

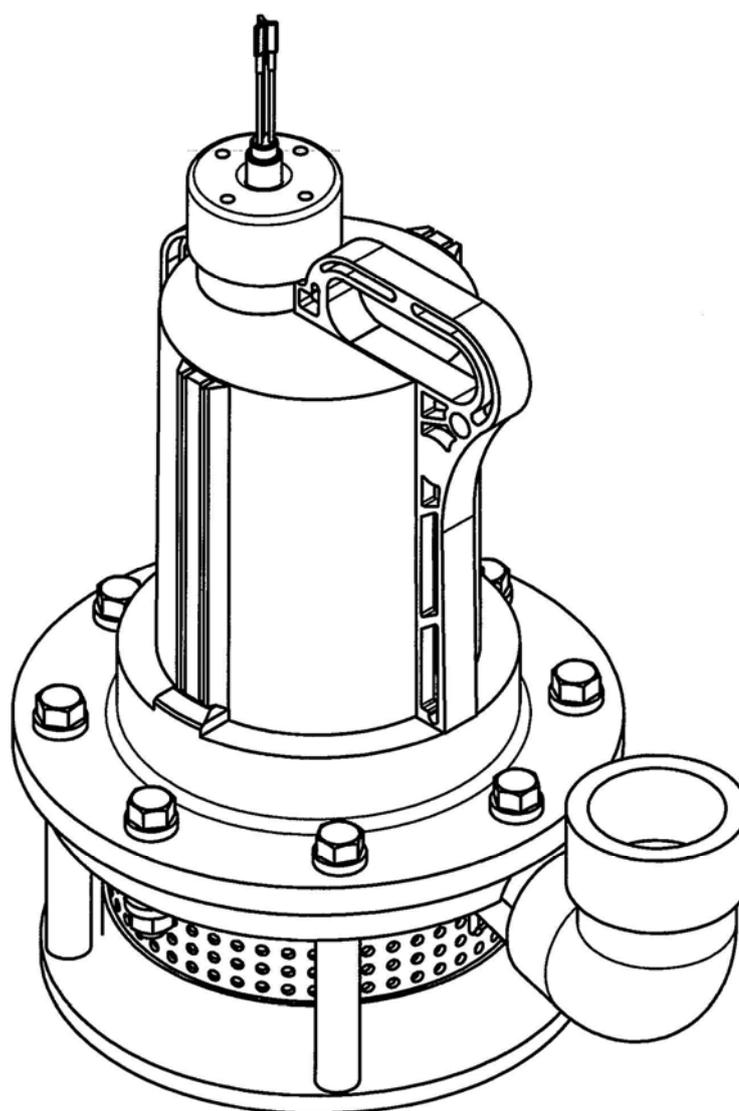
SUBMERSIBLE MAGNET DRIVE PUMP

SUBMERSE

YD-5002GWN1

INSTRUCTION MANUAL

Version: 171212



Preface

Thank you very much for purchasing World Chemical's submersible magnet drive pump "SUBMERSE". To effectively use SUBMERSE for an extended period of time, it is necessary for the user to properly operate and maintain the pump in accordance with the instruction manual.

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Warning



When using for dangerous liquid or in atmospheres

When using the pump for dangerous liquid or in potentially explosive atmospheres (only explosion-proof type), adhere to facility standards determined by law and check no liquid leak daily. If the pump is operated under abnormal conditions such as liquid leak, it leads to explosion, fire or personal injuries. Follow the manufacturers' instructions about handling the liquid.



Banning the use of damaged or modified pumps

If using the damaged or modified pump, it may cause personal injuries, electric shock or the pump damage. They are not covered by warranty.



Caution in transporting and lifting pumps

Use the hoist bolt when lifting a pump. If it does not own the hoist, use a belt sling and lift the pump with careful attention to the weight balance. Perform it by qualified personnel with the strong enough sling. The weight of the lightest pump is approx. 23kg at least. Do not carry a pump by hand as much as possible, because it may cause an accident.



Banning the operation with the power on

Do not check or disassemble a pump or motor while the power on. It leads to personal injuries from electric shock or getting caught in the rotor. Take the multiple safety precaution such as the switch for main power supply, the operation switch, and the hand switch for the pump.



Connection of an earth wire

Using the pump without connecting an earth wire may cause electric shock. Perform the connection by a qualified person according to the electric facilities technical standards and interior wiring regulations.



Protection of the power supply cord.

If stretching, pinching or damaging the power supply cords or motor lead wires, it causes fire or electric shock for the damaged cable. Install the cover of the terminal box in its proper position after wiring.



Ground Fault Interrupter (GFI)

If using a pump without a ground fault interrupter device, it may cause electric shock. Prevent the electric accidents and the pump damages applying circuit breakers, over-current protection devices and/or other protective devices.



Caution in removing a pump

When removing a pump from pipes, close the suction and discharge pipe valves and check no liquid leak. If direct contact with liquid, it may cause injury. Always wear protective gear when performing operations.

Caution

Banning the unspecified use

Do not use the pump for purposes other than those specified on the nameplate. Connect the pump after checking the power specification of motor (phase, voltage and frequency). Unspecified use may cause personal injuries or damages to the pump and peripheral equipment.

Restriction on persons handling a pump

Carry, install, wire, operate and maintain a pump by an expert who has full knowledge of the pump.

Caution in unpacking

Before opening the package, check the up side down. When it is a wooden crate, be careful to avoid injury yourself from nails and slivers.

Ventilation

Do not obstruct ventilation around the motor to prevent to overheat it. If handling toxic or odorous liquids, install the pump in a well-ventilated place to prevent symptoms of poisoning.

Repair and return

Contact your supplier or us to repair the damaged pump. When returning the pump by courier, clean up the inside and outside of the pump by water. Pack it with a plastic bag after checking no liquid.

Plastic parts

The pump is made of plastic. If it receives strong impact, it may damage and lead to personal injuries. Do no hit and climb on it. Install a piping support to prevent the piping load.

Pump start-up

Check the rotational direction when initially starting up the pump. Open the suction and discharge valves and check is no liquid leak from the pipe connection. Then, turn on the switch instantly after releasing air from the pipe and filling the liquid in the pump, and check the rotational direction. For reverse rotation, switch two of the three phases in the three-phase power supply. Before this, turn off the power supply and ensure safety.

Disposal of pump

When dispose the used pump, remove adhered liquid and dispose it as the industrial waste in accordance with the law.

Leak protection

Take appropriate preventative measures in consideration of possible leakage for the pump and pipe damage.

■ Model description

Model: YD-5002GWN1

YD-5002GWN1-HP (High pressure type, Only 60Hz)

Type: Chemical Submersible Magnet Drive Pump

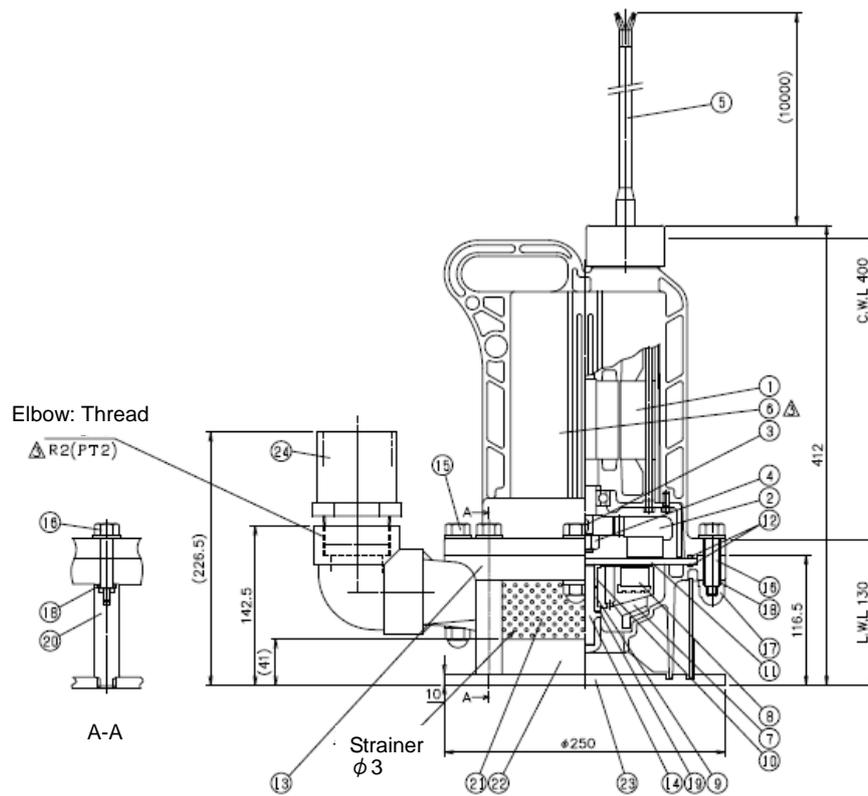
Name: SUBMERSE

■ Specification

Model	Frequency	Standard performance		Output	Power	Discharge bore	Weight
		Total head	Capacity				
5002GWN1	50Hz	8.3m	200L/min	1.1kW	200V x 3PH	50mm	23kg
5002GWN1	60Hz	8.3m	200L/min		200/220V		
5002GWN1-HP	60Hz	11.9m	100L/min		60Hz		

Pump						Motor					
Main material			CFR PP				Type		Dry three phase induction motor		
Bore			50A				Insulation		H		
Model			5002GWN1		5002GWN1-HP		Rated output		1.1kW		
Frequency			50Hz	60Hz	50Hz	60Hz	Phase		3		
Total head	Maximum	m	12	11.5	14.5		Pole		2		
	Standard		8.3	8.3			11.9	Rated voltage	50Hz	200v	
Capacity	Maximum	L/min	330	330	300		60Hz		200/220V		
	Standard		200	200			100	Rated current	50Hz	4.7A	
Others						60Hz			4.5A		
Dimension	Outline	mm	380 x 250 412				Starting current	50Hz	25.0A		
	Height							60Hz	23.6A		
Weight		kg	23				Method of starting		Direct		
Attached cable			2PNCT 4 cores				Rotating speed	50Hz	2810min-1		
			1.25 mm ² x 10m					60Hz	3370min-1		
Thermal protector			Incorporated in the motor				Liquid temperature (Max)		70°C		

■ Outline dimension



No.	Parts name	Reference
1	Motor	FC
2	Motor magnet	Ferrite
3	Motro magnet key	SS
4	Motor magnet nut	SS
5	Cabtyre cable	2PNCT
6	Motor cover	CFR PP
7	Impeller	CFR PP
8	Impeller magnet	Ferrite
9	Front bearing	PTFE / Ceramic
10	Rear bearing	PTFE
11	Separating board	Ceramic
12	O-ring for separating board	FPM / EPDM
13	Casing	CFR PP
14	Shaft	SiC

No.	Parts name	Reference
15	Set bolt 92	CFR PP
16	Set bolt 52	CFR PP
17	Nut for set bolt	CFR PP
18	O-ring for set bolt	FPM / EPDM
19	Floating washer	PTFE (Only Ceramic bearing)
20	Stand bolt	HT, PVC
21	Strainer	PP
22	Sludge fence	PP
23	Bottom plate	PP
24	50A Valve socket	PVC

* When the temperature of the liquid is high (55 degrees and more), do not use No. 24: Valve socket (PVC). If using a valve socket, HT-PVC valve socket is recommended.

■ Features

SUBMERSE is constructed of Carbon Fiber Reinforced Polypropylene and a corrosion resistant ceramic shaft. Additionally the structure is a magnet drive type which does not require a shaft seal. It makes the submersible pump use for strong acids and alkalis that the pump did not use to be used for.

1. All wet kit parts are made of corrosion resistant resin and ceramic.
2. The pump can be used for strong acids and alkalis.
3. It is a magnet drive structure which does not require a shaft seal. The liquid enters into the motor.
4. There is little consumables and it is easy to replace parts.
5. Operation of the pump is as simple as lowering it into a tank. It is also possible to operate with hanging.
6. The pump has a handling for carrying and be suitable for emergency use.
7. There is a ceramic plate between the motor and pump chamber to be resistant to heat and chemical..
8. A thermal protector is incorporated. If overload occurs from any cause, the motor is stopped by the thermal protector.

■ Precautions in handling

1. Slurry accelerates the bearing worn. Especially when the pump is used in a settling tank, mount the pump to prevent slurry entering or clear slurry. (Replacement of the bearing is easy and use the ceramic bearing for liquid with slurry.)
2. Completely submerge the pump to use. Operation in air causes the pump damage.
3. Operation with the check valve at the discharge pipe leads dry running not to release air. Install the air release pipe beneath the check valve and always release air.
4. If the pump is exposed from liquid, the motor resin cover may be damaged because the motor is not cooled.
5. It may cause dry running for the failure of the liquid level gauge. Check it before use.
6. Make sure to put the strainer to prevent dirt and always clean it not to be clogged. If it is clogged, the pump may burn not to pump.
7. When extending the electric wire, consider the diameter to prevent to decrease the voltage.
8. The temperature of the liquid is high (55 degrees and more), change the material of the valve socket (PVC) at the discharge outlet. (HT-PVC is recommended.)
9. Do not use the pump for highly concentrated sulfuric acid (50% and more).

■ Temperature to use

YD-5002GWN1: 70 degrees (MAX.) Cable material: 2PNCT

■ Minimum liquid level during operation

Minimum liquid level during continuous operation is 400 mm.

Keep the liquid depth during operation that the whole pump is submerged.

Operation under the liquid level of the continuous operation for dead head operation is within 5 minutes.

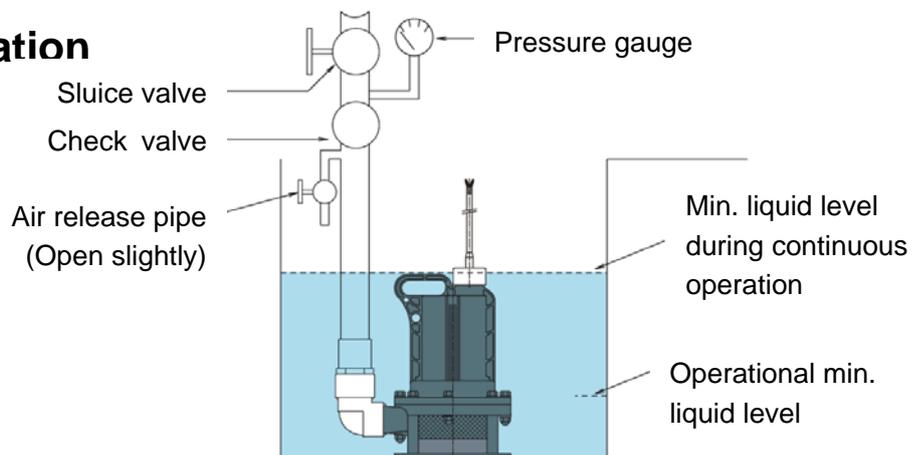
Do not short operation repeatedly.

- The thermal protector may work to protect the motor according to conditions in the operation and the pump may stop. In this case, stop the operation for a while. Ensure the liquid level is properly and start the operation after checking whether the pump is normal.

Minimum liquid level during operation is 130 mm.

- Even if the operational liquid level is correct, the operation error may occur to the air entering by the condition of the liquid level.
- If the impeller is operated in the air, the rotating parts may be damaged.

■ Example of installation



■ Model description

YD – 50 02 GWN1 – CP – A D 6 2 – HP – V
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

- | | | | |
|--------------------------|--------------------------------|-------------------------|---------|
| (1) Bore: | 50 = 50A | | |
| (2) Motor output: | 02 = 1.1kW | | |
| (3) Cover main material: | CFR PP | | |
| (4) Bearing material: | R = PTFE | A = Alumina Ceramic | |
| (5) O-ring material: | E = EPDM | D = FPM | |
| (6) Frequency: | 5 = 50Hz | 6 = 60Hz | |
| (7) Specific gravity: | 1 = 1.1 | 3 = 1.3 | 5 = 1.5 |
| (8) Impeller: | No mark = Standard type | HP = High pressure type | |
| (9) Special mark: | (Ex.) V = Non-standard voltage | Z = With PVC tube | |

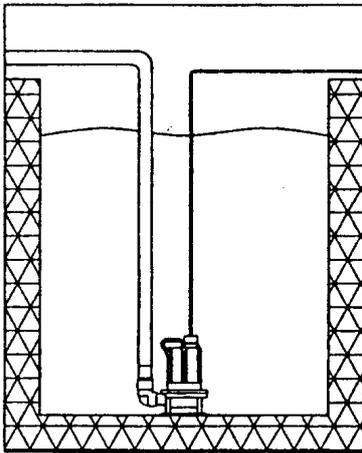
* When the special mark is suffixed, it means the special material required by customer or special specification with some modification.

■ Use

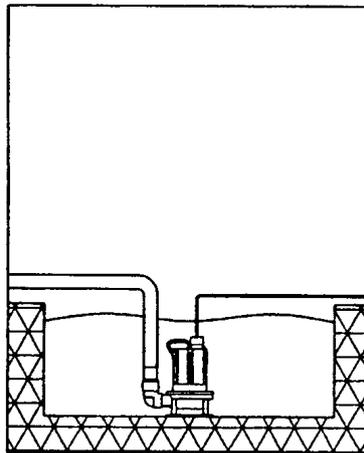
1. For pumping liquid and waste liquid from a deep or narrow pit or tank.
2. For pumping up easy bubbling liquid.
3. For pumping up chemical liquid from a sealed tank.
4. For circulating liquid in a tank.
5. For mixing liquid in a tank or an equipment.
6. For pumping and transferring liquid in emergencies.

Sample of use

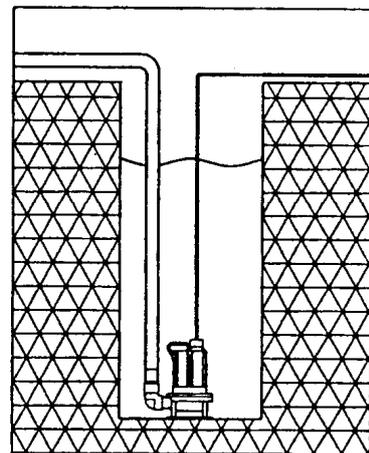
Pumping liquid from a
deep tank



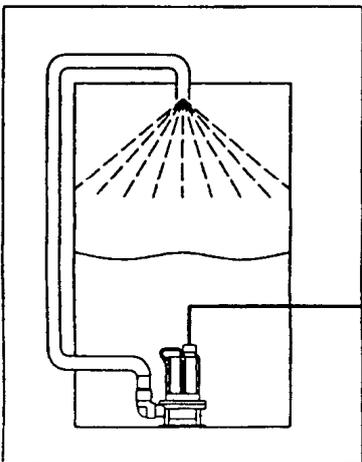
Pumping easy bubbling
liquid from a shallow tank



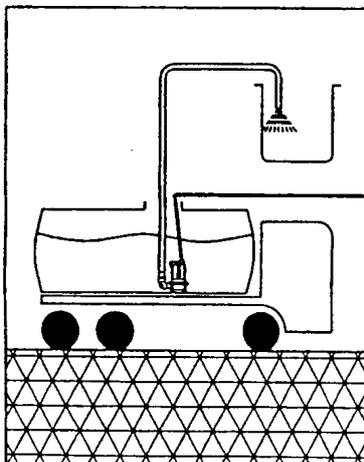
Pumping liquid from a
narrow and deep tank



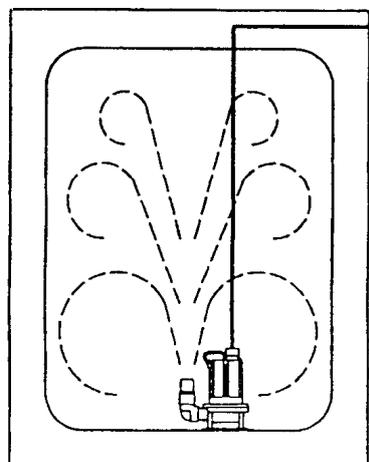
Scrubber system
(Washing system)



Using for a truck



For mixing



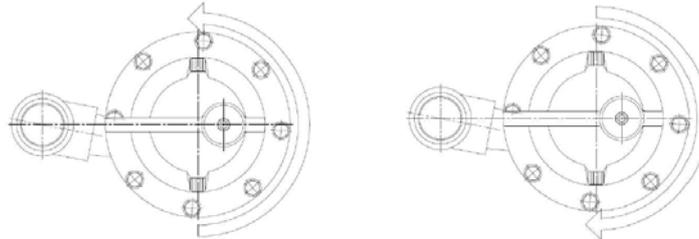
■ Precautions in operation

1. Electric wiring

Before starting operation, check the rotational direction. When U (red), V (white), W (black), and earth (green) are connected, the pump starts. Checking the rotational direction is as follows.

1-(1) In case of the inverse rotation, the capacity is only 30% of the forward rotation.

1-(2) When turning on the switch with lifting the pump in water, a counterclockwise back action is in the forward direction.



Positive rotation

Inverse rotation

Note: In case of the inverse rotation, switch two of three cables (Red, White, Black).

2. Precautions in electric wiring

- Make sure to connect a green earth wire to a polar plate or bar before connecting the cable to prevent electric shock.
- When it is necessary to be the instantaneous operation to check the rotational direction, never test the pump in air. Heat makes the pump may deform and causes the failure.
- Install a circuit breaker to prevent unexpected problems.

Note: To prevent electrical shock or fire, the user is obligated to provide a leak breaker according to the industrial safety and Health Regulation and Electric Equipment Technical Standard. (Japan)

<Cable side>	Red – U	<Motor cable side>
	White – V	
	Black – W	
	Green – Earth	

3. Voltage during operation

When the voltage is low, the current increases. In this case, the thermal protector works as the temperature of the stator is raised. The low voltage causes the performance failure. Use the pump with the voltage within the specified range.

Note: The applicable voltage for this pump is within $\pm 10\%$ of the rated voltage.

4. Thermal protector (Protection Instrument)

When the temperature of the motor coil is near burning temperature for electrical or mechanical causes, the burn protection function works and stops the motor by cutting off the electrical circuit. At this time, carefully check the operated cause of the thermal protector, and remove it before resuming operation.

Note: Make sure to turn off the power before check. The thermal protector automatically restart.

■ Disassemble

1. Remove 4 pcs of the set bolt 52 (16) from the stand bolt (20) to fix the casing (13).
2. The bottom board (23) with the stand bolt (20) and the strainer (21) are separated.
3. After removing the other set bolts (15) (16), place the entire pump horizontally and pull the casing (13) to separate. The impeller (7) is secured to the motor cover (6) through the separating board.
4. Remove the O-ring for separating board (12) and move the impeller attached to the driving side magnet (2) outward to remove.
 - Do not disassemble the motor (including the cable). When an overhaul of the motor is required, contact your supplier.

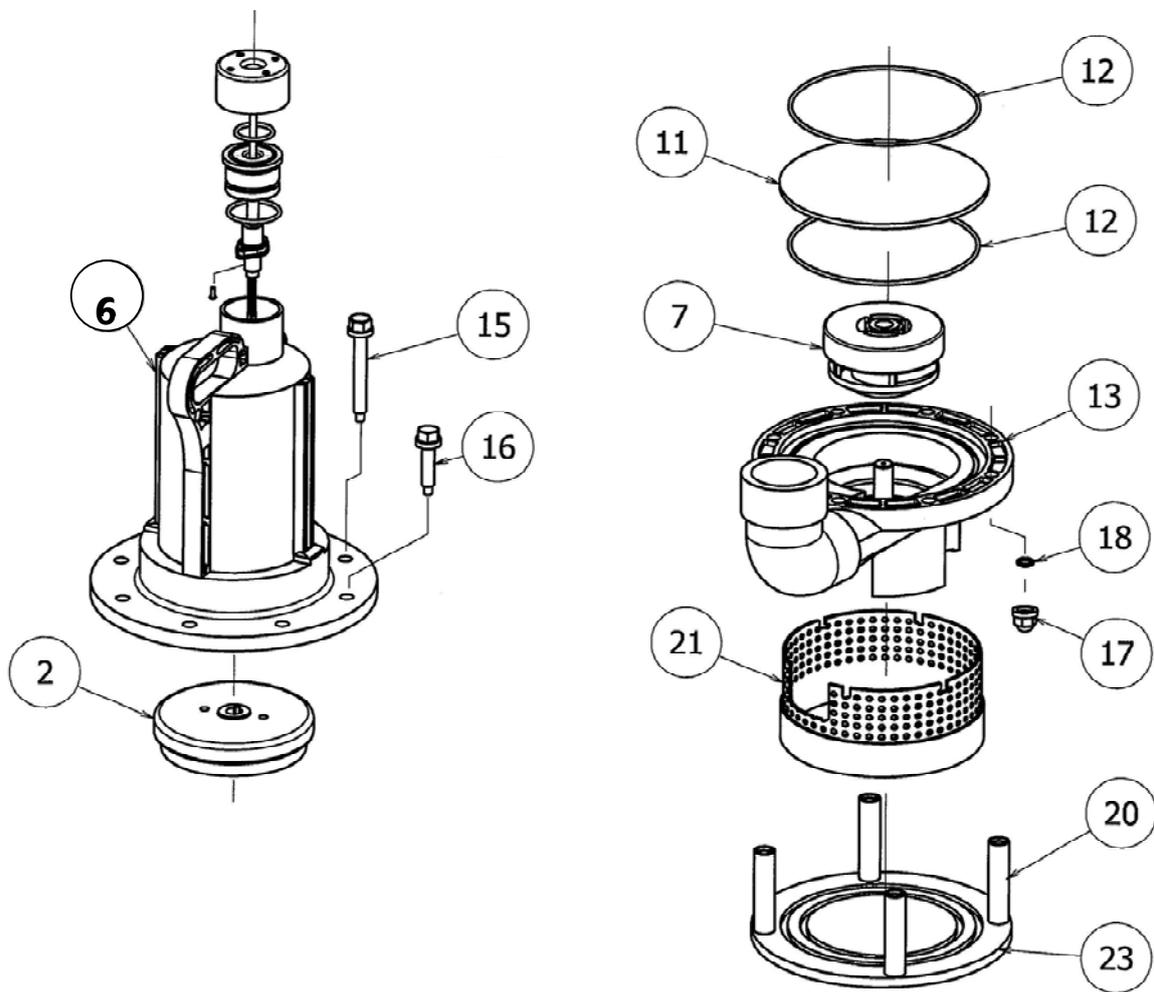
■ Assemble

1. Place the O-ring for separating board (12) in the groove of the motor cover (1) and put the separating board (11) on the motor cover (6).
2. Slide the impeller (7) from the edge of the separating board (11) to the center. In this case, do not slide the impeller quickly to the center. The impeller (7) may be pulled toward the motor magnet (2) by magnetic force and make an impact to the separating board (11). Then, the separating board (11) may be damaged.
3. Set the stand bolt (20) on the bottom board (23), put the strainer (21) and put the casing (13) on. In this case, install the O-ring for set bolt (18) to the stand bolt (20).
4. Install the O-ring for separating board (12) in the casing (13), and put the assembling 1 & 2 on. At that time, insert the bearing of the impeller (7) with the outer diameter of the pump shaft (14).
5. Finally, fix it with set bolts (15) & (16).

In this case, set the O-ring for set bolt (18) to the nut for set bolt (17). When setting, fix the nut or set bolt (17) firstly and fix the stand bolt (20).

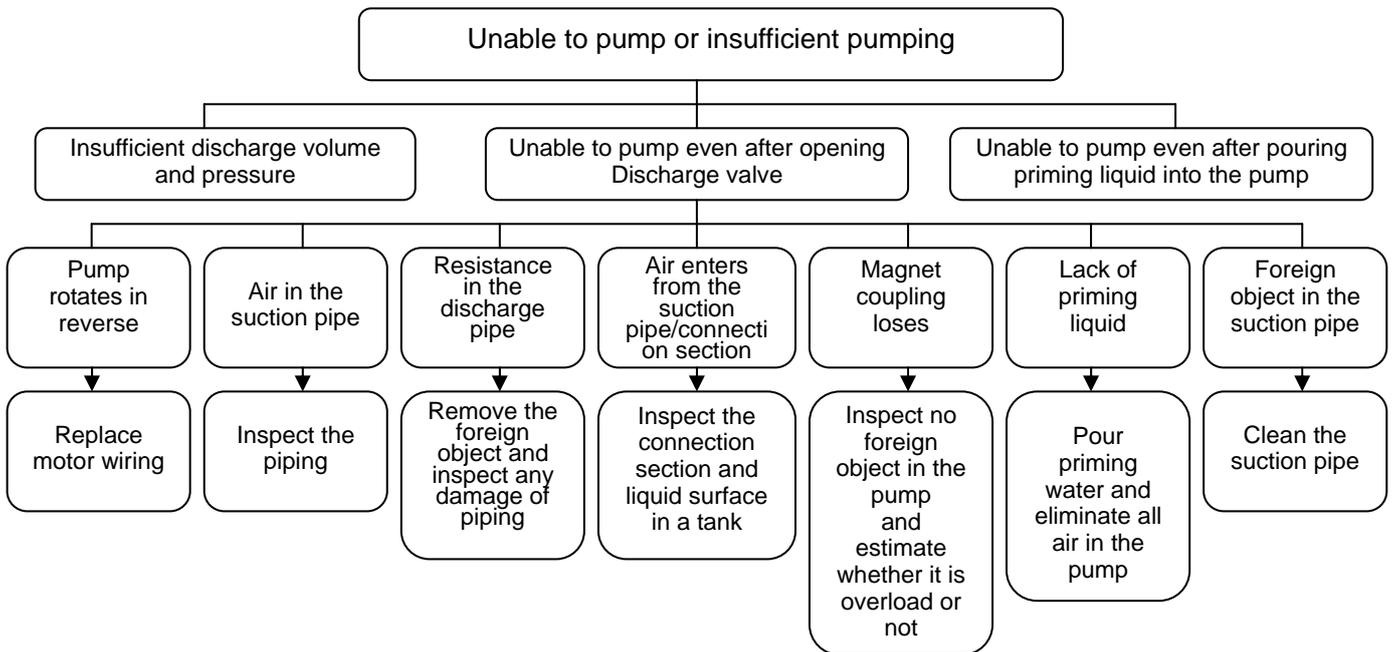
 - When tighten the set bolts (15) & (16), the torque is 8N·m.

■ Exploded view

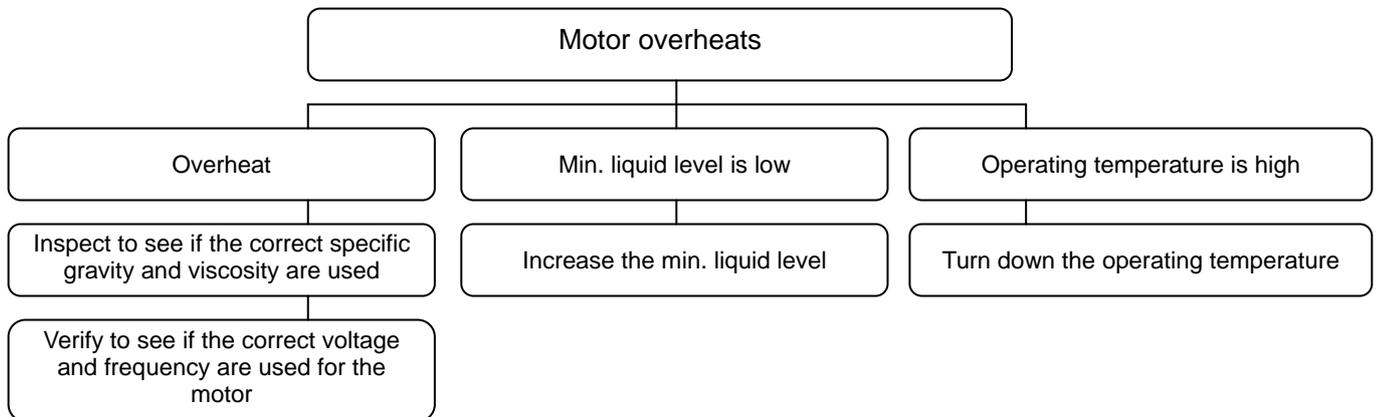


Troubleshooting

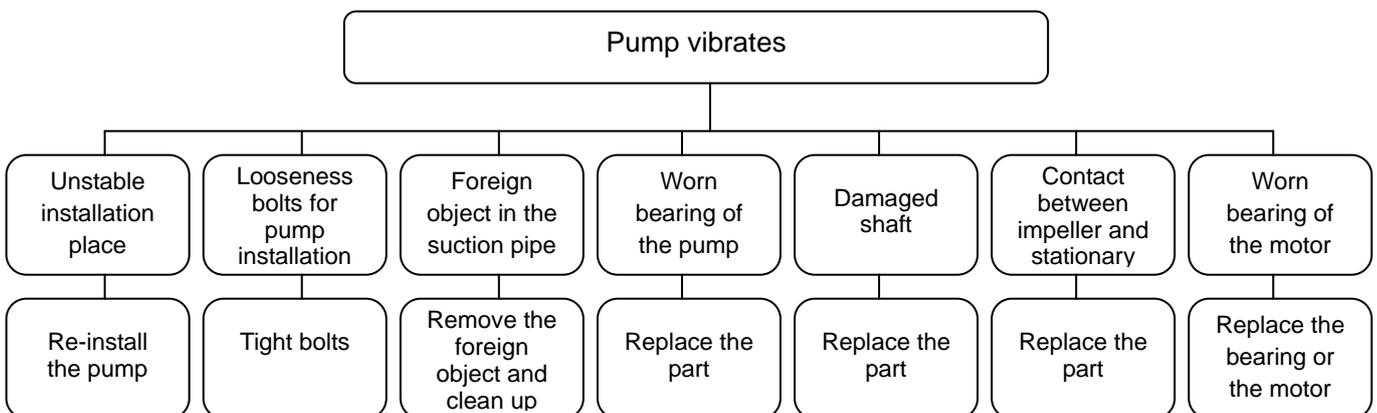
1. Unable to pump or insufficient pumping



2. Motor overheats



3. Pump vibrates



Warranty / Repair

1. Warranty period and coverage

- 1) The warranty period is one year from shipping out of our factory.
- 2) During warranty period, if the pump breaks down or becomes damaged in normal operating condition for our manufacturing defect(s), the parts of breakdown or damaged is repaired free of charge.
- 3) It is charged to repair for the following causes of breakdown(s) or damage(s) and replace parts.
 - Any breakdown or damage occurred after the warranty period.
 - Any breakdown or damage for improper use or safekeeping.
 - Any breakdown or damage to use parts manufactured by others or unauthorized parts.
 - Any breakdown or damage to repair or modify by an unauthorized agent.
 - Any breakdown or damage as a result of natural disaster.
- 4) Any breakdown or damage of a product manufactured using the specification or material designated by the customer are not covered by warranty.
- 5) Irregularities or breakdowns for chemical or hydrodynamic corrosion or the property of liquid that was pumped are not covered by warranty. The material chosen at the time of contract is only a recommendation; we do not guarantee the chemical resistance of such material.
- 6) In case the determination of the cause for a breakdown or damage is questionable, it is resolved through discussion between the customer and the manufacturer.
- 7) Any travel expenses incurred for non-warranted repair service to a remote location is charged.
- 8) Any expense or other damage incurred as a result of a breakdown during operation is not covered by warranty.

2. Repair

Notice: When repairing, consult your supplier. Wash the wet parts kit for the returned pump adequately and pack it.

If any irregularity is detected during operation, stop the pump and check it. Refer to the section on "Troubleshooting".

1. To request a repair service, ask your supplier or us.
2. Before requesting a repair service, read this instruction manual carefully and check it, again.
3. When requesting a repair service, provide the following information:
 - Pump model and serial number
 - The period of use and the condition
 - The failure parts and the condition
 - Type of liquid (name, specific gravity, temperature, any slurry or not)

Clean the inside of the pump adequately when returning it, because if the residual liquid leaks out during shipment, it creates a hazardous condition.

Use names in the parts table (P6) to order for replacement or spare parts. Nevertheless, also provide the part number and the material just in case.

Model:	
Purchase date:	Serial No.
Date to start:	Supplier:



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