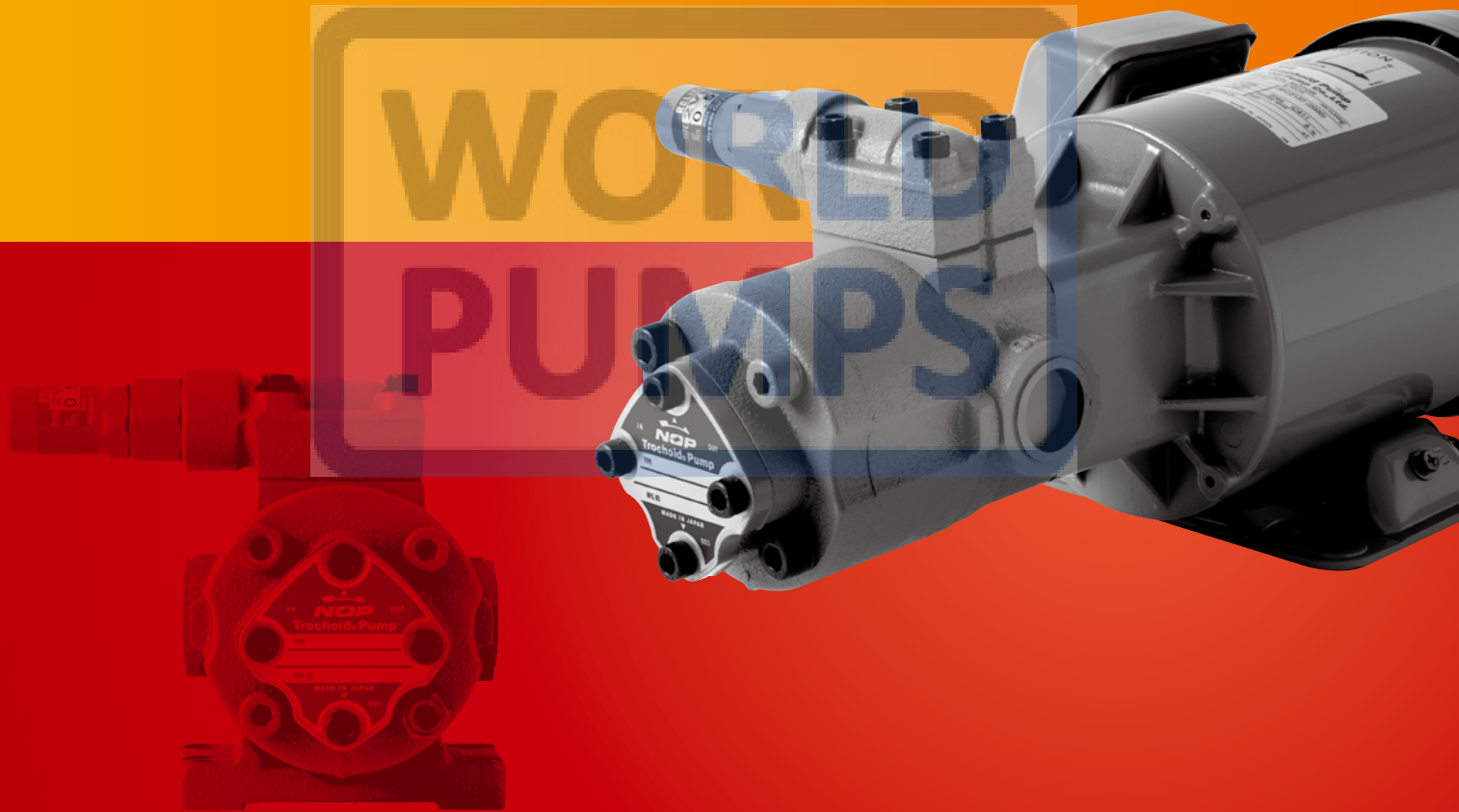


NOP[®]

≡≡≡ DIGEST EDITION ≡≡≡

Trochoid™ Pump

Products Guide

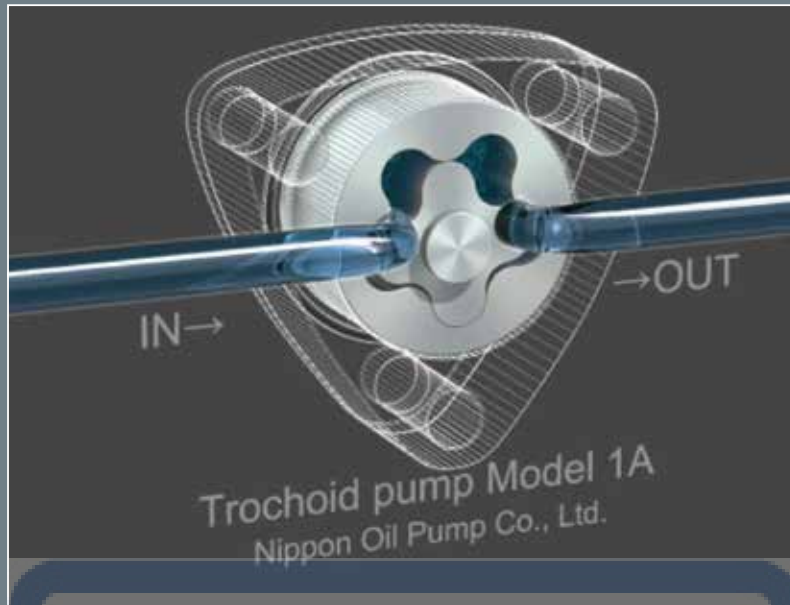


NOP[®]

Nippon Oil Pump Co., Ltd.

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 rotates, the volume of the gap expands and shrinks continuously. Expansion of the gap creates vacuum and fluid is drawn into the pump and as the gap shrinks, compression occurs and fluid is pumped out.



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

*¹Trochoid™ Pump with integrated motor

1. Compact size

- Trochoid™ Pump is an internal gear pump, which is more compact than other pump types 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.

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
Applications and Usage Examples of Trochoid™ Pump	P8

Specifications

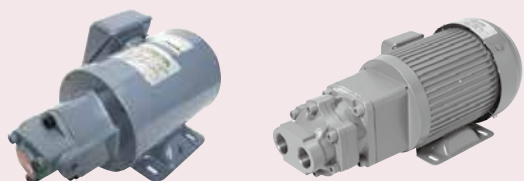




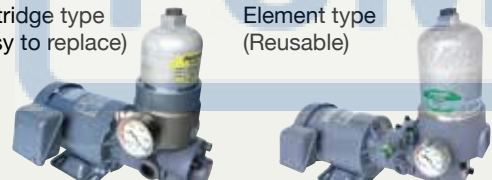







Small capacity	1ME (with integrated 3-phase motor)	P10
	1MB (Base-coupling mount type)	
	1A/1HG (Pumphead)	
	1MA (Pumphead for 1ME motor)	
	1A/1MA Performance Curve/1HG Performance Curve	P11
Small to medium capacity	2MY-2HBM(with integrated 3-phase motor)	P12
	2MY-2HTM(with integrated 3-phase motor)	
	2MY-2HWM (with integrated 3-phase motor)	
	2MY-S Filter (with integrated 3-phase motor)	P13
	2MY-W Filter (with integrated 3-phase motor)	P14
	2MY-2HBM+2HB (Dual pump with integrated 3-phase motor)	P15
	2MB (Base-coupling mount type)	
	2HB/2HT (Pumphead)	P16
	2HBM/2HTM/2HWM (Pumphead for 2MY-motor)	
	2.5HGA (Pumphead)	P17
	2HB(M) Performance Curve/2HT(M) Performance Curve	P18
2HW(M) Performance Curve/2.5HGA Performance Curve	P19	
Medium capacity	3MF (with integrated 3-phase motor)	P20
	N3F (Pumphead)	
	3MB-N3H (Base-coupling mount type)/N3H (Pumphead)	
	3MB-3V (Base-coupling mount type)/3V (Pumphead)/N3F Performance Curve	P21
	N3H Performance Curve/3V Performance Curve	P22
Large capacity	4MB-4AM (Base-coupling mount type)/4AM (Pumphead)	P23
	4MB-4A (Base-coupling mount type)/4A (Pumphead)	
	MB-GPL (Base-coupling mount type)/GPL (Pumphead)	
	4AM Performance Curve/4A Performance Curve	P24
	GPL Performance Curve	P25
Others	1RA/2RA (Pumphead)	P26
	3RD/4RD (Pumphead)	
	RELIEF VALVE	P27
	MB-GD (Base-coupling mount type)/GD (Pumphead)	
	MICRO TOP (Portable compact oil filter)	P28
	1PS (Oil cooler unit)	
	1RA Performance Curve/2RA Performance Curve.....	P29
	3RD Performance Curve/GD-VK Performance Curve	P30
GD-H Performance Curve	P31	


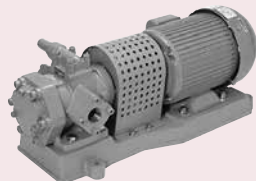


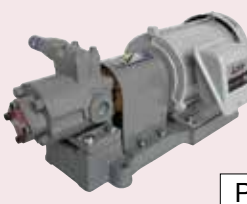
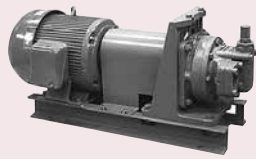



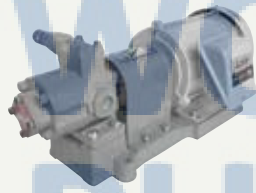







Instructions of Trochoid™ Pump

· Lists of Applicable Seal Kit, Bearing, Seal and Gasket Material Options for Special Specification	P32
· Trochoid™ Pump Discontinued Products List (Standard models)	P33
· Viscosity Chart	

- The model numbers given in this catalogs are examples with the most typical options.
For other options, please refer to the e-catalog on our website. <http://www.nopgroup.com/english/products/>
- Max.pressures shown in this catalog are calculated under the following conditions:
Test solution for general lubricant oil: ISO-VG46 Oil temperature: 40C
Test solution for metal-cutting fluid and fuel oil: ISO-VG2 Oil temperature: 40C
- The model number ends with "IE3" if you select a three phase motor with rated power of over 750W.

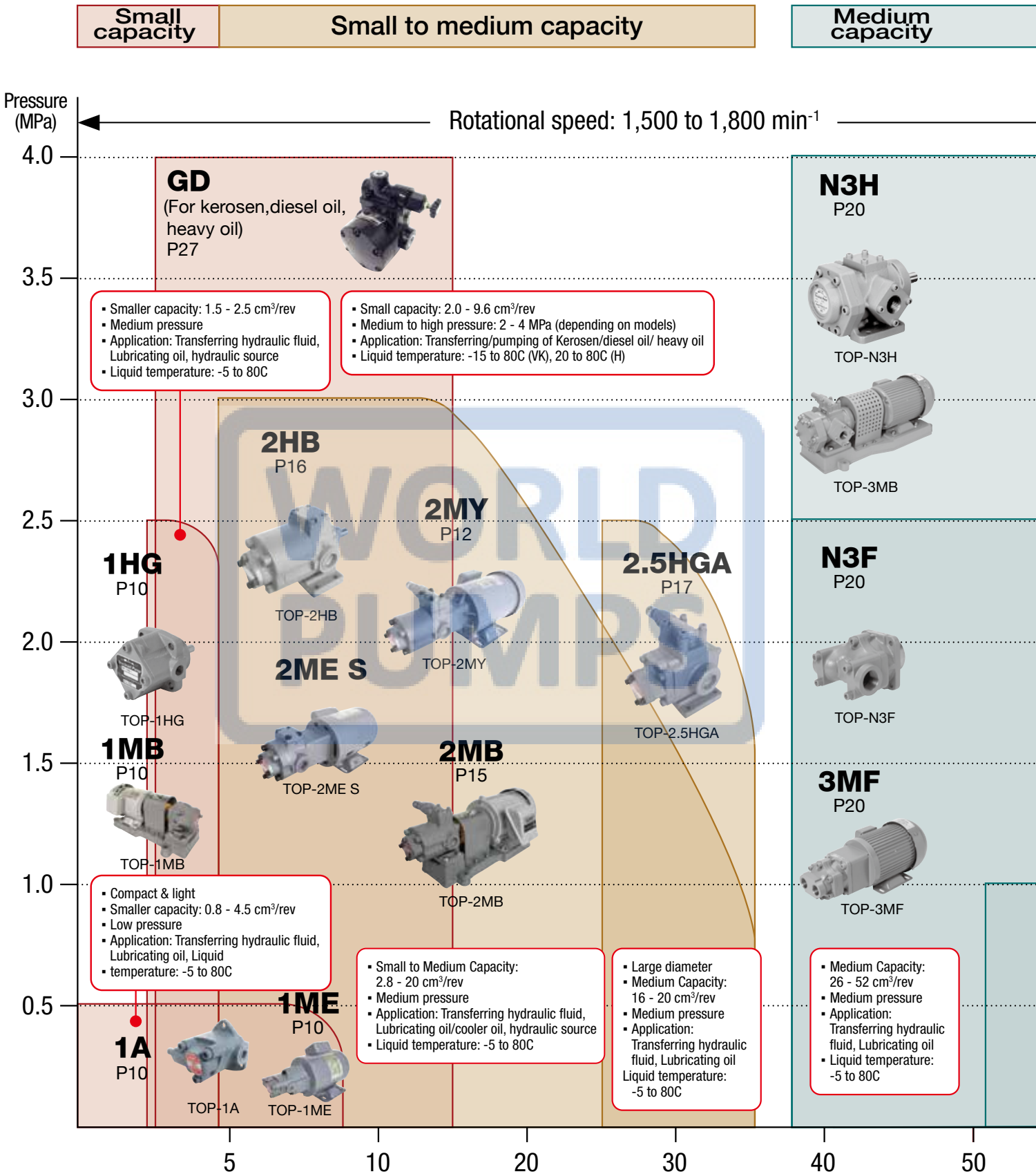
Trochoid™ Pump, Lunary™ Pump Quick Reference Guide

<p>Select a standard pump</p>	<p>Compact Models</p> <p>1ME 3MF</p>  <p>P10 P20</p> <p>2MY</p>  <p>P12</p> <p>Easy to attach and replace</p>		<p>Models with single-phase motor</p> <p>1ME S</p>  <p>2ME S</p>  <p>Note: For more information, please refer to our catalog.</p>	
	<p>Select a pump for a fluid</p>	<p>For cutting fluid</p> <p>2MY-2HWM (Basic model)</p>  <p>P12</p> <p>2MY-S Filter</p> <p>(Suction filter)</p> <p>Cartridge type (Easy to replace) Element type (Reusable)</p>  <p>P13</p>		<p>For high temperature oil</p> <p>1A-VF (Small flow rate)</p>  <p>P10</p> <p>2HB-VF/VH (Small to medium flow rate)</p>  <p>P16</p> <p>N3H-VF/VH (Medium flow rate)</p>  <p>P20</p> <p>1ME200SH-1MAVB-BT (High temperature edible oil)</p>  <p>Note: For more information, please refer to our catalog.</p>
<p>Select a pump for applications</p>		<p>More compact</p> <p>Double filters (To increase productivity)</p>  <p>P14</p> <p>Dual pump (To recover oil with a single unit)</p>  <p>P15</p>		<p>To cool oil</p> <p>1PS</p>  <p>P28</p>

<p>To attach a motor for specific use</p>			<p>To use only a pump</p>	
<p>1MB</p>  <p>P10</p>	<p>3MB</p>  <p>P20</p>	<p>1A/1HG (Small flow rate)</p>  <p>P10</p>	<p>N3F/N3H (Medium flow rate)</p>  <p>P20</p>	
<p>2MB</p>  <p>P15</p>	<p>4MB</p>  <p>P23</p>	<p>2HB/2.5HGA (Small to medium flow rate)</p>  <p>P16/P17</p>	<p>4AM/4A (Large flow rate)</p>  <p>P23</p>	
<p>To convey fuel oils (Kerosen,diesel oil, heavy oil)</p>			<p>To convey high viscosity oil</p>	
<p>2HT For low velocity oils</p>  <p>P16</p>	<p>2MB-2HT</p>  <p>P15</p>	<p>3V/3MB-3V</p>  <p>P21</p>	<p>GPL/MB-GPL</p>  <p>P23</p>	
<p>GD MB-GD For spray combustion</p>  <p>P27</p>				
<p>To transfer oil in the same direction regardless of its rotation direction</p>			<p>To use only a valve</p>	
<p>1RA</p> 	<p>2RA</p>  <p>P26</p>	<p>3RD</p> 	<p>2VB/2VD/2VBD/ 3VB/3VBD/ 4VBP/4VBPD</p>  <p>P27</p>	

Trochoid™ Pump, Lunary™ Pump Performance Distribution Map

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



Large capacity

Test oil: ISO-VG46 at 40C

Rotational speed: 1,000 to 1,200 min⁻¹

- Medium Capacity: 26 - 65 cm³/rev
- Medium to high pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

- Large Capacity: 115.5 - 280.5 cm³/rev
- Medium pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 120C

- Large Capacity: 349.8/580.8 cm³/rev
- Small pressure
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 120C

- High viscosity
- Large Capacity: 150/200/250 cm³/rev
- Application: Transferring hydraulic fluid, Lubricating oil
- Liquid temperature: -5 to 80C

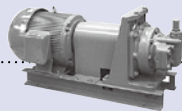
- High viscosity
- Medium Capacity: 39 - 65 cm³/rev
- Medium pressure

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

4AM
P23



TOP-4AM



TOP-4MB

3V
P21



TOP-3V

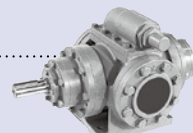
GPL/MB-GPL

Lunary™ Pump
P23
(960-1750min⁻¹)



GPL

4A
P23



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 in oils may cause a trouble to the pump, so please inquire with the oil manufacturer about the compatibility with your liquid 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
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 0.7MPa in discharge pressure. (The pump has a limit in discharge pressure)
- ×: Unavailable.
- For special specifications, refer to P.32. 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
○	○	×	○	×	×	×	×
○	○	×	○	×	×	×	×
○	○	●	□	×	×	×	×
×	○	●	□	×	●	×	●
×	×	×	×	×	○	○	○
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	×	×	×	×	○	○	○
×	×	×	×	○	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	●	×	●
○	○	●	□	×	×	×	×
○	○	×	□	×	●	×	●
×	○	×	×	×	×	×	×
×	○	×	×	×	×	×	×
○	○	●	□	×	×	×	×
○	○	●	□	×	×	×	×
×	○	×	×	×	×	×	×
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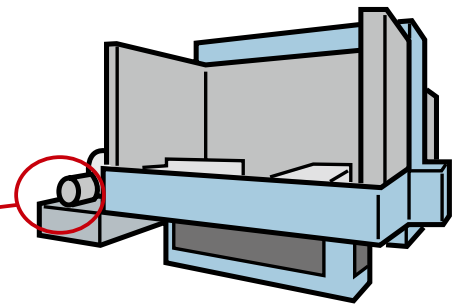
Applications and Usage Examples of Trochoid™ Pump

■ 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



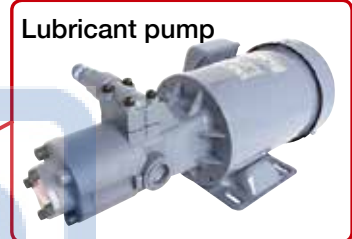
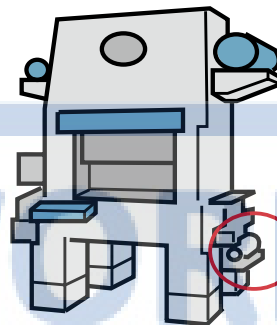
Machining center

■ 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

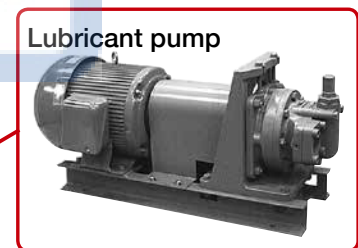
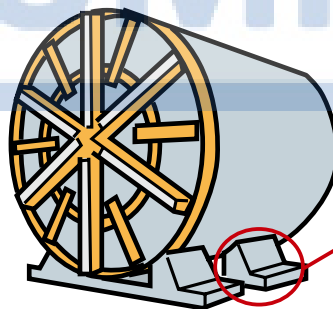


Press machine

■ Construction, Civil engineering, and Agricultural machine

Lubrication for rotating parts, supply of engine oil

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

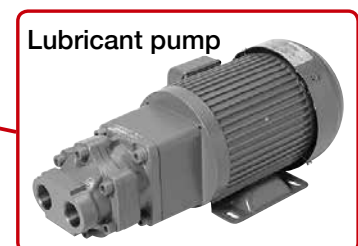
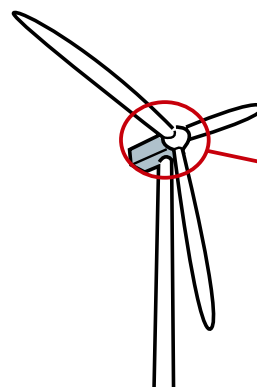


Shield machine

■ Environmental equipment

Lubricating oil, fuel oil supply, filtration

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



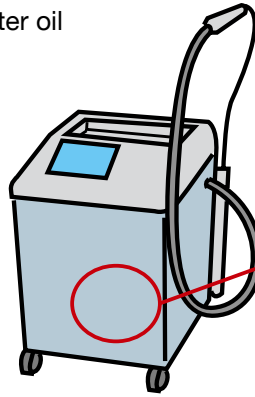
Wind-power generator

■Automotive

Exchange/supply of engine oil, torque converter oil

Hydraulic source for hydraulic equipment

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



Oil recovery and supply pump



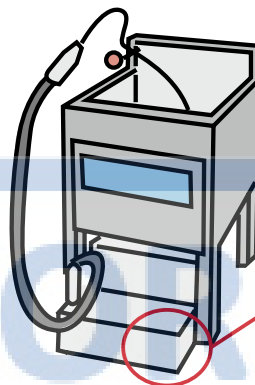
Oil exchanger

■Food

Transfer and filtration of edible oil

Hydraulic source for hydraulic equipment

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



Oil recovery and supply pump

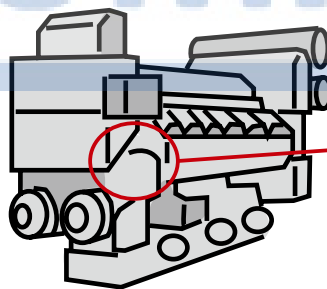


Frying oil filtration machine

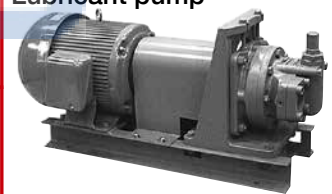
■Ship

Transfer of lubrication oil and fuel oils

- Diesel engine
- Emulsion production device
- Others



Lubricant pump

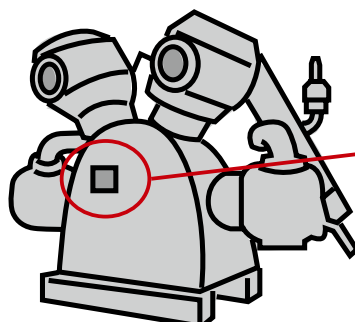


Diesel engine

■Others

Lubrication for steel making and forging machine

- Lubrication for air conditioner
- Compressor



Lubricant pump



Compressor

1ME (WITH INTEGRATED 3-PHASE MOTOR)

Model **TOP-1ME ▲▲▲▲ - 1▲MA (VB)**

Motor size

Valve option

75-1	75W Motor	100	100W Motor
75-2	75W Motor, Vertically Mounted	200	200W Motor



■ SPECIFICATION

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

Note: 1ME series can not be provided with explosion-proof increased safety motor or motor with terminal box attached on the other side. For outdoor use, please consult us.

■ MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation, Protection level IP44 200VAC 50/60Hz or 220VAC 60Hz, 4 poles, Continuous rating at 75W, 100W, 200W.

*The pump with a single phase power supply (100V) is also available. Output : 75W, 200W Please contact us for more information.

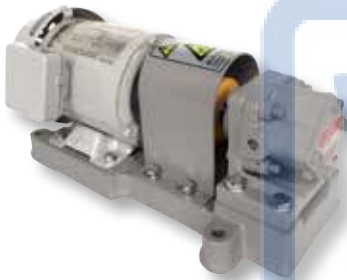
1MB (BASE-COUPLING MOUNT TYPE)

Model **TOP-1MB M ▲▲▲▲ - 1▲HGI**

Motor size

M Mitsubishi Motor
T Toshiba Motor

200 200W Motor
400 400W Motor



■ SPECIFICATION

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

■ MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation, Protection level IP44 200VAC 50/60Hz or 220VAC 60Hz, 4 poles, Continuous rating at 200W, 400W

1A/1HG (PUMPHEAD)

Model **TOP-1▲ A (VB)**

HG Valve option

A Standard type

HG High pressure type



■ SPECIFICATION

Model	Item	Theoretical displacement (cm ³ /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)	Max. revolution (min ⁻¹)	Approx. Weight (Kg)
			1500min ⁻¹	1800min ⁻¹			
			TOP-10A	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	

1MA (PUMPHEAD FOR 1ME MOTOR)

Model **TOP-1▲MA (VB)**

Valve option



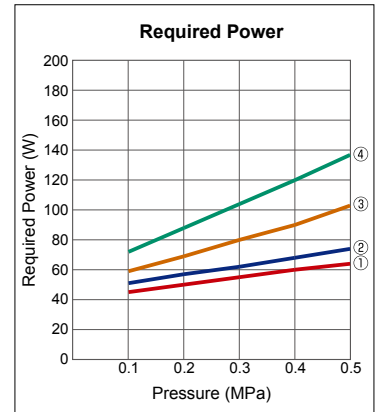
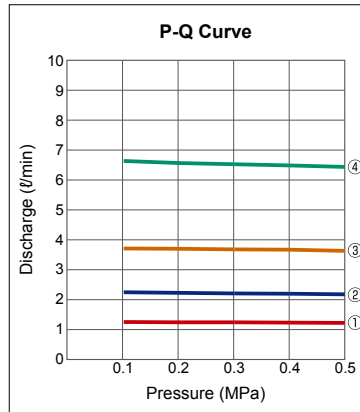
■ SPECIFICATION

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

1A/1MA Performance Curve

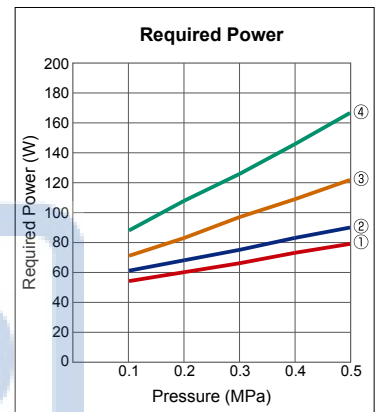
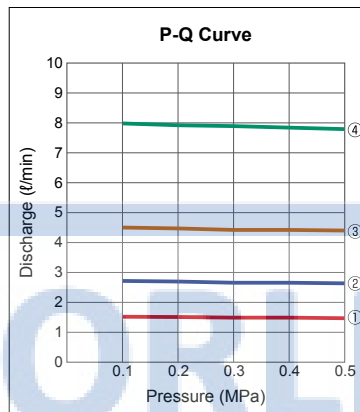
1450 min⁻¹

① 10A ② 11A
③ 12A ④ 13A



1750 min⁻¹

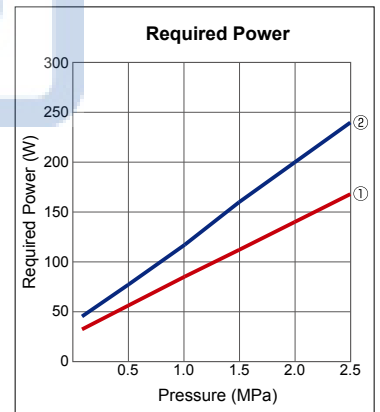
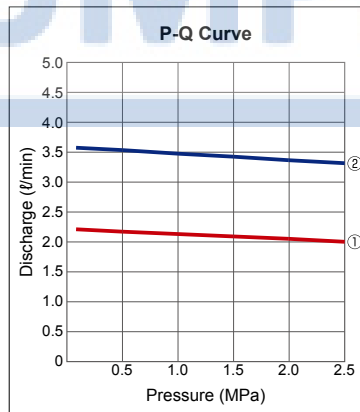
① 10A ② 11A
③ 12A ④ 13A



1HG Performance Curve

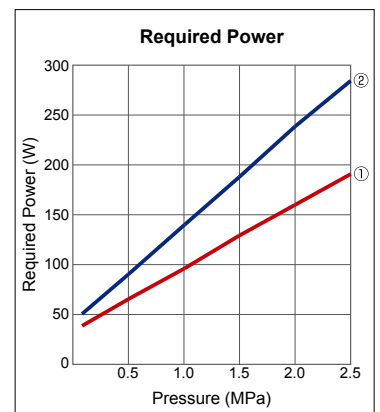
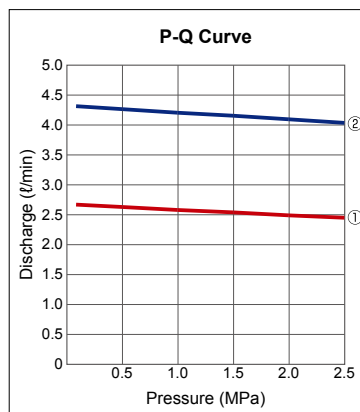
1450 min⁻¹

① 11HG ② 12HG



1750 min⁻¹

① 11HG ② 12HG



2MY-2HBM (WITH INTEGRATED 3-PHASE MOTOR)

Model TOP-2MY ▲▲▲▲ - 2▲▲HBM

Motor size

VB	Non	No valve
VB	With	valve
VD	With	valve (External return type)



SPECIFICATION (For General Lubricant Oil)

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

Note: 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 type was changed from "G" to "Rc" type.

MOTOR SPECIFICATION

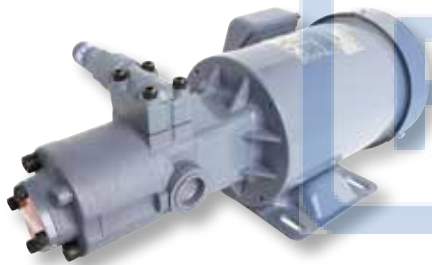
·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation (200, 400W), Class F insulation (750, 1500W), IE3(750, 1500W), CE-marking (750, 1500W), Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 200, 400, 750, 1500W.
 ·Please consult us when ordering outdoor-type, increased safety-type, motor other than for standard voltage, one with CE marking, with terminal box attached on the other side, or other special motor.
 *The pump with a single phase power supply (100V) is also available. Output : 200, 400, 750W

2MY-2HTM (WITH INTEGRATED 3-PHASE MOTOR)

Model TOP-2MY ▲▲▲▲ - 2▲▲HTM

Motor size

VB	Non	No valve
VB	With	valve
VD	With	valve (External return type)



SPECIFICATION (For Diesel Oil, Kerosene, Heavy Oil)

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

MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation (200, 400W), Class F insulation (750, 1500W), IE3 (750, 1500W), CE-marking (750, 1500W), Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 200, 400, 750, 1500W.
 ·Please consult us when ordering outdoor-type, increased safety-type, motor other than for standard voltage, one with CE marking, with terminal box attached on the other side, or other special motor.

2MY-2HWM (WITH INTEGRATED 3-PHASE MOTOR)

Model TOP-2MY ▲▲▲▲ - 2▲▲HWM

Motor size

VB	Non	No valve
VB	With	valve
VD	With	valve (External return type)



SPECIFICATION (For Metal-Cutting Fluid)

Model	Item	Motor speed 50Hz 1500min ⁻¹					Motor speed 60Hz 1800min ⁻¹				
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-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

■ FEATURES

·Designed in a special structure for coolant use

This coolant pump is designed to ensure excellent durability against coolant, because special design considerations are given to each part of the pump.

·High operating pressure

The pump can be used at the pressure up to 1.5 to 2.0MPa. Powerful jet from the high pressure nozzle removes cutting chips and cools blades effectively.

·Self-priming structure

While the conventional impeller pump is not self-priming and needs to be submerged in the tank or primed, 2HWM trochoid pump has a self-priming structure to eliminate such burdensome requirements.

■ MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation (200, 400W), Class F insulation (750, 1500W), IE3 (750, 1500W), CE-marking (750, 1500W), Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 200, 400, 750, 1500W.

·Please consult us when ordering outdoor-type, increased safety-type, motor other than for standard voltage, one with CE marking, with terminal box attached on the other side, or other special motor.

CLEAN HAT SERIES

2MY-S Filter (WITH INTEGRATED 3-PHASE MOTOR & SINGLE SUCTION FILTER)

Model **TOP-2MY** ▲▲▲▲ - **2▲▲H** **B** **MPVB** **E**

Motor size

B	For General Lubricant Oil	Non	Cartridge Type
W	For Metal-Cutting Fluid	E	Element Type



■ SPECIFICATION (For General Lubricant Oil)

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

■ SPECIFICATION (For Metal-Cutting Fluid)

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

■ MOTOR SPECIFICATION

·“203” is unavailable for the coolant models.

·Viscosity range of pumped liquid is 2-50mm²/sec. The vacuum gauge will indicate beyond the green zone if pumped fluid exceeds the permissible viscosity range.

2MY-S Filter (WITH INTEGRATED 3-PHASE MOTOR & SINGLE SUCTION FILTER)

Model **TOP-2MY** ▲▲▲▲ - **2▲▲H** **WNPEVB** *Element type only

Motor size



■ SPECIFICATION (For Metal-Cutting Fluid)

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

■ MOTOR SPECIFICATION

·Viscosity range of pumped liquid is 2-50mm²/sec. The vacuum gauge will indicate beyond the green zone if pumped fluid exceeds the permissible viscosity range.

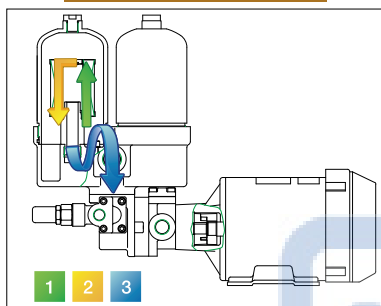
2MY-W Filter (WITH INTEGRATED 3-PHASE MOTOR & DOUBLE SUCTION FILTERS)

Model **TOP-2MY ▲▲▲▲ - 2▲▲HWMDPVDE-005** *Element type only

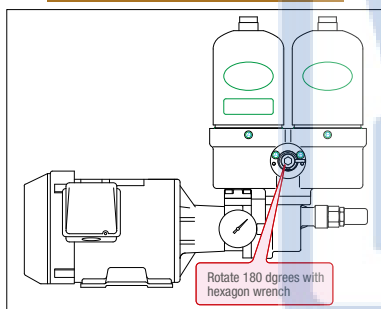
Motor size



Flow of oil inside the filter



How to switch between filters



■ SPECIFICATION (For Metal-Cutting Fluid)

Model	Item	Motor speed 50Hz 1500min ⁻¹					Motor speed 60Hz 1800min ⁻¹				
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			200W	400W	750W	1500W		200W	400W	750W	1500W
TOP-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	

Note: Viscosity range of pumped liquid is 2-50mm²/sec. The vacuum gauge will indicate over the green zone if pumped fluid exceeds the permissible viscosity range.

■ MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation (200, 400W), Class F insulation (750, 1500W), Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 200, 400, 750, 1500W

■ FILTER OPTIONS FOR "CLEAN HAT" SERIES

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

Note: Please specify the model number when ordering filters.

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

Safety precautions for the cartridge replacement

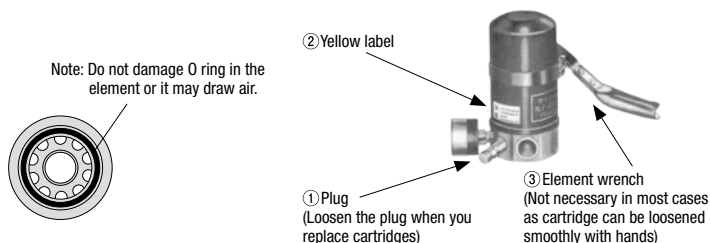
Before replacing the cartridges, make sure that there is no oil remaining inside the cartridge. You can drain the oil by loosening the air suction plug on the side of suction port (Indicated on yellow label on the case)

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.

2HBMPVB (Cartridge type)

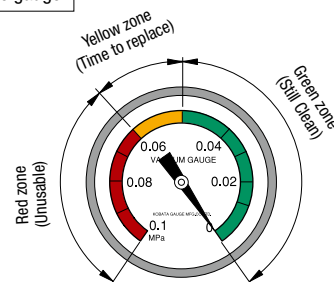


When to replace cartridge and clean element

·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.

Vacuum gauge



2MY-2HBM+2HB (DUAL PUMP WITH INTEGRATED 3-PHASE MOTOR)

Model **TOP-2MY** ▲▲▲▲ - **2▲▲HBM (VB)** + **2▲▲HB**

Motor size

Valve option

VB	Non	No valve
VB	With	valve
VD	With	valve (External return type)



■ SPECIFICATION (For Metal-Cutting Fluid)

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

■ MOTOR SPECIFICATION

·3-phase squirrel-cage induction motor, Totally enclosed, Class E insulation (200, 400W), Class F insulation (750, 1500W), IE3(750, 1500W), CE-marking (750, 1500W), Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 200, 400, 750, 1500W.
 ·Please consult us when ordering outdoor-type, increased safety-type, motor other than for standard voltage, one with CE marking, with terminal box attached on the other side, or other special motor.

2MB (BASE-COUPLING MOUNT TYPE)

Model **TOP-2MB**

M
T

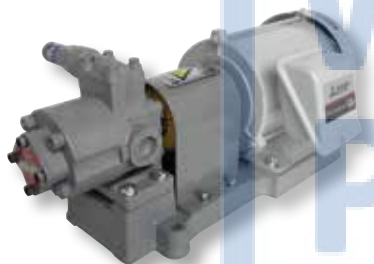
Motor size

B
T

M Mitsubishi Motor
T Toshiba Motor

B For General Lubricant Oil
T For Diesel Oil, Kerosene, Heavy Oil

Non	No valve
VB	With valve
VD	With valve (External return type)



■ SPECIFICATION (For General Lubricant Oil)

Model	Item	Motor speed 50Hz 1500min ⁻¹					Motor speed 60Hz 1800min ⁻¹						
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)				Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)					
			200W	400W	750W	1500W		2000W	200W	400W	750W	1500W	2000W
TOP-203HB		4.2	1.7	3.0	3.0	3.0	3.0	5.0	1.3	3.0	3.0	3.0	3.0
TOP-204HB		6.0	1.2	3.0	3.0	3.0	3.0	7.2	0.9	2.3	3.0	3.0	3.0
TOP-206HB		9.0	0.7	1.8	2.5	2.5	2.5	10.8	0.5	1.4	2.5	2.5	2.5
TOP-208HB		12.0	0.5	1.3	2.5	2.5	2.5	14.4	0.3	1.0	2.3	2.5	2.5
TOP-210HB		15.0	0.4	1.1	2.5	2.5	2.5	18.0	0.3	0.9	2.0	2.5	2.5
TOP-212HB		18.0	0.3	0.9	2.0	2.0	2.0	21.6	-	0.7	1.6	2.0	2.0
TOP-216HB		24.0	0.2	0.7	1.5	1.5	1.5	28.8	-	0.5	1.2	1.5	1.5
TOP-220HB		30.0	-	0.4	1.2	1.2	1.2	36.0	-	0.3	0.9	1.2	1.2

Note: 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 type was changed from G to Rc type.

■ MOTOR SPECIFICATION

·Compatible motor: 200, 400, 750, 1500, 2200W.

■ SPECIFICATION (For Diesel Oil, Kerosene, Heavy Oil)

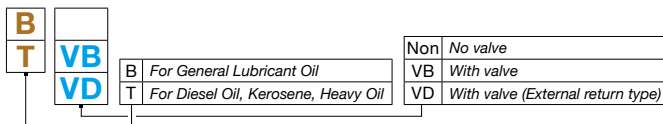
Model	Item	Motor speed 50Hz 1500min ⁻¹			Motor speed 60Hz 1800min ⁻¹				
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			200W	400W		750W	200W	400W	750W
TOP-203HT		4.2	0.7	0.7	0.7	5.0	0.7	0.7	0.7
TOP-204HT	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

■ MOTOR SPECIFICATION

·Compatible motor: 200, 400, 750W.

2HB/2HT (PUMPHEAD)

Model TOP-2▲▲H



■ SPECIFICATION (For General Lubricant Oil)

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

Note: Values in () are approx. weights of the pump when the valve is attached.
TOP-2HB is the updated series of TOP-2HA. It is compatible with old series in performance and mounting dimensions. Only the port type was changed from G to Rc type.

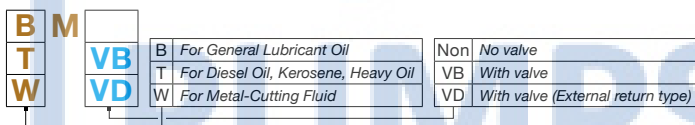
■ SPECIFICATION (For Diesel Oil, Kerosene, Heavy Oil)

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

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

2HBM/2HTM/2HWM (PUMPHEAD FOR 2MY-MOTOR)

Model TOP-2▲▲H B M



■ SPECIFICATION (For General Lubricant Oil)

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

Note: 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 old series in performance and mounting dimensions. Only the port type was changed from G to Rc type.
2HBM and 2HWM series come with 2MY coupling and screws for the attachment.

■ SPECIFICATION (For Diesel Oil, Kerosene, Heavy Oil)

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

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

■ SPECIFICATION (For Metal-Cutting Fluid)

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

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

2.5HGA (PUMPHEAD)

Model TOP-2▲▲▲HGA (VB)

Valve option



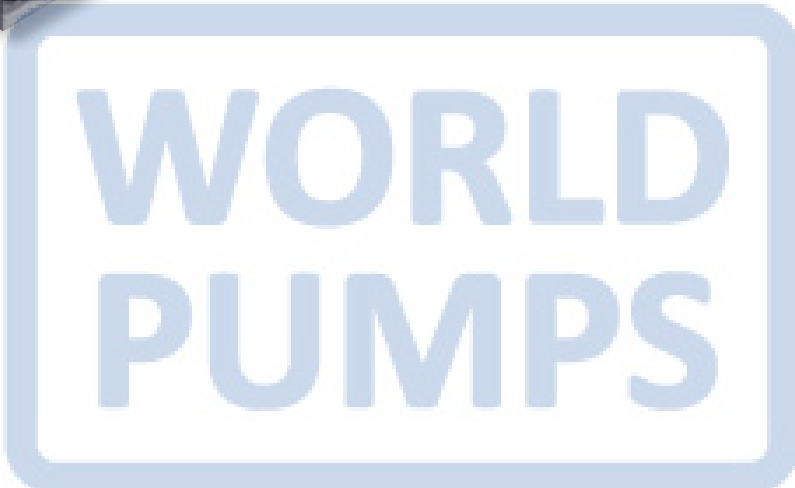
■ FEATURES

·This pump has been developed as an intermediate model between Model 2 and Model 3. It does not produce noise even during operation at a high speed. The relief valve is installed on the top of the pump. It is designed to allow shared use of the 3VB.

■ SPECIFICATION (For General Lubricant Oil)

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

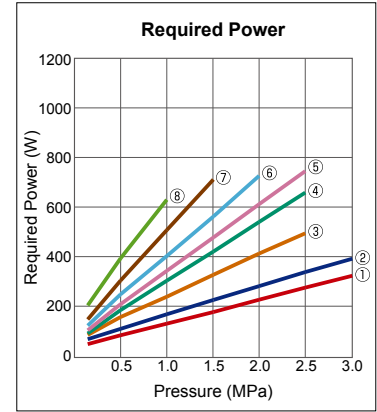
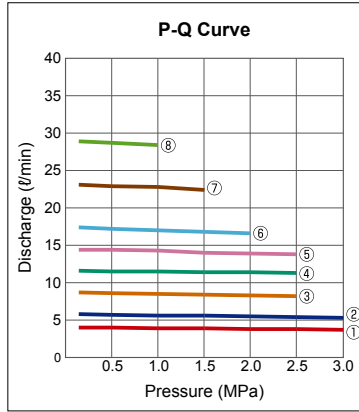
Note: Values in () show approx. weights of the pump when the valve is attached.



■ 2HB(M) Performance Curve

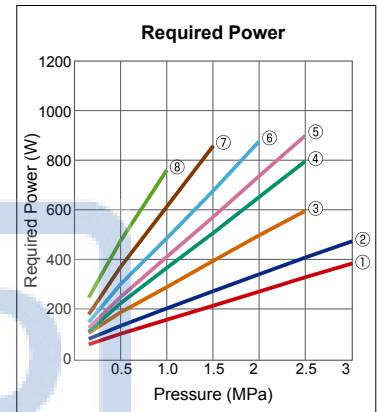
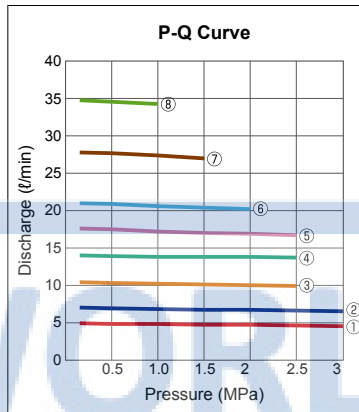
1450 min⁻¹

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



1750 min⁻¹

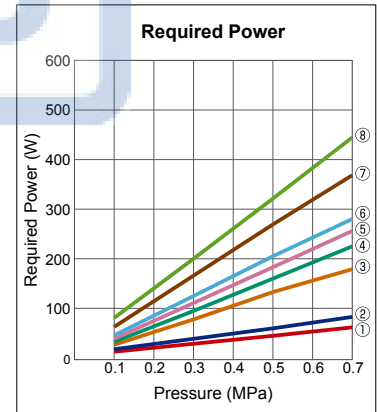
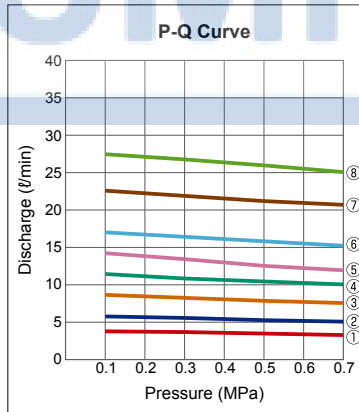
- ① 203HB ② 204HB
- ③ 206HB ④ 208HB
- ⑤ 210HB ⑥ 212HB
- ⑦ 216HB ⑧ 220HB



■ 2HT(M) Performance Curve

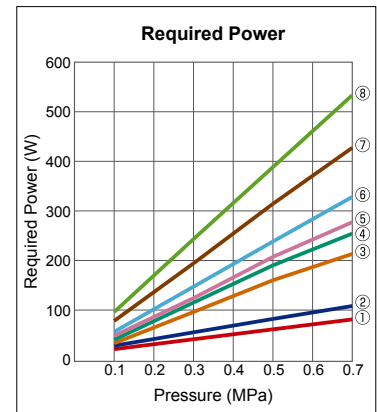
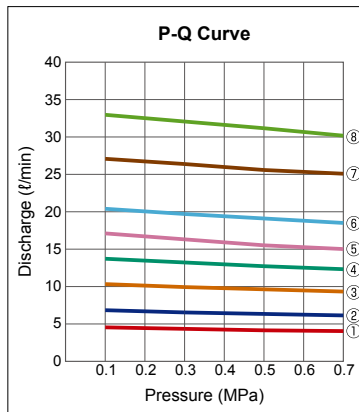
1450 min⁻¹

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



1750 min⁻¹

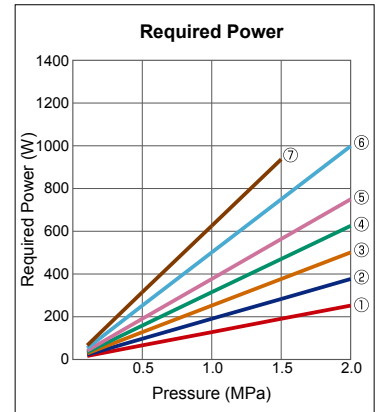
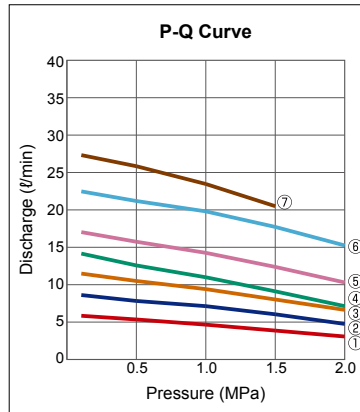
- ① 203HT ② 204HT
- ③ 206HT ④ 208HT
- ⑤ 210HT ⑥ 212HT
- ⑦ 216HT ⑧ 220HT



■ 2HW(M) Performance Curve

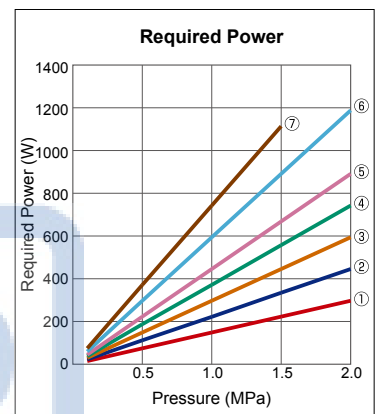
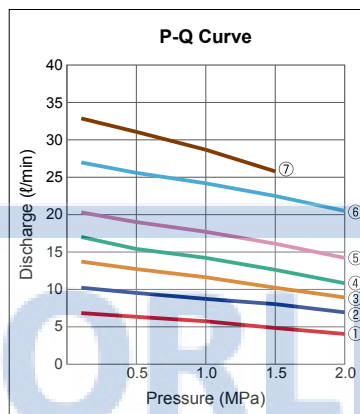
1450 min⁻¹

- ① 204HWM
- ② 206HWM
- ③ 208HWM
- ④ 210HWM
- ⑤ 212HWM
- ⑥ 216HWM
- ⑦ 220HWM



1750 min⁻¹

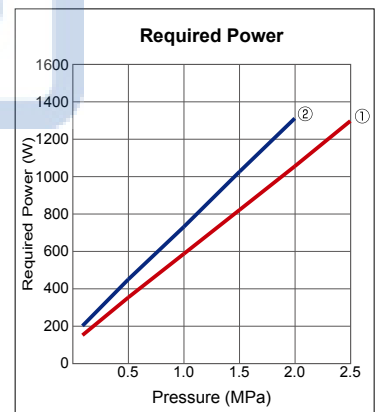
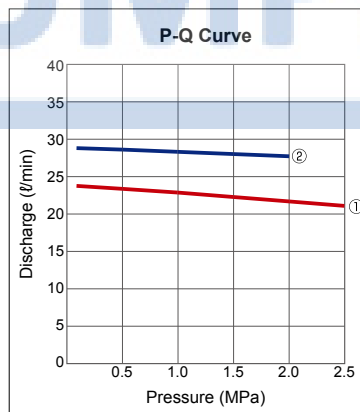
- ① 204HWM
- ② 206HWM
- ③ 208HWM
- ④ 210HWM
- ⑤ 212HWM
- ⑥ 216HWM
- ⑦ 220HWM



■ 2.5HGA Performance Curve

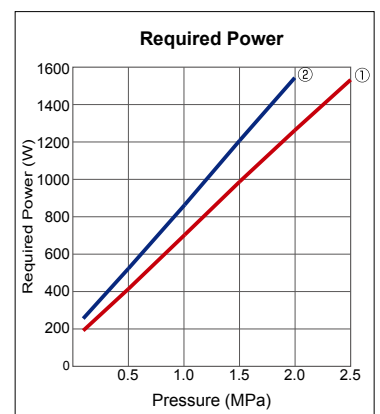
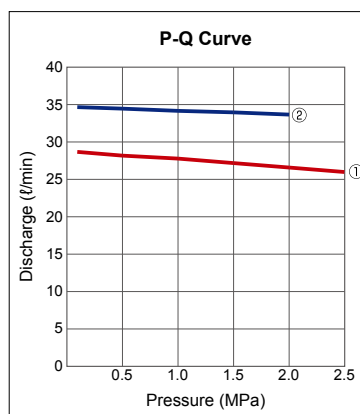
1450 min⁻¹

- ① 2516HGA
- ② 2520HGA



1750 min⁻¹

- ① 2516HGA
- ② 2520HGA

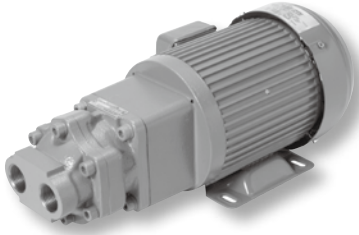


3MF (WITH INTEGRATED 3-PHASE MOTOR)

Model **TOP-3MF** ▲▲▲▲ - N3▲▲

FA (VB)
FB Valve option

FA	Discharge port parallel to pump shaft
FB	Discharge port perpendicular to pump shaft



SPECIFICATION

Model	Item	Motor speed 50Hz 1500min ⁻¹			Motor speed 60Hz 1800min ⁻¹				
		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)		Theoretical discharge (ℓ/min)	Max. pressure for motor output (MPa)			
			750W	1500W	2200W		750W	1500W	2200W
TOP-N320	FA	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								

Note: The value** can not always be achieved as it is subject to operating conditions and specifications.
TOP-N3F is the updated series of TOP-3F. It is also compatible with old series in performance and mounting dimensions.

MOTOR SPECIFICATION

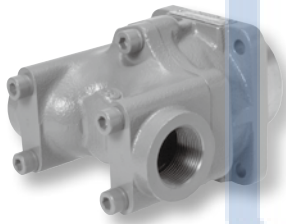
·3-phase squirrel-cage induction motor, Totally enclosed, Class F insulation, IE3.
CE-marking, Protection level IP44, 200VAC 50/60Hz, 220VAC 60Hz, 4 poles with continuous rating at 750, 1500, 2200W
·Please consult us when ordering outdoor-type, increased safety-type, motor other than for standard voltage, one with terminal box attached on the other side, or other special motor.

N3F (PUMPHEAD)

Model **TOP-N3** ▲▲

FA (VB)
FB M Valve option

FA	Discharge port parallel to pump shaft	Non	For mounted on 3MF motor
FB	Discharge port perpendicular to pump shaft	M	For using other pump driving forces



SPECIFICATION

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

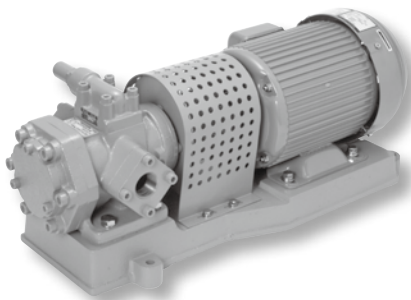
Note: The value** can not always be achieved as it is subject to individual operating conditions and specifications.
TOP-N3F is the updated series of TOP-3F. It is also compatible with the old series in performance and mounting dimensions.
N3FAM and N3FBM can not be coupled with 3MF motor.

3MB-N3H (BASE-COUPLING MOUNT TYPE) N3H (PUMPHEAD)

Model **TOP-3MB** M ▲▲▲▲ - N3▲▲H (VB)

M	Mitsubishi Motor
T	Toshiba Motor

TOP-N3 ▲▲H (VB)
Valve option



SPECIFICATION

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

Note: The value** can not always be achieved as it is subject to individual operating conditions and specifications.
Values in () show approx. weights of the pump when the valve is attached.
TOP-N3H is the updated series of TOP-3H. It is compatible with the old series in performance and mounting dimensions.

MOTOR SPECIFICATION

·Compatible motor: 1500, 2200, 3700, 5500W.

3MB-3V (BASE-COUPLING MOUNT TYPE) 3V (PUMPHEAD)

Model **TOP-3MB** M ▲▲▲▲ -3▲▲V (VB) M Mitsubishi Motor
T Motor size T Valve option T Toshiba Motor

TOP-3▲▲V (VB)
Valve option



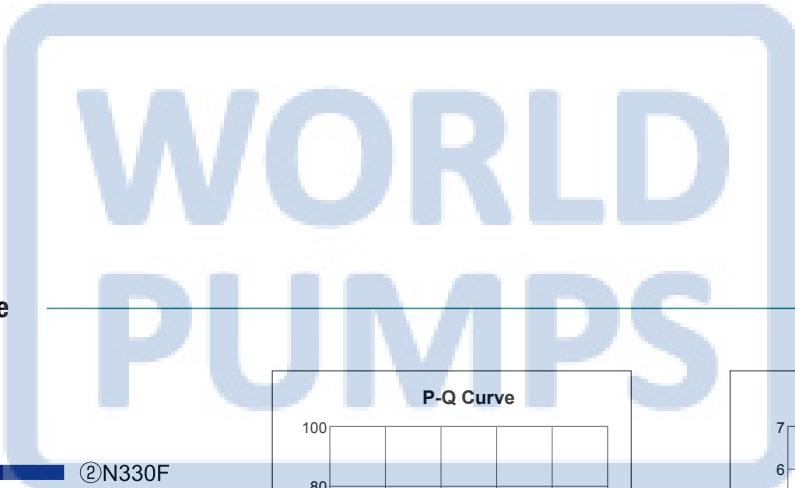
■ SPECIFICATION (For High Viscosity Oil)

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

Note: For delivering oil with high viscosity (46-2000mm²/sec), such as high viscosity lubricant oil or gear oil.
 Values in () show approx. weights of the pump when the valve is attached.

■ MOTOR SPECIFICATION

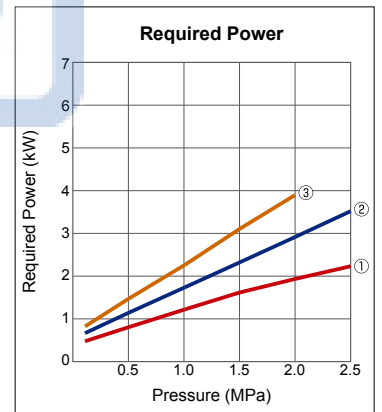
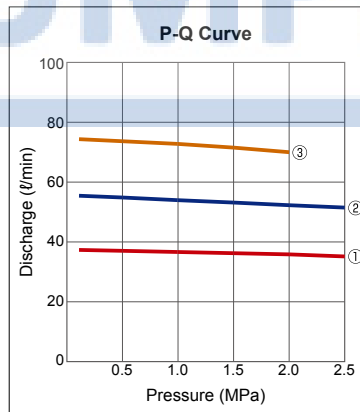
·Compatible motor: 2200, 3700, 5500W.



■ N3F Performance Curve

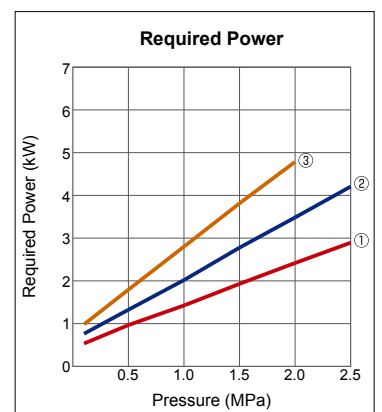
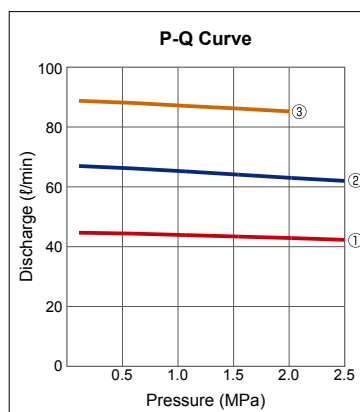
1450 min⁻¹

① N320F ② N330F
 ③ N340F



1750 min⁻¹

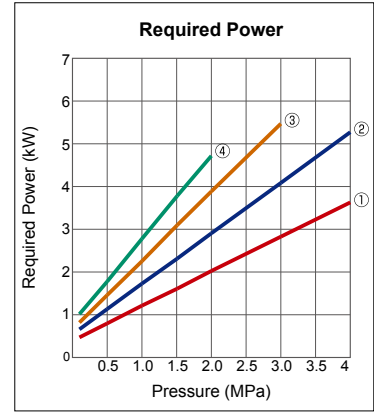
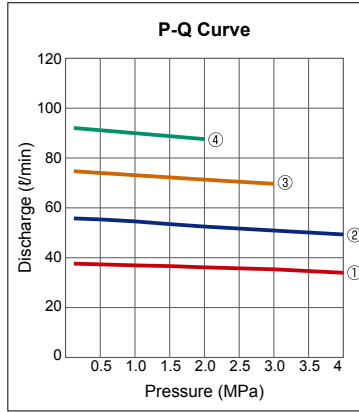
① N320F ② N330F
 ③ N340F



■ N3H Performance Curve

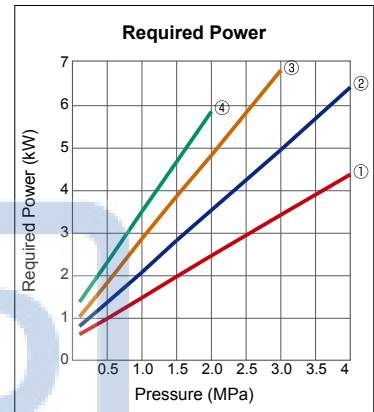
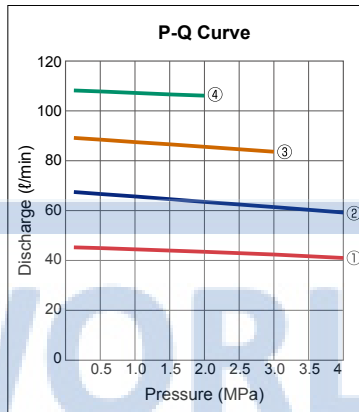
1450 min⁻¹

- ①N320H ■ ②N330H
- ③N340H ■ ④N350H



1750 min⁻¹

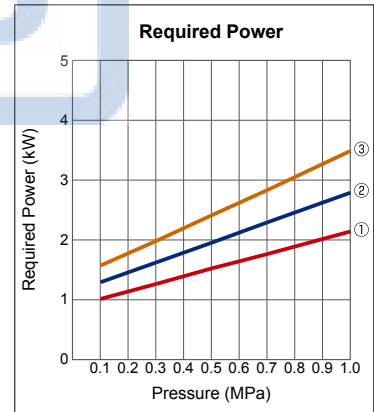
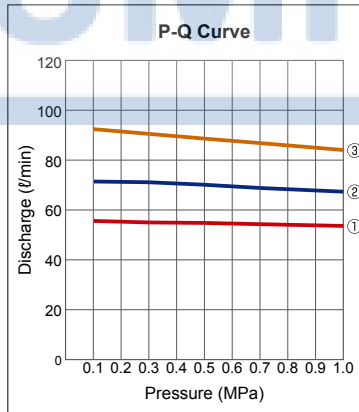
- ①N320H ■ ②N330H
- ③N340H ■ ④N350H



■ 3V Performance Curve

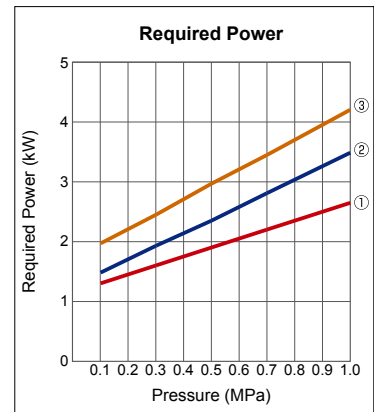
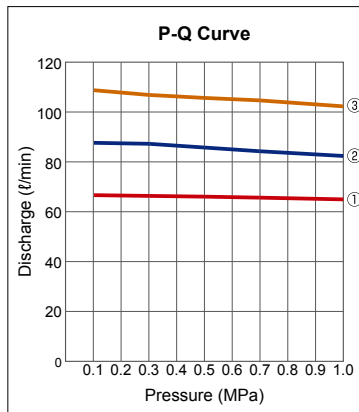
1450 min⁻¹

- ①330V ■ ②340V
- ③350V



1750 min⁻¹

- ①330V ■ ②340V
- ③350V



4MB-4AM (BASE-COUPLING MOUNT TYPE)

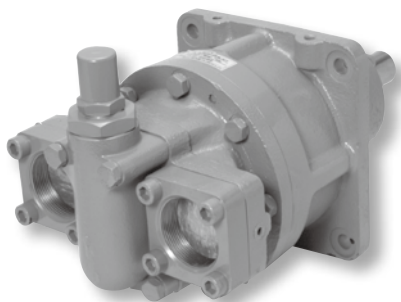
4AM (PUMPHEAD)

Model **TOP-4MB**

M	▲▲▲▲ -6-4▲▲▲AMIVB	M	Mitsubishi Motor
T		T	Toshiba Motor

TOP-4▲▲▲AM (I) VB

I	With angle plate
F	No angle plate



■ SPECIFICATION (For General Lubricant Oil)

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

Note: Add 9 Kg to the total weight when the angle plate (I) is attached.
Values in () show approx. weights of the pump when the valve is attached.

■ MOTOR SPECIFICATION

·Compatible motor: 3700, 5500, 7500W, 6 Poles.

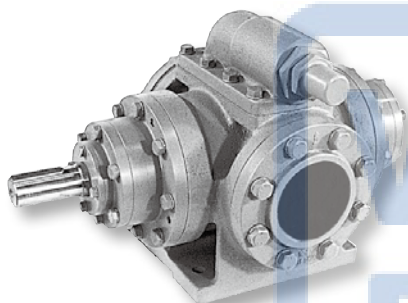
4MB-4A (BASE-COUPLING MOUNT TYPE)

4A (PUMPHEAD)

Model **TOP-4MB**

M	▲▲▲▲ -6-4▲▲▲AVB	M	Mitsubishi Motor
T		T	Toshiba Motor

TOP-4▲▲▲VB



■ SPECIFICATION (For General Lubricant Oil)

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

■ MOTOR SPECIFICATION

·Compatible motor: 5500, 7500, 11000, 15000W, 6 Poles.

LUNARY GEAR PUMP

MB-GPL (BASE-COUPLING MOUNT TYPE)

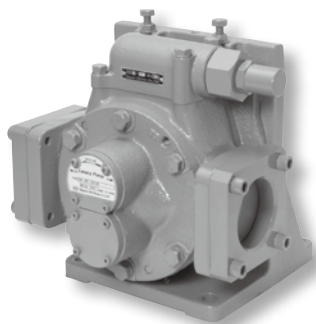
GPL (PUMPHEAD)

Model **MB**

M	▲▲▲▲ -6-GPL-▲▲▲IVB	M	Mitsubishi Motor
T		T	Toshiba Motor

GPL-▲▲▲

I	With angle plate
F	No angle plate



■ STRUCTURE

This pump employs gears with special teeth called Lunary™ (patented), and rotates at continuous one-point contact. The conventional one-point contact gear (segmental gear, sinusoidal gear, etc.) is based on correction or combination of the theoretical curve, so the slip ratio tends to increase. However, the Lunary gear provides high durability to the pump with low slip ratio because an ideal closed curve is gained from a theoretical straight line and ellipse.

■ FEATURES

- (1) Pulsation and noise are extremely limited due to lack of confinement.
- (2) This pump is effectively used with highly viscous oil because there is no cavitation.
- (3) Durability is provided by a patented Lunary gear.
- (4) Use of a shaft input is eliminated to cut down costs.

■ SPECIFICATION (For High Viscosity Oil)

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

Note: For transferring oil with high viscosity (46-2000mm²/sec), such as high viscosity lubricant oil or gear oil.
Add 13 Kg to the total weight when the angle plate (I) is attached.

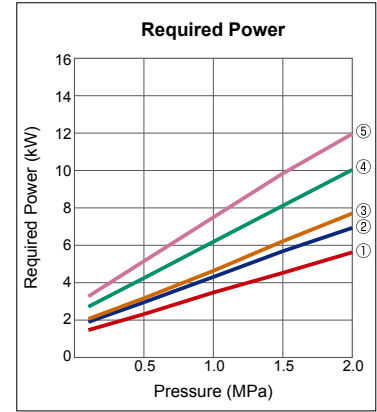
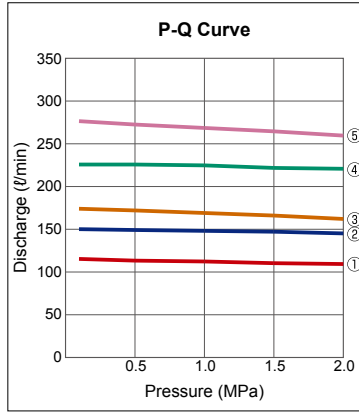
■ MOTOR SPECIFICATION

·Compatible motor: 3700, 5000, 7500W.

4AM Performance Curve

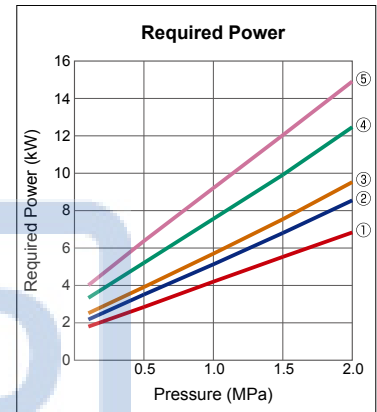
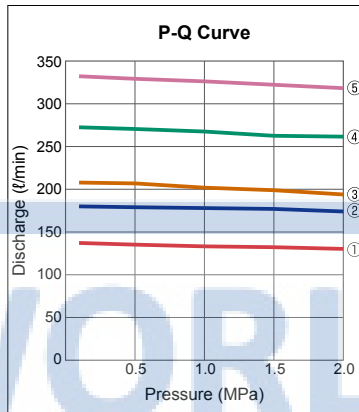
960 min⁻¹

- ①4100AM ■ ②4130AM
- ③4150AM ■ ④4200AM
- ⑤4250AM



1160 min⁻¹

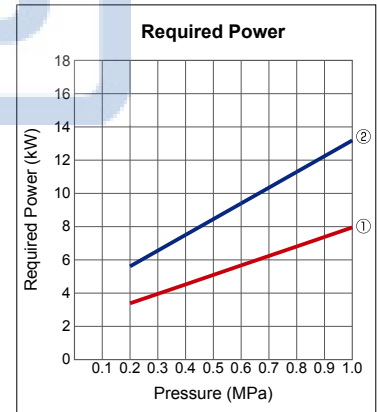
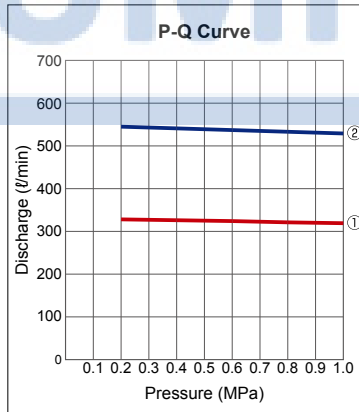
- ①4100AM ■ ②4130AM
- ③4150AM ■ ④4200AM
- ⑤4250AM



4A Performance Curve

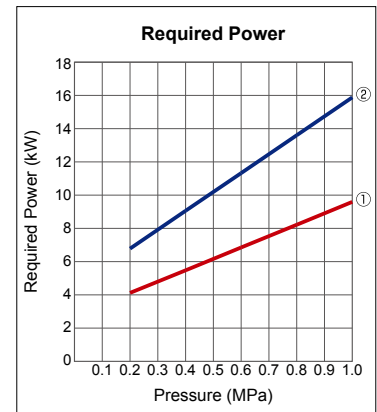
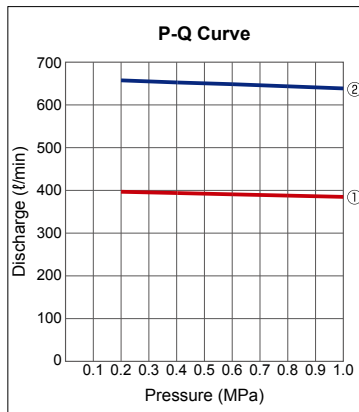
960 min⁻¹

- ①4300AVB ■ ②4500AVB



1160 min⁻¹

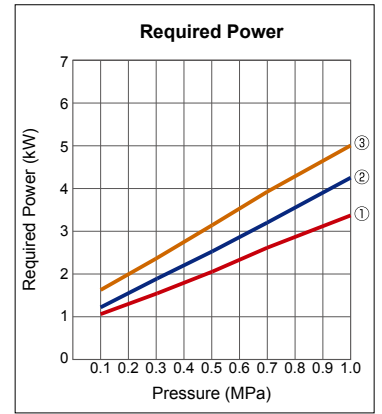
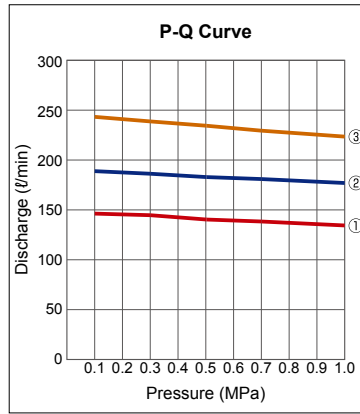
- ①4300AVB ■ ②4500AVB



■ GPL Performance Curve

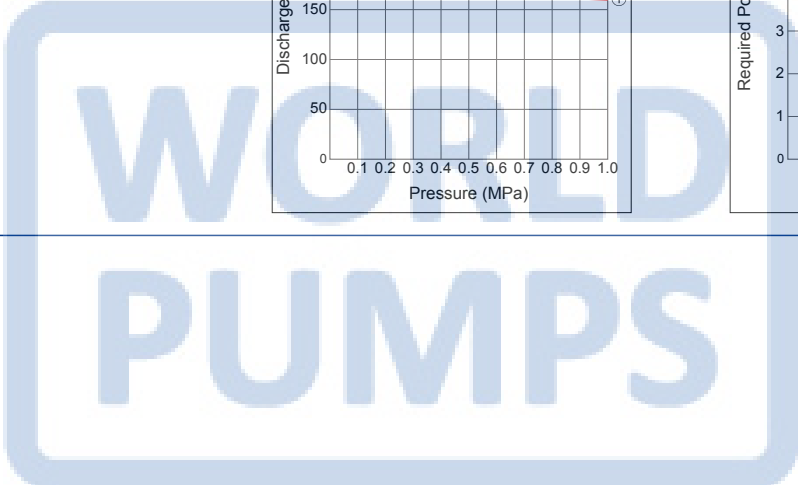
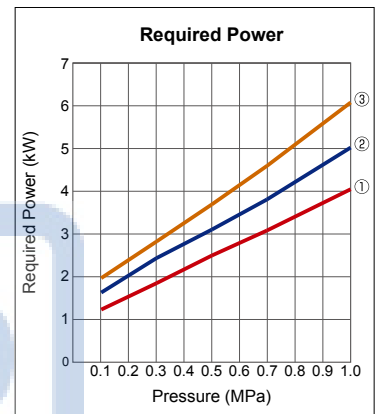
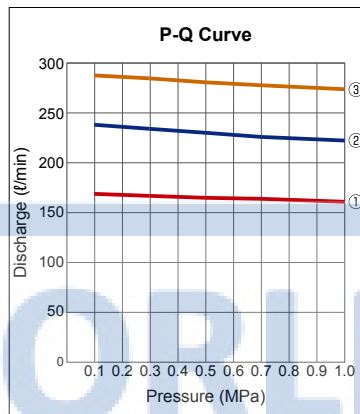
960 min⁻¹

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



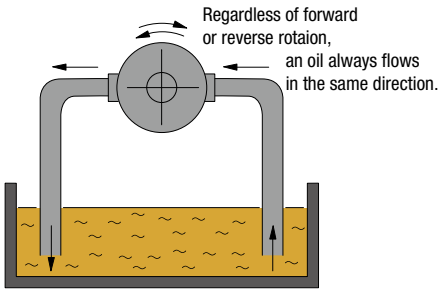
1160 min⁻¹

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



REVERSIBLE TROCHOID PUMP

FEATURES



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.

1RA/2RA (PUMPHEAD, REVERSIBLE)

Model **TOP-1RA-▲▲▲**
TOP-2RA-▲▲C



SPECIFICATION (For General Lubricant Oil)

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

SPECIFICATION (For General Lubricant Oil)

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

3RD/4RD (PUMPHEAD REVERSIBLE)

Model **TOP-3RD-▲▲T**
TOP-4RD-100



SPECIFICATION (For General Lubricant Oil)

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

SPECIFICATION (For General Lubricant Oil)

Model	Item	Theoretical displacement (cm ³ /rev)	Max. pressure (MPa)	Max. revolution (min ⁻¹)	Approx. Weight (Kg)
TOP-4RD-100		100	0.5	1000	30.5

RELIEF VALVE



■ FEATURES

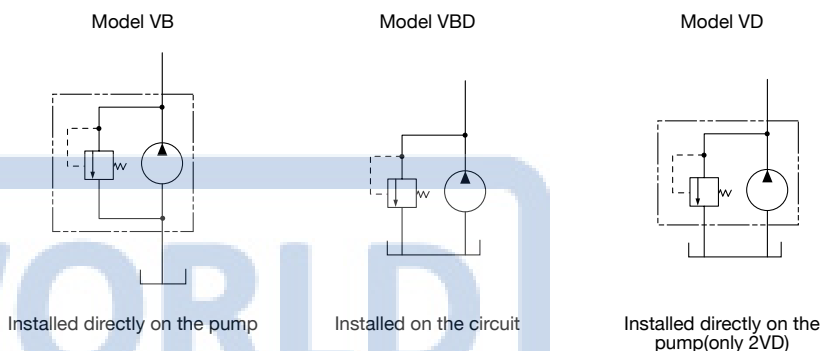
When pressure inside the hydraulic circuit has reached the valve set value, the valve opens to relieve part of or whole oil to the return side, thereby keeping the circuit pressure constant. It is also used to limit the maximum pressure to protect the pump and equipment.

Relief valves are available in a range from 2 to 4 VBP(D) according to the capacity and set pressure.

■ TYPE OF RELIEF VALVES

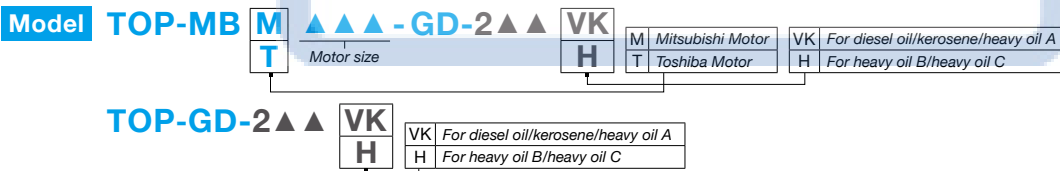
Item	Series		
	2	3	4
Used as a safety valve for temporary pressure reduction to protect the pump and equipment	2VD	3VD	4VD
Used as a pressure control valve for hydraulic system (or lubricating oil circulating system) (mounted on sub-plate)	2VBD	3VBD	4VBPD
Used as a pressure control valve for lubricating oil circulation system (or hydraulic system) (without sub-plate)	2VD	—	—
pressure control range (MPa)	0.08–2.5	0.08–3.0	0.15–2.0
Flow rate (MAX)	36	100	200

■ RELIEF VALVE CIRCUIT DIAGRAM AND INSTALLATION METHOD



FUEL PUMP

MB-GD (BASE-COUPLING MOUNT TYPE)
GD (PUMPHEAD)



■ SPECIFICATION

Model	Item	Theoretical displacement (cm ³ /rev)	Theoretical discharge (ℓ/min)		Max. pressure (MPa)		Max. revolution (min ⁻¹)	Approx. Weight (Kg)
			1500min ⁻¹	1800min ⁻¹	2.0	4.0		
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

Note: **VK: Set pressure of relief valve (fully closed) at factory is 2.0MPa.

***H: Set pressure of relief valve (fully closed) at factory is 2.5MPa.

■ MOTOR SPECIFICATION

·Compatible motor: 750, 1500W.

MICRO TOP (SMALL AND HANDY SIZE OIL FILTER)

Model **TFP400-S** **100** **-2512A-** **00**
200 **03**
10

100	100V (Single phase)	00	No filter with a closing lit
200	200V (Single phase)	03	With 3μ filter
		10	With 10μ filter



■ SPECIFICATION

The Micro-top is a convenient and economical oil filtering device designed in a compact configuration. It is a handy lightweight device which you can take with you wherever you want to go. It is completely equipped with the cords and hoses. It can be operated by a mere touch of a push button. This product serves as a multi-purpose device for your factory.

■ APPLICATION

- Removal of contaminants from oil inside the hydraulic tank
- Replacement and supply of oil for construction machinery and industrial vehicles
- Lubrication and oil removal
- Protection of oil against deterioration and contamination
- Cleaning of oils

■ SPECIFICATION

Theoretical discharge (l/min)	12/50Hz, 14.4/60Hz
Discharge pressure (MPa)	0.3
Filter(microns)	3 or 10 microns
Motor	Single phase: 100V/200V only, 400W
Accessories	Vinyl hoses for suction and discharge wires (2 meters each)
Approx.weight (kg)	15

1PS (OIL COOLING UNIT)

Model **1PS75-2-12MAVB-C** **23**
24

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

Motor size

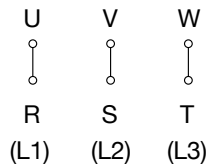


■ APPLICATION

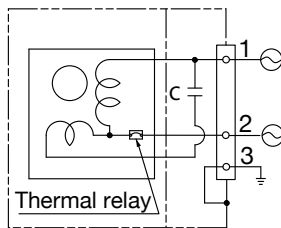
For cooling machinaries or other industrial equipment

Wiring diagram

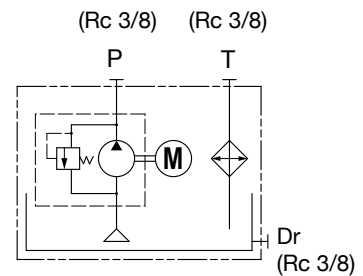
(Motor for pump)



Connection diagram



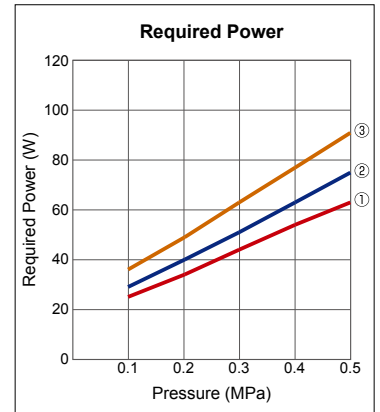
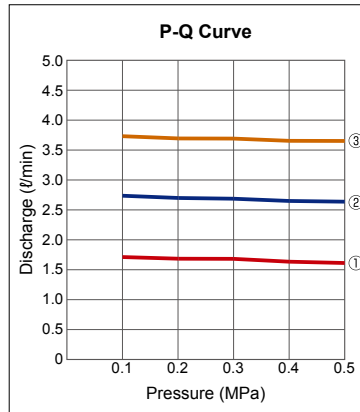
Hydraulic circuit diagram



1RA Performance Curve

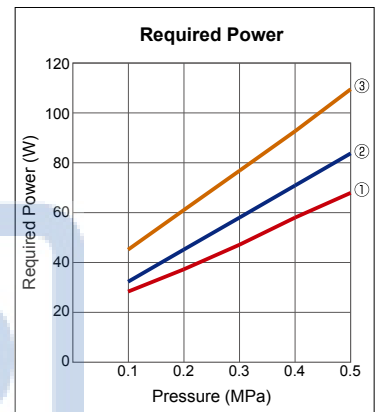
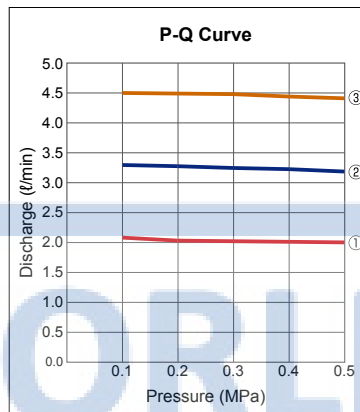
1450 min⁻¹

① 1RA-100 ② 1RA-200
③ 1RA-300



1750 min⁻¹

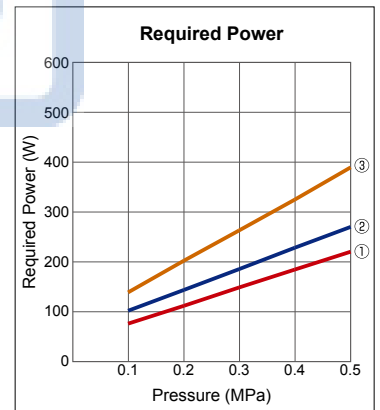
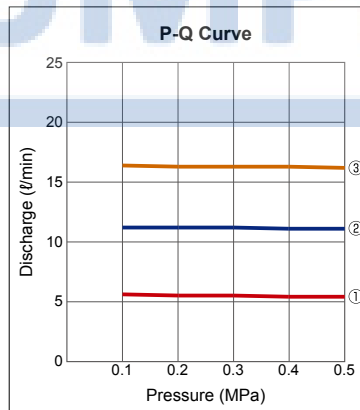
① 1RA-100 ② 1RA-200
③ 1RA-300



2RA Performance Curve

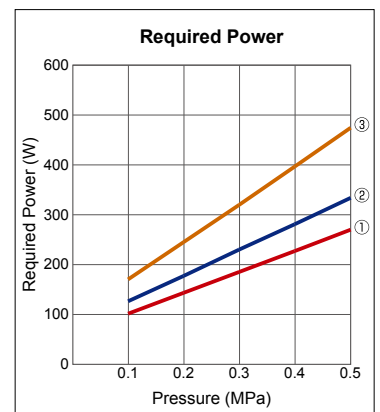
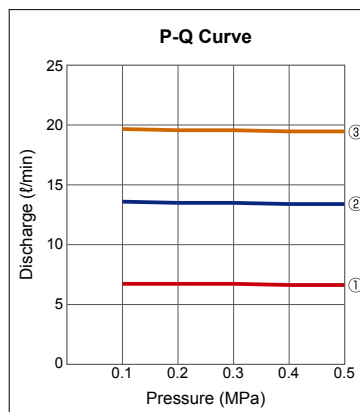
1450 min⁻¹

① 2RA-4C ② 2RA-8C
③ 2RA-12C



1750 min⁻¹

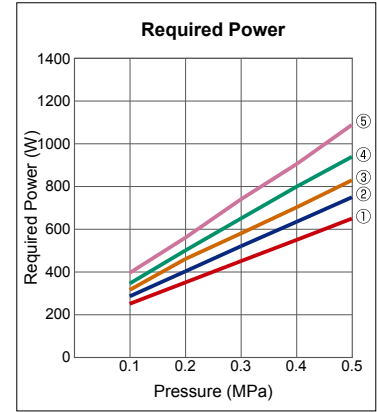
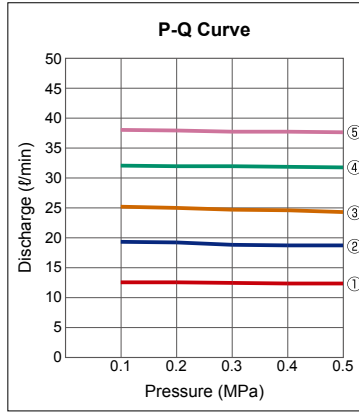
① 2RA-4C ② 2RA-8C
③ 2RA-12C



■ 3RD Performance Curve

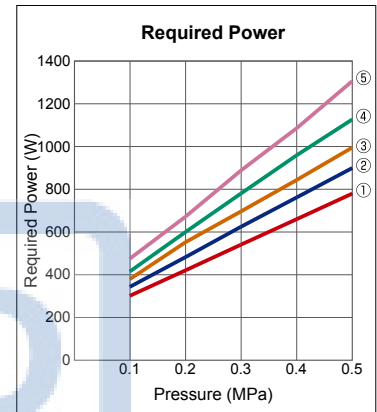
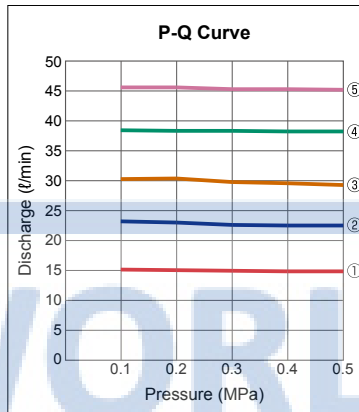
960 min⁻¹

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



1160 min⁻¹

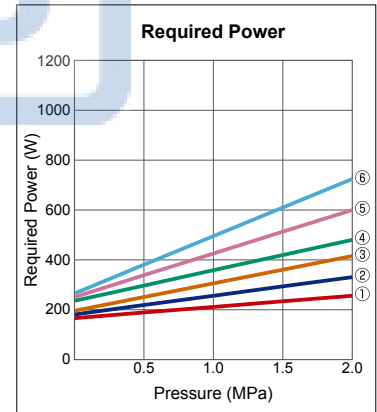
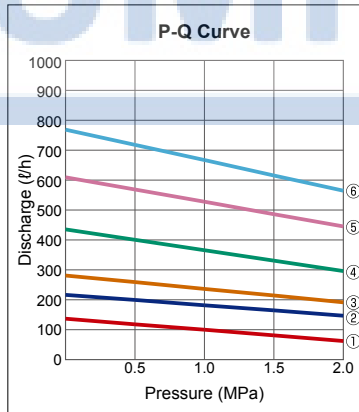
- ①3RD-10T ■ ②3RD-15T
- ③3RD-20T ■ ④3RD-25T
- ⑤3RD-30T



■ GD-VK Performance Curve

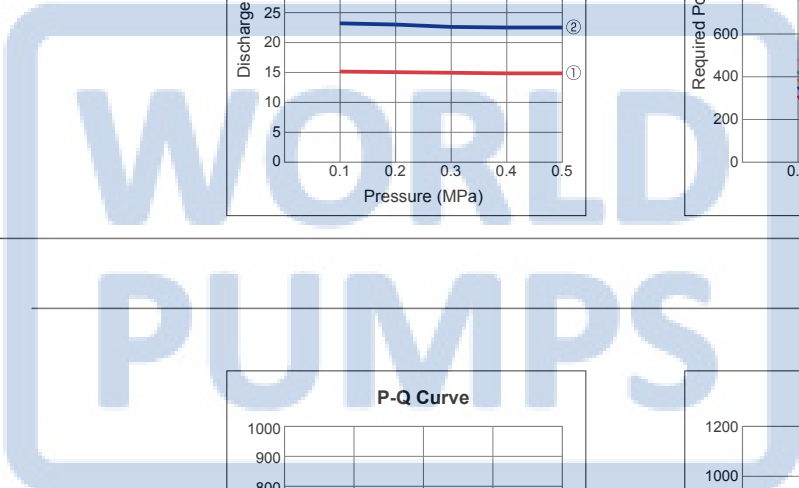
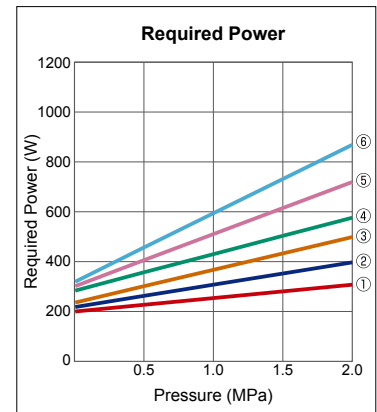
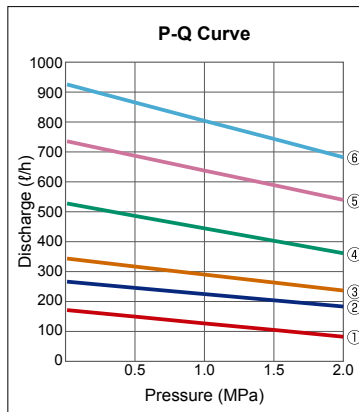
1450 min⁻¹

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



1750 min⁻¹

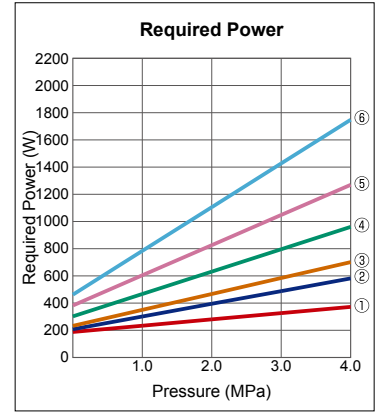
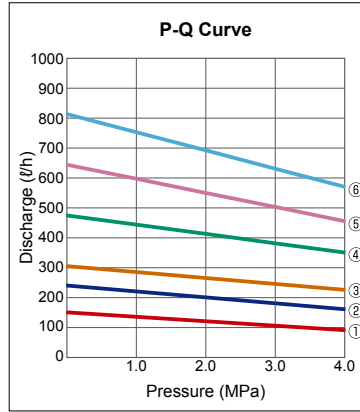
- ①GD-202VK
- ②GD-203VK
- ③GD-204VK
- ④GD-206VK
- ⑤GD-208VK
- ⑥GD-210VK



■ GD-H Performance Curve

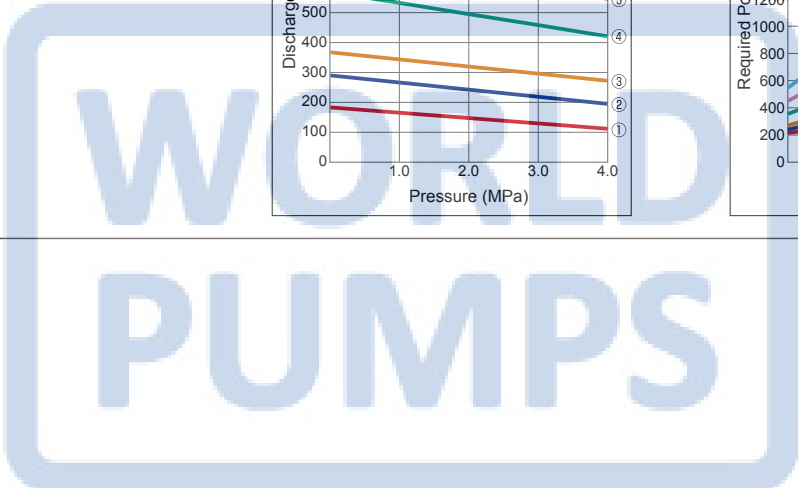
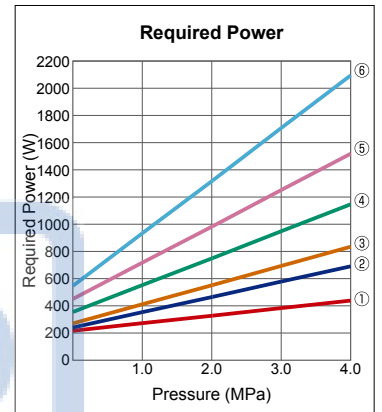
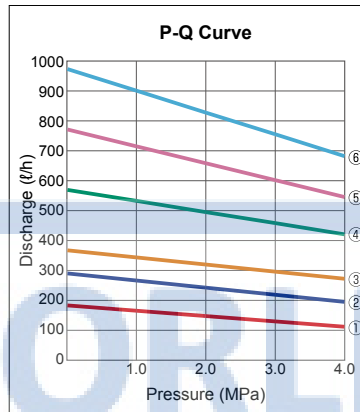
1450 min⁻¹

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



1750 min⁻¹

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



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	1
		6301	1
2.5HGA		6201	1
		TAF192720	2
N3FA N3FB		6205	2
		TA2225Z	1
N3H		6205	2
		6305	1

Pump model	Item	Bearing	
		Model no.	Q'ty
4AM		6307	2
		NA6908	1
4A		6309	2
		N309	2
GPL		TR354830	4
		6205	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		VV	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 other special oils. (Discharge pressure for fuel oil: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
N3H		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
		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 other special oils (Discharge pressure for fuel oil: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
3V		VH	For high temperature (Fluid temperature: up to 200C/Discharge pressure: up to 0.7MPa)	Teflon	FKM	C3	Teflon sheet	Specific rotor
		VV	For high temperature (Fluid temperature: up to 120C/Discharge pressure: up to 0.7MPa)	FKM	FKM	Standard	Teflon sheet	Standard
		VV	For special fluid	FKM	FKM	Standard	Teflon sheet	Standard
4AM		VH	For high temperature (Fluid temperature: up to 200C/Discharge pressure: up to 0.7MPa)	Teflon	FKM:G75x1 FKM:S65x1 Teflon square rings	6307C3×2 NA6908×1	-	Standard

- VF and VH are unavailable for Trochoid pumps with an integrated motor, such as 1ME, 2MY, 2ME, 3MF and other models. (High temperature oil might damage the motor.)
- Ensure that the maximum discharge pressure of the pump is below 0.7MPa for VF and VH. (High temperature oil might lower its viscosity and lubricity and that may damage the pump under the high discharge pressure.)
- Fuel oils can be used with "vv". (Ensure that the maximum discharge pressure is below 0.7MPa. They have generally low-viscosity and hence 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.

Trochoid™ Pump Discontinued Products List (Standard models)

As of Sep. 20, 2018

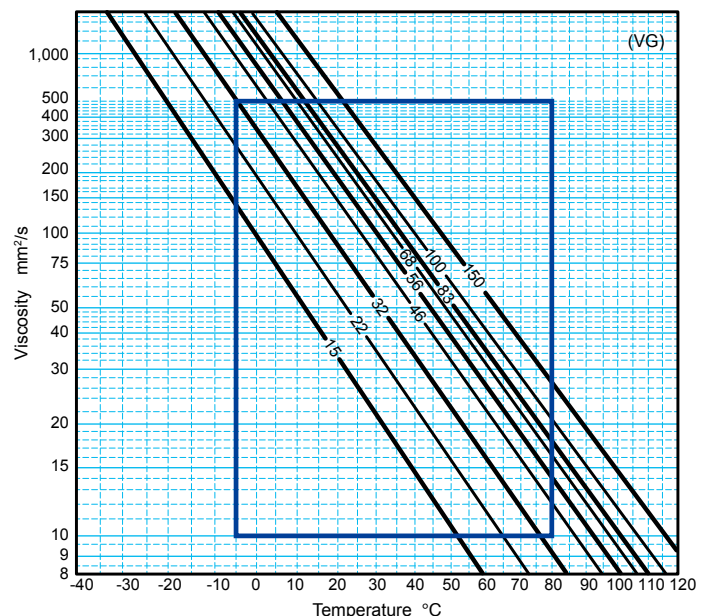
Representative model	Production end date	Supply end date	Technical support end date	Successor model	Remarks
Trochoid™ Pump 2▲▲HA (M)	Nov./1995	Nov./2003	Nov./2008	Trochoid™ Pump 2▲▲HB (M)	External dimensions and mount dimensions are the same as 2▲▲HB (M). The bore diameter of the new model is changed 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 products becomes unavailable.

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 mm²/s.