that the pipes are self-supported and will not place any weight on the pump.
- Make sure that the pipe lengths and angles are correct when connected so that no unnecessary strain is placed on the pump.
- A pressure gauge should be installed so that pump conditions can be easily monitored.
- Stop valves, union jacks and some other couplings should be used to make pump maintenance easier.
- When handling oils with high viscosities, select pipes with diameters bigger than the pump to minimize pressure loss.
- Some of the high-pressure hoses and other parts have narrow internal diameters. Therefore, be sure to check not only the inner diameter of screw-in sections, but the whole area of the pipe as well before use.
- It is recommended that an air vent valve in discharge line and additional priming hole in suction line be provided to prevent possible startup troubles.

Types of Pipes and Couplings

- All pipes must be cleaned thoroughly before connected to the pump. Some pipes may have dust from storage or threading debris remaining inside. Be sure to flush out all pipes to ensure that they are thoroughly clean before use.

Caution The pump and connected equipment may become damaged if the pipes are not adequately clean.

Caution Do not attempt to flush the pipes after attaching to the pump.

Caution Test the pipes for air tightness before installing the pump.

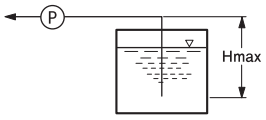
Pipe Arrangement for Suction Line

- For the suction line, select pipes with diameter that will keep the fluid velocity in the pipe at 1.5m/s or less and suction resistance at -0.03MPa or less.
- Make sure that the total pressure resistance of devices installed on the suction line, such as pipes, filter and valves is smaller than 0.03MPa.

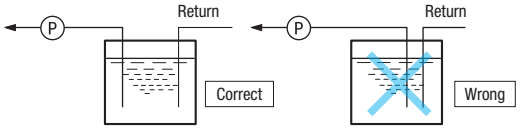
$$\text{< Calculation >} \quad \text{Fluid Velocity (m/s)} = \frac{\text{Pump Flow Rate } (m^3/s)}{\text{Pipe Cross-section Area } (m^2)}$$

Caution Trapped air or foam inside the pipes may result in pump noise, vibrations and heating, which in turn could damage the pump.

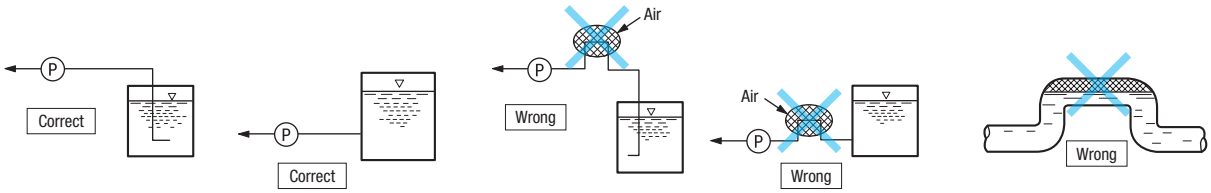
- Calculate the suction head based on the minimum oil level.



- Keep the piping in suction line as far away as possible from the return port of the relief valve or actuator so that there will be no negative influence from the returned oil.



- Piping in the suction line should be as short as possible and with minimum number of bends.
- Inspect all of the valves thoroughly, cocks and couplings before assembling the pipes. Do not use any items with cavities or narrow ports.
- When bending or soldering the pipes, make sure that those pipe bores do not become smaller.
- Make sure that pipe inside diameter doesn't change throughout the pipe.
- Make sure that the opening section of the packing is cut away in accurate diameter and without any burrs.
- Make sure that air doesn't enter the pipes.
- It is recommended that suction pipes with bore diameter of one or two size larger be selected to reduce suction resistance if pumping oil with viscosity of ISO VG68 or higher in viscosity.



- Use gate-type valves when installing valves.
- If the pressure still remains inside the pipes in discharge line after the operation is stopped, a non-return valve should be installed in discharge line, not in suction line.

Caution Make sure that the pressure in suction line won't exceed 0.03MPa. Excess pressure in suction line may cause oil seal damage, oil leakage. Special attention will be required particularly if you use the reversible type Trochoid pump.

■ Discharge Pipework

- Select pipes which is wide enough to allow the fluids flowing through the discharge line at a speed of 3 m/s or less.

■ Filters

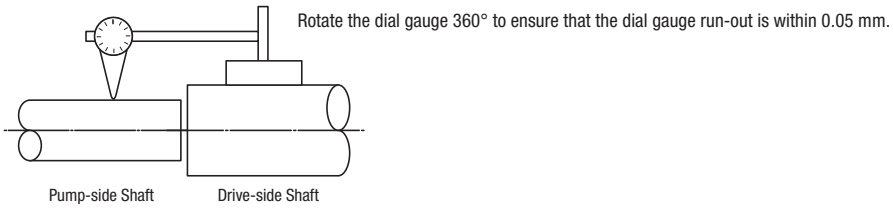
- It is recommended to Install suction filter of 150-mesh with as large capacity as possible if operated in a normal condition.
- Select filters with a passage resistance of 0.01MPa or less after confirming the manufacturer's specifications.
- The purpose of installing suction filter is to remove large objects that could hamper normal pump operations. Even very tiny object passing through the filter could significantly shorten the pump service life. Therefore, the oil replacement should be performed on a regular basis, or clean the oil regularly with a filter with mesh smaller than 11μm.

Caution Foreign objects mixed in the oil may significantly shorten the pump service life or damage the pump. Very fine objects which can pass through the suction filter also can cause performance drop, shortened service life, oil leaks depending on the use conditions. Therefore, the filters need to be cleaned on a regular basis. Continuous use of clogged filters may result in an abnormal noise, vibrations and poor discharge.

Pump Drive Method

■ Driving Method

- Pump driven by special-purpose motor: Trochoid pump with integrated motor.
- Pump driven by general-purpose motor: Trochoid pump with base coupling mount type motor or Lunary pump with base coupling mount type motor.
- Power source other than using motor: Trochoid pump, Lunary pump.
- Trochoid and Lunary pumps are designed on the premise that the motor and shaft center are arranged in a straight line. Centering of the drive shaft and pump should be within 0.05mm TIR.



- Please contact us for the drive methods in which the load is placed on pump shaft along radial or thrust direction.

Caution Poor alignment between the motor and the Trochoid or Lunary pump may result in vibrations, loud noises and damage to the pump.

Caution When attaching the coupling to the pump shaft, do not forcibly hammer the coupling. It could result in pump malfunctions.

Caution Applying thrust load or radial load to the pump shaft may cause pump malfunctions.

Preparations

Before Operation

- Check the direction of the pump rotation, suction port and discharge port.
- The rotation direction of our integrated motors (which is designed to be coupled directly with NOP pump), is indicated on the motor frame or terminal box . Please confirm the direction of motor rotation before wiring.

1) Our NOP motor (3-phase power source) is designed to rotate in the standard rotation directions when wired in accordance with the wiring diagram as shown below.

2) Some types of general-purpose motor (3-phase) equipped with a base coupling may need to be wired differently from the diagram above. Please check the rotation direction indicated on both the motor and the pump before wiring.

Caution Mistakes in the rotation direction and positioning of the suction and discharge ports could result in oil leaks or damage to the pump.

- Make sure that the tank on the suction side is filled with clean oil.
- Make sure that there are no loose areas in the piping.
- Make sure that the entire pipeline is unblocked.
- Make sure that the valves around the pump are all fully opened.
- On the initial startup, turn the pump on and off quickly for a few times to verify that the motor is rotating in the right direction.
- There is no ON / OFF switch on our pumps. It will start just after the wire is connected to the power supply. So, make sure that the power is completely disconnected before working on the wiring.

Test Run

1) Dry Run

- Do not run the pump dry for more than 10 seconds. Stop the operation if the pump cannot prime oil.
- If it takes long time until the pump starts to draw oil, pour oil into suction pipe beforehand.

Inspection

Daily Start-up Inspection

- Be sure to make the necessary inspections every time before start-up. In particular, for oil leaks from the pump or pipes, abnormal noise and heating.

Caution If any abnormalities are discovered, immediately stop the pump and check for the problem area.

Regular Inspections

- If the pump is used as an important safety parts, regular inspections should be carried out at least once a year to ensure that they are operating correctly.
- Please consult with us when performing the inspection.

Maintenance

- Seal kits and spare parts should be kept on hand to deal with sudden faults or poor operation due to the pump deterioration.
- The most common cause of poor performance is the use of dirty or degraded fluid. So, the oil replacement and other maintenance work should be performed on a regular basis.
- Be sure to cease all operations and perform necessary inspections and maintenance if there are any abnormal sounds, heating or other abnormalities when using a motor that had been kept in storage for an extended period of time.
- The coupling and oil seals used for the Trochoid pump and motor are consumable parts and so will need to be replaced on a regular basis (1 year or 8,000 hours of use).
- The pump service life will become shorter than 1 year or 8,000 hours of use If it is operated in an environment other than as stated above.
- There are certain types of seal-kit that we cannot supply, such as ones for fuel oil, cutting-oil or heat-resistant types.

Warranty

- The warranty will not cover any faults caused by operation outside the stated specifications or attributed to foreign matter or other external causes.
- The Trochoid pump is warranted to be free from defects in workmanship and materials for 1 year after the delivery or 8,000 hours of use, whichever occurs first. The warranty applies only when operated within the product specifications and in accordance with the “Instruction Manual for Trochoid and Lunary Pumps” stated in this Trochoid Pump Catalog.
- The warranty doesn’t cover any faults caused by any modifications or disassembling of the pump made by customer.

Specifications

Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg) (Relief valve attached)
		1500min^{-1}	1800min^{-1}			
TOP-10A	0.8	1.2	1.4	0.5	3000	0.5 (0.8)
TOP-11A	1.5	2.2	2.7	0.5	2000	0.5 (0.8)
TOP-12A	2.5	3.7	4.5	0.5	1800	0.6 (0.9)
TOP-13A	4.5	6.7	8.1	0.5	1800	0.8 (1.1)
TOP-11HG	1.5	2.2	2.7	2.5	3000	1.4
TOP-12HG	2.5	3.7	4.5	2.5	2500	1.5
TOP-1RA-100	1.1	1.6	2.0	0.5	2000	1.1
TOP-1RA-200	1.8	2.7	3.2	0.5	2000	1.2
TOP-1RA-300	2.5	3.7	4.5	0.5	2000	1.3
TOP-203HB	2.8	4.2	5	3	3000	3.5 (3.9)
TOP-204HB	4	6	7.2	3	3000	3.6 (4.0)
TOP-206HB	6	9	10.8	2.5	2500	3.8 (4.2)
TOP-208HB	8	12	14.4	2.5	2500	4.0 (4.4)
TOP-210HB	10	15	18	2.5	2500	4.1 (4.6)
TOP-212HB	12	18	21.6	2	2000	4.3 (4.7)
TOP-216HB	16	24	28.8	1.5	1800	4.6 (5.1)
TOP-220HB	20	30	36	1.2	1800	5.0 (5.5)
TOP-203HT	2.8	4.2	5	0.7	1800	3.5 (3.9)
TOP-204HT	4	6	7.2	0.7	1800	3.6 (4.0)
TOP-206HT	6	9	10.8	0.7	1800	3.8 (4.2)
TOP-208HT	8	12	14.4	0.7	1800	4.0 (4.4)
TOP-210HT	10	15	18	0.7	1800	4.1 (4.6)
TOP-212HT	12	18	21.6	0.7	1800	4.3 (4.7)
TOP-216HT	16	24	28.8	0.7	1800	4.6 (5.1)
TOP-220HT	20	30	36	0.7	1800	5.0 (5.5)
TOP-2RA-4C	4	6	7.2	0.5	2000	3.9
TOP-2RA-8C	8	12	14.4	0.5	2000	4.2
TOP-2RA-12C	120	18	21.6	0.5	1800	4.5
TOP-2516HGA	16	24	28.8	2.5	2500	6.9 (7.5)
TOP-2520HGA	20	30	36	2	2000	7.2 (7.7)
TOP-N320FAM	26	39	46.8	2.5	1800	8
TOP-N320FAMVB	26	39	46.8	2.5	1800	10.5
TOP-N320FBM	26	39	46.8	2.5	1800	9
TOP-N330FAM	39	58.5	70.2	2.5*1	1800	8
TOP-N330FAMVB	39	58.5	70.2	2.5*1	1800	10.5
TOP-N330FBM	39	58.5	70.2	2.5*1	1800	9
TOP-N340FAM	52	78	93.6	2.0*1	1800	8
TOP-N340FAMVB	52	78	93.6	2.0*1	1800	10.5
TOP-N340FBM	52	78	93.6	2.0*1	1800	9
TOP-N320H	26	39	46.8	4	1800	14.8 (15.4)
TOP-N330H	39	58.5	70.2	4.0*1	1800	14.9 (15.5)
TOP-N340H	52	78	93.6	3.0*1	1800	14.9 (15.5)
TOP-N350H	65	97.5	117	2.0*1	1800	15.6 (16.2)
TOP-330V	39	58.5	70.2	1	1800	19.3 (20.7)
TOP-340V	52	78	93.6	1	1800	19.5 (20.9)
TOP-350V	65	97.5	117	1	1800	19.3 (20.7)

Model	Theoretical displacement (cm^3/rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min^{-1})	Approx. weight. (kg) (Relief valve attached)
		1000min^{-1}	1200min^{-1}			
TOP-3RD-10T	13	13.0	15.6	0.5	1800	10
TOP-3RD-15T	19.5	19.5	23.4	0.5	1800	10
TOP-3RD-20T	26	26.0	31.2	0.5	1800	10.5
TOP-3RD-25T	32.5	32.5	39.0	0.5	1800	11
TOP-3RD-30T	39	39.0	46.8	0.5	1800	11.5
TOP-4100AM	115.5	115.5	138.6	2	1800	28
TOP-4130AM	148.5	148.5	178.2	2	1800	30
TOP-4150AM	171.6	171.6	205.9	2	1500	31
TOP-4200AM	231.0	231.0	277.2	2	1500	34
TOP-4250AM	280.5	280.5	336.6	2	1200	42
TOP-4300A	349.8	349.8	419.7	1	1200	117
TOP-4500A	580.8	580.8	696.9	1	1200	122
TOP-4RD-100	100	100	-	0.5	1000	30.5
GPL-150VB	150	150	180	1	1800	38.9
GPL-200VB	200	200	240	1	1800	40.3
GPL-250VB	250	250	300	1	1800	42.5

*Please consult us when using the pump at the pressure of "*1"

Pump type ※mark indicates motor power	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1500min^{-1} Maximum pressure for motor output (MPa)					Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min^{-1} Maximum pressure for motor output (MPa)				
		200W	400W	750W	1500W	2200W		200W	400W	750W	1500W	2200W
TOP-2MY※-203HBM	4.2	1.7	3	3	3	-	5	1.3	3	3	3	-
TOP-2MY※-204HBM	6	1.2	3	3	3	-	7.2	0.9	2.3	3	3	-
TOP-2MY※-206HBM	9	0.7	1.8	2.5	2.5	-	10.8	0.5	1.4	2.5	2.5	-
TOP-2MY※-208HBM	12	0.5	1.3	2.5	2.5	-	14.4	0.3	1	2.3	2.5	-
TOP-2MY※-210HBM	15	0.4	1.1	2.5	2.5	-	18	0.3	0.9	2	2.5	-
TOP-2MY※-212HBM	18	0.3	0.9	2	2	-	21.6	-	0.7	1.6	2	-
TOP-2MY※-216HBM	24	0.2	0.7	1.5	1.5	-	28.8	-	0.5	1.2	1.5	-
TOP-2MY※-220HBM	30	-	0.4	1.2	1.2	-	36	-	0.3	0.9	1.2	-
TOP-2MY※-204HWM	6	1.2	2	2	2	-	7.2	1	2	2	2	-
TOP-2MY※-206HWM	9	0.8	1.8	2	2	-	10.8	0.6	1.6	2	2	-
TOP-2MY※-208HWM	12	0.6	1.4	2	2	-	14.4	0.4	1.2	2	2	-
TOP-2MY※-210HWM	15	0.4	1.2	2	2	-	18	0.3	1	2	2	-
TOP-2MY※-212HWM	18	0.3	1	2	2	-	21.6	-	0.8	1.6	2	-
TOP-2MY※-216HWM	24	0.2	0.8	1.5	2	-	28.8	-	0.6	1.2	2	-
TOP-2MY※-220HWM	30	-	0.6	1.2	1.5	-	36	-	0.5	1	1.5	-
TOP-2MY※-204HWMPVB(E)	6	1.2	2	2	2	-	7.2	1	2	2	2	-
TOP-2MY※-206HWMPVB(E)	9	0.8	1.8	2	2	-	10.8	0.6	1.6	2	2	-
TOP-2MY※-208HWMPVB(E)	12	0.6	1.4	2	2	-	14.4	0.4	1.2	2	2	-
TOP-2MY※-210HWMPVB(E)	15	0.4	1.2	2	2	-	18	0.3	1	2	2	-
TOP-2MY※-212HWNPEVB	18	0.3	1	2	2	-	21.6	-	0.8	1.6	2	-
TOP-2MY※-216HWNPEVB	24	0.2	0.8	1.5	2	-	28.8	-	0.6	1.2	2	-
TOP-2MY※-220HWNPEVB	30	-	0.6	1.2	1.5	-	36	-	0.5	1	1.5	-
TOP-2MY※-203HTM	4.2	0.7	0.7	0.7	0.7	-	5	0.7	0.7	0.7	0.7	-
TOP-2MY※-204HTM	6	0.7	0.7	0.7	0.7	-	7.2	0.7	0.7	0.7	0.7	-
TOP-2MY※-206HTM	9	0.7	0.7	0.7	0.7	-	10.8	0.6	0.7	0.7	0.7	-
TOP-2MY※-208HTM	12	0.6	0.7	0.7	0.7	-	14.4	0.4	0.7	0.7	0.7	-
TOP-2MY※-210HTM	15	0.5	0.7	0.7	0.7	-	18	0.3	0.7	0.7	0.7	-
TOP-2MY※-212HTM	18	0.4	0.7	0.7	0.7	-	21.6	-	0.7	0.7	0.7	-
TOP-2MY※-216HTM	24	0.3	0.7	0.7	0.7	-	28.8	-	0.6	0.7	0.7	-
TOP-2MY※-220HTM	30	-	0.6	0.7	0.7	-	36	-	0.5	0.7	0.7	-
TOP-2ME※S-203HBM	4.2	1.7	3	3	-	-	5	1.3	3	3	-	-
TOP-2ME※S-204HBM	6	1.2	3	3	-	-	7.2	0.9	2.3	3	-	-
TOP-2ME※S-206HBM	9	0.7	1.8	2.5	-	-	10.8	0.5	1.4	2.5	-	-
TOP-2ME※S-208HBM	12	0.5	1.3	2.5	-	-	14.4	0.3	1	2.3	-	-
TOP-2ME※S-210HBM	15	0.4	1.1	2.5	-	-	18	0.3	0.9	2	-	-
TOP-2ME※S-212HBM	18	0.3	0.9	2	-	-	21.6	-	0.7	1.6	-	-
TOP-2ME※S-216HBM	24	0.2	0.7	1.5	-	-	28.8	-	0.5	1.2	-	-
TOP-2ME※S-220HBM	30	-	0.4	1.2	-	-	36	-	0.3	0.9	-	-
TOP-2MBT※-203HB	4.2	1.7	3	3	3	3	5	1.3	3	3	3	3
TOP-2MBT※-204HB	6	1.2	3	3	3	3	7.2	0.9	2.3	3	3	3
TOP-2MBT※-206HB	9	0.7	1.8	2.5	2.5	2.5	10.8	0.5	1.4	2.5	2.5	2.5
TOP-2MBT※-208HB	12	0.5	1.3	2.5	2.5	2.5	14.4	0.3	1	2.3	2.5	2.5
TOP-2MBT※-210HB	15	0.4	1.1	2.5	2.5	2.5	18	0.3	0.9	2	2.5	2.5
TOP-2MBT※-212HB	18	0.3	0.9	2	2	2	21.6	-	0.7	1.6	2	2
TOP-2MBT※-216HB	24	0.2	0.7	1.5	1.5	1.5	28.8	-	0.5	1.2	1.5	1.5
TOP-2MBT※-220HB	30	-	0.4	1.2	1.2	1.2	36	-	0.3	0.9	1.2	1.2
TOP-2MBM※-203HB	4.2	1.7	3	3	3	3	5	1.3	3	3	3	3
TOP-2MBM※-204HB	6	1.2	3	3	3	3	7.2	0.9	2.3	3	3	3
TOP-2MBM※-206HB	9	0.7	1.8	2.5	2.5	2.5	10.8	0.5	1.4	2.5	2.5	2.5
TOP-2MBM※-208HB	12	0.5	1.3	2.5	2.5	2.5	14.4	0.3	1	2.3	2.5	2.5
TOP-2MBM※-210HB	15	0.4	1.1	2.5	2.5	2.5	18	0.3	0.9	2	2.5	2.5
TOP-2MBM※-212HB	18	0.3	0.9	2	2	2	21.6	-	0.7	1.6	2	2
TOP-2MBM※-216HB	24	0.2	0.7	1.5	1.5	1.5	28.8	-	0.5	1.2	1.5	1.5
TOP-2MBM※-220HB	30	-	0.4	1.2	1.2	1.2	36	-	0.3	0.9	1.2	1.2
TOP-2MBT※-203HT	4.2	0.7	0.7	0.7	-	-	5	0.7	0.7	0.7	-	-
TOP-2MBT※-204HT	6	0.7	0.7	0.7	-	-	7.2	0.7	0.7	0.7	-	-
TOP-2MBT※-206HT	9	0.7	0.7	0.7	-	-	10.8	0.6	0.7	0.7	-	-
TOP-2MBT※-208HT	12	0.6	0.7	0.7	-	-	14.4	0.4	0.7	0.7	-	-
TOP-2MBT※-210HT	15	0.5	0.7	0.7	-	-	18	0.3	0.7	0.7	-	-
TOP-2MBT※-212HT	18	0.4	0.7	0.7	-	-	21.6	-	0.7	0.7	-	-
TOP-2MBT※-216HT	24	0.3	0.7	0.7	-	-	28.8	-	0.6	0.7	-	-
TOP-2MBT※-220HT	30	-	0.6	0.7	-	-	36	-	0.5	0.7	-	-
TOP-2MBM※-203HT	4.2	0.7	0.7	0.7	-	-	5	0.7	0.7	0.7	-	-
TOP-2MBM※-204HT	6	0.7	0.7	0.7	-	-	7.2	0.7	0.7	0.7	-	-
TOP-2MBM※-206HT	9	0.7	0.7	0.7	-	-	10.8	0.6	0.7	0.7	-	-
TOP-2MBM※-208HT	12	0.6	0.7	0.7	-	-	14.4	0.4	0.7	0.7	-	-
TOP-2MBM※-210HT	15	0.5	0.7	0.7	-	-	18	0.3	0.7	0.7	-	-
TOP-2MBM※-212HT	18	0.4	0.7	0.7	-	-	21.6	-	0.7	0.7	-	-
TOP-2MBM※-216HT	24	0.3	0.7	0.7	-	-	28.8	-	0.6	0.7	-	-
TOP-2MBM※-220HT	30	-	0.6	0.7	-	-	36	-	0.5	0.7	-	-

Pump type ※mark indicates motor power	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1500min^{-1} Maximum pressure for motor output (MPa)					Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min^{-1} Maximum pressure for motor output (MPa)				
		750W	1500W	2200W	3700W	5500W		750W	1500W	2200W	3700W	5500W
TOP-3MF※-N320FA	39	0.4	1.3	2.1	-	-	46.8	0.2	1	1.7	-	-
TOP-3MF※-N320FAVB	39	0.4	1.3	2.1	-	-	46.8	0.2	1	1.7	-	-
TOP-3MF※-N320FB	39	0.4	1.3	2.1	-	-	46.8	0.2	1	1.7	-	-
TOP-3MF※-N330FA	58.5	0.1	0.8	1.3	-	-	70.2	-	0.6	1	-	-
TOP-3MF※-N330FAVB	58.5	0.1	0.8	1.3	-	-	70.2	-	0.6	1	-	-
TOP-3MF※-N330FB	58.5	0.1	0.8	1.3	-	-	70.2	-	0.6	1	-	-
TOP-3MF※-N340FA	78	-	0.5	0.9	-	-	93.6	-	0.3	0.6	-	-
TOP-3MF※-N340FAVB	78	-	0.5	0.9	-	-	93.6	-	0.3	0.6	-	-
TOP-3MF※-N340FB	78	-	0.5	0.9	-	-	93.6	-	0.3	0.6	-	-
TOP-3MBT※-N320H	39	-	1.3	2.2	4	4	46.8	-	1	1.7	3.2	4
TOP-3MBT※-N330H	58.5	-	0.8	1.4	2.6	4.0*1	70.2	-	0.5	1	2.1	3.3
TOP-3MBT※-N340H	78	-	0.5	0.9	1.8	3.0*1	93.6	-	0.3	0.6	1.4	2.3
TOP-3MBT※-N350H	97.5	-	0.3	0.7	1.4	2.0*1	117	-	0.1	0.4	1	1.8
TOP-3MBM※-N320H	39	-	1.3	2.2	4	4	46.8	-	1	1.7	3.2	4
TOP-3MBM※-N330H	58.5	-	0.8	1.4	2.6	4.0*1	70.2	-	0.5	1	2.1	3.3
TOP-3MBM※-N340H	78	-	0.5	0.9	1.8	3.0*1	93.6	-	0.3	0.6	1.4	2.3
TOP-3MBM※-N350H	97.5	-	0.3	0.7	1.4	2.0*1	117	-	0.1	0.4	1	1.8
TOP-3MBT※-330V	58.5	-	-	1	1	1	70.2	-	-	0.7	1	1
TOP-3MBT※-340V	78	-	-	0.6	1	1	93.6	-	-	0.4	1	1
TOP-3MBT※-350V	97.5	-	-	0.4	1	1	117	-	-	0.2	0.7	1
TOP-3MBM※-330V	58.5	-	-	1	1	1	70.2	-	-	0.7	1	1
TOP-3MBM※-340V	78	-	-	0.6	1	1	93.6	-	-	0.4	1	1
TOP-3MBM※-350V	97.5	-	-	0.4	1	1	117	-	-	0.2	0.7	1

*Please consult us when using the pump at the pressure of "*1"

Pump type ※mark indicates motor power	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1000min^{-1} Maximum pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Motor speed 60Hz 1200min^{-1} Maximum pressure for motor output (MPa)		
		3700W	5500W	7500W		3700W	5500W	7500W
TOP-4MBT※-4100AM	115.5	1.1	2	2	138.6	0.8	1.5	2
TOP-4MBT※-4130AM	148.5	0.8	1.5	2	178.2	0.6	1.1	1.6
TOP-4MBT※-4150AM	171.6	0.7	1.3	1.4	205.9	0.5	0.9	1.2
TOP-4MBT※-4200AM	231.0	0.4	0.8	1.1	277.2	0.2	0.6	0.7
TOP-4MBT※-4250AM	280.5	-	0.6	0.9	336.6	-	0.4	0.6
TOP-4MBM※-4100AM	115.5	1.1	2	2	138.6	0.8	1.5	2
TOP-4MBM※-4130AM	148.5	0.8	1.5	2	178.2	0.6	1.1	1.6
TOP-4MBM※-4150AM	171.6	0.7	1.3	1.9	205.9	0.5	0.9	1.5
TOP-4MBM※-4200AM	231.0	0.4	0.8	1.3	277.2	0.2	0.6	1.0
TOP-4MBM※-4250AM	280.5	-	0.6	1.0	336.6	-	0.4	0.7

- Test Oil: ISO-VG46/Oil temperature: 40C
- Test Oil: ISO-VG2/Oil temperature: 40C (2HT and 2HW Series)
- These are for reference values only.

Scan the QR code for more technical data

NOP® Trochoid™ Pump

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Safety notice: For safe operation of our products, please peruse the User's Instruction Manual provided with the product.

NOP® Nippon Oil Pump Co., Ltd.

This catalog is valid through june, 2022.

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