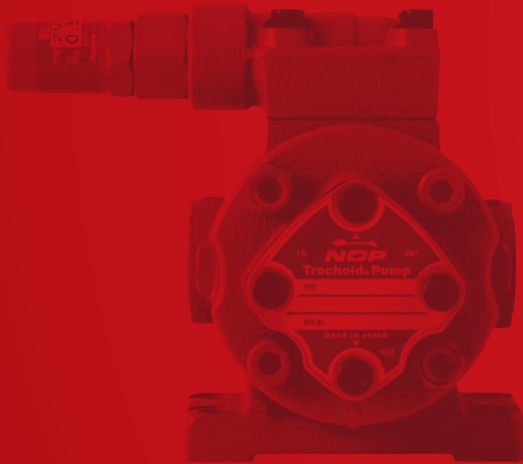
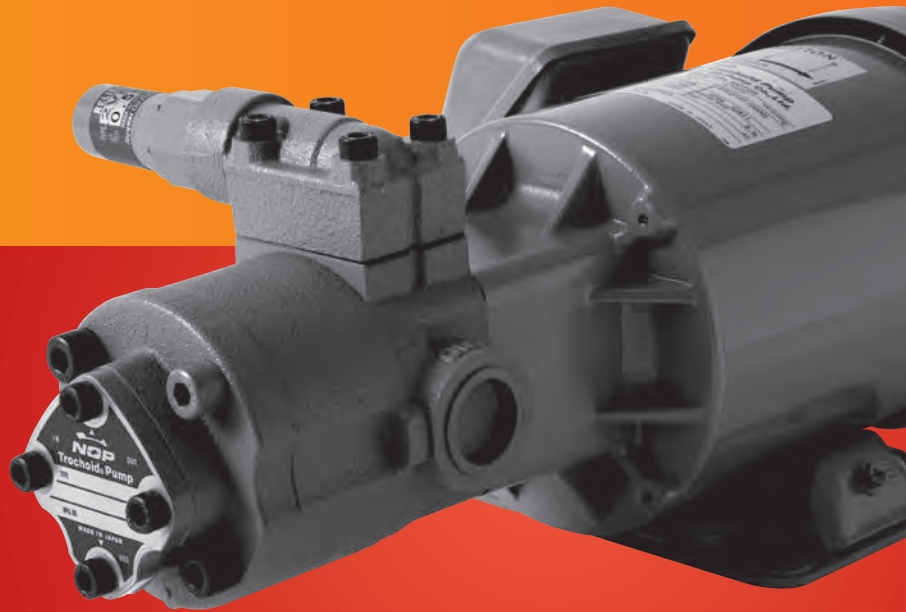


# NOP<sup>®</sup>

## Trochoid™ Pump

### Products Guide



# NOP<sup>®</sup>

Nippon Oil Pump Co., Ltd.

## Select a pump

Trochoid™ Pump, Lunary™ Pump Quick Reference Guide .....	P2
Trochoid™ Pump, Lunary™ Pump Performance Distribution Map .....	P4
Trochoid™ Pump, Lunary™ Pump Oil Compatibility Table .....	P6
How Trochoid™ Pump works .....	P8
Features of Trochoid™ Pump .....	P9
Applications and Example Usage of Trochoid™ Pump .....	P10
Flowchart for Selecting Trochoid™ Pump .....	P12
NOP's Response to Motor Efficiency Regulations and Safety Standards .....	P14
How to Check the Nameplate of Trochoid™ Pump .....	P15


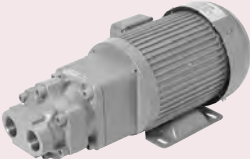













## Specifications


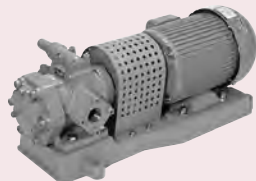


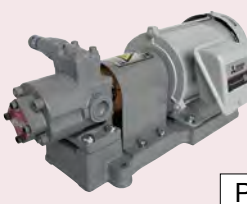












Small capacity	1ME (with integrated 3-phase motor) .....	P16	1A/1MA/1HG (Pumphead) .....	P24
	1ME S (with integrated single-phase motor) .....	P18	1A/1MA Performance Curve .....	P28
	1ME S (with integrated single-phase motor for edible oil at high temperature) .....	P20	1HG Performance Curve.....	P30
	1MB (Base-coupling mount type) .....	P22		
Small to medium capacity	2MY-2HBM (with integrated 3-phase motor) .....	P32	2HB/2HT (Pumphead) .....	P54
	2ME S (with integrated single-phase motor) .....	P34	2HBM/2HTM/2HWM (Pumphead for 2MY-motor) ...	P57
	2MY-2HTM (with integrated 3-phase motor) .....	P36	2HB(M) Performance Curve .....	P60
	2MY-2HWM (with integrated 3-phase motor) .....	P38	2HT(M) Performance Curve .....	P62
	2MY-S Filter (with integrated 3-phase motor) .....	P40	2HW(M) Performance Curve .....	P64
	2MY-W Filter (with integrated 3-phase motor) .....	P47	2.5HGA (Pumphead) .....	P66
	2MY-2HBM+2HB (Dual pump with integrated 3-phase motor) .....	P49	2.5HGA Performance Curve .....	P69
	2MB (Base-coupling mount type) .....	P51		
Medium capacity	3MF (with integrated 3-phase motor) .....	P71	N3F Performance Curve .....	P84
	N3F (Pumphead) .....	P75	N3H Performance Curve.....	P86
	3MB-N3H (Base-coupling mount type)/N3H (Pumphead) .....	P78	3V Performance Curve .....	P88
	3MB-3V (Base-coupling mount type)/3V (Pumphead) .....	P81		
Large capacity	4MB-4AM (Base-coupling mount type)/4AM (Pumphead) ...	P90	4A Performance Curve .....	P98
	4AM Performance Curve .....	P93	MB-GPL (Base-coupling mount type)/GPL (Pumphead) .....	P100
	4MB-4A (Base-coupling mount type)/4A (Pumphead) ...	P95	GPL Performance Curve.....	P103
Others	1RA/2RA (Pumphead) .....	P105	MB-GD (Base-coupling mount type)/GD (Pumphead) .....	P120
	1RA Performance Curve .....	P107	GD-VK Performance Curve .....	P123
	2RA Performance Curve .....	P109	GD-H Performance Curve .....	P125
	3RD/4RD (Pumphead).....	P111	MICRO TOP (Portable compact oil filter) .....	P127
	3RD Performance Curve.....	P113	1PS (Oil cooler unit) .....	P129
	RELIEF VALVE .....	P115		

## Instructions of Trochoid™ Pump

Lists of applicable seal kit, bearing, seal and gasket material options for special specification .....	P131
Viscosity Chart.....	P132
Trouble Shooting.....	P133
Trochoid™ Pump Q&A .....	P134
Trochoid™ Pump Discontinued Product List (Standard models) .....	P135
Trochoid™ Pump, Lunary™ Pump operation instructions .....	P136
Specifications .....	P142

# Trochoid™ Pump, Lunary™ Pump Quick Reference Guide

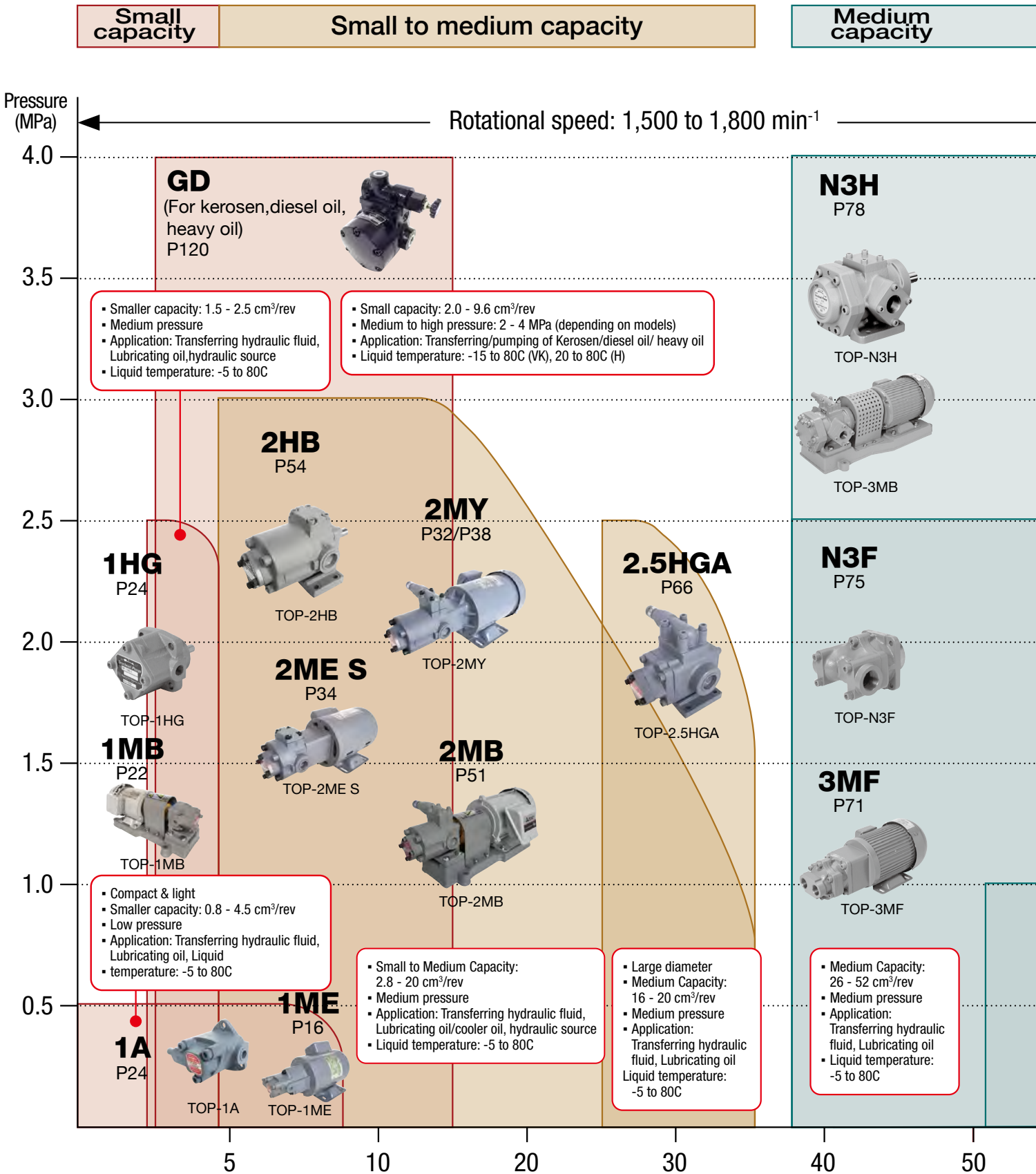
<p><b>Select a standard pump</b></p>	<p><b>Compact Models</b></p>		<p><b>Models with single-phase motor</b></p>		
	<p>1ME</p>  <p>P16</p>	<p>3MF</p>  <p>P71</p>	<p>1ME S</p>  <p>P18</p>		
	<p>2MY</p>  <p>P32</p>	<p><b>Easy to attach and replace</b></p>		<p>2ME S</p>  <p>P34</p>	
<p><b>Select a pump for a fluid</b></p>	<p><b>For cutting fluid</b></p>		<p><b>For high temperature oil</b></p>		
	<p>2MY-2HWM (Basic model)</p>  <p>P38</p>	<p>2MY-S Filter <b>(With suction filter)</b></p> <p>Cartridge type (Easy to replace)</p>  <p>P40</p>		<p>2MY-S Filter <b>(With suction filter)</b></p> <p>Element type (Reusable)</p>  <p>P40</p>	<p>1A-VF (Small flow rate)</p>  <p>P24</p>
			<p>2HB-VF/VH (Small to medium flow rate)</p>  <p>P54</p>	<p>1ME200SH-1MAVB-BT (High temperature edible oil)</p>  <p>P20</p>	
<p><b>Select a pump for applications</b></p>	<p><b>More compact</b></p>		<p><b>To cool oil</b></p>	<p><b>To clean oil</b></p>	
	<p>Double filters (To increase productivity)</p>  <p>P47</p>	<p>Dual pump (To recover oil with a single unit)</p>  <p>P49</p>	<p>1PS</p>  <p>P129</p>	<p>MICRO TOP</p>  <p>P127</p>	

To attach a motor for specific use			To use only a pump		
<p><b>1MB</b></p>  <p><b>3MB</b></p> 	<p><b>1A/1HG</b> (Small flow rate)</p> 	<p><b>N3F/N3H</b> (Medium flow rate)</p> 	<p><b>P22</b></p> <p><b>P78</b></p>	<p><b>P24</b></p> <p><b>P75/P78</b></p>	
<p><b>2MB</b></p> 	<p><b>4MB</b></p> 	<p><b>2HB/2.5HGA</b> (Small to medium flow rate)</p> 	<p><b>4AM/4A</b> (Large flow rate)</p> 	<p><b>P51</b></p> <p><b>P90/P95</b></p>	<p><b>P54/P66</b></p> <p><b>P90/P95</b></p>
To convey fuel oils (Kerosen,diesel oil, heavy oil)			To convey high viscosity oil		
<p><b>2HT</b> For low velocity oils</p> 	<p><b>2MB-2HT</b></p> 	<p><b>3V/3MB-3V</b></p> 	<p><b>P54</b></p> <p><b>P51</b></p>	<p><b>P81</b></p>	
<p><b>GD MB-GD</b> For spray combustion</p> 	<p><b>P120</b></p>	<p><b>GPL/MB-GPL</b></p> 	<p><b>P100</b></p>		
To transfer oil in the same direction regardless of its rotation direction			To use only a valve		
<p><b>1RA</b></p> 	<p><b>2RA</b></p> 	<p><b>3RD</b></p> 	<p><b>2VB/2VD/2VBD/ 3VB/3VBD/ 4VBP/4VBD</b></p> 	<p><b>P105/P111</b></p> <p><b>P115</b></p>	



# 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<sup>-1</sup>

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

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

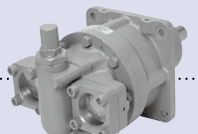
- Large Capacity: 349.8/580.8 cm<sup>3</sup>/rev
- Small pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 120C

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

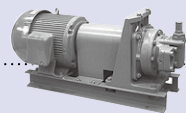
- High viscosity
- Medium Capacity: 39 - 65 cm<sup>3</sup>/rev
- Medium pressure

- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

**4AM**  
P90



TOP-4AM



TOP-4MB

**3V**  
P81



TOP-3V

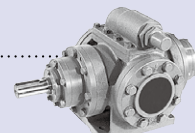
**GPL/MB-GPL**

Lunary® Pump  
P100  
(960-1750min<sup>-1</sup>)



GPL

**4A**  
P95



TOP-4A

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 compatibility with your oil before use.
- For operating environments, please refer to the instruction manuals and specifications of Trochoid™ Pump, Lunary™ Pump.

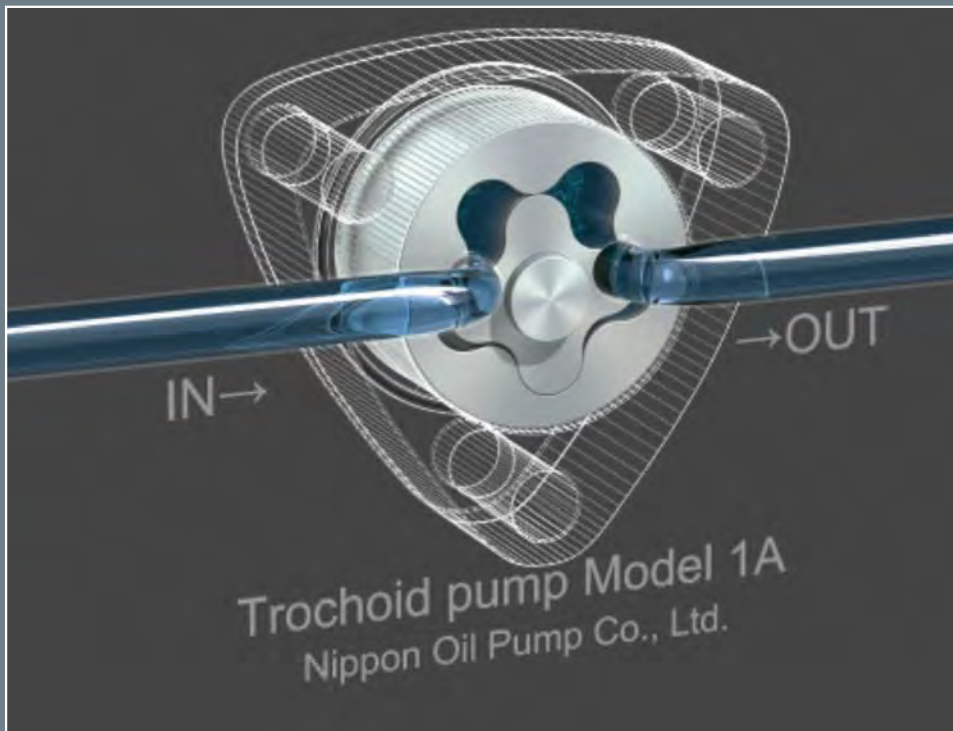
		Oil						
		Industrial lubricating oil	Hydraulic oil	Gear oil	Turbine oil	Engine oil	Trque converter oil	Spindle oil
Model								
Small capacity	1A	○	○	○	○	○	○	×
	1A-VV (Special specification)	○	○	×	○	×	×	×
	1HG	○	○	○	○	○	○	□
	1HG-VV (Special specification)	○	○	×	×	×	×	□
	GD	×	×	×	×	×	×	×
Small to medium capacity	2HB	○	○	○	○	○	○	□
	2HB-VV (Special specification)	○	○	×	○	○	×	□
	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	Cooking oil	Quenching oil	Insulating/ Electric insulating oil	Metal cutting fluid (Straight oil/ Water soluble)	Diesel oil	Kerosene	Heavy oil
○	○	×	○	×	×	×	×
○	○	×	○	×	×	×	×
○	○	●	□	×	×	×	×
×	○	●	□	×	●	×	●
×	×	×	×	×	○	○	○
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	×	×	×	×	○	○	○
×	×	×	×	○	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	●	×	●
○	○	●	□	×	×	×	×
○	○	×	□	×	●	×	●
×	○	×	×	×	×	×	×
×	○	×	×	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	○	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×
×	×	×	×	×	×	×	×

## 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\*<sup>1</sup>  
in terms of the production volume.

\*<sup>1</sup>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.

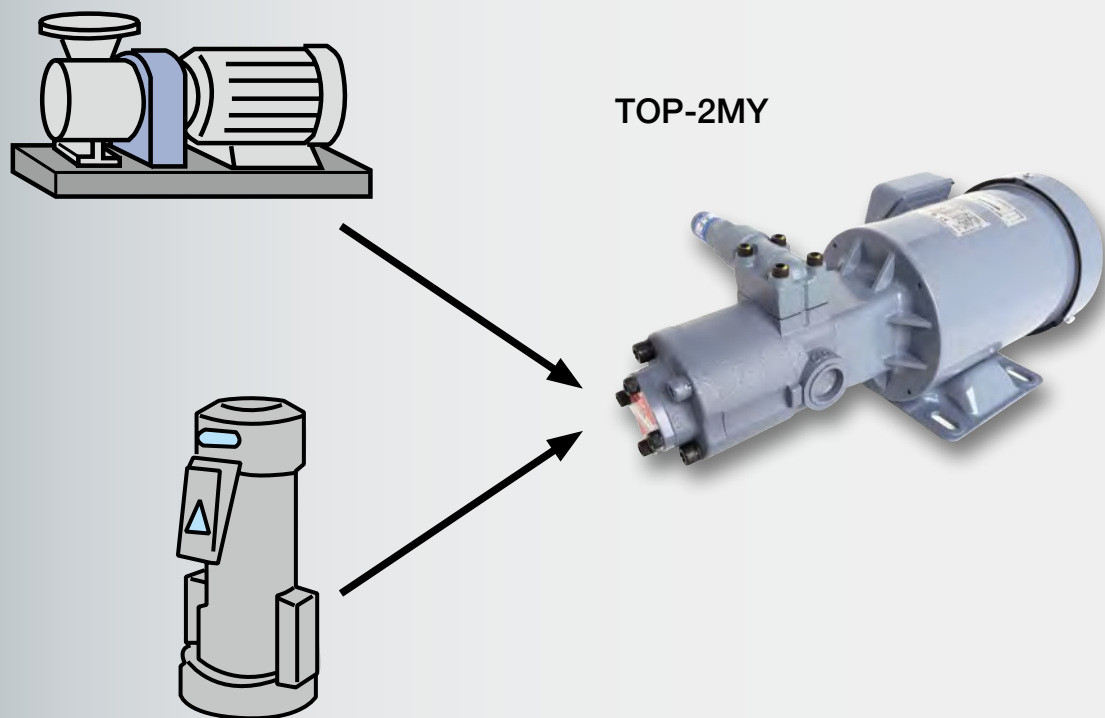
### ■ Stable delivery times

- We manufacture pumps in-house using reliable parts procured in Japan, which satisfies our customer'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-priming

- 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.

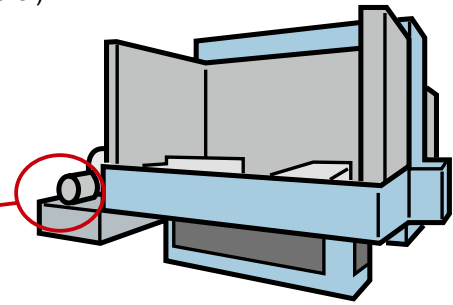
# Application and Example Usage of Trochoid™ Pump

## Machine Tool

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

Supply of coolant fluid (cutting oil)

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



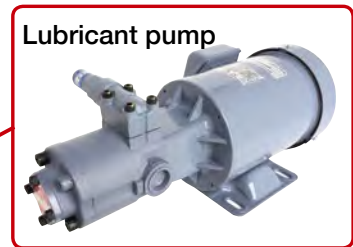
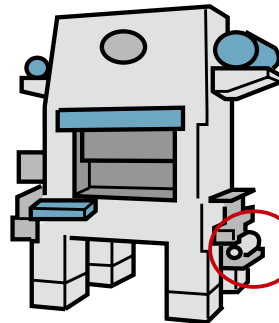
Machining center

## 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

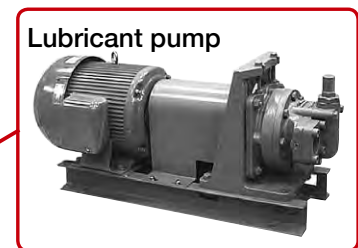
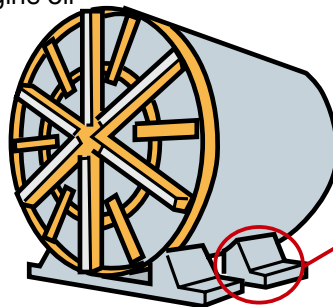


Press machine

## Construction, Civil engineering, and Agricultural machine

Lubrication for rotating parts, supply of engine oil

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

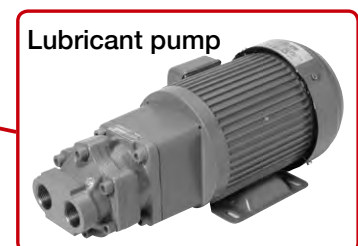
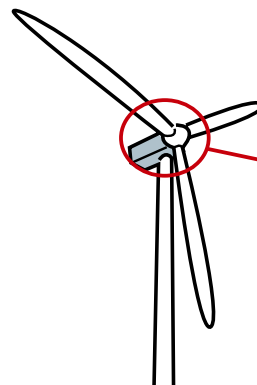


Shield machine

## Environmental equipment

Lubricating oil, fuel oil supply, filtration

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

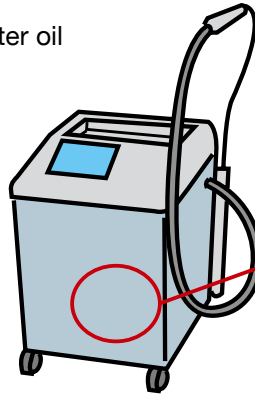


Wind-power generator

## ■ Automotive

Exchange/supply of engine oil, torque converter oil  
Hydraulic source for hydraulic equipment

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



Oil exchanger

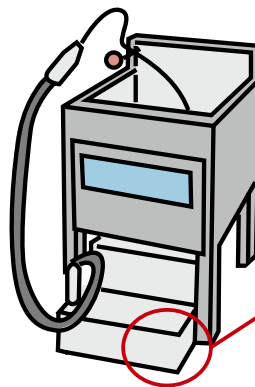
Oil recovery and supply pump



## ■ Food

Transfer and filtration of edible oil  
Hydraulic source for hydraulic equipment

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



Frying oil filtration machine

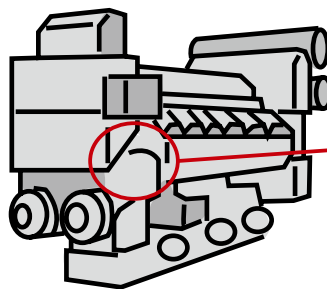
Oil recovery and supply pump



## ■ Ship

Transfer of lubrication oil and fuel oils

- Diesel engine
- Emulsion production device
- Others



Diesel engine

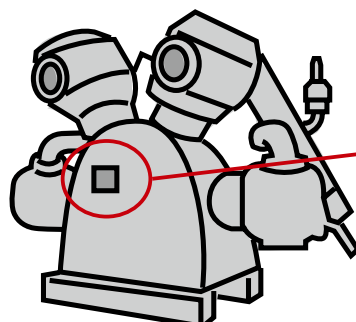
Lubricant pump



## ■ 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 assigned pages.

Example: 2HB → P54

#### Hint

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

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

- Oil temperature  $\geq 80\text{C}$
- Oil viscosity  $\leq 10 \text{ mm}^2/\text{s}$

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)

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

81 to 120C

**FKM**

121 to 200C

**PTFE**

#### 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 motor 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 viscosity of 46 mm<sup>2</sup>/s.

**Hint**

Oil viscosity and rotational speed affect the pump performance.

Select the power of motor with an adequate margin.

**STEP 4**

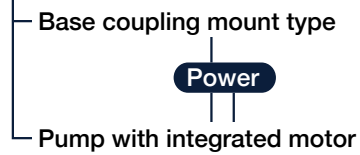
**Select a driving force of the pump**



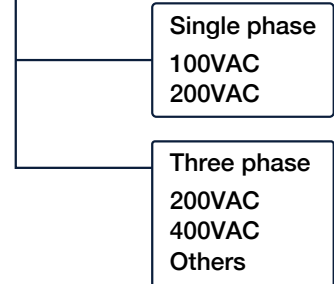
**Driving source**



**Attachment method**



**Power**



**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: XXXXXXXXXXXX (Serial No.)

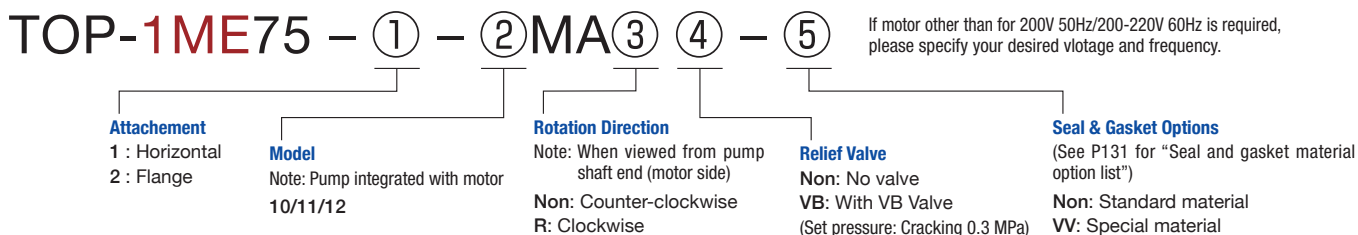


# 1ME

(WITH INTEGRATED 3-PHASE MOTOR)

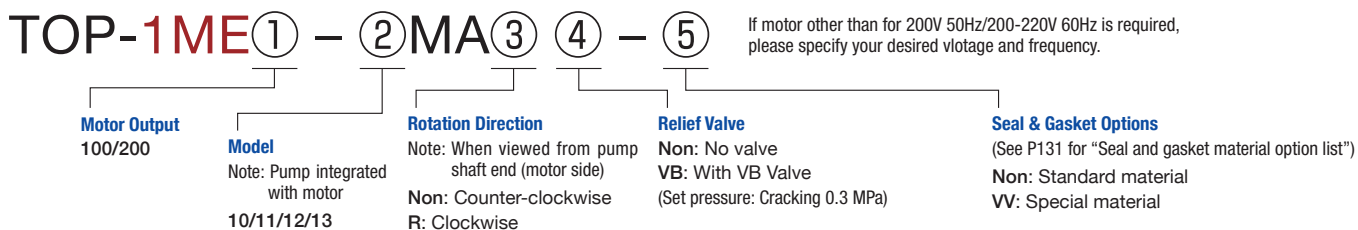


## Model Numbering System



Note: Do not submerge TOP-1ME75-2 under liquid. Install the pump with the motor side facing up.

## Model Numbering System



## Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>			
		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
<b>TOP-10MA</b>		1.2	0.5	0.5	0.5	1.4	0.4	0.5	0.5
<b>TOP-11MA</b>		2.2	0.5	0.5	0.5	2.7	0.3	0.5	0.5
<b>TOP-12MA</b>		3.7	0.2	0.5	0.5	4.5	0.1	0.3	0.5
<b>TOP-13MA</b>		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.

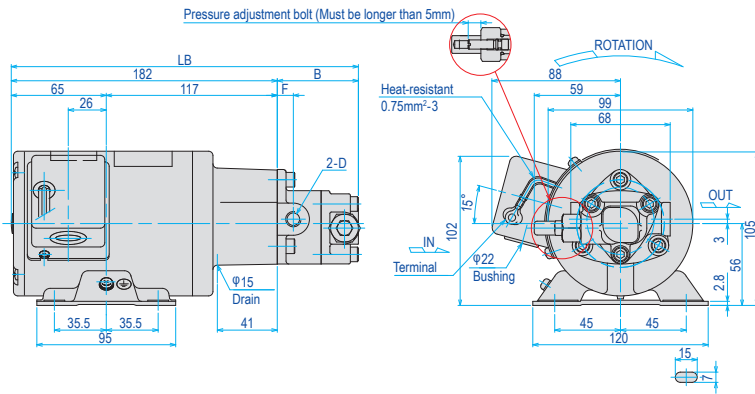
## Motor Specifications •3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation •Protection level IP44

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

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

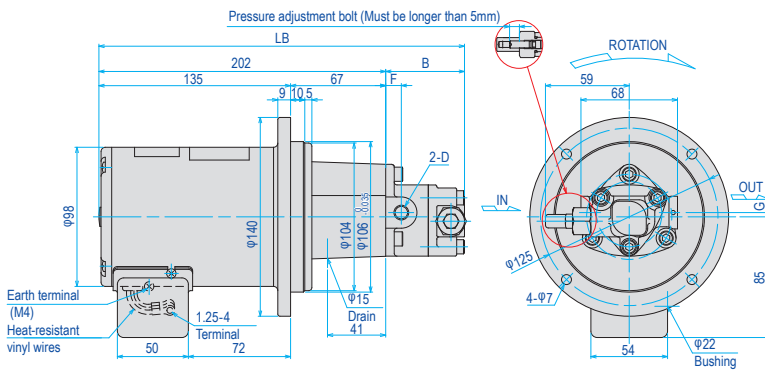
■ Dimensions (Typical) for 1ME

Model : TOP-1ME75-1-1\*MAVB-\*\*



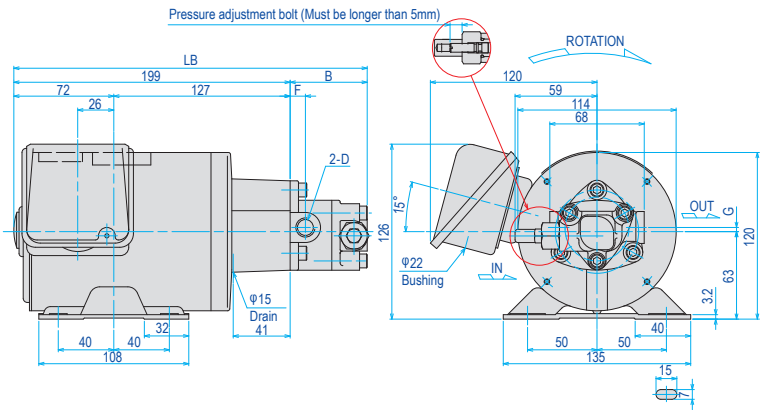
Model	Item	LB	B	D	F
10		231.5	49.5	Rc 1/8	11
11		231.5	49.5	Rc 1/8	11
12		237.5	55.5	Rc 1/4	11

Model : TOP-1ME75-2-1\*MAVB-\*\*



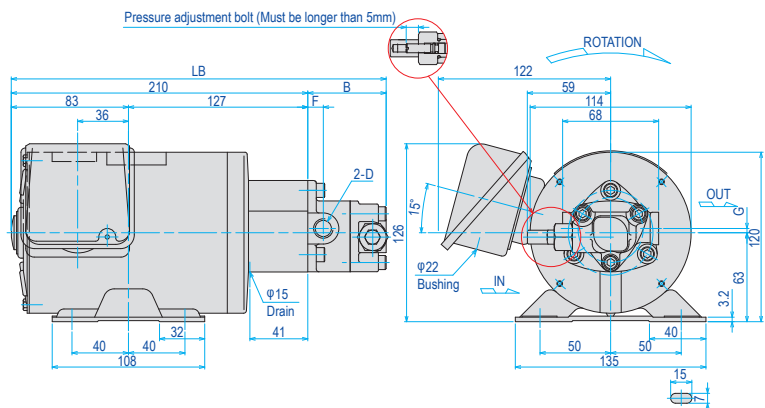
Model	Item	LB	B	D	F	G
10		251.5	49.5	Rc 1/8	11	3
11		251.5	49.5	Rc 1/8	11	3
12		257.5	55.5	Rc 1/4	11	3

Model : TOP-1ME100-1\*MAVB-\*\*



Model	Item	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-\*\*



Model	Item	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	Motor speed 50Hz 1500min <sup>-1</sup>			Motor speed 60Hz 1800min <sup>-1</sup>		
	Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)	
		75W	200W		75W	200W
<b>TOP-10MA</b>	1.2	0.5	0.5	1.4	0.4	0.5
<b>TOP-11MA</b>	2.2	0.5	0.5	2.7	0.3	0.5
<b>TOP-12MA</b>	3.7	0.2	0.5	4.5	0.1	0.5
<b>TOP-13MA</b>	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 <sup>-1</sup> )	Current (A)	Approx. Weight (Kg)
<b>75</b>	4	Cont	100	50 60	1430 1730	2.0 1.6	5.9
			100	50 60	1450 1740	6.4 5.2	
<b>200</b>	4	Cont	100	50 60	1450 1740	3.2 2.6	9.0
			200	50 60	1450 1740	3.2 2.6	

• IME75S is a condenser-operating type.

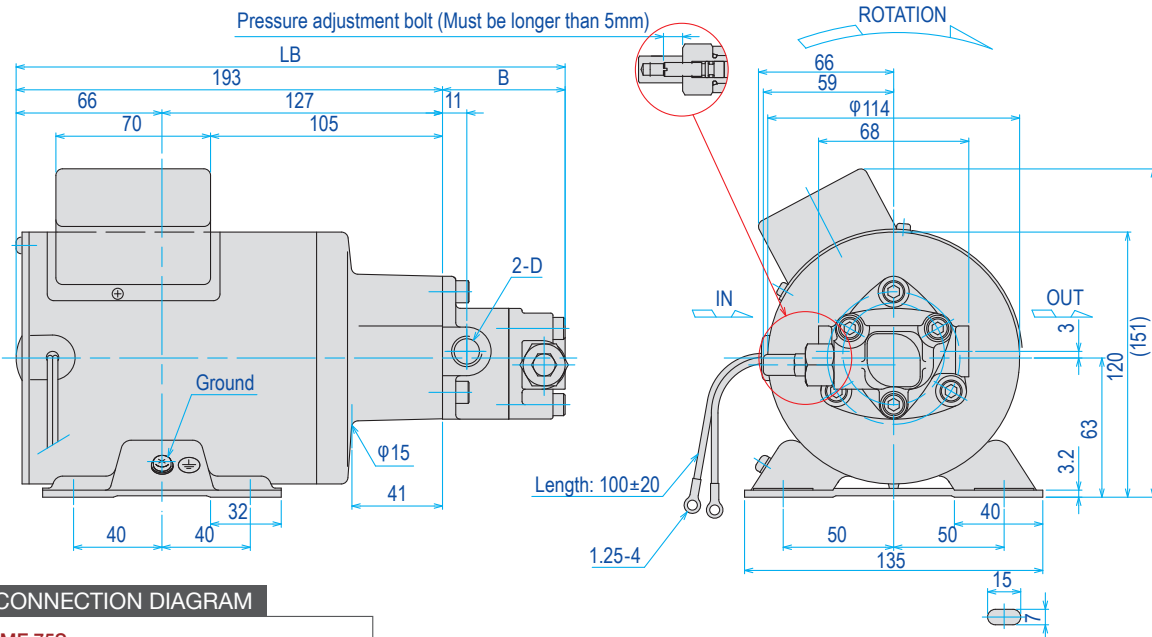
• IME200 is a condenser-starting type.

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



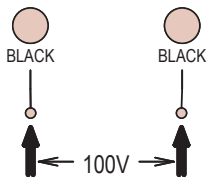
■ Dimensions (Typical) for 1ME S

Model : TOP-1ME75S-1\*MAVB-\*\*



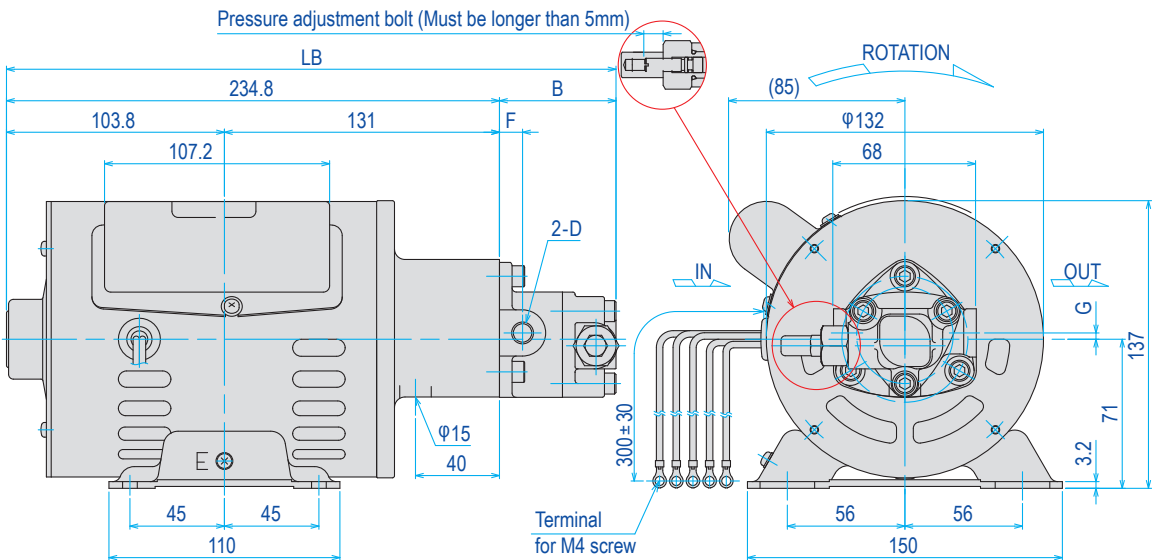
CONNECTION DIAGRAM

IME 75S



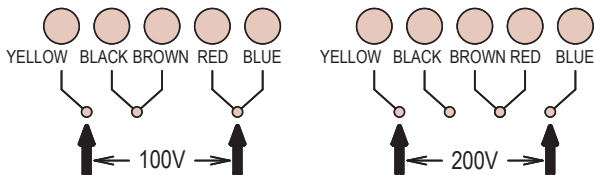
Model	Item	LB	B	D
10		242.5	49.5	Rc 1/8
11		242.5	49.5	Rc 1/8
12		248.5	55.5	Rc 1/4

Model : TOP-1ME200S-1\*MAVB-\*\*



CONNECTION DIAGRAM

IME 200S



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

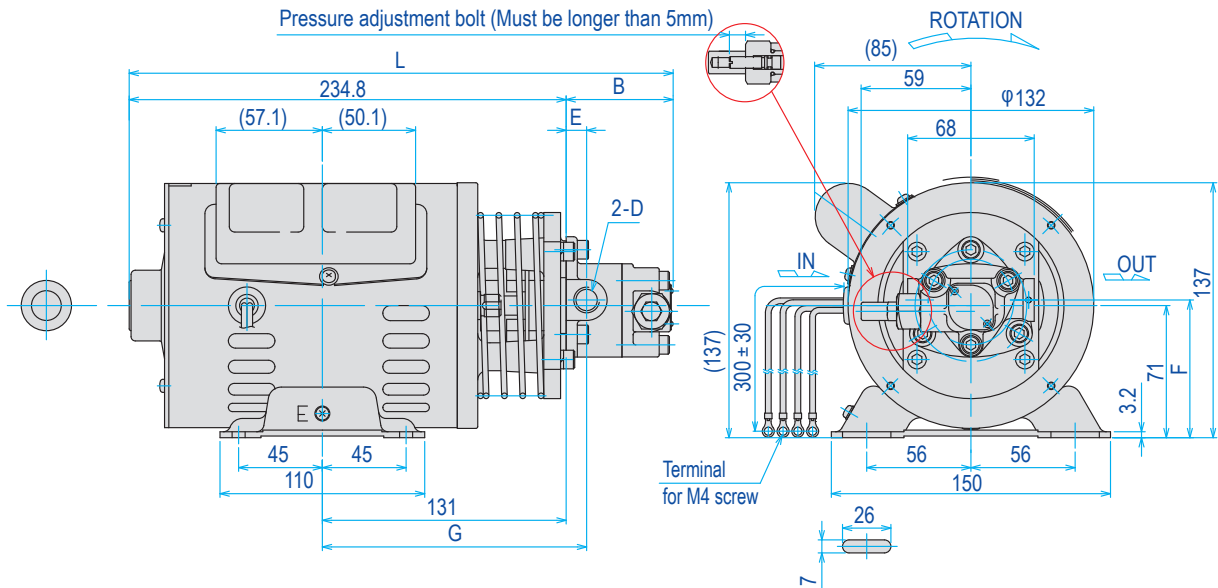
Output (W)	Number of poles (P)	Rating	Voltage (V)	Frequency (Hz)	Motor Speed (min <sup>-1</sup> )	Current (A)	Approx. Weight (Kg)
<b>200SH</b>	4	Cont	100	50 60	1450 1740	6.4 5.2	10
			200	50 60	1450 1740	3.2 2.6	
<b>200S-001</b>	4	30 Minute	100	50 60	1450 1740	6.4 5.2	8
			200	50 60	1450 1740	3.2 2.6	

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

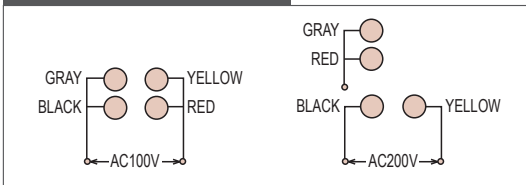
Any disassembly or alteration of the product will void the warranty.

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

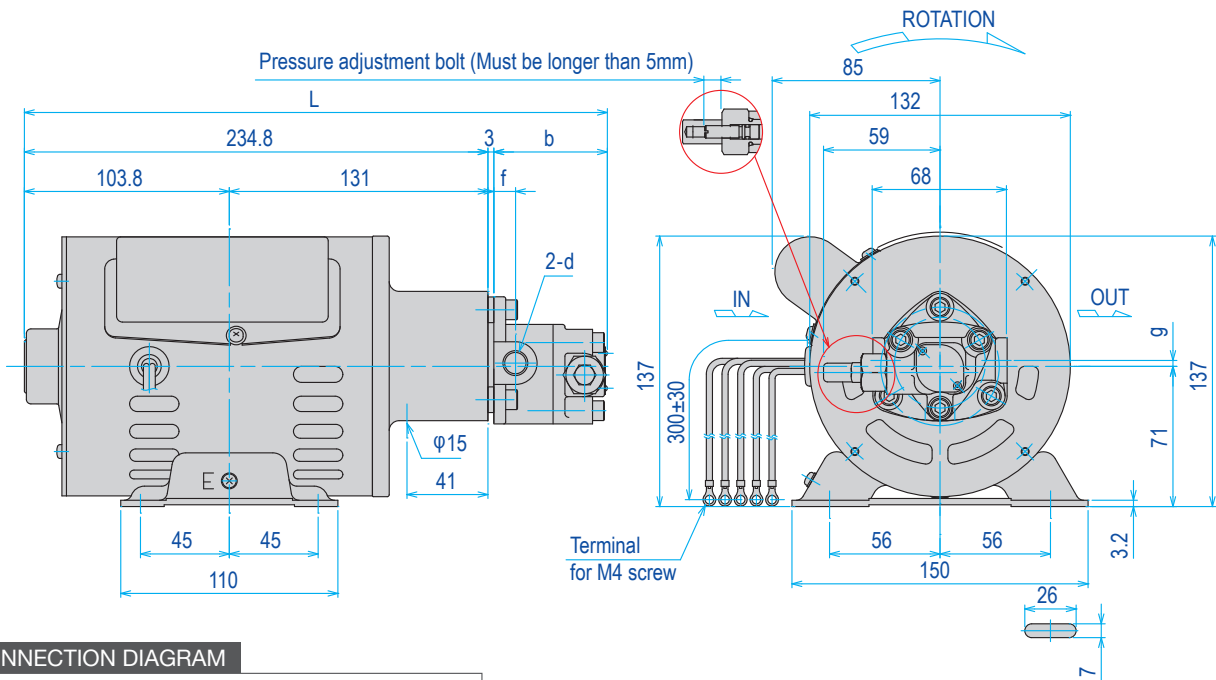
Model : TOP-1ME200SH-1\*MAVB-BT



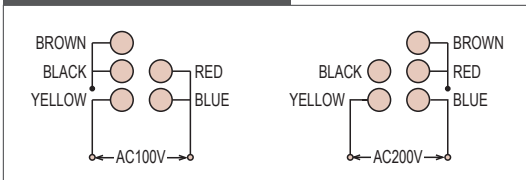
CONNECTION DIAGRAM



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



CONNECTION DIAGRAM



# 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

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

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

## Motor Specifications

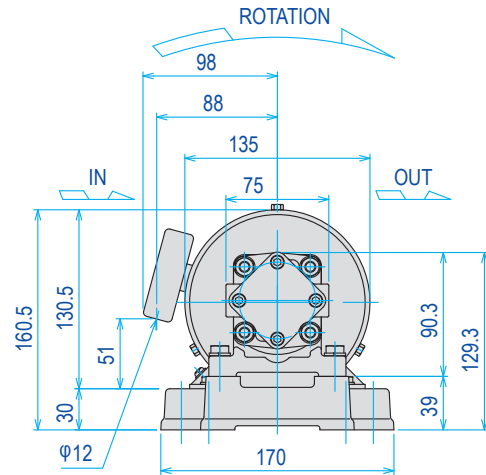
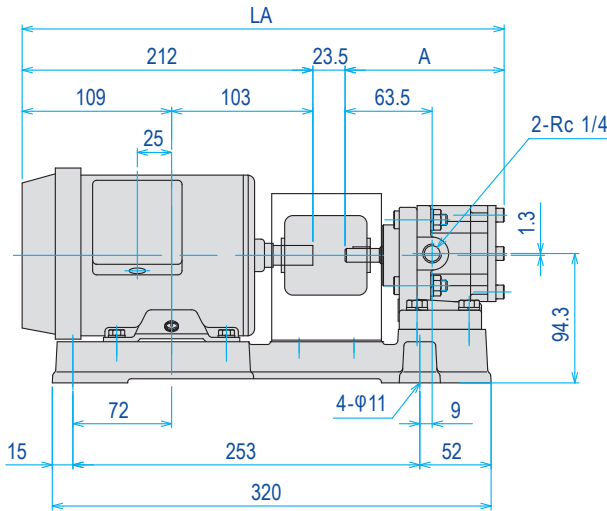
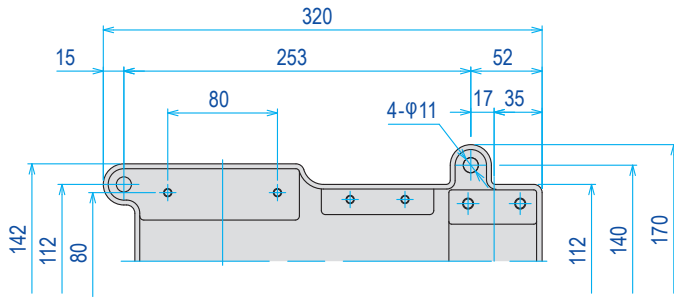
•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation •Protection level IP44

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

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

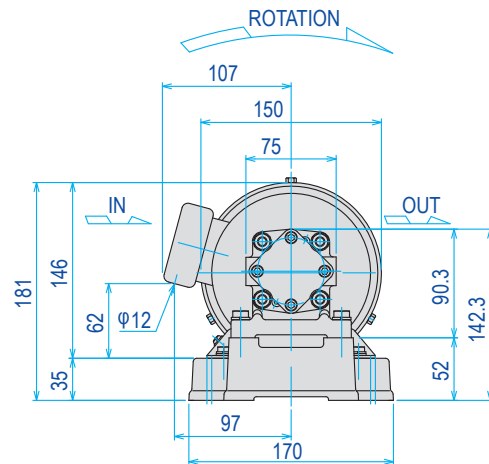
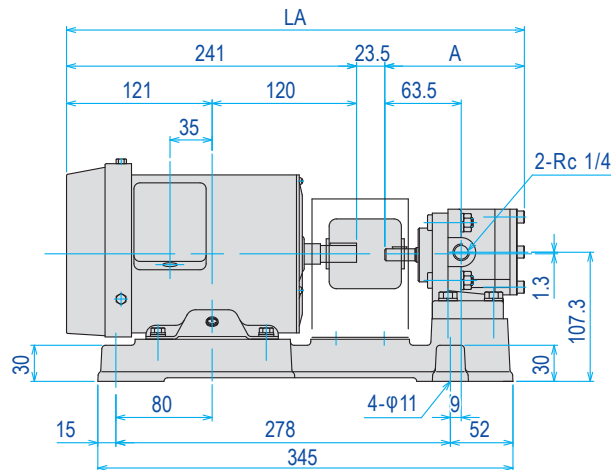
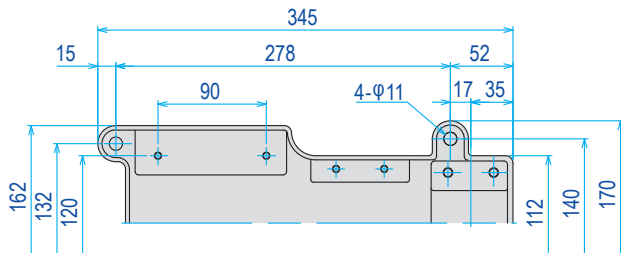
■ Dimensions (Typical) for 1MB

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)



## Model Numbering System

TOP-1①A②③-④

**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-1①MA②③-④

**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

Model \ Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
		1500min <sup>-1</sup>	1800min <sup>-1</sup>			
<b>TOP-10A</b>	0.8	1.2	1.4	0.5	3000	0.5 (0.8)
<b>TOP-11A</b>	1.5	2.2	2.7	0.5	2000	0.5 (0.8)
<b>TOP-12A</b>	2.5	3.7	4.5	0.5	1800	0.6 (0.9)
<b>TOP-13A</b>	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-1①HG②③-④

**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

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

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

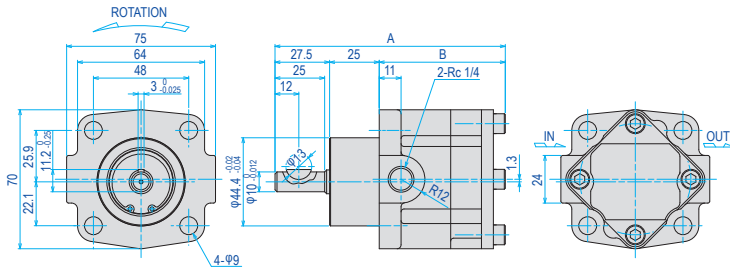
Any disassembly or alteration of the product will void the warranty.





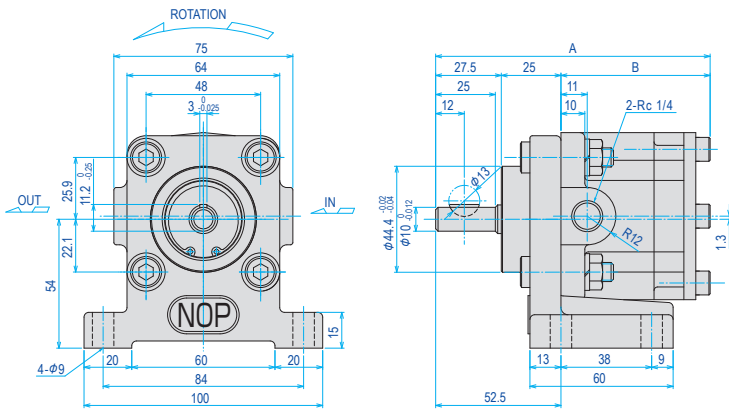
■ Dimensions (Typical) for 1HG

Model : TOP-1\*HG-\*\*



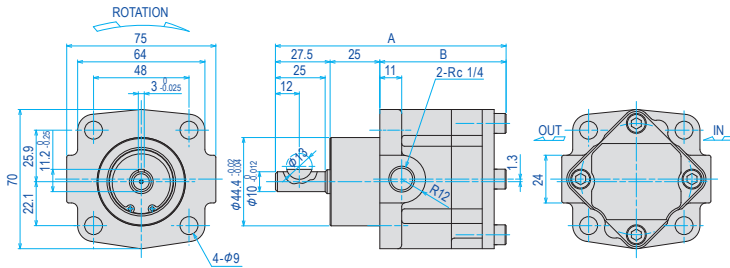
Model \ Item	A	B
11	111	58.5
12	116	63.5

Model : TOP-1\*\*HGI-\*\*



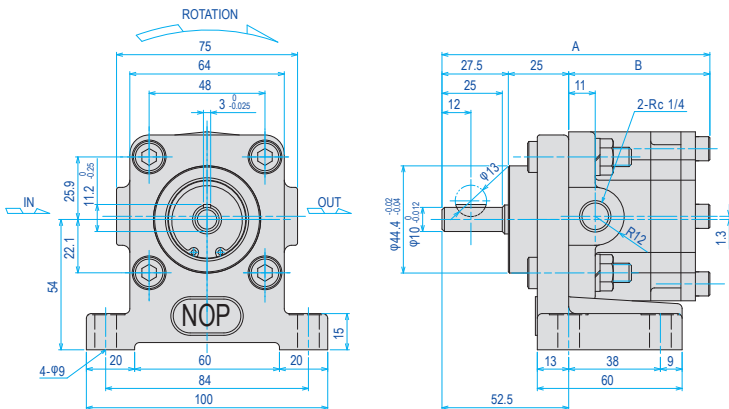
Model \ Item	A	B
11	111	58.5
12	116	63.5

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

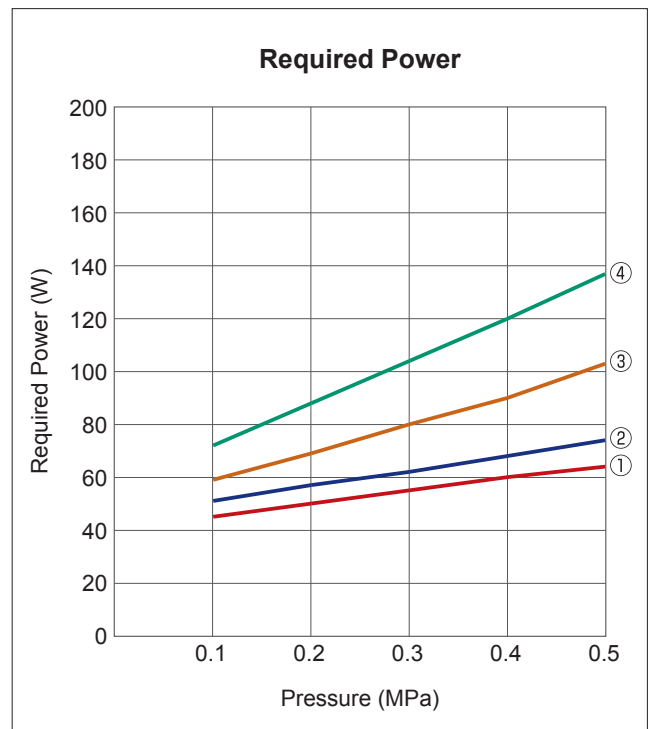
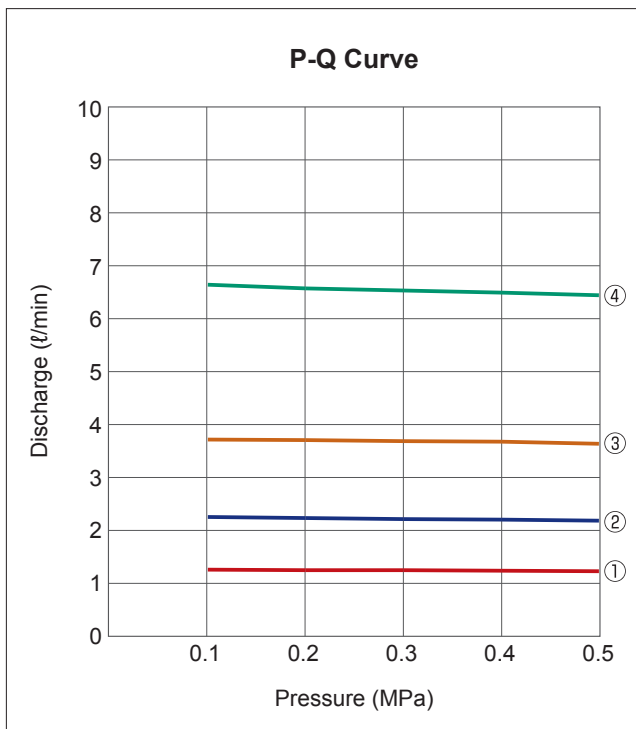
# 1A/1MA Performance Curve

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<sup>-1</sup>

① 10A    ② 11A    ③ 12A    ④ 13A



Model	Item	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
<b>TOP-10A</b>		1.24	1.23	1.23	1.22	1.21	45	50	55	60	64
<b>TOP-11A</b>		2.24	2.22	2.20	2.19	2.17	51	57	62	68	74
<b>TOP-12A</b>		3.71	3.70	3.68	3.67	3.63	59	69	80	90	103
<b>TOP-13A</b>		6.65	6.58	6.54	6.50	6.45	72	88	104	120	137

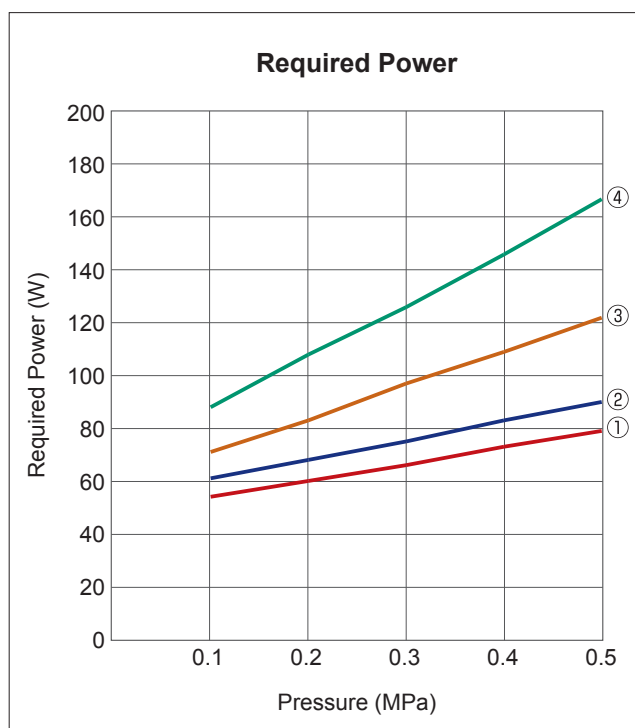
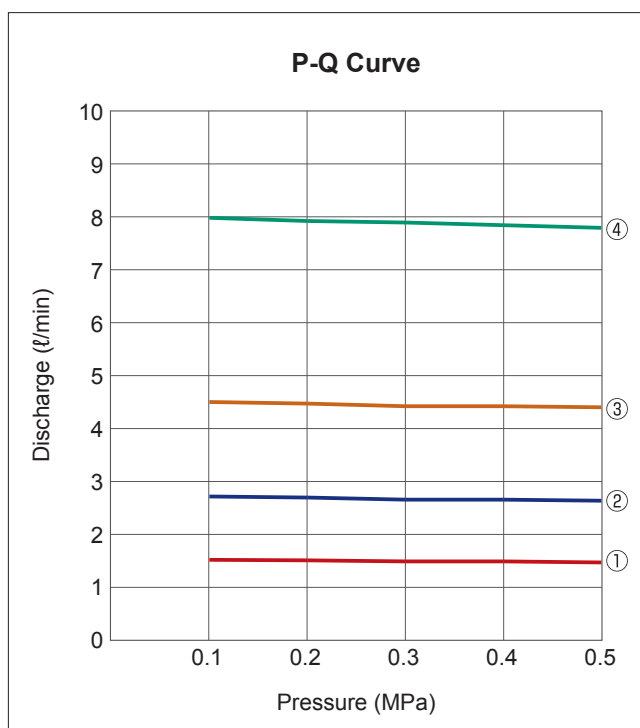
Any disassembly or alteration of the product will void the warranty.

**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<sup>-1</sup>

① 10A    ② 11A    ③ 12A    ④ 13A



Model	Item	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
<b>TOP-10A</b>		1.51	1.50	1.48	1.48	1.46	54	60	66	73	79
<b>TOP-11A</b>		2.71	2.69	2.65	2.65	2.63	61	68	75	83	90
<b>TOP-12A</b>		4.50	4.47	4.42	4.42	4.40	71	83	97	109	122
<b>TOP-13A</b>		7.99	7.98	7.85	7.85	7.80	88	108	126	146	167

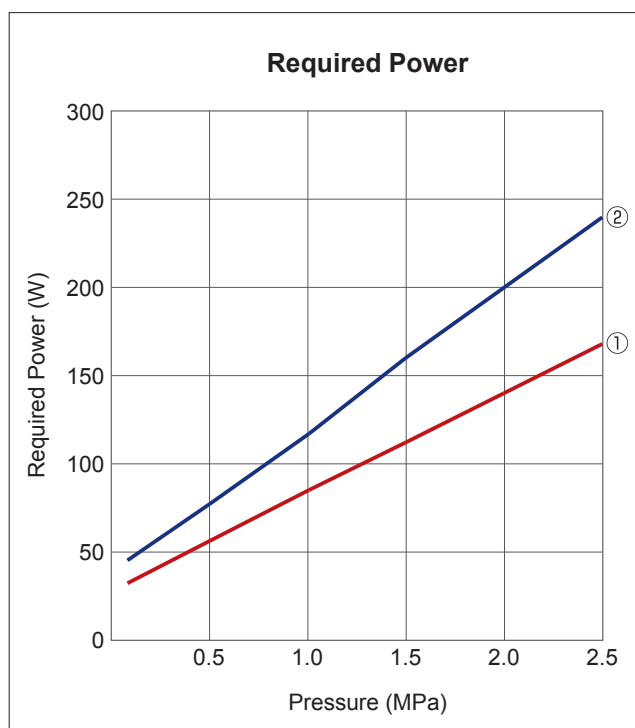
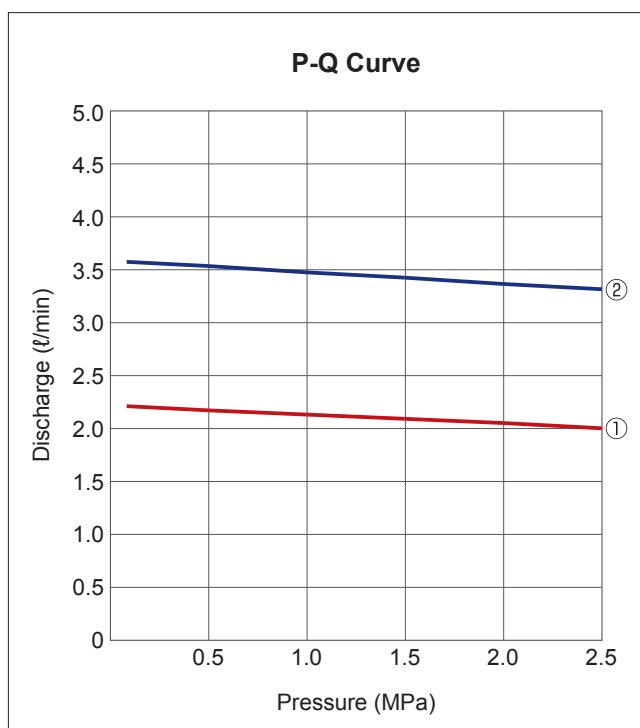
# 1HG Performance Curve

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<sup>-1</sup>

① 11HG    ② 12HG



Item	Discharge (l/min)						Required Power (W)					
	Pressure (MPa)						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
<b>TOP-11HG</b>	2.21	2.17	2.13	2.09	2.05	2.00	32	56	85	112	140	168
<b>TOP-12HG</b>	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.

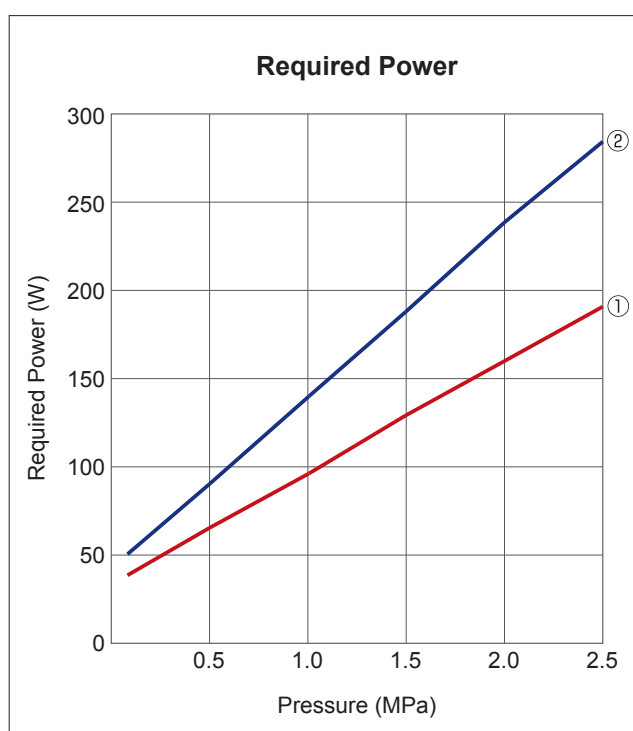
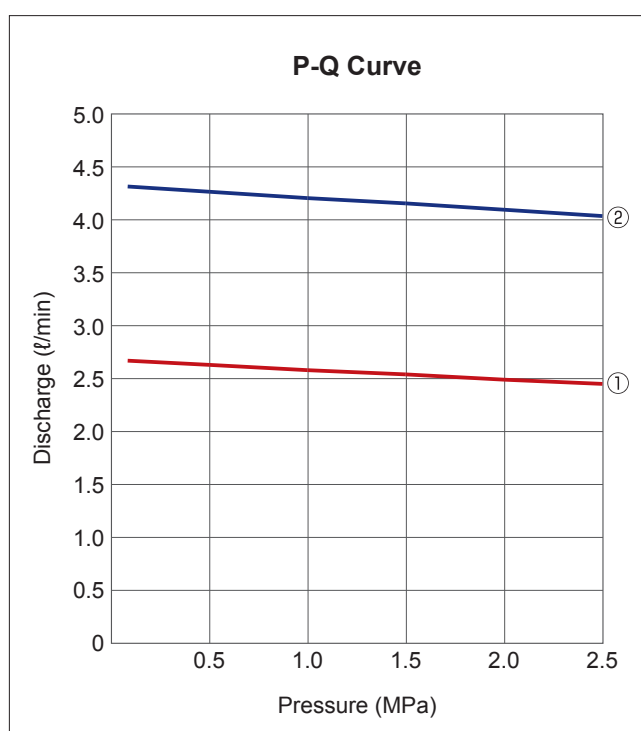


**Test Oil: ISO-VG46 Oil Temperature: 40C (Average)**

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<sup>-1</sup>

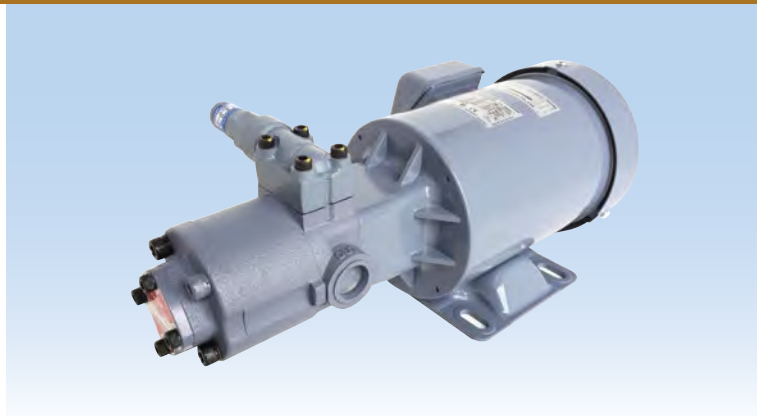
① 11HG    ② 12HG



Item	Discharge (l/min)						Required Power (W)					
	Pressure (MPa)						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
<b>TOP-11HG</b>	2.67	2.63	2.58	2.54	2.49	2.45	38	65	96	129	160	191
<b>TOP-12HG</b>	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-2MY** ① – ② **HBM** ③ ④ ⑤ – ⑥

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

<p><b>Motor Output</b> 200/400/ 750/1500</p> <p>Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.</p>	<p><b>Model</b> Note: Pump integrated with motor 203/204/206/208/ 210/212/216/220</p>	<p><b>Port Type</b> Non: Rc (Standard) G: G</p>	<p><b>Rotation Direction</b> Note: When viewed from pump shaft end (motor side) Non: Counter-clockwise R: Clockwise</p>	<p><b>Relief Valve</b> Non: No valve VB: With VB Valve VD: With VD Valve (External return-type)</p>	<p><b>Seal &amp; Gasket Options</b> (See P131 for "Seal and gasket material option list") Non: Standard material VV/US/UT</p>
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## Specifications

Item	Theoretical discharge (ℓ/min)	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>				
		Max. pressure for motor output (MPa)				Max. pressure for motor output (MPa)				
		200W	400W	750W	1500W	200W	400W	750W	1500W	
<b>TOP-203HBM</b>	4.2	1.7	3.0	3.0	3.0	5.0	1.3	3.0	3.0	3.0
<b>TOP-204HBM</b>	6.0	1.2	3.0	3.0	3.0	7.2	0.9	2.3	3.0	3.0
<b>TOP-206HBM</b>	9.0	0.7	1.8	2.5	2.5	10.8	0.5	1.4	2.5	2.5
<b>TOP-208HBM</b>	12.0	0.5	1.3	2.5	2.5	14.4	0.3	1.0	2.3	2.5
<b>TOP-210HBM</b>	15.0	0.4	1.1	2.5	2.5	18.0	0.3	0.9	2.0	2.5
<b>TOP-212HBM</b>	18.0	0.3	0.9	2.0	2.0	21.6	–	0.7	1.6	2.0
<b>TOP-216HBM</b>	24.0	0.2	0.7	1.5	1.5	28.8	–	0.5	1.2	1.5
<b>TOP-220HBM</b>	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 <sup>-1</sup> )	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min <sup>-1</sup> )	Current (A)	
<b>200</b>	4	Cont	200	50	1440	1.34	380	50	1440	0.64	6.5
			200	60	1720	1.12	400	50	1440	0.67	
			220	60	1730	1.17	400	60	1720	0.56	
<b>400</b>	4	Cont	200	50	1420	2.20	380	50	1420	1.08	9.0
			200	60	1710	1.93	400	50	1430	1.11	
			220	60	1730	1.95	400	60	1710	0.96	
<b>750</b>	4	Cont	200	50	1440	3.30	400	50	1440	1.77	14.0
			200	60	1720	3.10	400	60	1730	1.61	
			220	60	1740	3.00	440	60	1760	1.57	
<b>1500</b>	4	Cont	200	50	1450	6.90	400	50	1450	3.40	22.0
			200	60	1740	6.20	400	60	1740	3.10	
			220	60	1750	6.00	440	60	1750	3.00	

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

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

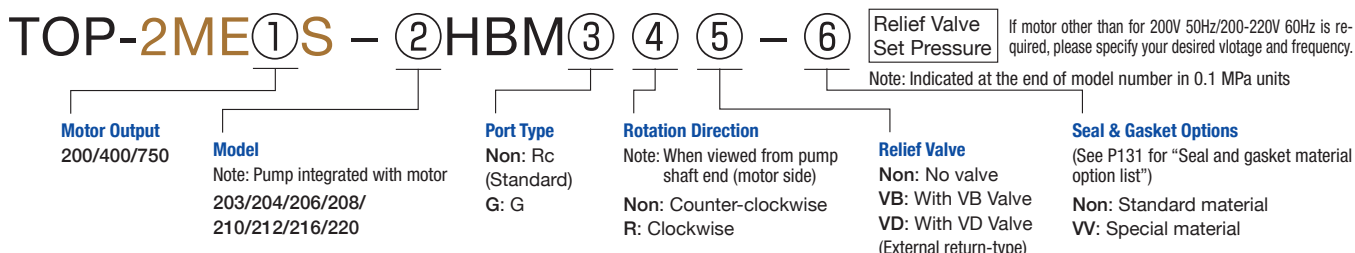


# 2ME S

(WITH INTEGRATED SINGLE-PHASE MOTOR)



## Model Numbering System



## Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>			Motor speed 60Hz 1800min <sup>-1</sup>				
		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
<b>TOP-203HBM</b>		4.2	1.7	3.0	3.0	5.0	1.3	3.0	3.0
<b>TOP-204HBM</b>		6.0	1.2	3.0	3.0	7.2	0.9	2.3	3.0
<b>TOP-206HBM</b>		9.0	0.7	1.8	2.5	10.8	0.5	1.4	2.5
<b>TOP-208HBM</b>		12.0	0.5	1.3	2.5	14.4	0.3	1.0	2.3
<b>TOP-210HBM</b>		15.0	0.4	1.1	2.5	18.0	0.3	0.9	2.0
<b>TOP-212HBM</b>		18.0	0.3	0.9	2.0	21.6	–	0.7	1.6
<b>TOP-216HBM</b>		24.0	0.2	0.7	1.5	28.8	–	0.5	1.2
<b>TOP-220HBM</b>		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

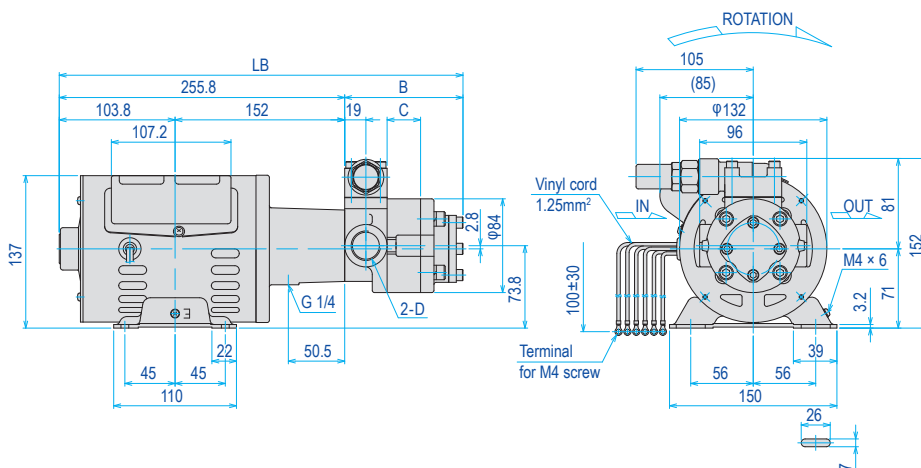
Output (W)	Number of poles (P)	Rating	Voltage (V)	Frequency (Hz)	Motor Speed (min <sup>-1</sup> )	Current (A)	Approx. Weight (Kg)
200	4	Cont	100	50	1450	6.4	9
				60	1740	5.2	
			200	50	1450	3.2	
400	4	Cont	100	50	1410	8.8	13
				60	1690	8.0	
			200	50	1410	4.4	
750	4	Cont	100	50	1420	11.0	16
				60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

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

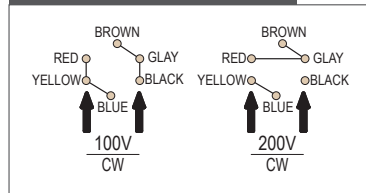
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 2ME S

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

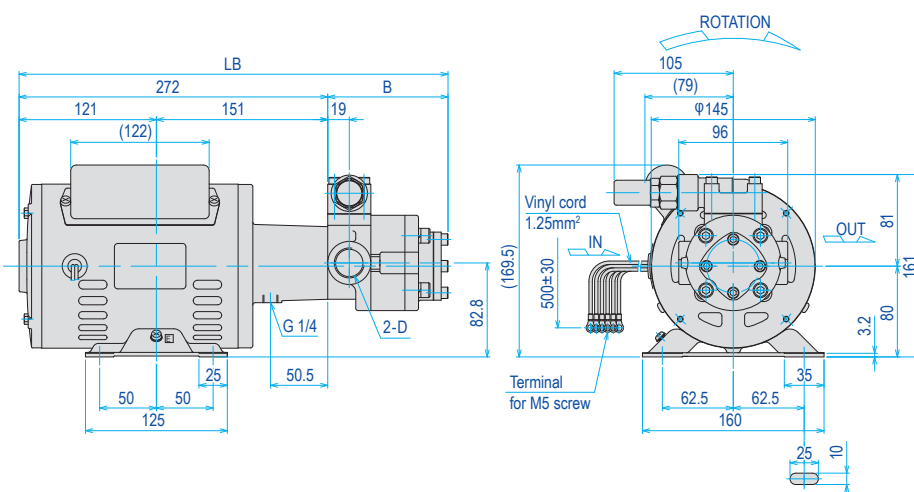


CONNECTION DIAGRAM

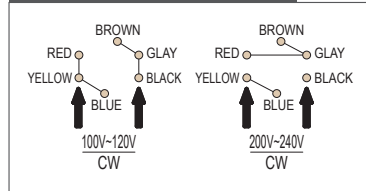


Model	Item	LB	B	C	D
203		338.8	83	7	Rc 1/2
204		341.8	86	10	
206		346.8	91	15	
208		351.8	96	20	
210		356.8	101	25	Rc 3/4
212		361.8	106	30	
216		371.8	116	40	

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

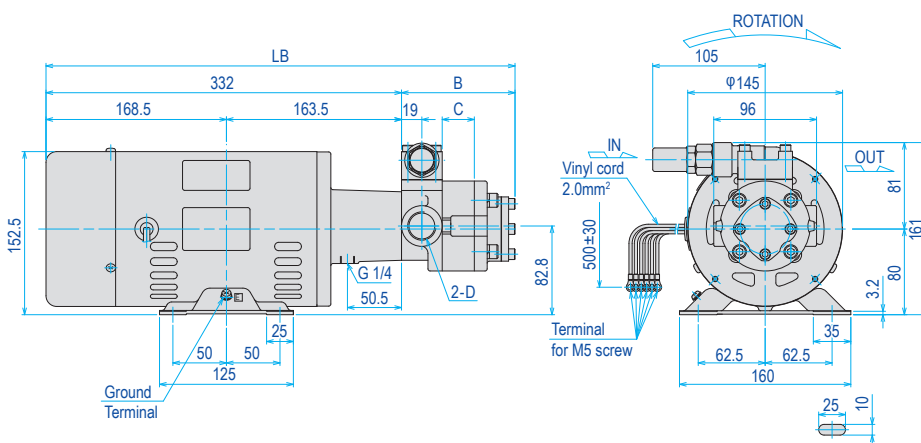


CONNECTION DIAGRAM

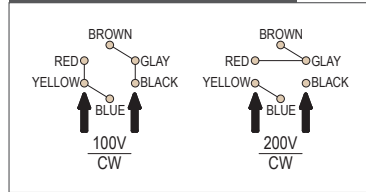


Model	Item	LB	B	C	D
203		355	83	7	Rc 1/2
204		358	86	10	
206		363	91	15	
208		368	96	20	
210		373	101	25	Rc 3/4
212		378	106	30	
216		388	116	40	
220		398	126	50	

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



CONNECTION DIAGRAM



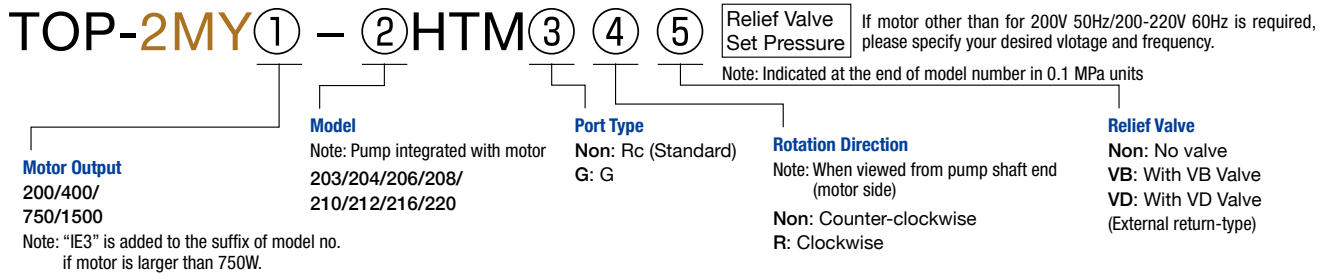
Model	Item	LB	B	C	D
203		415	83	7	Rc 1/2
204		418	86	10	
206		423	91	15	
208		428	96	20	
210		433	101	25	Rc 3/4
212		438	106	30	
216		448	116	40	
220		458	126	50	

# 2MY-2HTM

(WITH INTEGRATED 3-PHASE MOTOR)



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



## Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		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
<b>TOP-203HTM</b>		4.2	0.7	0.7	0.7	0.7	5.0	0.7	0.7	0.7	0.7
<b>TOP-204HTM</b>		6.0	0.7	0.7	0.7	0.7	7.2	0.7	0.7	0.7	0.7
<b>TOP-206HTM</b>		9.0	0.7	0.7	0.7	0.7	10.8	0.6	0.7	0.7	0.7
<b>TOP-208HTM</b>		12.0	0.6	0.7	0.7	0.7	14.4	0.4	0.7	0.7	0.7
<b>TOP-210HTM</b>		15.0	0.5	0.7	0.7	0.7	18.0	0.3	0.7	0.7	0.7
<b>TOP-212HTM</b>		18.0	0.4	0.7	0.7	0.7	21.6	0.2	0.7	0.7	0.7
<b>TOP-216HTM</b>		24.0	0.3	0.7	0.7	0.7	28.8	–	0.6	0.7	0.7
<b>TOP-220HTM</b>		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 <sup>-1</sup> )	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min <sup>-1</sup> )	Current (A)	
<b>200</b>	4	Cont	200	50	1440	1.34	380	50	1440	0.64	6.5
			200	60	1720	1.12	400	50	1440	0.67	
			220	60	1730	1.17	400	60	1720	0.56	
<b>400</b>	4	Cont	200	50	1420	2.20	380	50	1420	1.08	9.0
			200	60	1710	1.93	400	50	1430	1.11	
			220	60	1730	1.95	400	60	1710	0.96	
<b>750</b>	4	Cont	200	50	1440	3.30	400	50	1440	1.77	14.0
			200	60	1720	3.10	400	60	1730	1.61	
			220	60	1740	3.00	440	60	1760	1.57	
<b>1500</b>	4	Cont	200	50	1450	6.90	400	50	1450	3.40	22.0
			200	60	1740	6.20	400	60	1740	3.10	
			220	60	1750	6.00	440	60	1750	3.00	

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

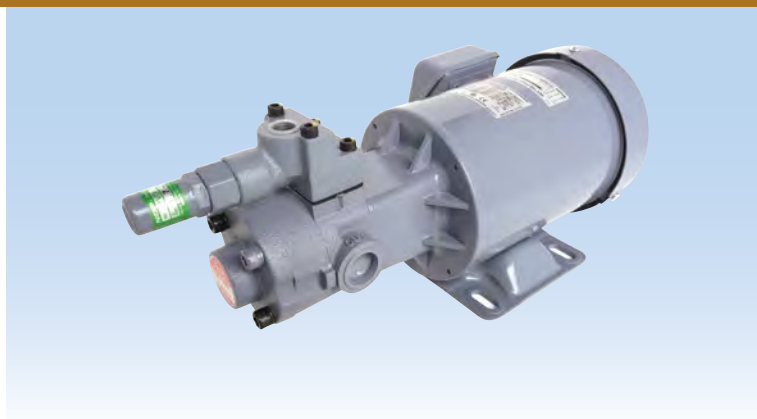
Any disassembly or alteration of the product will void the warranty.





# 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 voltage 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

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>					Motor speed 60Hz 1800min <sup>-1</sup>				
		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 <sup>-1</sup> )	Current (A)	Voltage (V)	Frequency (Hz)	Motor Speed (min <sup>-1</sup> )	Current (A)	
200	4	Cont	200	50	1440	1.34	380	50	1440	0.64	6.5
			200	60	1720	1.12	400	50	1440	0.67	
			220	60	1730	1.17	400	60	1720	0.56	
400	4	Cont	200	50	1420	2.20	380	50	1420	1.08	9.0
			200	60	1710	1.93	400	50	1430	1.11	
			220	60	1730	1.95	400	60	1710	0.96	
750	4	Cont	200	50	1440	3.30	400	50	1440	1.77	14.0
			200	60	1720	3.10	400	60	1730	1.61	
			220	60	1740	3.00	440	60	1760	1.57	
1500	4	Cont	200	50	1450	6.90	400	50	1450	3.40	22.0
			200	60	1740	6.20	400	60	1740	3.10	
			220	60	1750	6.00	440	60	1750	3.00	

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

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



# 2MY-S Filter

(WITH INTEGRATED 3-PHASE MOTOR)



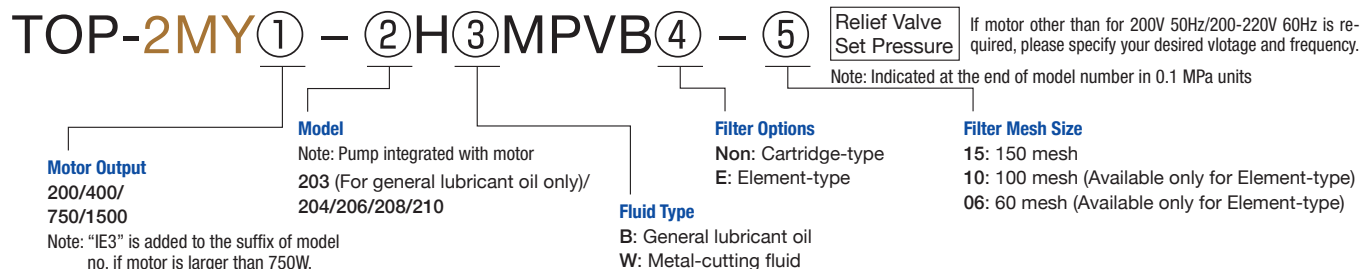
2HBMP



2HWMP



## Model Numbering System



## Specifications (For General Lubricant Oil)

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		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
<b>TOP-203HBMPVB (E)</b>		4.2	1.7	2.5	2.5	2.5	5.0	1.3	2.5	2.5	2.5
<b>TOP-204HBMPVB (E)</b>		6.0	1.2	2.5	2.5	2.5	7.2	0.9	2.3	2.5	2.5
<b>TOP-206HBMPVB (E)</b>		9.0	0.7	1.8	2.5	2.5	10.8	0.5	1.4	2.5	2.5
<b>TOP-208HBMPVB (E)</b>		12.0	0.5	1.3	2.5	2.5	14.4	0.3	1.0	2.3	2.5
<b>TOP-210HBMPVB (E)</b>		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
- Viscosity range of pumped liquid is 2-50mm<sup>2</sup>/sec. The vacuum gauge will indicate over the green zone if pumped fluid exceeds the permissible viscosity range.

## Specifications (For Metal Cutting Fluid)

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		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
<b>TOP-204HWMPVB (E)</b>		6.0	1.2	2.0	2.0	2.0	7.2	1.0	2.0	2.0	2.0
<b>TOP-206HWMPVB (E)</b>		9.0	0.8	1.8	2.0	2.0	10.8	0.6	1.6	2.0	2.0
<b>TOP-208HWMPVB (E)</b>		12.0	0.6	1.4	2.0	2.0	14.4	0.4	1.2	2.0	2.0
<b>TOP-210HWMPVB (E)</b>		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.
- Viscosity range of pumped liquid is 2-50mm<sup>2</sup>/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	<b>F913-3-150W</b>	<b>150</b>
Element for 2HBMPVBE Element for 2HWMPVBE	<b>351-04-60W</b> <b>351-04-100W</b> <b>351-04-150W</b>	<b>60</b> <b>100</b> <b>150</b>
Element for 2HWNPE	<b>351-06-60W</b> <b>351-06-100W</b> <b>351-06-150W</b>	<b>60</b> <b>100</b> <b>150</b>

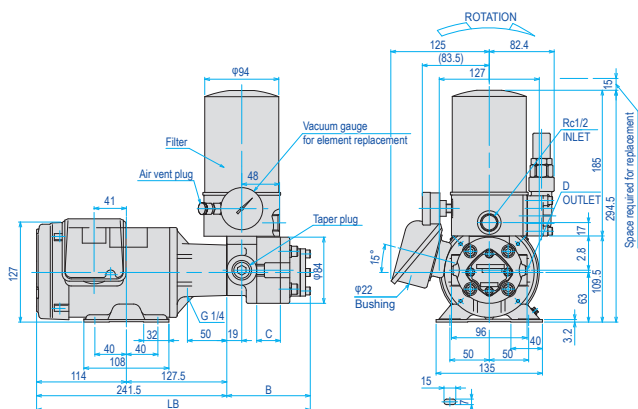
Note: Please specify the model number when ordering filters.

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.

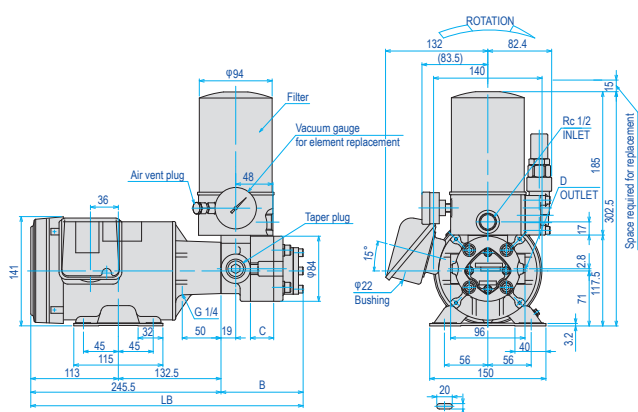
■ Dimensions (Typical) for 2MY-S Filter (Cartridge-type, For General Lubricant Oil)

Model : TOP-2MY200-2\*\*HBMPVB



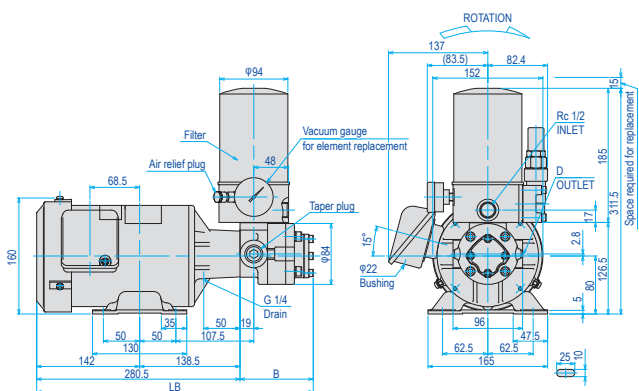
Item Model	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	Rc 3/4
210	342.5	101	25	

Model : TOP-2MY400-2\*\*HBMPVB



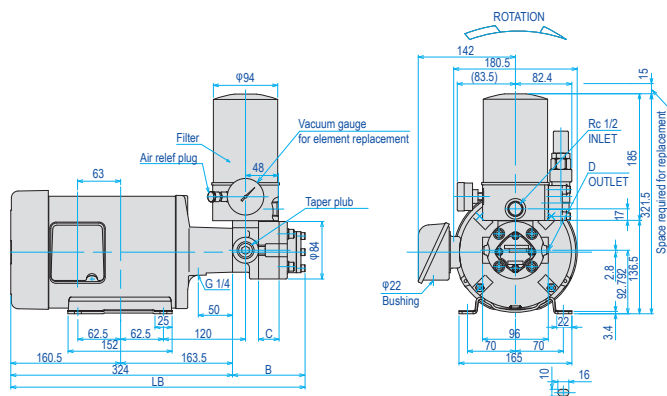
Item Model	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	Rc 3/4
210	346.5	101	25	

Model : TOP-2MY750-2\*\*HBMPVB 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	Rc 3/4
210	381.5	101	

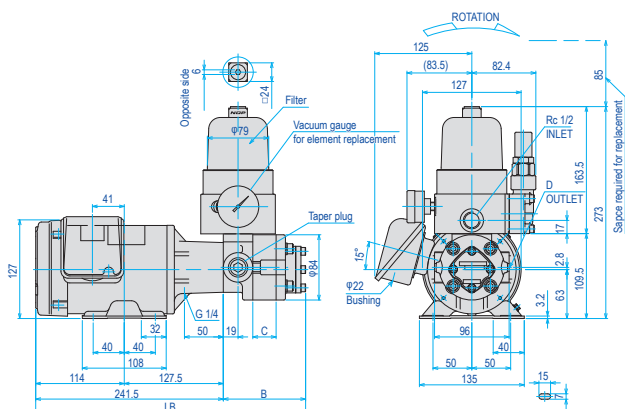
Model : TOP-2MY1500-2\*\*HBMPVB IE3



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	Rc 3/4
210	425	101	25	

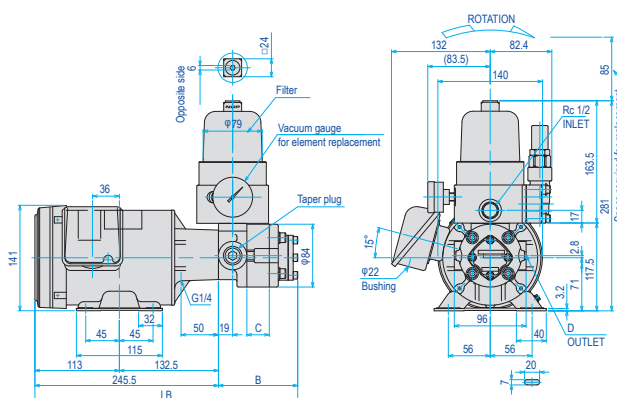
■ Dimensions (Typical) for 2MY-S Filter (Element-type, For General Lubricant Oil)

Model : TOP-2MY200-2\*\*HBMPVBE



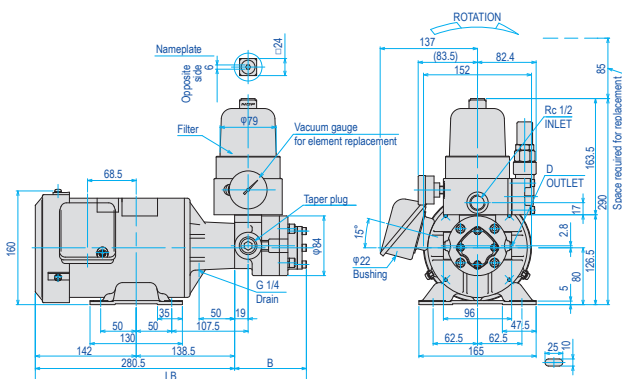
Item Model	LB	B	C	D
203	324.5	83	7	Rc 1/2
204	327.5	86	10	
206	332.5	91	15	
208	337.5	96	20	Rc 3/4
210	342.5	101	25	

Model : TOP-2MY400-2\*\*HBMPVBE



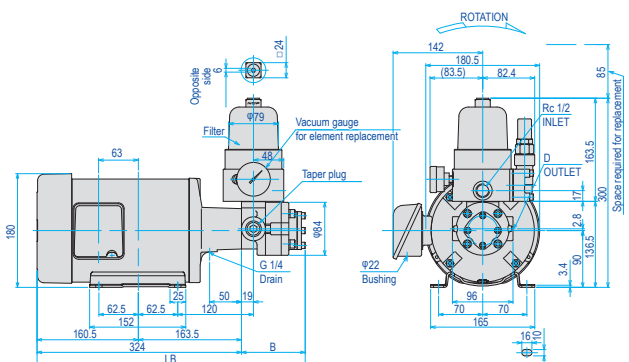
Item Model	LB	B	C	D
203	328.5	83	7	Rc 1/2
204	331.5	86	10	
206	336.5	91	15	
208	341.5	96	20	Rc 3/4
210	346.5	101	25	

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	Rc 3/4
210	381.5	101	

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



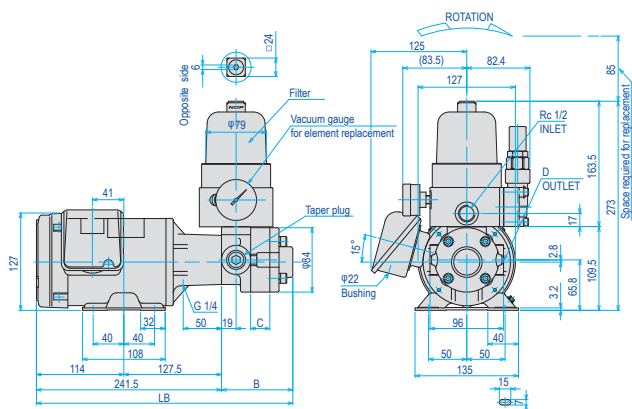
Item Model	LB	B	D
203	407	83	Rc 1/2
204	410	86	
206	415	91	
208	420	96	Rc 3/4
210	425	101	

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



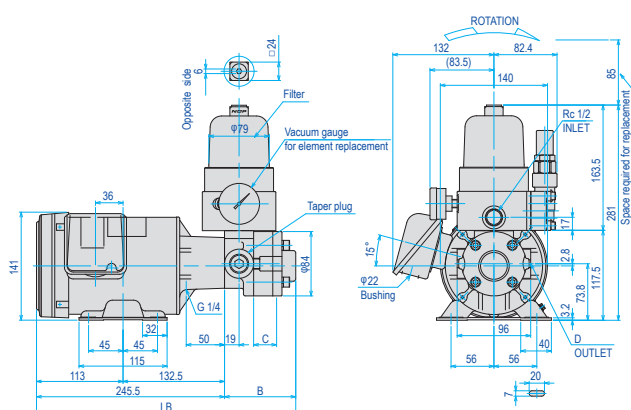
■ Dimensions (Typical) for 2MY-S Filter (Element-type, For Metal Cutting Fluid)

Model : TOP-2MY200-2\*\*HWMPVBE



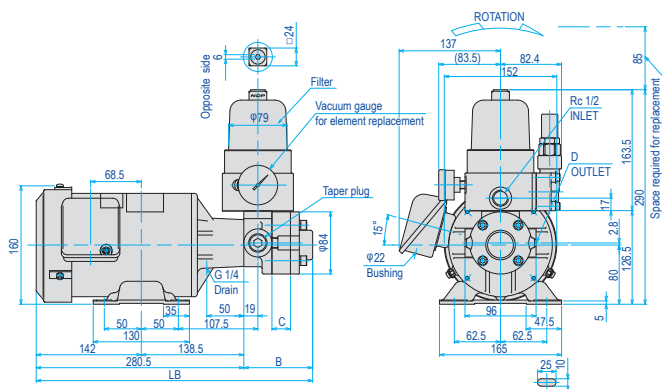
Model	Item	LB	B	C	D
204		319.5	78	10	Rc 1/2
206		324.5	83	15	
208		329.5	88	20	Rc 3/4
210		334.5	93	25	

Model : TOP-2MY400-2\*\*HWMPVBE



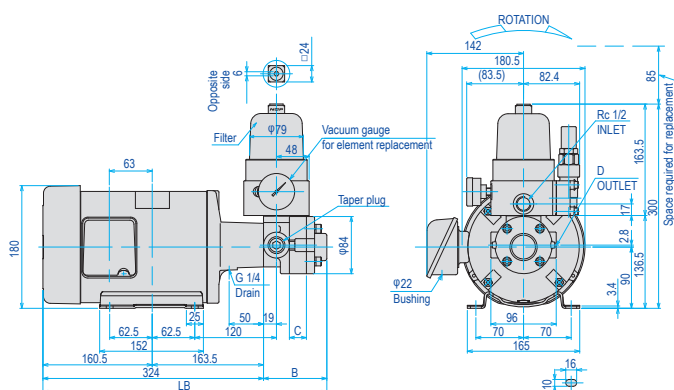
Model	Item	LB	B	C	D
204		323.5	78	10	Rc 1/2
206		328.5	83	15	
208		333.5	88	20	Rc 3/4
210		338.5	93	25	

Model : TOP-2MY750-2\*\*HWMPVBE 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	Rc 3/4
210		373.5	93	25	

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



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

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-2MY** ① – ② **HWNPEVB** – ③ – ④

**① Motor Output**  
200/400/  
750/1500  
Note: "IE3" is added to the suffix of model no. if motor is larger than 750W.

**② Model**  
Note: Pump integrated with motor  
212/216/220

**③ Relief Valve Set Pressure**  
Note: Indicated at the end of model number in 0.1 MPa units

**④ Filter Mesh Size (Available only for Element-type)**  
15: 150 mesh  
10: 100 mesh  
06: 60 mesh

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

## Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		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
<b>TOP-212HWNPEVB</b>	18.0	0.3	1.0	2.0	2.0	21.6	–	0.8	1.6	2.0	
<b>TOP-216HWNPEVB</b>	24.0	0.2	0.8	1.5	2.0	28.8	–	0.6	1.2	2.0	
<b>TOP-220HWNPEVB</b>	30.0	–	0.6	1.2	1.5	36.0	–	0.5	1.0	1.5	

- Test oil: ISO-VG2/Oil temperature: 40C
- Viscosity range of pumped liquid is 2-50mm<sup>2</sup>/sec. The vacuum gauge will indicate over the green zone if pumped fluid exceeds the permissible viscosity range.

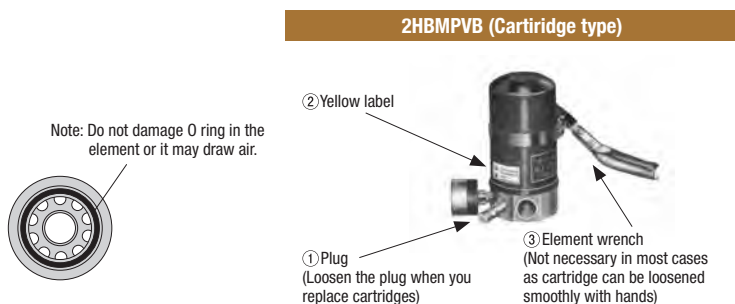
### Safety precautions for the cartridge replacement

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

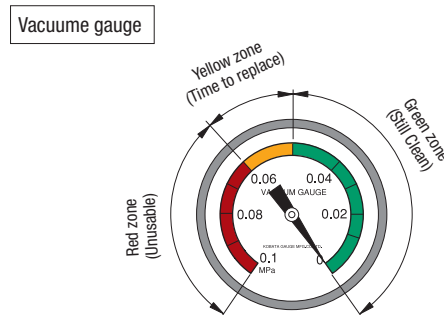
The oil remaining inside the cartridge will be released to the tank through the suction line. This process normally takes about 10 seconds before the oil is completely drained from the cartridge. Note: Make sure no check valve is installed on the suction line.

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.



### When to replace cartridge and clean element

- For cartridge 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.





# 2MY-W Filter

(WITH INTEGRATED 3-PHASE MOTOR)



## Model Numbering System (For Metal Cutting Fluid)

TOP-2MY① – ②HWMDPVDE-005 – ③

**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

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 voltage and frequency.

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

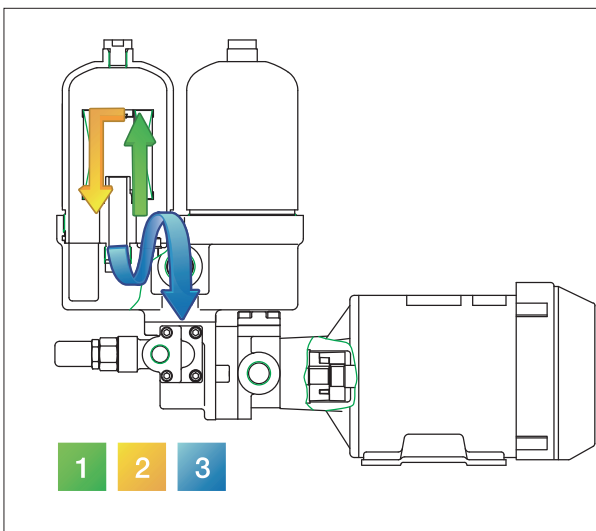
## Specifications (For Metal Cutting Fluid)

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		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	

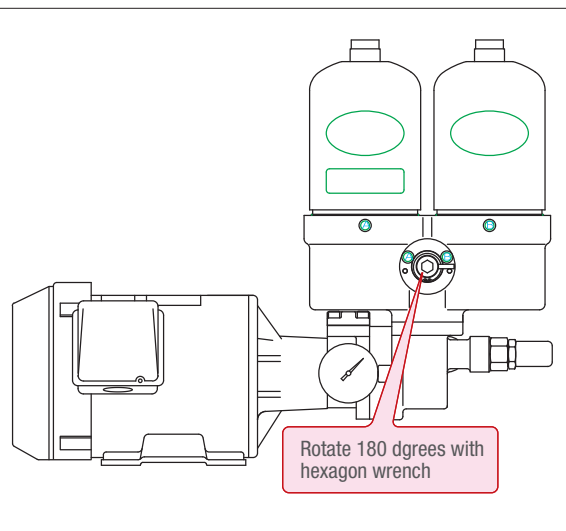
• Test oil: ISO-VG2/Oil temperature: 40C

• Viscosity range of pumped liquid is 2-50mm<sup>2</sup>/sec. The vacuum gauge will indicate over the green zone if pumped fluid exceeds the permissible viscosity range.

### Flow of oil inside the filter



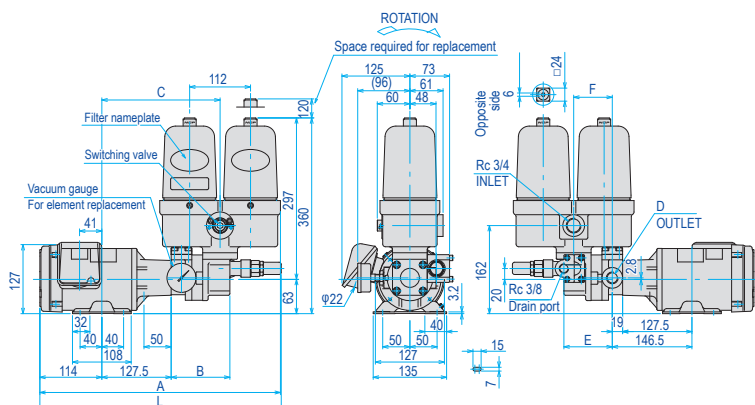
### How to switch between filters



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

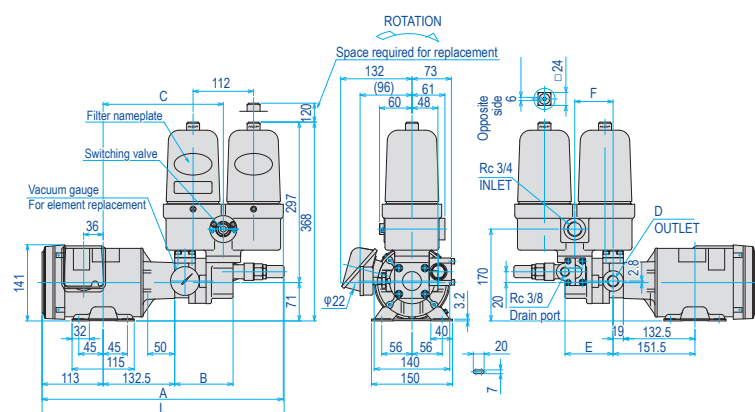
\* "Drain port Rc 3/8" is provided to drain liquid from relief valve.

Model : TOP-2MY200□-2\*\*HWMDPVDE-005



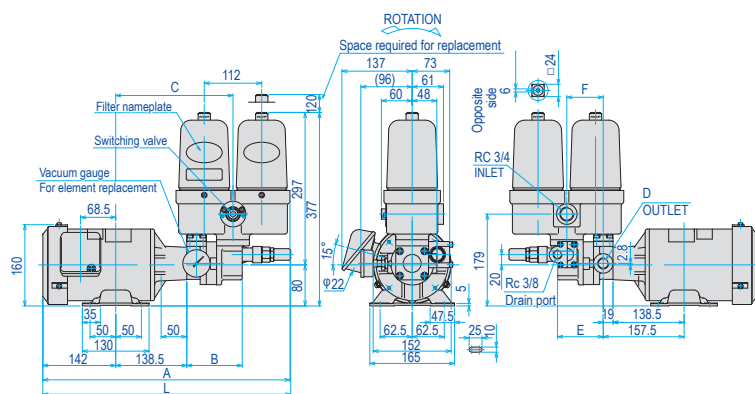
Item	L	A	B	C
Model 204	434	432.5	98	207.5
206	439	437.5	103	212.5
208	444	442.5	108	217.5
210	449	447.5	113	222.5
Item	D	E	F	
Model 204	Rc 1/2	79	61	
206		84	66	
208		89	71	
210		94	76	

Model : TOP-2MY400□-2\*\*HWMDPVDE-005



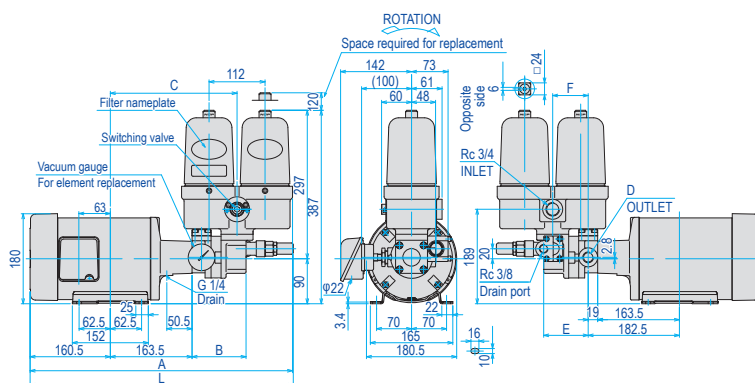
Item	L	A	B	C
Model 204	438	436.5	98	212.5
206	443	441.5	103	217.5
208	448	446.5	108	222.5
210	453	451.5	113	227.5
212	458	456.5	118	232.5
Item	D	E	F	
Model 204	Rc 1/2	79	61	
206		84	66	
208		89	71	
210	Rc 3/4	94	76	
212		99	81	

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



Item	L	A	B	C
Model 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
Item	D	E	F	
Model 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

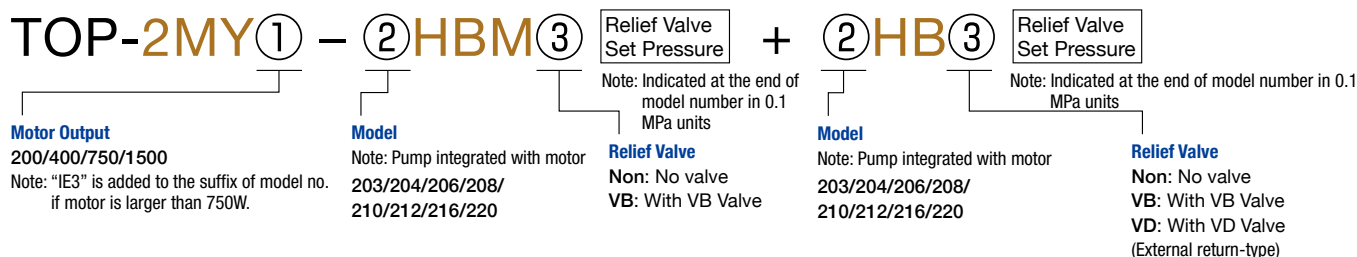


Item	L	A	B	C
Model 204	516.5	515	98	243.5
206	521.5	520	103	248.5
208	526.5	525	108	253.5
210	531.5	530	113	258.5
212	536.5	535	118	263.5
Item	D	E	F	
Model 204	Rc 1/2	79	61	
206		84	66	
208		89	71	
210		94	76	
212		99	81	

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

# 2MY- 2HBM+2HB

(DUAL PUMP  
WITH INTEGRATED 3-PHASE MOTOR)



## Specifications

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

## Motor Specifications

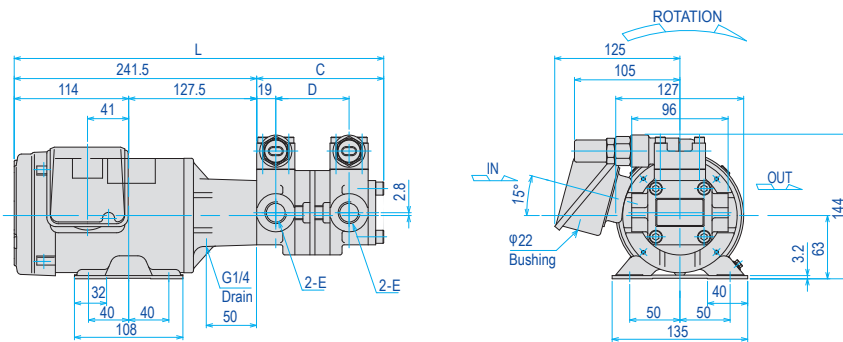
•3-phase squirrel-cage induction motor •Totally enclosed •Class E insulation (200W, 400W)  
•Class F insulation (750W, 1500W) •Protection level IP44

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

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

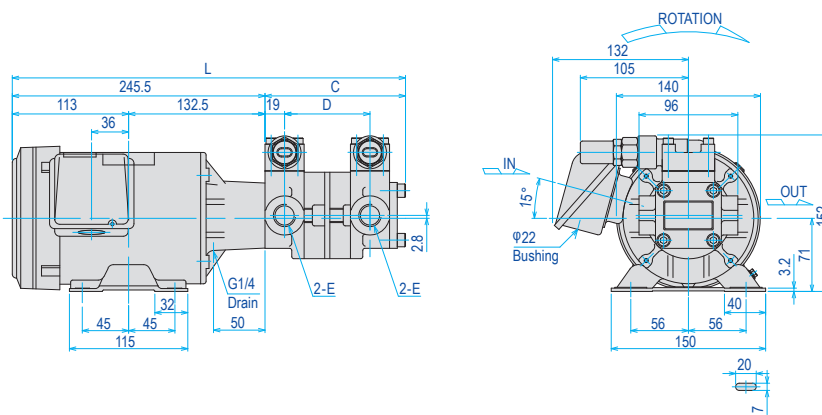
■ Dimensions (Typical) for 2MY-2HBM+2HB

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



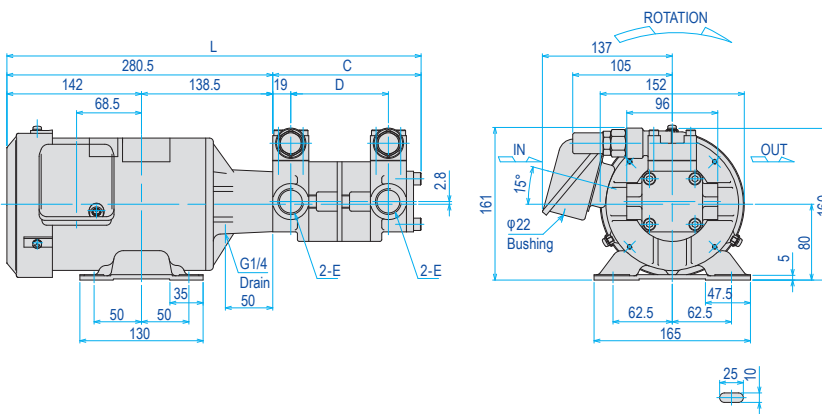
Model	Item	L	C	D	E
203		352	110.5	57	Rc 1/2
204		358	116.5	63	
206		368	126.5	73	

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



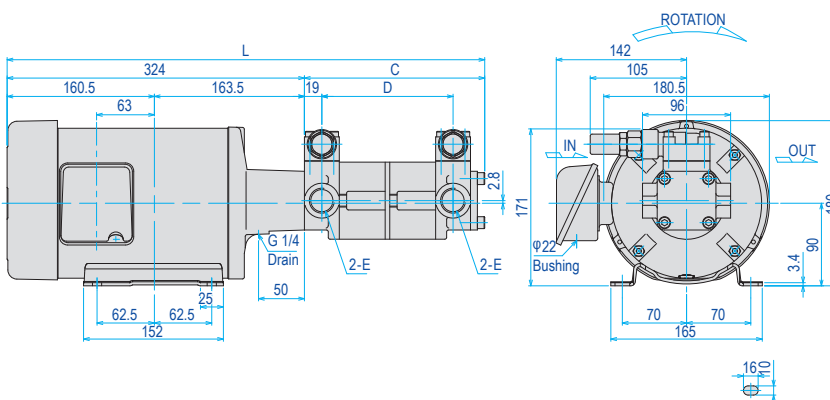
Model	Item	L	C	D	E
203		356	110.5	57	Rc 1/2
204		362	116.5	63	
206		372	126.5	73	
208		382	136.5	83	
210		392	146.5	93	Rc 3/4
212		402	156.5	103	
216		422	176.5	123	
216		442	196.5	143	

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



Model	Item	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



Model	Item	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.

Small capacity  
Small to medium capacity  
Medium capacity  
Large capacity  
Others



# 2MB

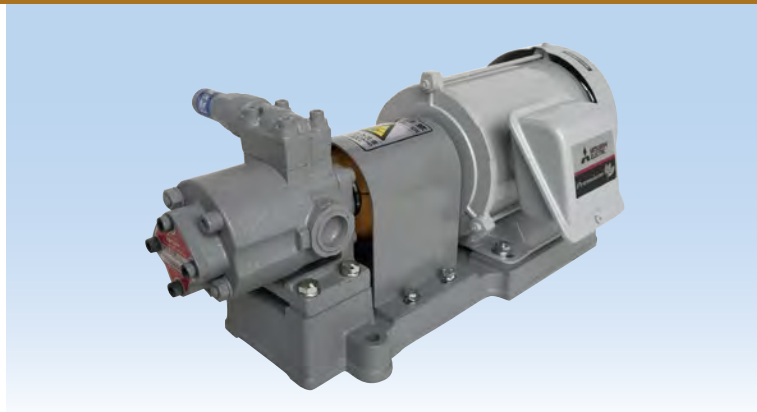
(BASE-COUPLING MOUNT TYPE)



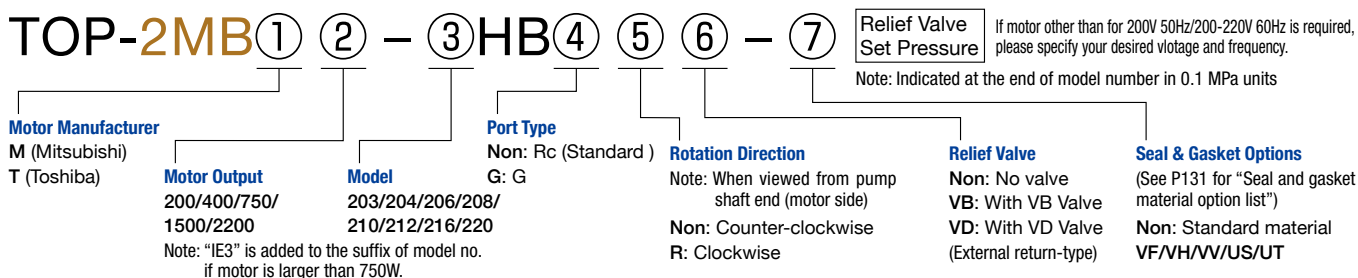
2HB



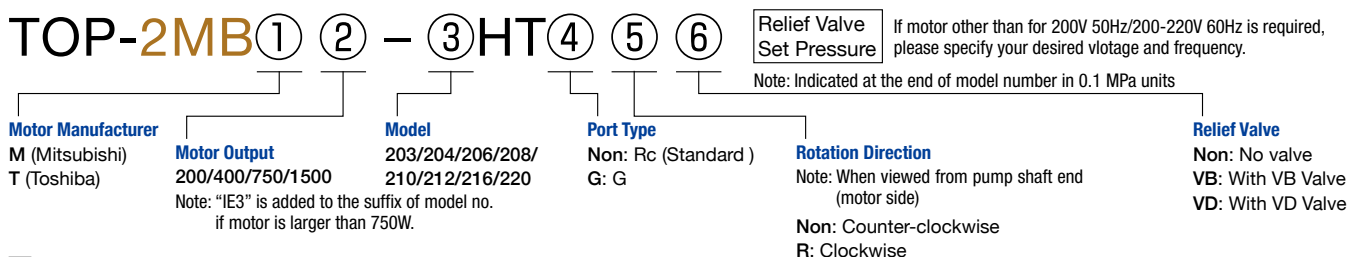
2HT



## Model Numbering System (For General Lubricant Oil)



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



## Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>					Motor speed 60Hz 1800min <sup>-1</sup>						
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)					Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				
			200W	400W	750W	1500W	2200W		200W	400W	750W	1500W	2200W
<b>TOP-203HB</b>	4.2	1.7	3.0	3.0	3.0	3.0	5.0	1.3	3.0	3.0	3.0	3.0	
<b>TOP-204HB</b>	6.0	1.2	3.0	3.0	3.0	3.0	7.2	0.9	2.3	3.0	3.0	3.0	
<b>TOP-206HB</b>	9.0	0.7	1.8	2.5	2.5	2.5	10.8	0.5	1.4	2.5	2.5	2.5	
<b>TOP-208HB</b>	12.0	0.5	1.3	2.5	2.5	2.5	14.4	0.3	1.0	2.3	2.5	2.5	
<b>TOP-210HB</b>	15.0	0.4	1.1	2.5	2.5	2.5	18.0	0.3	0.9	2.0	2.5	2.5	
<b>TOP-212HB</b>	18.0	0.3	0.9	2.0	2.0	2.0	21.6	-	0.7	1.6	2.0	2.0	
<b>TOP-216HB</b>	24.0	0.2	0.7	1.5	1.5	1.5	28.8	-	0.5	1.2	1.5	1.5	
<b>TOP-220HB</b>	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	Motor speed 50Hz 1500min <sup>-1</sup>			Motor speed 60Hz 1800min <sup>-1</sup>				
		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
<b>TOP-203HT</b>	4.2	0.7	0.7	0.7	5.0	0.7	0.7	0.7	
<b>TOP-204HT</b>	6.0	0.7	0.7	0.7	7.2	0.7	0.7	0.7	
<b>TOP-206HT</b>	9.0	0.7	0.7	0.7	10.8	0.6	0.7	0.7	
<b>TOP-208HT</b>	12.0	0.6	0.7	0.7	14.4	0.4	0.7	0.7	
<b>TOP-210HT</b>	15.0	0.5	0.7	0.7	18.0	0.3	0.7	0.7	
<b>TOP-212HT</b>	18.0	0.4	0.7	0.7	21.6	-	0.7	0.7	
<b>TOP-216HT</b>	24.0	0.3	0.7	0.7	28.8	-	0.6	0.7	
<b>TOP-220HT</b>	30.0	-	0.6	0.7	36.0	-	0.5	0.7	

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

Trochoid™ Pump is a registered trademark of Nippon Oil Pump Co.,Ltd in Japan and other countries.

Small capacity

Small to medium capacity

Medium capacity

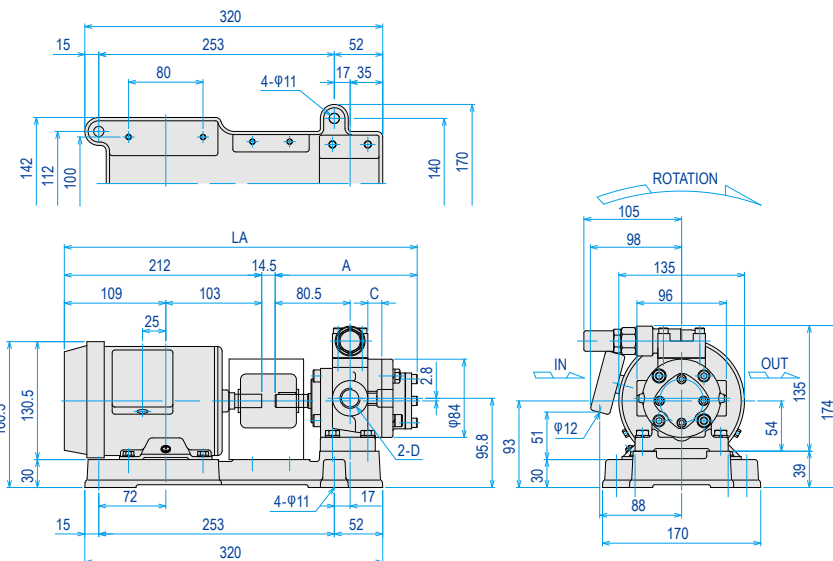
Large capacity

Others



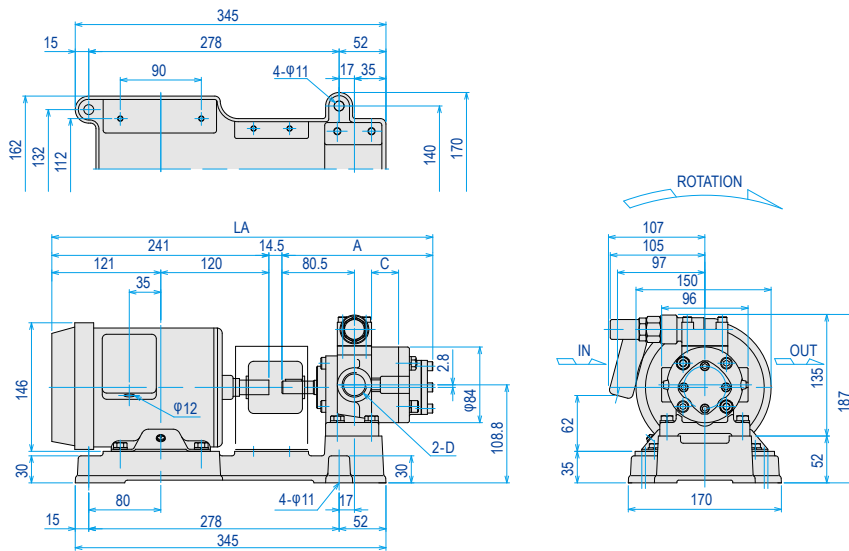
■ Dimensions (Typical) for 2MB

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



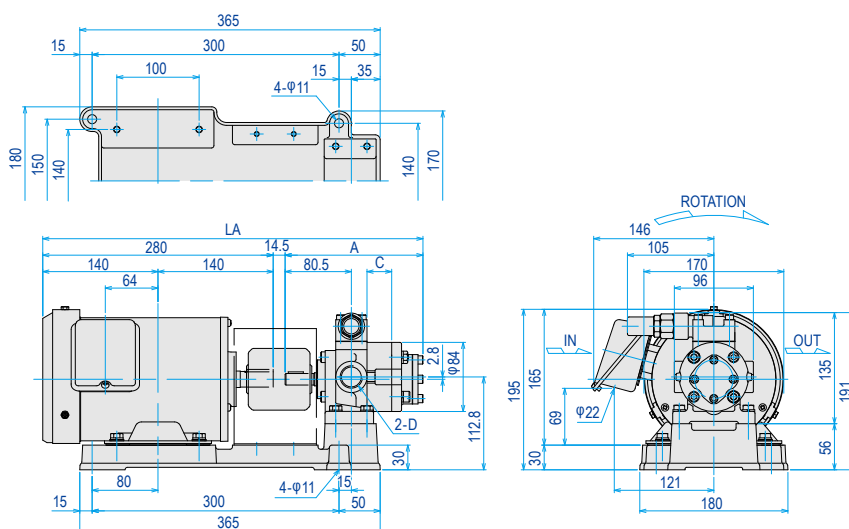
Model	Item	LA	A	C	D
203		371	144.5	7	Rc 1/2
204		374	147.5	10	
206		379	152.5	15	
208		384	157.5	20	
210		389	162.5	25	Rc 3/4
212		394	167.5	30	
216		404	177.5	40	

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



Model	Item	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

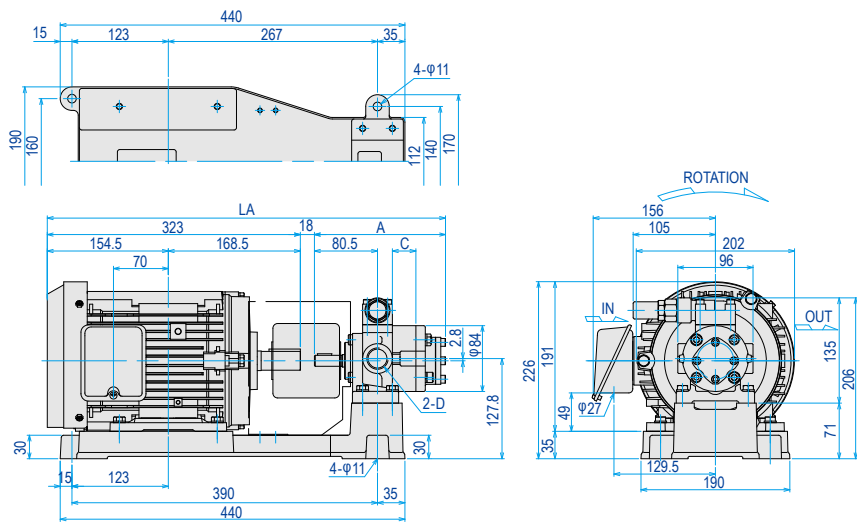


Model	Item	LA	A	C	D
203		439	144.5	7	Rc 1/2
204		442	147.5	10	
206		447	152.5	15	
208		452	157.5	20	
210		457	162.5	25	Rc 3/4
212		462	167.5	30	
216		472	177.5	40	
220		482	187.5	50	

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

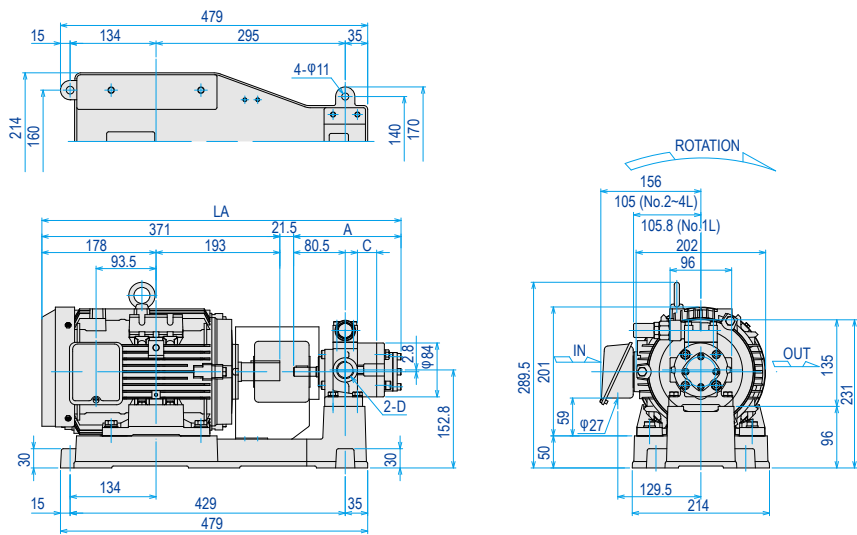
■ Dimensions (Typical) for 2MB

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



Model	Item	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-2MBT2200-2\*\*HBVB-\*\* IE3 / TOP-2MBT2200-2\*\*HTVB IE3



Model	Item	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

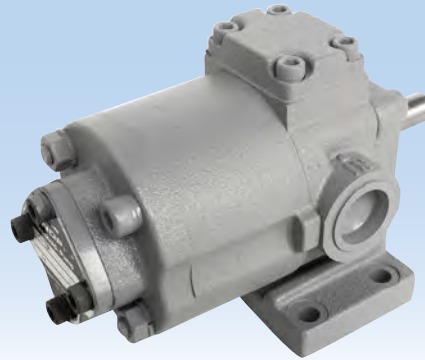
(PUMPHEAD)



2HB



2HT



## Model Numbering System (For General Lubricant Oil)

TOP-①HB②③④⑤ - 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-①HT②③④⑤ 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

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>			
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

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>			
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)

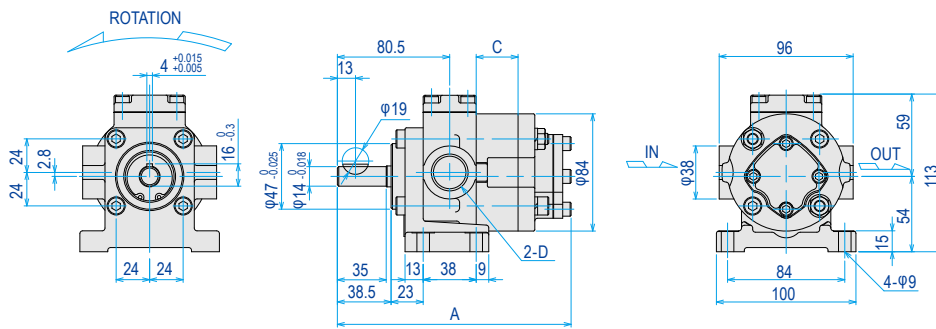
• Test oil: ISO-VG2/Oil temperature: 40C

• Values in ( ) show approx. weights of the pump when the valve is attached.

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

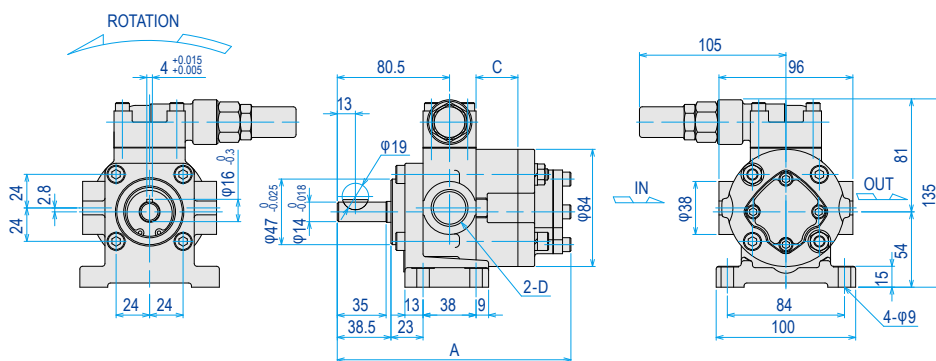
■ Dimensions (Typical) for 2HB/2HT

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



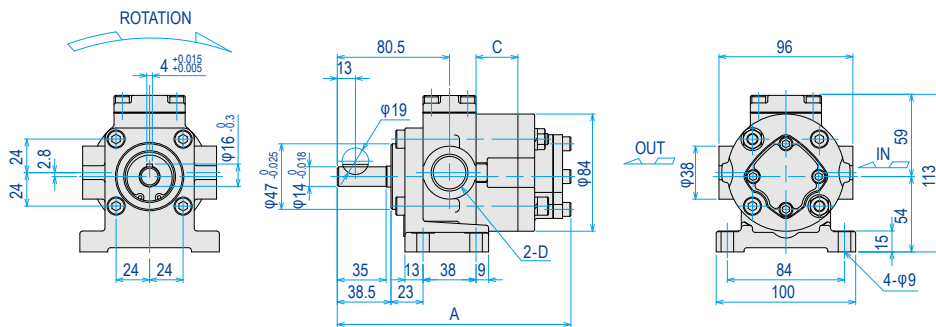
Model	Item	A	C	D
203		144.5	7	Rc 1/2
204		147.5	10	
206		152.5	15	
208		157.5	20	Rc 3/4
210		162.5	25	
212		167.5	30	
216		177.5	40	
220		187.5	50	

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



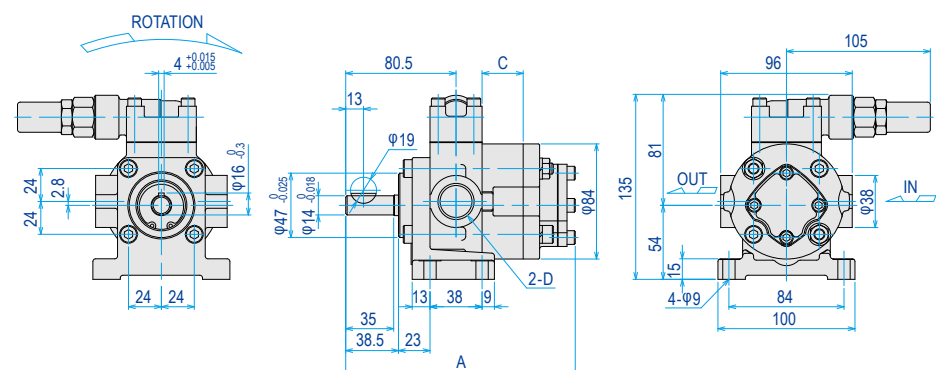
Model	Item	A	C	D
203		144.5	7	Rc 1/2
204		147.5	10	
206		152.5	15	
208		157.5	20	Rc 3/4
210		162.5	25	
212		167.5	30	
216		177.5	40	
220		187.5	50	

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



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

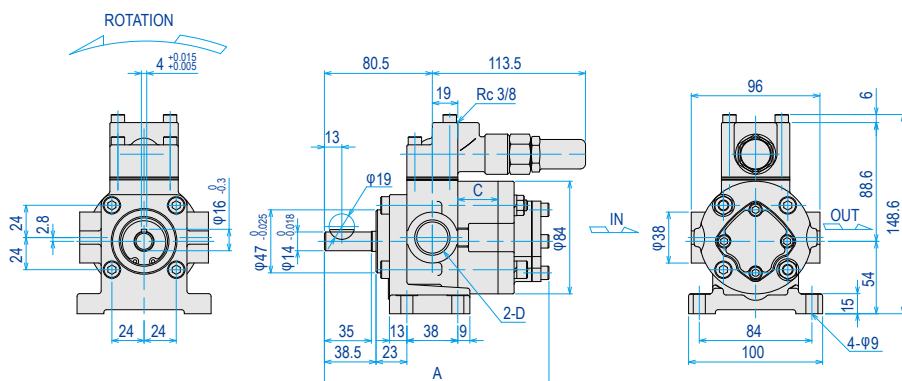
Model : TOP-2\*\*HBRVB-\*\* / TOP-2\*\*HTRVB



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

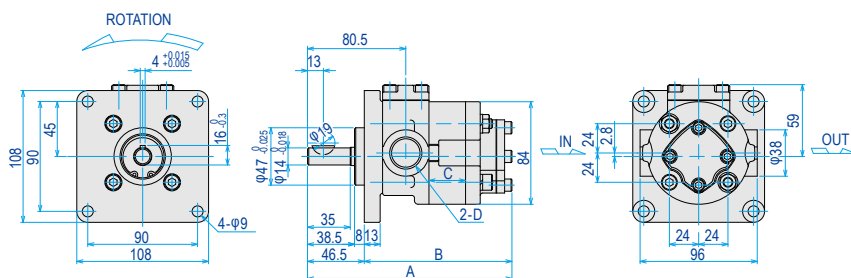
■ Dimensions (Typical) for 2HB/2HT

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



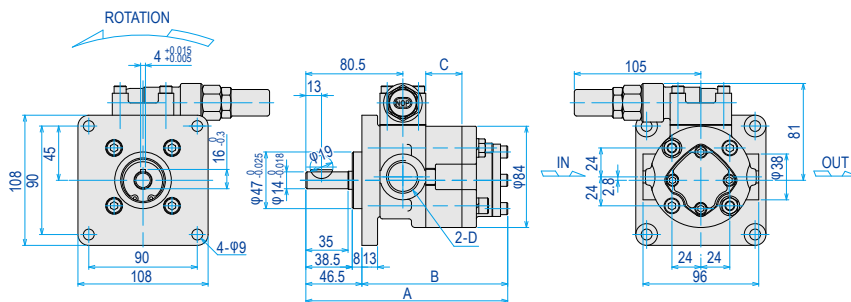
Model	Item	A	C	D
203 204 206	203	144.5	7	Rc 1/2
	204	147.5	10	
	206	152.5	15	
208 210 212 216 220	208	157.5	20	Rc 3/4
	210	162.5	25	
	212	167.5	30	
	216	177.5	40	
220	187.5	50		

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



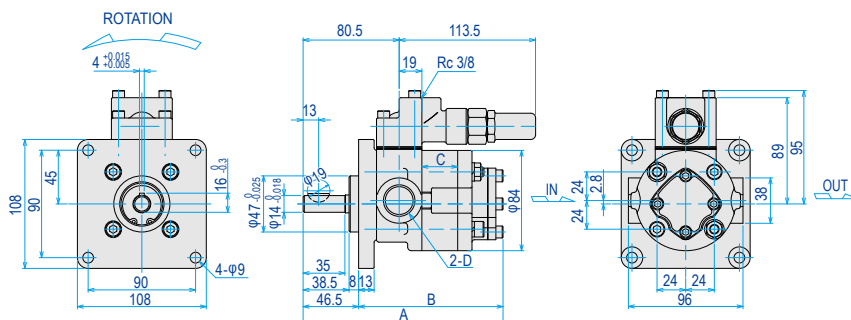
Model	Item	A	B	C	D
203 204 206 208	203	144.5	98	7	Rc 1/2
	204	147.5	101	10	
	206	152.5	106	15	
	208	157.5	111	20	
210 212 216 220	210	162.5	116	25	Rc 3/4
	212	167.5	121	30	
	216	177.5	131	40	
	220	187.5	141	50	

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



Model	Item	A	B	C	D
203 204 206 208	203	144.5	98	7	Rc 1/2
	204	147.5	101	10	
	206	152.5	106	15	
	208	157.5	111	20	
210 212 216 220	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



Model	Item	A	B	C	D
203 204 206 208	203	144.5	98	7	Rc 1/2
	204	147.5	101	10	
	206	152.5	106	15	
	208	157.5	111	20	
210 212 216 220	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)



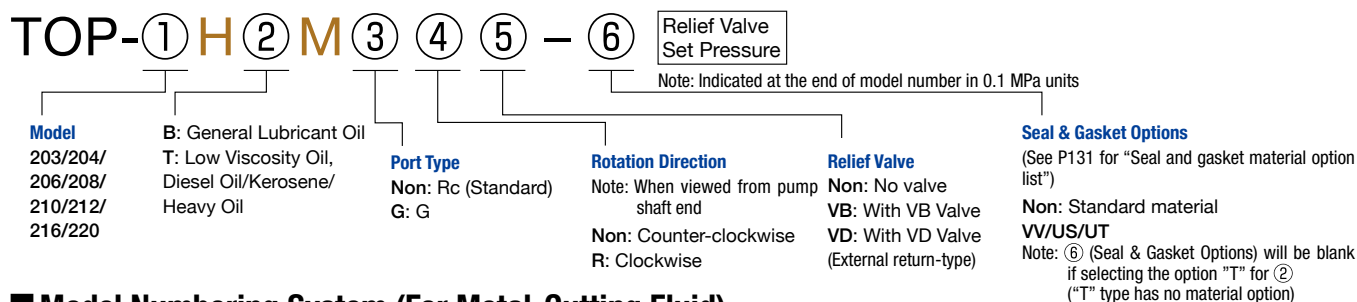
2HBM

2HTM

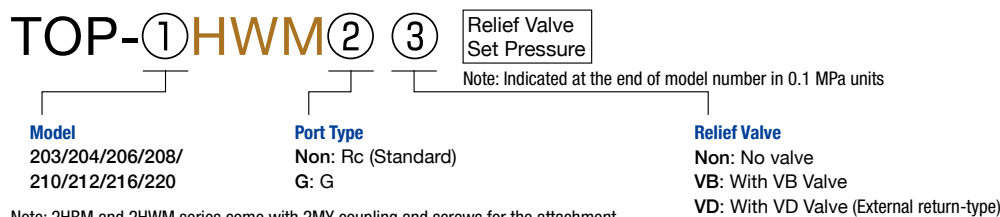
2HWM



## Model Numbering System



## Model Numbering System (For Metal-Cutting Fluid)



## Specifications

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

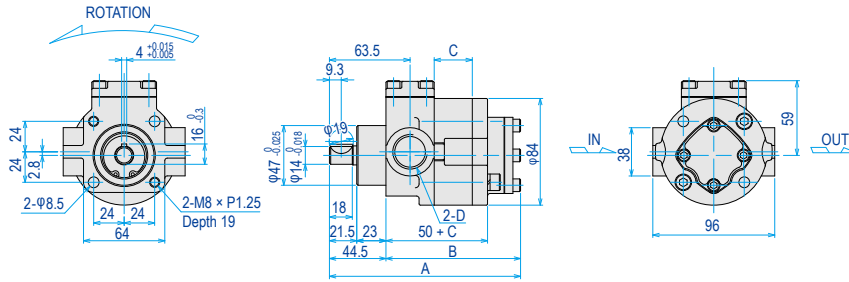
## Specifications

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

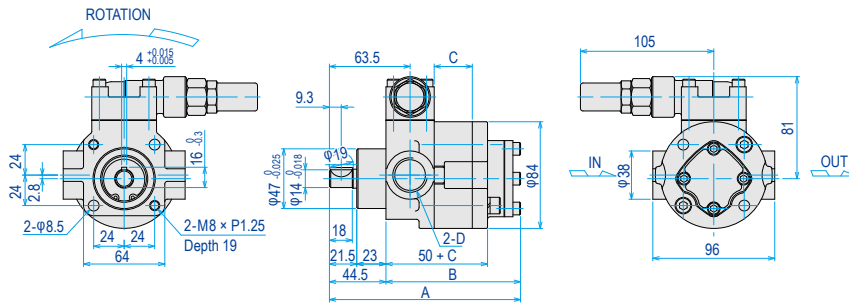
■ Dimensions (Typical) for 2HBM/2HTM/2HWM

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



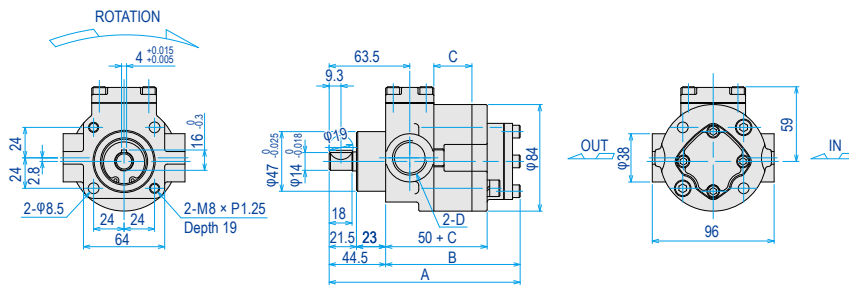
Item Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	Rc 3/4
210	145.5	101	25	
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

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



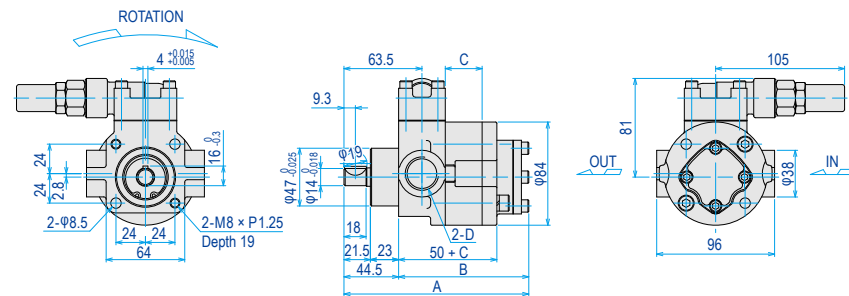
Item Model	A	B	C	D
203	127.5	83	7	Rc 1/2
204	130.5	86	10	
206	135.5	91	15	
208	140.5	96	20	Rc 3/4
210	145.5	101	25	
212	150.5	106	30	
216	160.5	116	40	
220	170.5	126	50	

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	Rc 3/4
210	145.5	101	25	
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	Rc 3/4
210	145.5	101	25	
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.





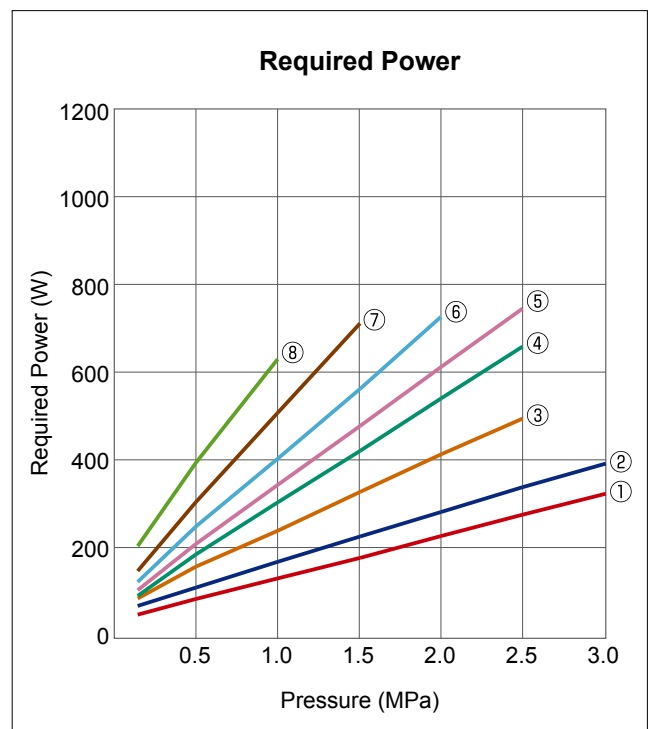
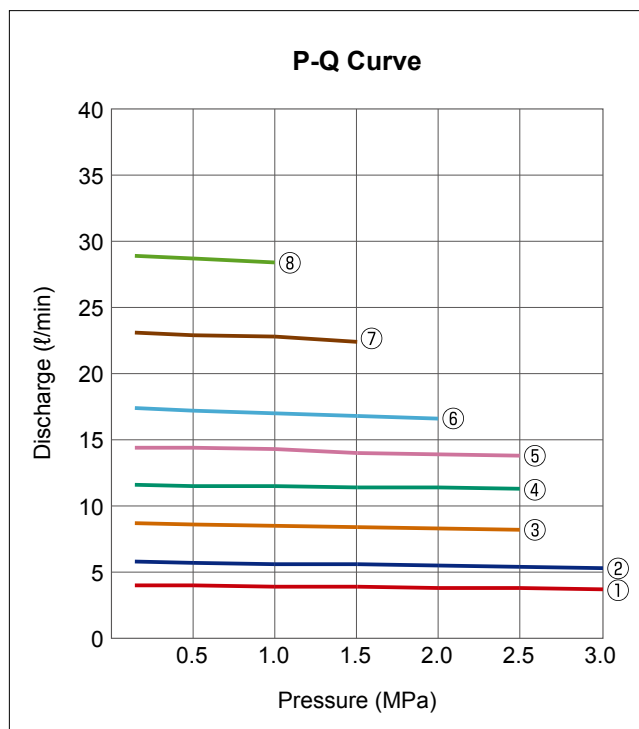
# 2HB(M) Performance Curve

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<sup>-1</sup>

- ① 203HB
- ② 204HB
- ③ 206HB
- ④ 208HB
- ⑤ 210HB
- ⑥ 212HB
- ⑦ 216HB
- ⑧ 220HB



Model	Item	Discharge (l/min)						Required Power (W)							
		Pressure (MPa)						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	①	4.0	4.0	3.9	3.9	3.8	3.8	3.7	48	84	131	178	228	277	325
TOP-204HB	②	5.8	5.7	5.6	5.6	5.5	5.4	5.3	68	110	169	227	283	340	394
TOP-206HB	③	8.7	8.6	8.5	8.4	8.3	8.2		85	158	240	329	415	497	
TOP-208HB	④	11.6	11.5	11.5	11.4	11.4	11.3		91	186	305	423	543	662	
TOP-210HB	⑤	14.4	14.4	14.3	14.0	13.9	13.8		104	210	345	480	615	749	
TOP-212HB	⑥	17.4	17.2	17.0	16.8	16.6			123	250	405	565	730		
TOP-216HB	⑦	23.1	22.9	22.8	22.4				148	306	510	715			
TOP-220HB	⑧	28.9	28.7	28.4					205	396	633				

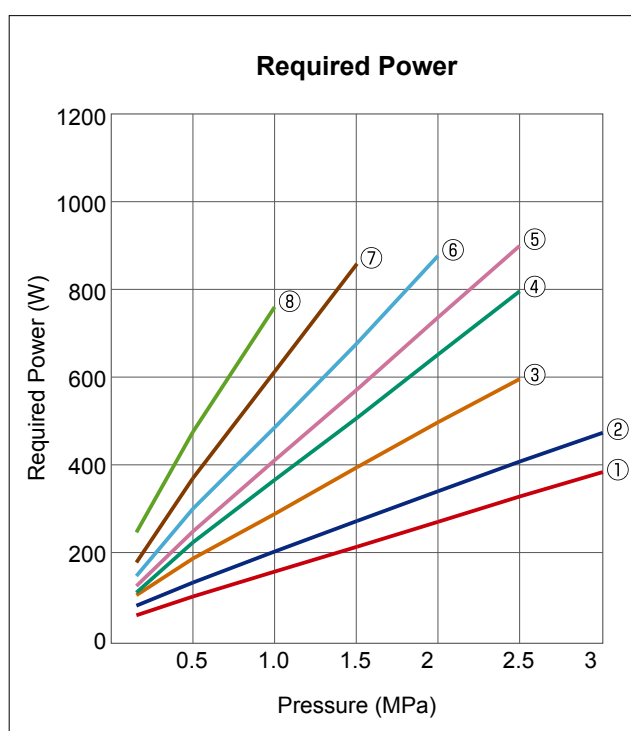
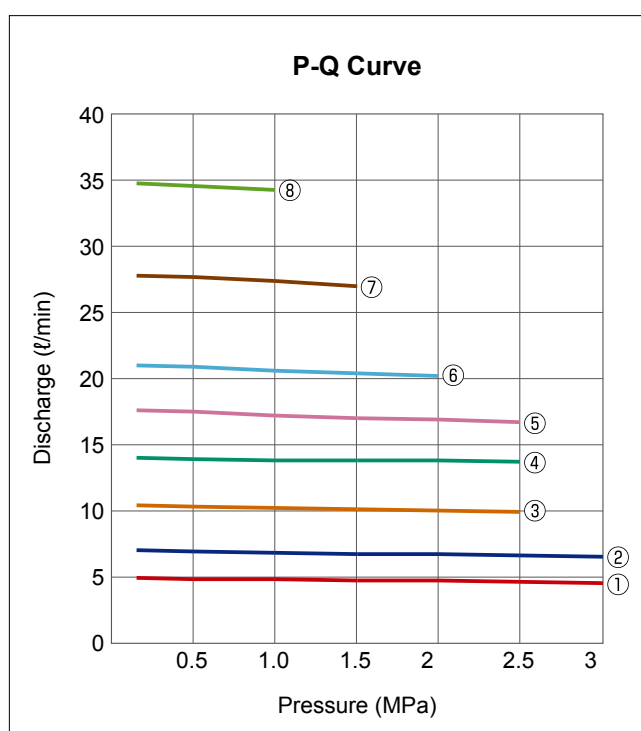
Any disassembly or alteration of the product will void the warranty.

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<sup>-1</sup>

- ① 203HB
- ② 204HB
- ③ 206HB
- ④ 208HB
- ⑤ 210HB
- ⑥ 212HB
- ⑦ 216HB
- ⑧ 220HB



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

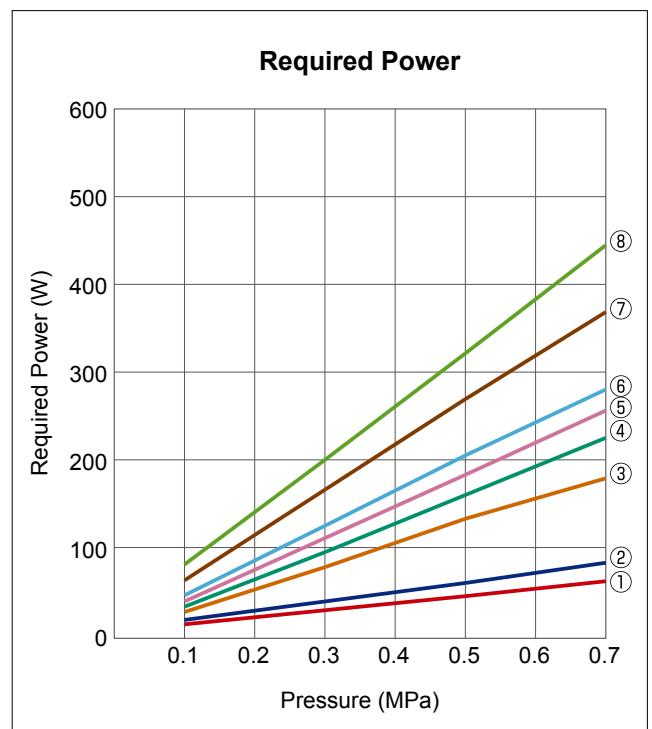
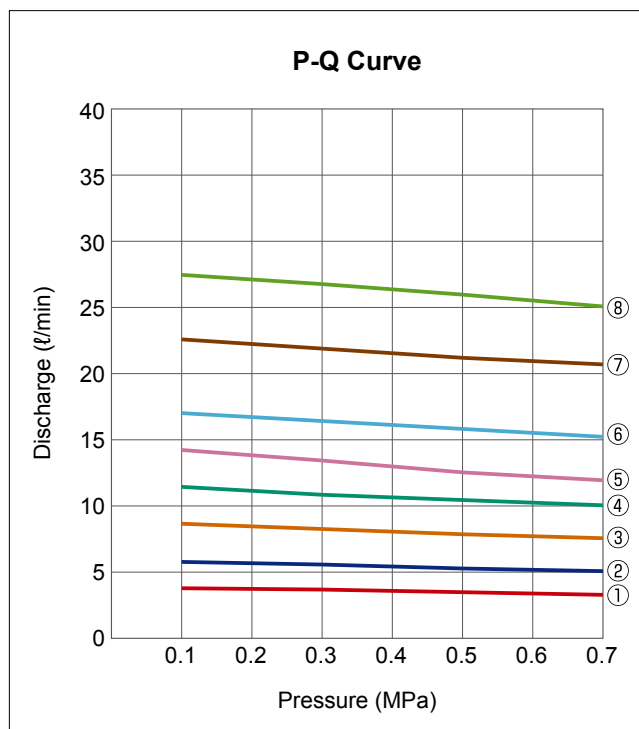
# 2HT(M) Performance Curve

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<sup>-1</sup>

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



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

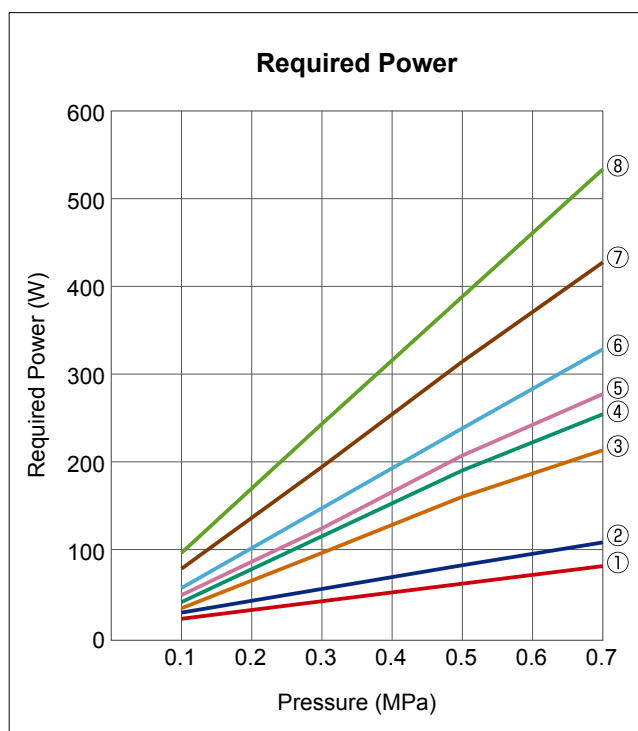
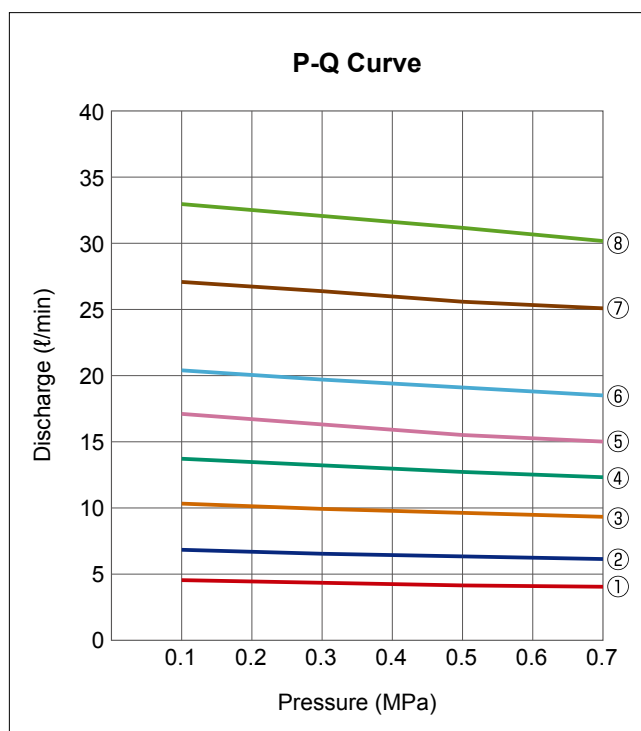
Any disassembly or alteration of the product will void the warranty.

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<sup>-1</sup>

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



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

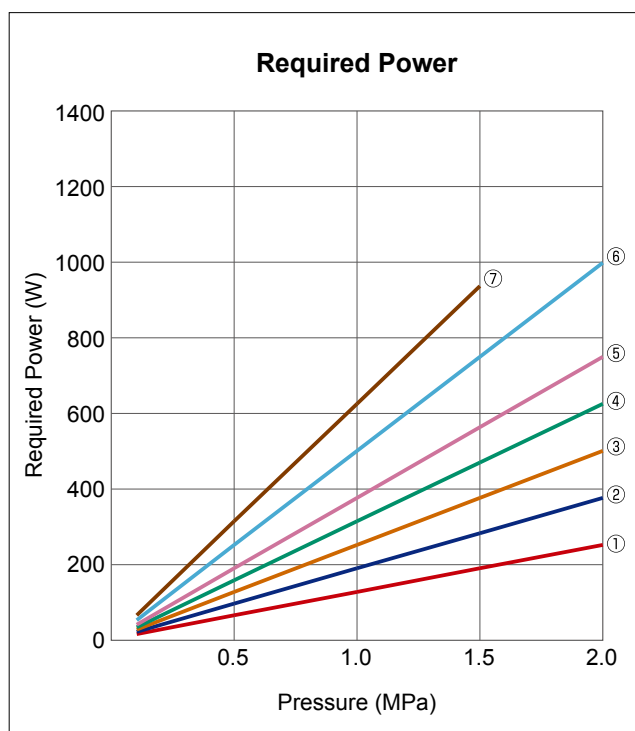
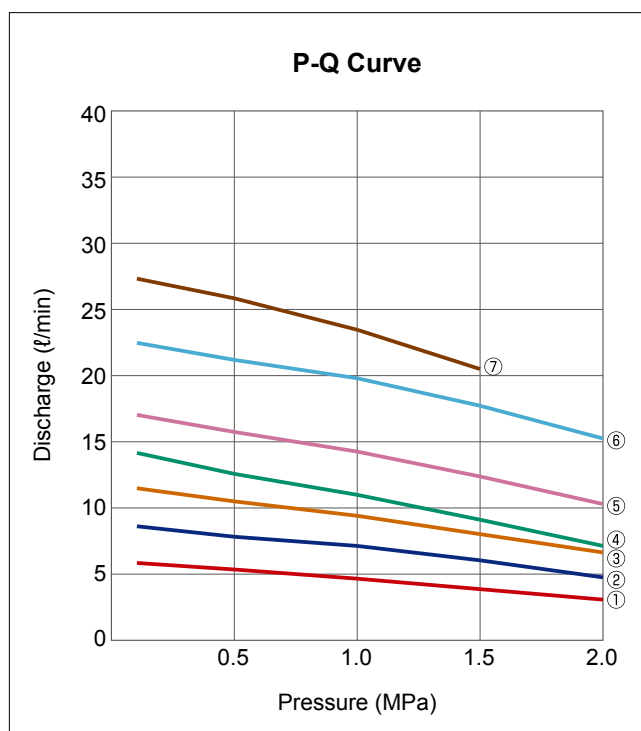
# 2HW(M) Performance Curve

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<sup>-1</sup>

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



Model \ Item	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
<b>TOP-204HWM</b>	5.7	5.2	4.5	3.7	2.9	13	63	125	188	250
<b>TOP-206HWM</b>	8.5	7.7	7.0	5.9	4.6	19	94	188	281	375
<b>TOP-208HWM</b>	11.4	10.4	9.3	7.9	6.5	25	125	250	375	500
<b>TOP-210HWM</b>	14.1	12.5	10.9	9.0	7.0	31	156	313	469	625
<b>TOP-212HWM</b>	17.0	15.7	14.2	12.3	10.2	38	188	375	563	750
<b>TOP-216HWM</b>	22.5	21.2	19.8	17.7	15.2	50	250	500	750	1000
<b>TOP-220HWM</b>	27.4	25.9	23.5	20.5		63	313	625	938	

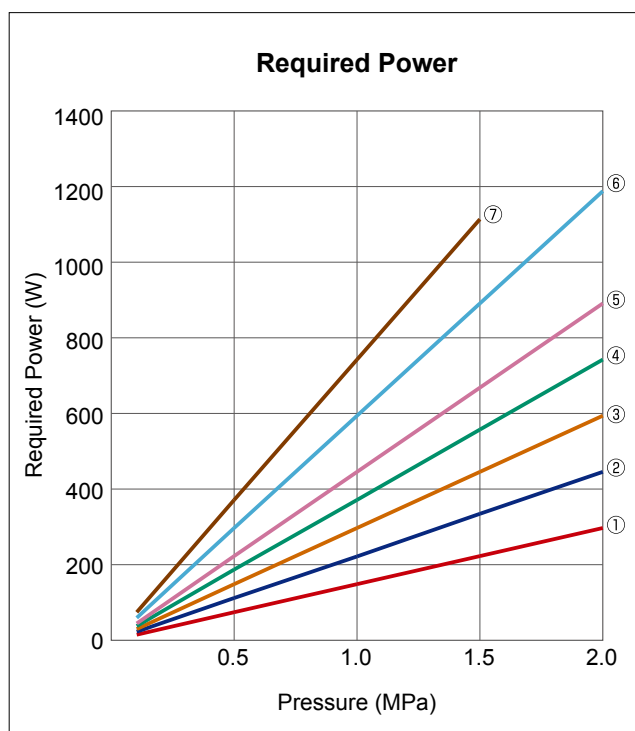
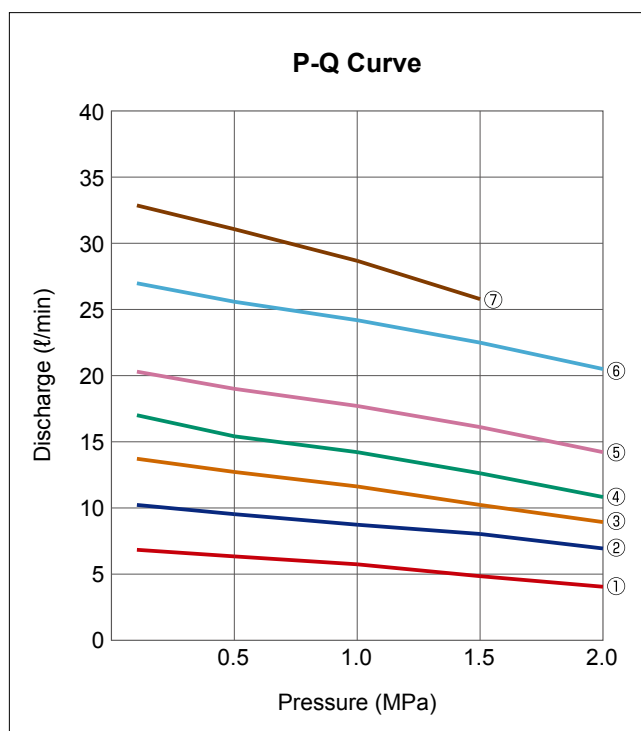
Any disassembly or alteration of the product will void the warranty.

**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<sup>-1</sup>

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



Model \ Item	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
<b>TOP-204HWM</b>	6.8	6.3	5.7	4.8	4.0	15	75	150	225	300
<b>TOP-206HWM</b>	10.2	9.5	8.7	8.0	6.9	23	113	224	338	450
<b>TOP-208HWM</b>	13.7	12.7	11.6	10.2	8.9	30	150	300	450	600
<b>TOP-210HWM</b>	17.0	15.4	14.2	12.6	10.8	38	189	375	563	750
<b>TOP-212HWM</b>	20.3	19.0	17.7	16.1	14.2	45	225	450	675	900
<b>TOP-216HWM</b>	27.0	25.6	24.2	22.5	20.5	60	300	600	900	1200
<b>TOP-220HWM</b>	32.9	31.1	28.7	25.8		75	375	750	1125	

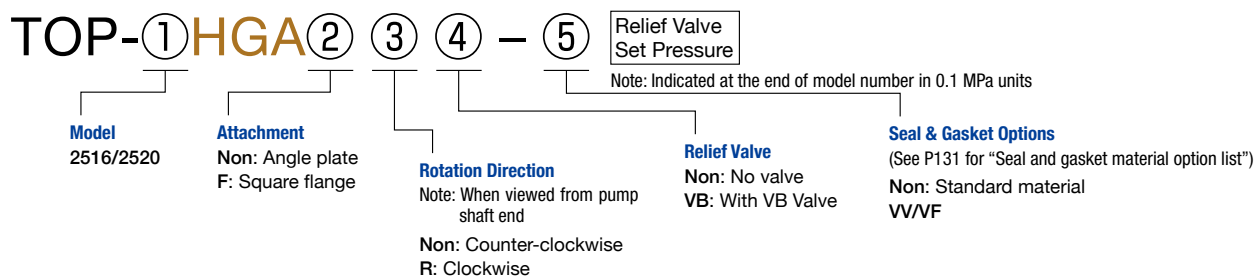


# 2.5HGA

(PUMPHEAD)



## Model Numbering System



## Specifications

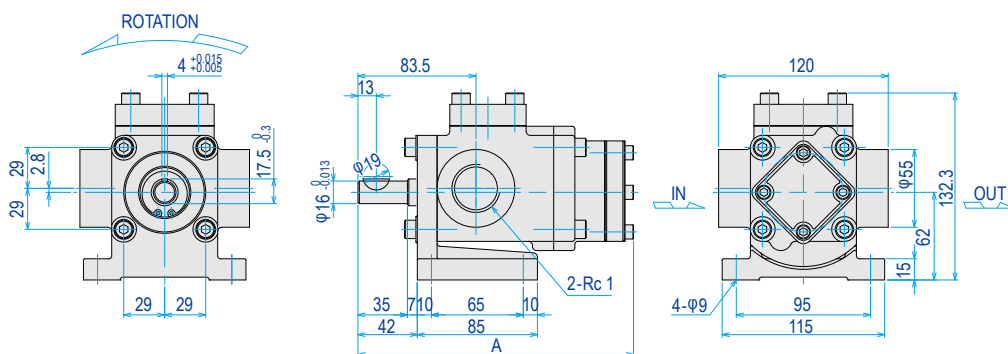
Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>			
<b>TOP-2516HGA</b>		16	24	28.8	2.5	2500	6.9 (7.5)
<b>TOP-2520HGA</b>		20	30	36.0	2.0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

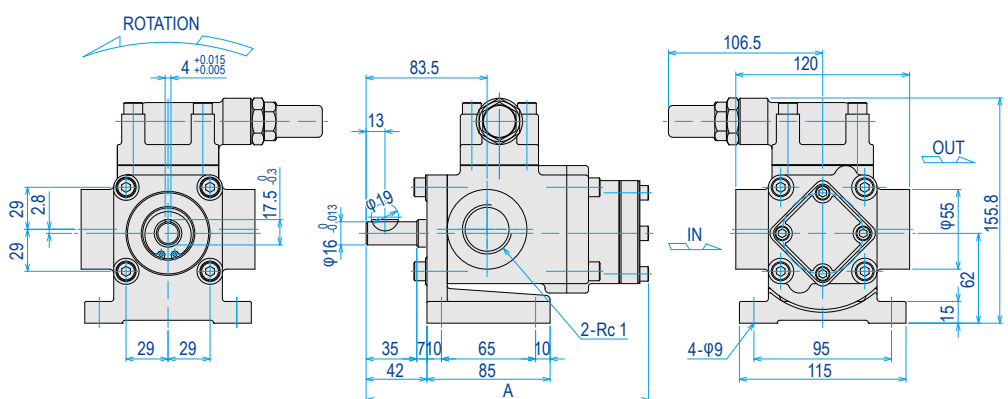
■ Dimensions (Typical) for 2.5HGA

Model : TOP-25\*\*HGA-\*\*



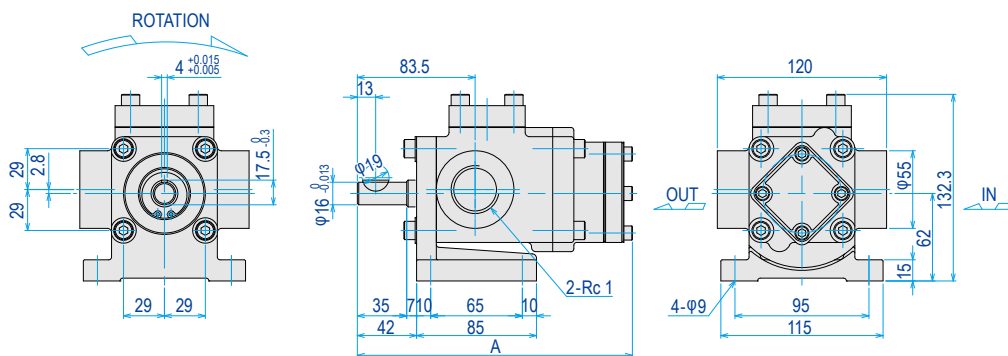
Model \ Item	A
2516	195
2520	201

Model : TOP-25\*\*HGA VB-\*\*



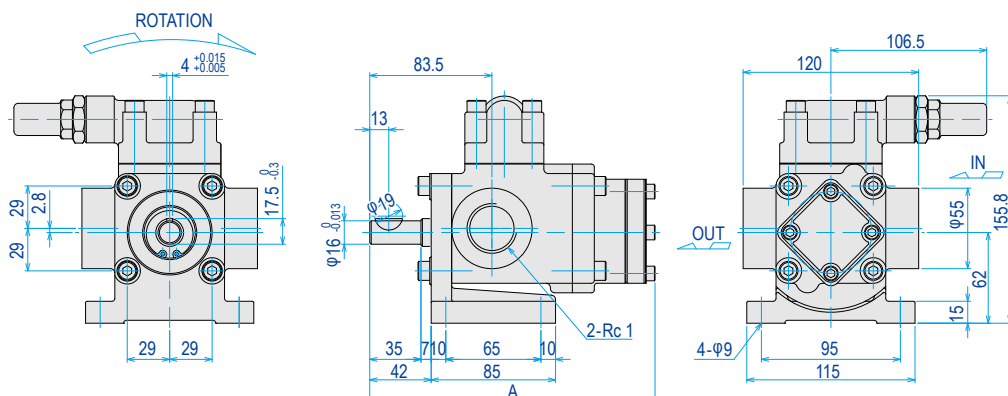
Model \ Item	A
2516	195
2520	201

Model : TOP-25\*\*HGAR-\*\*



Model \ Item	A
2516	195
2520	201

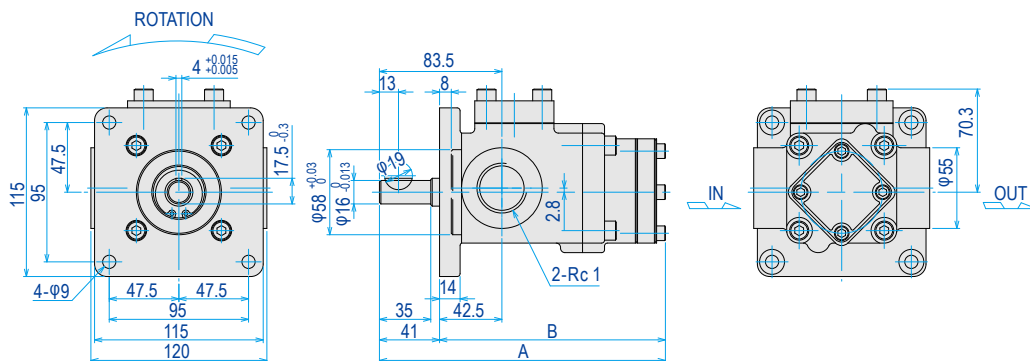
Model : 25\*\*HGAR VB-\*\*



Model \ Item	A
2516	195
2520	201

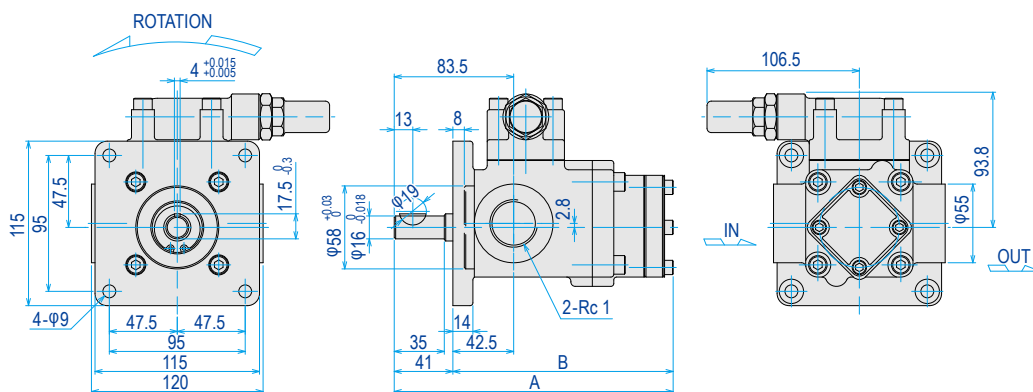
■ Dimensions (Typical) for 2.5HGA

Model : TOP-25\*\*HGAF-\*\*



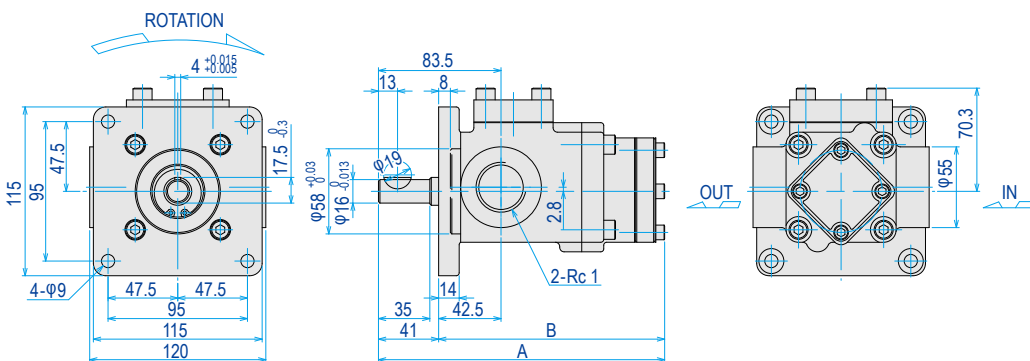
Item Model	A	B
2516	195	154
2520	201	160

Model : TOP-25\*\*HGAFVB-\*\*



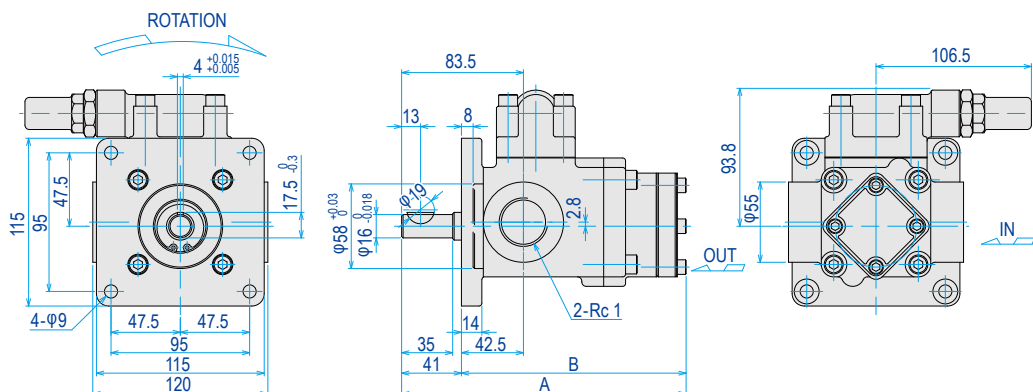
Item Model	A	B
2516	195	154
2520	201	160

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.

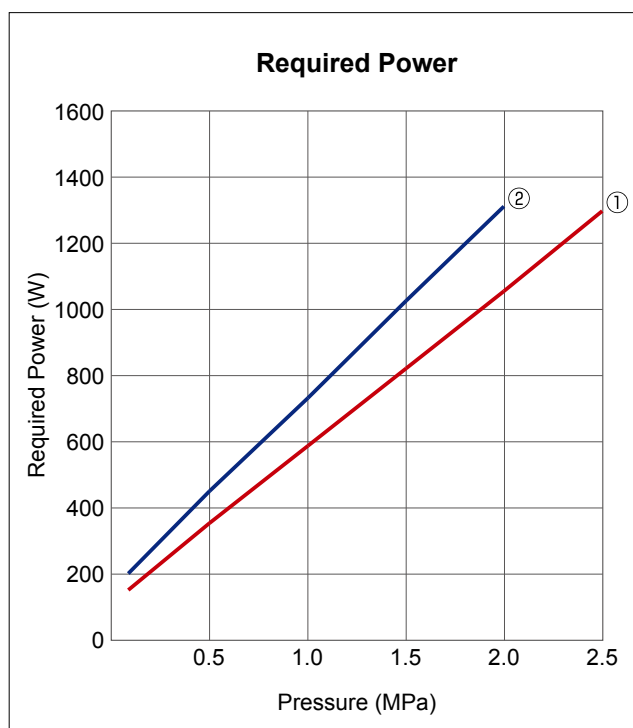
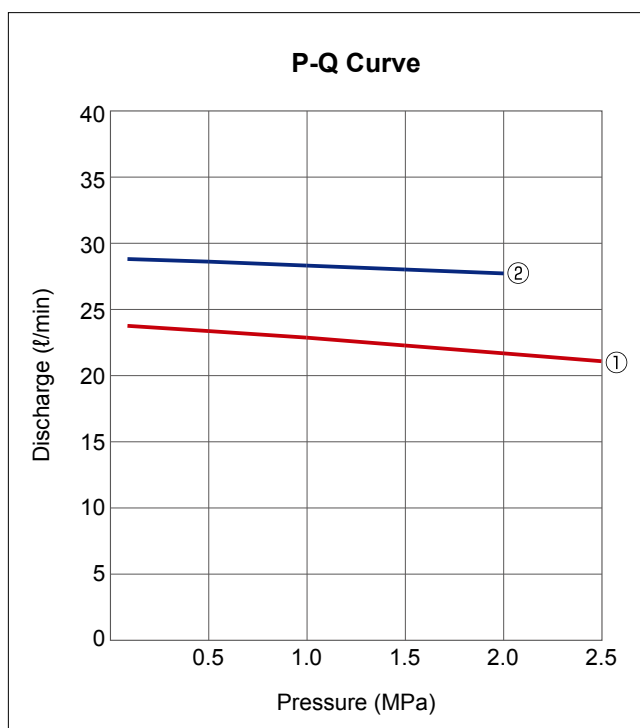
## 2.5HGA Performance Curve

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<sup>-1</sup>

① 2516HGA      ② 2520HGA



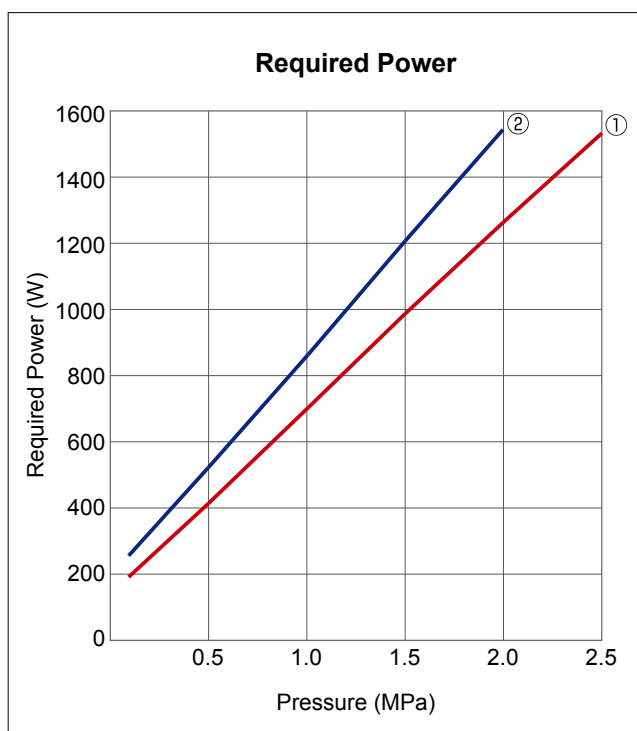
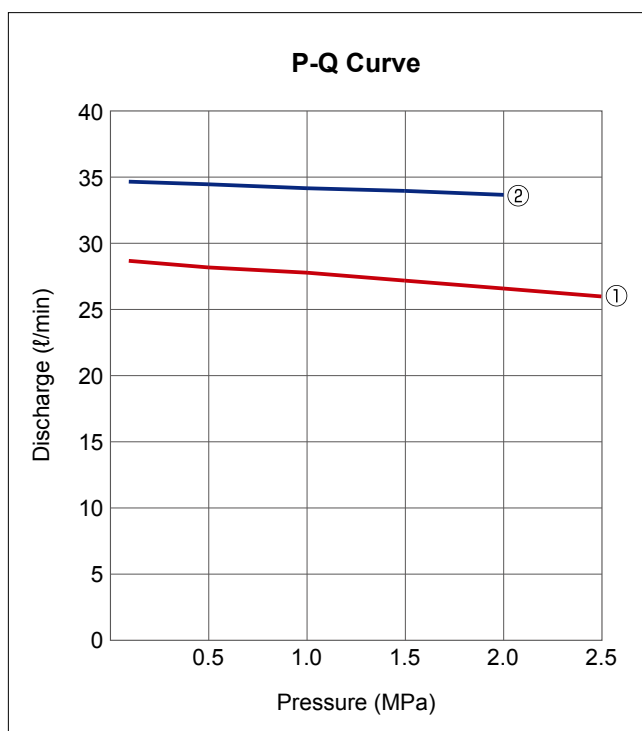
Item	Discharge (l/min)						Required Power (W)					
	Pressure (MPa)						Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
<b>TOP-2516HGA</b>	23.8	23.4	22.9	22.3	21.7	21.1	150	353	587	822	1056	1299
<b>TOP-2520HGA</b>	28.9	28.7	28.4	28.1	27.8		200	450	732	1027	1313	

**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<sup>-1</sup>

① 2516HGA      ② 2520HGA

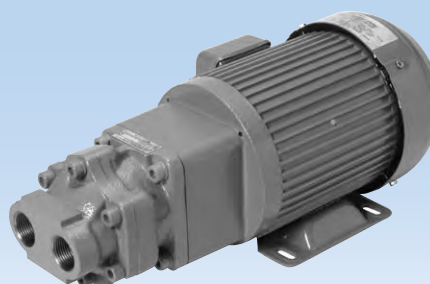


Item	Discharge (l/min)						Required Power (W)					
	Pressure (MPa)						Pressure (MPa)					
	0.1	0.5	1.0	1.5	2.0	2.5	0.1	0.5	1.0	1.5	2.0	2.5
<b>TOP-2516HGA</b>	28.7	28.2	27.8	27.2	26.6	26.0	185	410	702	989	1267	1540
<b>TOP-2520HGA</b>	34.7	34.5	34.2	34.0	33.7	-	250	520	864	1211	1551	-

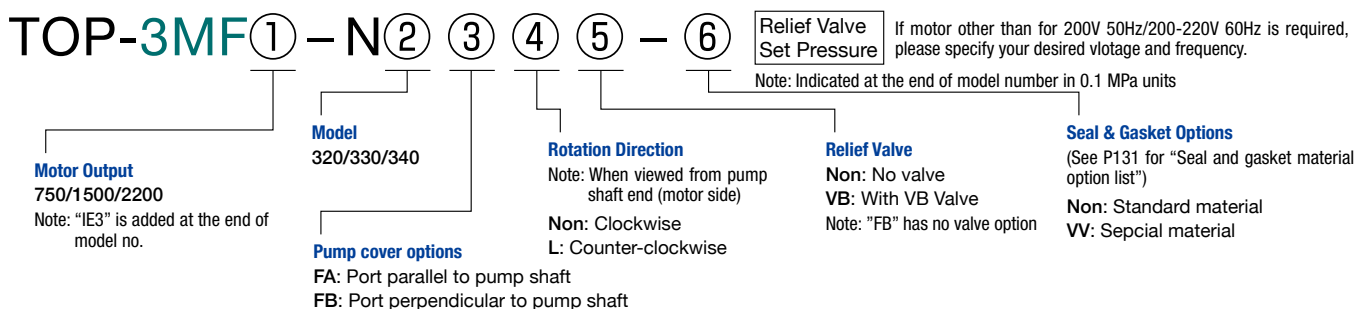
Any disassembly or alteration of the product will void the warranty.

# 3MF

(WITH INTEGRATED 3-PHASE MOTOR)



## Model Numbering System



## 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 <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>			
		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	39.0	0.4	1.3	2.1	46.8	0.2	1.0	1.7
	FA VB								
	FB								
TOP-N330	FA	58.5	0.1	0.8	1.3	70.2	—	0.6	1.0
	FA VB								
	FB								
TOP-N340	FA	78.0	—	0.5	0.9	93.6*	—	0.3	0.6
	FA VB								
	FB								

- 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.

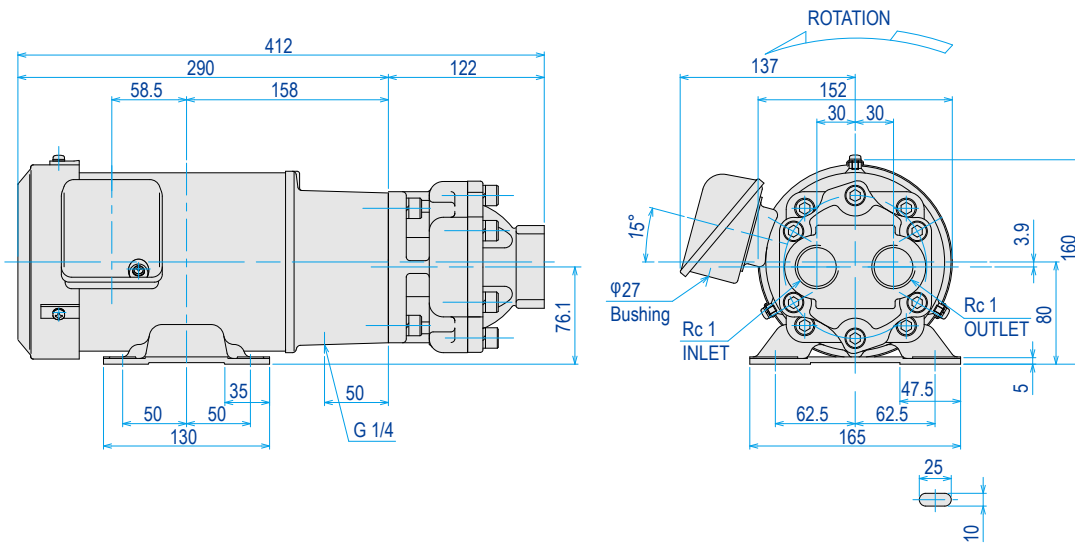
## Motor Specifications •3-phase squirrel-cage induction motor •Totally enclosed •Class F insulation •Protection level IP44

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

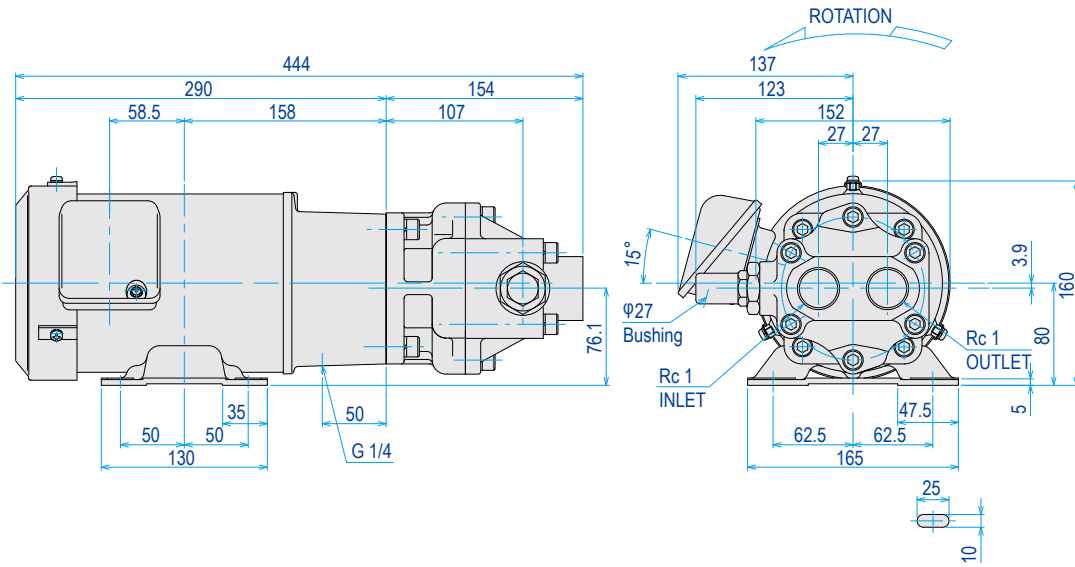
- Please consult us when ordering outdoor-type, increased safety-type, special voltage type or one with CE marking, terminal box attached on the other side, or other special motors.
- This series complies with requirements of IE3, CE marking and class F insulation. Note: Please consult us if motor other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

■ Dimensions (Typical) for 3MF

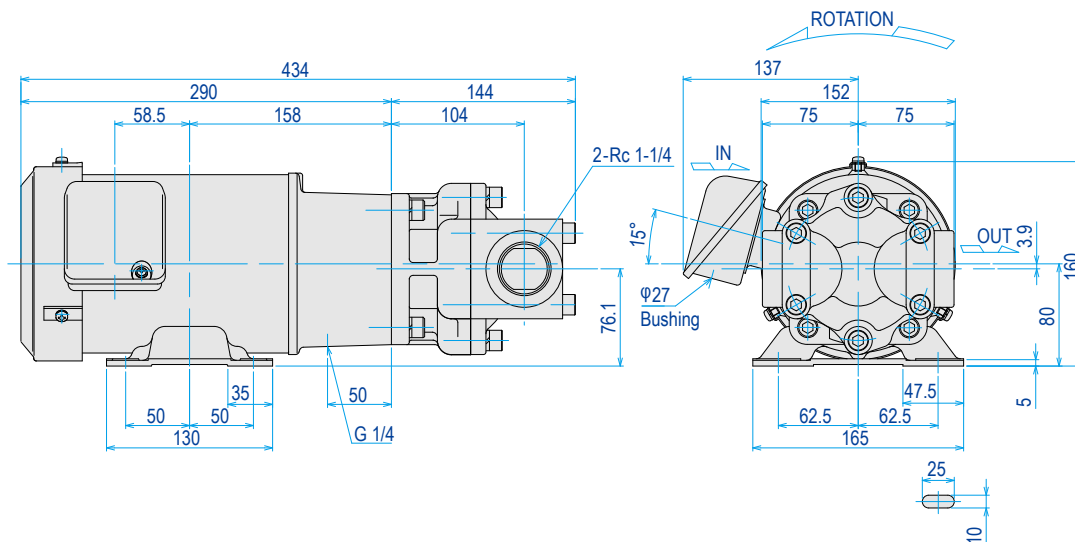
Model : TOP-3MF750-N3\*\*FA-\*\* IE3



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



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

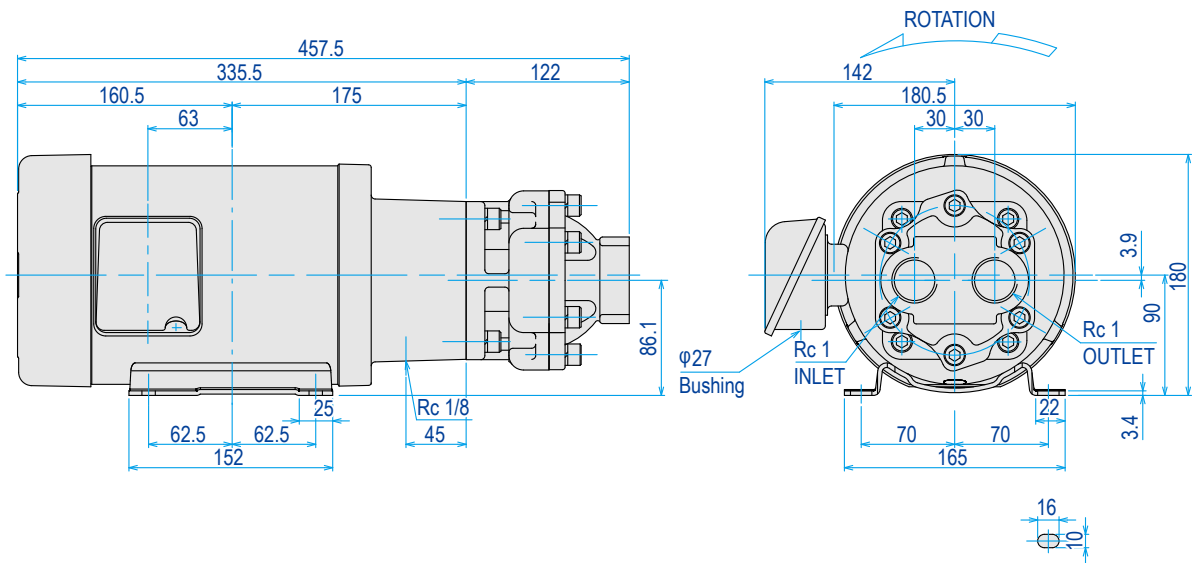


Any disassembly or alteration of the product will void the warranty.

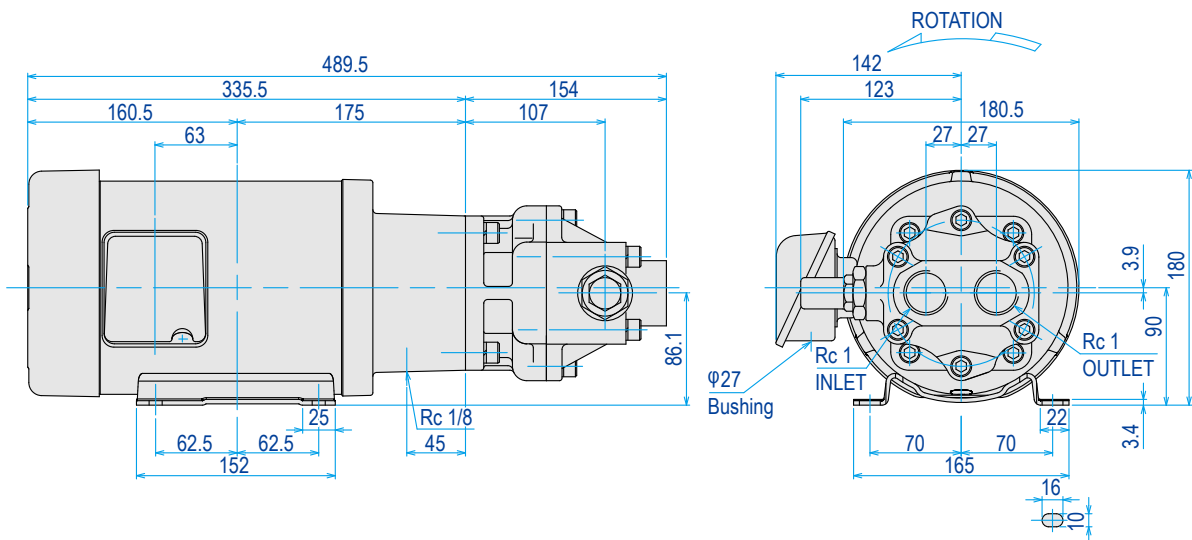


■ Dimensions (Typical) for 3MF

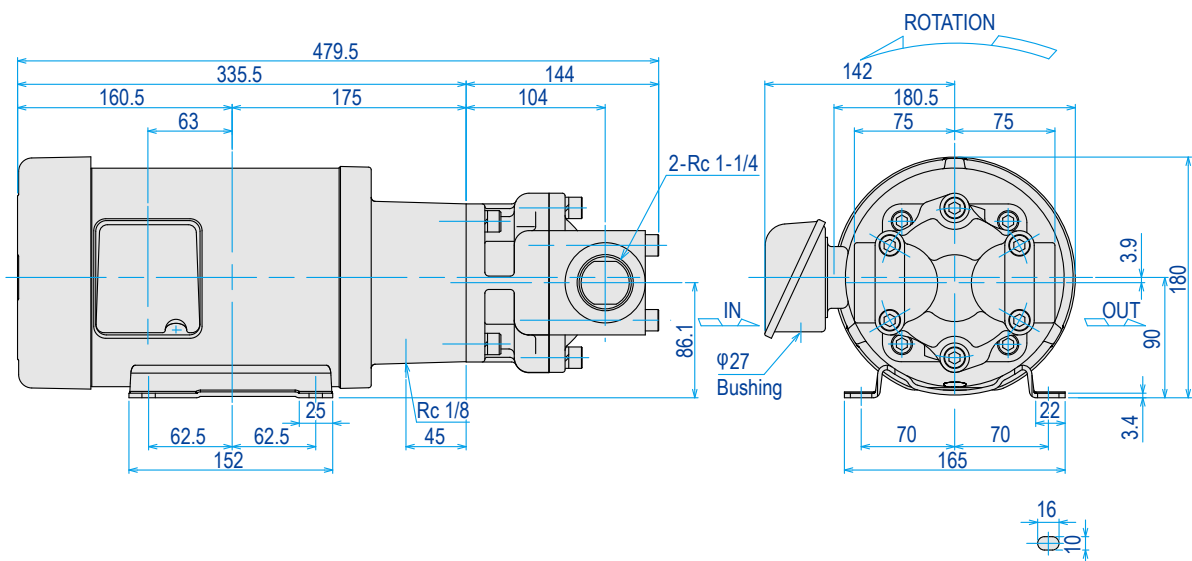
Model : TOP-3MF1500-N3\*\*FA\*\* IE3



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

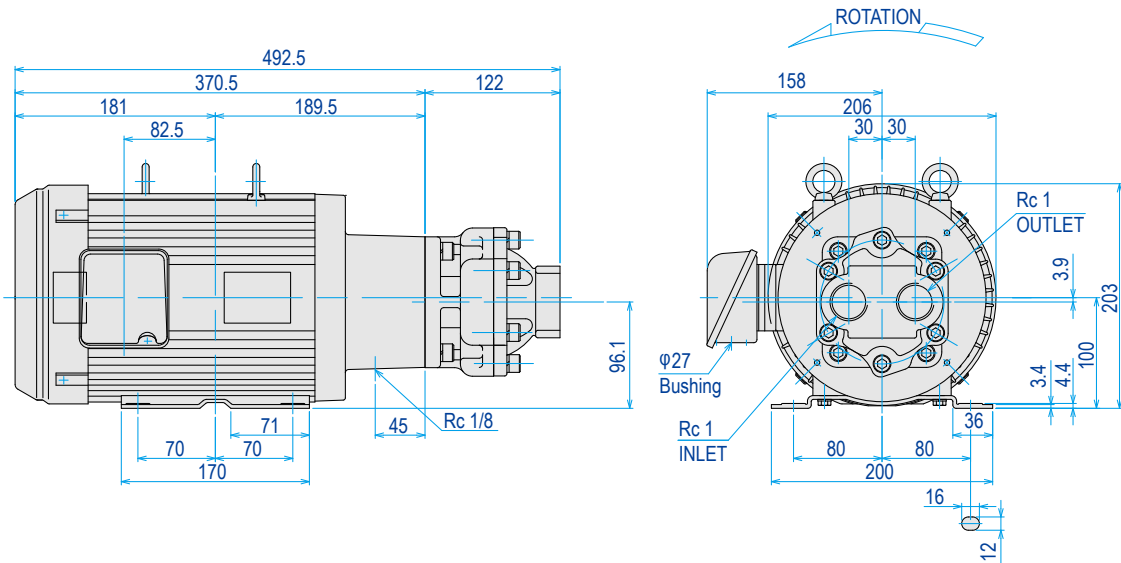


Model : TOP-3MF1500-N3\*\*FB\*\* IE3

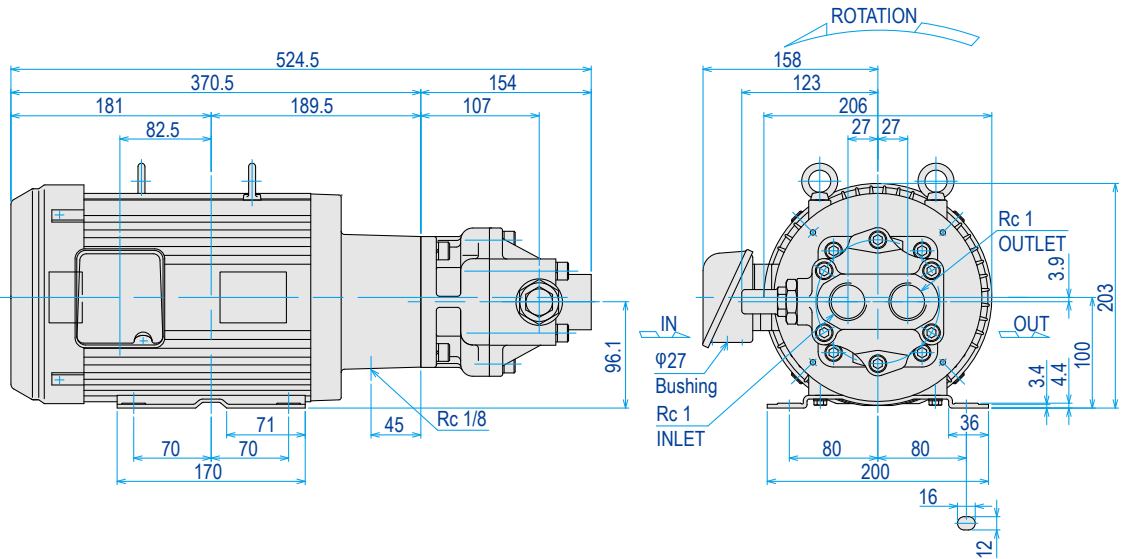


■ Dimensions (Typical) for 3MF

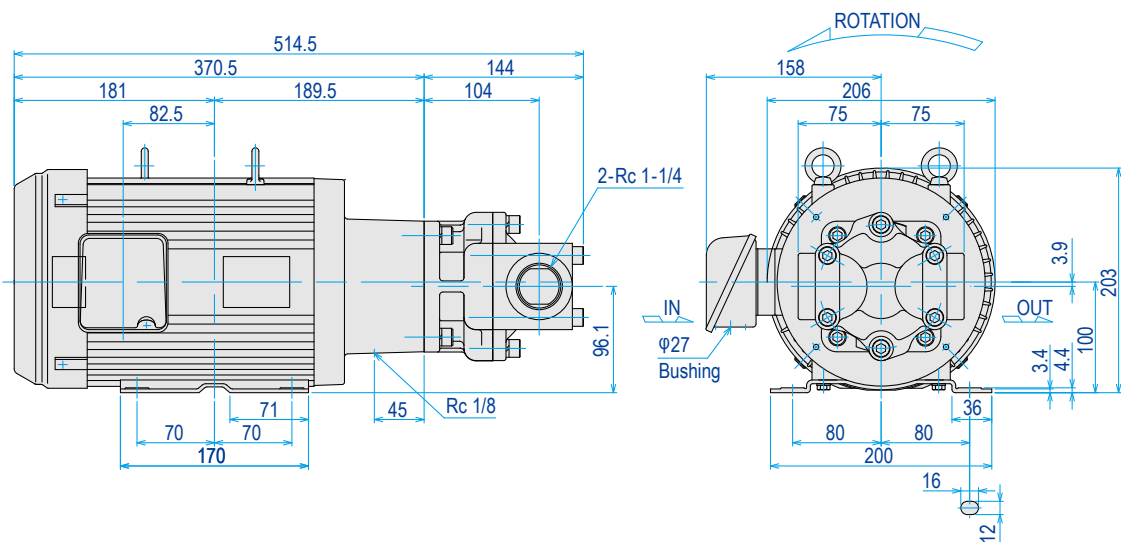
Model : TOP-3MF2200-N3\*\*FA\*\* IE3



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



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

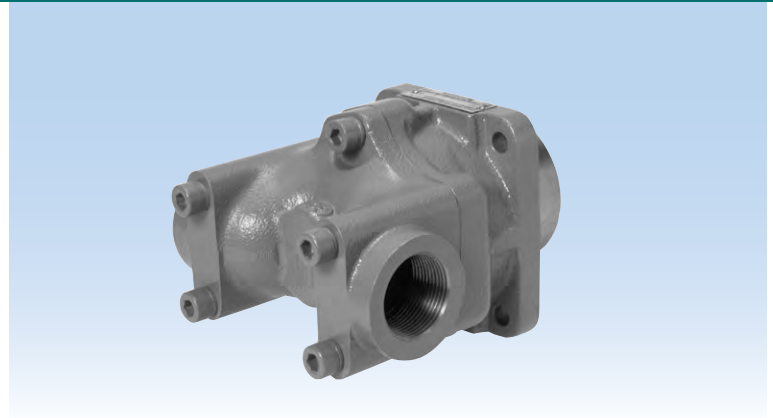


Any disassembly or alteration of the product will void the warranty.

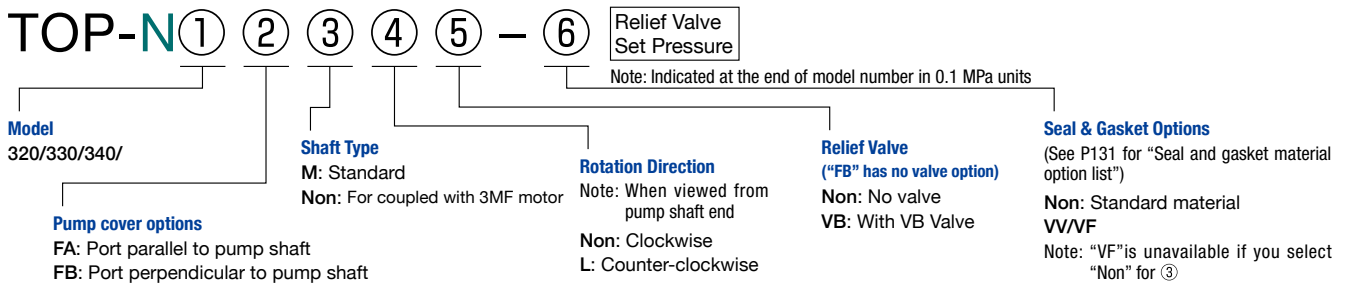
Small capacity  
Small to medium capacity  
Medium capacity  
Large capacity  
Others

## N3F

(PUMPHEAD)



### Model Numbering System



### Specifications

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

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>			
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.

Small capacity

Small to medium capacity

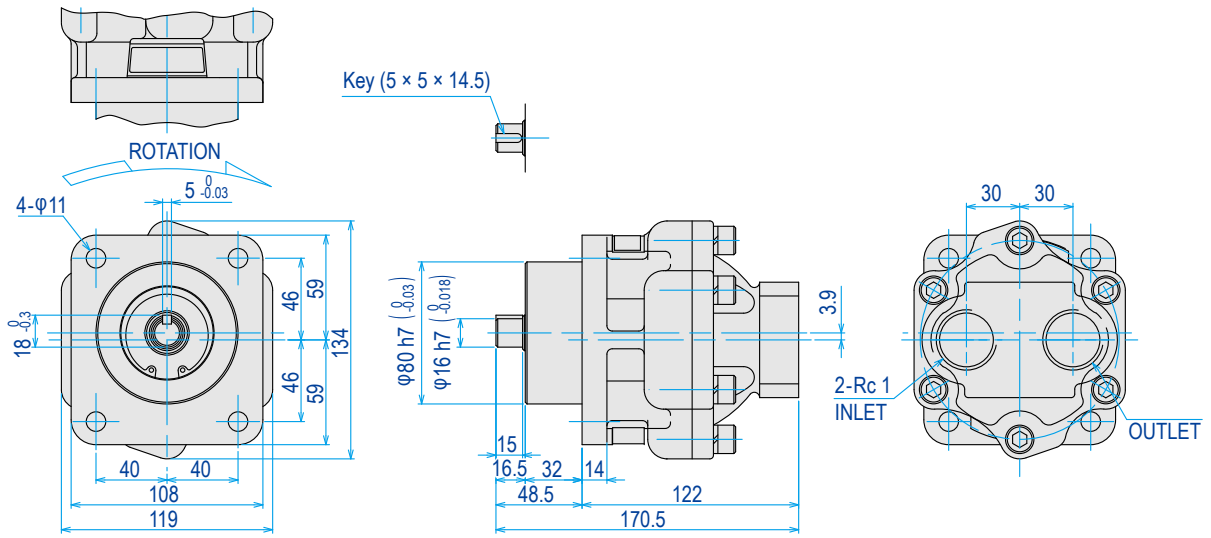
Medium capacity

Large capacity

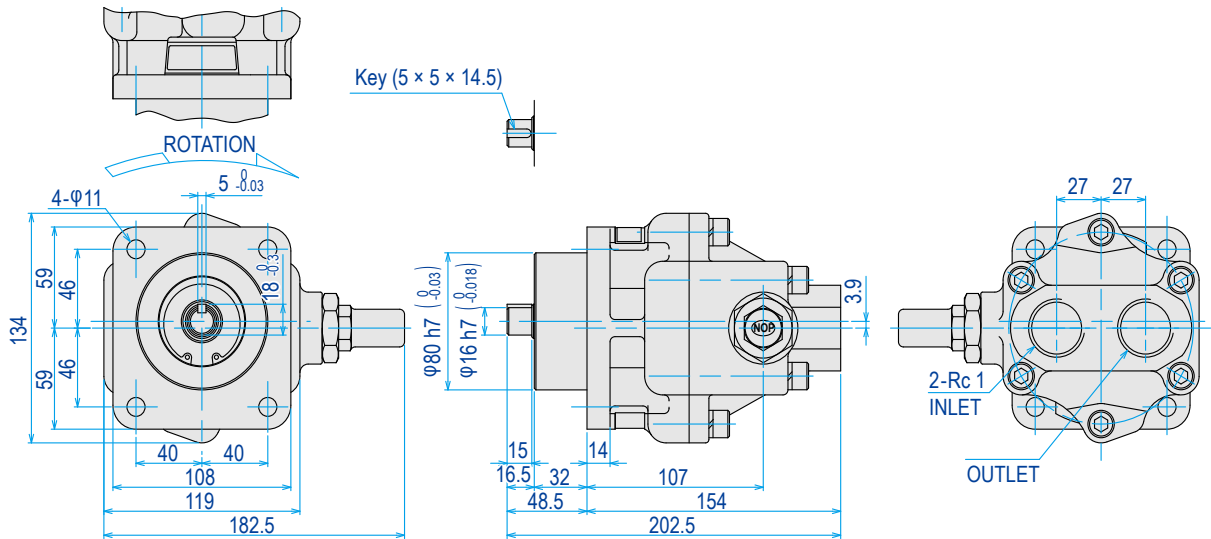
Others

■ Dimensions (Typical) for N3F

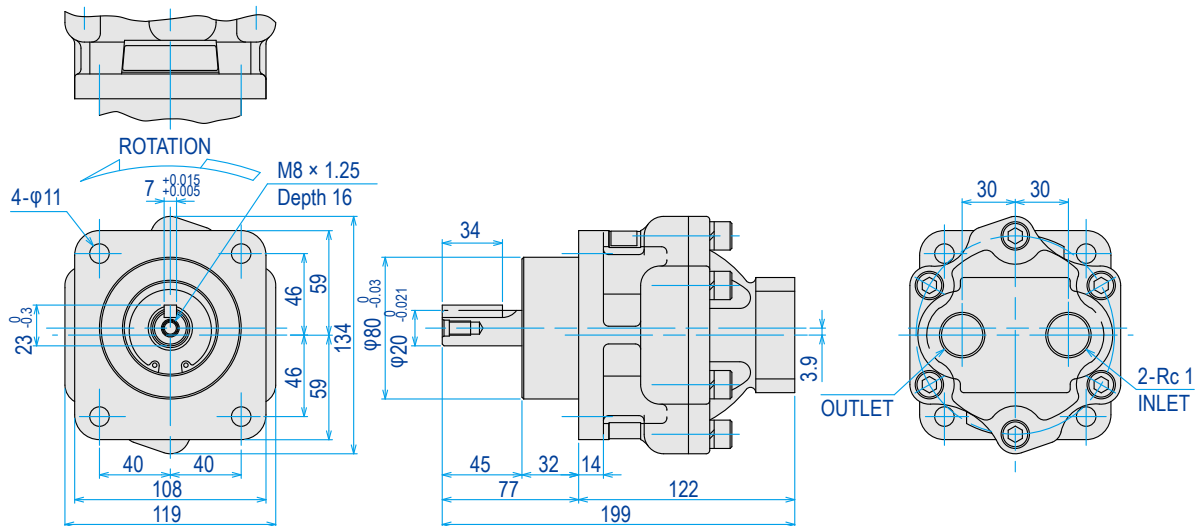
Model : TOP-N3\*\*FA-\*\*



Model : TOP-N3\*\*FAVB-\*



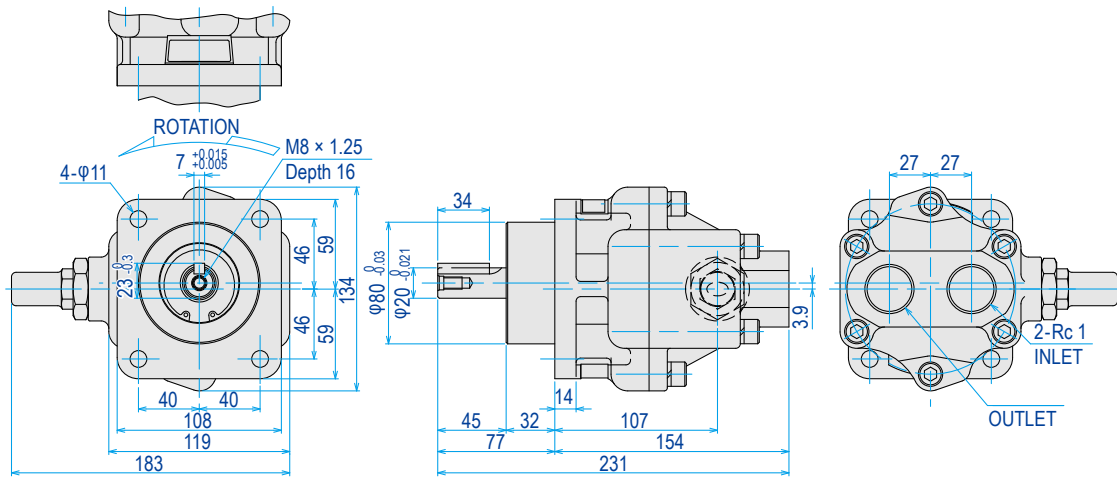
Model : TOP-N3\*\*FAML-\*



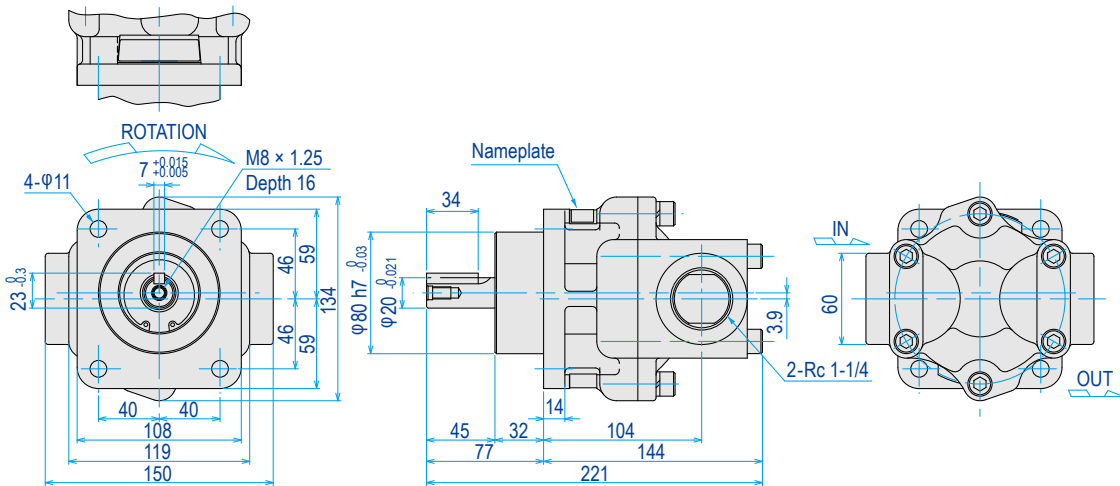
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for N3F

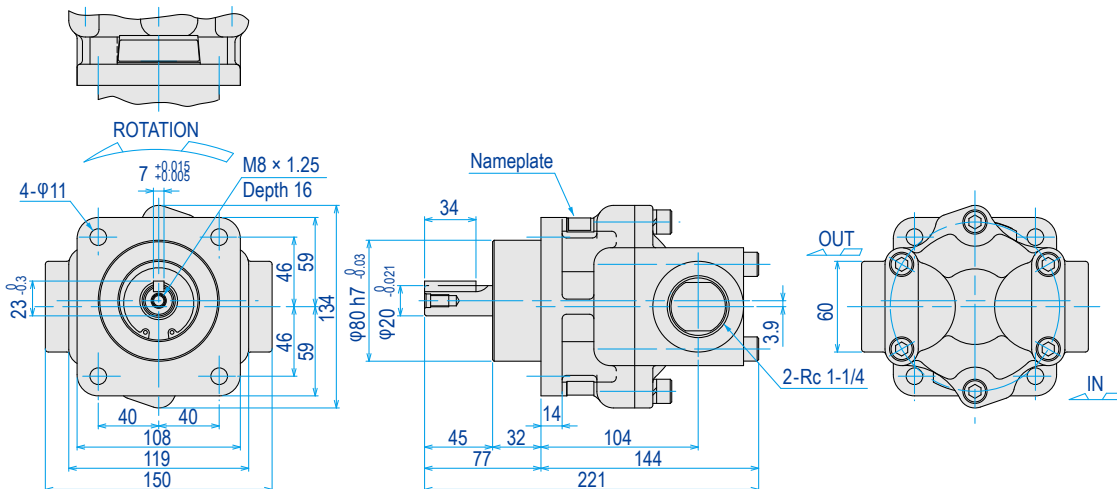
Model : TOP-N3\*\*FAMLVB-\*\*



Model : TOP-N3\*\*FBM-\*\*



Model : TOP-N3\*\*FBML-\*\*

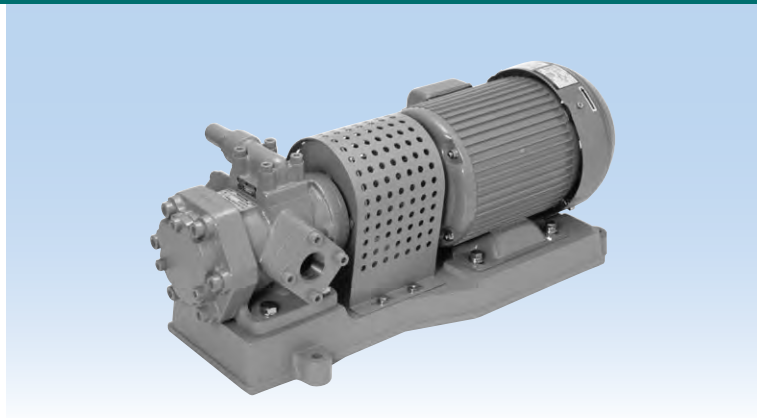


# 3MB-N3H

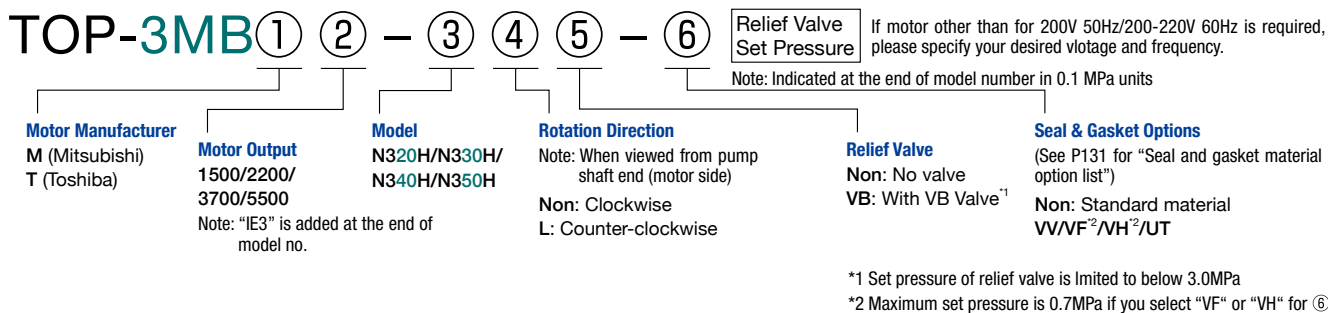
(BASE-COUPLING MOUNT TYPE)

# N3H

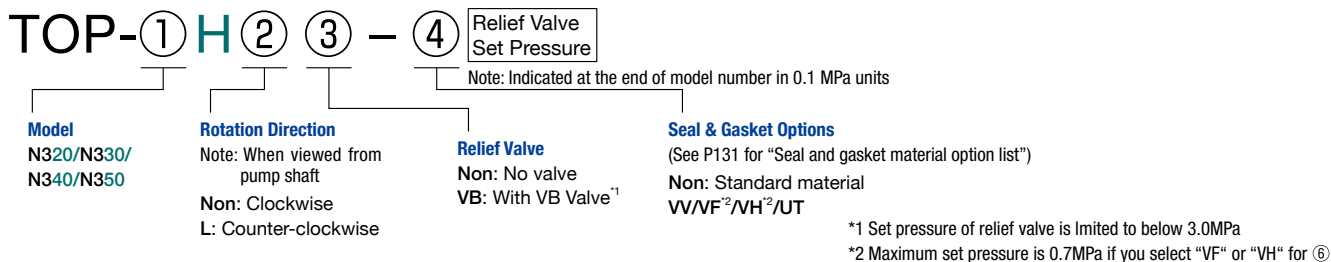
(PUMPHEAD)



## Model Numbering System (For General Lubricant Oil)



## Model Numbering System (Pumphead)



## Specifications

Note: The value<sup>\*\*</sup> can not always be achieved as it is subject to individual operating conditions and specifications.

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>			
<b>TOP-N320H</b>		26.0	39.0	46.8	4.0	1800	14.8 (15.4)
<b>TOP-N330H</b>		39.0	58.5	70.2	4.0*	1800	14.9 (15.5)
<b>TOP-N340H</b>		52.0	78.0	93.6	3.0*	1800	14.9 (15.5)
<b>TOP-N350H</b>		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<sup>\*\*</sup> can not always be achieved as it is subject to individual operating conditions and specifications.

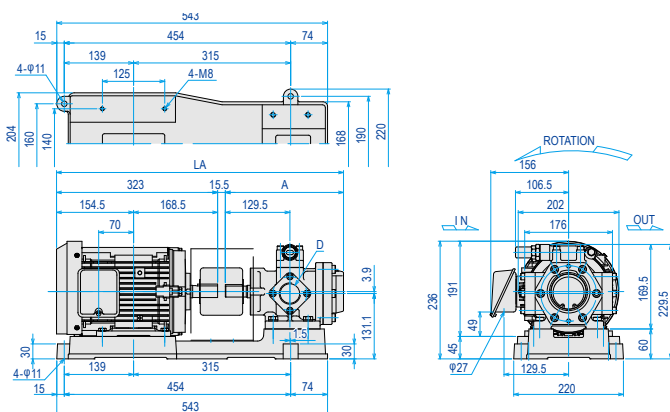
Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>					
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			1500W	2200W	3700W	5500W		1500W	2200W	3700W	5500W
<b>TOP-N320H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

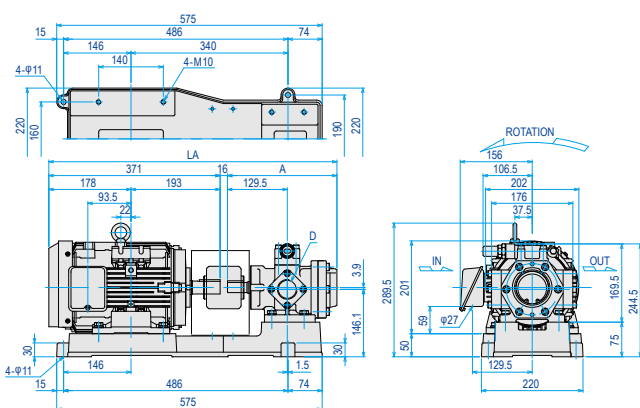
■ Dimensions (Typical) for 3MB-N3H

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



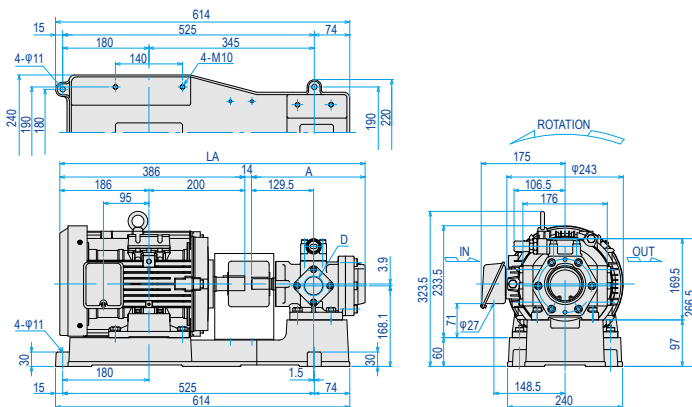
Item Model	LA	A	D	
			INLET	OUTLET
320	575.5	237	Rc 1	Rc 1
330	575.5	237	Rc 1 1/4	
340	575.5	237		
350	585.5	247		

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



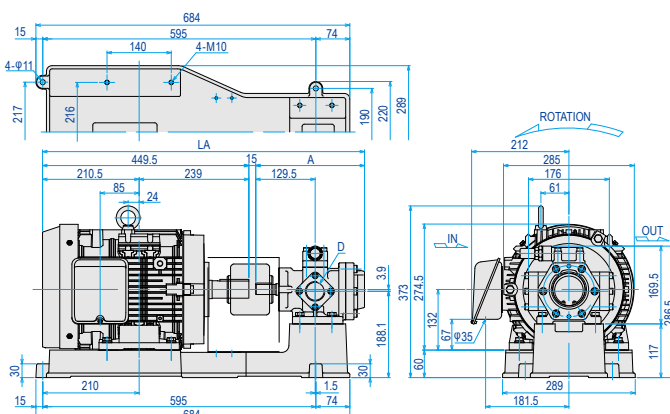
Item Model	LA	A	D	
			INLET	OUTLET
320	624	237	Rc 1	Rc 1
330	624	237	Rc 1 1/4	
340	624	237		
350	634	247		

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

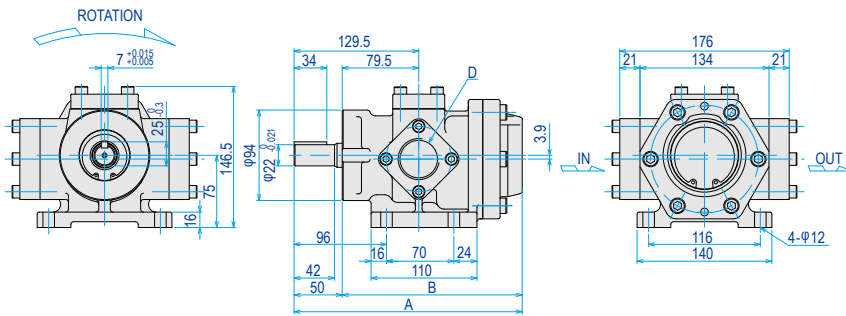


Item Model	LA	A	D	
			INLET	OUTLET
320	701.5	237	Rc 1	Rc 1
330	701.5	237	Rc 1 1/4	
340	701.5	237		
350	711.5	247		



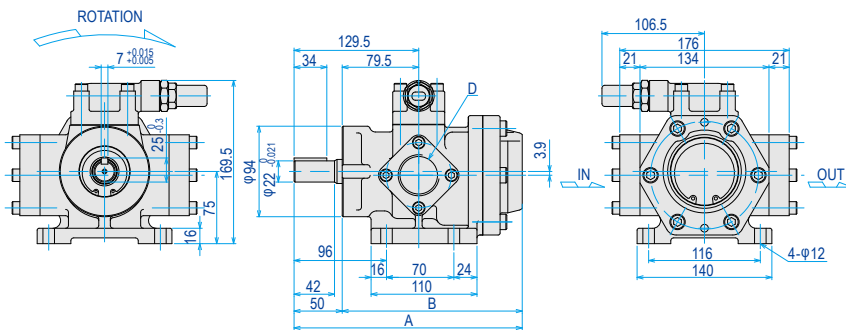
■ Dimensions (Typical) for N3H

Model : TOP-N3\*\*H-\*\*



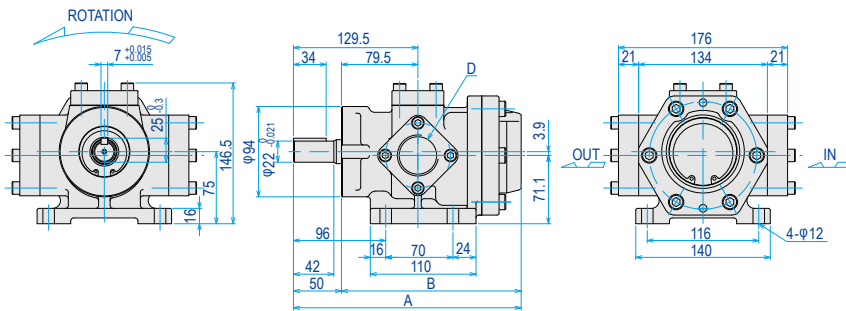
Model	Item	A	B	D	
				INLET	OUTLET
320		237	187	Rc 1	Rc 1
330		237	187	Rc 1 1/4	
340		237	187		
350		247	197		

Model : TOP-N3\*\*HVB-\*\*



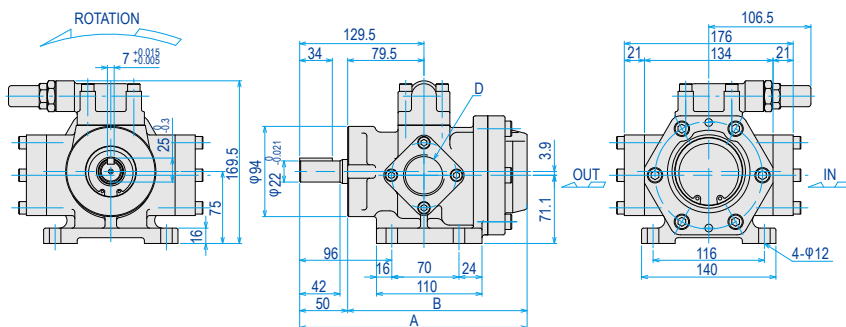
Model	Item	A	B	D	
				INLET	OUTLET
320		237	187	Rc 1	Rc 1
330		237	187	Rc 1 1/4	
340		237	187		
350		247	197		

Model : TOP-N3\*\*HL-\*\*



Model	Item	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-\*\*



Model	Item	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.

Small capacity  
Small to medium capacity  
Medium capacity  
Large capacity  
Others

## 3MB-3V

(BASE-COUPLING MOUNT TYPE)

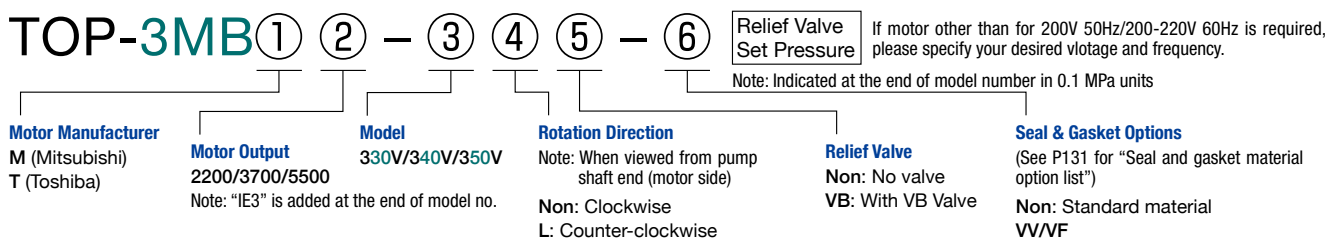
## 3V

(PUMPHEAD)

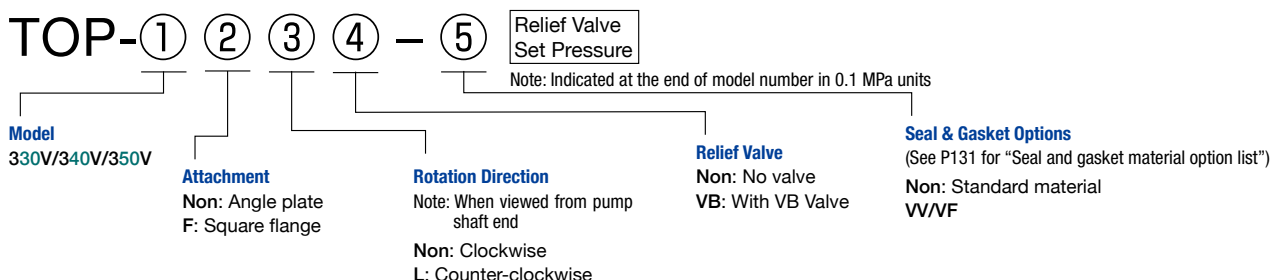
For Transferring  
High Viscosity Oil



### Model Numbering System (For General Lubricant Oil)



### Model Numbering System (Pumphead)



Note: For transferring oil with high viscosity (46-2000mm<sup>2</sup>/sec), such as high viscosity lubricant oil or gear oil

### Specifications

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

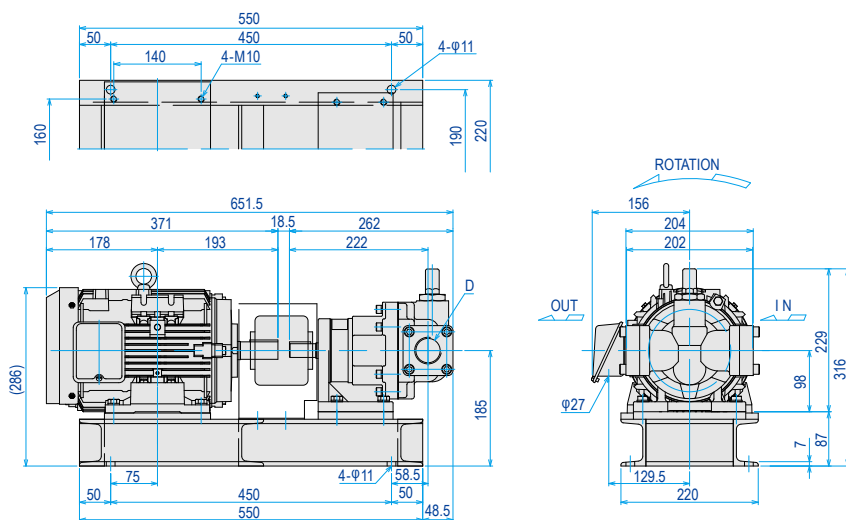
- Test oil: ISO-VG46/Oil temperature: 40C
- Values in ( ) show approx. weights of the pump when the valve is attached.

### Specifications

Model	Item	Motor speed 50Hz 1500min <sup>-1</sup>				Motor speed 60Hz 1800min <sup>-1</sup>			
		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
<b>TOP-330V</b>		58.5	1.0	1.0	1.0	70.2	0.7	1.0	1.0
<b>TOP-340V</b>		78.0	0.6	1.0	1.0	93.6	0.4	1.0	1.0
<b>TOP-350V</b>		97.5	0.4	1.0	1.0	117.0	0.2	0.7	1.0

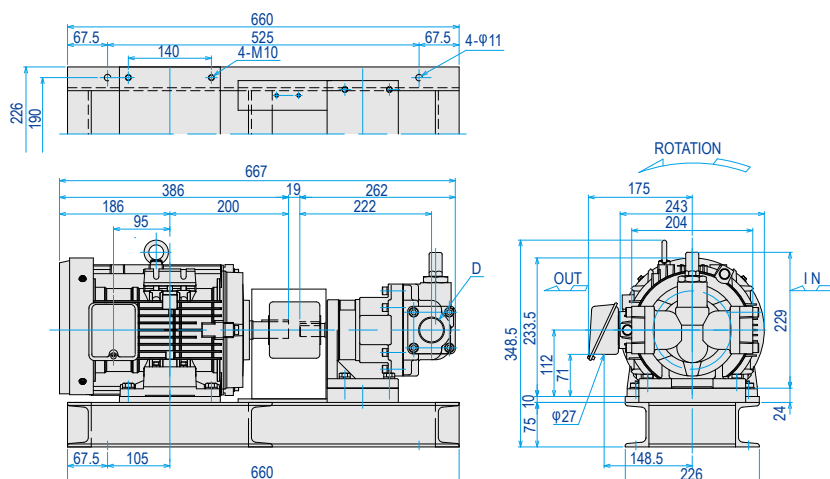
■ Dimensions (Typical) for 3MB-3V

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



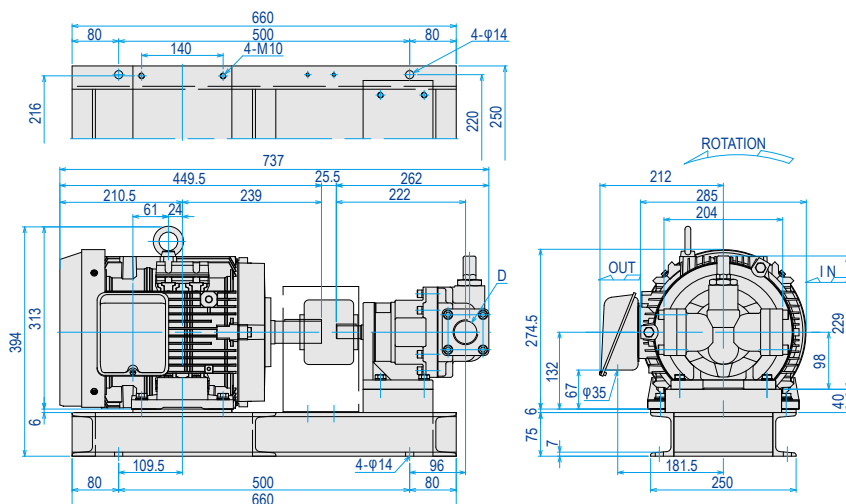
Model	Item	D	
		INLET	OUTLET
330		Rc 1 1/4	
340		Rc 1 1/2	Rc 1 1/4
350			

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



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

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

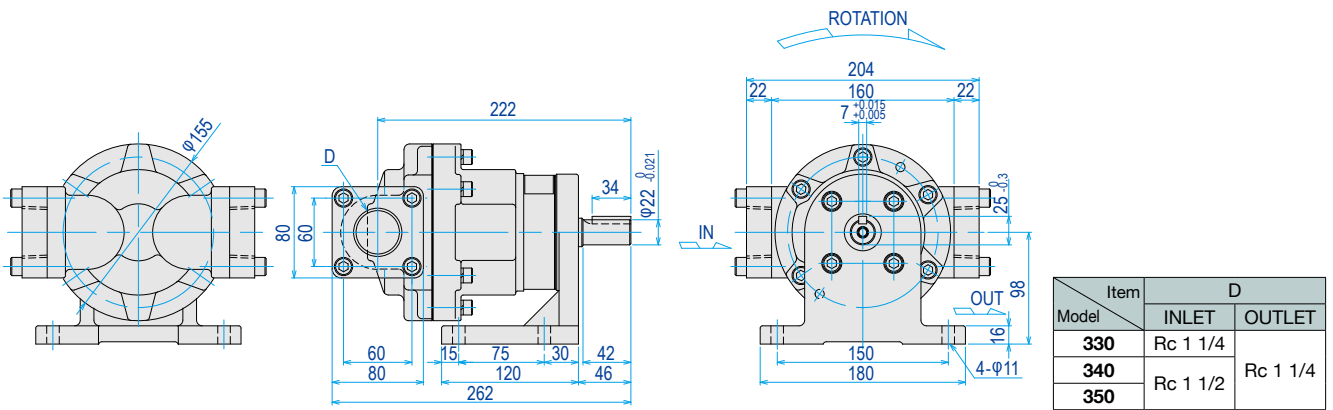


Model	Item	D	
		INLET	OUTLET
330		Rc 1 1/4	
340		Rc 1 1/2	Rc 1 1/4
350			

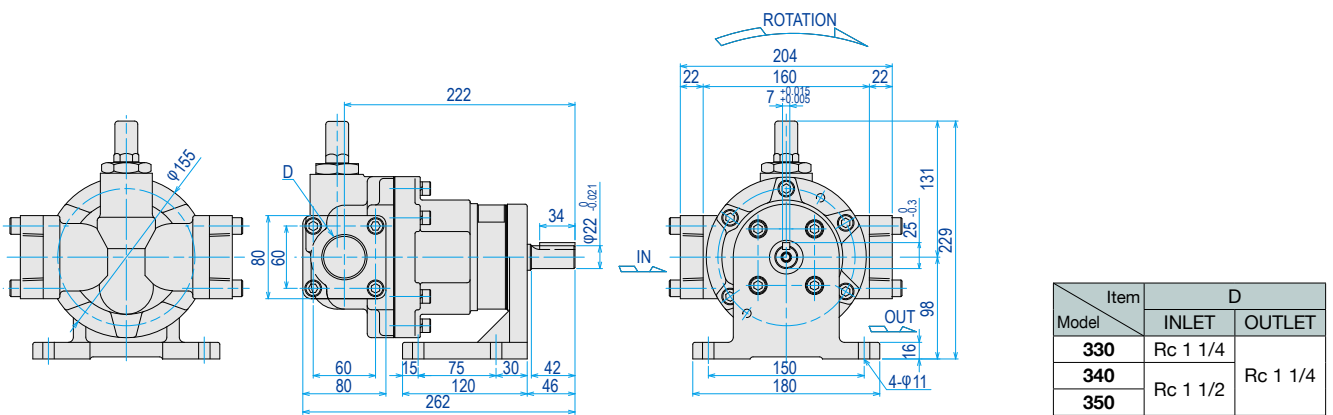
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 3V

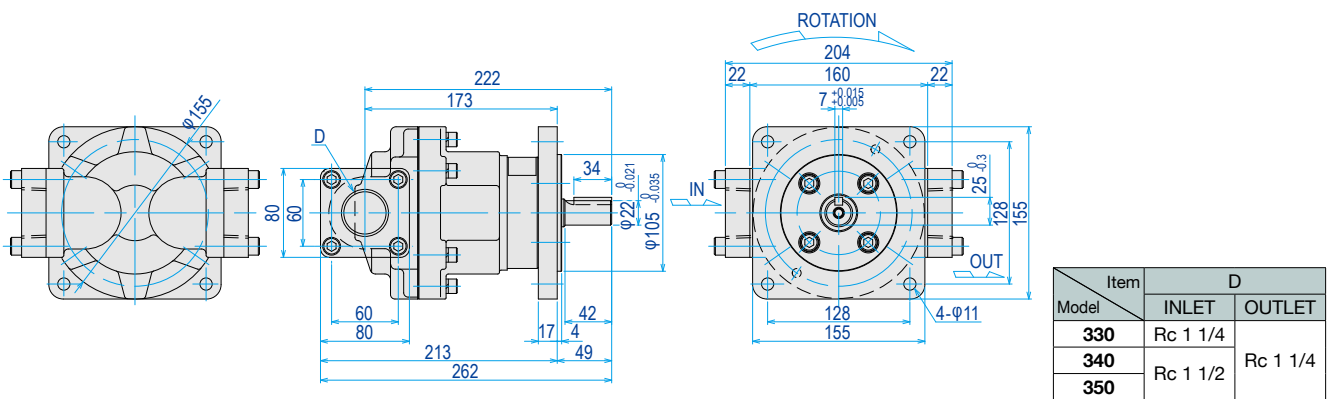
Model : TOP-3\*\*V-\*\*



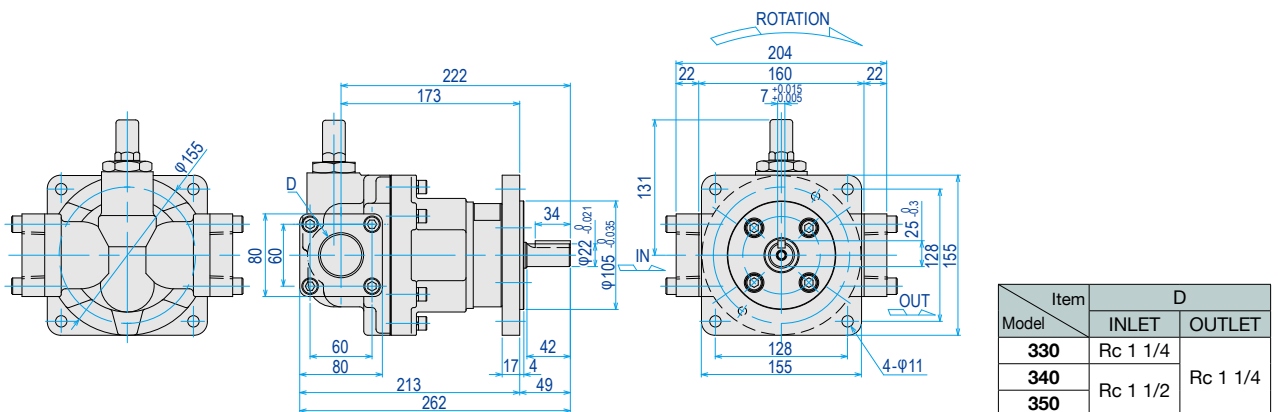
Model : TOP-3\*\*VVB-\*\*



Model : TOP-3\*\*VF-\*\*



Model : TOP-3\*\*VFVB-\*\*



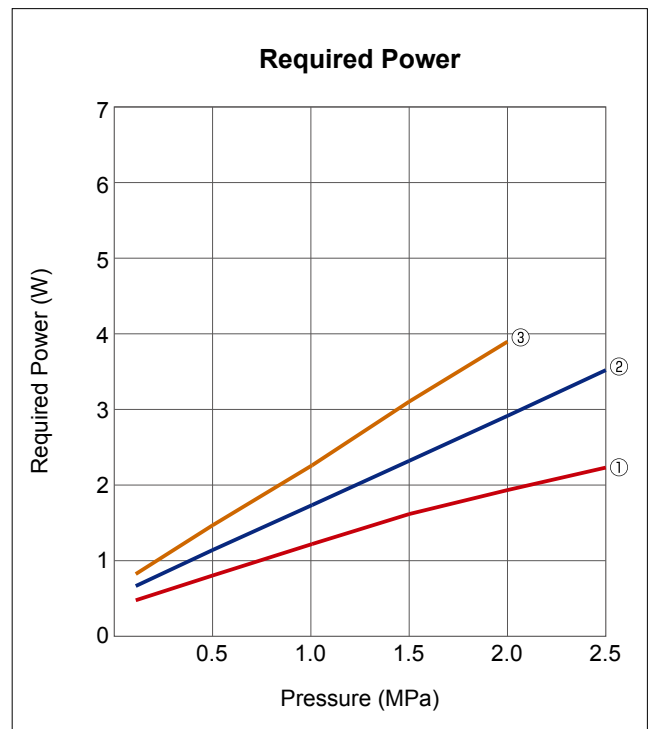
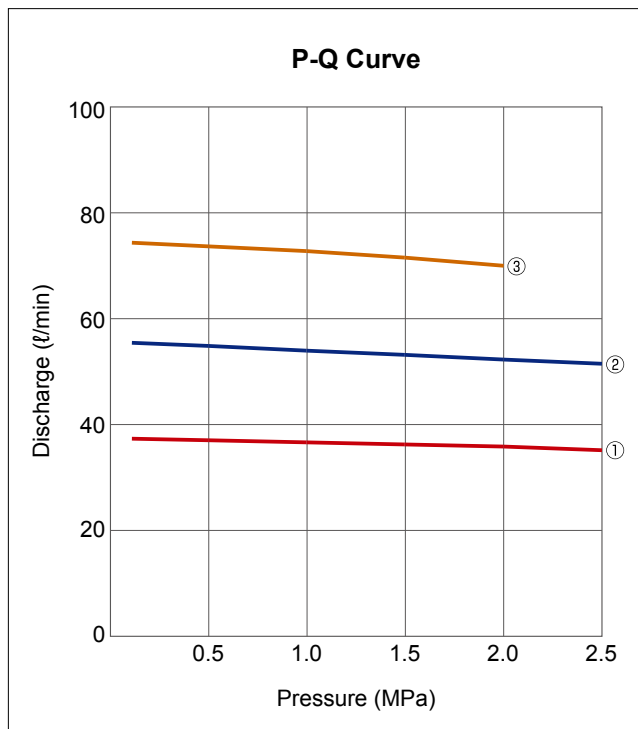
# N3F Performance Curve

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<sup>-1</sup>

① N320F    ② N330F    ③ N340F



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

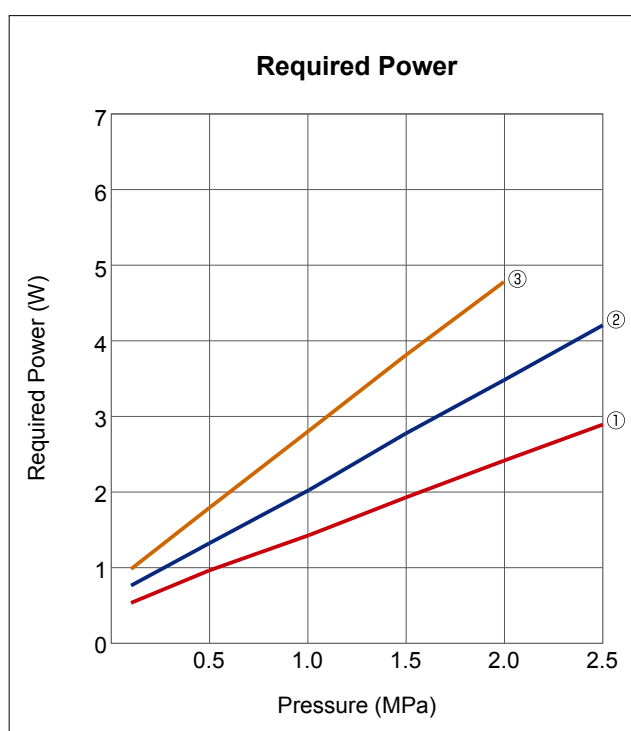
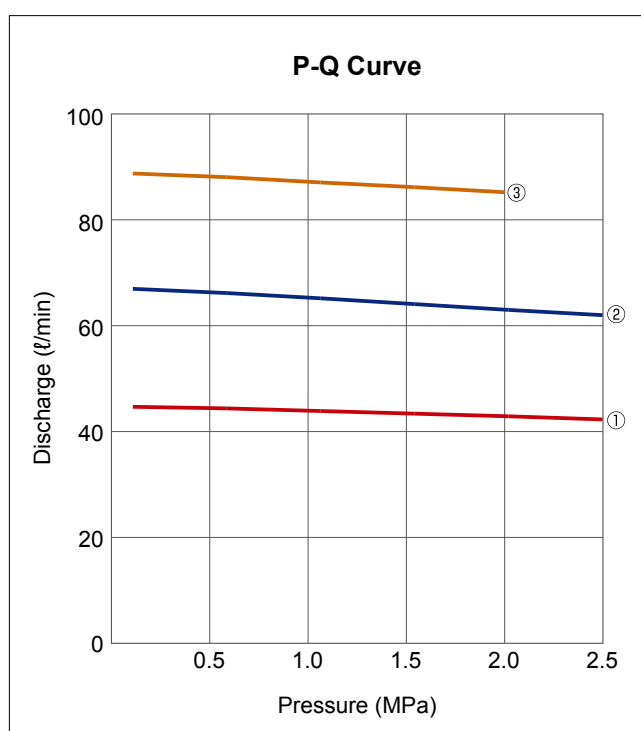
Any disassembly or alteration of the product will void the warranty.

**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<sup>-1</sup>

① N320F    ② N330F    ③ N340F



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

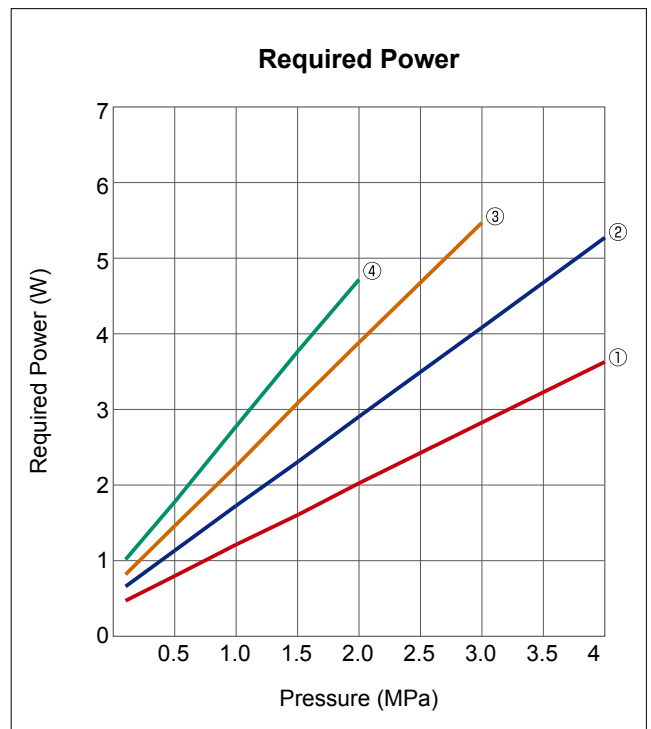
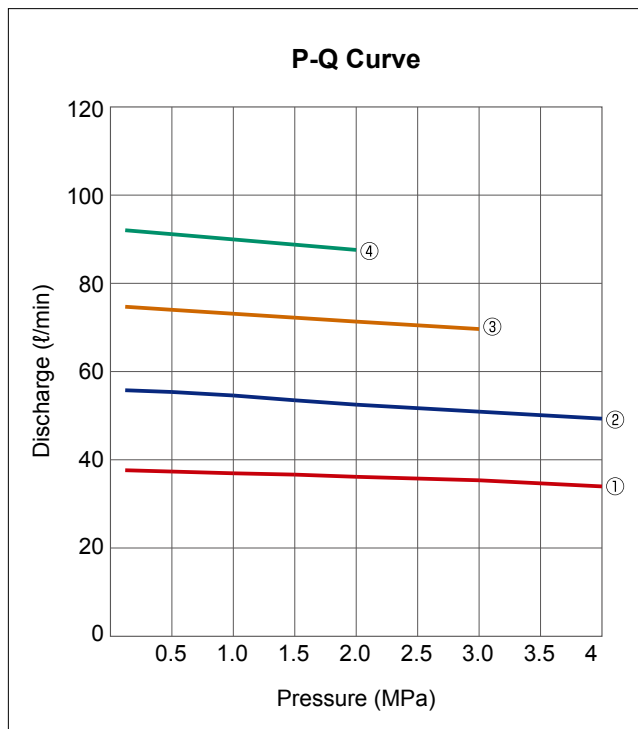
# N3H Performance Curve

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<sup>-1</sup>

① N320H    ② N330H    ③ N340H    ④ N350H



Model	Item	Discharge (ℓ/min)						Required Power (W)							
		Pressure (MPa)						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
<b>TOP-N320H</b>		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
<b>TOP-N330H</b>		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
<b>TOP-N340H</b>		74.6	73.9	73.0	72.1	71.2	69.5		0.80	1.45	2.25	3.10	3.90	5.50	
<b>TOP-N350H</b>		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.

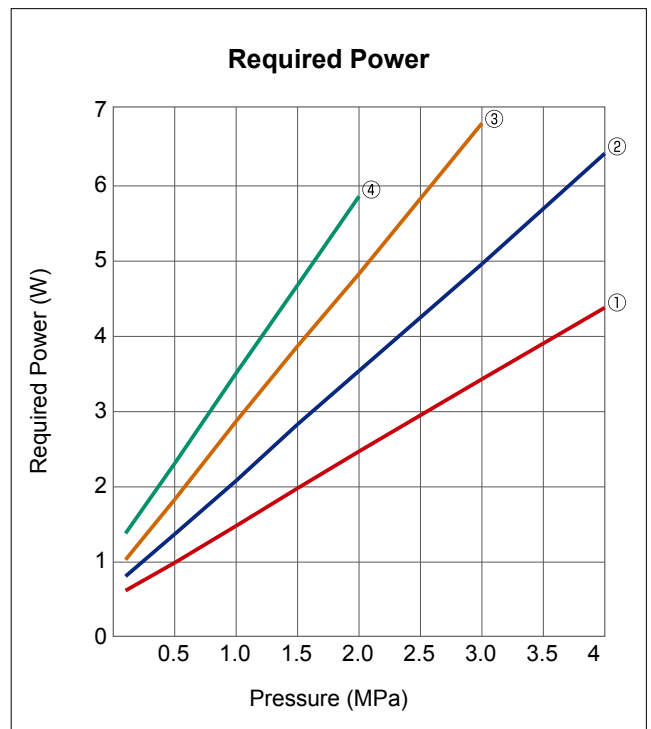
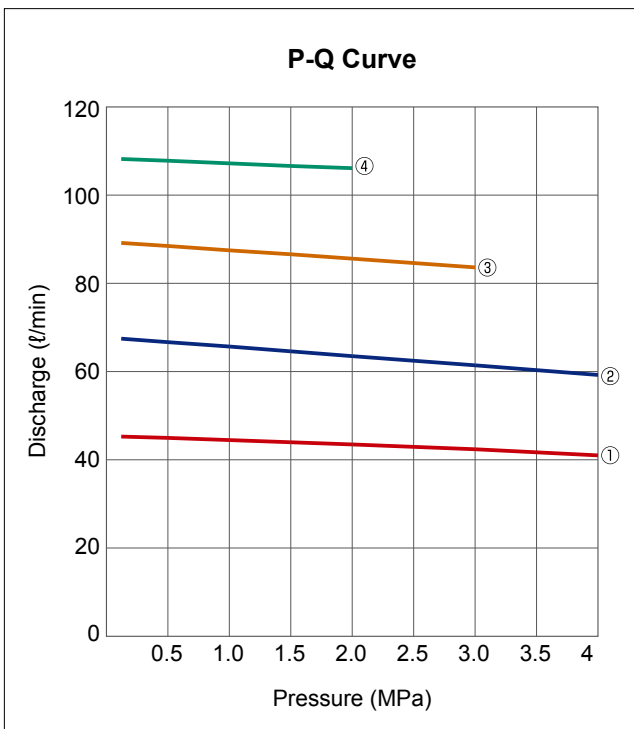


**Test Oil: ISO-VG46 Oil Temperature: 40C (Average)**

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<sup>-1</sup>

① N320H    ② N330H    ③ N340H    ④ N350H



Model \ Item	Discharge (l/min)							Required Power (W)						
	Pressure (MPa)							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
<b>TOP-N320H</b>	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
<b>TOP-N330H</b>	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
<b>TOP-N340H</b>	89.2	88.5	87.5	86.6	85.6	83.6		1.00	1.80	2.84	3.84	4.80	6.80	
<b>TOP-N350H</b>	108.4	108.0	107.4	106.8	106.3			1.35	2.28	3.48	4.65	5.83		

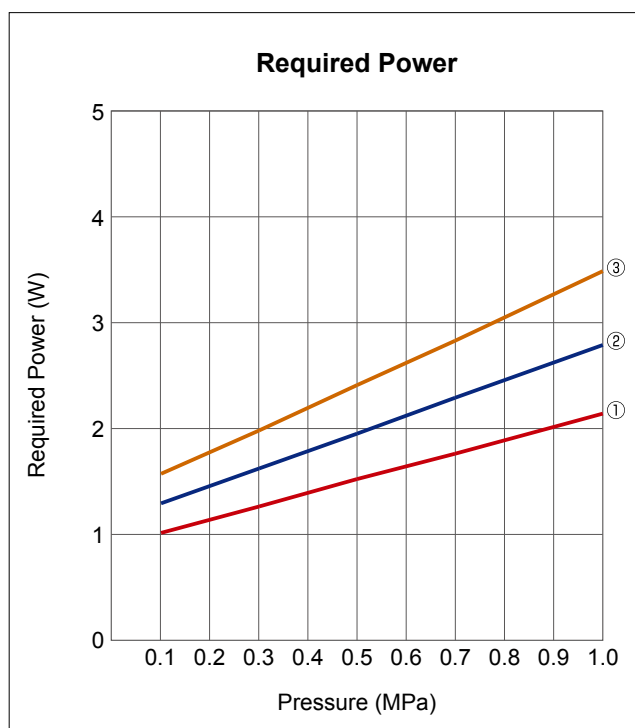
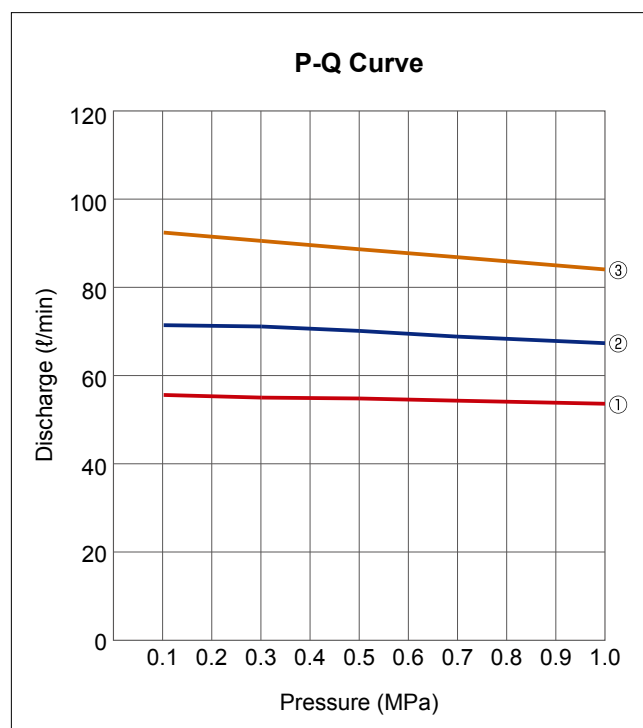
# 3V Performance Curve

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<sup>-1</sup>

① 330V    ② 340V    ③ 350V



Item	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
<b>TOP-330V</b>	56.2	55.6	55.4	54.9	54.2	1.01	1.26	1.52	1.76	2.14
<b>TOP-340V</b>	72.1	71.8	70.8	69.5	68.0	1.29	1.62	1.95	2.29	2.79
<b>TOP-350V</b>	93.2	91.3	89.4	87.6	84.8	1.57	1.98	2.41	2.83	3.49

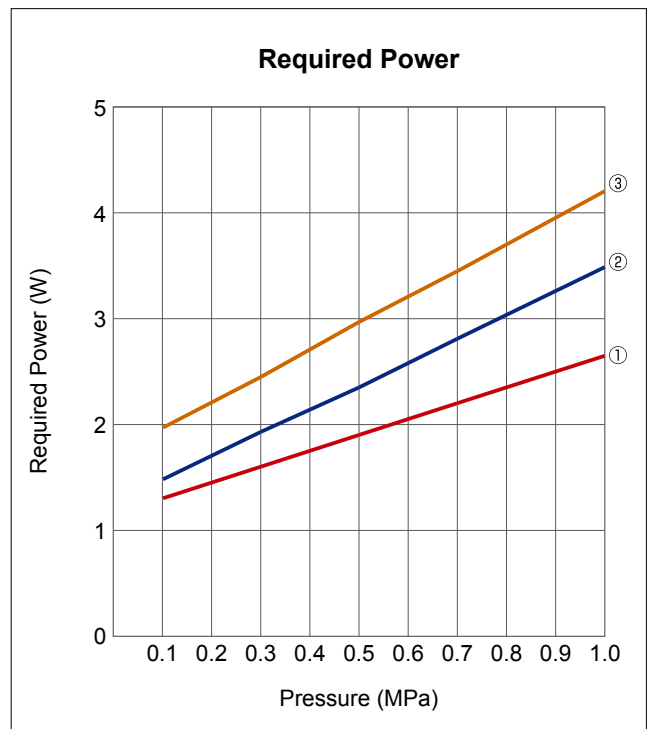
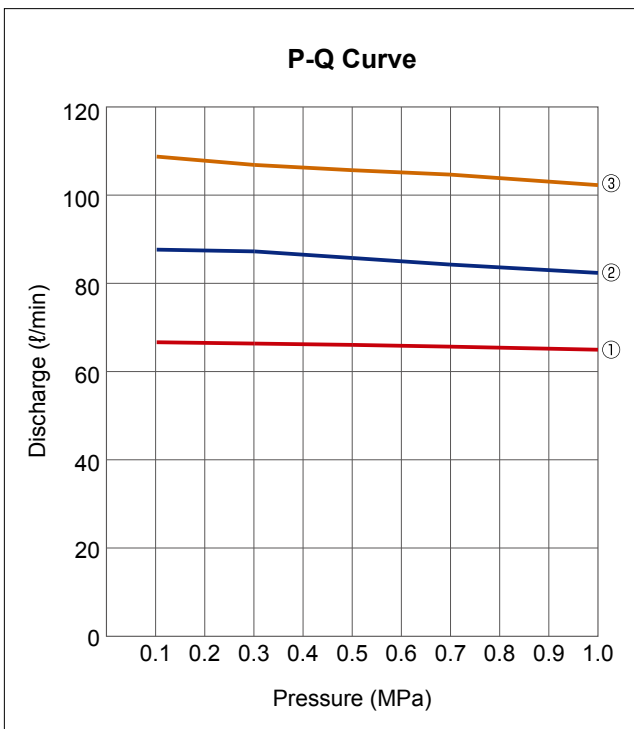
Any disassembly or alteration of the product will void the warranty.

**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<sup>-1</sup>

① 330V    ② 340V    ③ 350V



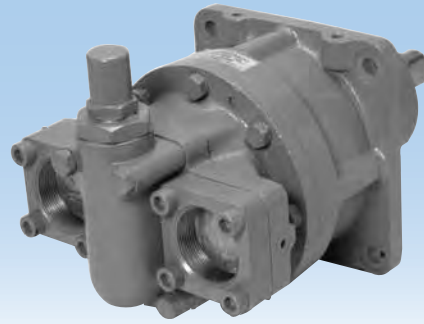
Item	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
<b>TOP-330V</b>	67.3	67.0	66.7	66.3	65.6	1.30	1.60	1.90	2.20	2.65
<b>TOP-340V</b>	88.4	88.0	86.5	85.0	83.1	1.48	1.93	2.35	2.81	3.49
<b>TOP-350V</b>	109.6	107.7	106.5	105.5	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-4MB** ① ② - 6 - ③ ④ VB - ⑤

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

<p><b>Motor Manufacturer</b> M (Mitsubishi) T (Toshiba)</p>	<p><b>Motor Output</b> 3700/ 5500/ 7500 Note: "IE3" is added at the end of model no.</p>	<p><b>Model</b> 4100AM/ 4130AM/ 4150AM/ 4200AM/ 4250AM</p>	<p><b>Rotation Direction</b> Note: When viewed from pump shaft end (motor side) <b>Non:</b> Clockwise <b>L:</b> Counter-clockwise</p>	<p><b>Seal &amp; Gasket Options</b> (See P131 for "Seal and gasket material option list") <b>Non:</b> Standard material (fluororubber) <b>VH:</b> Special material</p>
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## Model Numbering System (Pumphead)

**TOP-** ① ② ③ VB - ④

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

<p><b>Model</b> 4100AM/ 4130AM/ 4150AM/ 4200AM/ 4250AM</p>	<p><b>Attachment</b> <b>Non:</b> No angle plate <b>I:</b> Angle plate</p>	<p><b>Rotation Direction</b> Note: When viewed from pump shaft end <b>Non:</b> Clockwise (Standard) <b>L:</b> Counter-clockwise</p>	<p><b>Seal &amp; Gasket Options</b> (See P131 for "Seal and gasket material option list") <b>Non:</b> Standard material (fluororubber) <b>VH:</b> Special material</p>
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## Specifications

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
<b>TOP-4100AM</b>		115.5	2.0	1800	28.0
<b>TOP-4130AM</b>		148.5	2.0	1800	30.0
<b>TOP-4150AM</b>		171.6	2.0	1500	31.0
<b>TOP-4200AM</b>		231.0	2.0	1500	34.0
<b>TOP-4250AM</b>		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

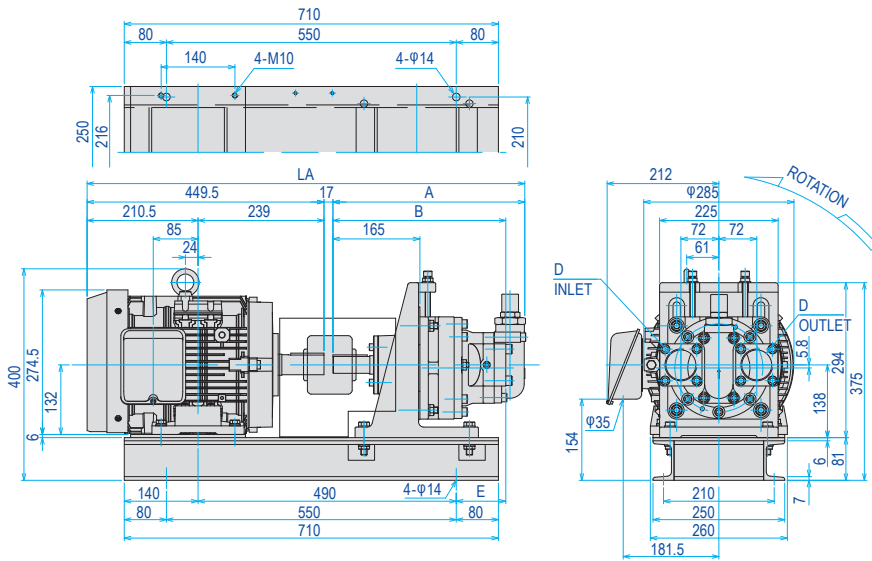
Model	Item	Motor speed 50Hz 1000min <sup>-1</sup>			Theoretical discharge (ℓ/min)	Motor speed 60Hz 1200min <sup>-1</sup>				
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			3700W	5500W			7500W	3700W	5500W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

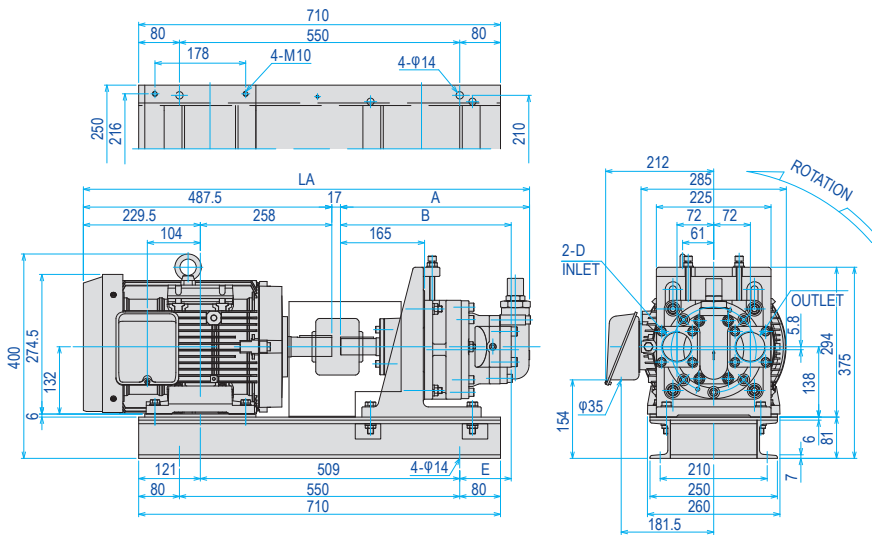
■ Dimensions (Typical) for 4MB-4AM

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



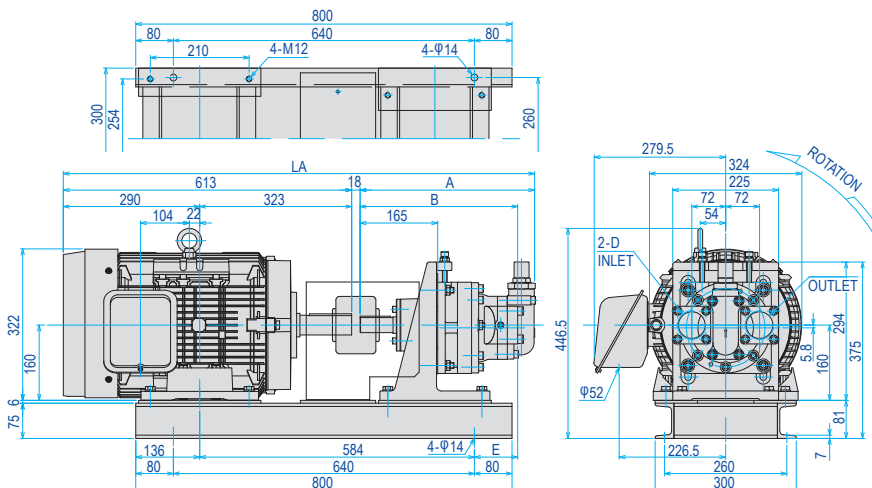
Item Model	LA	A	B	D	E
4100	820.5	354	318	Rc 1-1/2	84
4130	830.5	364	328	Rc 2	94
4150	837.5	371	335		101
4200	855.5	389	353		119

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



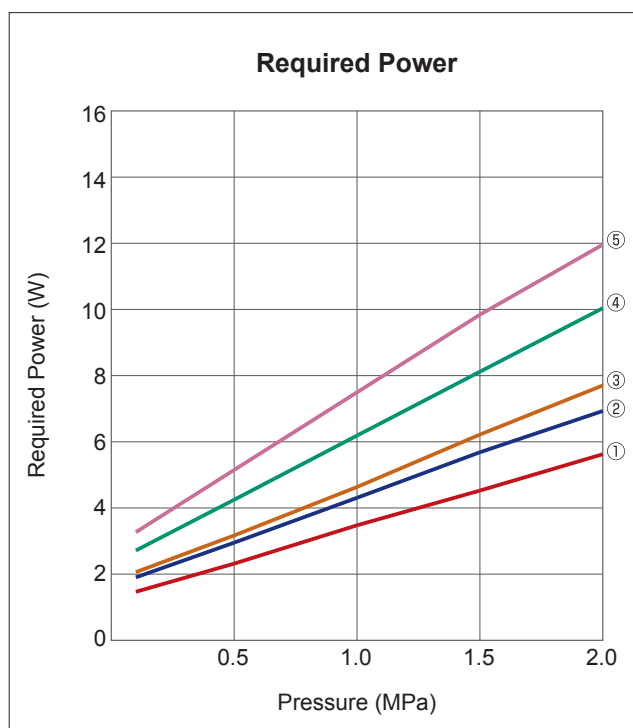
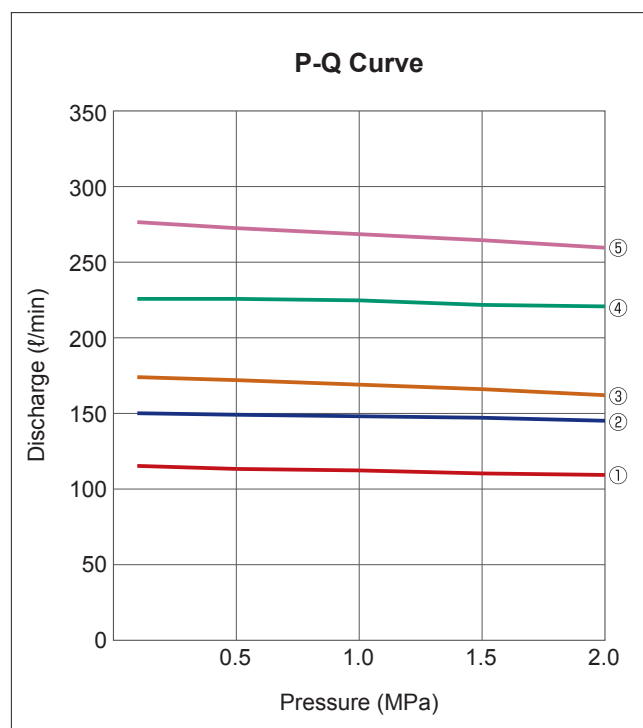
# 4AM Performance Curve

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<sup>-1</sup>

① 4100AM    ② 4130AM    ③ 4150AM    ④ 4200AM    ⑤ 4250AM



Model	Item	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
<b>TOP-4100AM</b>		115	113	112	110	109	1.40	2.26	3.43	4.49	5.60
<b>TOP-4130AM</b>		150	149	148	147	145	1.84	2.90	4.27	5.66	6.92
<b>TOP-4150AM</b>		174	172	169	166	162	2.00	3.12	4.60	6.20	7.70
<b>TOP-4200AM</b>		226	226	225	222	221	2.66	4.21	6.17	8.12	10.06
<b>TOP-4250AM</b>		277	273	269	265	260	3.22	5.12	7.49	9.86	12.00

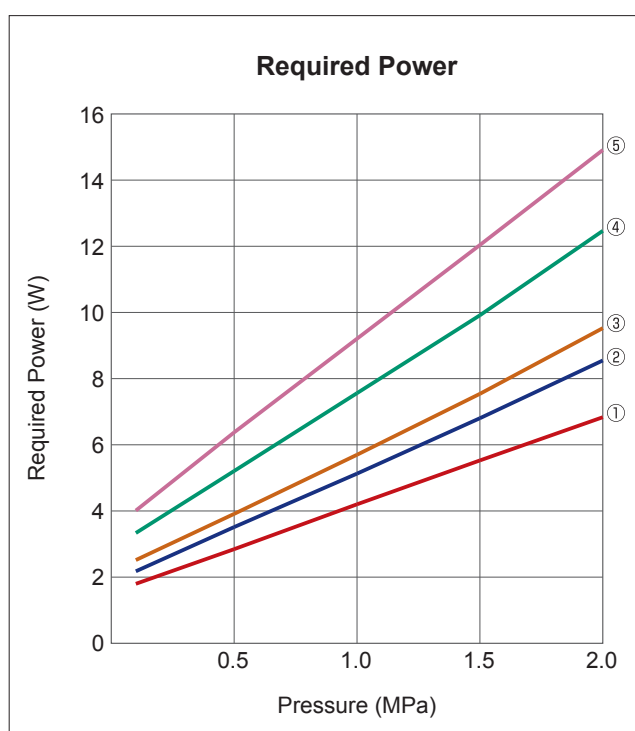
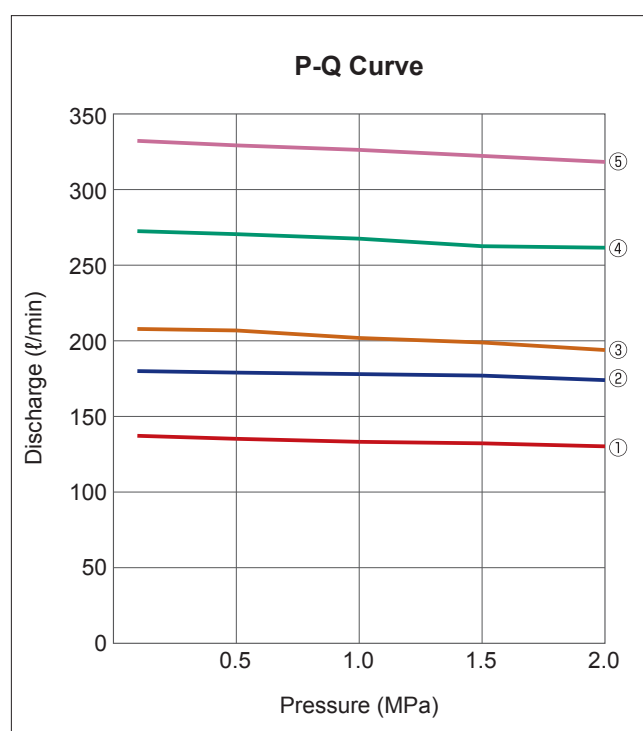


### Test Oil: ISO-VG46 Oil Temperature: 40C (Average)

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<sup>-1</sup>

① 4100AM    ② 4130AM    ③ 4150AM    ④ 4200AM    ⑤ 4250AM



Model	Item	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
<b>TOP-4100AM</b>		137	135	133	132	130	1.78	2.83	4.19	5.52	6.83
<b>TOP-4130AM</b>		180	179	178	177	174	2.16	3.50	5.12	6.80	8.55
<b>TOP-4150AM</b>		208	207	202	199	194	2.50	3.90	5.64	7.44	9.53
<b>TOP-4200AM</b>		273	271	268	263	262	3.32	5.20	7.56	9.92	12.48
<b>TOP-4250AM</b>		333	330	327	323	319	4.00	6.37	9.21	12.05	14.93

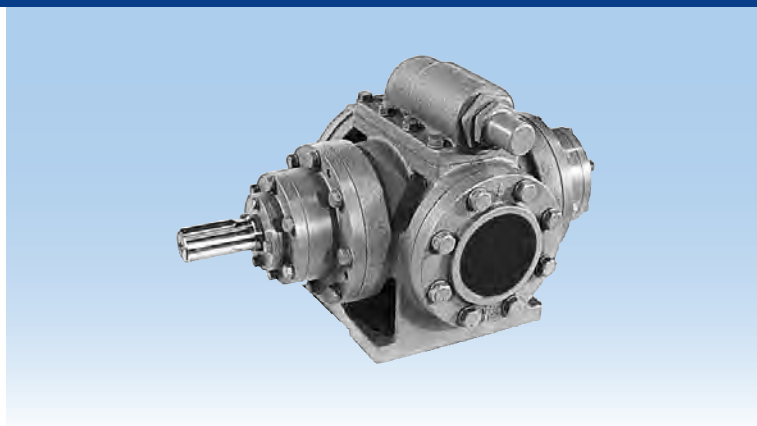
Any disassembly or alteration of the product will void the warranty.

## 4MB-4A

(BASE-COUPLING MOUNT TYPE)

## 4A

(PUMPHEAD)



### Model Numbering System (For General Lubricant Oil)

**TOP-4MB** ① ② - 6 - ③ ④ **VB** Relief Valve Set Pressure

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

<p><b>Motor Manufacturer</b> M (Mitsubishi) T (Toshiba)</p>	<p><b>Motor Output</b> 5500/7500/ 11000/15000 Note: "IE3" is added at the end of model no.</p>	<p><b>Model</b> 4300A/4500A</p>	<p><b>Rotation Direction</b> Note: When viewed from pump shaft end (motor side) Non: Clockwise L: Counter-clockwise</p>
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### Model Numbering System (Pumphead)

**TOP-** ① ② **VB** Relief Valve Set Pressure

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

<p><b>Model</b> 4300A/4500A</p>	<p><b>Rotation Direction</b> Note: When viewed from pump shaft end Non: Clockwise L: Counter-clockwise</p>
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### Specifications

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

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

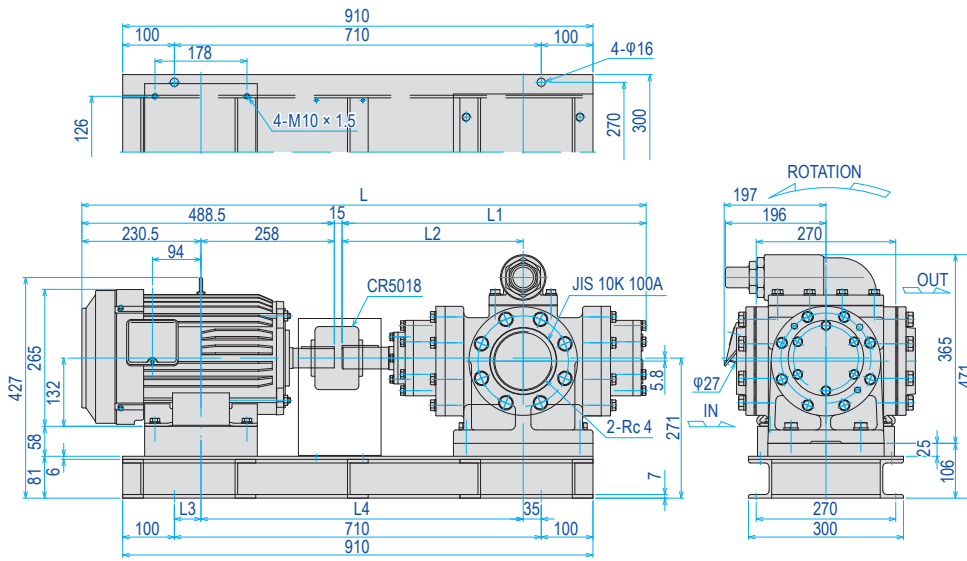
### Specifications

Model	Item	Motor speed 50Hz 1000min <sup>-1</sup>			Motor speed 60Hz 1200min <sup>-1</sup>				
		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
<b>TOP-4300AVB</b>		349.8	0.6	0.9	1.0	419.7	0.4	0.7	1.0
<b>TOP-4500AVB</b>		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

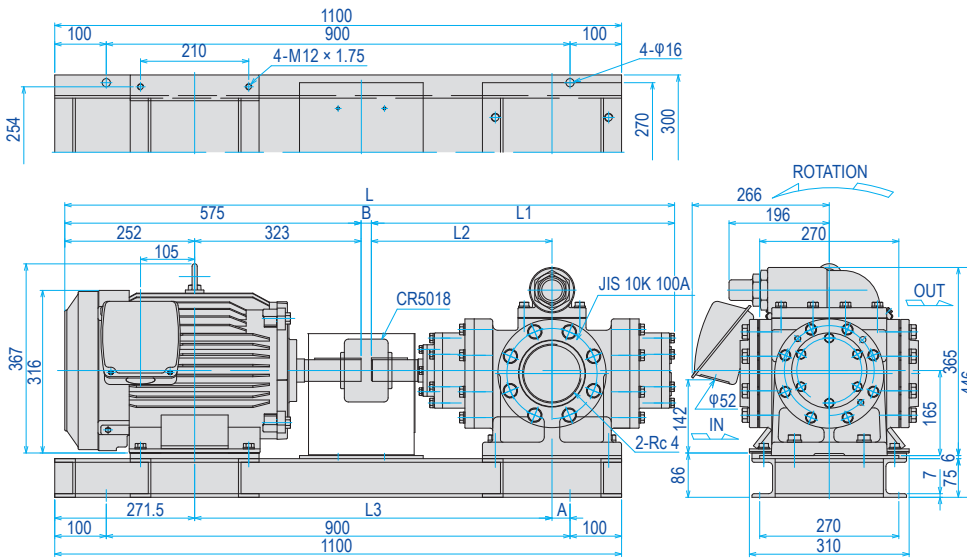
■ Dimensions (Typical) for 4MB-4A

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



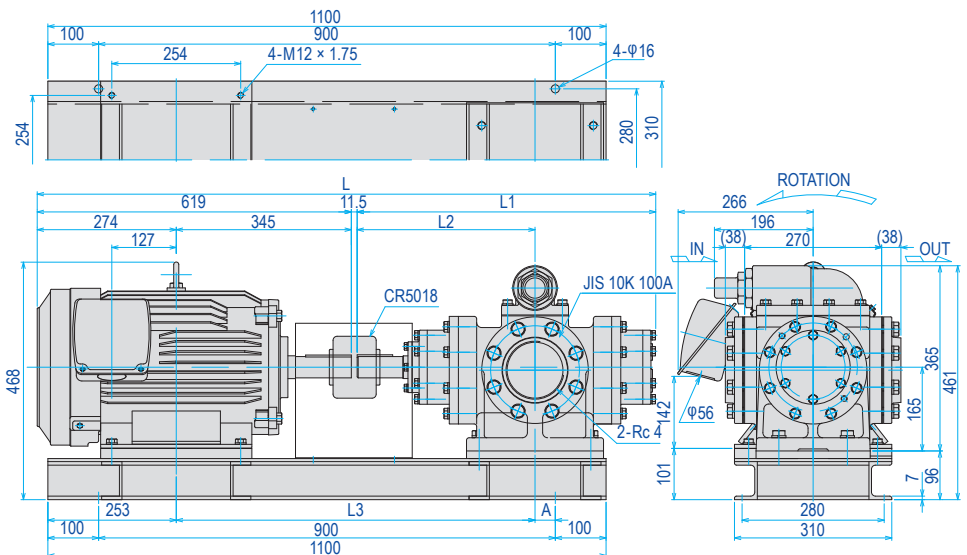
Model	Item	L	L1	L2
4300		1021.9	518.4	315.5
4500		1091.9	588.4	350.5
Model	Item	L3	L4	
4300		86.5	588.5	
4500		51.5	623.5	

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



Model	Item	L	L1	L2
4300		1108.4	518.4	315.5
4500		1183.4	588.4	350.5
Model	Item	L3	A	B
4300		653.5	75	15
4500		693.5	35	20

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

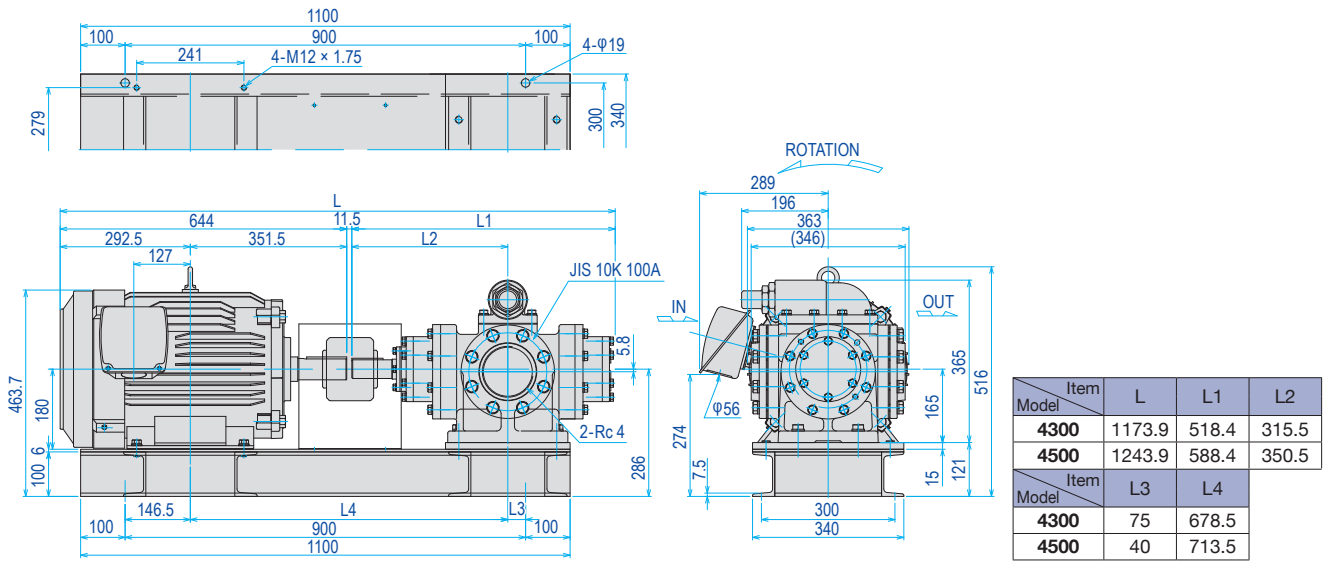


Model	Item	L	L1	L2
4300		1148.9	518.4	315.5
4500		1218.9	588.4	350.5
Model	Item	L3	A	
4300		672	75	
4500		707	40	

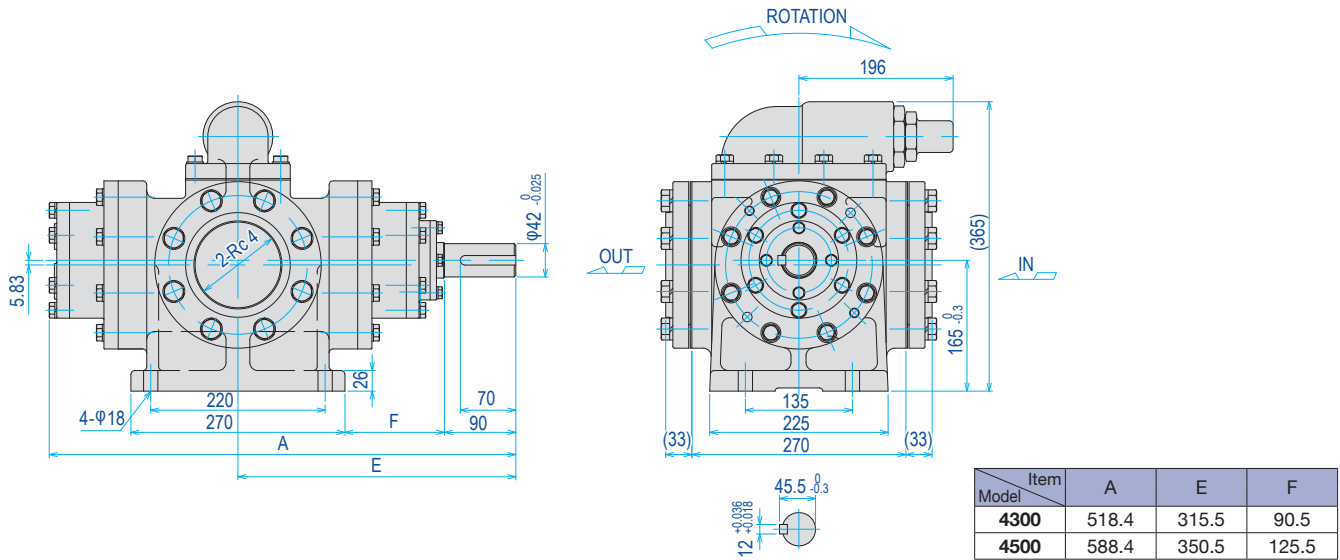
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for 4MB-4A/4A

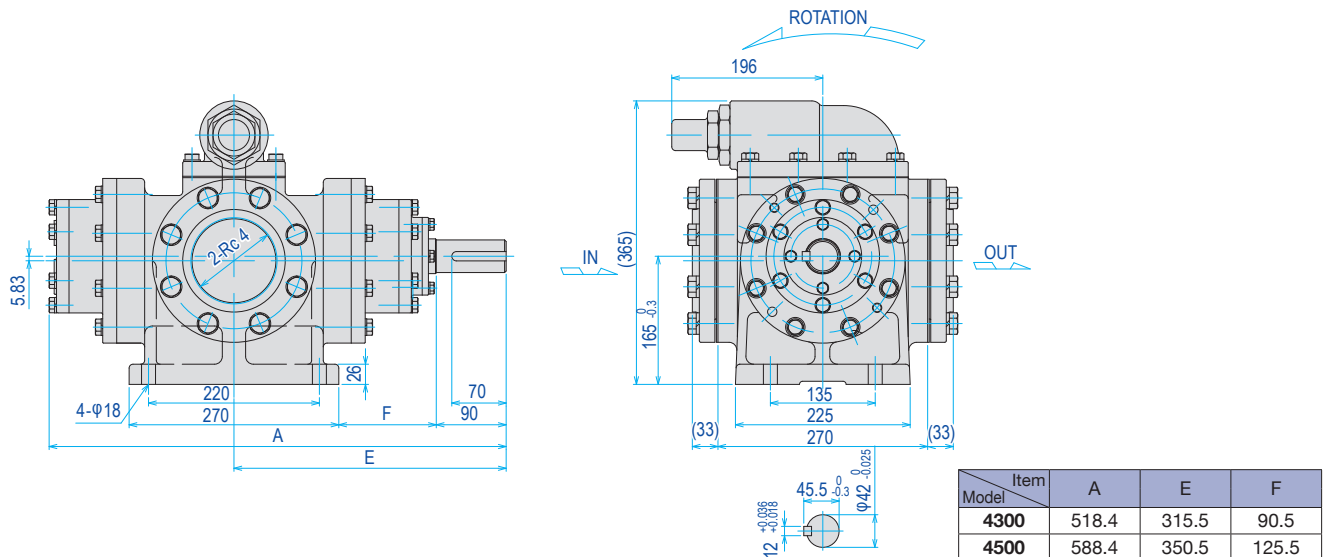
Model : TOP-4MBM15000-6-4\*\*\*AVB IE3



Model : TOP-4\*\*\*AVB



Model : TOP-4\*\*\*ALVB



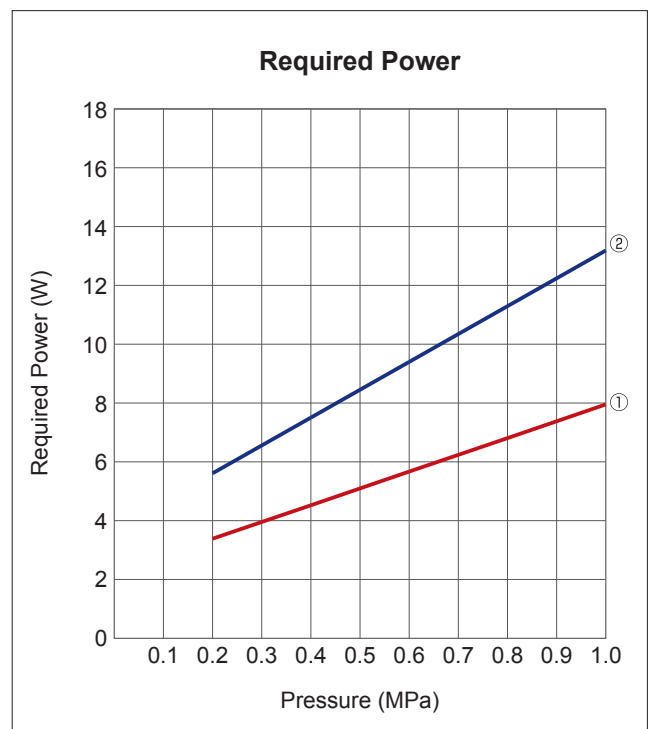
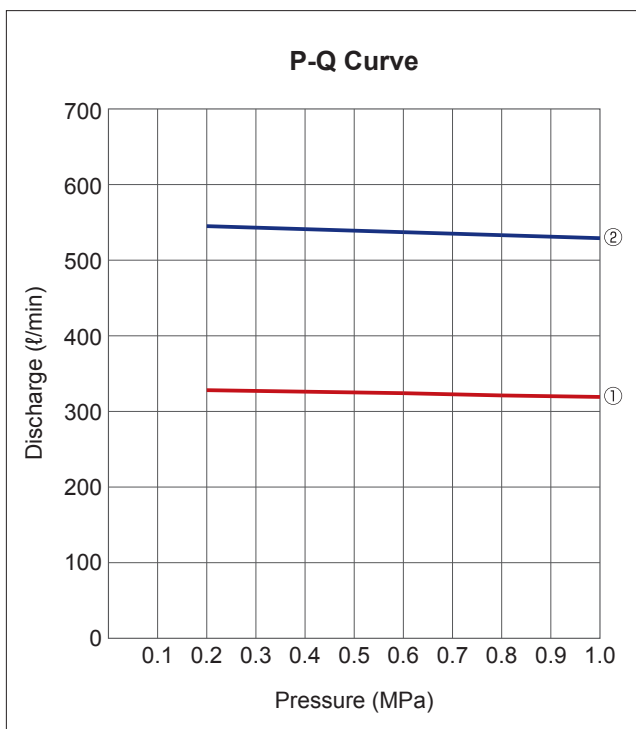
# 4A Performance Curve

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<sup>-1</sup>

① 4300AVB      ② 4500AVB



Model	Item	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
<b>TOP-4300AVB</b>		328	326	324	321	319	3.37	4.51	5.66	6.80	7.95
<b>TOP-4500AVB</b>		546	542	538	534	530	5.60	7.50	9.40	11.30	13.20

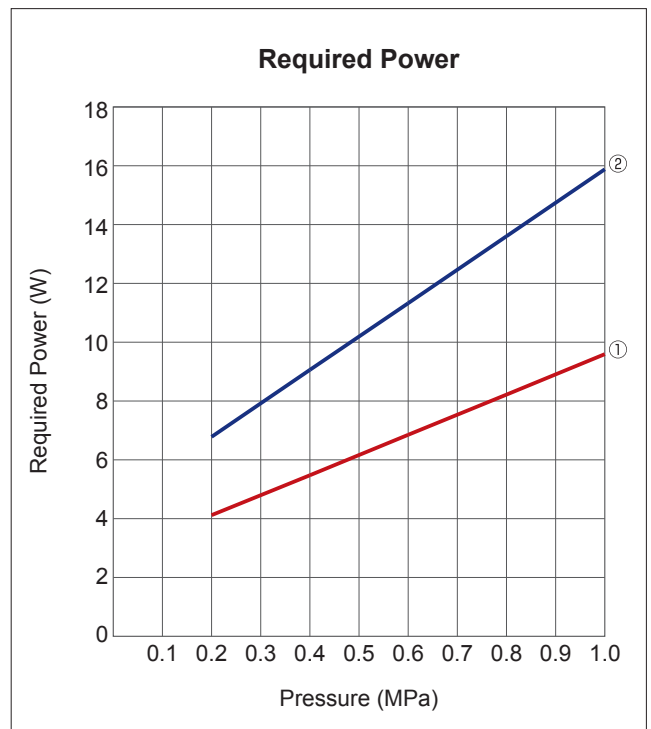
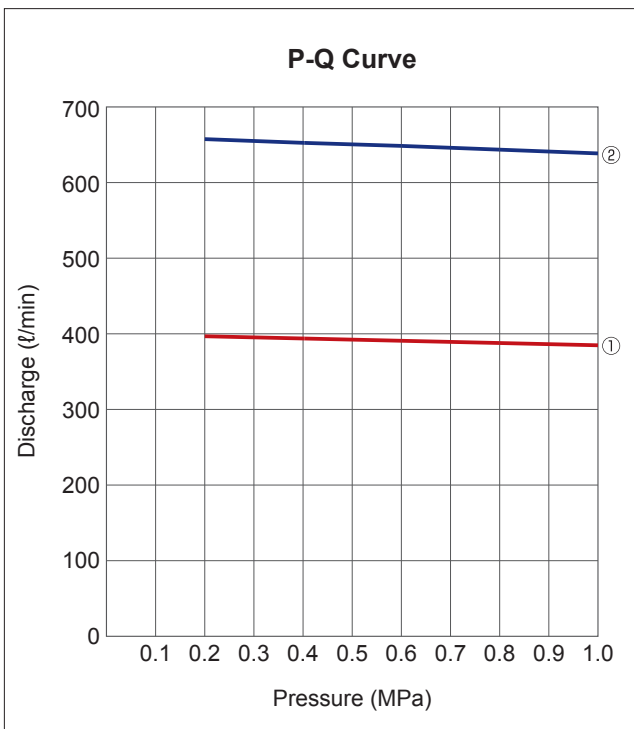
Any disassembly or alteration of the product will void the warranty.

**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.

1160 min<sup>-1</sup>

① 4300AVB      ② 4500AVB



Model	Item	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
<b>TOP-4300AVB</b>		397	394	391	388	385	4.07	5.44	6.83	8.21	9.60
<b>TOP-4500AVB</b>		659	654	650	645	640	6.76	9.06	11.35	13.65	15.95

# MB-GPL

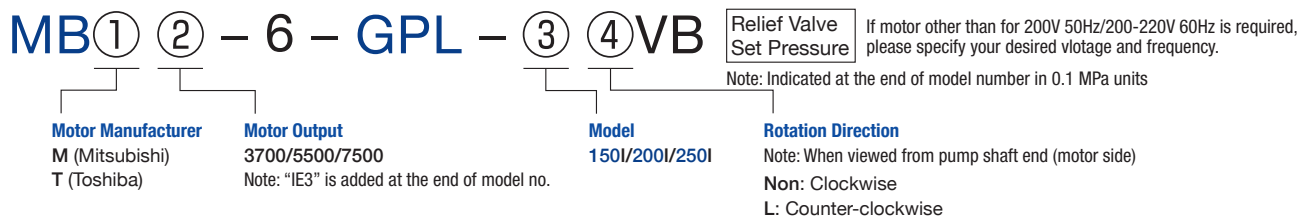
(BASE-COUPLING MOUNT TYPE)

## GPL

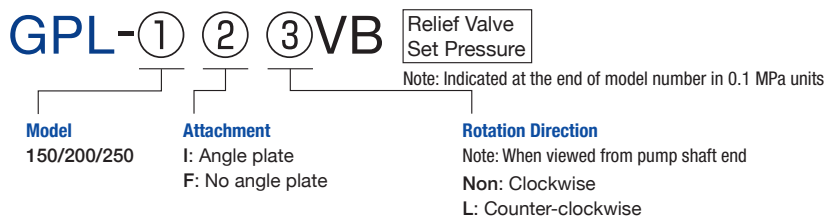
(PUMPHEAD)



### Model Numbering System (For General Lubricant Oil)



### Model Numbering System (Pumphead)



Note: For transferring oil with high viscosity (46-2000mm<sup>2</sup>/sec), such as high viscosity lubricant oil or gear oil

### Specifications

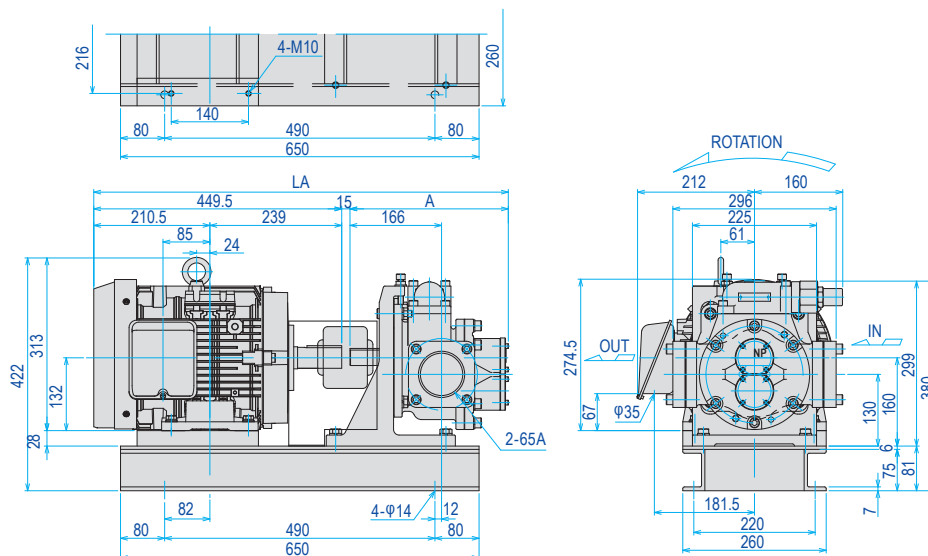
Model \ Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. Weight (Kg)
		1000min <sup>-1</sup>	1200min <sup>-1</sup>			
<b>GPL-150VB</b>	150	150	180	1.0	1800	29.0
<b>GPL-200VB</b>	200	200	240	1.0	1800	30.0
<b>GPL-250VB</b>	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.

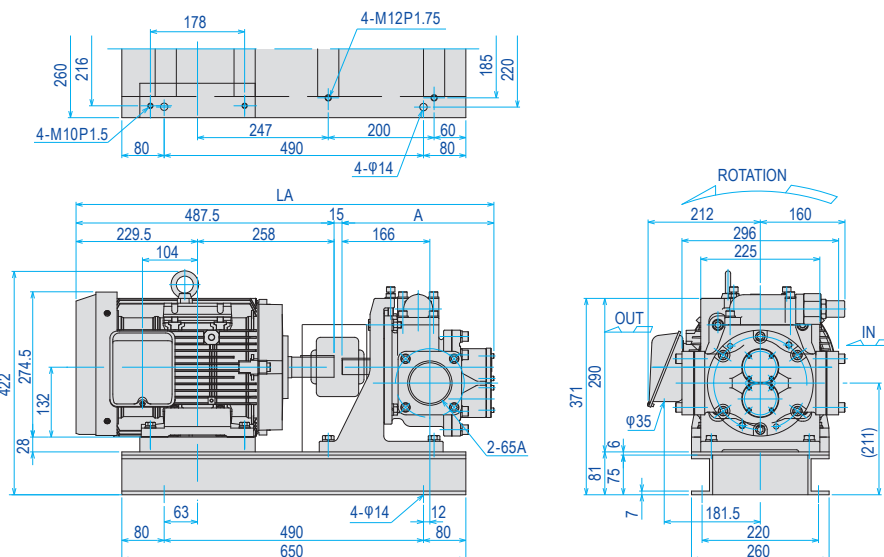
■ Dimensions (Typical) for MB-GPL

Model : TOP-MBT3700-6-GPL-\*\*\*IVB IE3



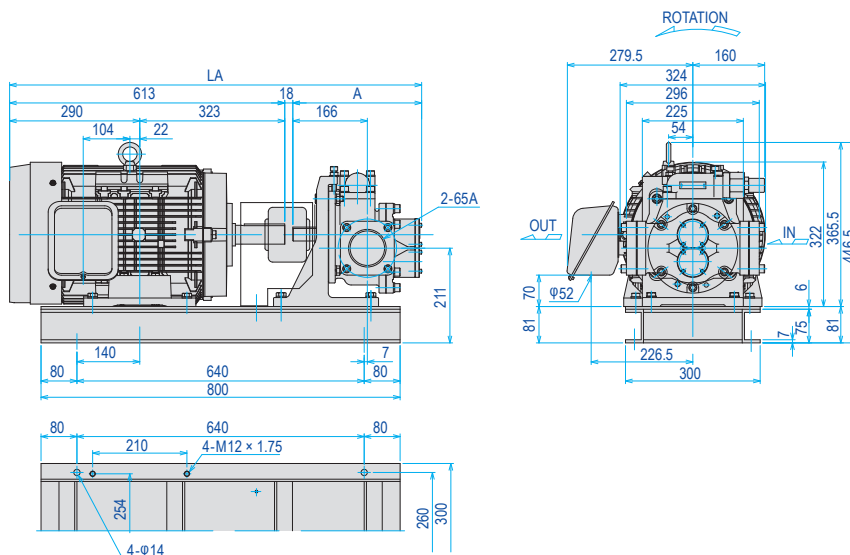
Item Model	LA	A
150	732.5	268
200	751.5	287
250	770.5	306

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

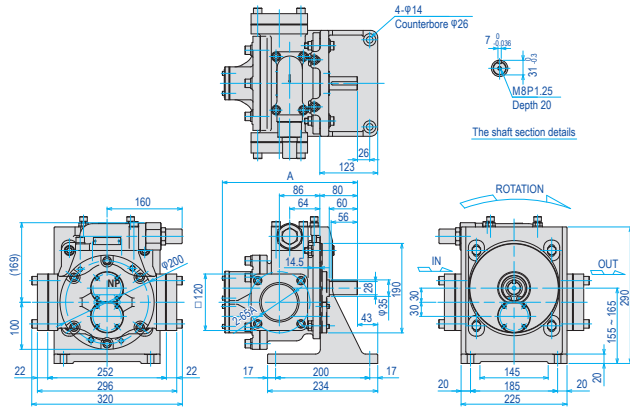


Item Model	LA	A
150	899	268
200	918	287
250	937	306



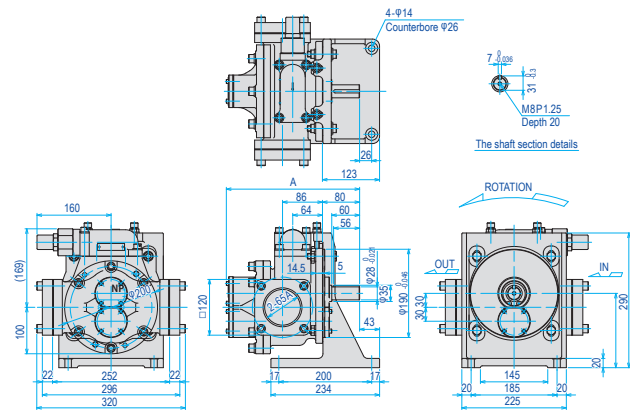
■ Dimensions (Typical) for GPL

Model : TOP-GPL-\*\*\*IVB



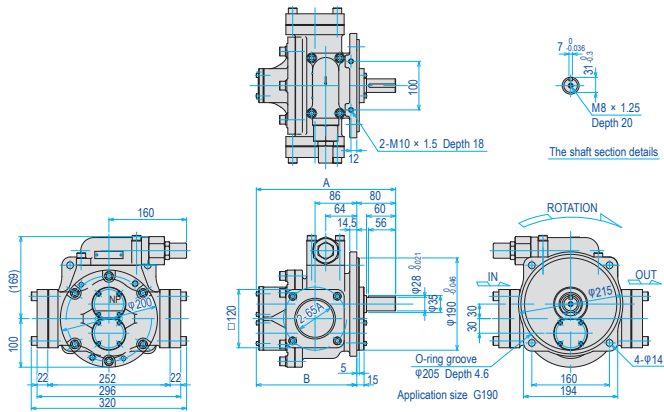
Model	Item	A
150		268
200		287
250		306

Model : TOP-GPL-\*\*\*ILVB



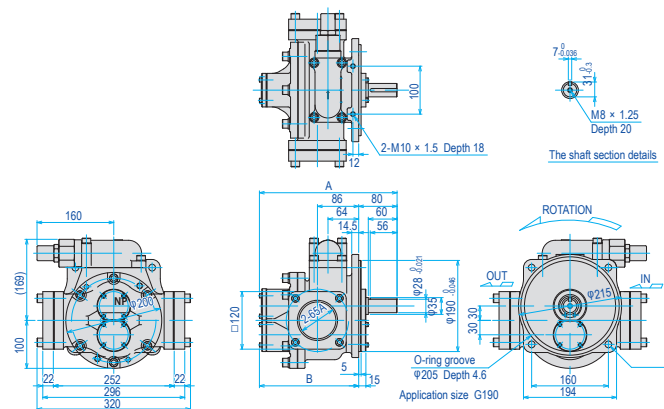
Model	Item	A
150		268
200		287
250		306

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.

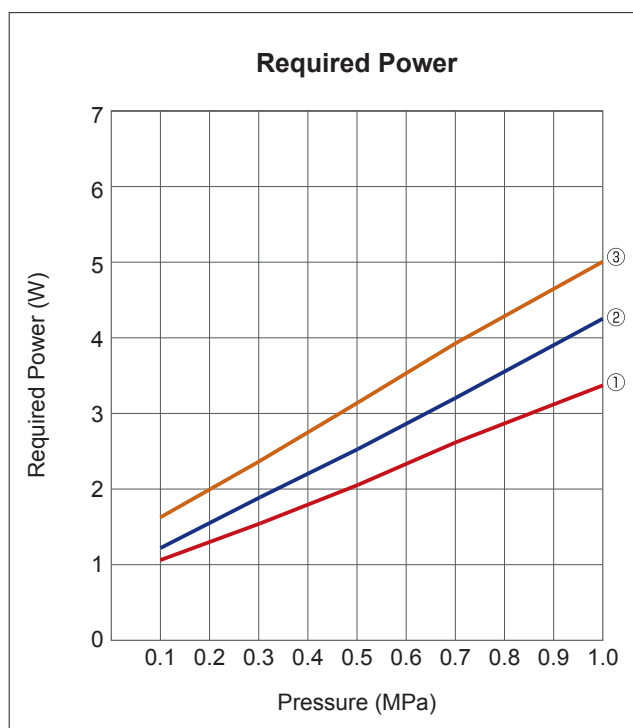
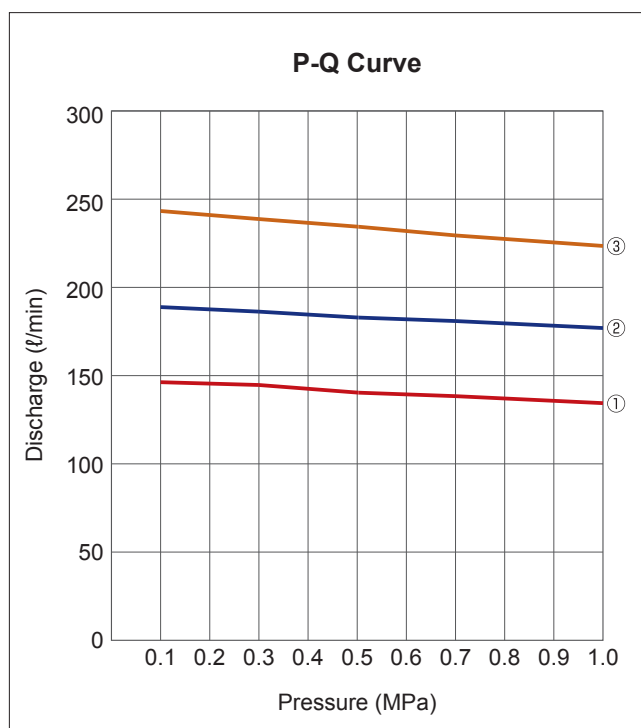
# GPL Performance Curve

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<sup>-1</sup>

① GPL-150VB    ② GPL-200VB    ③ GPL-250VB



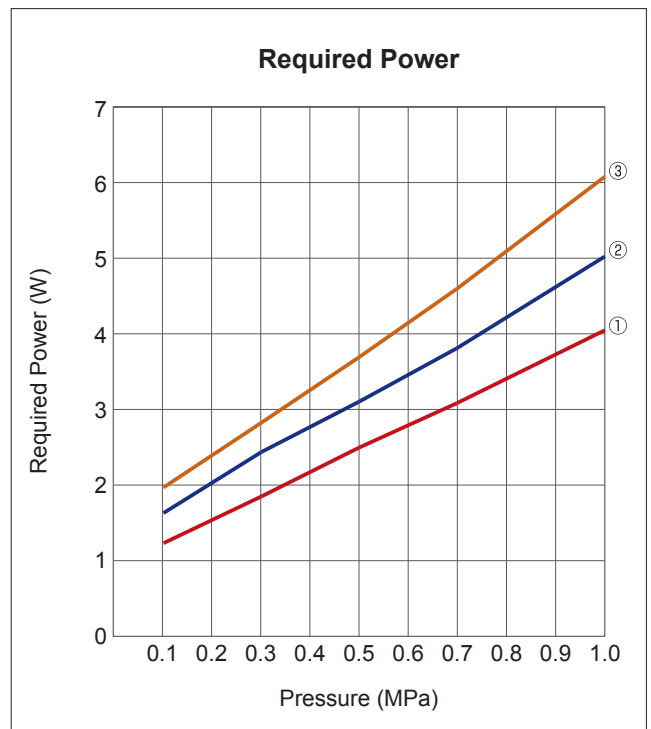
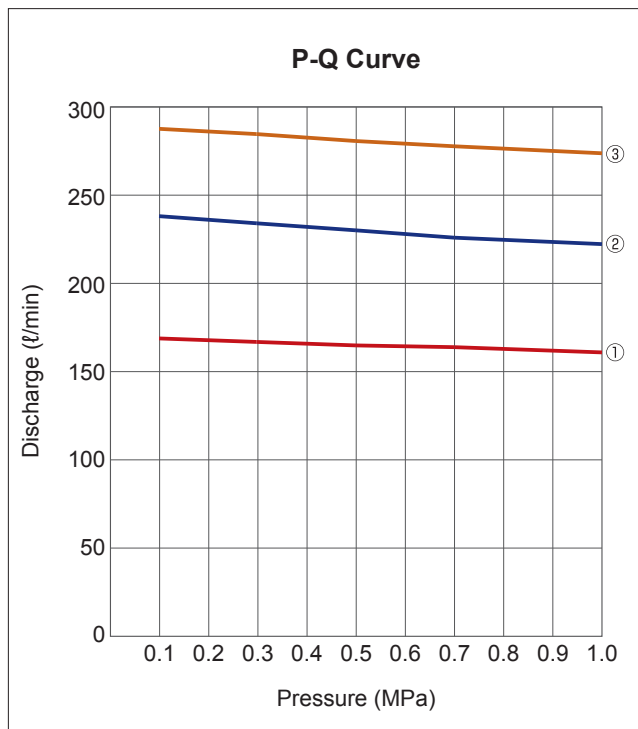
Model	Item	Discharge (ℓ/min)					Required Power (W)				
		Pressure (MPa)					Pressure (MPa)				
		0.1	0.3	0.5	0.7	1.0	0.1	0.3	0.5	0.7	1.0
<b>GPL-150VB</b>		147	144	141	139	135	1.05	1.54	2.03	2.65	3.38
<b>GPL-200VB</b>		190	186	184	182	178	1.21	1.89	2.53	3.21	4.27
<b>GPL-250VB</b>		245	239	236	231	225	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<sup>-1</sup>

① GPL-150VB    ② GPL-200VB    ③ GPL-250VB



Model	Item	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
<b>GPL-150VB</b>		169	167	165	164	161	1.22	1.84	2.49	3.08	4.05
<b>GPL-200VB</b>		239	232	229	227	223	1.62	2.43	3.10	3.81	5.03
<b>GPL-250VB</b>		289	286	282	279	275	1.96	2.82	3.64	4.55	6.09

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

## 1RA

(PUMPHEAD, REVERSIBLE)

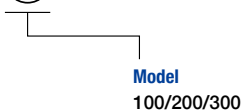
## 2RA

(PUMPHEAD, REVERSIBLE)



### ■ Model Numbering System (For General Lubricant Oil)

TOP-1RA – ①



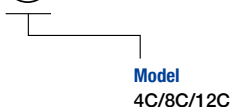
### ■ Specifications

Model \ Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. weight (kg)
		1500min <sup>-1</sup>	1800min <sup>-1</sup>			
<b>TOP-1RA-100</b>	1.1	1.6	2.0	0.5	2000	1.1
<b>TOP-1RA-200</b>	1.8	2.7	3.2	0.5	2000	1.2
<b>TOP-1RA-300</b>	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



### ■ Specifications

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

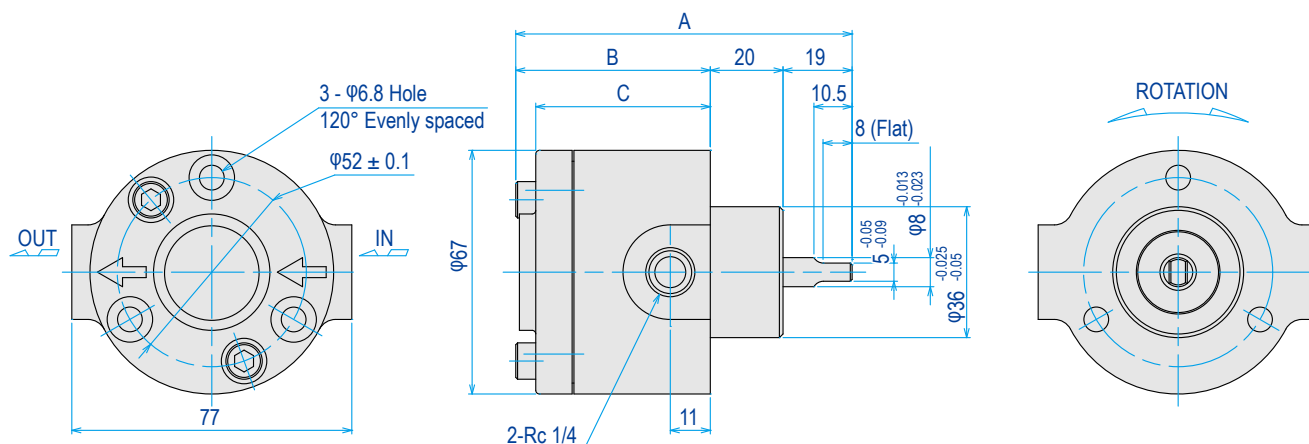
• Test oil: ISO-VG46/Oil temperature: 40C

Regardless of forward or reverse rotation, an oil always flows in the same direction.

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.

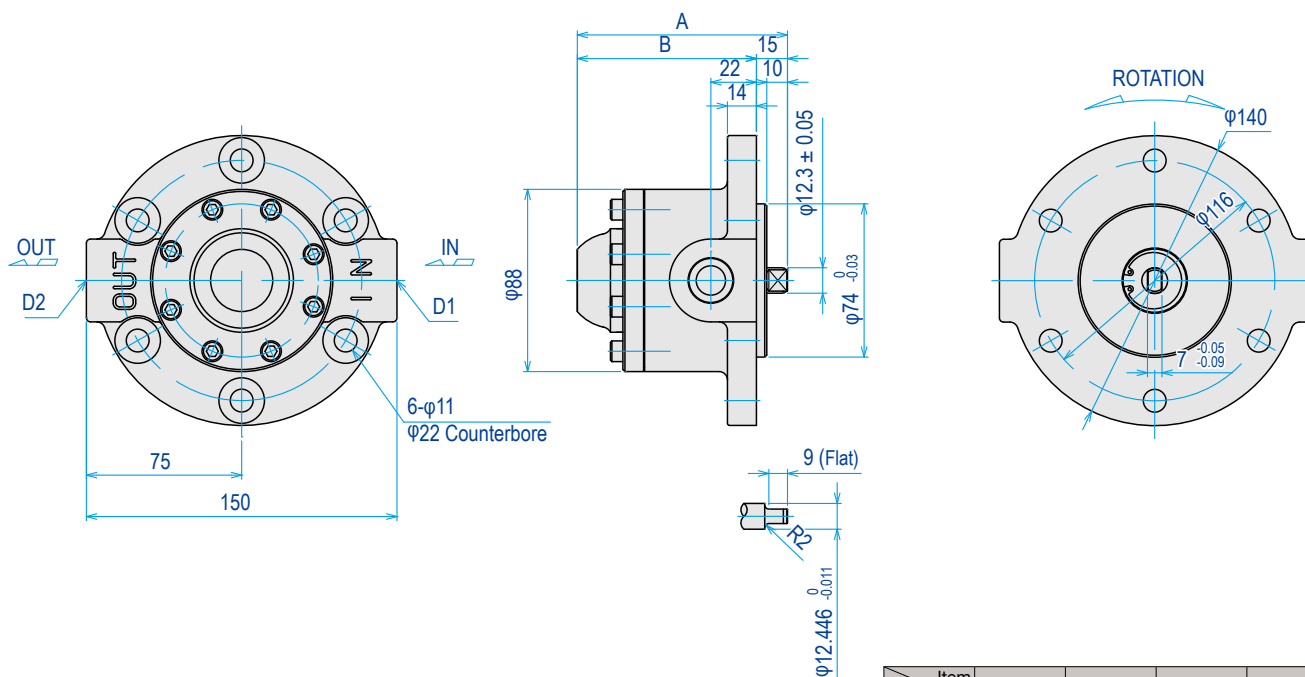
■ Dimensions (Typical) for 1RA/2RA

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.

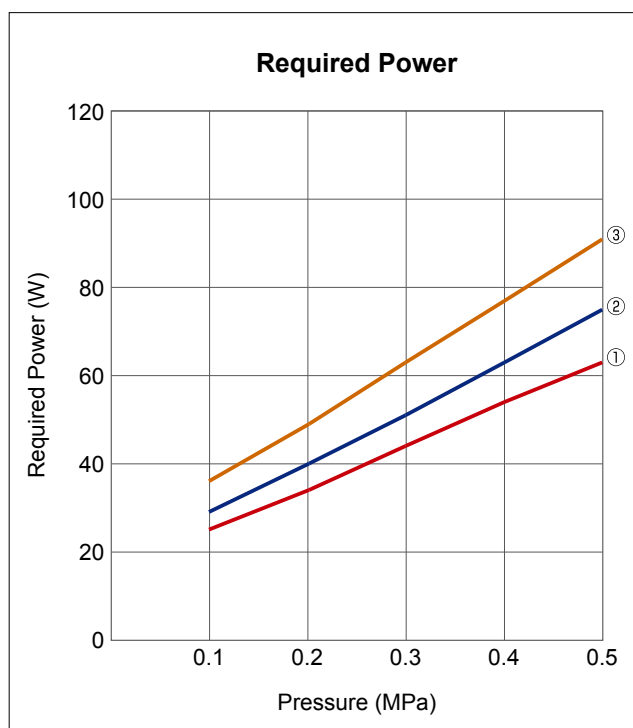
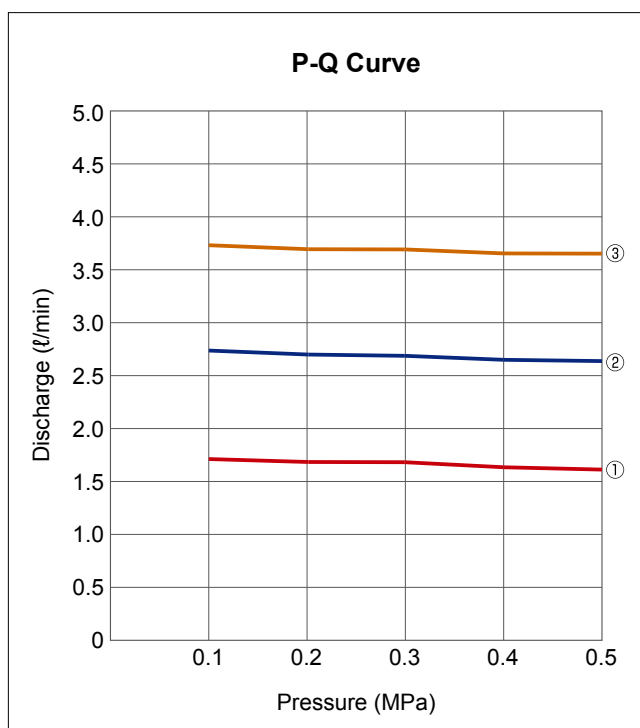
# 1RA Performance Curve

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<sup>-1</sup>

① 1RA-100    ② 1RA-200    ③ 1RA-300



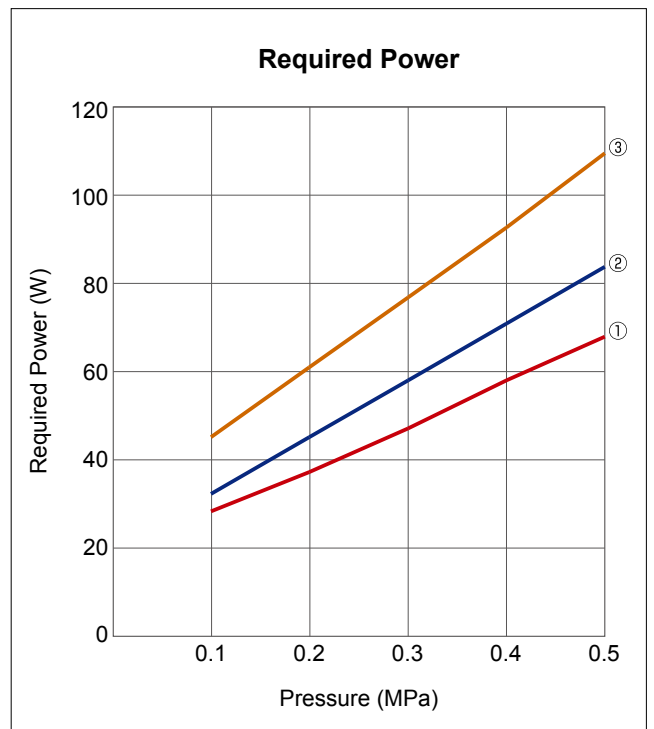
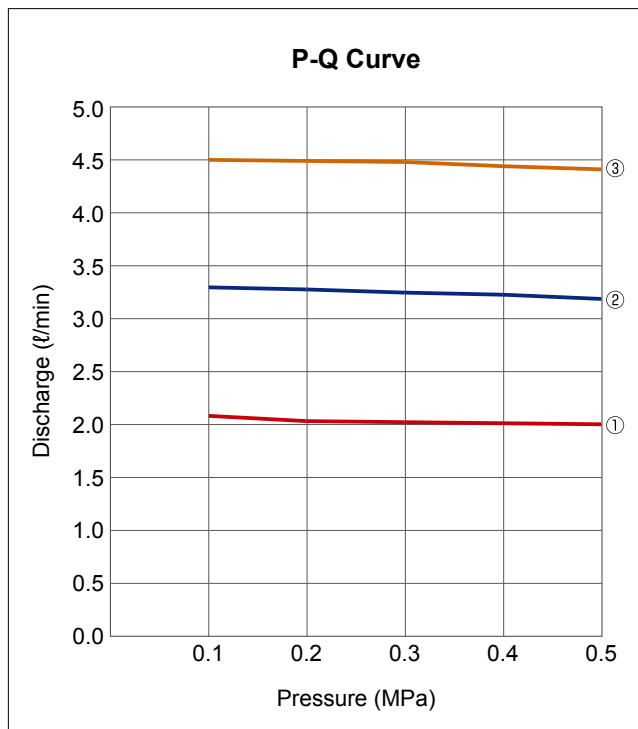
Item	Discharge (l/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
<b>TOP-1RA-100</b>	1.69	1.68	1.66	1.63	1.59	25	34	44	54	63
<b>TOP-1RA-200</b>	2.72	2.70	2.67	2.65	2.62	29	40	51	63	75
<b>TOP-1RA-300</b>	3.72	3.70	3.68	3.66	3.64	36	49	63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

① 1RA-100    ② 1RA-200    ③ 1RA-300



Model	Item	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
<b>TOP-1RA-100</b>		2.08	2.03	2.02	2.01	2.00	28	37	47	58	68
<b>TOP-1RA-200</b>		3.30	3.28	3.25	3.23	3.19	32	45	58	71	84
<b>TOP-1RA-300</b>		4.51	4.50	4.49	4.45	4.42	45	61	77	93	110

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

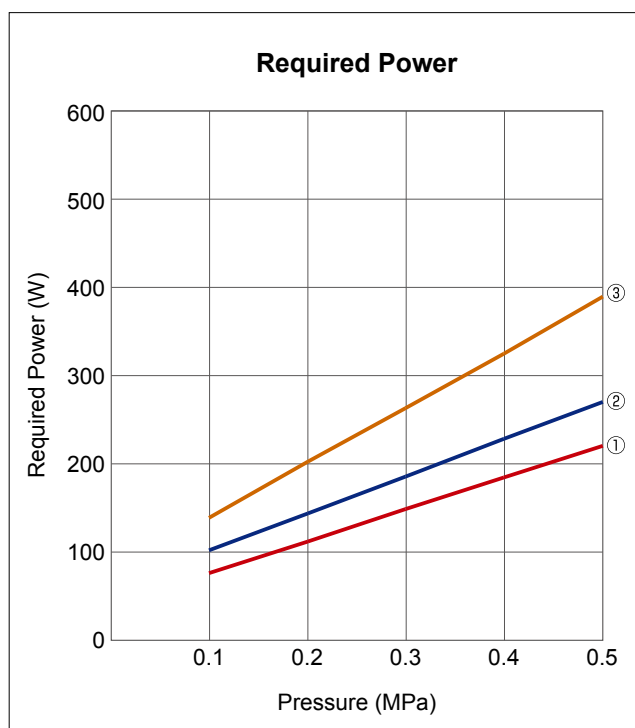
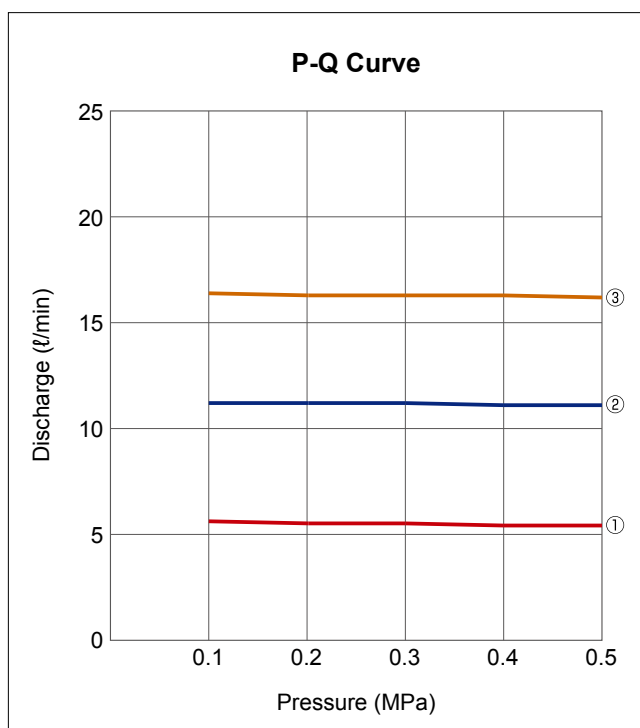
# 2RA Performance Curve

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<sup>-1</sup>

① 2RA-4C    ② 2RA-8C    ③ 2RA-12C



Model	Item	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
<b>TOP-2RA-4C</b>		5.6	5.5	5.5	5.4	5.4	75	111	148	184	220
<b>TOP-2RA-8C</b>		11.2	11.2	11.2	11.1	11.1	101	143	185	228	270
<b>TOP-2RA-12C</b>		16.4	16.3	16.3	16.3	16.2	138	202	263	325	390

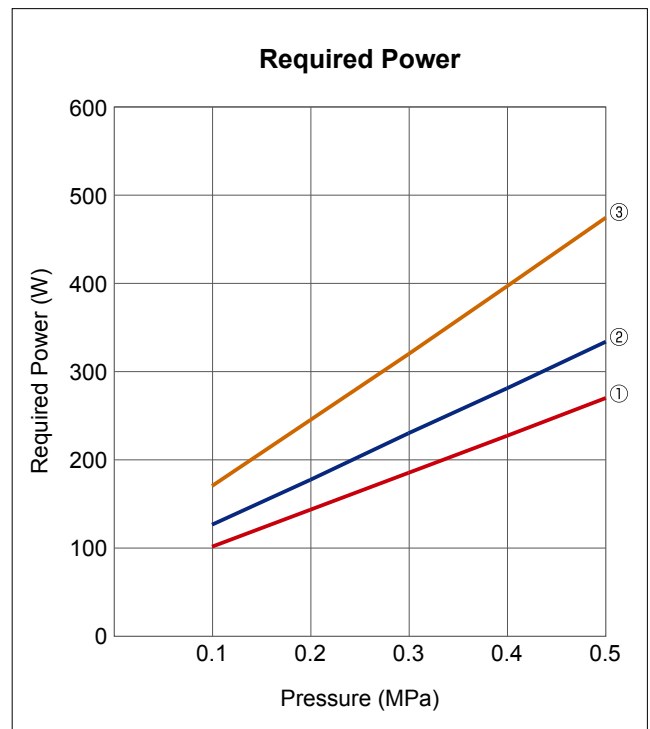
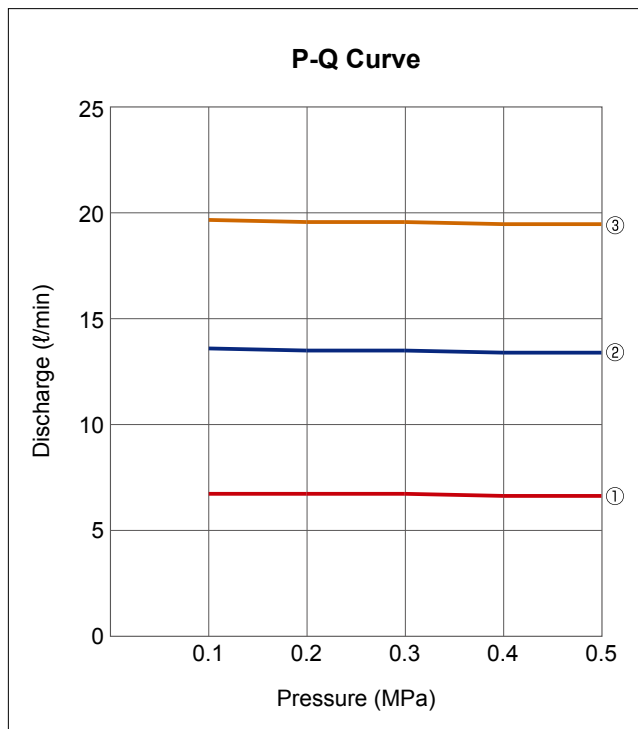


**Test Oil: ISO-VG46 Oil Temperature: 40C (Average)**

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<sup>-1</sup>

① 2RA-4C    ② 2RA-8C    ③ 2RA-12C



Model	Item	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
<b>TOP-2RA-4C</b>		6.7	6.7	6.7	6.6	6.6	101	143	185	227	270
<b>TOP-2RA-8C</b>		13.6	13.5	13.5	13.4	13.4	126	177	230	281	334
<b>TOP-2RA-12C</b>		19.7	19.6	19.6	19.5	19.5	170	245	320	397	475

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

## 3RD

(PUMPHEAD, REVERSIBLE)

## 4RD

(PUMPHEAD, REVERSIBLE)



### ■ Model Numbering System (For General Lubricant Oil)

TOP-3RD – ①

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

### ■ Specifications

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. weight. (kg)
			1000min <sup>-1</sup>	1200min <sup>-1</sup>			
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)

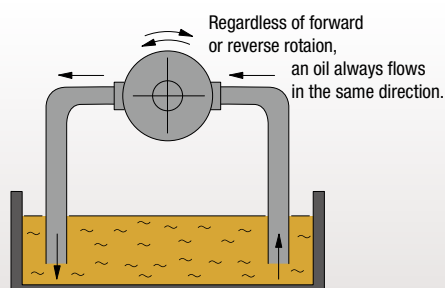
TOP-4RD – ①

Model  
100

### ■ Specifications

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

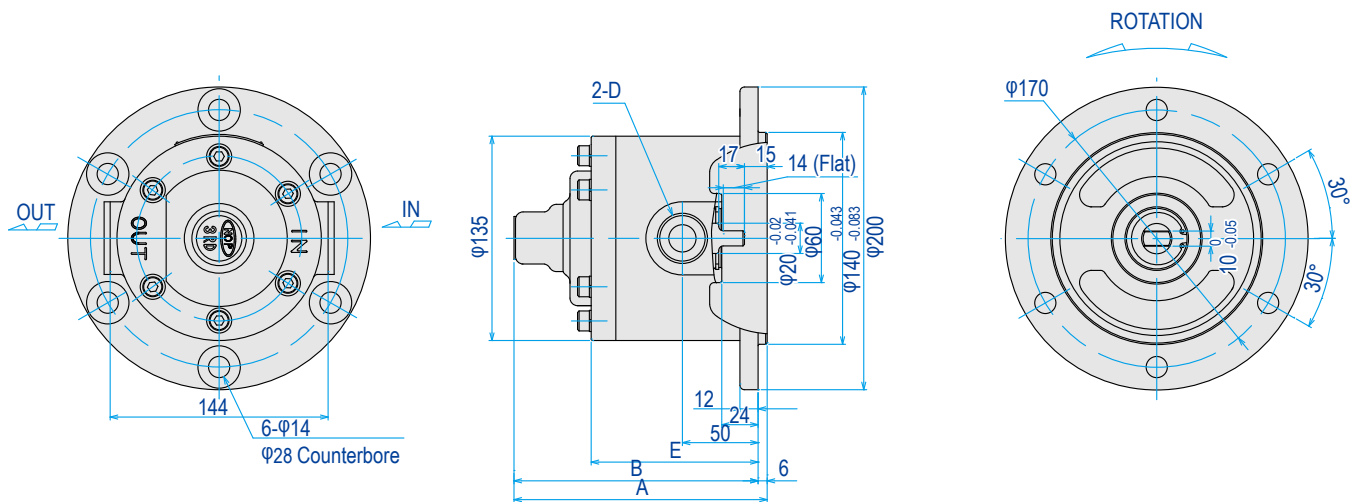
• Test oil: ISO-VG46/Oil temperature: 40C



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.

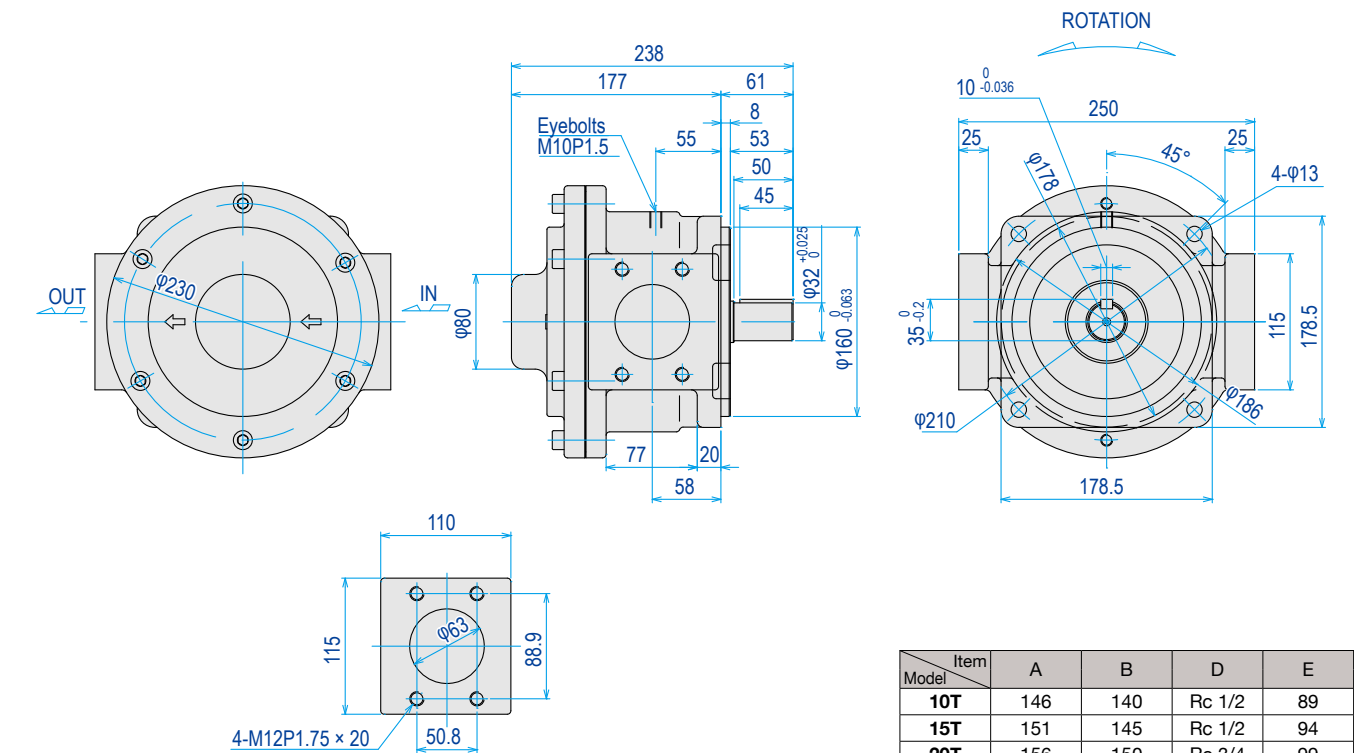
■ Dimensions (Typical) for 3RD/4RD

Model : TOP-3RD-\*\*T



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



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.

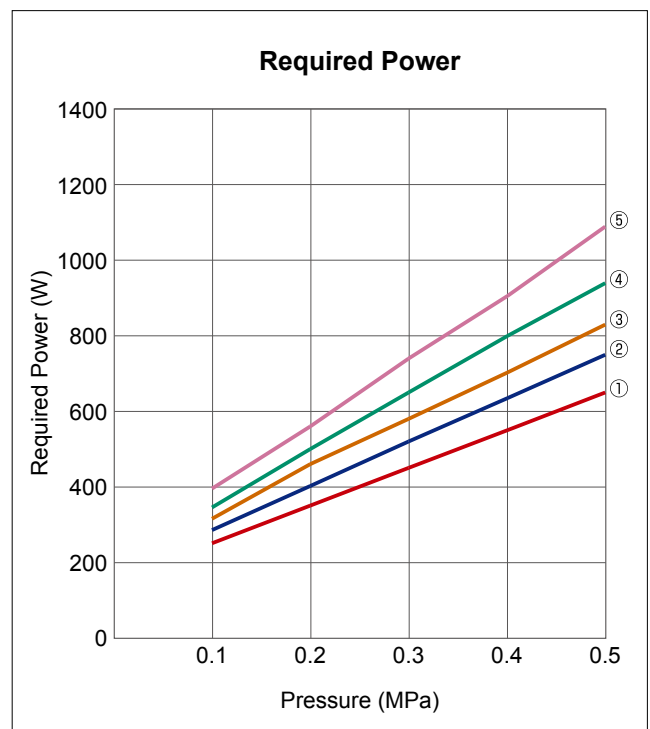
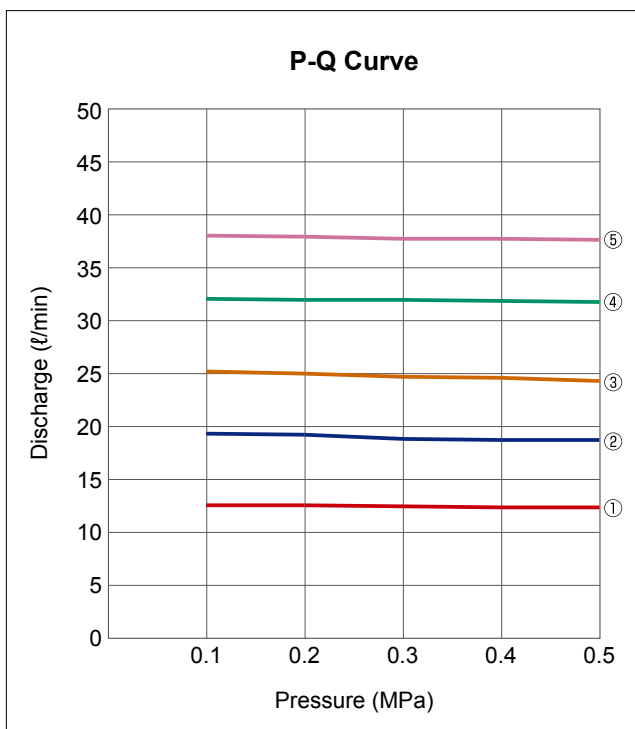
# 3RD Performance Curve

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<sup>-1</sup>

① 3RD-10T    ② 3RD-15T    ③ 3RD-20T    ④ 3RD-25T    ⑤ 3RD-30T



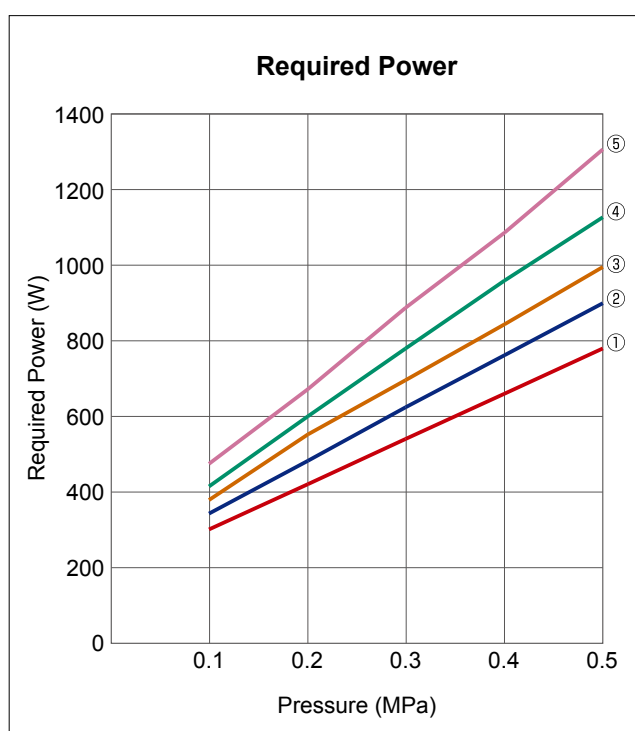
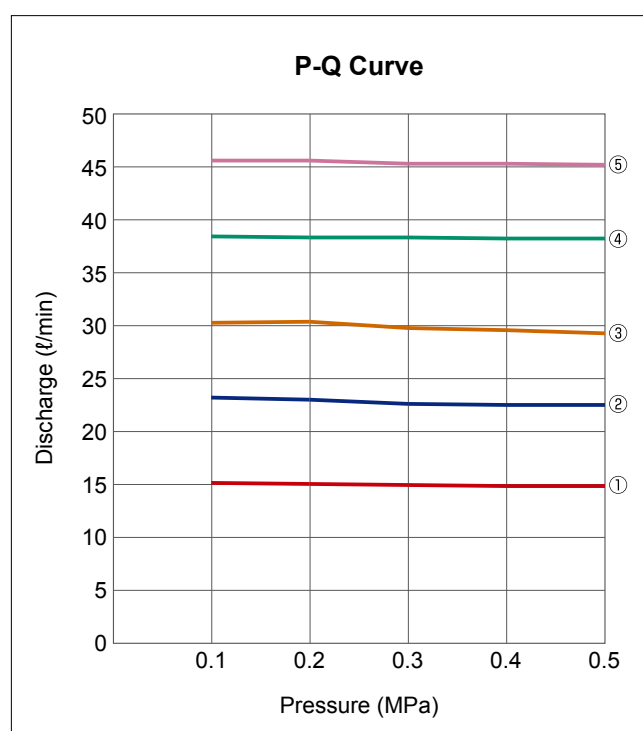
Model	Item	Discharge (l/min)					Required Power (W)				
		Pressure (MPa)					Pressure (MPa)				
		0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
<b>TOP-3RD-10T</b>		12.5	12.5	12.4	12.3	12.3	250	350	450	550	650
<b>TOP-3RD-15T</b>		19.3	19.2	18.8	18.7	18.7	285	402	520	635	750
<b>TOP-3RD-20T</b>		25.2	25.0	24.7	24.6	24.3	315	460	580	703	830
<b>TOP-3RD-25T</b>		32.1	32.0	32.0	31.9	31.8	345	500	650	800	940
<b>TOP-3RD-30T</b>		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<sup>-1</sup>

① 3RD-10T    ② 3RD-15T    ③ 3RD-20T    ④ 3RD-25T    ⑤ 3RD-30T



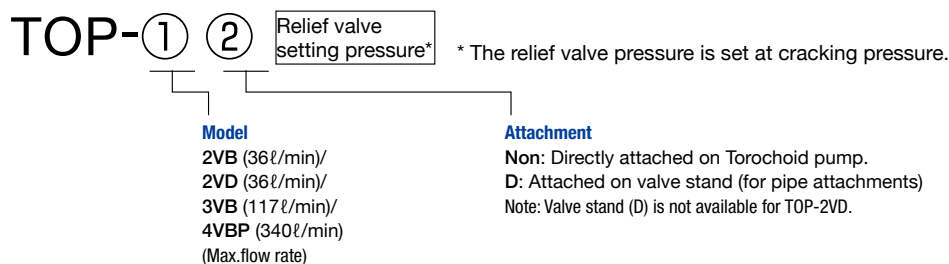
Model	Item	Discharge (l/min)					Required Power (W)				
		Pressure (MPa)					Pressure (MPa)				
		0.1	0.2	0.3	0.4	0.5	0.1	0.2	0.3	0.4	0.5
<b>TOP-3RD-10T</b>		15.1	15.0	14.9	14.8	14.8	300	420	540	660	780
<b>TOP-3RD-15T</b>		23.2	23.0	22.6	22.5	22.5	342	482	624	762	900
<b>TOP-3RD-20T</b>		30.3	30.4	29.8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

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

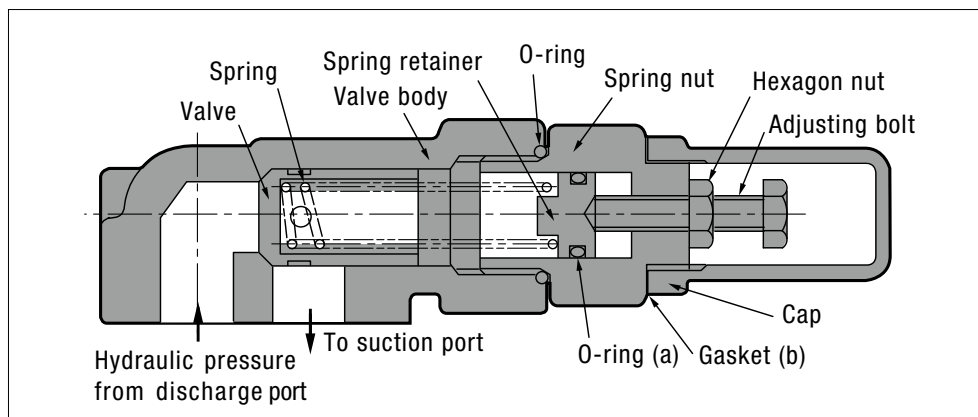
# RELIEF VALVES



## Model Numbering System (For General Lubricant Oil)



## Internal Structure



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

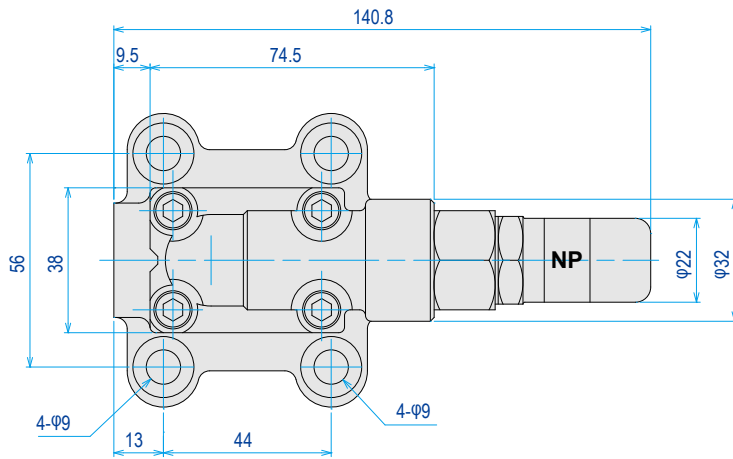
## Adjusting Pressure Range of Relief Valve

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	—

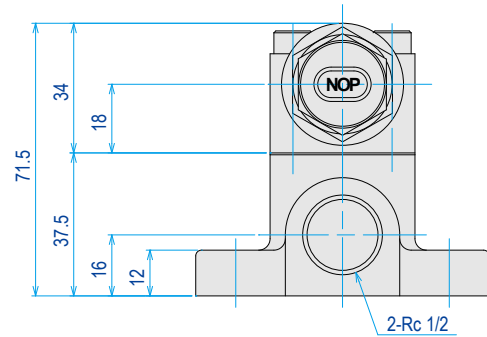
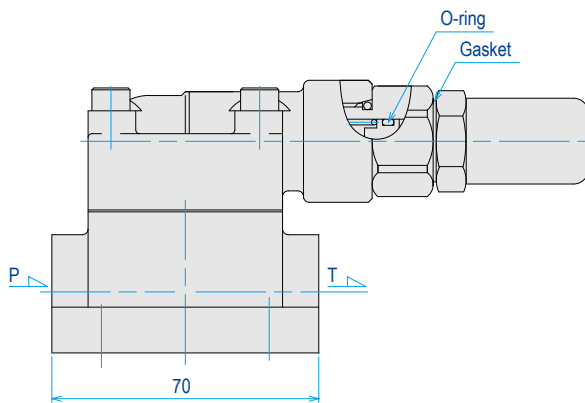
Note: Cracking pressure: Pressure at which a valve starts to operate

■ Dimensions (Typical) for RELIEF VALVES

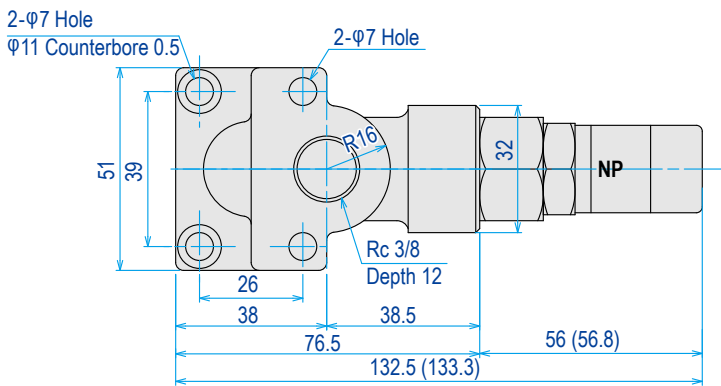
Model : TOP-2VBD



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

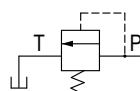
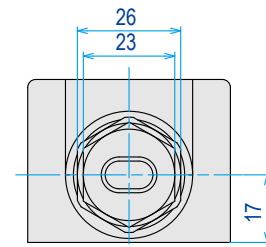
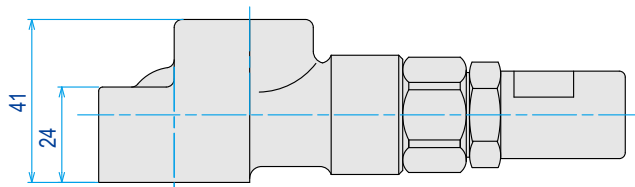


Model : TOP-2VD



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

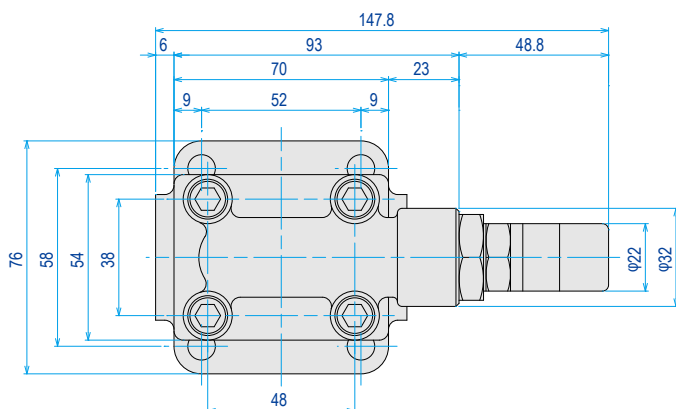
The values in ( ) show the dimensions for spring No.1



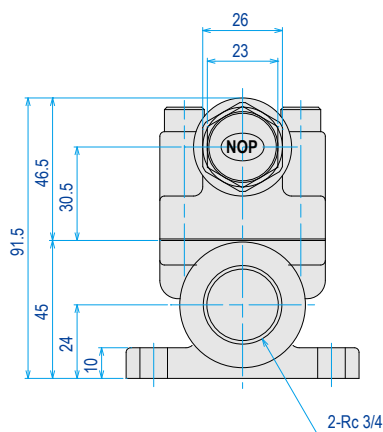
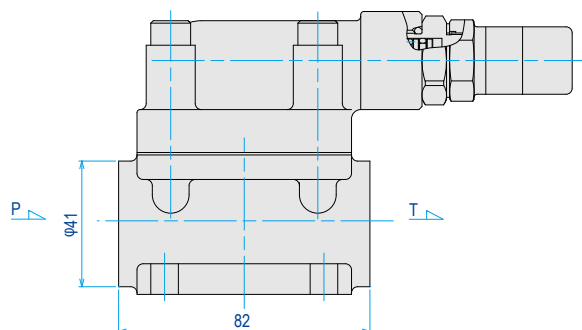
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for RELIEF VALVES

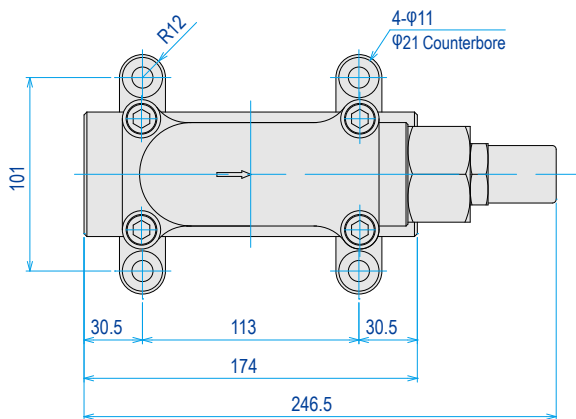
Model : TOP-3VBD



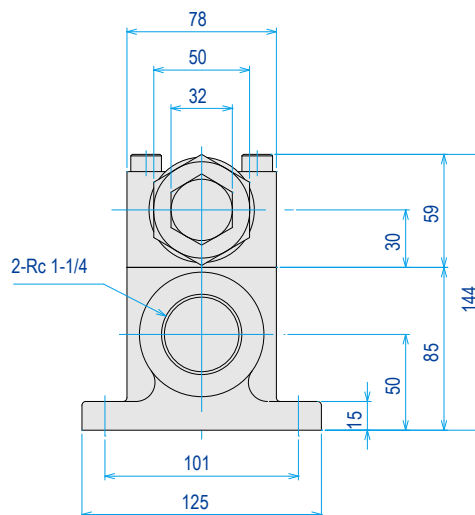
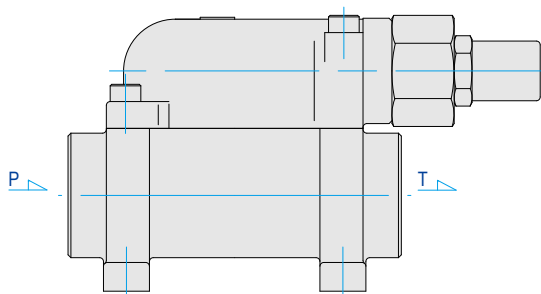
Spring No.	Pressure range (MPa)	Seal & Gasket
No.1L	0.08~0.25	Gasket (b)
No.2L	0.26~0.55	O-ring (a) P10
No.3L	0.56~1.30	
No.4L	1.31~1.70	
No.5L	1.71~2.49	
No.6L	2.50~3.00	



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

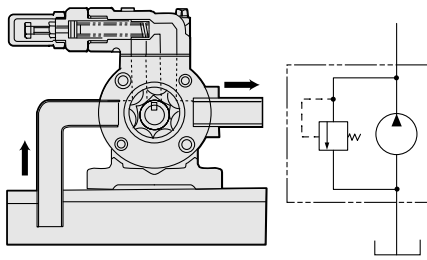




## How to install a Trochoid pump relief valve properly in a pump system

### Internal return (as a safety valve)

#### VB Type

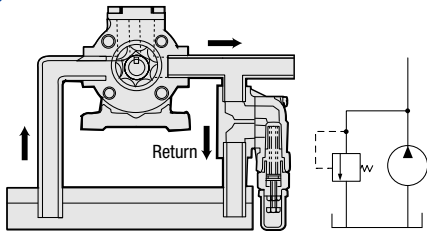


The valve is used as a safety valve to lower pressure instantly during oil transfer, which is attached to the pump directly.

If the valve is being activated constantly and/or the discharge port is being closed completely for a long time in the system, air bubbles, 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)

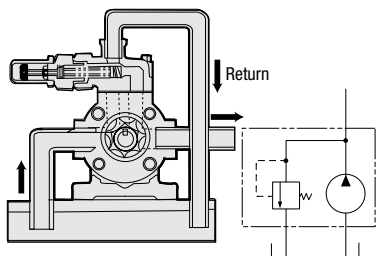
#### VBD Type



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 circuit of the system. It is the most suitable for the system bypassing the full flow for a long time and/or using the valve constantly as the pressure control valve.

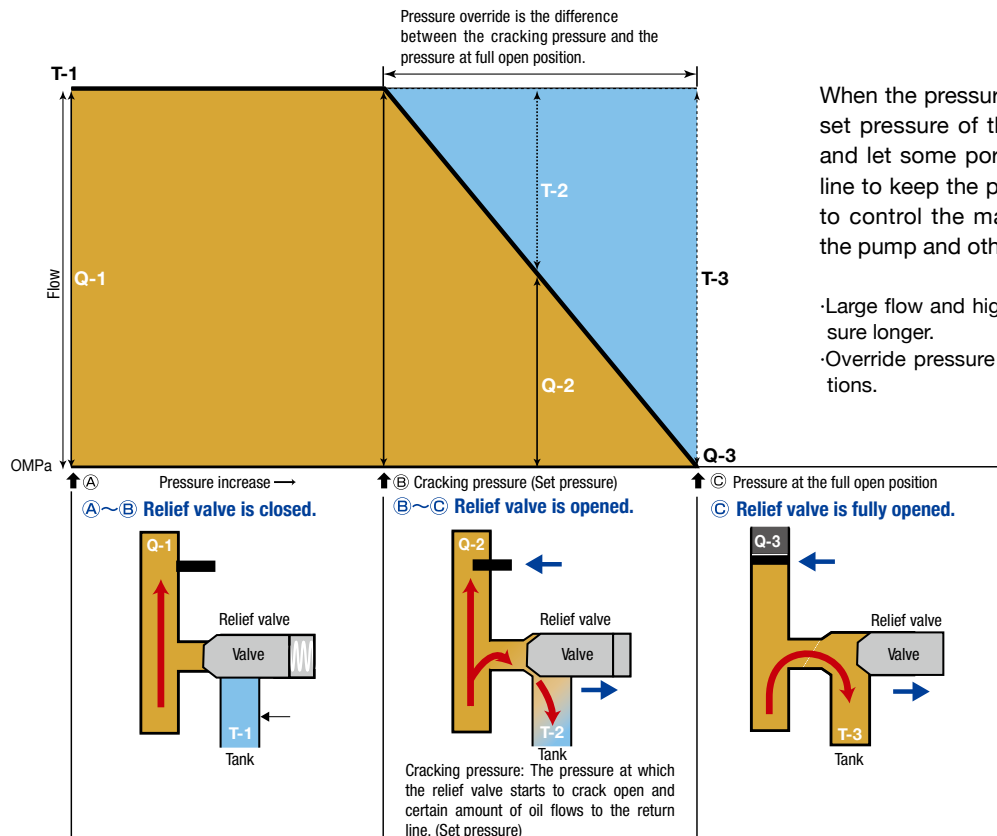
#### 2VD Type



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

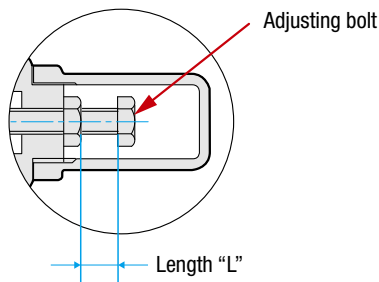


Any disassembly or alteration of the product will void the warranty.

## 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 ③ in the operation chart described on the previous page.

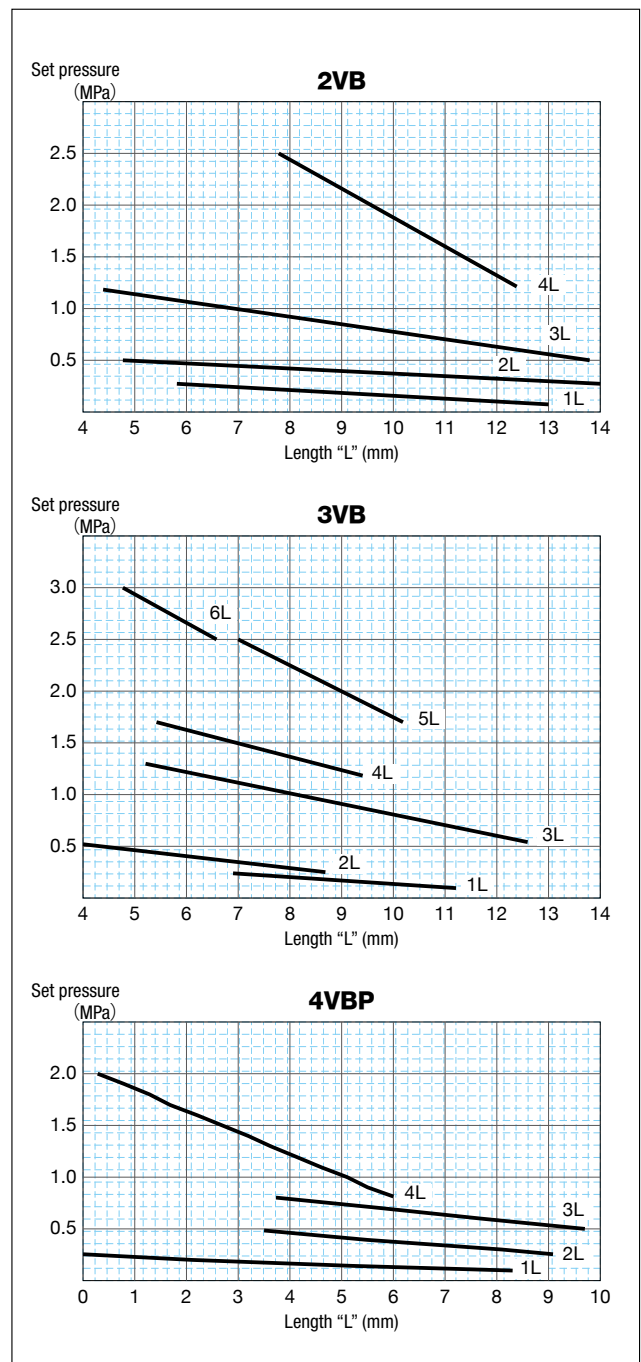
## Instructions for selecting a relief valve

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

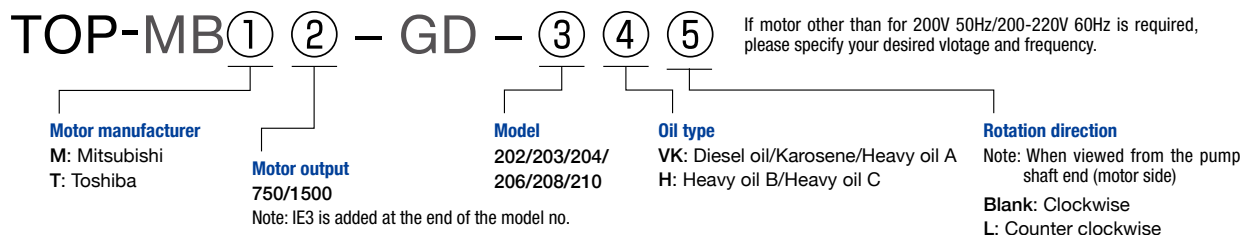
(BASE-COUPLING MOUNT TYPE)

# GD

(PUMPHEAD)

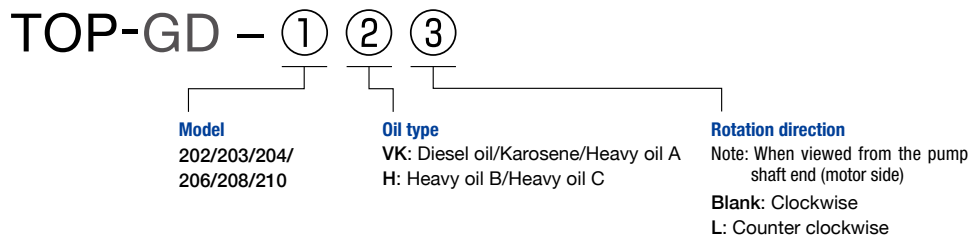


## Model Numbering System



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

## Model Numbering System



## Specifications

Model	Item	Theoretical displacement (cm <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)		Max. revolution (min <sup>-1</sup> )	Approx. weight. (kg)
			1500min <sup>-1</sup>	1800min <sup>-1</sup>	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

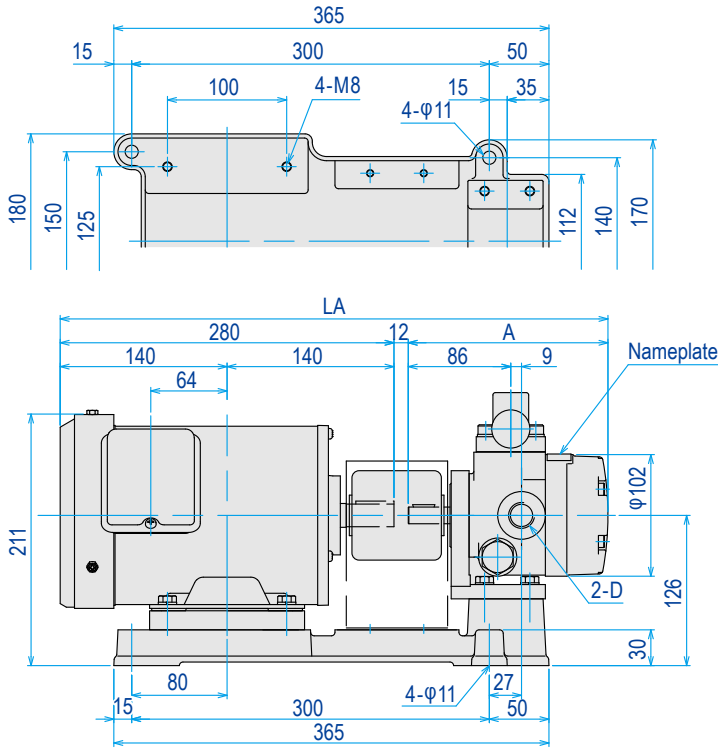
\*\*VK: Set pressure of relief valve (fully closed) at factory is 2.0MPa/Test oil: Karosene/Oil temperature: 20C

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

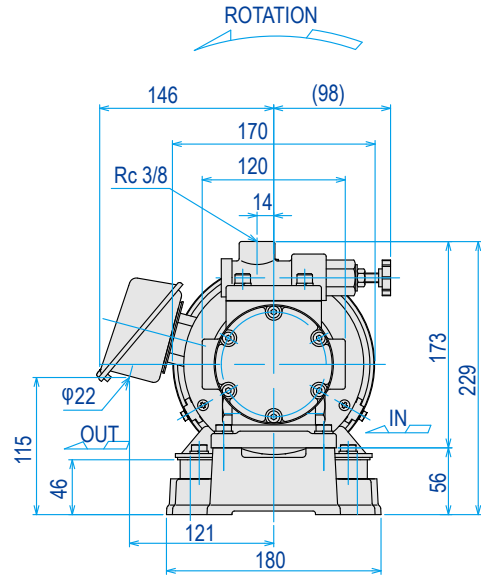
Any disassembly or alteration of the product will void the warranty.

■ Dimensions (Typical) for MB-GD

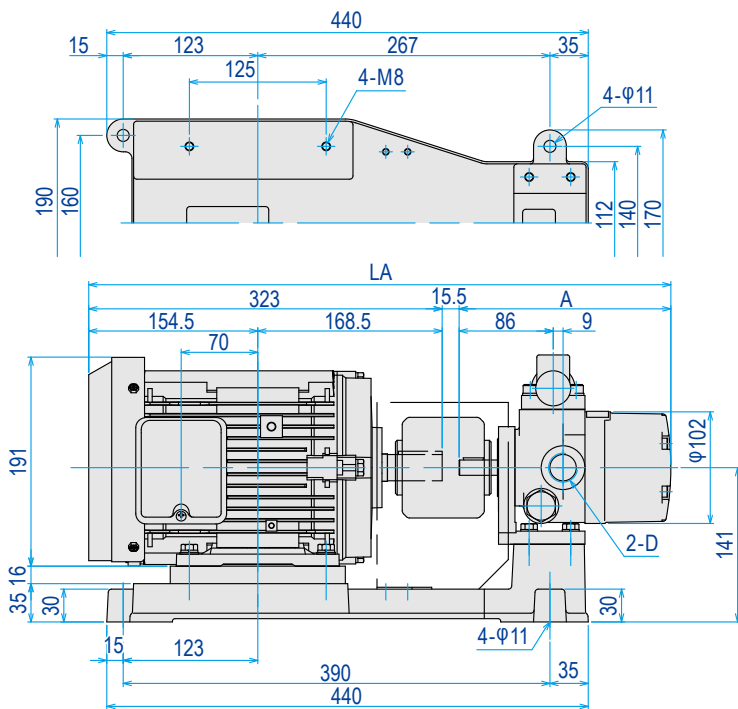
Model : TOP-MBT750-GD-2\*\*VK IE3 / TOP-MBT750-GD-2\*\*H IE3



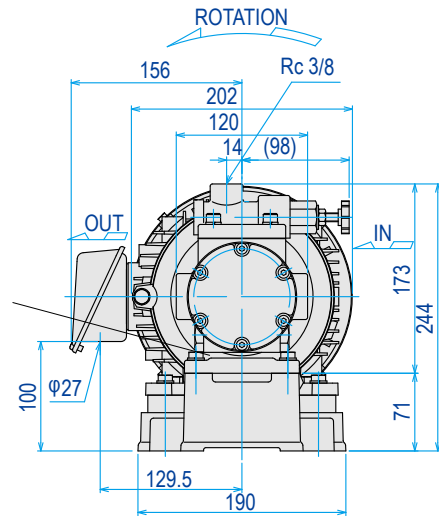
Item Model	LA	A	D
202	459.5	167.5	Rc 1/2
203			
204			
206	485.5	193.5	Rc 3/4
208			
210	497.5	205.5	



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

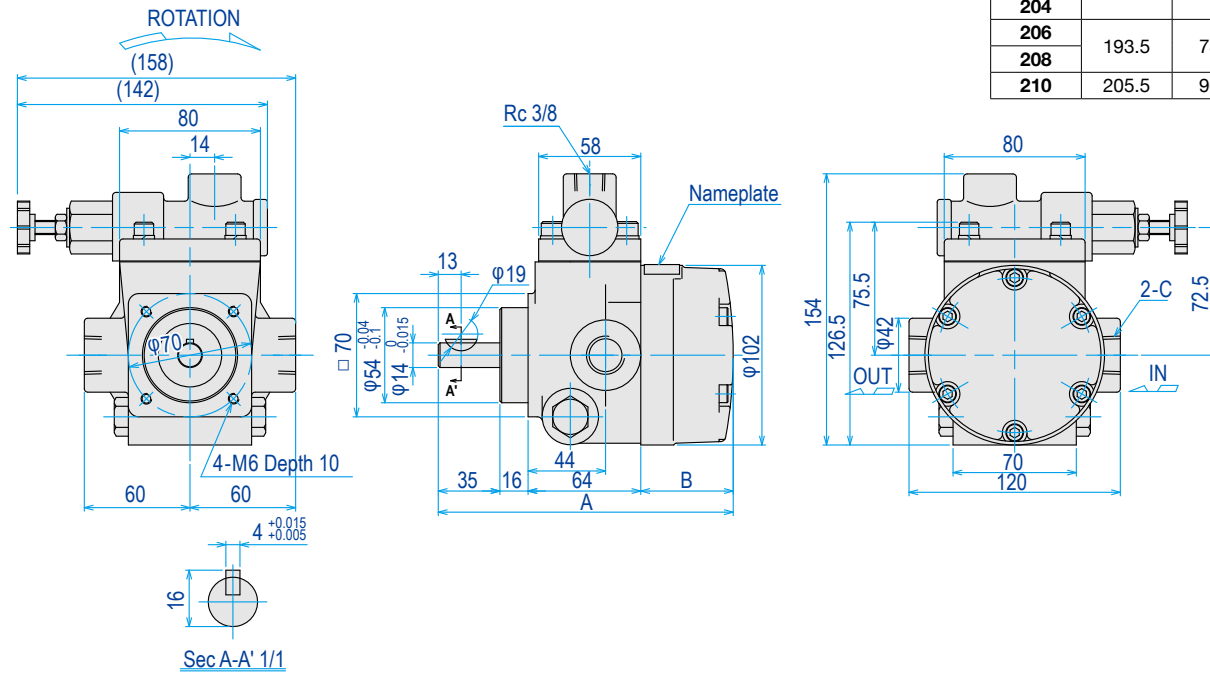


Item Model	LA	A	D
202	506	167.5	Rc 1/2
203			
204			
206	532	193.5	Rc 3/4
208			
210	544	205.5	



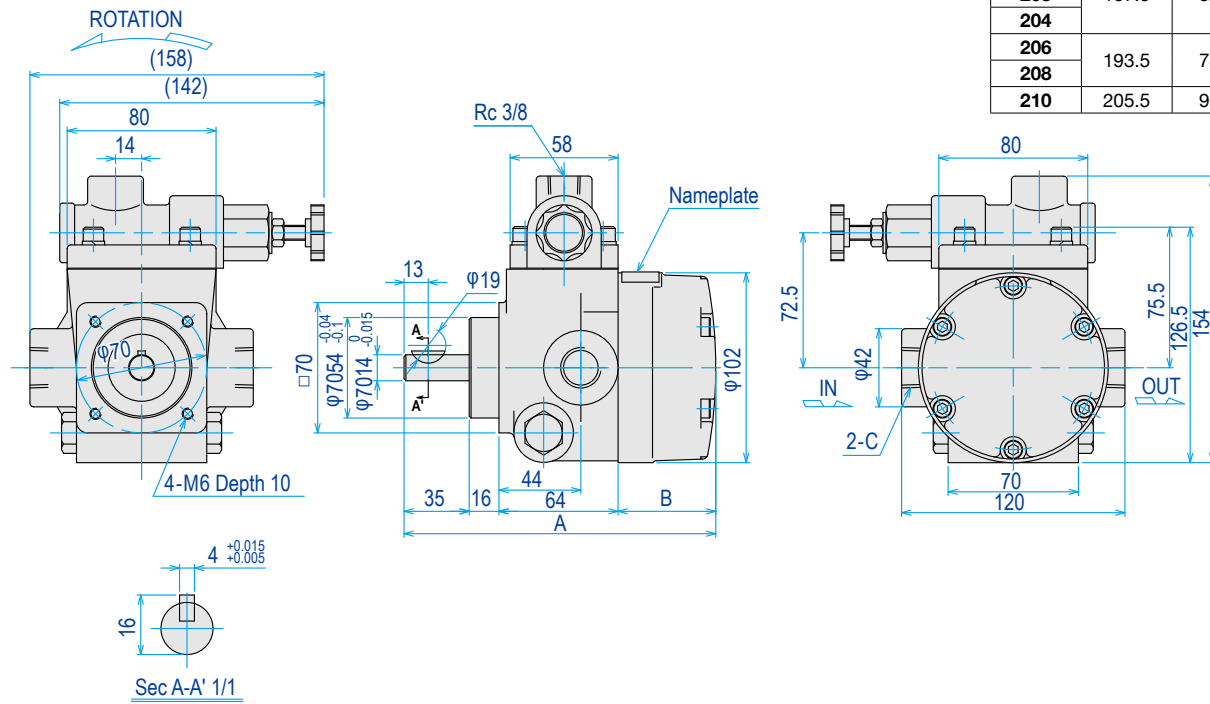
■ Dimensions (Typical) for GD

Model : TOP-GD2\*\*VK



Model	Item	A	B	C
202				
203		167.5	52.5	Rc 1/2
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				
203		167.5	52.5	Rc 1/2
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.

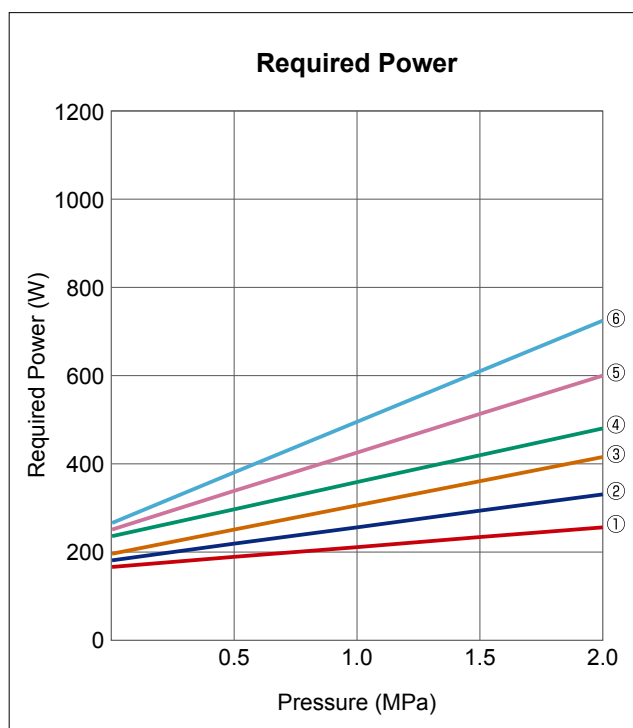
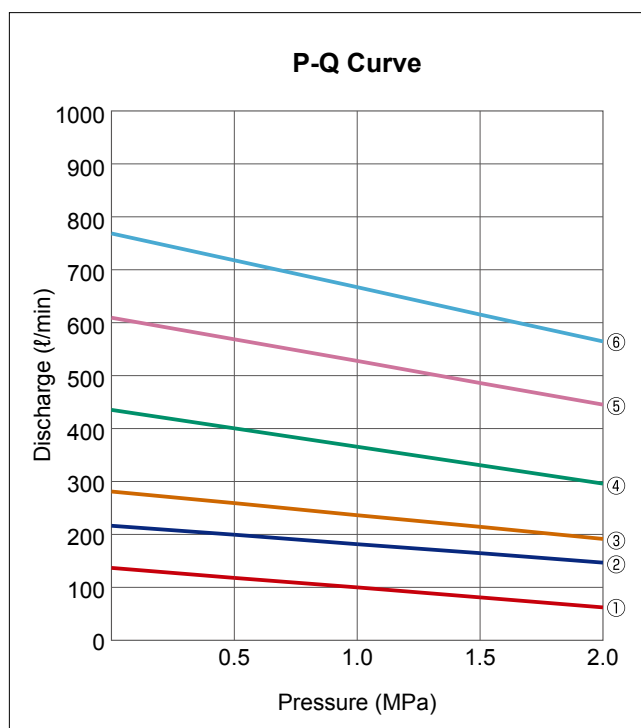
# GD-VK Performance Curve

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<sup>-1</sup>

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



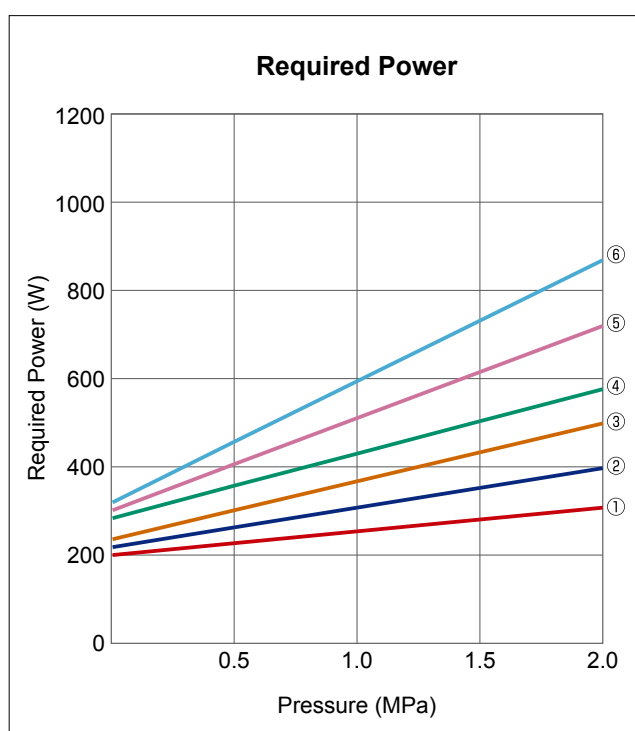
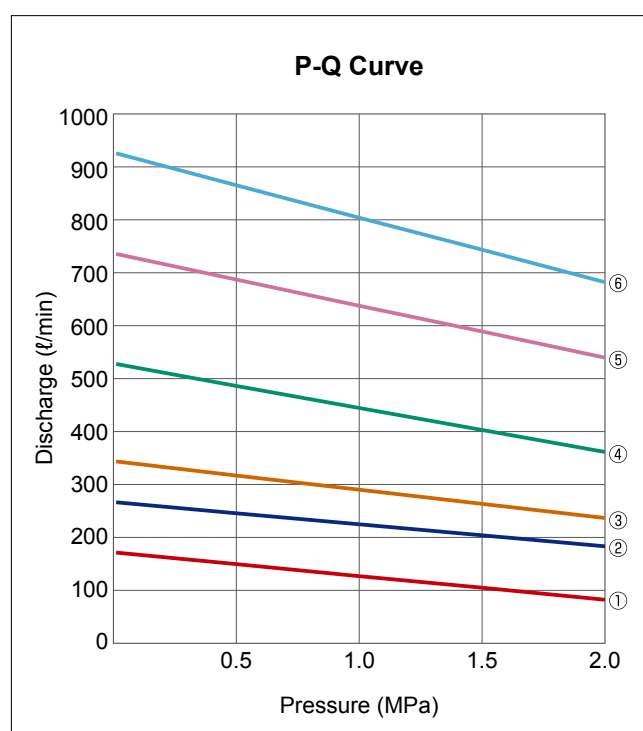
Item	Discharge (ℓ/min)					Required Power (W)				
	Pressure (MPa)					Pressure (MPa)				
	0.0	0.5	1.0	1.5	2.0	0.0	0.5	1.0	1.5	2.0
<b>GD-202VK</b>	140	121	103	84	65	165	188	210	233	255
<b>GD-203VK</b>	220	203	185	168	150	180	218	255	293	330
<b>GD-204VK</b>	285	263	240	218	195	195	250	305	360	415
<b>GD-206VK</b>	440	405	370	335	300	235	296	358	419	480
<b>GD-208VK</b>	615	574	533	491	450	250	338	425	513	600
<b>GD-210VK</b>	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<sup>-1</sup>

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



Item	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
<b>GD-202VK</b>	168	146	123	101	78	198	225	252	279	306
<b>GD-203VK</b>	264	243	222	201	180	216	261	306	351	396
<b>GD-204VK</b>	342	315	288	261	234	234	300	366	432	498
<b>GD-206VK</b>	528	486	444	402	360	282	356	429	503	576
<b>GD-208VK</b>	738	689	639	590	540	300	405	510	615	720
<b>GD-210VK</b>	930	869	807	746	684	318	456	594	732	870

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

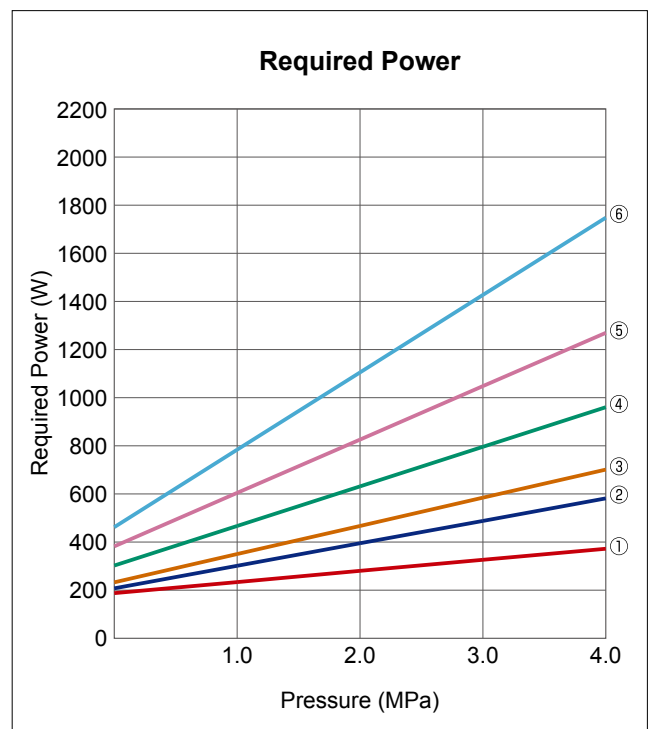
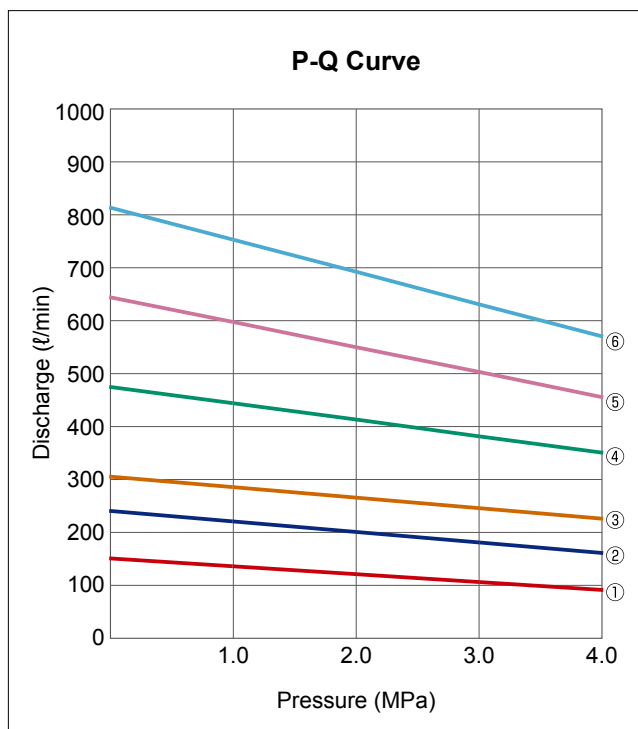
# GD-H Performance Curve

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<sup>-1</sup>

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



Model	Item	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
<b>GD-202H</b>		150	135	120	105	90	185	231	278	324	370
<b>GD-203H</b>		240	220	200	180	160	205	299	393	486	580
<b>GD-204H</b>		305	285	265	245	225	230	348	465	583	700
<b>GD-206H</b>		475	444	413	381	350	300	465	630	795	960
<b>GD-208H</b>		645	598	550	503	455	380	603	825	1048	1270
<b>GD-210H</b>		815	754	693	631	570	460	783	1105	1428	1750

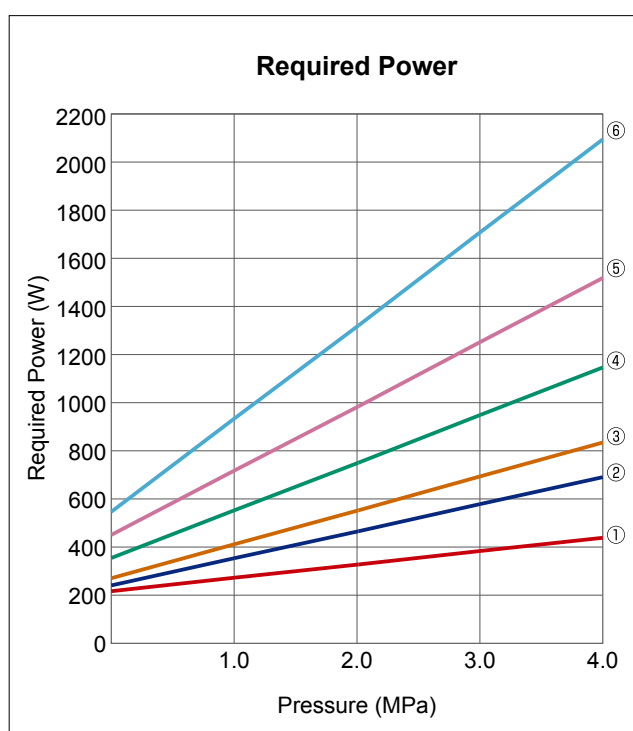
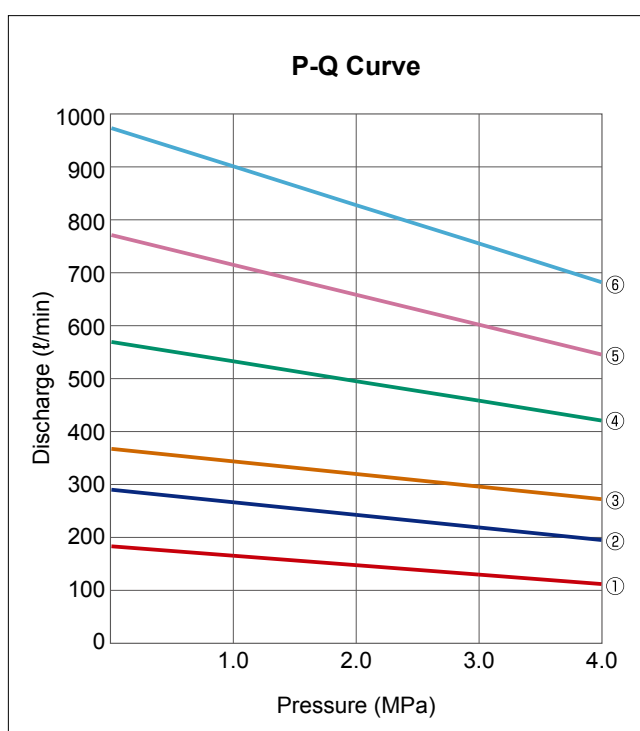


### Test Oil: Heavy oil B Oil Temperature: 40C (Average)

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<sup>-1</sup>

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



Item	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
<b>GD-202H</b>	180	162	144	126	108	222	278	333	389	444
<b>GD-203H</b>	288	264	240	216	192	246	359	471	584	696
<b>GD-204H</b>	366	342	318	294	270	276	417	558	699	840
<b>GD-206H</b>	570	533	495	458	420	360	558	756	954	1152
<b>GD-208H</b>	774	717	660	603	546	456	723	990	1257	1524
<b>GD-210H</b>	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: Single 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 capacity: 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 temperature: 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 (Suction & Discharge) Inlet Outer diameterφ22, Outlet Outer diameterφ18 Tube fitting for pump hose: R1/2 Pressure gauge Plug
Option	Suction strainer (100 mesh)

## Applications

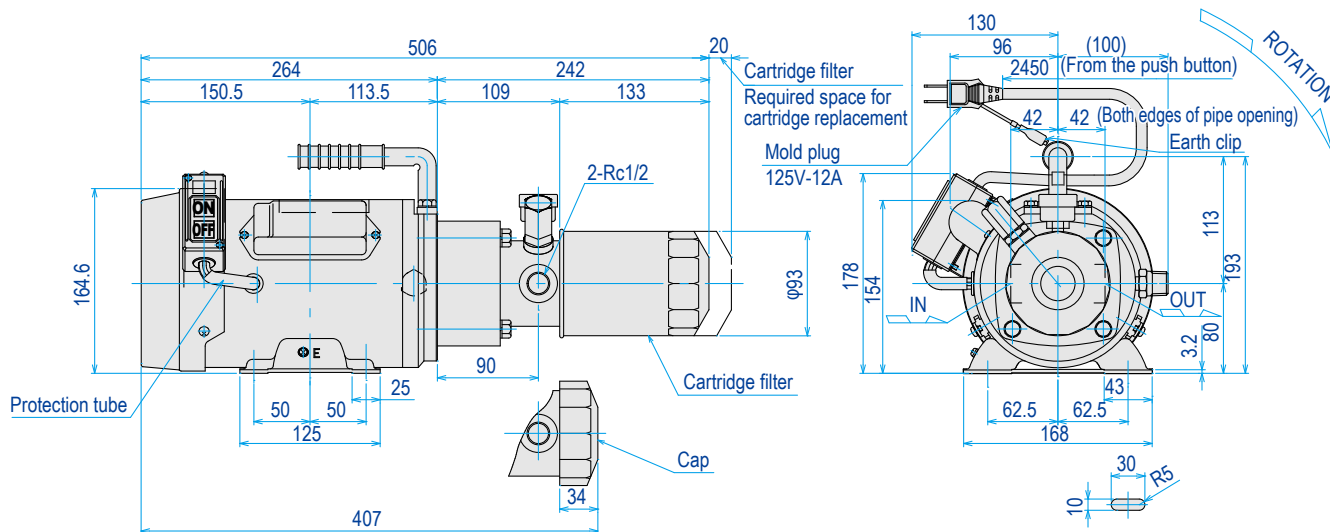
- To remove particles from oil in the hydraulic system tank
- To exchange and supply oil for construction machines and industrial vehicle
- To prevent oil deterioration and oil pollution
- For oil cleaning for other purposes

## 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.

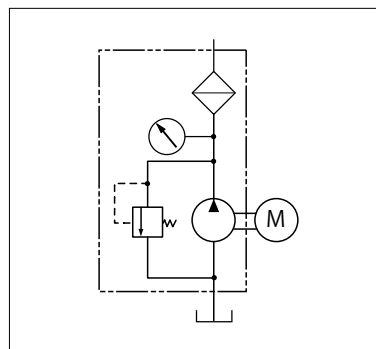
■ Dimensions (Typical) for MICRO TOP

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.

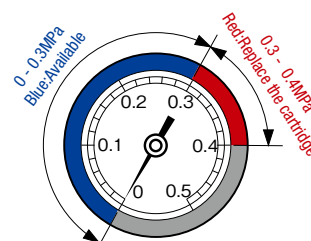


■ Precautions

- 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

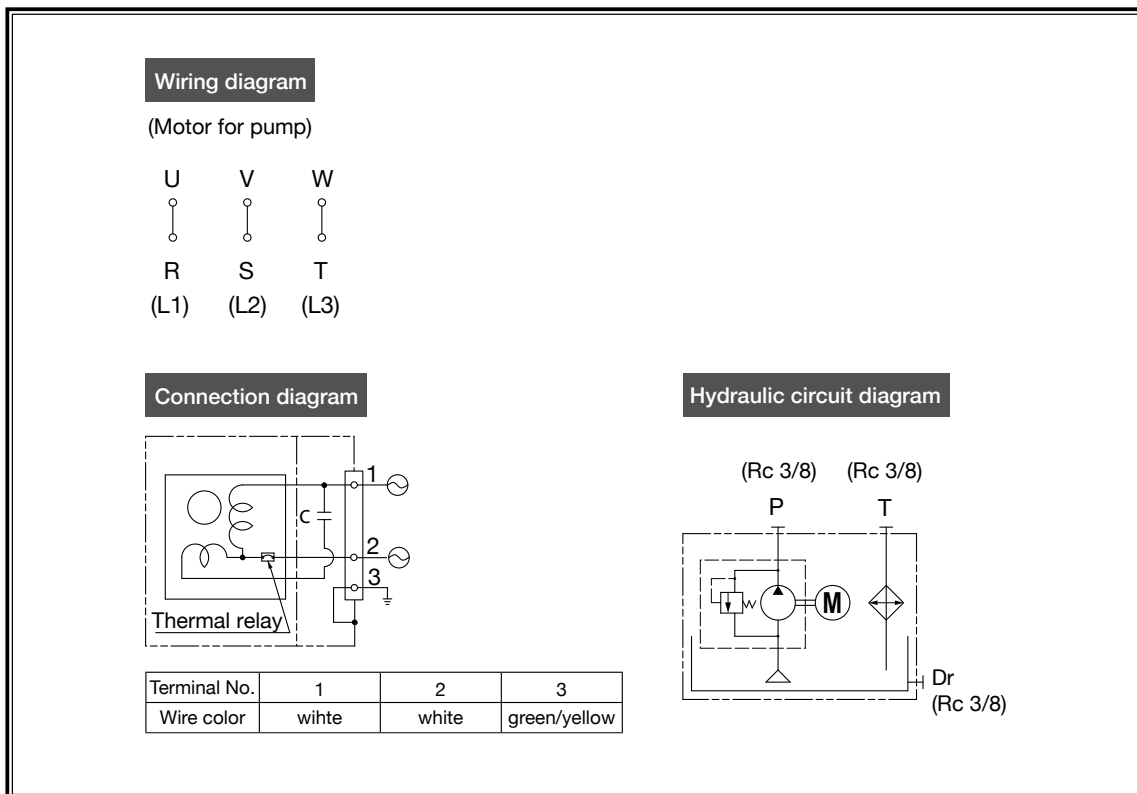
Output  
75

Model

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

## Applications

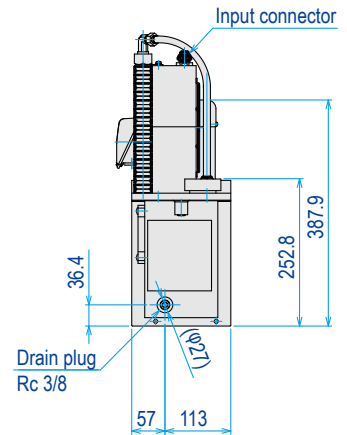
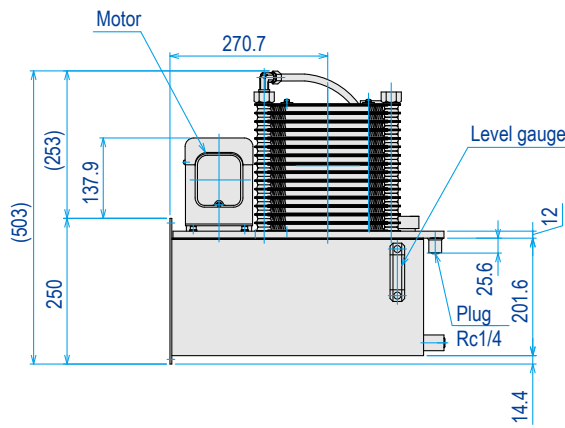
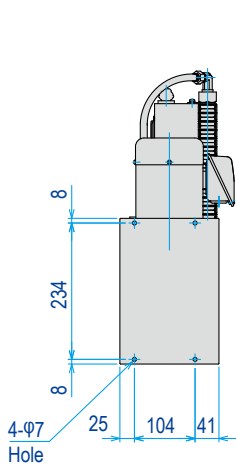
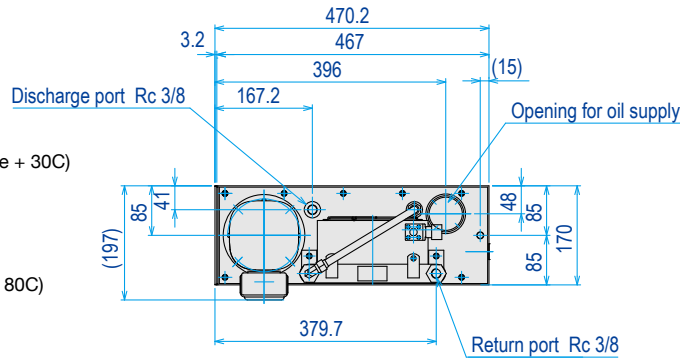
For cooling oil for machine tool and industrial equipment



■ Dimensions (Typical) for 1PS

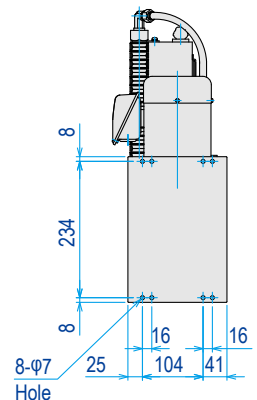
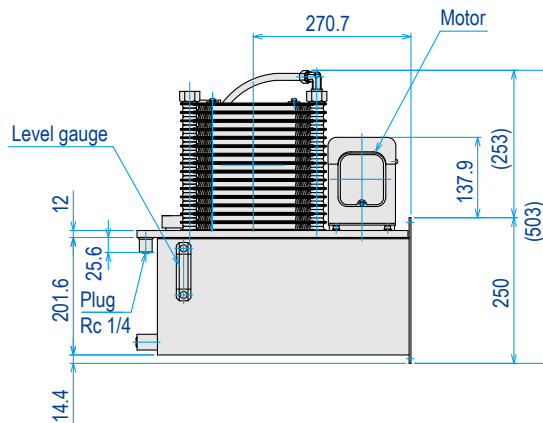
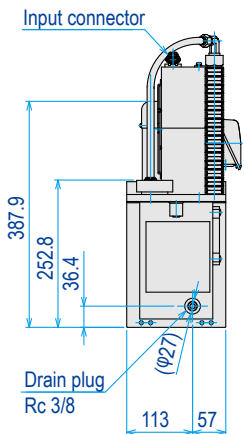
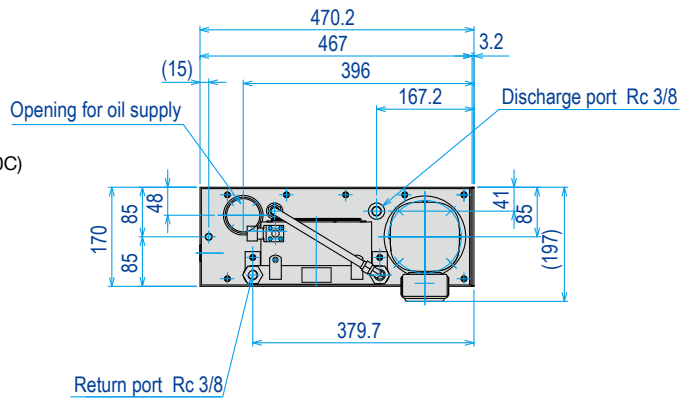
Model No.:1PS75-2-12MAVB-C23

**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 mm<sup>2</sup>/s to 21 mm<sup>2</sup>/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 mm<sup>2</sup>/s to 21 mm<sup>2</sup>/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

Pump model	Item	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

Pump model	Item	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

Pump model	Item	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

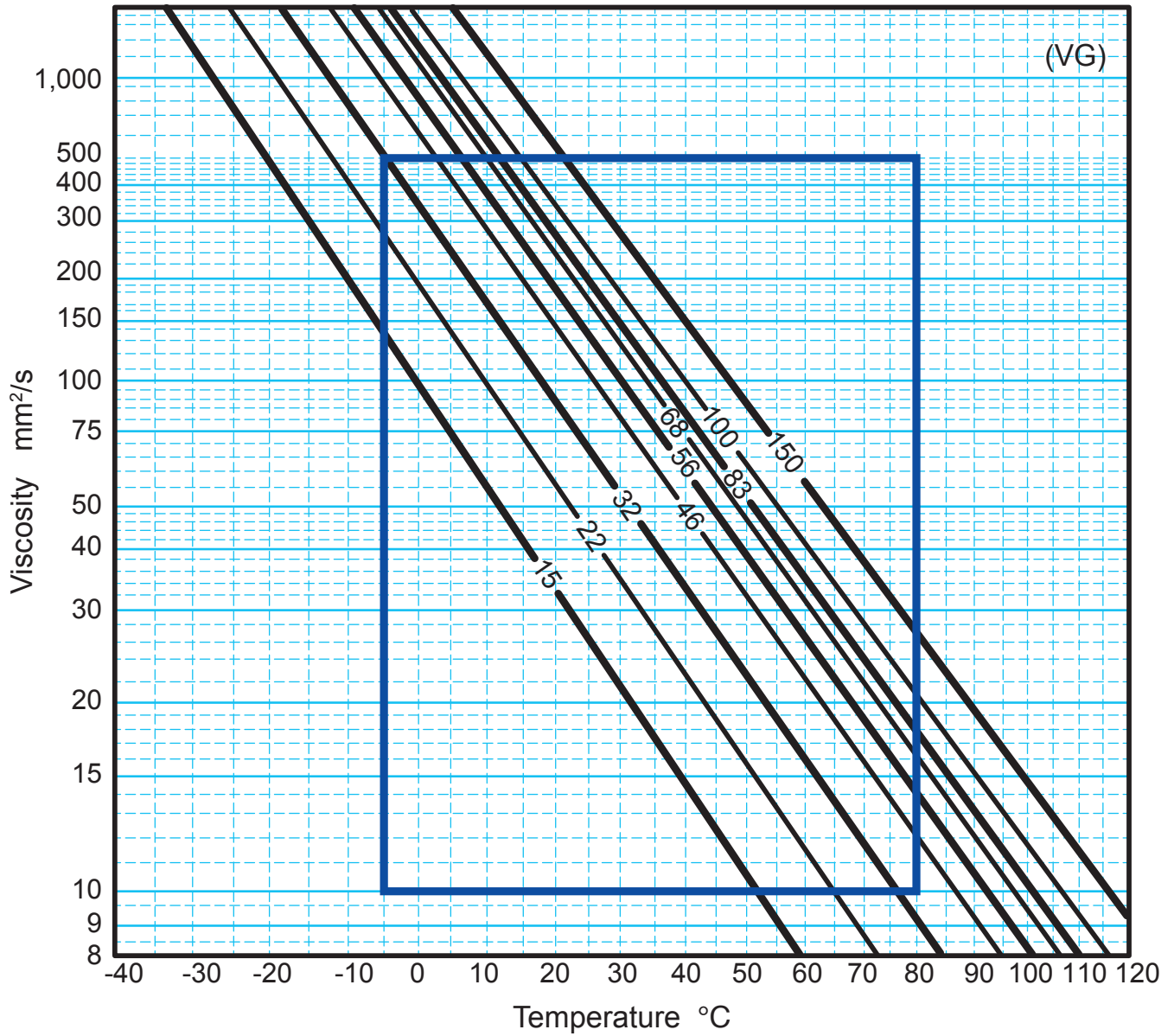
Pump model	Item	code	Application	Oil seal	O-ring	Bearing	Gasket	Trochoid rotor
				Material name				
1A	US		For special fluid	Silicon	Silicon	—	—	Standard
	VF		For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.5MPa)	FKM	FKM			Standard
	VV		For special fluid	FKM	FKM			Standard
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	6307C3x2 NA6908x1	—	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<sup>2</sup>/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 resistance 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 lubricitiy 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 OMPa (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?	<p><b>Outline of Trochoid Pump</b>            Trochoid 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.</p> <p><b>Features of Trochoid Pump</b>            Trochoid 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.</p>
How high does the Trochoid Pump suck up?	<p>At a rotational speed of 1000 to 2500min<sup>-1</sup> 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.</p>
Is it possible to use the Trochoid Pump in reverse rotation and switch suction and discharge?	<p>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.</p>
Pressure is applied to the suction port of Trochoid Pump. Is it all right?	<p>The oil seal pressure resistance of Trochoid Pump is max. 0.03MPa. Make sure that it is within 0.03MPa.</p>
Is high temperature oil available for Trochoid Pump?	<p>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 liquid 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.</p>
What is the minimum rotation speed of the Trochoid Pump?	<p>The permissible rotational speed range of the Trochoid Pump is 500 to 1800 min<sup>-1</sup>. 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<sup>-1</sup>.            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).</p>
Is it possible to use Trochoid Pump in cold places?	<p>Ambient temperature ranges are as follows:            Trochoid pump: -20 to 40C/Trochoid pump with integrated motor: -10 to 40C</p>
Air bubbles appear in the discharge line of the Trochoid Pump. Is it all right?	<ol style="list-style-type: none"> <li>1) Air entering into the circuit (from the piping joint of the suction line). → Retighten or reconnect the piping joints.</li> <li>2) Air entering into the circuit (from the oil seal). → Replace the oil seal.</li> <li>3) Insufficient oil in the tank. → Replenish oil to the specified level.</li> <li>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.</li> </ol>
The motor is hot. Is it all right?	<p>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.</p>
I would like to know how to wire the Motor of Trochoid Pump (integrated motor).	<p>The wiring diagram of the motor is displayed on the terminal box of the motor. Please check the diagram before working on the wiring.</p>
What is the reversible Trochoid Pump?	<p>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.</p>

# 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 technical support about the product are unavailable.

# Trochoid™ Pump, Lunary™ Pump Operation Instructions [Please read all instructions before using.]

## INDEX

■ To Select a Pump .....	P. 136	■ Pump Drive Method .....	P. 140
■ To Select a Motor .....	P. 138	■ Preparations .....	P. 141
■ Safety Precautions .....	P. 138	■ Inspection .....	P. 141
■ Pump Installation .....	P. 138	■ Maintenance .....	P. 141
■ Suction Capacities .....	P. 139	■ Warranty .....	P. 141
■ Pipe Arrangement.....	P. 139		

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 durability 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<sup>2</sup>/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<sup>2</sup>/sec.
- The viscosity range of the pump for high viscosity liquid (Lunary Pump 3V) is 46 to 2000 mm<sup>2</sup>/sec.

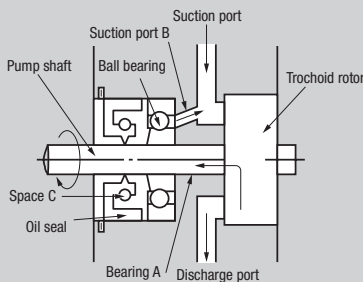
**Caution** Operating outside the above range may drastically shorten the pump service life and reduce the performance and cause leaks.

- 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 Lunary 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.



- 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.

The figure is for illustrative purpose.

**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 a 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<sup>-1</sup> 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.

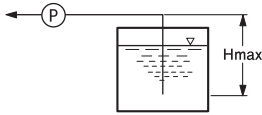
< Calculation > Fluid Velocity (m/s) = 
$$\frac{\text{Pump Flow Rate (m}^3\text{/s)}}{\text{Pipe Cross-section Area (m}^2\text{)}}$$

**Caution**

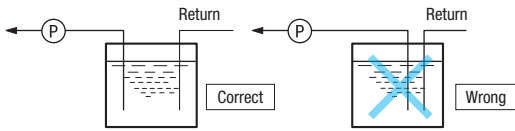
Trapped air or foam inside the pipes may result in pump noise, vibrations and heating, which in turn could damage the pump.



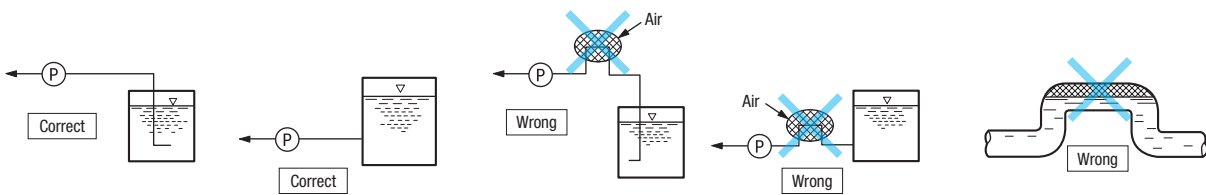
- Calculate the suction head based on the minimum oil level.



- 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

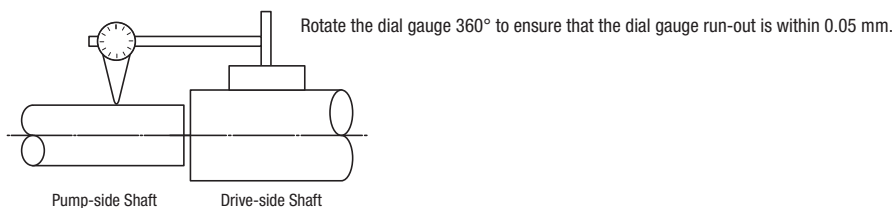
- It is recommended to install suction filter of 150-mesh with as large capacity as possible if operated in a normal condition.
- Select filters with a passage resistance of 0.01MPa or less after confirming the manufacturer's specifications.
- The purpose of installing suction filter is to remove large 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

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### ■ 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

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### ■ 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

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- 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

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- 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 <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. weight. (kg) (Relief valve attached)
		1500min <sup>-1</sup>	1800min <sup>-1</sup>			
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	12	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* <sup>1</sup>	1800	8
TOP-N330FAMVB	39	58.5	70.2	2.5* <sup>1</sup>	1800	10.5
TOP-N330FBM	39	58.5	70.2	2.5* <sup>1</sup>	1800	9
TOP-N340FAM	52	78	93.6	2.0* <sup>1</sup>	1800	8
TOP-N340FAMVB	52	78	93.6	2.0* <sup>1</sup>	1800	10.5
TOP-N340FBM	52	78	93.6	2.0* <sup>1</sup>	1800	9
TOP-N320H	26	39	46.8	4	1800	14.8 (15.4)
TOP-N330H	39	58.5	70.2	4.0* <sup>1</sup>	1800	14.9 (15.5)
TOP-N340H	52	78	93.6	3.0* <sup>1</sup>	1800	14.9 (15.5)
TOP-N350H	65	97.5	117	2.0* <sup>1</sup>	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 <sup>3</sup> /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min <sup>-1</sup> )	Approx. weight. (kg) (Relief valve attached)
		1000min <sup>-1</sup>	1200min <sup>-1</sup>			
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 <sup>-1</sup>					Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min <sup>-1</sup>				
		Maximum pressure for motor output (MPa)						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 <sup>-1</sup>					Theoretical discharge (ℓ/min)	Motor speed 60Hz 1800min <sup>-1</sup>				
		Maximum pressure for motor output (MPa)						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 <sup>*1</sup>	70.2	-	0.5	1	2.1	3.3
TOP-3MBT*-N340H	78	-	0.5	0.9	1.8	3.0 <sup>*1</sup>	93.6	-	0.3	0.6	1.4	2.3
TOP-3MBT*-N350H	97.5	-	0.3	0.7	1.4	2.0 <sup>*1</sup>	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 <sup>*1</sup>	70.2	-	0.5	1	2.1	3.3
TOP-3MBM*-N340H	78	-	0.5	0.9	1.8	3.0 <sup>*1</sup>	93.6	-	0.3	0.6	1.4	2.3
TOP-3MBM*-N350H	97.5	-	0.3	0.7	1.4	2.0 <sup>*1</sup>	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 <sup>-1</sup>			Theoretical discharge (ℓ/min)	Motor speed 60Hz 1200min <sup>-1</sup>		
		Maximum pressure for motor output (MPa)				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.

# **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.

For further information:

HP: <https://www.nopgroup.com/english>

Tel : +81-3-6402-4041

Fax: +81-3-3436-1777

Sumitomo Fudosan Higashi Shimbashi Building-6 3F,  
1-2-4 Hamamatsucho, Minato-ku, Tokyo, Japan  
105-0013

Your dealer: