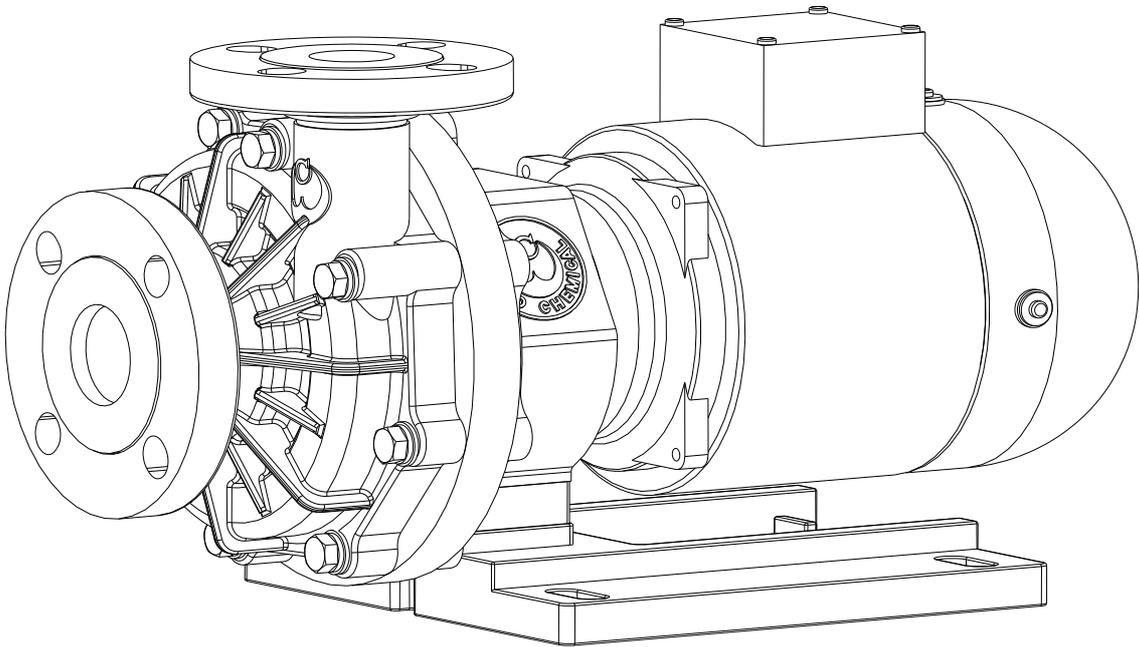


**Corrosion Resistant Horizontal
Non Self-Priming Pump
[Mechanical seal type]**

**YD-GSM1/GSM3 Series
INSTRUCTION MANUAL**

Version: 20230704



Preface

Thank you very much for purchasing World Chemical’s centrifugal pump “YD-GSM1/GSM3”. When handling the pump, make sure to read this manual to the end and use the pump safety and long-term efficiency. After reading, store this manual for ready reference as necessary.

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Safety precaution

To prevent danger to the user and others as well as property damage, the information that must be observed is described as follows.

- The degree of danger or damage incurred because of a wrong use in violation of the indication is classified into the following.
- The type of information to be observed is classified into the following symbols. (Examples of such symbols are shown below.)

	Indicates that there is a possibility of "death or a serious injury."
Warning	
	Indicates that there is a possibility of "an injury or property damage only."
Caution	

	Indicates a "caution."
	Indicates a "prohibition."
	Indicates a "mandatory action."



Warning



(1) Dangerous liquid and surrounding

When using pumps which transfer dangerous liquid or in potentially explosive atmospheres (only explosion proof type), make sure to perform the daily inspection not to leak liquid which observing the facility standards set forth by law. The pump operation under an abnormal condition like liquid leakage causes a tragedy like personal injury, explosion or fire. Follow the instructions of the supplier or liquid manufacturer about handling the liquid.



(2) Prohibition on the use of damaged or modified pumps

Using damaged or modified pumps may cause personal injury, electric shock or the pump damage. It is out of our warranty, so never use them.



(3) Caution in transporting and lifting a pump.

Make sure to use the hoist bolt when lifting pumps with it. If pump do not own the hoist bolt, lift them by a belt sling with care of the weight balance. The qualified person should perform this work with a sling strong enough. The weight of the even lightest pump is approx. 16kg. Carrying pumps by hands may cause an accident, so stop it as possible.



(4) Prohibition on the operation when the power is on

Do not inspect or disassemble pumps or motors when applying power. It causes to get caught in the rotor or personal injury like electric shock. Take multiple safety measures like a handy switch of the pump as well as the main or operation switch.



(5) Connection with an earth wire

The operation of pumps without connecting an earth wire may cause electric shock. Make sure to connect it by a qualified person according to the electric facilities technical standards and interior wiring regulations.



(6) Protection of a power supply cord

Stretching, pinching or damaging power or motor cords causes fire or electric shock by the damaged cable. Attach the terminal box cover in the right place after wiring the motor.



(7) Ground Fault Interrupter (GFI)

The operation of pumps without a ground fault interrupter may cause electric shock. Apply circuit breakers of over-current protection devices to prevent electric accidents or the motor damaged.



(8) Caution in removing pumps

When removing pumps from plumbing, make sure to close the suction and discharge valves not to leak liquid. As the direct contacting with liquid may be harmful, always wear protective gears when operating.



Caution

-  (1) Prohibition on the unauthorized use
Do not use pumps with the specification except for the indication on the nameplate. Install pumps after checking especially the motor (phase, voltage and frequency). Wrong use may cause personal injury or the pump or peripheral equipment damaged.
-  (2) Restriction on handlers
Carry, install, wire, operate and maintain pumps by experts who have well knowledge of pumps.
-  (3) Caution when unpackaged
Checking the upside down, unpack. When wooden crates are unpacked, be careful not to get injured by nails and slivers.
-  (4) Ventilation
Obstructions which prevent ventilation make the motor overheat, so do not put them. Handling toxic or odorous liquid causes the risk of symptoms of poisoning. Install pumps in a well-ventilated place.
-  (5) Repair and return
When repairing damaged pumps, contact your supplier or us. If the pump is returned by courier, clean the inside and outside of the pump with water, check no liquid adhered and pack it with plastic bag.
-  (6) Resin parts
Pumps consist of resin parts. Pumps are damaged by strong impact, causing personal injury. Do not hit and climb on it. Besides, attach piping supports to prevent to apply a load directly.
-  (7) Pump start-up
Make sure to inspect the rotational direction at the first time of the pump starting-up. At that time, open the suction and discharge valves and check no liquid leakage at the pipe connections. As the air is released from the piping and the pump is full of liquid, turn on the switch instantly to check the rotational direction. If the three-phase motor rotates in reverse, rewire the pump after switching two of the three wires. Perform this wiring after surely turning off the power supply for safety.
-  (8) Disposal of pump
Disposing pumps, handle them as the industrial waste according to the appropriate law after cleaning adhered liquid.
-  (9) Leak protection
Make sure to take appropriate preventative measures in consideration of liquid leakage from pumps and piping damaged.

Unpacking check

Check the followings and contact your supplier if there is any unclear.

1. The model, total head, capacity, motor specification and voltage on the motor nameplate comply with the ordered specifications.
2. All accessories are included.
3. There are no damage or loosen bolts during transportation.

Model description

YD - 2500 GSM1 - GP- S D 5 1
 (1) (2) (3) (4) (5) (6) (7)

(1) Bore Diameter/Motor Output

Model	Suction Bore	Discharge Bore	Motor Output
2500GSM (F)1	25A	25A	0.4kW
4001GSM (F)3	40A	40A	0.75kW
4002GSM (F)3	50A	40A	1.5kW

(2) Pump Model (Material)

GSM 1/GSM3 (GFR PP)

GSMF1/GSMF3 (CFR ETFE)

(3) Material

GP: GFR PP

CF: CFR ETFE

(4) Mechanical seal type

S: Carbon

(5) O-ring material

D: FPM

(6) Frequency

5: 50Hz

6: 60Hz

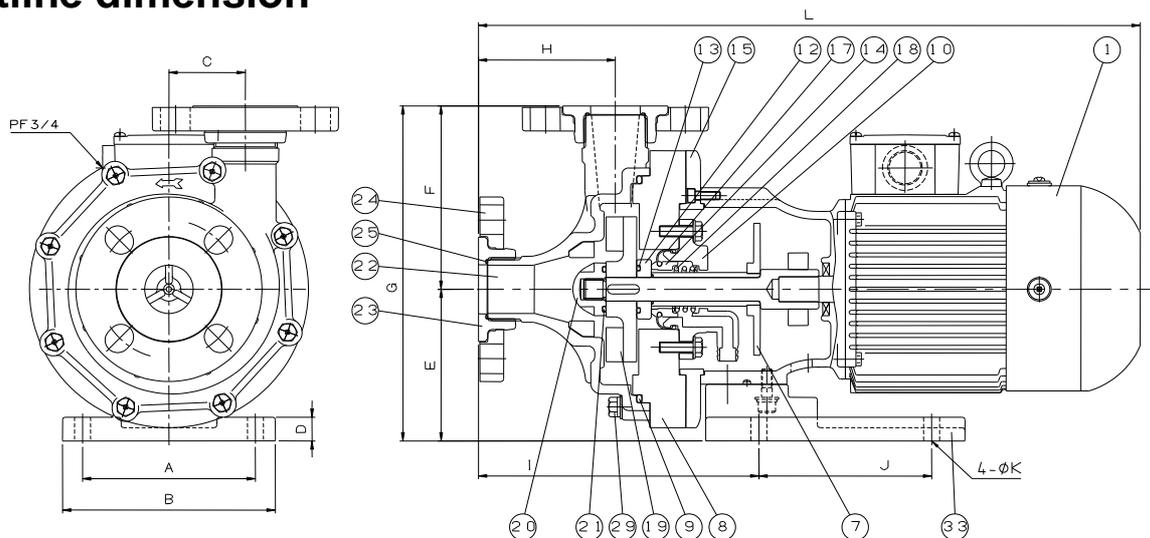
(7) Specific gravity

1: 1.1

Specification

Model		2500GSM(F)1	4001GSM(F)3	4002GSM(F)3
Bore (Suction x Discharge)		25A x 25A	40A x 40A	50A x 50A
Motor output		0.4kW	0.75kW	1.5kW
Standard (m _L /min)	50Hz 60Hz	S.G.1.1.	8 - 60	10 - 110
Weight (kg)		16.0	19.0	25.0
Liquid temperature (MAX)		0~50°C		

Outline dimension



GSM(F)1 dimension

	A	B	C	D	E	F	G	H	I	J	K	L
2500GSM(F)	130	160	65	18	115	145	260	90	192	130	12	450
4001GSM(F)	130	160	57.5	18	115	139	254	103	211	130	12	498
4002GSM(F)	208	260	65	20	116	145	261	89	180	200	36-14	514

Parts description & material

No.	Parts name	Qty	Material		Remarks
			YD-GSM	YD-GSMF	
1	Motor with bracket	1	FC200+Aluminium frame motor		
8	Back cover	1	PVC		
9	Oring for Back cover	1	FPM 2500/4002GSM(F) : G180 4001GSM(F):G160		FPM: Dai-el
10	Seal case	1	Diallyl phthalate		
11	Hexagonal bolt	4	SUS304 (M8)		with SW, W
12	Rotating ring	1	Alumina ceramics		
13	Oring for Rotating	1	FPM 2500GSM(F):P25 etc. : P28		FPM: Dai-el
14	Stationary ring	1	Carbon		
15	Rear casing support	1	FC200		
16	Hex. socket head cap screw	6	SUS304		
17	Phragm	1	Acid-proof fluoro-rubber		
18	Spring	1	Hestelloy		
19	Impeller	1	HT. PVC		
20	Impeller nut	1	HT. PVC		
21	Oring for Impeller nut	1	FPM 2500GSM(F):P22 etc. : P26		FPM: Dai-el
22	Front casing	1	GFR PP	CFR ETFE	
23	Lapjoint	2	GFR PP	CFR ETFE	
24	Loose flange	2	GFR PP	GFR PP (Black)	JIS10K
25	Oring for Lapjoint	2	FPM Suc 2500GSM(F):AS568-120 4001GSM(F) : AS568-129 4002GSM(F):AS568-136 Dis 2500GS(F):AS568-120/etc.:AS568-129		FPM: Dai-el
29	Hexagonal bolt	8	SUS304 M8		with SW, W
33	Pump base	1	GFR PP		

Installing / operating precautions

1. Installing precautions

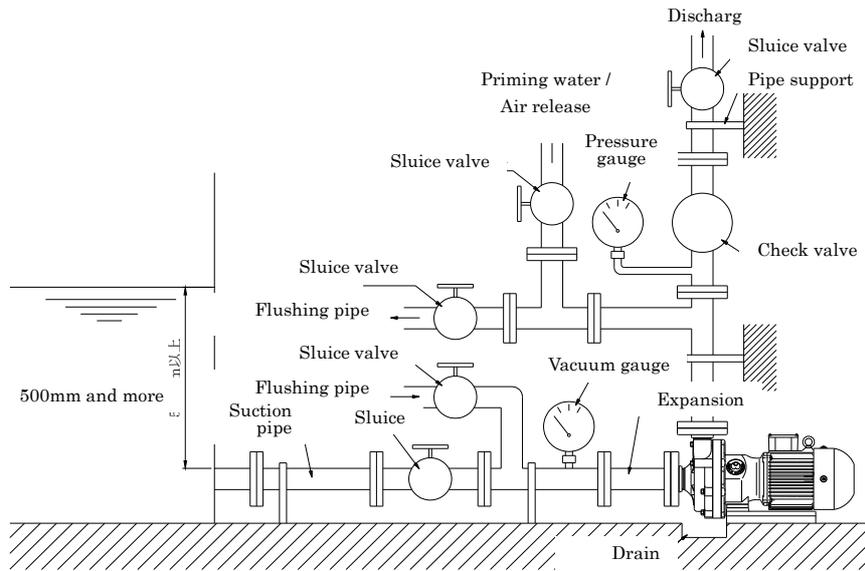
- (1) If much air enters into a pump during operation, it causes a breakdown.
 - Set the pump suction inlet 50 cm or lower than the liquid level in a tank.
 - Do not allow any space for air trap or up-and-down bending in a suction pipe.
 - Arrange a suction pipe to have a gradient of 1/100 and more facing the pump.
 - Use a suction pipe with a larger diameter than the pump suction bore. If not, use an eccentric reducer for the top to level off.
- (2) Install a strainer at the suction pipe to prevent foreign objects clogged. In this case, clean it periodically and minimize the loss resistance.
- (3) It is recommended to install check valves on the rising piping at the discharge side to prevent water hammer. Additionally, install bypass pipes for air exhaust underneath.
 - The discharge pipe is long and the head is 10m and more.
 - The tip of the discharge pipe is 9 m and more higher than the liquid level in a suction tank.
 - It is the pipe condition that two and more pumps are used parallel.
- (4) Create bending sections and expansion joints of a pipe to prevent pump deformation and liquid leakage by heat expansion of the pipe.
- (5) Handle a pump with care not to give any impact, as the inside main material is resin.
- (6) Arrange the pipe and the pump flange surface parallel. Do not tighten bolts excessively.
Bolt: M16, tightening torque: 19.6N·m (200kgf·cm)
- (7) When piping, be the same in size of the pump. If not, it may cause the casing damaged.
- (8) Never turn a pipe after piping to the pump flange.
- (9) When using a pump outdoors, use the water-proof type cable clamp and wire to prevent rainwater in the terminal box.

2. Prohibited to apply a piping load.

- (1) Get a piping load by a pipe support.
- (2) If it is possible for the piping to be expanded by high temperature liquid, the pump may be damaged by expansion. Therefore, install the extendable or flexible joint to prevent the load to the pump at the expansion.

3. Drain ditch

- (1) Arrange a drain ditch that leaked liquid flows into a wastewater pit.
- (2) When it is hard to arrange a drain ditch, place a drain pan instead.



4. Operation precaution

(1) Before operation

- 1) Clean pipes and the inside of a tank thoroughly.

If dirt or foreign objects enter, not only the performance decreases but also it causes failure.

- 2) Check that the connection bolts for flange are tightened firmly.

If loosened, it may cause physical injury or the damage to other facilities by liquid leakage.

- 3) Open the suction and discharge valves to prime liquid and release air. At that time, check that there is no liquid leakage again.

- 4) Check the rotating direction of a motor.

If the three-phase power supplied motor rotates inverse, switch two of three wires and re-wire it.

The correct motor rotating direction is clockwise as viewed from the motor fan.

(2) Prohibited to pump dry running.

The mechanical seal is cooled by circulating pumped liquid. If it operates without liquid inside, the pump may cause for heat. Do not run pump dry. If the pump runs dry, do not suddenly pour liquid in it. Leave the pump for 1 hour and more. If pouring liquid suddenly, the heated sliding parts are cooled rapidly and severely damage. It may be beyond repair.

(3) At the time of the operation sealed by liquid by mistake (Suction and discharge valves are closed.)

When the pump is operated during the suction and discharge valves are closed, the temperature and pressure inside of the pump increase. If disassembling the pump in this state, steam and hot liquid may spew out. To be safe, reduce the pressure in the pump by valves open and close after the temperature fully declines. If the inside of the pump is damaged by the sealed operation, the complete pump may have to be changed.

(4) Temperature range of liquid in use

Vapor pressure, viscosity, and corrosiveness are change depending on the temperature of the liquid

in use. Use the pump under the conditions afforded in view of them.

- Temperature range of the liquid in use: 0 – 50 degrees.

(5) Specific gravity and viscosity of liquid in use

When specific gravity and viscosity of liquid change dramatically, the pump's performance capacity, efficiency, and shaft power change depending to the condition of the pumped liquid. Use the pump under the conditions afforded in view of them.

(6) Limit pressure of the pump

Note that the discharged pressure of the pump does not exceed the following limitation.

Model	2500GSM (F)1	4001GSM (F)3	4002GSM (F)3
Limit pressure (MPa)	0.14	0.19	0.23

(7) Change of the condition to use

The pump is manufactured under specifications decided at the time of purchase. If the specification conditions are changed, confer us.

(8) Intermittent operation

Start of a pump is six times or less in an hour. Frequent start / stop of a pump may cause the pump damage for overload.

(9) Minimum flow rate

Operate a pump at flow rate higher than the following figure.

Model	Minimum flow rate
2500GSM(F)1, 4001GSM(F)3	10L/min
4002GSM(F)3	20L/min

Maintenance / Check

1. Daily check

- (1) Check no vibration / any abnormal noises from the pump and smooth operation.
- (2) Compare the current value during operation with the rated current value, and check that the operating load is normal. Additionally, check if the discharge pressure / capacity and the current value during operation are nothing wrong than ever before
- (3) Check the liquid level of the suction tank. (The liquid level is 50 cm and more from the suction inlet of the pump.)

2. Periodical check

- (1) Periodically overhaul the pump to ensure a smooth operation.
- (2) When changing the installation sites or carrying the pump for repair, make sure to discharge liquid and wash with water for safety,
- (3) Once in a year or 1000 hours, *Keep the record. Check no abnormal liquid leakage from the mechanical seal. Additionally, check no scratch or abrasion on the seal surface of the rotating and stationary ring. (If it has any abnormality, liquid leakage from the bottom hole of the motor bracket can be shown. It is recommended to replace parts periodically according to the occurrence frequency of the scratch or abrasion.)

Disassembly / Assembly

1. Disassembly

- (1) Drain the liquid remaining inside the pump and wash the interior of the pump thoroughly.
- (2) Loose and remove the hexagonal bolts (29) on the front casing (22), and detach the front casing from the rear casing support (15).
- (3) Put a driver between the impeller (19) and fix it. Loosen the impeller nuts (20) anti-counterclockwise and pull the impeller out forward.
- (4) Remove the right and left keys during pushing the rotating ring (12), then detach the ring.
- (5) When removing the back cover (8), the seal case (10) comes off together to be bolted on the back.
- (6) Loosen four hexagonal bolts (11) and remove the seal case (10).

* Pull out the phragm (17) between the back cover and the seal case firmly. The phragm is embedded in the ditch of the seal case, but it is possible to remove it spread apart because of elasticity.

Finally, remove a spring (18) in the back of the stationary ring (14).

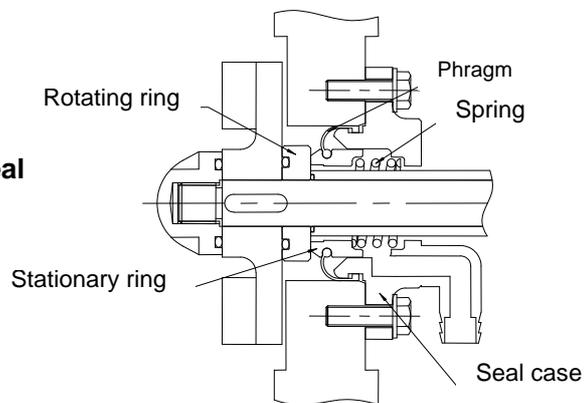
2. Assembly

Assembly of a pump is the inverse way of the disassembly. Clean the sliding parts and O-ring without scratch thoroughly not to adhere dirty or damage. Insert the mechanical seal during the salient of the seal case is fix with the ditch of the rotating ring, turn the phragm up and fit the mechanical seal into the outside ditch of the seal case.

* Tightening torque is as follows,

Parts	Tightening torque
Bolts for seal case	6.5N·m
Bolts for front casing	10.0N·m

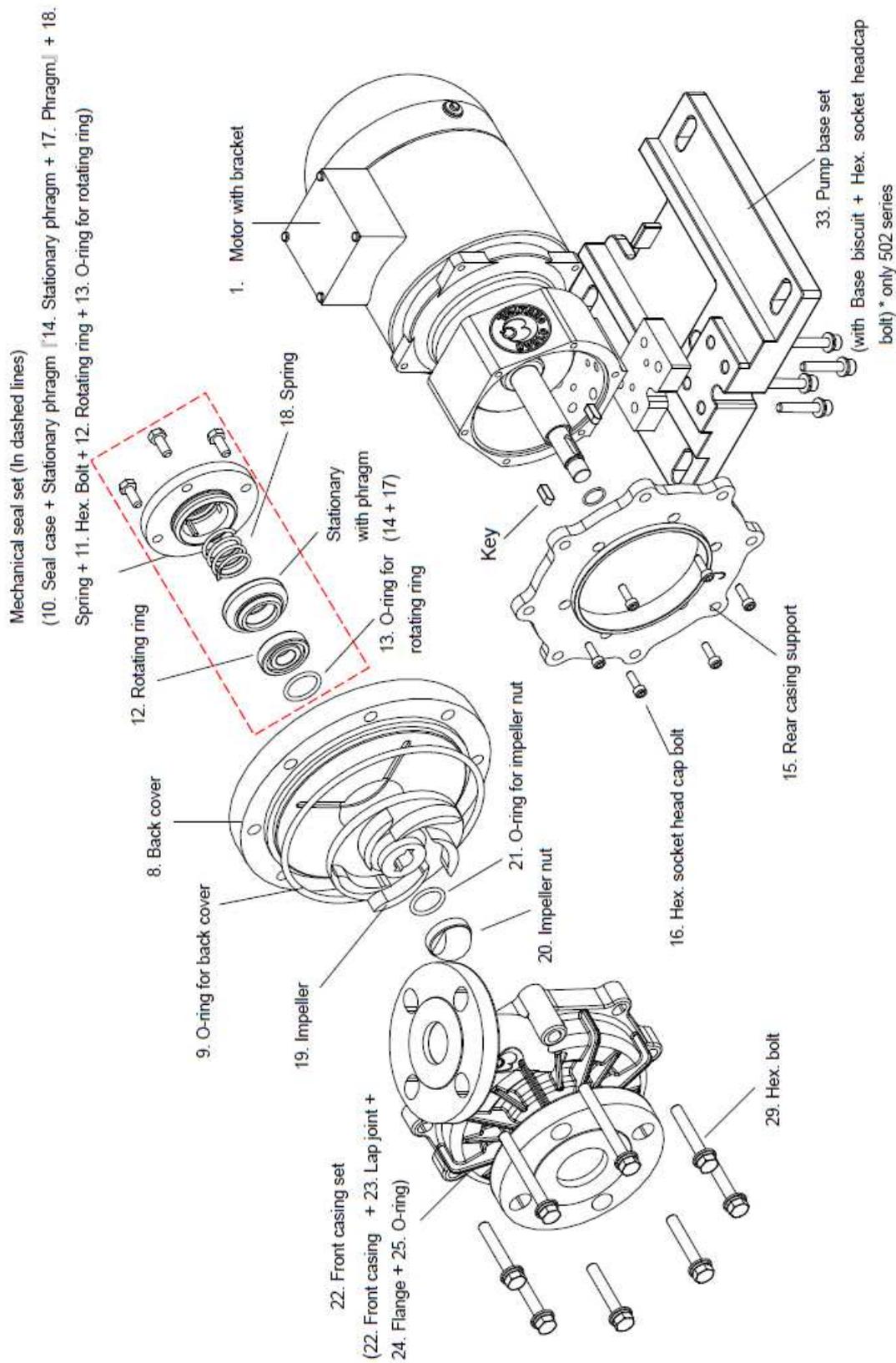
Structure of mechanical seal



Type and Material

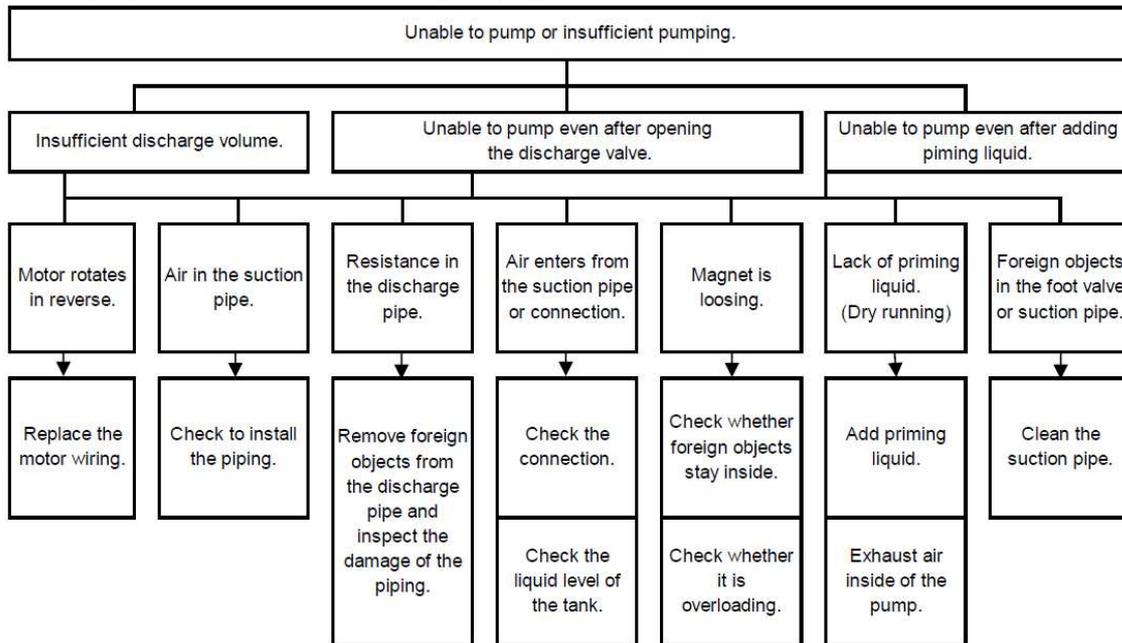
Model	Seal case	Spring	Stationary ring	Phragm	Rotating ring
S	Diallyl Phthalate	Hastelloy	Carbon	Acid-resistant fluoro-rubber	Ceramic

Exploded view

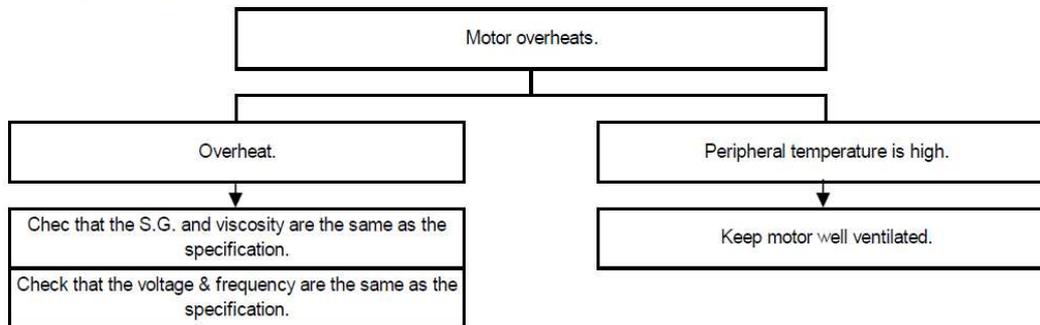


Troubleshooting

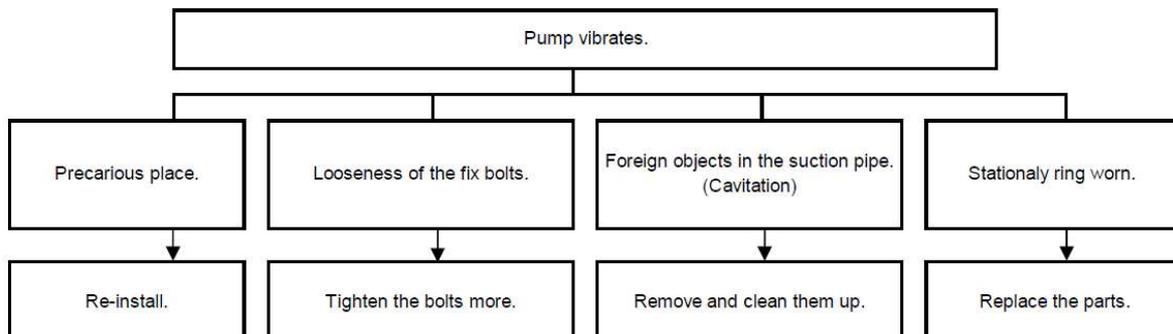
1. Pump up failure and insufficient pumping.



2. Motor overheats.



3. Pump vibrates.



Warranty / Repair

1. Warranty period and coverage

- (1) The warranty period is 12 months from dispatched from our factory.
- (2) During warranty period, if the pump breaks down or is damaged at the use under the condition instructed in this manual due to manufacturing defect(s), the failure parts are repaired free of charge.
- (3) Even if the failure occurs within the warranty period, the followings are repaired or replaced for compensation in principle.
 - Breakdown or damage due to different use or safekeeping from the instructions in this manual.
 - Breakdown or damage due to incorrect use or unjust repair or modification.
 - Breakdown or damage as result of pollution, salt damage, gas damage, abnormal voltage or undesigned power (voltage, frequency) as well as fire, earthquake, flood disaster, lightning strike or other natural disaster.
 - Abrasion or degradation of consumable parts like a packing or O-ring.
 - Breakdown or damage during transportation, for relocation or fall after your purchase
- (4) We cannot be responsible for the break down or damage of the customer-specified pump.
- (5) Irregularities or breakdowns due to chemical or hydrodynamic corrosion by liquid are not covered under the warranty. The material chosen at the time of the contract is only a recommendation. We do not guarantee the chemical resistance of the material.
- (6) If the determination of the cause for the breakdown or damage is questionable, it attributes to the negotiation between the customer and us.
- (7) Expenses or other damage incurred as a result of breakdowns at the use under the different condition from the instruction in this manual are not covered under the warranty.

2. Repair

Notice:

For repair, consult the supplier. When returning a pump, thoroughly clean and pack the wet parts kit.

If irregularities are detected during operation, stop the operation immediately for check. (Refer to the section on “troubleshooting”).

- (1) Consult your supplier or us for repair.
- (2) Read this manual again and re-check before requesting repair.
- (3) When visiting to a distance location for repair, the travel expenses are charged.
- (4) Inform the followings when requesting repair.
 - Model name and serial number
 - Use duration and condition
 - Damages parts and condition
 - Liquid (Name, Specific gravity, Temperature, Slurry)

If liquid leaks during transportation, it is very dangerous, so make sure to clean inside thoroughly. When ordering replaced parts, specify the name in the parts name list (P5, 10). Although, inform the parts' number and material, too.

Installation record

Model:	
Purchase date:	Serial number:
Start date:	Supplier:



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