

**NEW**

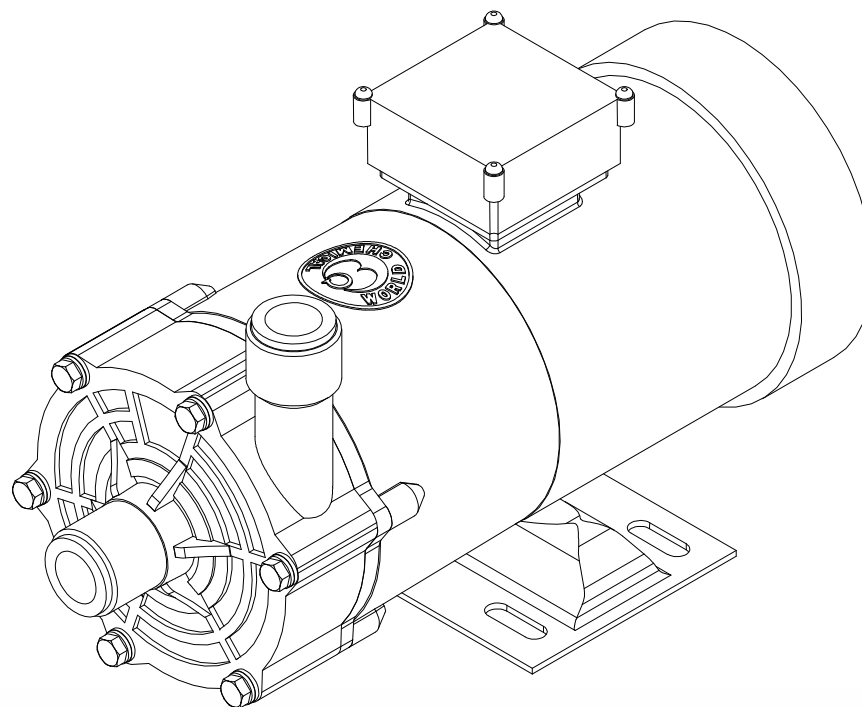
Compact magnetic pump

*Chemi-Free*

INSTRUCTION MANUAL

**YD-16GS(F)**  
**YD-20GS(F)/16-20GSH(F)**

Version: 100914



 **World Chemical CO.,LTD.**

Thank you for purchasing our compact magnetic pump YD-16-20GS. This instruction manual is divided into the following sections: safety precautions, general description, installation, operating procedures and maintenance. Please read this instruction manual thoroughly. An adequate understanding of each section is required to maximize the pump's performance and to assure safety and long-term efficiency.

## Table of Contents

Safety Precaution .....	P2
General Description	
1. Unpacking inspection .....	P4
2. Mechanism .....	P4
3. Model type .....	P5
4. Specification .....	P5
5. Performance curve .....	P6
6. Parts diagram .....	P10
7. Outline dimension .....	P12
Installation	
1. Before operating the pump .....	P14
2. Installation, plumbing and Electrical wiring .....	P15
Operating Procedures	
1. Method of operation .....	P19
Maintenance	
1. Troubleshooting .....	P22
2. Maintenance / Inspection .....	P23
3. How to drain liquid .....	P24
Warranty and Repair .....	P25



This instruction manual shall be retained by the user and kept near the unit for easy access.

For further information or inquiry, please contact your dealer, agent.

## IMPORTANT NOTES

### To operate the pump safely and correctly

- Please read and follow the safety precautions to avoid injury and / or property damage.
- Please follow the important safety related notes described in this section.
- Symbols and their meanings are as follows:

	Warning	Incompliance with the warning may lead to serious injury or death.
	Warning	Incompliance with the precaution may lead to injury or damage to the pump.

### Symbols



This symbol indicates a warning or precaution.



This symbol indicates a prohibited action.



This symbol indicates a required action.

# SAFETY PRECAUTIONS



## Warning



Power off

### ● Please turn the power off.

Carrying out the procedure while the power is on risks an electric shock. When performing the procedure, power must be turned off and the pump or device stopped.



### ● Please discontinue the operation.

When sensing any danger or irregularity during an operation, please suspend the operation and start from the beginning.



Prohibited

### ● Do not use any power source other than that specified.

Breakdowns, fire or electric shock may occur as a result of using a voltage other than what is indicated on the nameplate. Do not use any power source other than the one specified.



Prohibited

### ● Avoid contact with water.

Spilling liquid on the motor or wiring may lead to fire or electric shock. Please install the pump at a place where it will not get wet.



Prohibited

### ● In case of a damaged pump

A damaged pump has the potential risk for a short circuit or electric shock. Never use a damaged pump.



Precaution

### ● Do not damage, modify or stretch the power cord.

Heating or placing heavy objects on the cord will damage it, causing fire and / or electric shock.



Attach  
Ground wire

### ● The pump must be grounded.

There is a risk of electric shock if the ground wire is not properly attached. The ground wire must be attached.



Wear Pro-  
tective gears

### ● Wear protective gears.

Direct contact with chemicals or liquids may be hazardous. Please wear protective gears during operation.



Prohibited

### ● Do not use the pump for purposes other than that indicated.

Using the pump for purposes other than that specified may cause injury or damage. Please use the pump in accordance to its specifications.



Modification  
prohibited

### ● Do not modify the pump.

Modifying a pump is dangerous. Never modify the pump. The manufacturer will not be responsible for any injury or damage resulting from an unauthorized modification.

# SAFETY PRECAUTIONS



## Warning



Prohibited

### ●Restrictions on persons handling the pump.

Transportation, installation, wiring, operation, servicing, and inspection should be performed only by an expert who has full knowledge on the handling the pump.



Precaution

### ●Ventilation.

In handling toxic or odorous liquids, have the pump situated in a well-ventilated place to prevent poisoning.



Precaution

### ●Outflow protection.

Always take appropriate preventative measure to safeguard against liquid leaks in the event of breakdown of pump or piping.



Prohibited

### ●Do not use the pump around water.

The pump is neither dust-proof nor waterproof. Using the pump under moist condition has the risk for electric shock.



Prohibited

### ●Do not idle the pump.

Do not use the pump without liquid. The friction generates the heat and causes damage of inside the pump.



Prohibited

### ●Do not pressurize inside the pump.

It causes the liquid leak from the seal area of the O-ring and / or damages the pumps.



Electric  
Shock hazard

### ●Circuit breaker.

To prevent electric shock, a separately-purchased circuit breaker should be installed.



Electric  
Shock hazard

### ●No exchange the power supply code.

The damaged code cannot be exchanged. Using the pump without change has a risk of electric shock or fire. Handle the power code with care.



Prohibited

### ●Restrictions of the installation.

- Location has a risk of fire
- Location of high temperature (over 40 degrees) or below freezing.



### ●Disposing of scrapped pump.

When disposing a scrapped pump, dispose any chemical agents clinging to the pump and discard as industrial waste in accordance with the law.

# GENERAL DESCRIPTION

For safe operation of the pump, its purpose, limitation, hazard and proper operating procedures must be observed before use.

## 1. Unpacking Inspection

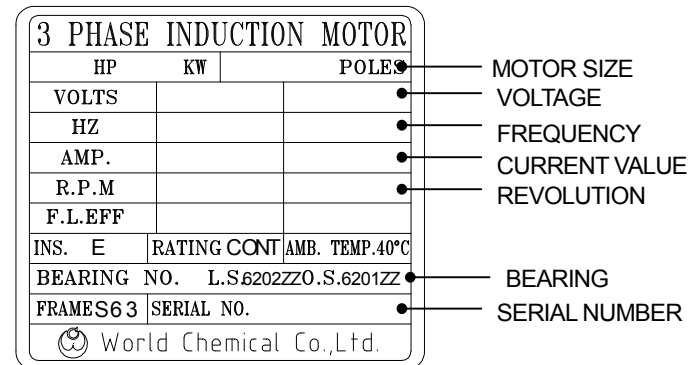
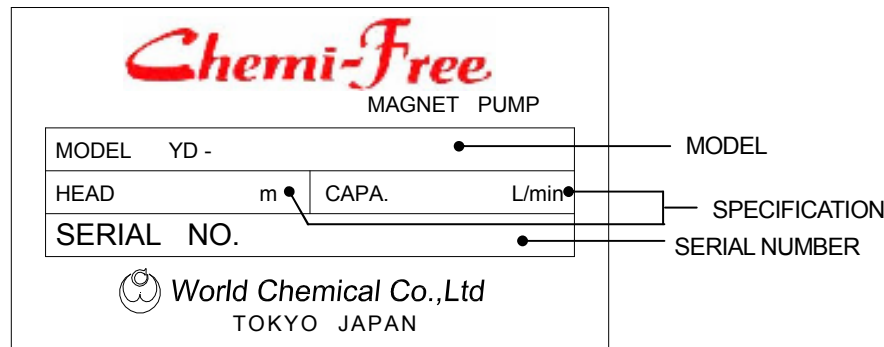
Inspect the following before use:

- (1) Make certain the product is what you have ordered. Make sure the model type, discharge output, pump height and voltage specified on the nameplate as ordered.
- (2) Check for any damaged or missing parts.  
Visually inspect or hand-check the unit for any accidental damage or bolts that may have loosened during shipment.

\* For any defect, question or concern, please contact the distributor with whom you placed the order.

## 2. Mechanism

YD-GS model pump is a magnet-driven centrifugal pump. Rotation of a magnetically driven impeller in the pump chamber sends fluids from the intake to the discharge.



# GENERAL DESCRIPTION

## 3. Model Type

**YD-16 GS(F)-S**

Suction Bore/ Discharge Bore mm (inch)	Type		Connection (Suction x Discharge Bore) mm (inch)
	Standard	High pressure	
16: 20(3/4") x 16(5/8") 20: 20(3/4") x 20(3/4")	GS (GFR PP)	GSH (GFR PP)	S: Thread (G1 x G1) H: Hose (26(1") x 26(1"))
	GSF (CFR ETFE)	GSHF (CFR ETFE)	S: Thread (G1 x G1)

\* Optional parts : Coupling for union (20A x 20A) and flange (25A x 25A).

## 4. Specifications

Model S: Standard H: High pressure	Performance spec. m-L/min (ft-gpm)		Maximum Head m (ft)		Maximum Discharge Amount L/min (gpm)		Motor		Weight	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	Power output W(HP)	Voltage		
S	YD-16GS	5-50 (16.4- 13.2)	6.5-60 (21.3-16)	7.4 (24.3)	10.2 (33.5)	70 (18.5)	78 (20.6)	180(1/4)	100V 200V	7.1 6.2
	YD-20GS	7-60 (23-16)	9.5-70 (31-18.5)	9.4 (31)	12.4 (40.7)	100 (26.4)	100 (26.4)	260(1/3)	100V 200V	8.9 8.0
H	YD-16GSH	12-24 (39.4-6.3)	17-25 (56-6.6)	13.9 (45.6)	19.2 (63)	40 (10.6)	40 (10.6)	260(1/3)	100V 200V	8.9 8.0
	YD-20GSH	9.5-70 (31-18.5)	-	12.7 (42)	-	104 (27.5)	-	260(1/3)	100V 200V	8.9 8.0

(S.G.1.2)

S	YD-16GSF	5-60 (16.4-16)	5-60 (16.4-16)	8.2 (27)	8.7 (28.5)	90 (28.3)	91 (24)	180(1/4)	100V 200V	7.4 6.6
H	YD-16GSHF	12-24 (39.4-6.3)	14-25 (46-6.6)	13.8 (45.3)	15.5 (51)	40 (10.6)	40 (10.6)	260(1/3)	100V 200V	9.2 8.3
	YD-20GSHF	7.5-70 (24.6- 18.5)	8-70 (26.2- 18.5)	11 (36)	12 (39.4)	116 (30.6)	122 (32.2)	260(1/3)	100V 200V	9.2 8.3

### Note:

1) Testing was conducted using clean fresh water at room temperature.

2) The maximum discharge output displays the flow rate at a height of zero meter. The maximum height the pump can lift represents the entire range of lifts.

3) Maximum fluid viscosity (when specific gravity is 1.0): up to 30 mm<sup>2</sup>/s { 30cSt } .

4) Ambient temperature range: 0°C to 40°C (32F to 104F).

5) Ambient humidity range: 35 to 85%RH

6) Fluid temperature range: 0°C (32F) to no more than 80°C (176F).

However, it may differ depending on the specification with respect to fluid and heat cycle.

\* Do not use freezing fluid.

7) The maximum limit for specific gravity of the fluid is 1.1. This may differ depending on the pump specification, ambient temperature and fluid viscosity, etc.

8) YD-20GSH is only 50Hz.

9) Motor type: Single phase condenser motor and three phase motor. Single phase 200V motor is available on a special order basis.

10) Single phase 100V/110V motor and three phase 200V/220V motor are with the thermal protector. \* Operation temperature: Single phase 120°C (248F) / Three phase 135°C (275F)

11) To protect the motor in a corrosive gas environment, oil seal has been installed in the load-bearing side and a V-ring in the non-load-bearing side.

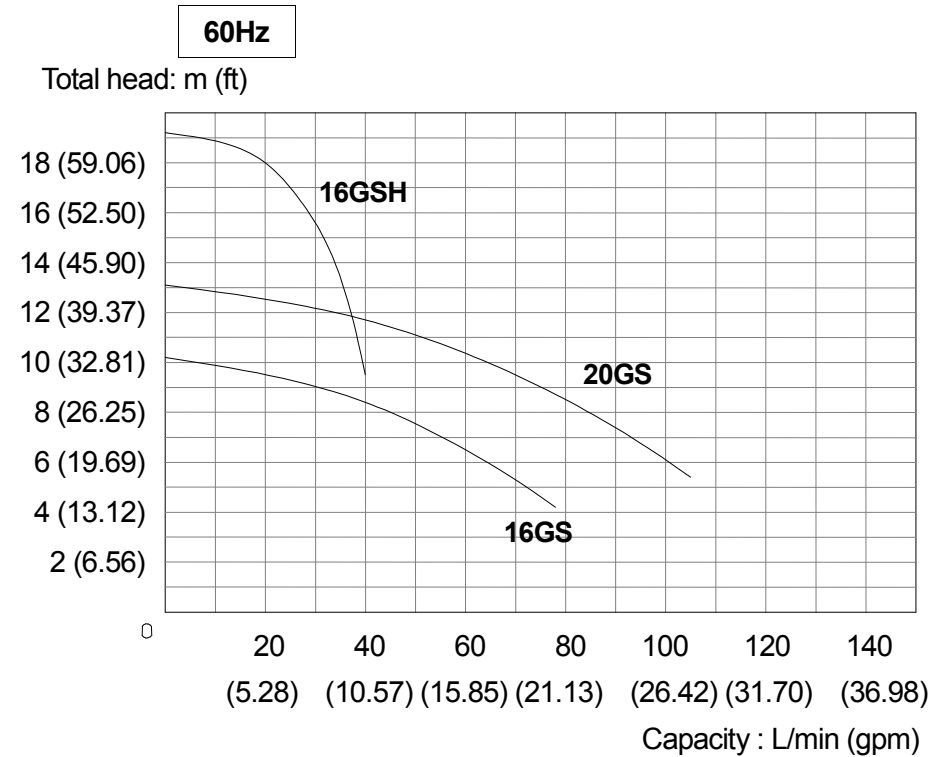
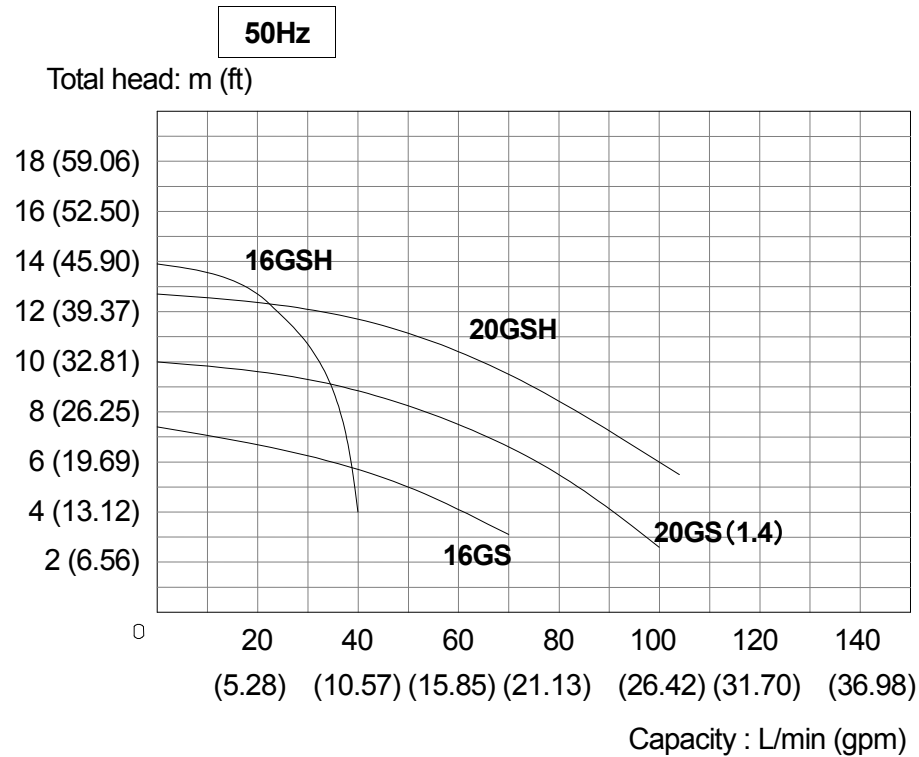
12) The Union-type and Flange-type connection is an option that comes in screw-type with a union coupling. For assembly, please refer to illustrations and instructions on p10, 12, 17.

13) Please note, performance and/or dimensions may be altered without prior notification for product improvement purposes.

# GENERAL DESCRIPTION

## 5. Performance Curve

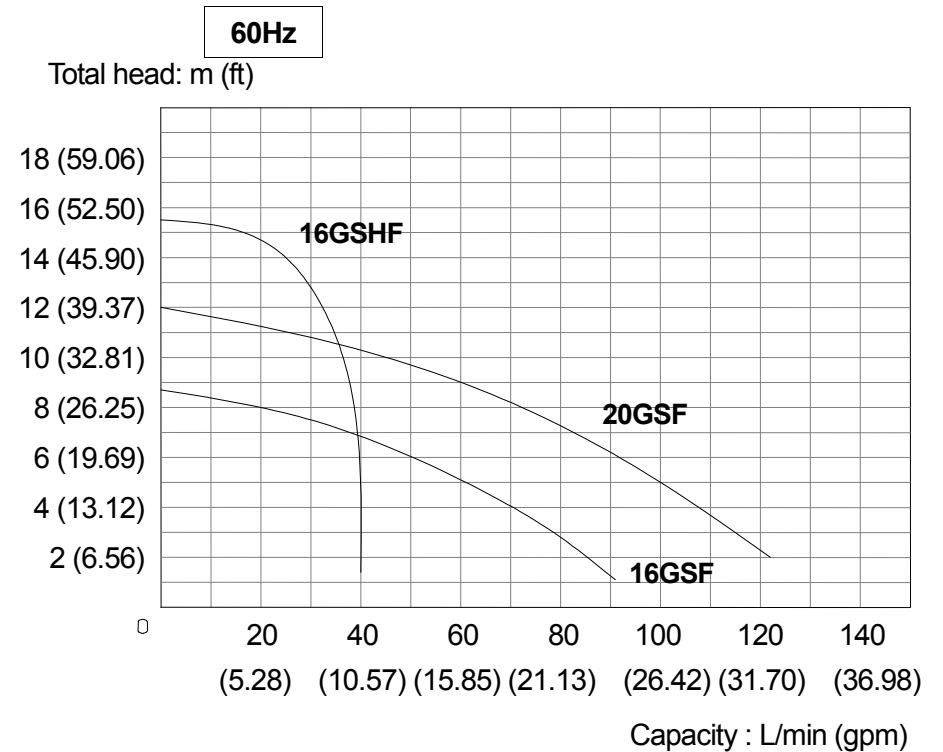
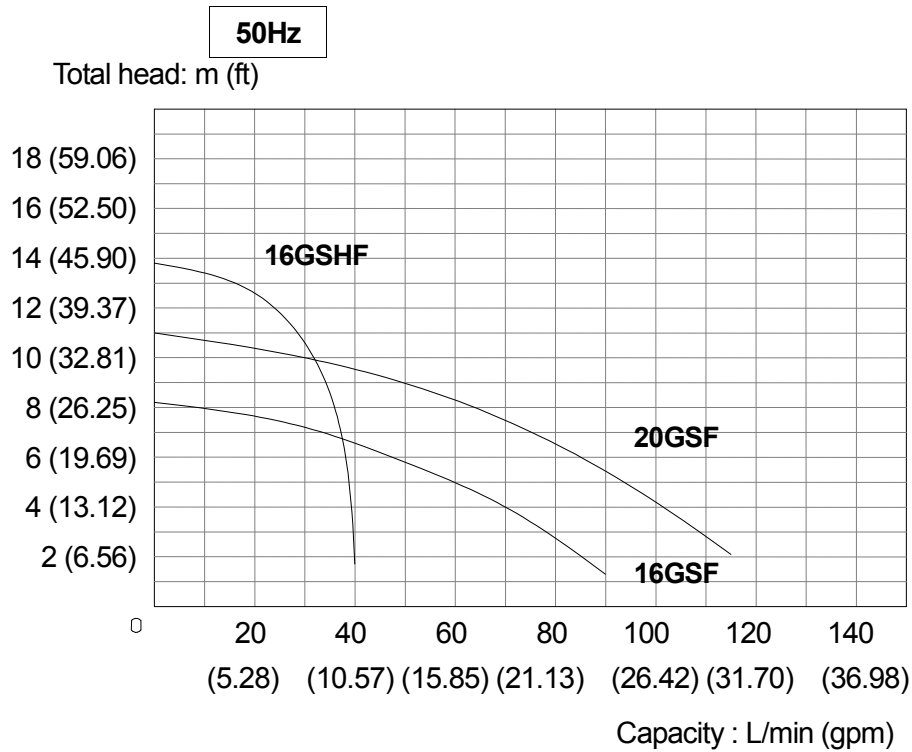
16 / 20 GS S.G.1.1 (1.4)



This performance test is based on JIS B 8301, 8302. The specific gravity of test liquid is 1.0.

# GENERAL DESCRIPTION

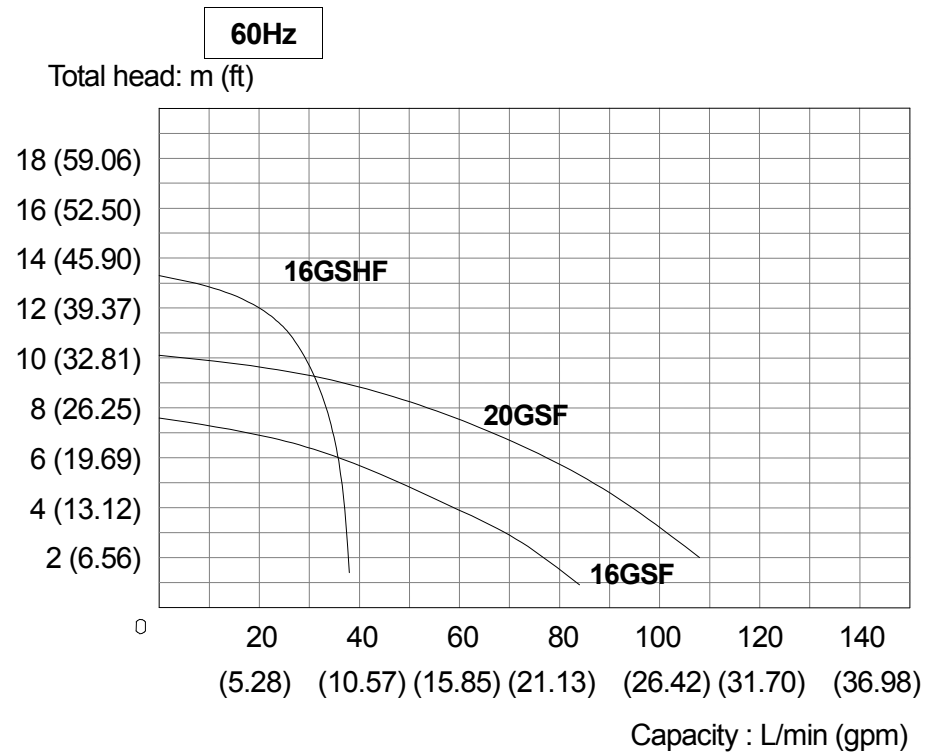
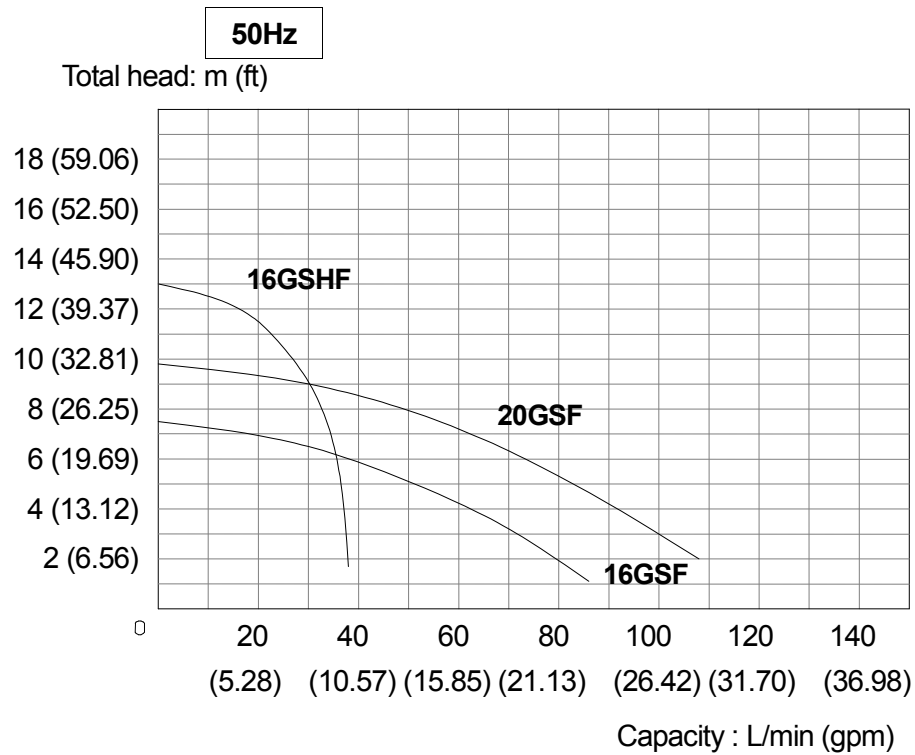
16 / 20 GSF S.G.1.2



This performance test is based on JIS B 8301, 8302. The specific gravity of test liquid is 1.0.

# GENERAL DESCRIPTION

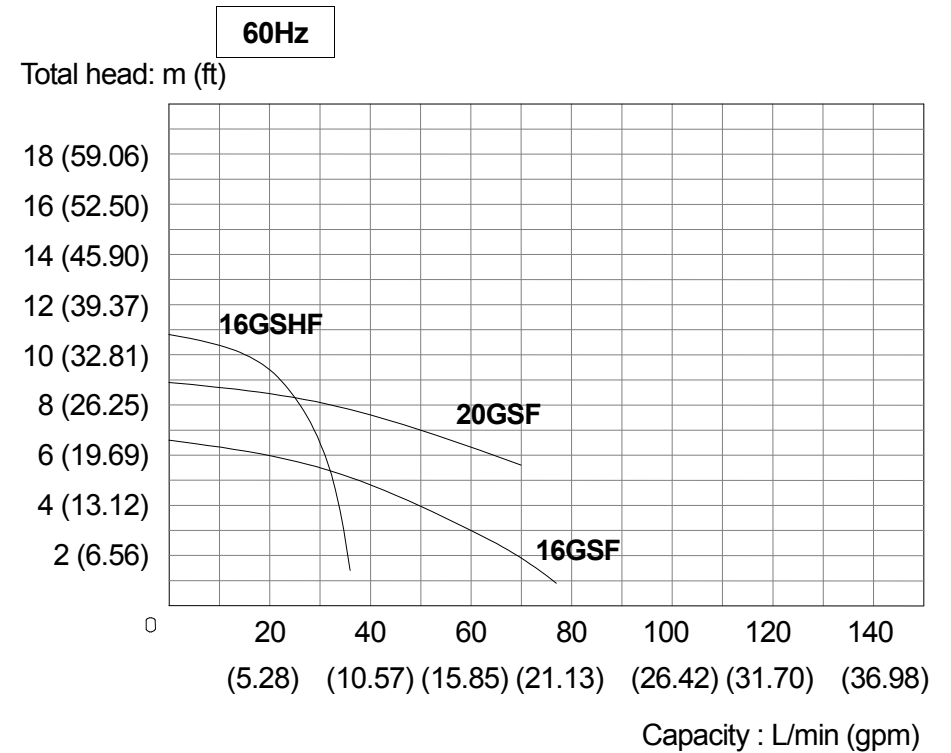
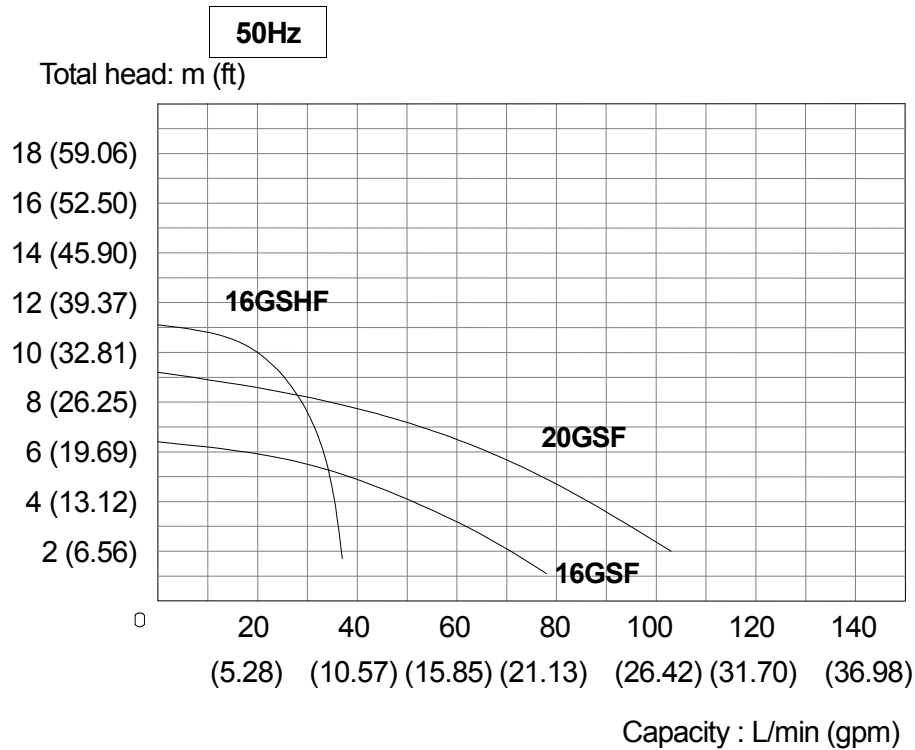
16 / 20 GSF S.G.1.5



This performance test is based on JIS B 8301, 8302. The specific gravity of test liquid is 1.0.

# GENERAL DESCRIPTION

16 / 20 GSF S.G.1.9



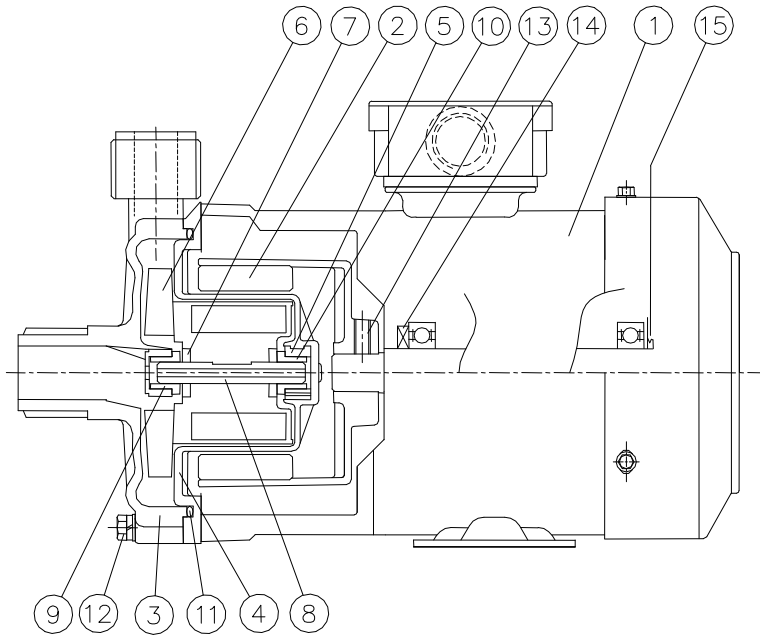
This performance test is based on JIS B 8301, 8302 .The specific gravity of test liquid is 1.0.

# GENERAL DESCRIPTION

## 6. Parts Diagram

YD-16GS

YD-16GSF

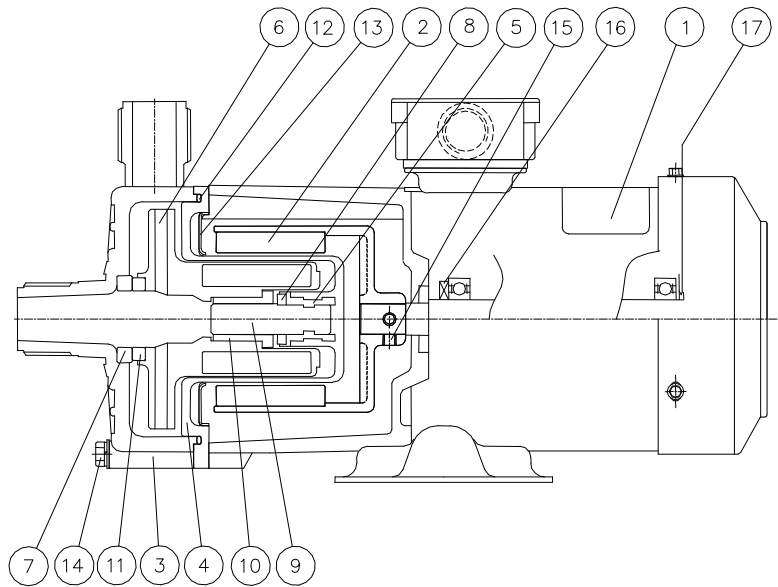


No.	PARTS NAME	QTY	MATERIAL		NOTE
			GS	GSF	
1	Motor (180W)	1			with Base
2	Outer Magnet	1	Ferrite Magnet / ADC 12		
3	Front casing	1	GFR PP	CFR ETFE	
4	Rear casing	1	GFR PP	CFR ETFE	
5	Bushing	1	GFR PPS	CFR ETFE	
6	Impeller	1	GFR PP/Ferrite Mag.	CFR ETFE/Ferrite Mag.	
7	Thrust washer	2	Alumina Ceramic		
8	Shaft	1	Alumina Ceramic		
9	Front Bearing	1	PTFE		
10	Rear Bearing	1	PTFE		
11	O-ring (AS568-242)	1	FPM		
12	Hexagonal Bolt (M5*35)	6	SUS		with Nuts & Bolts
13	Hexagonal Stud Bolts(M6*10)	2	Carbon Steel Plating		
14	Oil Seal	1	CR		TC 30157
15	V-Ring	1	CR		12A-φ11.5~φ12.5
Motor Bearing (LS: 6202ZZ, OS: 6201ZZ)					

# GENERAL DESCRIPTION

YD-20GS-20GSH (16GSH)

YD-20GSF-20GSHF (16GSHF)



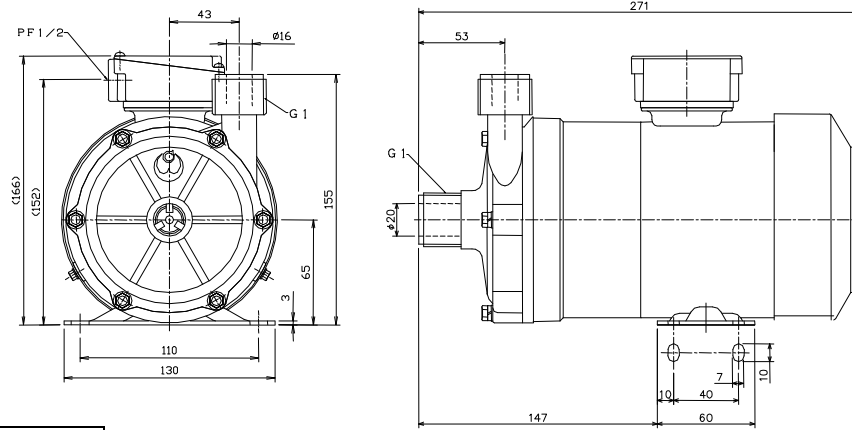
No.	PARTS NAME	QTY	MATERIAL		NOTE
			GS(H)	GS(H)F	
1	Motor (260W)	1			with Base
2	Outer Magnet	1	Ferrite Magnet / ADC 12		
3	Front Casing	1	GFR PP	CFR ETFE	
4	Rear Casing	1	GFR PP	CFR ETFE	
5	Bushing	1	GFR PPS	CFR ETFE	
6	Impeller	1	GFR PP/Ferrite Mag.	CFR ETFE/Ferrite Mag.	
7	Front Thrust Washer	1	Alumina Ceramic		
8	Rear Thrust Washer	1	Alumina Ceramic		
9	Shaft	1	Alumina Ceramic		
10	Bearing	1	PTFE		
11	Thrust Ring	1	PTFE		
12	O-ring (G-110)	1	FPM		
13	Back Up Ring	1	SPCC		
14	Hexagonal Bolt (M6*60)	6	SUS		with Nuts & Bolts
15	Hexagonal Stud Bolts(M6*10)	2	Carbon Steel Plating		
16	Oil Seal	1	CR		TC 30157
17	V-Ring	1	CR		12A-φ11.5~φ12.5
	Motor Bearing (LS: 6202ZZ, OS: 6201ZZ)				

# GENERAL DESCRIPTION

## 7. Outline Dimension

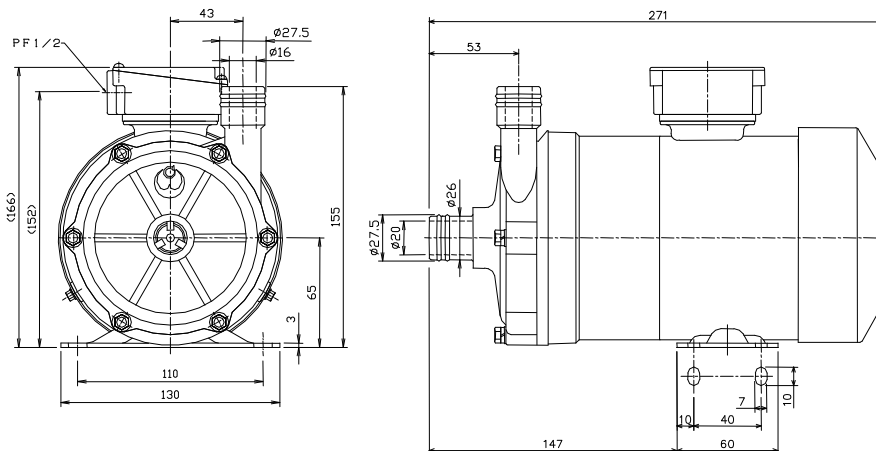
**YD-16GS** | **YD-16GSF**

Thread type



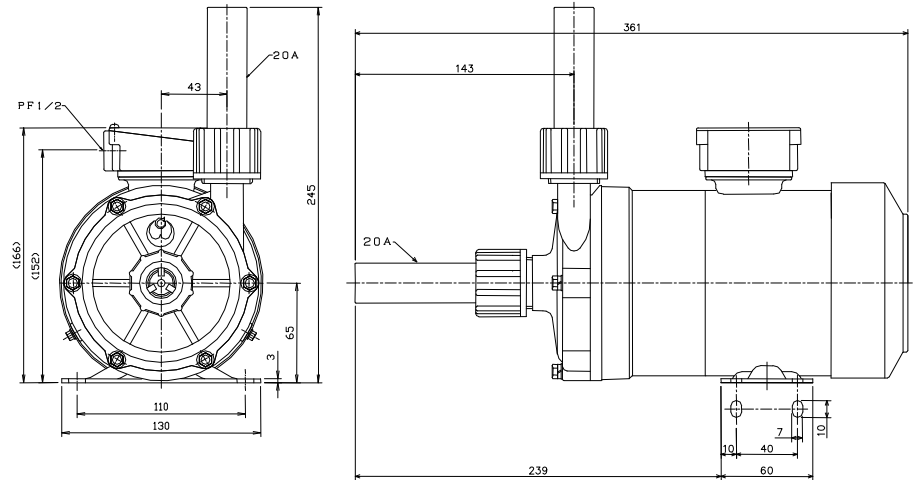
**16GS**

Hose type



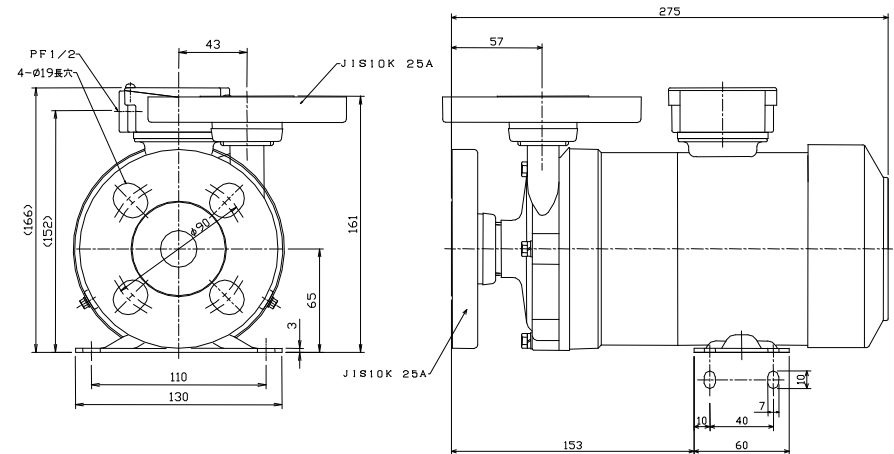
**YD-16GS** | **YD-16GSF**

Union type (Option)



**16GS** | **16GSF**

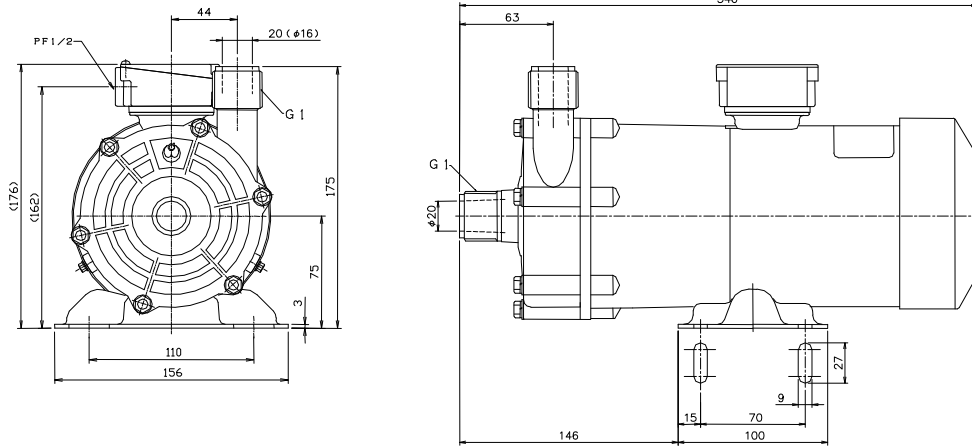
Flange type (Option)



# GENERAL DESCRIPTION

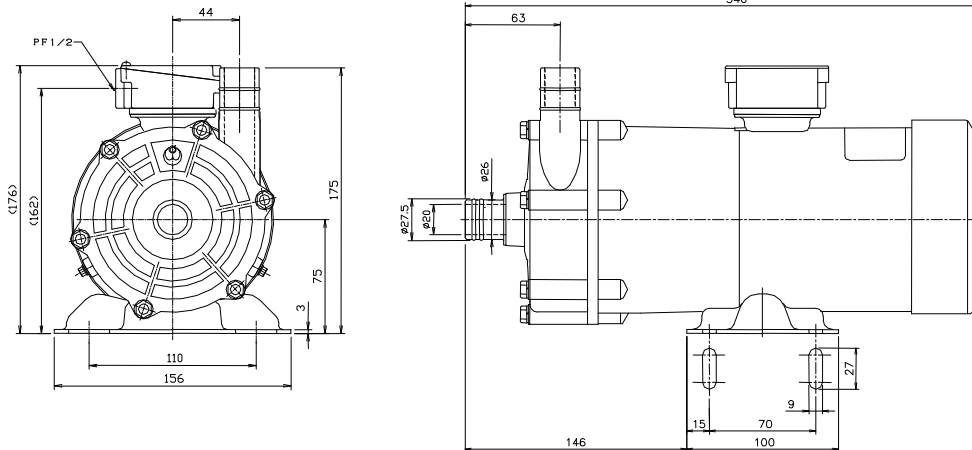
**YD-20GS·20GSH (16GSH) YD-20GSF (16GSHF)**

Thread type



**YD-20GS**

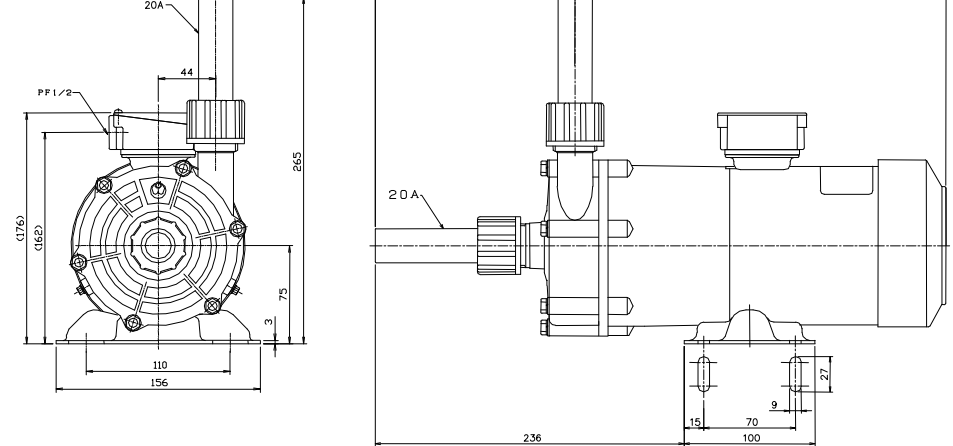
Hose type



**YD-20GS·20GSH (16GSH)**

**YD-20GSF (16GSHF)**

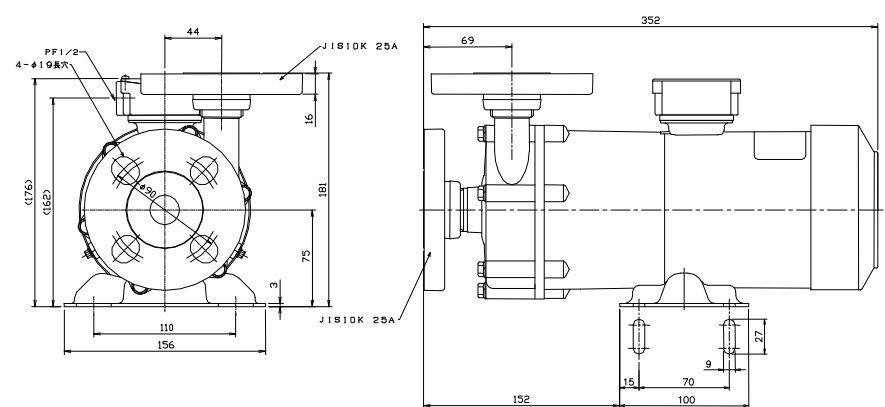
Union type (Option)



**YD-20GS·20GSH (16GSH)**

**YD-20GSF (16GSHF)**

Flange type (Option)



# INSTALLATION

## 1. Before operating the pump

Operators and maintenance personnel must read the instruction manual thoroughly before operating the pump. Do not operate the pump unless these instructions have been completely understood.

### Warning

- Power should be turned off when the pump or its electrical parts are wet. Direct contact will cause electric shock.
- No fire:  
For safety concerns, do not place any hazardous or combustible materials near the pump.

### Precautions

- Since the pump has a powerful magnet, do not place any objects that are incompatible with magnetic fields such as wristwatches, floppy discs or CD's on or near the pump.
- Do not operate the pump without liquid. It may cause the frictional heat and damage the parts.

- **Handle the pump with care**

Dropping or inflicting a powerful shock to the unit may cause damage or pump breakdown.

- **The pump is not designed for self-priming**

Before attempting to run the unit, the pump must be filled with the liquid to be pumped.

- **The pump is neither dust-proof nor waterproof**

Do not let the motor get wet.

- **About the power cord**

Placing heavy objects on the cord or heating the cord will damage it, causing fire and/or electric shock. If the cord is damaged, please stop the operation and consult with the manufacturer.

- **Banned liquid**

Please contact the detail.

### Precautions

- **Conditions for installation/storage location**

- Locations exposed to direct sunlight
- High temperature locations (40°C (104F) or higher)
- Dusty or humid places
- Any location where temperatures may drop to freezing points or below
- Any location exposed to the elements

# INSTALLATION

- Since the pump has a powerful magnet, do not use any liquids containing metals such as iron or nickel, etc.
- Attach ground wiring  
Ground wire must be properly grounded.
- To prevent electric shock, a separately-purchased circuit breaker should be installed.
- Maintenance and cleaning  
Do not use solvents such as benzene, alcohol or paint thinner as these solvents may cause paint to fade or peel.
- In case of a damaged pump  
To avoid short circuit or accidental electric shock, never use a damaged pump.

## 2. Installation, plumbing and electrical wiring

When sensing any danger or irregularity during installation, please suspend the operation and start from the beginning.

### 2-1 Installation

#### [1] Installation location

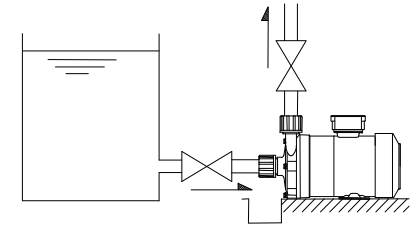
Select a location with an ambient temperature between 0°C (32F) and 40°C (104F) and a relative humidity of 90% or below.

The location should also be conveniently accessible for future maintenance and inspections.

#### [2] Installing the pump

The pump is not designed a self-priming pump, the unit should be installed at a height below the liquid surface in the intake reservoir.

However, if there is not enough separation between the pump intake height and the liquid surface height, air may be drawn into the pump and interrupt pump flow. Make certain that air is not drawn in by maintaining a separation of at least 30cm (12 inches) below the liquid surface.



#### [3] Direction of pump discharge

The pump discharge can be set to any desired direction. However, it is the best to set discharge upward to allow air in the pump chamber to escape.

#### [4] Fasten the base

The unit must be fastened at its base. Never install the unit with the pump on top or bottom.

#### [5] Drain ditch

The drain ditch should be set to let the leaked liquid flow to the treatment tank. If it is no treatment tank, set the drain pan on instead.

## 2-2 Plumbing

#### [1] Tightening the pipes

Use the following bolt sizes to connect the pump discharge and intake flanges. Bolts should be tightened with an appropriate torque. (The following torque is used for PVC pipe flange, rubber gasket.)

Model	Bolt Size	Tightening Torque (N·m {kgf ·cm})
YD-16GS	M16	19.6 {200}
YD-20GS		

# INSTALLATION

## [2] Intake pipe

1. Try to use a short pipe with very few bends. Also, install pipe supports so the weight and thermal stress from the pipe will not be exerted on the pump unit.
2. Securely attach the intake pipe coupling, being careful that air is not drawn in. If air gets into the intake pipe, pump flow may be interrupted, and, in some cases, it may damage the pump.
3. The intake pipe should not have any arched sections (such as an elbow) where air can accumulate. Also, the pipe should be installed at an upgrade toward the pump with a gradient of 1/100 or more.
4. Use a reducer if the diameter of the intake pipe differs from that of the pump intake opening. The reducer should be connected in such a way that its top is horizontally level. Never use an intake pipe with a diameter smaller than that of the intake opening.
5. To ensure that the pump can be easily taken apart for inspection, it is recommended that a valve be installed on the intake pipe. Since this valve is only needed when the pump is taken apart for inspection, it must remain fully opened during operation.
6. If the pump is to be used for transferring hazardous liquids, a flushing pipe for cleaning the interior of the pump must be installed, in considering the need for taking apart the pump unit.
7. Use an intake pipe with a diameter at least the size of the intake opening.
8. A screen should be installed at the intake opening of the intake reservoir to avoid contamination with foreign objects. Since the screen will clog, clean it regularly depending on how dirty the liquid is and the operation time logged. If the clogged screen is left unattended, air will be drawn into the pump, interrupting pump flow, causing breakdowns.

## [3] Discharge pipe

1. Install a support for the discharge pipe so that the pump does not have to bear its weight.
2. A desired performance may not be achieved due to an increased resistance from a long pipe. When selecting a pipe diameter, take into account the calculation of pipe resistance.
3. If there are many bends within a short range on the discharge pipe, use a diameter one size larger than that of the discharge opening. If a pipe of the same diameter is used, the desired pressure may not be achieved due to pressure loss within the pipe. Especially in cases such as with etching machines which require pressure, pipes with a diameter larger by one size should be used.
4. In the following situations, a check valve is recommended. When choosing a check valve, its limiting pressure should be adequately considered (water hammer phenomenon, effect of backflow to the pump, etc.).
  - When the discharge pipe is long.
  - When the discharge pump height is 10 m (33ft) and more.
  - When the end of discharge pipe is at least 9 m (30ft) higher than the intake liquid surface.
  - When two or more pumps are connected parallel to a common pipe.
5. It is recommended that a valve (dividing valve) be installed on the discharge pipe to allow for discharge volume control and to prevent motor overload. When both a check valve and a discharge valve are to be installed, they may be arranged in a one-long-one-short manner and in the order of :  
Pump → Check valve → Dividing valve.

# INSTALLATION

6. A pressure gauge must be installed on the discharge pipe.
7. If the horizontal portion of the discharge pipe is long, there must be an air draining device along the pipe.
8. If there is a possibility of liquid in the discharge pipe freezing, install a drain valve to let the liquid out.

## [4] Tubing

1. Tubing should be short with very few bends to reduce flow resistance. Also the intake tubing should be short with a large diameter to avoid cavitation (a phenomenon where bubbles occur).
2. Use anti-corrosion vinyl tubing that can withstand pump pressure.
3. Tubing size (tubing inner diameter  $\phi 26$ )  
Use a tubing size that matches the pump diameter. Using a different size diameter cannot ensure a tight connection. Use a braided-tubing to prevent the intake side from collapsing from the suction pressure. (It is especially necessary for warm water.)
4. Attaching valve  
Install a valve between the line and tubing connected to the pump.
  - Intake valve: for easy removal of the pump and maintenance service.
  - Discharge valve: for controlling pump discharge output and pump height.
5. How to connect tubing  
Attach tubing to the discharge and intake openings by pushing the tip of the tubing all the way in.



### Precautions

Air may be drawn in due to incomplete connection at the intake side, leading to reduced pump height and pump idling. This may in turn cause the impeller to overheat and breakdown.

6. Secure tubing with a tightening device (tubing band, etc.) to prevent any leak at the joints. Tightening devices should be attached on the rib of discharge outlet.



### Precautions

Since the connections are made of resin, do not tighten excessively.

7. Do not exert the tubing weight on either the intake opening or the discharge outlet.

## [5] Unions

1. Place O-ring (P-22) in the grooves of the union socket (20A, C-PVC) provided, and tightened the screws on the front casing using union nuts (GFR PP).
2. Set union socket surface parallel to the front casing surface and tighten O-ring uniformly.

## [6] Flange

1. Discharge outlet : Upward  
The loose flange, lap joint and O-ring are set.
2. Intake opening : Sideways  
The loose flange, lap joint and O-ring are set.

## 2-3 Electrical wiring

Due to personal injury and property damage risks, electrical wiring and power source setup must be handled by qualified professionals. When necessary, please contact the manufacturer or our distributor.

# INSTALLATION

## ■ Before starting work on electrical wiring

- [1] Before starting the work, make sure the main power source has been turned off (or whether the power supply has been shut off).
- [2] Electrical wiring must comply with the applicable electrical codes. (Use only quality wiring material, and follow the electrical equipment technical standards and inside wiring procedures.)
- [3] Use the specified power source voltage as indicated on the “specification” label.
- [4] The pump does not have an ON / OFF switch. The pump will begin operating when power is supplied by connecting the power cord.
- [5] Prepare a ground wire for connection to the motor’s ground wiring. Installation of the pump should take place in a well-ventilated place where there is no risk of an accidental spillage of liquid.
- [6] In case a circuit breaker has been installed.  
When a circuit breaker is activated, the cause must be cleared before resuming operation. Turn off the power supply when looking for the cause.

## Motor / Stable current value / Starting current value

Model	Stable current (50Hz / 60Hz)				Starting current (50Hz / 60Hz)			
	100V (Single phase)	200V (Single phase)	200V (Three phase)	220V / 60Hz (Three phase)	100V (Single phase)	200V (Single phase)	200V (Three phase)	220V / 60Hz (Three phase)
180W	3.2A/2.6A	1.6A/2.02A	1.03A/0.99A	0.93A	11.7A/11.2A	5.6A/5.5A	5.1A/4.5A	5.1A
260W	4.7A/3.7A	2.27A/2.18A	1.32A/1.26A	1.22A	20.0A/20.1A	10.6A/-	6.1A/5.7A	6.3A

# OPERATING PROCEDURES

## 1. Method of operation

### Precautions

- Make sure the pump has been securely installed before starting the unit.
- Since any foreign objects enter the pump, turn off the power and remove the foreign objects. If left unattended, it may cause damage or breakdown.
- Do not let the pump run idle (pumping without liquid). Without any liquid, heat generated from abrasions may damage pump components.

[1] Before starting the pump, make certain the pipe or tubing connected to the discharge outlet or intake opening is securely fastened.

[2] Do not run the pump with the discharge valve and / or the intake valve shut off or nearly shut off.

**Operate the pump as the minimum flow is over 5L/min.**

[3] Avoid opening the discharge or shutting-off the discharge outlet suddenly. Magnet coupling may come off and the impeller may stop rotating. (In such a case, turn off the power. When the motor comes to a stop, the coupling will be restored.)

[4] Be careful that the discharge pressure does not exceed the following limiting value of pressure-resistant.


**16GS(F)** :0.15MPa

**16GSH(F), 20GS(F), 20GSH** :0.28MPa

### ■ Operation

Please operate the pump as following procedure after installing, plumbing and wiring.

- The pump does not have an ON / OFF switch. The pump will begin operating when power is supplied by connecting the power cord.

No.	Operating procedure	Remarks (Check list)
1	<b>Check plumbing, wiring and the voltage.</b>	<ul style="list-style-type: none"> <li>● Perform the check based on instructions in sections on “Plumbing” and “Electrical wiring”.</li> <li>● Check for proper power source voltage by comparing it against the specification label.</li> </ul>
2	<b>Open or close valve</b>	<ul style="list-style-type: none"> <li>● Intake valve : Fully open</li> <li>● Discharge valve : Fully open</li> </ul>
3	<b>Make sure the pump chamber is wet with liquid.</b>	<ul style="list-style-type: none"> <li>● Fill the pump chamber with priming liquid (the liquid to be pumped).</li> </ul>
4	<b>Check the rotation direction. (Turn on the power for only an instant and immediately turn it off.)</b>	<ul style="list-style-type: none"> <li>● Turn on the power to start the pump and check for the pump rotation direction. Look through the fan cover to check if the motor fan is rotating in the direction of the labeled arrow that appears on the motor (if looking from the motor fan side, it should be in a clock-wise direction).</li> </ul> <p> <b>Precautions</b></p> <p>When the motor fan does not come to a smooth stop, it is an indication that something is wrong. Please inspect the pump interior.</p>
5	<b>Turn on the power.</b>	<ul style="list-style-type: none"> <li>● After completing steps 1 to 4, turn on the power and begin pumping.</li> </ul>

# OPERATING PROCEDURES

No.	Operating procedure	Remark (Check list)
<b>6</b>	<b>Set desired discharge output and pump head</b>	<ul style="list-style-type: none"> <li>Gradually adjust the discharge valve to the desired discharge output and pump head. Avoid sudden opening or shutting off of the valve.</li> </ul> <p>Note: Do not shut off the discharge valve for more than one minute.</p> <p>Note: Make sure the pump is pumping normally. If it is not pumping any liquid, immediately turn off the power and clear the cause by following the instructions stated for "Troubleshooting" (P22).</p>
<b>7</b>	<b>Precautions during operation</b>	<ul style="list-style-type: none"> <li>Make sure no foreign objects enter the pump. Foreign objects may cause the impeller to jam and interrupt the pump flow. The power should be turned off immediately, since the motor will continue to run even if the impeller is jammed (consult directly with the manufacturer).</li> <li>If the circuit breaker is activated, turn off the power and investigate the cause by following the instructions stated in the section for "Troubleshooting" (P22).</li> </ul>

## ■ Shutdown operation

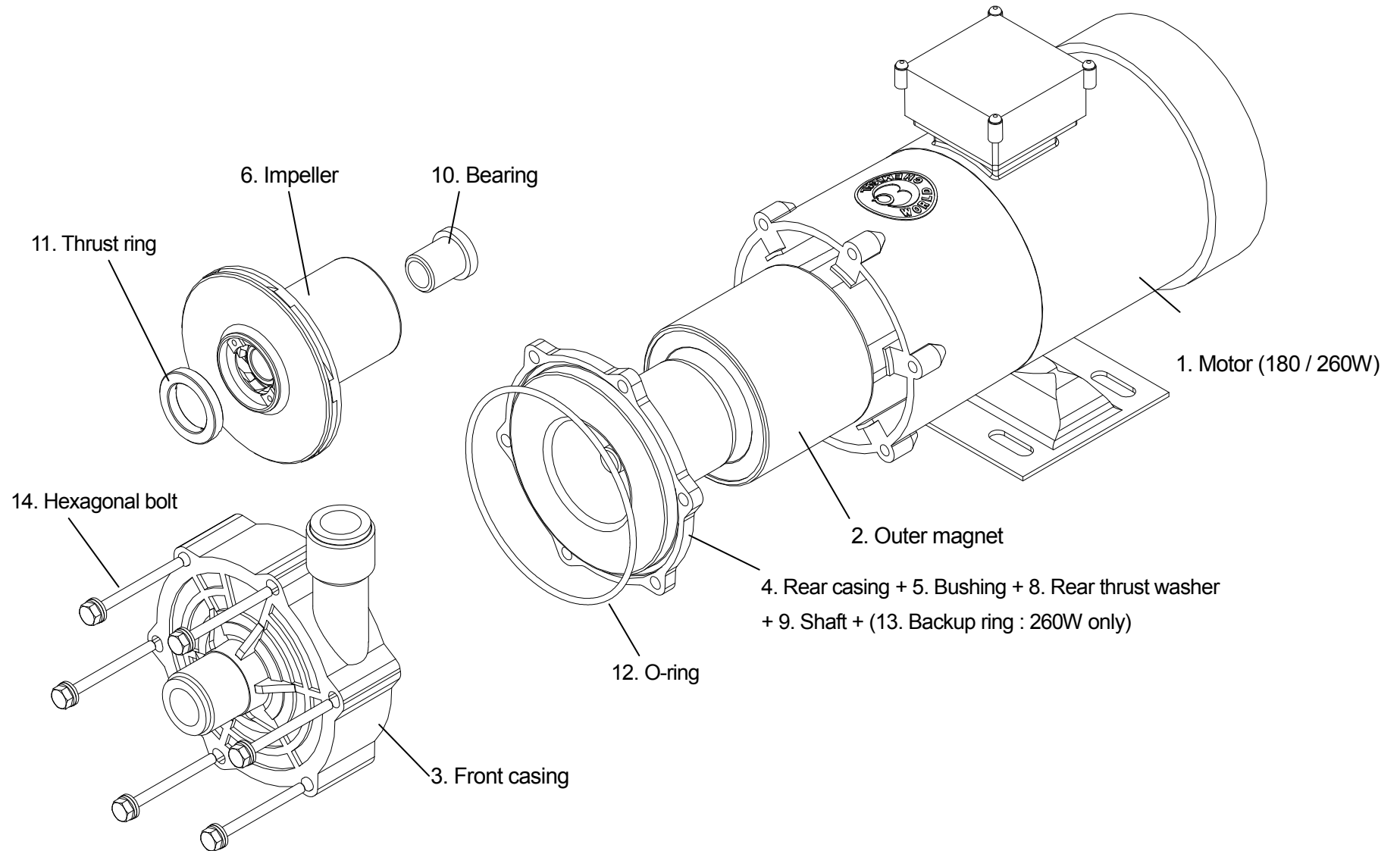
No.	Shutdown procedure	Remark
<b>1</b>	<b>Turn off the power. (make sure the pump comes to a stop)</b>	Check to see if the motor rotation comes to a smooth stop after the power is turned off. If the motor does not come to a smooth stop, the pump needs to be inspected. (For any question, please contact us directly.)
<b>2</b>	<b>Shut off the discharge valve.</b>	Gradually shut off the discharge valve. Since it is a magnetic valve, do not shut it off suddenly.

## ■ Precautions for a long-term shutdown

If the pump is to be shutdown over a long period of time, the liquid inside the pump must be removed. Also, to prevent the motor bearing from rusting, please operate the pump and circulate water for five minutes every three months.

# MAINTENANCE

## EXPLODED VIEW



# MAINTENANCE

## 1. Troubleshooting

TROUBLE	PUMP INDICATIONS		CAUSE	CHECK LIST AND ACTION(S) TO BE TAKEN
	When discharge valve is shut off	When discharge valve is opened		
<b>No Discharge</b>		Pressure and vacuum gauge showing zero	<ul style="list-style-type: none"> <li>Not enough priming liquid</li> <li>Pump runs idle</li> </ul>	<ul style="list-style-type: none"> <li>Stop the pump and fill with enough liquid, then restart</li> </ul>
	Priming liquid does not go into the pump		<ul style="list-style-type: none"> <li>Intake screen is clogged</li> <li>improper intake piping</li> <li>Lowering of the liquid surface level inside the intake reservoir</li> </ul>	<ul style="list-style-type: none"> <li>Clean the screen</li> <li>Check for any valve closure or screen obstruction</li> <li>Check for liquid surface level in intake reservoir, and raise the surface to a satisfactory level</li> </ul>
	After the pump starts, the pressure would drop after discharge valve is opened	Pressure and vacuum gauge show sudden fluctuation and drooped to zero	<ul style="list-style-type: none"> <li>Air entering through intake pipe or gasket</li> </ul>	<ul style="list-style-type: none"> <li>Check the intake for any gap</li> <li>Check for any abnormally low liquid surface</li> <li>Make sure voltage is normal</li> </ul>
	No discharge after restarting the pump following a shutdown	No discharge after restarting the pump following a shutdown	<ul style="list-style-type: none"> <li>Air lock, air accumulation in the intake pipe</li> </ul>	<ul style="list-style-type: none"> <li>Release air in the pipe</li> <li>Inspect piping and modify air pocket section</li> <li>Make sure air mixed in the backflow liquid can be smoothly drawn back into the intake reservoir, improve the piping incline; clean the screen</li> </ul>
	Pressure gauge reading remain low at all time		<ul style="list-style-type: none"> <li>Pump rpm not enough</li> <li>Pump rotating in the wrong direction</li> </ul>	<ul style="list-style-type: none"> <li>Inspect wiring and motor, and take appropriate measures</li> <li>Replace wiring</li> </ul>
<b>Discharge Output Not Enough</b>		High vacuum gauge reading	<ul style="list-style-type: none"> <li>Clogged screen is obstructing in the intake pipe</li> </ul>	<ul style="list-style-type: none"> <li>Clean the clogged screen</li> </ul>
	Pressure gauge and vacuum gauge showing optimum readings	Very high vacuum gauge reading	<ul style="list-style-type: none"> <li>Air accumulating in the intake pipe</li> <li>The entrance to impeller is clogged</li> </ul>	<ul style="list-style-type: none"> <li>Inspect intake pipe installation and make modification if necessary</li> <li>Remove foreign objects</li> </ul>
		Pressure and vacuum gauge show fluctuation	<ul style="list-style-type: none"> <li>Air entering through intake pipe or gasket</li> </ul>	<ul style="list-style-type: none"> <li>Inspect intake pipe joints and tighten if necessary</li> </ul>
			<ul style="list-style-type: none"> <li>Foreign object obstructing the discharge</li> </ul>	<ul style="list-style-type: none"> <li>Remove foreign objects inside the pump</li> <li>Remove obstructions or scale in pipe</li> </ul>
		High vacuum gauge reading but normal pressure reading	<ul style="list-style-type: none"> <li>Air pocket or other obstruction in the intake pipe</li> </ul>	<ul style="list-style-type: none"> <li>Check for any arched section on the intake pipe and take appropriate action</li> </ul>
		High pressure gauge reading but normal vacuum	<ul style="list-style-type: none"> <li>There may be a section of the discharge pipe giving high resistance or the actual pump height of pressure loss is too great.</li> </ul>	<ul style="list-style-type: none"> <li>Check for the actual pump height or pressure loss in the discharge pipe and take appropriate action</li> </ul>
		Low pressure gauge reading and very low vacuum gauge reading	Low pressure gauge reading and vacuum gauge reading also low	<ul style="list-style-type: none"> <li>Reverse rotation</li> </ul>
<b>Motor Heats Up</b>		<ul style="list-style-type: none"> <li>Whirling pressure dropped</li> <li>Overload</li> <li>High ambient temperature</li> </ul>	<ul style="list-style-type: none"> <li>Make sure the voltage and Hz are appropriate</li> <li>Make sure the liquid specific gravity and viscosity are appropriate</li> <li>Improve ventilation</li> </ul>	
<b>Sudden Loss of Discharge Output</b>	High vacuum gauge reading	<ul style="list-style-type: none"> <li>Screen clogged by foreign objects</li> </ul>	<ul style="list-style-type: none"> <li>Remove foreign objects</li> </ul>	
<b>Pump Vibrates</b>		<ul style="list-style-type: none"> <li>Base defect</li> <li>Loose bolt</li> <li>Closed intake pipe, cavitation in the intake pipe</li> <li>Impeller comes into contact with casing</li> <li>Worm motor bearing</li> </ul>	<ul style="list-style-type: none"> <li>Make sure installation is done appropriately</li> <li>Tighten the serews</li> <li>Clean or remove the cause for cavitation</li> <li>Remove the cause or replace</li> <li>Replce bearing or motor</li> </ul>	

## 2. Maintenance / Inspection

### 2-1 Maintenance

#### ■ Check for loose screws

After the pump has been in use for a long period of time, screws on the pump may become loose. Screws can be tightened within the limit in which resin will not become deformed. Also, check for loose screws before operating the pump following a long-term storage.

The tightening torque is as follows:

**16GS, 16GSH, 20GS, 20GSH** : 0.24N·m

**16GSF, 16GSHF, 20GSF** : 0.35N·m

### 2-2 Maintenance

#### ■ Daily inspection

Pump operating condition: Check for any vibration or abnormal sound. Current value and discharge output should also be checked for any abnormality. In case of any abnormality, turn off the power immediately and clear the cause by following instructions stated in the section for “Troubleshooting”.

#### ■ Replacement parts (normal wear-and-tear parts)

After a continuous operation over a long period of time, it is necessary to replace components with appropriate spare parts. Especially true for those components that goes through the normal wear-and-tear (impeller, O-ring, etc.), spare parts must be stocked at all time. Please contact the manufacturer for details.

#### ■ Recommended worn-out value for replacing moving parts

Model	Shaft	Bearing	Thrust Washer	Thrust Bearing
<b>16GS(F)</b>	φ7 mm (φ0.28 in.)	φ9 mm (φ0.35 in.)	Worn by 1mm (0.04 in.)	Worn by 1mm (0.04 in.)
<b>20GS(F)</b> <b>20GSH</b> <b>16GSH(F)</b>	φ13 mm (φ0.5 in.)	φ15 mm (φ0.6 in.)	Worn by 1mm (0.04 in.)	Worn by 1mm (0.04 in.)

(Note) When the combined worn out value is 1mm (0.04 inch) or more between the thrust washer and thrust bearing, replace the parts with a greater worn out value.

## 3. How to drain liquid

### Warnings

- Power should be turned off before performing this procedure. Protective gears (safety gloves, safety shoes, etc.) must be worn when performing this procedure.
- In case a hazardous chemical is used, rubber gloves, goggles, etc. must be worn for protection.

### Precautions

- When the tubing is removed, liquid will flow out of the discharge outlet and intake opening. Do not inadvertently let the liquid come in contact with the motor or other electrical parts.
- Do not discharge any hazardous chemicals in the pump directly onto the floor. Discharge it into a tray (container).
- The pump is not dustproof or waterproof. Do not let the motor get wet or dusty.

### ■ Procedure for draining liquid

- [1] Turn off the power. Make sure that the power cannot be accidentally turned on by others during this procedure.
- [2] Shut off the discharge and intake valves completely.
- [3] Remove any piping or tubing connected to the discharge outlet and intake opening.

### Precautions

Be aware of residual liquid in the pipe, tubing and pump.

- [4] Remove the bolts securing the pump base, and remove the pump.
- [5] Drain liquid. Place the intake opening facing downward to discharge into a tray (container).

# WARRANTY AND REPAIR

## 1. Warranty period and coverage

- [1] The warranty period is one year from the date of delivery.
- [2] During warranty period, if the unit breaks down or becomes damaged in normal operating condition due to manufacturing defect(s), the cause of breakdown or damaged part(s) will be repaired free of charge.
- [3] There will be a service charge for repairing the following-breakdown(s) or damage(s) and for replacement of worn out part(s):
- Any breakdown or damage occurred after the warranty period
  - Any breakdown or damage due to improper use or safekeeping
  - Any breakdown or damage due to the use of part(s) manufactured by others or the use of unauthorized parts
  - Any breakdown or damage stemming from repair or modification performed by an unauthorized agent
  - Any breakdown or damage as a result of natural disaster or act of God
- [4] We cannot be responsible for any breakdown or damage of a product manufactured using the specification or material designated by the customer.
- [5] Irregularities or breakdown due to chemical or hydrodynamic corrosion or the property of liquid that was pumped will not be covered under the warranty. The material chosen at the time of contract is only a recommendation, we do not guarantee the chemical resistance of such materials.
- [6] In case the determination of the cause for a breakdown or damage is questionable, it shall be resolved through discussion between the customer and the manufacturer.

- [7] We will bill the customer for any travel expenses incurred for non-warranted repair service to a remote location.
- [8] Any expense or other damage incurred as a result of breakdown during operating is not covered under the warranty.

## 2. Repair

### (ATTENTION)

For repair, consult the distributor where the pump was purchased. When returning a pump, the pump chamber should be adequately cleaned.

If any irregularity is detected during operation, the pump should be stopped for inspection (refer to the section of “Troubleshooting”).

- [1] To request a repair service, please call your distributor or the manufacturer.
- [2] Before requesting any repair service, please carefully read the instruction manual again and repeat the inspection.
- [3] When requesting a repair service, please be prepared to provide following information:
- Model type and manufacturing serial number
  - How long the unit has been used and its condition
  - The part in question and its condition
  - Type of liquid pumped (name, specific gravity, liquid temperature, any slurry or not).

## WARRANTY AND REPAIR

Since the residual liquid in a pump can leak out during shipment, creating a hazardous condition, make sure the inside of the unit is adequately cleaned when returning a pump.

Customers may order spare parts using names displayed in the parts table.

Nevertheless, it is safer to also provide the parts number.

<b>MODEL</b>	<b>Y D -</b>		
<b>Date of Purchase</b>		<b>Serial No.</b>	<b>NO.</b>
<b>Purchased from</b>			



**7F, TOUSEN HIGASHI AZABU Bldg.,  
1-5-2, Higashi Azabu, Minato-ku, Tokyo  
106-0044 Japan  
TEL: 03-3588-1140 FAX: 03-3588-1141  
E-mail: [overseas@wcc.co.jp](mailto:overseas@wcc.co.jp)  
Website: <http://www.wcc.co.jp>**