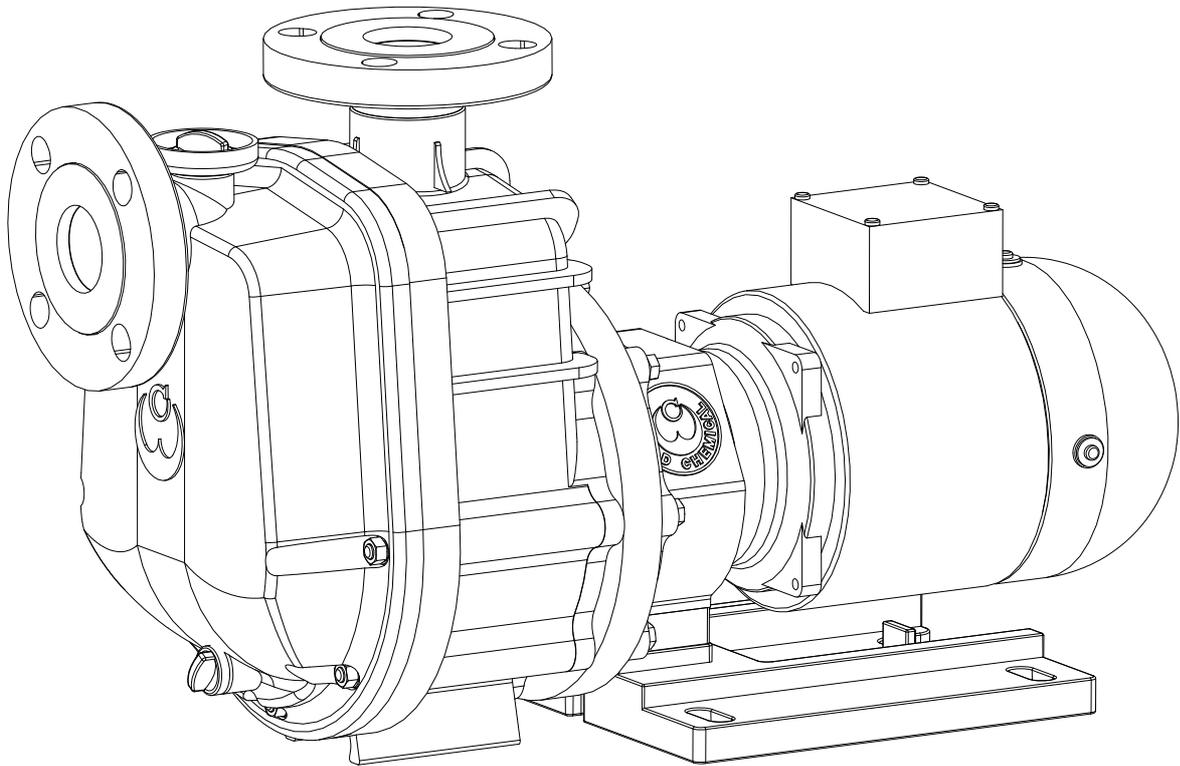


**Corrosion Resistant Horizontal
Self-Priming Pump
[Mechanical seal type]**

YD-GVM1/GVM3 Series

INSTRUCTION MANUAL

Version: 20230704



Preface

Thank you very much for purchasing World Chemical’s centrifugal pump “YD-GVM1/GVM3”. 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 while observing the facility standards set forth by law. The pump operation under an abnormal condition like liquid leakage causes a tragedy like person injury, explosion or fire. Follow the instructions of the supplier or the 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 not of our warranty, so never use them.



(3) Caution in transporting and lifting pumps

Make sure to use the hoist bolt when lifting pumps with it. If pumps 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. 19kg. 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 facility technical standards and interior wiring regulations.



(6) Protection of a power supply cord.

Stretching, pinching or damaging power or motor codes 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) Prohibited on the unauthorized use

Do not use pumps with a specification except for the indication on the nameplate. Install pumps after checking especially the motor specification (phase, voltage and frequency). Wrong use may cause personal injury or the pump and peripheral equipment damaged.



(2) Restrictions on handler

Carry, install, wire, operate and maintain pumps by experts who have full knowledge of pumps.



(3) Caution when unpacked

Check the upside down and unpack. When unpacking wooden crates, be careful not to get injured by nails and slivers.



(4) Ventilation

Obstructions which prevent ventilation around the pump make the motor overheat, so do not put them. Handling toxic or odorous liquid causes the risk of symptoms of poisoning. Install pumps in 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 chemical liquid adhered and pack it with plastic bag.



(6) Resin parts

Pumps consist of resin parts. Pumps are damaged by strong impact, causing person 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 check the rotational direction at the first time of the pump start-up. At that time, open suction and discharge valves, and check no liquid leakage from pipe connections. As the air is released from the piping and the pump is filled of liquid, turn on the switch instantly to check the 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 industrial wastes according to the appropriate law after cleaning adhered liquid.



(9) Leak protection

In case 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 GVM1 - GP- S D 5 1

(1) (2) (3) (4) (5) (6) (7)

(1) Bore Diameter/Motor Output

Model	Suction Bore	Discharge Bore	Motor Output
2500GVM (F)1	25A	25A	0.4kW
4001GVM (F)3	40A	40A	0.75kW
5002GvM (F)3	50A	40A	1.5kW

(2) Pump Model (Material)

GVM 1/GVM3 (GFR PP)
GVMF1/GVMF3 (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

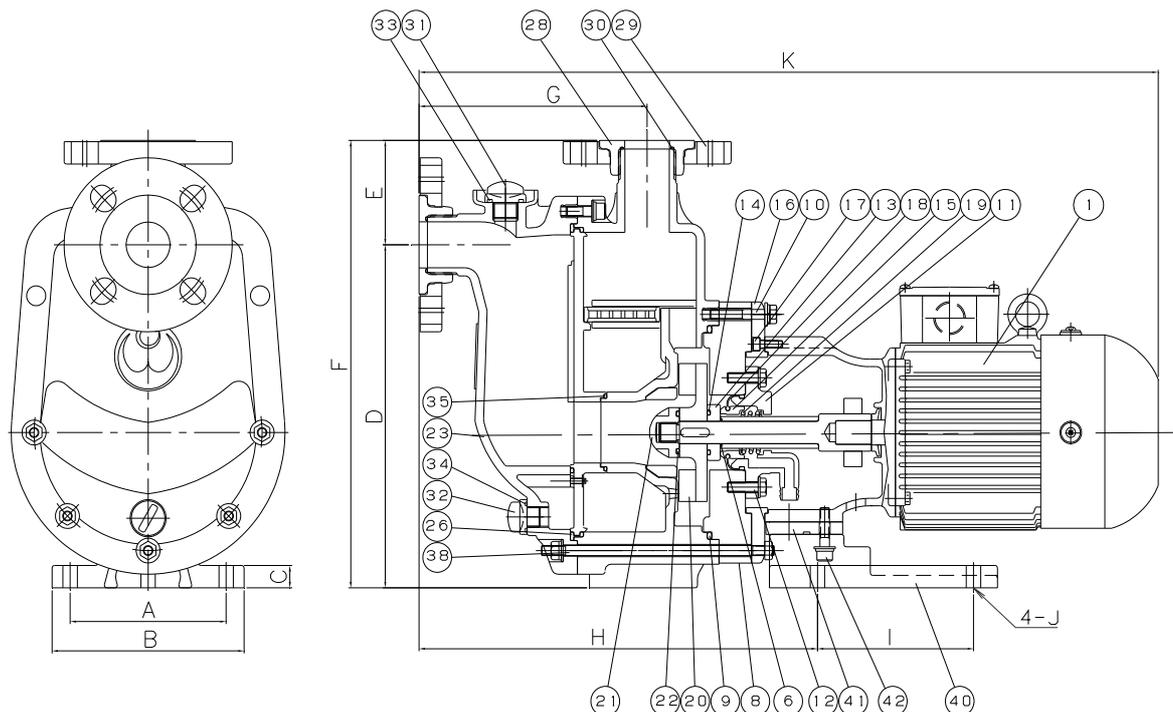
(7) Specific gravity

1: 1.1

Specification

Model		2500GVM(F)1	4001GVM(F)3	5002GVM(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	S.G.1.1.	8 - 40	8 - 110
	60Hz			
Weight (kg)		18.5	22.5	29.0
Liquid temperature (MAX)		0~50°C		

Outline dimension / Structure



GVM(F) Outline dimension

2500GVM(F)1	130	160	18	255	70	325	167	301.5	130	φ 12	559.5
4001GVM(F)3	130	160	18	276	84	360	190	332	130	φ 12	619
5002GVM(F)3	208	260	20	296	93	389	206	333	200	36-14	667

Parts description / Material

No.	Parts name	Qty	Material		Remarks
			YD-GVM	YD-GVMF	
1	Motor with bracket	1	FC200+Aluminium frame motor		
6	Oring for Shaft sleeve	1	FPM 2500GVM(F):AS568-015 etc.:AS568-017		
8	Back cover	1	PVC		
9	Oring for Backcover	1	FPM 2500GVM(F) : P140 4001GVM(F) : 160G 5002GVM(F) : G180		FPM: Dai-el
10	Hexagonal bolt	3	SUS304 (M8)		with SW, W
11	Seal case	1	Diallyl phthalate		
12	Hexagonal bolt	4	SUS304 (M8)		with SW, W
13	Rotating ring	1	Alumina ceramics		
14	Oring for Rotating	1	FPM 2500GVM(F):P25 etc.P28		FPM: Dai-el
15	Stationary ring	1	Carbon		
16	Rear casing support	1	FC200		
17	Hex. socket head cap screw	6	SUS304		
18	Phragm	1	Acid-proof fluoro-rubber		
19	Spring	1	Hsetelloy		
20	Impeller	1	HT. PVC		
21	Impeller nut	1	HT. PVC		

22	Oring for Impeller nut	1	FPM 2500GVM(F):P22 etc.:P26		FPM: Dai-el
23	Casing set	1	GFR PP	CFR ETFE	
26	Gascket	1	FPM		
28	Lap joint	2	GFR PP	CFR ETFE	
29	Loose flange	2	GFR PP	GFR PP (Black)	JIS10K
30	Oring for Lapjoint	2	FPM 2500GVM(F) : AS568-120 4001GVM : AS568-129 5002GVM : AS568-136		FPM: Dai-el
31	Priming plug	1	GFR PP	CFR ETFE	
32	Drain plug	1	GFR PP	CFR ETFE	
33	Oring for Priming plug	1	FPM P24		
34	Oring for Drain plug	1	FPM P20		
35	Oring for Separating board	1	FPM 2500GVM(F):P39 4001GVM(F):AS568-227 5002GVM(F):AS568-230		
38	Stud bolt	3/5	SUS304 (M6/M8)		with Hex. N, SW, W
40	Pump base	1	GFR PP		
41	Base joint	1	FC200		4001GVM(F)/5002GVM(F)
42	Cap screw Bolts	4	SUS304		with SW, W

Installing and operating precautions

1. Installing precautions

- (1) If much air enters into a pump during operation, it causes a breakdown.
 - During self-priming operation, the pressure in the suction pipe becomes negative. If air enters for connection failure, liquid does not go to the pump and the temperature increases. It may cause the pump damage.
 - Use a suction pipe with the same diameter as the pump suction inlet. If the pipe is larger than the pump diameter, self-suction ability is decreased and lead to priming failure.
- (2) Install a strainer at the suction pipe to prevent foreign objects. In this case, clean the strainer periodically to minimize the loss resistance.
- (3) It is recommended to install check valves on the rising discharge pipe to prevent water hammer. Additionally, install bypass pipes beneath for air release.
 - The discharge pipe is long and 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.
 - Two and more pumps are used parallel.
- (4) Create bending sections and expansion joints on the piping to prevent pump deformation and liquid leakage by caused by thermal expansion of the pipe.
- (5) Handle the pump with care not to create any impact, as the main material inside is resin.
- (6) Arrange the flange surface of the pipe and pump parallel and not tighten the bolts excessively.
Bolt: M16, tightening torque: 19.6N·m (200kgf·cm)
- (7) When piping, adjust it to the pump. If not, the pump casing may be damaged.
- (8) Do not turn a pipe after connecting the pipe with a pump flange.
- (9) Install the discharge pipe by rising 1m and more not to decrease the self-priming ability
- (10) When using a pump outdoors, use a water-proof cable clamp without rain in the terminal box.

2. Piping load

- (1) Be subjected to 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.

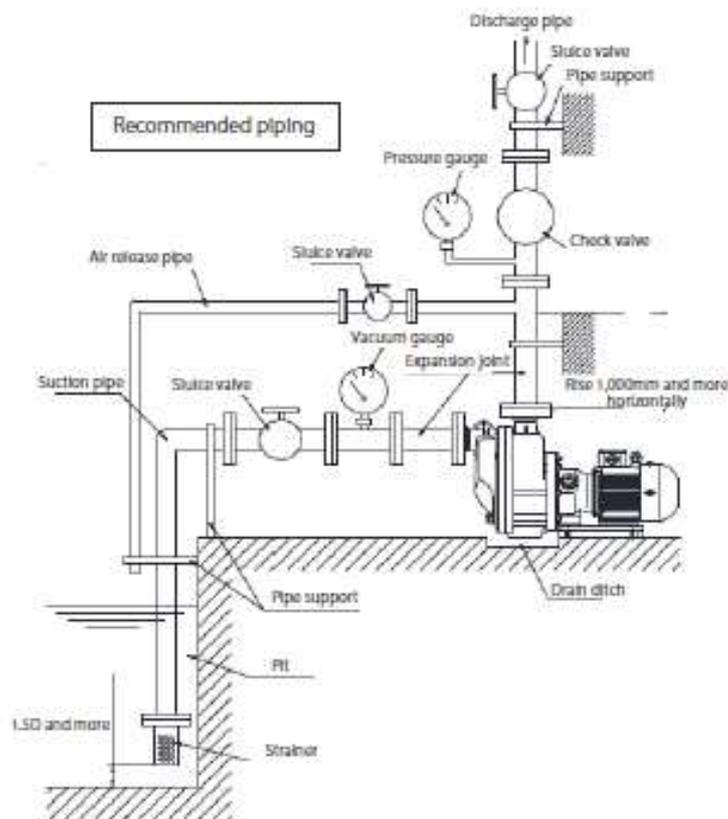
3. Drain ditch

- (1) Arrange a drain ditch like that leaked liquid flows into the wastewater pit.
- (2) If not, place a drain pan instead.

4. Priming water

Tighten the priming water plug firmly after pouring priming water.

2500GVM(F)1	4001GVM(F)3	5002GVFM(F)3
2.0 L	3.0L	4.0L



5. Operating precau

1) Before operation

- (1) Clean A pipe
 - If foreign particles enter, not only the pump performance decreases but also causes failure.
- (2) Remove the priming water plug on the casing to pour priming water and release air.
 - It is unnecessary to pour priming water next time for the pump structure.
- (3) Check that the bolts for flange are tightened firmly. If they are loosened, liquid leakage occurs and it may cause physical injury or the damage to other facilities.
- (4) Check that the drain plug is closed. If it is loosened at the pump start, the self-priming ability is dramatically decreased and it may cause the pump damage.

(5) Check the rotating direction of the motor.

If it is the three-phase power supply and the inverse rotation. Switch two wires of three wires. The direction is clockwise as viewed from the motor fan.

2) Do not run dry.

As the mechanical seal is cooled by pumped liquid through self-priming circulation, the operation with no liquid inside may cause the pump damage for heat. Do not run pump dry. If the pump runs dry, do not suddenly pour liquid in it and allow the pump to leave for more than one hour before adding fluid. A sudden flow of liquid could rapidly cool the heated frictional parts and severely damage them beyond repair.

3) When the operation is sealed by liquid by mistake (Both 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. Because of the danger involved, perform these operations only after the temperature fully declines and both valves closed for decompression of inside the pump. Be careful not to operate the pump with its liquid sealed. It may have to replace the pump.

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 in 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 in sue change dramatically, the pump's performance capacity, efficiency, and power input rating change depending to the condition of the pumped liquid. Use the pump in conditions afforded in view of them.

6) Limit pressure

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

Model	2500GVM(F)1	4001GVM(F)3	5002GVM(F)3
Limit capacity (MPa)	0.13	0.15	0.21

7) Change of the use conditions

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 pumps at flow rate higher than the following figure.

Model	Minimum flow rate
2500GVM(F)1, 4001GVM(F)3	10L/min
5002GVM(F)3	20L/min

Maintenance / Check

1. Daily check
 - (1) Check that there are no vibrations or any abnormal noises from the pump and the pump works smoothly.
 - (2) Compare the current value during operation with the rated current value and check that the operating load of the motor is normal. Additionally, check if the discharge pressure / capacity and the current value during operation are anything wrong than ever before
 - (3) Check the liquid level of the suction tank. (The height of the liquid level is more than 50 cm from the suction inlet of the pump.)
2. Periodic check
 - (1) Periodically overhaul the pump to ensure a smooth operation.
 - (2) Completely drain the liquid and wash with water for safety, when moving the pump to change installation sites or for repairs.
 - (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) Loosen and remove the hexagonal bolts (with W & SW) for the casing set (23) and detach the casing set from the rear casing set (16).
 - (3) Put a driver between the impeller (20) and fix it. Loosen the impeller nuts (21) counterclockwise and pull the impeller out forward.
 - (4) Remove the right and left keys during pushing the rotating ring (13), then detach the ring.
 - (5) When removing the back cover (8), the seal case (11) comes off together to be bolted on the back of the cover.
 - (6) Loosen four hexagonal bolts (12) and remove the seal case (11).

* Strongly withdraw the phragm (18) 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 with spread apart because of elasticity.

Finally, remove a spring (19) in the back of the stationary ring (15).

2. Assembly

Assembly is the inverse of the disassembly. Clean the sliding parts and O-ring thoroughly not to adhere dirty or damage. Insert the mechanical seal during fitting the salient of the seal case with the ditch of the rotating ring, turn the phragm up and fit into the mechanical seal in the outside ditch of the seal case. * Tighten each bolt evenly.

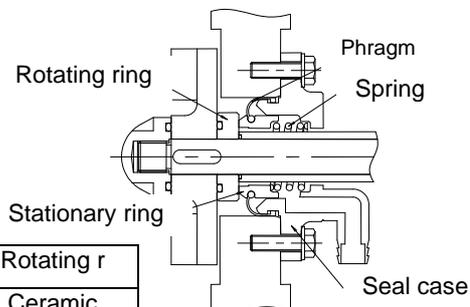
* Tightening torque is as follows,

Parts	Tightening torque	
Bolts for seal case	6.5N·m	
Bolts for front casing	2500GVM(F)	7.0N·m
	4001/5002GVM(F)	10.0N·m

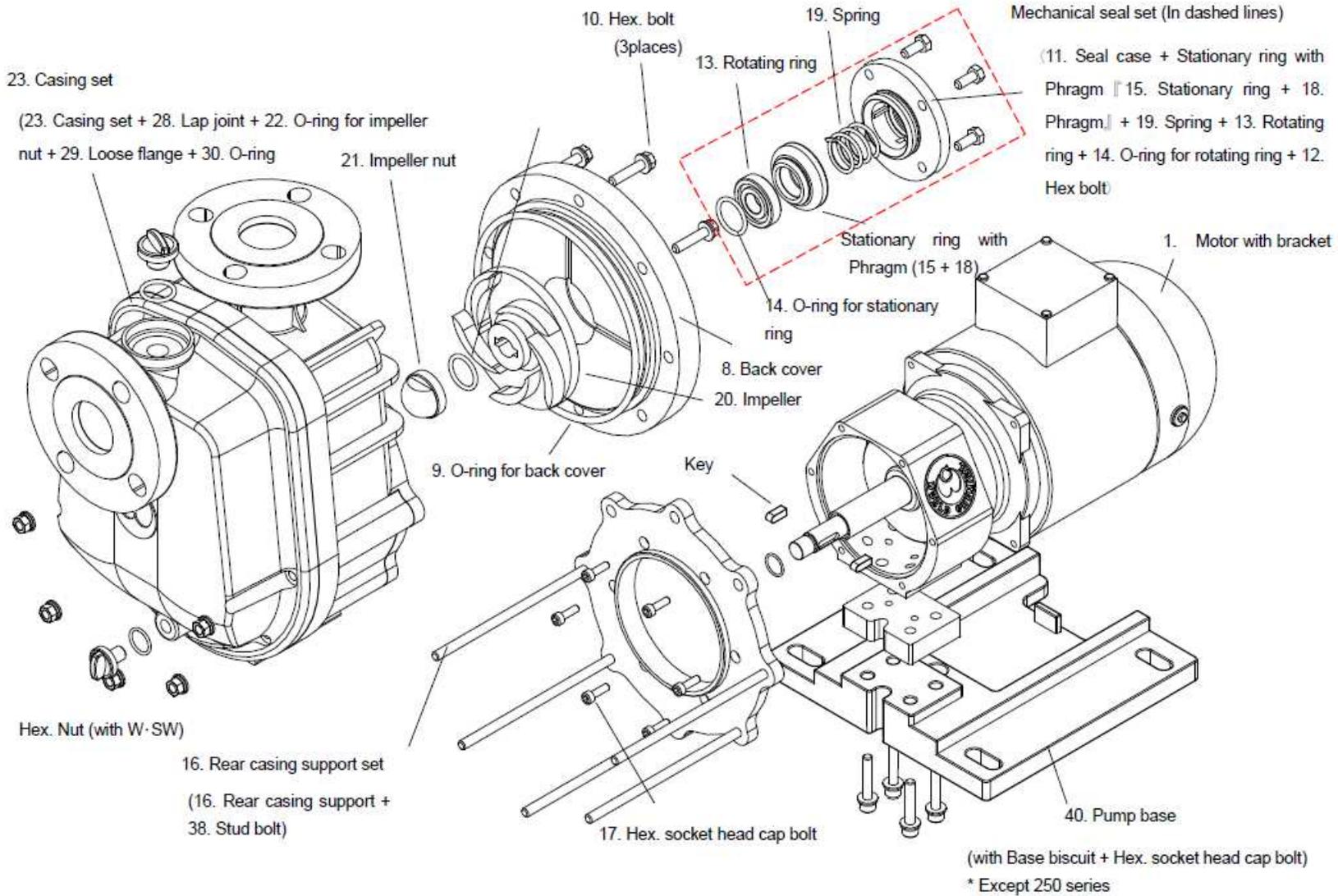
Type and Material

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

Structure of mechanical seal

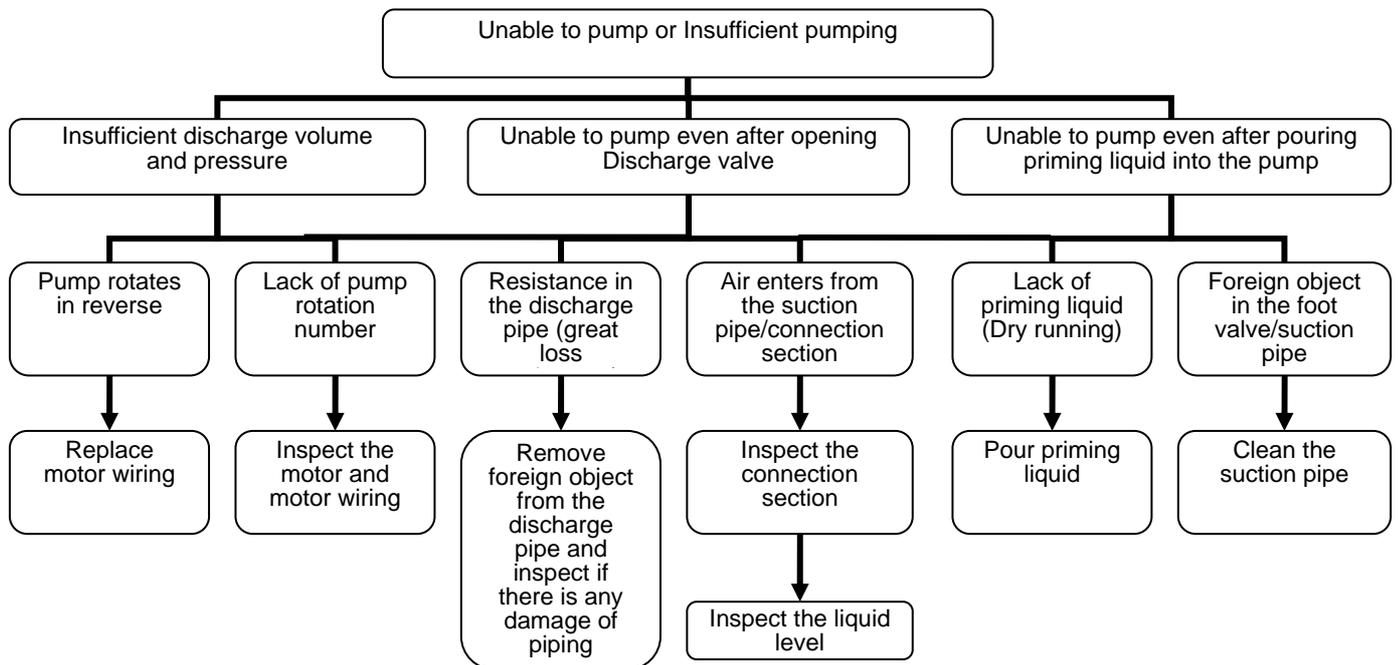


Exploded view

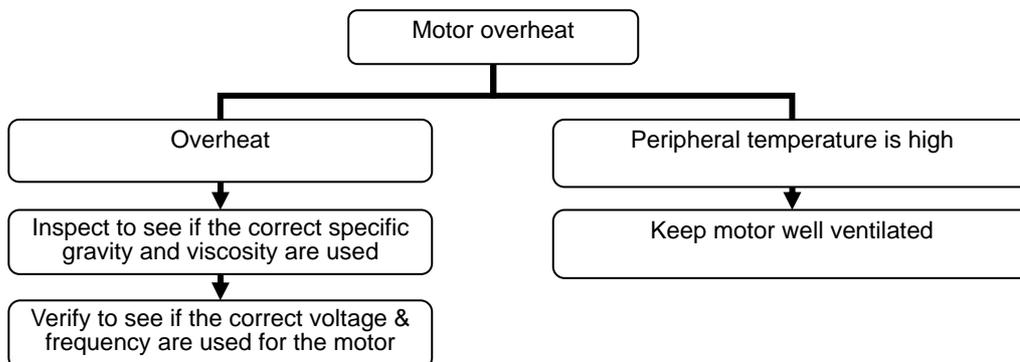


Troubleshooting

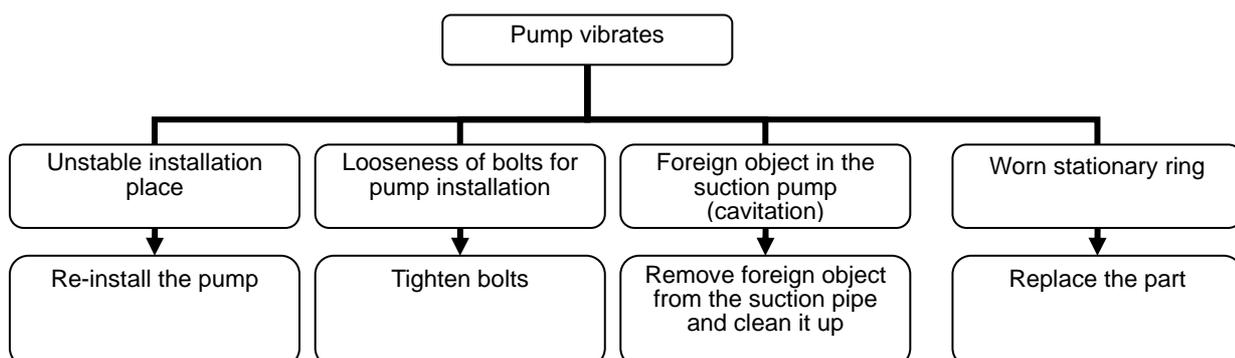
1. Unable to pump or insufficient pumping



2. Motor overheats



3. Pump vibrates



Warranty / Repair

1. Warranty period and coverage

- (1) The warranty period is 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,P6,11). Although, inform the parts' number and material, too.

Installation record

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



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

YD-GVM1/GVM3 Series

INSTRUCTION MANUAL

Version: 20230704

