CORROSION RESISTANT MAGNETIC CENTRIFUGAL PUMP

Chemi-Free

INSTRUCTION MANUAL

Version: WCA.0202

YD-16GS
YD-16GSF
YD-16GSH
YD-16GSHF
YD-20GS
YD-20GSF
YD-20GSH

WORLD CHEMICAL USA, INC.

PREFACE

Thank you for purchasing our compact magnetic pump, “Chemi-Free”. Please read this manual thoroughly. An adequate understanding of this manual is required to maximize the pump’s performance and to assure safety and long-term efficiency. Store this manual where it can be easily accessed.

TABLE OF CONTENTS

SAFETY PRECAUTION

The following procedures are intended to protect you from personal injury and/or property damage.

- The following symbols classify the degree of danger and explain the damages that could occur when its contents are ignored and the pump is used erroneously.

	**Warning:** Non-compliance can lead to fatal or serious injury.
	**Precaution:** Non-compliance can lead to some injury and/or property damage.

- The types of rules to be observed are classified and explained under the following symbols. (The following are examples of picture displays.)

	This symbol indicates a warning or precaution.
	This symbol indicates a prohibited action.
	This symbol indicates a required action.

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.

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.

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.

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.

SAFETY PRECAUTION (continued)

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.

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 protective gears.

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

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.

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.

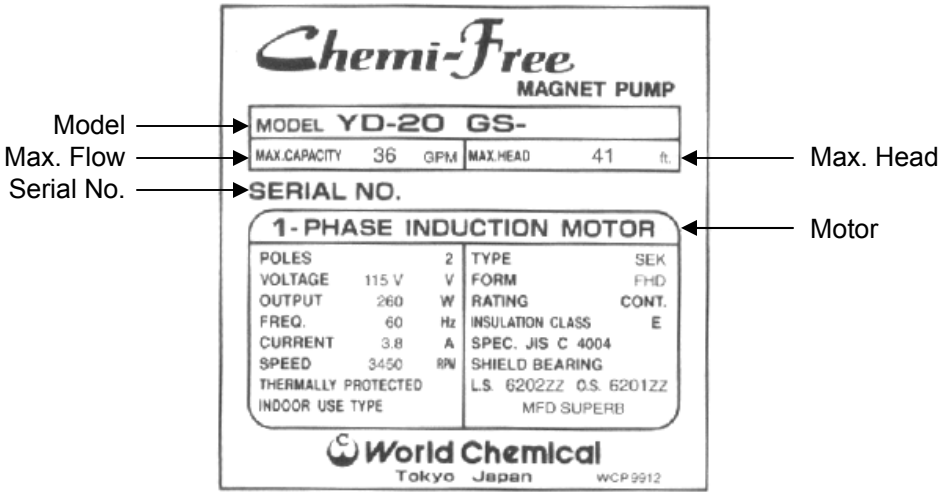
INSPECTION WHEN UNPACKING THE PUMP

Inspect the following and contact the source where the pump was purchased if any abnormality is found.

(1) Check to see if the type, total lift, discharge volume, motor specification and voltage specification on the pump and motor nameplates comply with the ordered specifications.

(2) Check for all auxiliary parts.

(3) Check for any loose bolts or any damages caused by mishandling during transportation.



MODEL DESCRIPTION

Y D – 16 G S (H) F – S

(1) (2) (3)

(1) Discharge Diameter

(2) Main Material

GS/GSH: GFR PP (H stands for high pressure.)

GSF/GSHF: CFR ETFE (H stands for high pressure.)

(3) Connection

S: NPT thread

SU: Union

SF: Flange

H: Hose

SPECIFICATION

■ GS/GSH Series

Model	Bore in. (mm)		Max Head ft. (m)		Max Capacity gpm (lpm)		Motor Output HP (kW)	Weight lbs. (kg)
	Suction	Discharge	50Hz	60Hz	50Hz	60Hz		
YD-16GS	1 (25)	1 (25)	24 (7.4)	33 (10.2)	24 (92)	26 (100)	1/4 (0.18)	13 (6.1)
YD-20GS	1 (25)	1 (25)	28 (8.8)	41 (12.4)	32 (120)	36 (135)	1/3 (0.26)	18 (8.1)
YD-16GSH	1 (25)	1 (25)	46 (13.9)	63 (19.2)	11 (42)	12 (45)	1/3 (0.26)	18 (8.1)
YD-20GSH	1 (25)	1 (25)	42 (12.7)	———	36 (135)	———	1/3 (0.26)	18 (8.1)

Note: YD-20GS H is not available in the U.S.

■ GSF/GSHF Series

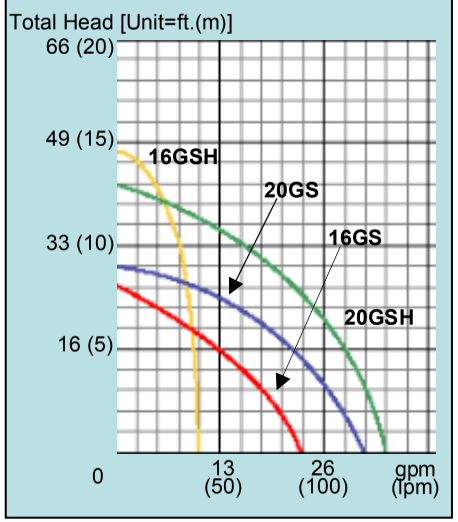
Model	Bore in. (mm)		Max Head ft. (m)		Max Capacity gpm (lpm)		Motor Output HP (kW)	Weight lbs. (kg)
	Suction	Discharge	50Hz	60Hz	50Hz	60Hz		
YD-16GSF	1 (25)	1 (25)	27 (8.2)	29 (8.7)	25 (96)	25 (95)	1/4 (0.18)	14 (6.2)
YD-20GSF	1 (25)	1 (25)	36 (11.0)	39 (12.0)	34 (127)	36 (135)	1/3 (0.26)	18 (8.3)
YD-16GSHF	1 (25)	1 (25)	45 (13.8)	51 (15.5)	11 (40)	11 (40)	1/3 (0.26)	18 (8.3)

Note: Please note that above specifications may change for improvement without notice.

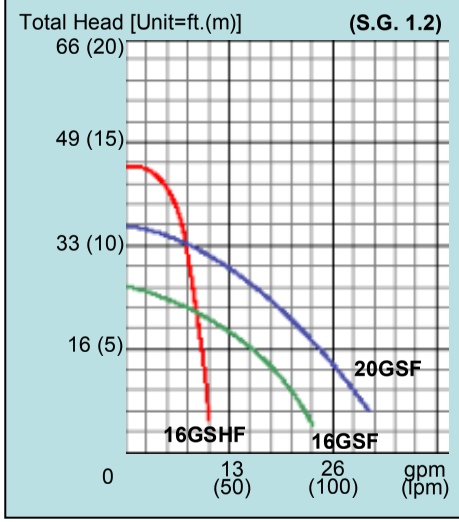
PERFORMANCE CURVES

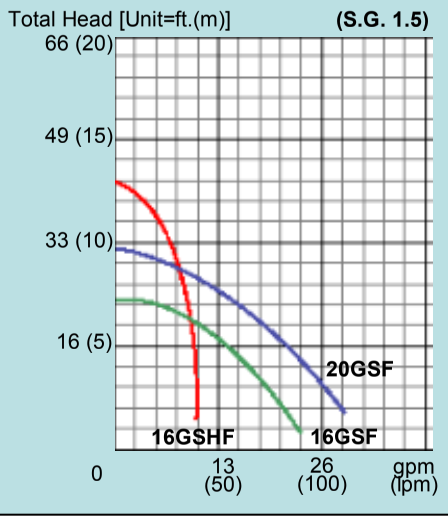
50Hz

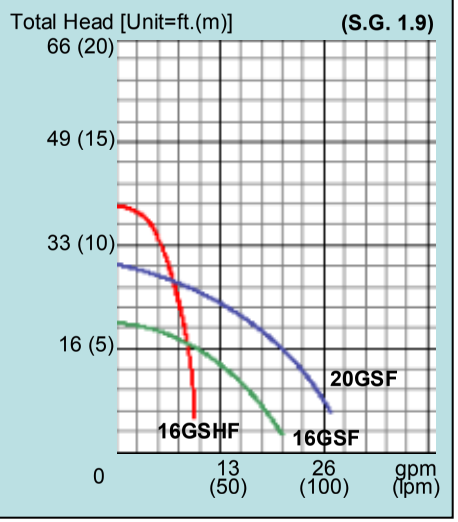
GS(H) Type



GSF/GSHF Type

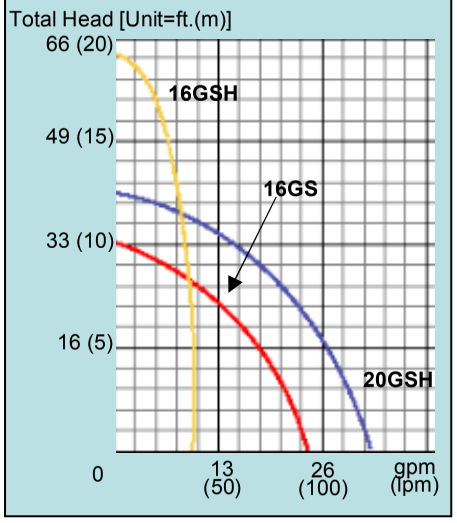




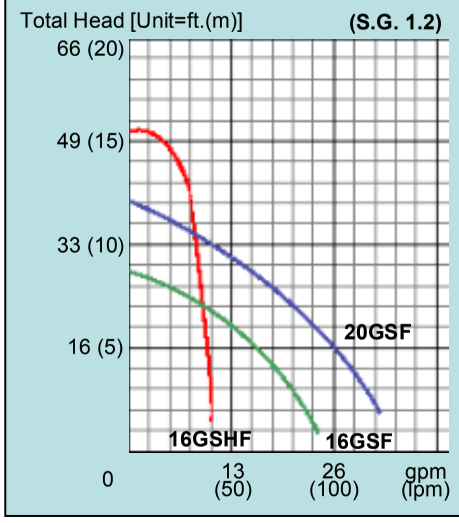


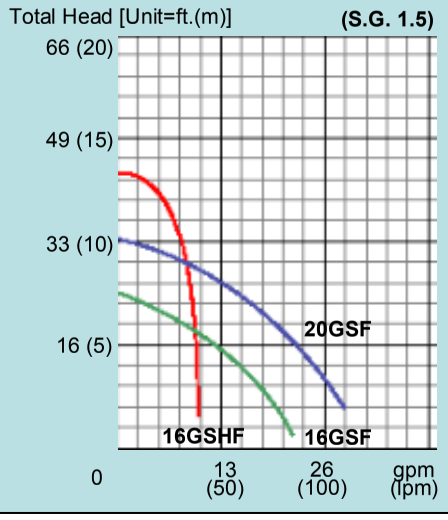
60Hz

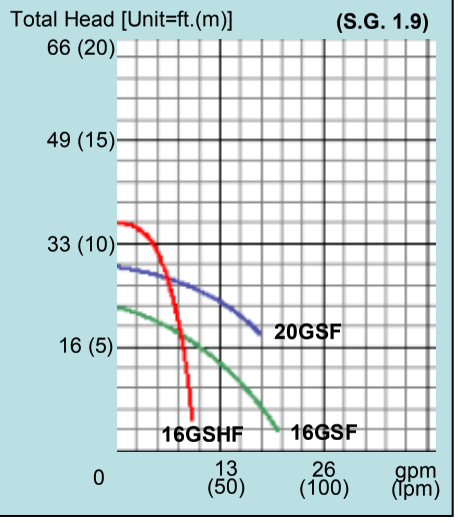
GS(H) Type



GSF/GSHF Type



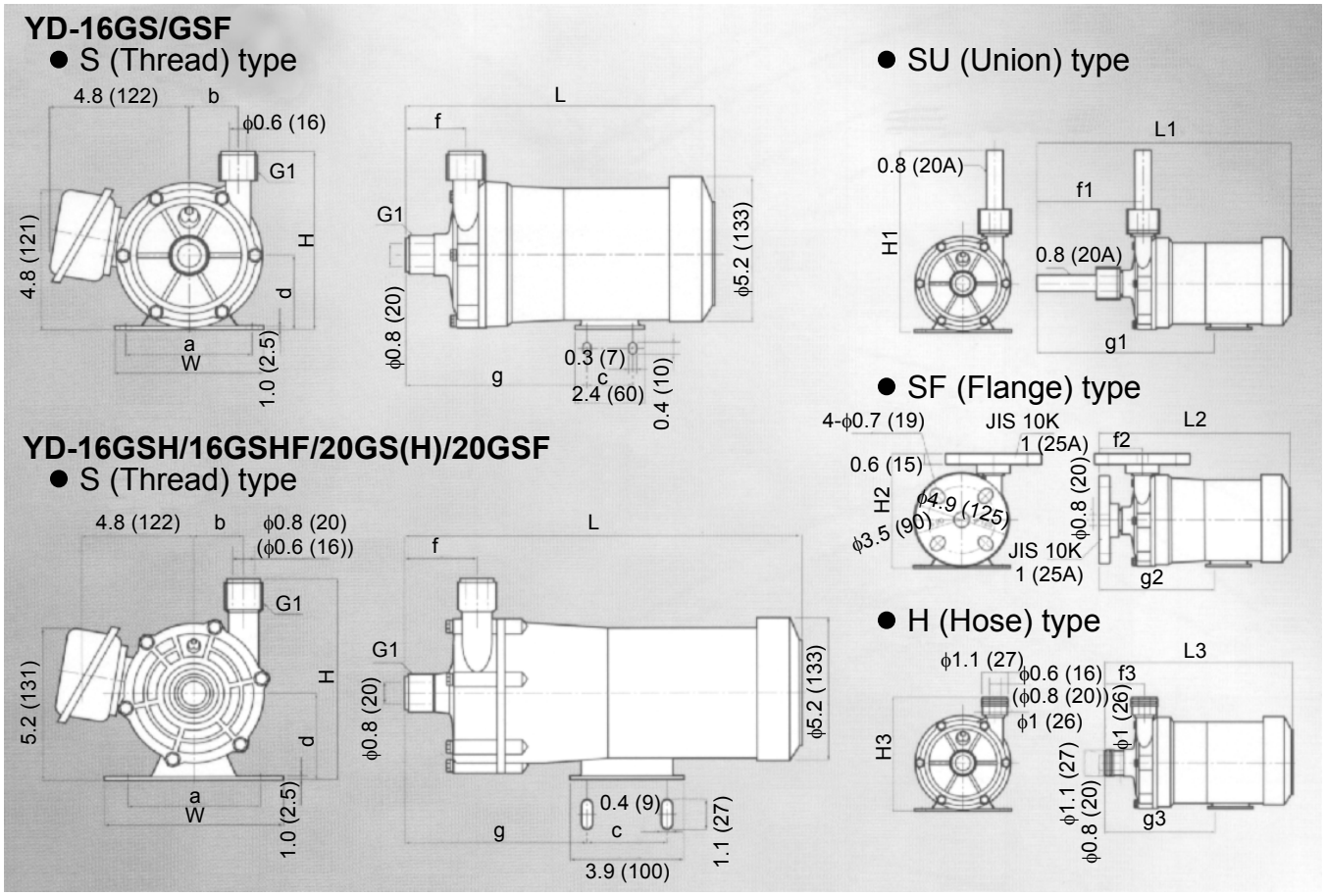




*Note: YD-20GSH is not available in U.S.

OUTLINE DIMENSION

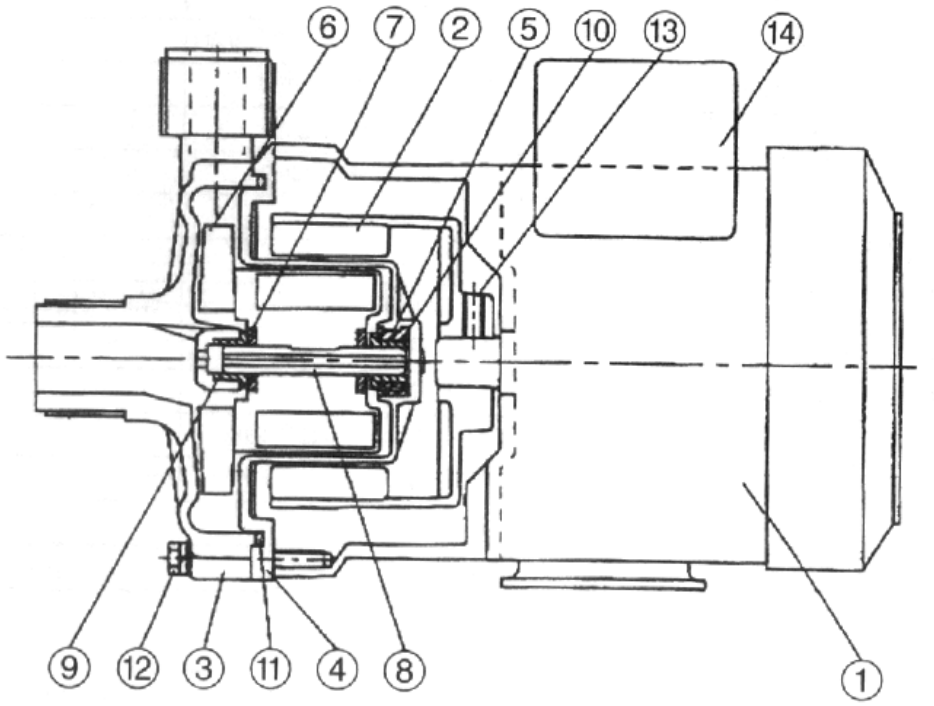
■ **Unit: in. (mm)**



MODEL	W	H	L	a	b	c	d	f	g	f1	f2	f3	g1	g2	g3	H1	H2	H3	L1	L2	L3
YD-16GS	5.1	6.1	10.7	4.3	1.7	1.6	2.6	2.1	6.3	5.6	2.3	2.1	9.8	6.5	6.3	9.6	6.3	6.1	14.2	10.9	10.7
YD-16GSF	(130)	(155)	(271)	(110)	(43)	(40)	(65)	(53)	(159)	(143)	(59)	(53)	(249)	(165)	(159)	(245)	(161)	(155)	(361)	(277)	(271)
YD-16GSH																					
YD-16GSHF	6.1	6.9	13.8	4.3	1.7	2.8	3.0	2.5	6.3	6.0	2.7	2.5	9.9	6.6	6.3	10.4	7.1	6.9	17.3	14.0	13.8
YD-20GS	(156)	(175)	(350)	(110)	(44)	(70)	(75)	(63)	(161)	(153)	(69)	(63)	(251)	(167)	(161)	(265)	(181)	(175)	(440)	(356)	(350)
YD-20GSH																					
YD-20GSF																					

PARTS DESCRIPTION

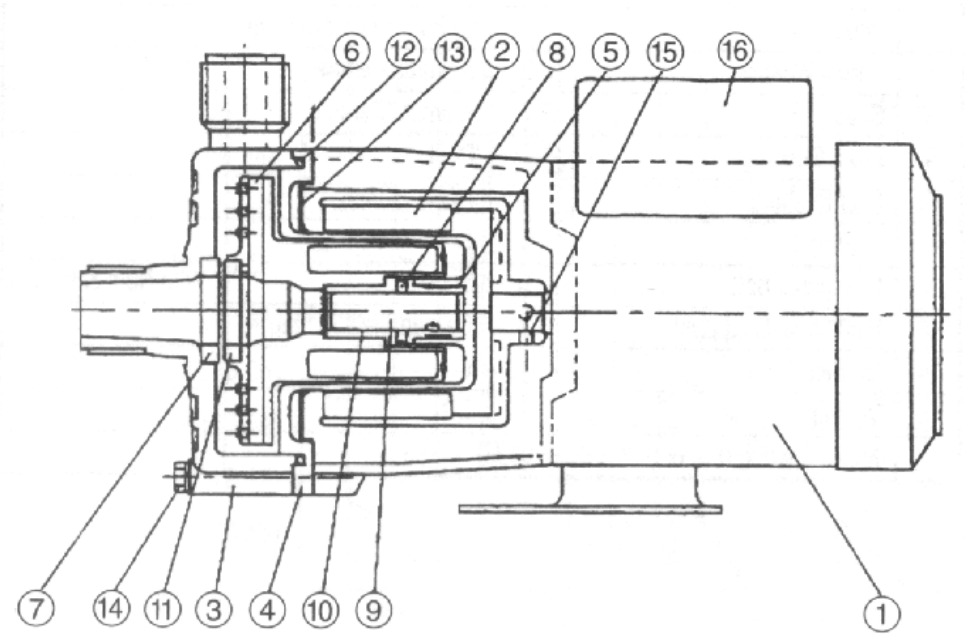
■ YD-16GS/GSF



No.	Parts	Qty	Material	Note
1	Motor	1		with base
2	Outer Magnet	1	Ferrite magnet	
3	Front Casing	1	GFR PP	
4	Rear Casing	1	GFR PP	
5	Bushing Holder	1	GFR PPS	
6	Impeller	1	GFR PP/Ferrite magnet	
7	Thrust Washer	2	Alumina ceramic	
8	Shaft	1	Alumina ceramic	
9	Front Bushing	1	PTFE	
10	Rear Bushing	1	PTFE	
11	O-ring	1	FPM	ISO-242
12	Hexagonal Bolt	6	SUS	M5*35
13	Hexagonal Socket Set Screws	2	Carbon steel plating	M6*10
14	Condenser Box	1	ADC 12	

PARTS DESCRIPTION

■ YD-16GSH/16GSHF/20GS(H)/20GSF



No.	Parts	Qty	Material	Note
1	Motor	1		with base
2	Outer Magnet	1	Ferrite magnet	
3	Front Casing	1	GFR PP	
4	Rear Casing	1	GFR PP	
5	Shaft Holder	1	GFR PPS	
6	Impeller	1	GFR PP/Ferrite magnet	
7	Front Thrust Washer	2	Alumina ceramic	
8	Rear Thrust Washer	1	Alumina ceramic	
9	Shaft	1	Alumina ceramic	
10	Bushing	1	PTFE	
11	Thrust Ring	1	PTFE	
12	O-ring	1	FPM	G-110
13	Backup Ring	1	SPCC	
14	Hexagonal Bolt	6	SUS	M6*60
15	Hexagonal Socket Set Screws	2	Carbon steel plating	M6*10
16	Condenser Box	1	ADC 12	

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.
- For safety concerns, do not place any hazardous or combustible materials near the pump.

Precaution

- 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.

(1) Handle the pump with care.

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

(2) 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.

(3) The pump is neither dust-proof nor waterproof.

Do not let the motor get wet or dusty.

(4) 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 operation and consult with the manufacturer. Please do not modify or excessively bend, stretch, twist or bundle the cord.

(5) Do not use the unit to pump any of the following fluids.

- Liquid that would make polypropylene expand.
- Paraffin carbohydrates such as gasoline or kerosene, etc.
- Halogen carbohydrates such as trichloroethylene or tetrachloro-carbons, etc.
- Ether or low-grade esters.
- Slurries (hastens the abrasion on pump shaft).

Precaution

- Avoid the following conditions for installation/storage location.
  - ▲ Locations exposed to direct sunlight
  - ▲ High temperature locations (104 ° F/ 40 ° C or higher)
  - ▲ Dusty or humid places

BEFORE OPERATING THE PUMP (continued)

- ▲ Any location where temperatures may drop to freezing point or below
- ▲ Any location exposed to the elements

(6) Since the pump has a powerful magnet, do not use any liquids containing metals such as iron or nickel, etc.

(7) Attach ground wiring.

Ground wire must be properly grounded.

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

(9) Maintenance and cleaning

Do not use solvents such as benzene, alcohol or paint thinner as these solvents may cause paint to fade or peel.

(10) In case of a damaged pump

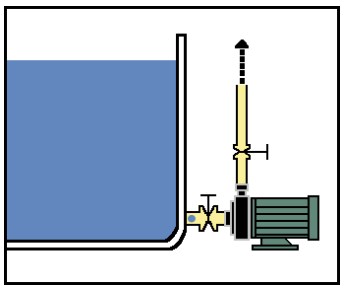
To avoid short circuit or accidental electric shock, never use a damaged pump.

INSTALLATION, PLUMBING AND ELECTRICAL WIRING

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

(1) Installation

- ● Installation location
  - ▲ Select a location with an ambient temperature between 32 ° F/0 ° C and 104 ° F/40 ° C and a relative humidity of 90% or below. The location should also be conveniently accessible for future maintenance and inspections.
- ● Installing the pump
  - ▲ Since this is not a self-priming pump, the unit should be installed at a height below the liquid surface in the tank. 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 12 in. (30 cm) below the liquid surface.



- ● Direction of pump discharge
  - ▲ The pump discharge can be set to any desired direction. However, it is best to set discharge upward to allow air in the pump chamber to escape.
- ● Fasten the base
  - ▲ The unit must be fastened at its base. Never install the unit with the pump on top or bottom.

INSTALLATION, PLUMBING AND ELECTRICAL WIRING (continued)

(2) Plumbing

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

Model	Bolt Size	Tightening Torque (N-m [kgf.cm])
YD-16GS	M16	20 [204]
YD-20GS		

- Intake pipe
  - ▲ 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.
  - ▲ 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.
  - ▲ 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.
  - ▲ 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.
  - ▲ 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.
  - ▲ 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.
  - ▲ Use an intake pipe with a diameter at least the size of the intake opening.
  - ▲ A screen should be installed at the intake opening of the intake tank 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.

INSTALLATION, PLUMBING AND ELECTRICAL WIRING

(continued)

- Discharge pipe
  - ▲ Install a support for the discharge pipe so that the pump does not have to bear its weight.
  - ▲ 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.
  - ▲ 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.
  - ▲ 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.).
    a. When the discharge pipe is long.
    b. When the discharge pump height exceeds 33 ft. (10 m).
    c. When the end of discharge pipe is at least 30 ft. (9 m) higher than the intake liquid surface.
    d. When two or more pumps are connected parallel to a common pipe.
  - ▲ 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 the following order: Pump → Check Valve → Dividing Valve
  - ▲ A pressure gauge must be installed on the discharge pipe.
  - ▲ If the horizontal portion of the discharge pipe is long, there must be an air draining device along the pipe.
  - ▲ If there is a possibility of liquid in the discharge pipe freezing, install a drain valve to let the liquid out.
- Tubing
  - ▲ Tubing should be short with very few bends to reduce flow resistance. Also to avoid cavitation (a phenomenon where bubbles occur) the intake tubing should be short with a large diameter.
  - ▲ Use anti-corrosion vinyl tubing that can withstand pump pressure.
  - ▲ Tubing size (tubing inner diameter ϕ1.02” [ϕ26mm])

    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 by the suction pressure. (It is especially necessary for warm water.)

▲ Attaching valve

Install a valve between the line and tubing connected to the pump.

a. Intake valve: allow easy removal of the pump and maintenance service.
b. Discharge valve: for controlling pump discharge output and pump height.

▲ How to connect tubing

Attach tubing to the discharge and intake openings by pushing the tip of the tubing all the way in.

Precaution

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.

▲ 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.

Precaution

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

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

● Unions (optional type)

▲ Place o-rings (P-22) in the grooves of the union socket (3/4”, PVC) provided, and tighten the screws on the front casing using union nuts (GFR PP).

▲ Set union socket surface parallel to the front casing surface and tighten o-rings uniformly.

(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 directly or our distributor.

Before starting work on electrical wiring

● Before starting the work, make sure the main power source has been turned off (whether or not the power supply has been shut off).

● 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.)

INSTALLATION, PLUMBING AND ELECTRICAL WIRING (continued)

- Use the specified power source voltage as indicated on the “specification” label.
- The pump does not have an ON/OFF switch. The pump will begin operating when power is supplied by connecting the power cord.
- Prepare a ground wire for connection to the motor’s ground wire. Installation of the pump should take place in a well-ventilated place where there is no risk of an accidental spillage of liquid.
- 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

MOTOR	STABLE CURRENT 50Hz/60Hz			STARTING CURRENT 50Hz/60Hz		
STABEL OUTPUT	100V 1 Phase	200V 1 Phase	200V 3 Phase	100V 1 Phase	200V 1 Phase	200V 3 Phase
180W	3.2A/2.6A	1.6A/1.3A	0.94A/0.88A	13.5A/13.2A	6.8A/6.6A	4.5A/4.0A
260W	4.7A/3.7A	2.4A/1.9A	1.4A/1.3A	19.7A/18.7A	9.9A/9.4A	6.1A/5.7A

OPERATING PROCEDURES

(1) Operation

After installation, plumbing and electrical wiring have been completed, follow the procedures below to begin operation.

- Before starting the pump, make certain the pipe or tubing connected to the discharge outlet or intake opening is securely fastened.
- Do not run the pump with the discharge valve and/or the intake valve shut off or nearly shut off.
- 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.)

Precaution

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

OPERATING PROCEDURES (continued)

Operating procedure

- Check plumbing, wiring.
  - ▲ Perform the check based on instruction in sections on “Plumbing” and “Electrical wiring”.
  - ▲ Check for proper power source voltage by comparing it against the specification label.
- Open or close valve.
  - ▲ Intake valve: full open
  - ▲ Discharge valve: full open
- Make sure the pump chamber is wet with liquid.
  - ▲ Fill the pump chamber with priming liquid (the liquid to be pumped)
- Check the rotation direction. (Turn on the power for only an instant and immediately turn it off.)
  - ▲ 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 clockwise direction).

    Precaution

    When the motor fan does not come to a smooth stop, it is an indication that something is wrong. Please inspect the pump interior.
- Turn on the power.
  - ▲ After completing steps 1 to 4, turn on the power and begin pumping.
- Set desired discharge output and pump head.
  - ▲ Gradually adjust the discharge valve to the desired discharge output and pump head. Avoid sudden opening or shutting off of the valve.

    Note: Do not shut off the discharge valve for more than one minute.

    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”.
- Precautions during operation
  - ▲ 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).
  - ▲ If the circuit breaker is activated, turn off the power and investigate the cause by following the instructions stated in the section for “Troubleshooting”.

OPERATING PROCEDURES (continued)

(2) Shutdown operation

- Shut off the discharge valve.
  - ▲ Gradually shut off the discharge valve. Since it is a magnetic valve, do not shut it off suddenly.
- Turn off the power (make sure the pump comes to a stop).
  - ▲ 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.)

(3) 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

(1) Maintenance

- Check for loose screws
  - ▲ After the pump has been in use for a long period of time, screws on the pump unit 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.
- 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 (consumable parts)
  - ▲ After a continuous operation over a long period of time, it is necessary to replace components with appropriate spare parts. Especially true for consumable parts such as impeller, o-ring and so on. Spare parts must be stocked at all time. Please contact the manufacturer for details.
- Recommended worn-out value for replacing moving parts

MODEL	SHAFT	BUSHING	THRUST WASHER	THRUST BEARING
16GS	ϕ0.28" (ϕ7 mm)	ϕ0.35" (ϕ9 mm)	Worn by 0.04" (1 mm)	Worn by 0.04" (1 mm)
16GSH, 20GS/GSH	ϕ0.5" (ϕ13 mm)	ϕ0.6" (ϕ15 mm)	Worn by 0.04" (1 mm)	Worn by 0.04" (1 mm)

Note: When the combined worn out value is 0.04” (1 mm) or more between shaft and bushing or between thrust washer and thrust bearing, replace the part with a greater worn out value.

MAINTENANCE (continued)

(2) How to drain liquid

Warning

- 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.

Precaution

- 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.

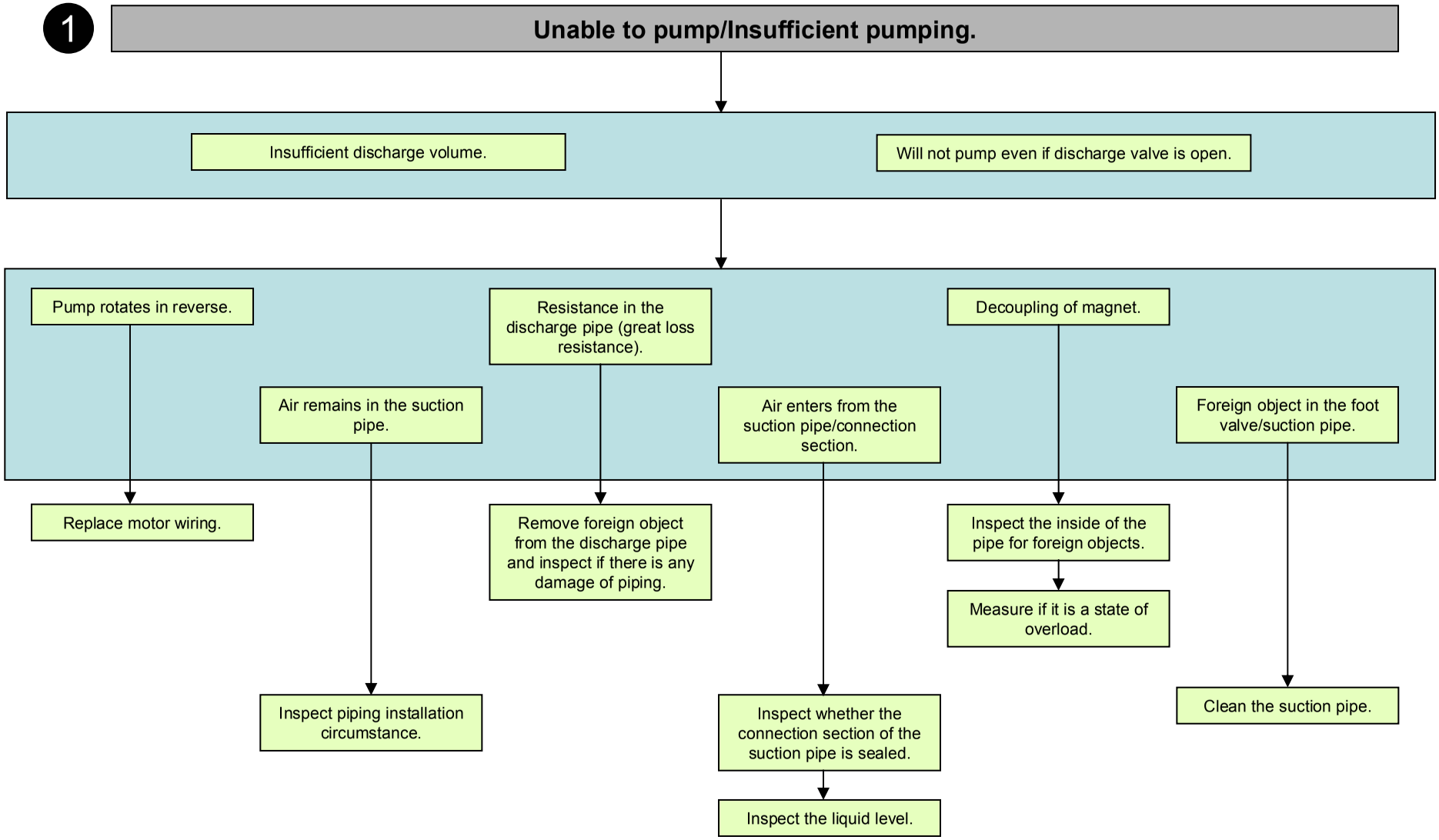
Procedure for draining liquid

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

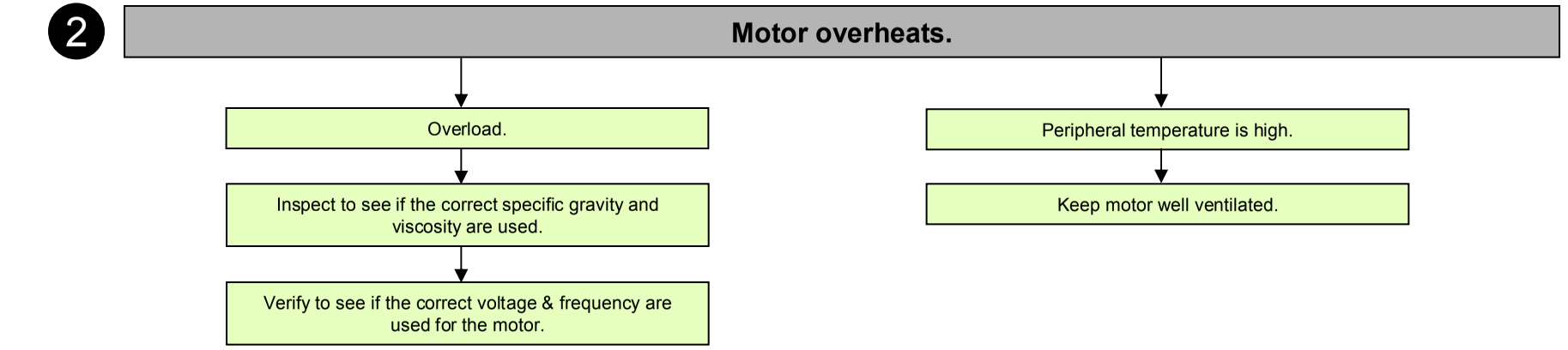
  Precaution

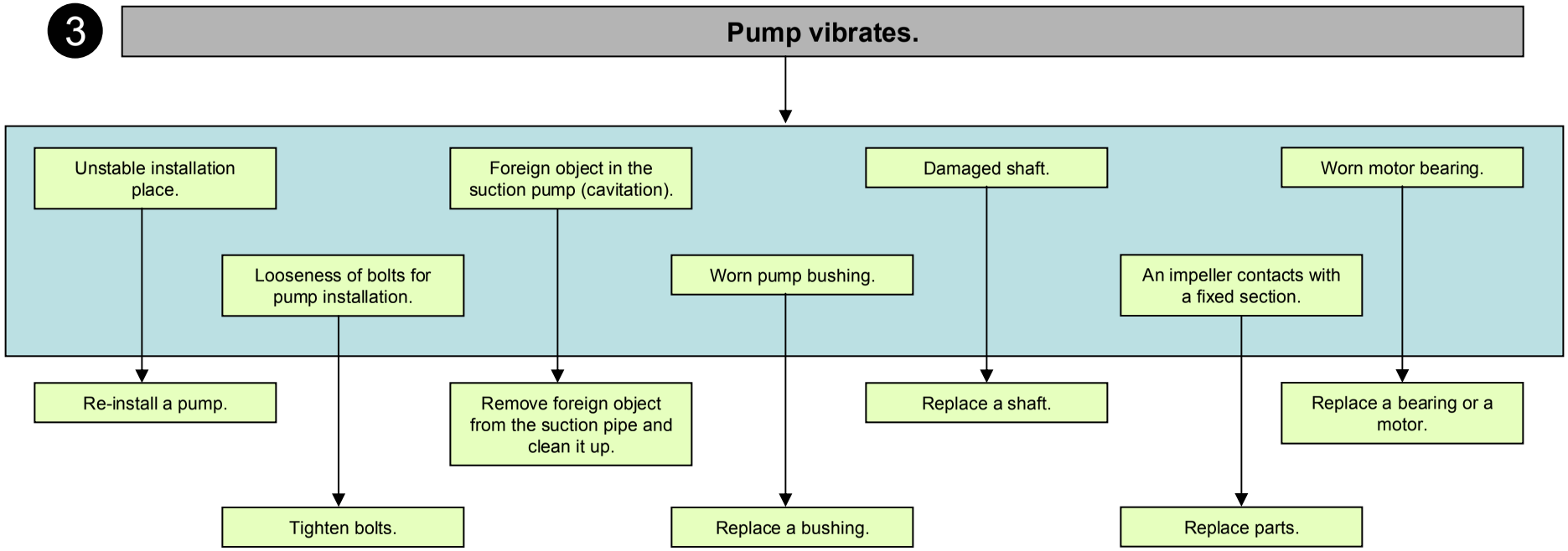
  Be aware of residual liquid in the pipe, tubing and pump.
- Remove the bolts securing the pump base, and remove the pump.
- Drain liquid. Place the intake opening facing downward to discharge into a tray (container).

TROUBLESHOOTING



TROUBLESHOOTING





WARRANTY PERIOD AND COVERAGE

- The warranty period is one year from the date of delivery.
- 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.
- 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.
- We cannot be responsible for any breakdown or damage of a product manufactured using the specification or material designated by the customer.
- Irregularities or breakdowns 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 material.
- 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.
- We will bill the customer for any travel expenses incurred for non-warranted repair service to a remote location.
- Any expense or other damage incurred as a result of a breakdown during operation is not covered under the warranty.

REPAIR

- 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 on “troubleshooting”).
- To request a repair service, please call your distributor or the manufacturer.
- Before requesting any repair service, please carefully read the instruction manual again and repeat the inspection.

- When requesting a repair service, please be prepared to provide the 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)

- 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 part number.

MODEL	**:**	YD-
SERIAL NO.	**:**	
DISTRIBUTOR	**:**	
DATE OF PURCHASE	**:**	

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