

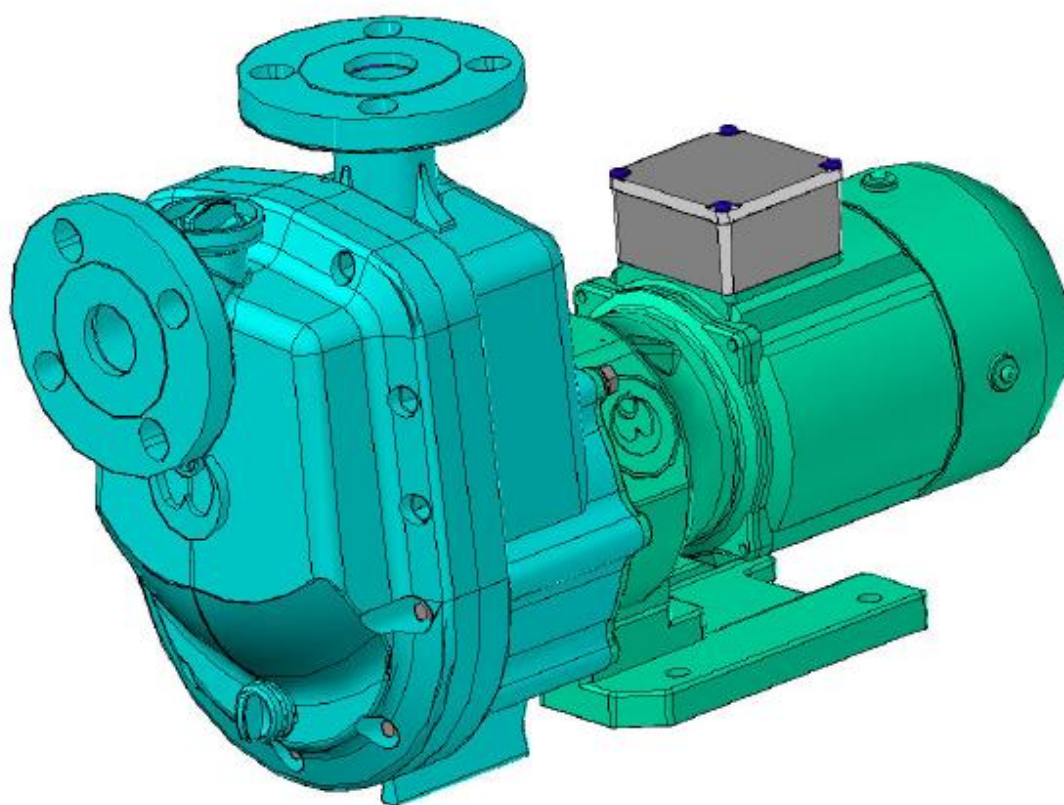
Corrosion Resistance Magnet Drive Pump

Super MAC

YD-GV(F)

INSTRUCTION MANUAL

Version: 241015



 **World Chemical Co., Ltd.**

Preface

Thank you very much for purchasing World Chemical's magnet pump "Super Mag". 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.



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Safety precaution (To be observed at all times)

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 may occur when its contents are ignored or the pump is used improperly.
- Safety rules to be observed are classified and explained under the following symbols. (The following are examples of picture displays)

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

	This symbol cautions people to be careful.
	This symbol signifies that this action must not be taken.
	This symbol indicates that the action must be taken.



WARNING



- (1) When using the pump for dangerous liquids and in surroundings.

When using the pump for dangerous liquids or in surroundings (only explosion prevention specifications), adhere to facility standards determined by law and conduct daily check not to leak liquid. If the pump is operated under abnormal conditions such as liquid leakage, it may cause serious accidents such as explosion, fire or personal injury. Regarding handling liquid, follow the liquid manufacturer.



- (2) No use the damaged or modified pump.

Using the damaged or modified pump may cause fatal accident, electric shock or pump damage. It is not covered by our warranty.



- (3) Caution when transporting or lifting the pump.

Always use the hoist belt for the pump that come with it. When the pump does not have a hoist belt, use a belt sling to lift the pump while watching the weight balance with care. It should be performed by qualified personnel with an enough strong sling. The lightest pumps' weight is around 10kg (22 lbs.), and do not carry it by hands as much as possible, because it may cause an accident.



- (4) No work with the pump powered on.

Do not check or disassemble the pump or motor powered on. It may lead to personal injuries such as electric shock or getting caught in the rotor. Work it with multiple safety devices such as a handy switch other than the main power or operation switch.



- (5) Connect the earth cable.

If using the pump without connecting earth cable to the motor, it may cause electric shock. Make sure to connect it by qualified personnel under the electrical equipment technical standards and interior wiring regulations.



- (6) Protect power supply cord.

Over-stretching, pinching and damaging the power supply cord or motor lead wire may cause fire or electric shock to damage it. Place the terminal box cover at the original position after wiring.



- (7) Install Current Leak Circuit Breaker.

The operation without a current leak circuit breaker may cause electric shock. Install it or an over current protection device to prevent electric accidents or the pump damage.



- (8) Caution when removing the pump.

When removing the pump from piping, make sure to close valves on the suction/discharge pipes and check no liquid leakage before. Direct contact with liquid may be harmful, so wear protective gears. The hole on the bracket is used to attach/remove the coupling to the motor shaft or check the rotation state of the coupling for maintenance. Do not put fingers or tools for another way. Make sure not to put fingers or tools into the hole of the bracket or the open of the fan cover during operation. It may cause injury and damage.



CAUTION



- (1) No unspecified use.

Do not use the pump for purposes other than specification in the spec. sheet or the nameplate. Especially, check the motor specification (phase, voltage and frequency) to connect. Unspecified use may cause personal injury, the pump or peripheral equipment damage.



- (2) Restrictions of operator.

Transportation, installation, wiring, operation, servicing, and inspection should be performed by qualified personnel who have full knowledge on the handling the pump.



- (3) Caution when opening package.

Open the package after checking upside down of the product. When opening a wooden crate, be careful of nails and silvers without hurting you.



- (4) Ventilation.

Do not place objects around the pump that may obstruct ventilation as the motor heats up. When toxic or odorous liquid is handled, install the pump in a well-ventilated place to prevent poisoning.



- (5) Repair and return the pump.

When repairing the damaged pump, contact your supplier. When sending the pump back by express, wash the interior and exterior with fresh water and check them without liquid. Then, pack the pump with a plastic bag.



- (6) Plastic (resin) parts.

The pump is made of plastic and a strong impact may cause fatal accident. Do not hit and get on the pump. Also attach piping supports not to apply any pipe load to the pump.



- (7) Pump start.

Check the rotating direction at the start of the pump. At that time, open the suction / discharge valves and check no liquid leakage from the pipe connection. Then, check the direction by quick start-up of the switch after exhausting air in the pipe and filling the pump with liquid. If the rotation is in reverse, switch two of the three phases in the three-phase power supply. Make sure to power off and confirm safe conditions before.



- (8) Dispose the scrapped pump.

When disposing the used pump, remove adherent liquid and discard it as industrial waste in law.



- (9) Outflow protection.

Just in case liquid leaks to break the pump or pipes, take appropriate preventative measures.

Unpacking check

Check as follows and contact your supplier when you have any questions.

1. The indication in the nameplate (model, total head, capacity, motor specification, voltage and motor specification) is the same as your order.
2. Accessory is stored in.
3. There is no damage and loosen bolts for transportation.

Model description

YD – 20 Y6 GV 1 – CP – R D 5 2 – N
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

'(1) (2)

Model	Suc. Bore	Dis. Bore	Motor
20A6GV1	20A	20A	1PH, 100V, 0.26kW
20Y6GV1	20A	20A	3PH, 200V, 0.26kW
2000GV1	20A	20A	3PH, 200V, 0.4kW

(3) Model GV: Self-priming pump

(4) Motor type 1: IE1

(5) Wet Parts Kit Material

CP: CFR-PP (Carbon Reinforced Polypropylene)

(6) Bearing Material R: CFR-PTFE

(7) O-ring Material

D: FPM (Dai-el) E: EPDM

(8) Frequency

5: 50Hz 6: 60Hz

(9) Limit of Specific Gravity

2: Until 1.2 6: Until 1.6 (Only 0.4kW)

(10) Identifying code

YD – 4001 GV 3 – GP – CD 5 1
 (1) (2) (3) (4) (5) (6) (7)

(1) Bore / Motor output (3 phase, 200V)

Model	Suction bore	Discharge bore	Motor output
2500GV1	25A	25A	0.4kW
2501GV(F)3	25A	25A	0.75kW
2502GV(F)3	25A	25A	1.5kw
4001GV(F)3	40A	40A	0.75kW
4002GV(F)3	40A	40A	1.5kW
4003GV(F)3	40A	40A	2.2kW
5002GV(F)3	50A	50A	1.5kw
5003GV(F)3	50A	50A	2.2kW
5005GV(F)3	50A	50A	3.7kW

(2) Model

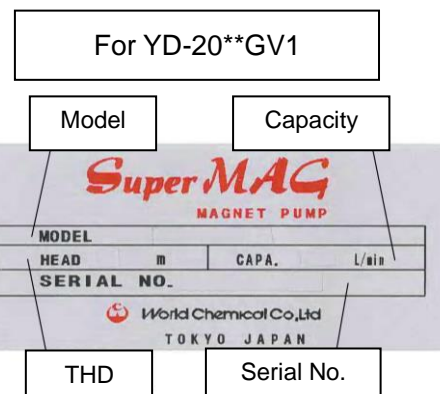
GV
GVF

(3) Motor type

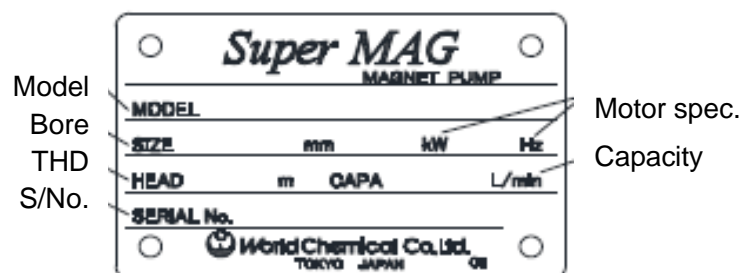
1: IE1
3: IE3

(4) Main material

GP: GFR PP
CF: CFR ETFE



YD-250*/400*/500*GV(F) series



Motor spec.
Capacity

(5) Bearing / O-ring material (250*/400*/500*GV(F) *series)

Model	YD-****GV(F)*-△△					
Material code	CD	CE	AD	AE	KD	KE
Bearing	Carbon		Almina ceramics		SiC	
O-ring	FPM (Dai-el)	EPDM	FPM (Dai-el)	EPDM	FPM (Dai-el)	EPDM

*1) Special material: The material other than the standard one is used by consultation with the customer.

(6) Frequency

5: 50Hz 6: 60Hz

(7) Limit of specific gravity

1: 1.05/1.1 2: 2.2 3: 1.3 4: 1.4 6: 1.6 8: 1.8 G: 2.0

250*GV* series

Code/Model	2500GV1		2501GV3		2502GV3	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
No indication	1.05	1.05	-	1.1	-	
-G	-		2.0	1.8	-	2.0

400*GV3 series

Code/Model	4001GV3		4002GV3		4003GV3	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
No indication	1.1	-	-	1.1	-	
-G	-		1.8	-	-	1.4

500*GV3 series

Code/Model	5002GV3		5003GV3		5005GV3	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
No indication	1.1	-	1.1	1.1	-	1.2
-G	-		1.4	-	1.8	1.6

250*GVF3 series

Code/Model	2501GV3		2502GVF3	
	50Hz	60Hz	50Hz	60Hz
-F	-	1.1	-	
-G	2.0	1.6	-	1.8

400*GVF3 series

Code/Model	4001GVF3		4002GVF3		4003GVF3	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
-F	1.1	-	-	1.1	-	
-G	-		1.6	-	-	1.3

500*GVF3 series

Code/Model	5002GVF3		5003GVF3		5005GV3	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
-F	1.1	-	1.1	1.1	-	1.2
-G	-		1.4	-	1.8	1.6

Specification

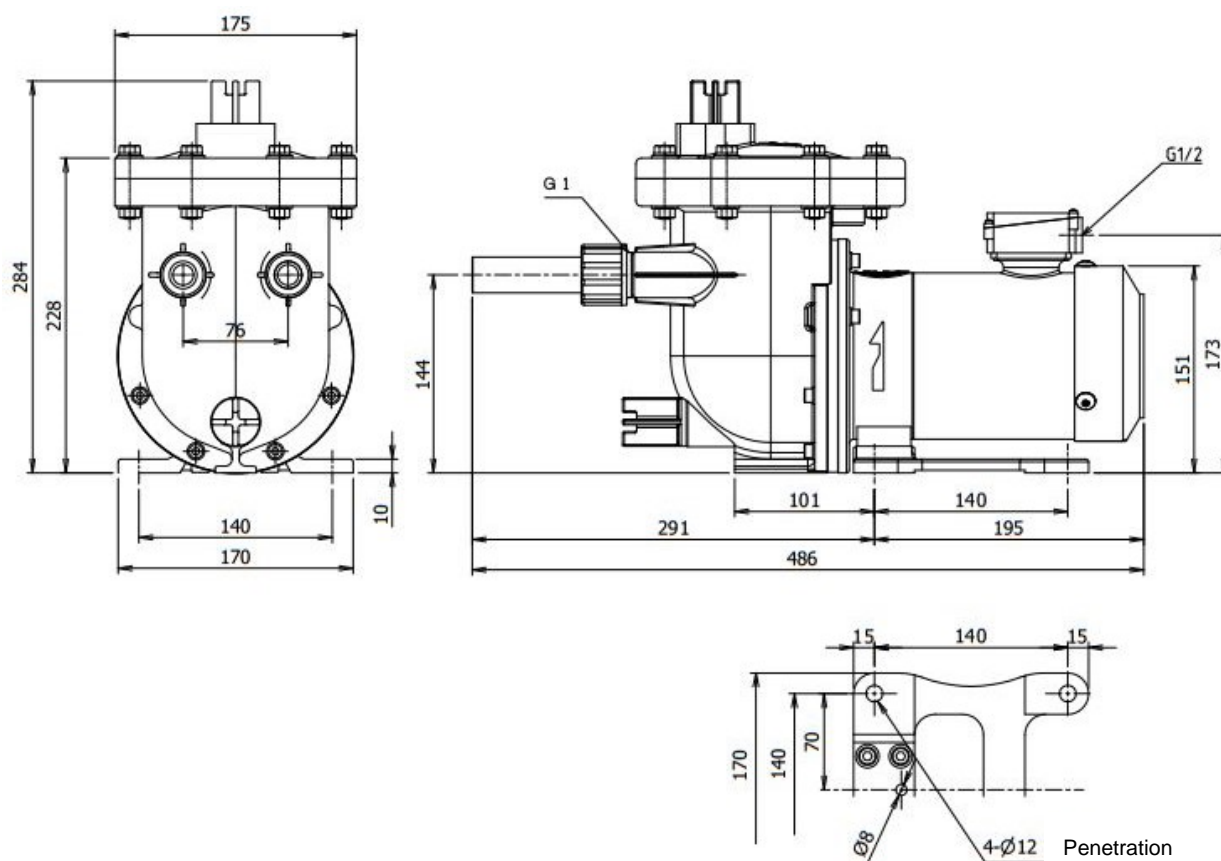
■ 20**GV1 series

Model			20Y6GV1	20A6GV1	2000GV1
Bore (Suc. x Dis.)			20A (0.8") x 20A (0.8") (Union connection)		
Motor output			0.26Kw (1/3HP) (Indoor motor)		0.4Kw (1/2HP) (Indoor motor)
Standard spec. (m_L/min)	50Hz		6 – 30		6 – 30
	60Hz		7 – 30		7 – 30
Specific gravity			1.2		1.6
Weight (kg)			10.0		11.5
Limit of self-priming (m)			2.5 m(for clean water at 20 degree)		

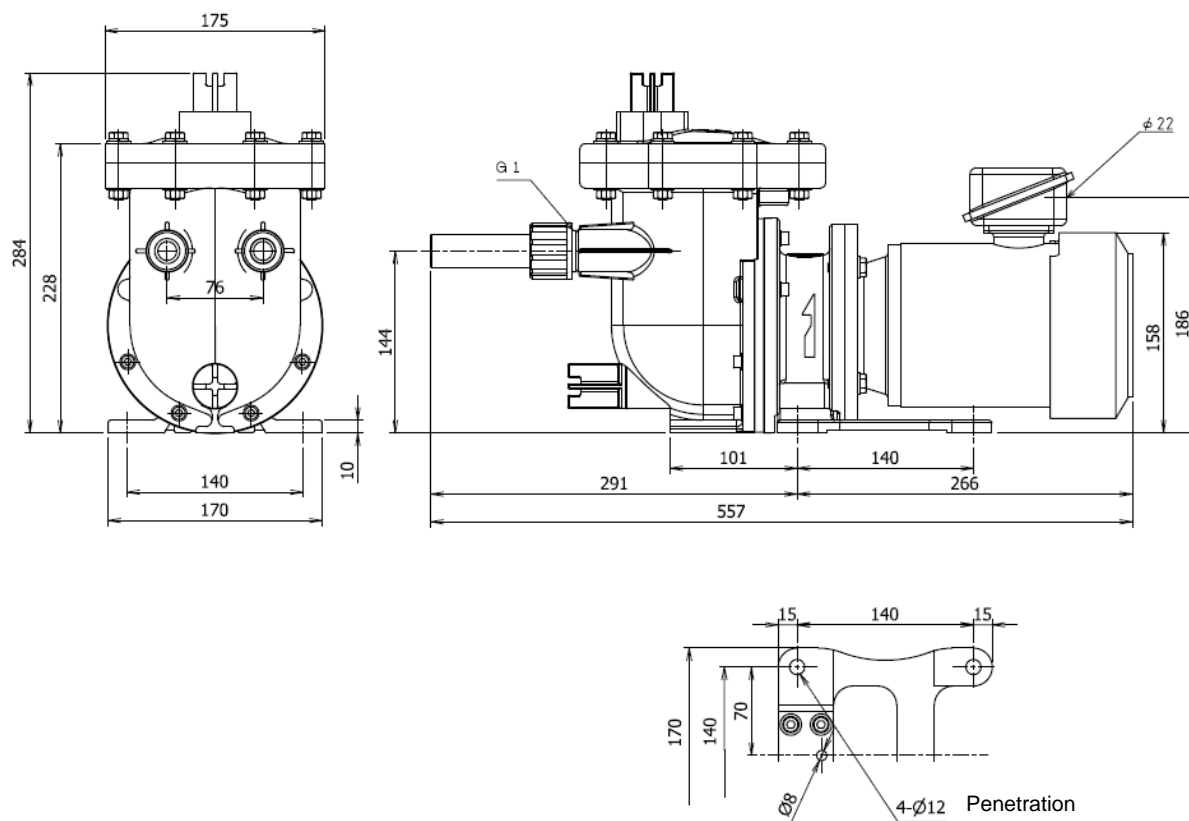
* Motor is indoor type. If the pump is used outside, consult us.

Outline dimension

YD-20Y6GV1 / 20A6GV1



YD-2000GV1 / 20A0GV1

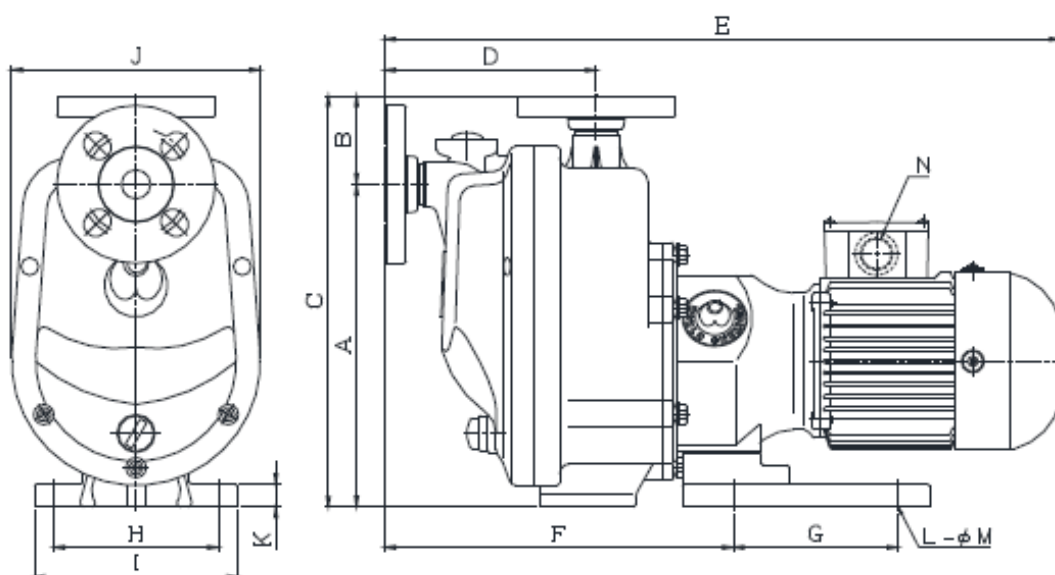


■ 250*GV(F)* series

Model			2500	2501		2502	
			GV1	GV3	GVF3	GV3	GVF3
Bore (Suc. x Dis.)			25A (1") x 25A (1")				
Motor output			0.4kW (1/2HP)	0.75kW (1HP)		1.5kW (2HP)	
Standard spec. (m_L/min	50Hz	No ind. (-F)	8 - 80	-		-	
		-G	-	8 - 80	8 - 80	-	
	60Hz	No ind. (-F)	-	12 - 110	12 – 100	-	
		-G	-	8 - 80	8 - 80	12 - 110	12 - 105
Weight (kg)		GV	18.5	20.5		24.5	
		GVF	-	23		27	
Limit of self-priming (m)			5 m(for clean water at 20 degree)				

Outline dimension

YD-2500GV1 / 2501 / 2502GV(F)3



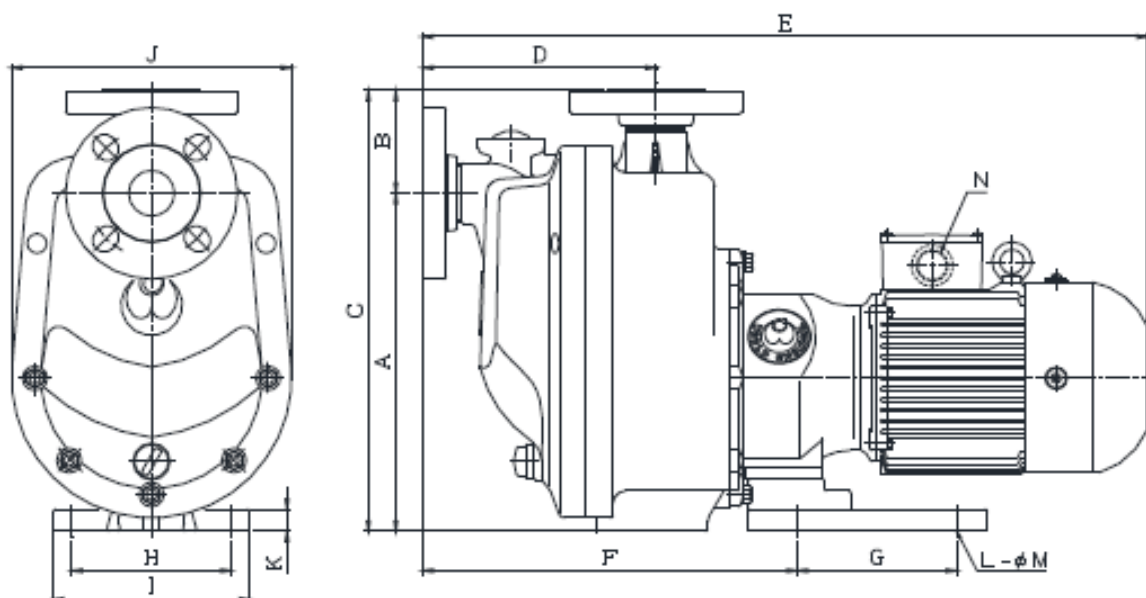
	A	B	C	D	E	F	G	H	I	J	K	L-φM	N
2500GV(F)1	255	70	325	167	533	275	130	130	160	196	18	4-φ12	PF3/4
2501GV(F)3					562								
2502GV(F)3					592								

■ 400*GV(F)3 series

Model			4001		4002		4003	
			GV3	GVF3	GV3	GVF3	GV3	GVF3
Bore (Suc. x Dis.)			40A (1.5") x 40A (1.5")					
Motor output			0.75kW (1HP)		1.5kW (2HP)		2.2kW (3HP)	
Standard spec. (m _L /min)	50Hz	No ind. (-F)	10 - 160	10 – 110	-		-	
		-G	-		11 - 160	11 - 160	-	
	60Hz	No ind. (-F)	-		16 - 200	15 – 200	-	
		-G	-		-	-	17 - 200	16 - 200
Weight (kg)		GV	22.5		26.5		29	
		GVF	25		29		31.5	
Limit of self-priming (m)			5 m(for clean water at 20 degree)					

Outline dimension

YD-4001 / 4002 / 4003GV(F)3



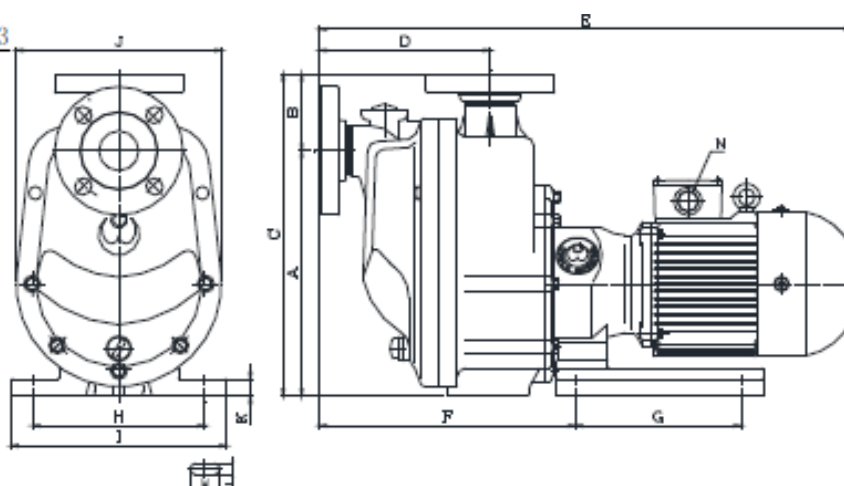
	A	B	C	D	E	F	G	H	I	J	K	L-φM	N
4001GV(F)3	276	84	360	190	592	305	130	130	160	228	18	4-φ12	PF3/4
4002GV(F)3					622								
4003GV(F)3													

■ 500*GV(F)3 series

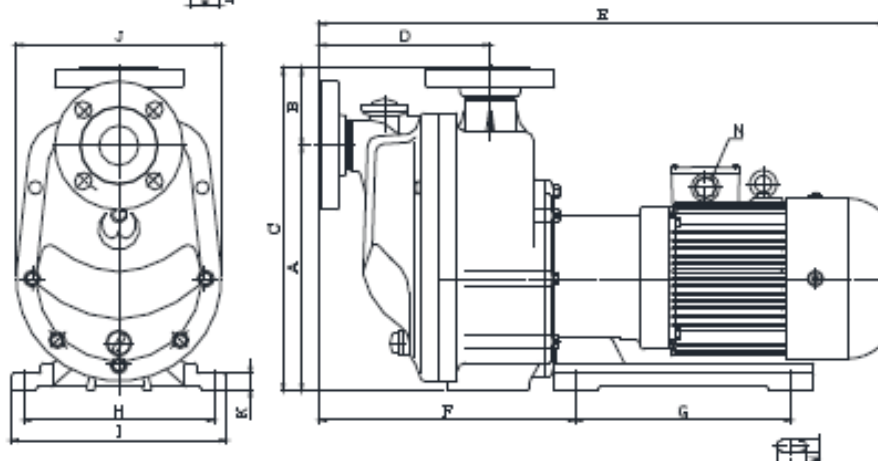
Model			5002		5003		5005	
			GV3	GVF3	GV3	GVF3	GV3	GVF3
Bore (Suc. x Dis.)			50A (2") x 50A (2")					
Motor output			1.5kW (2HP)		2.2kW (3HP)		3.7kW (5HP)	
Standard spec. (m_L/min	50Hz	No ind. (-F)	16 - 200	15 – 200	18 - 250	17 – 250	-	
		-G	-		17 - 200		18 - 250	
	60Hz	No ind. (-F)	-		18 - 250	17 – 250	28 - 200	23 - 300
		-G	-		-	-	18 - 250	
Weight (kg)		GV	29.5		32		53	
		GVF	32.5		35		56	
Limit of self-priming (m)			5 m(for clean water at 20 degree)					

Outline dimension YD-5002 / 5003 / 5005GV(F)3

YD-5002/5003GV(F)3



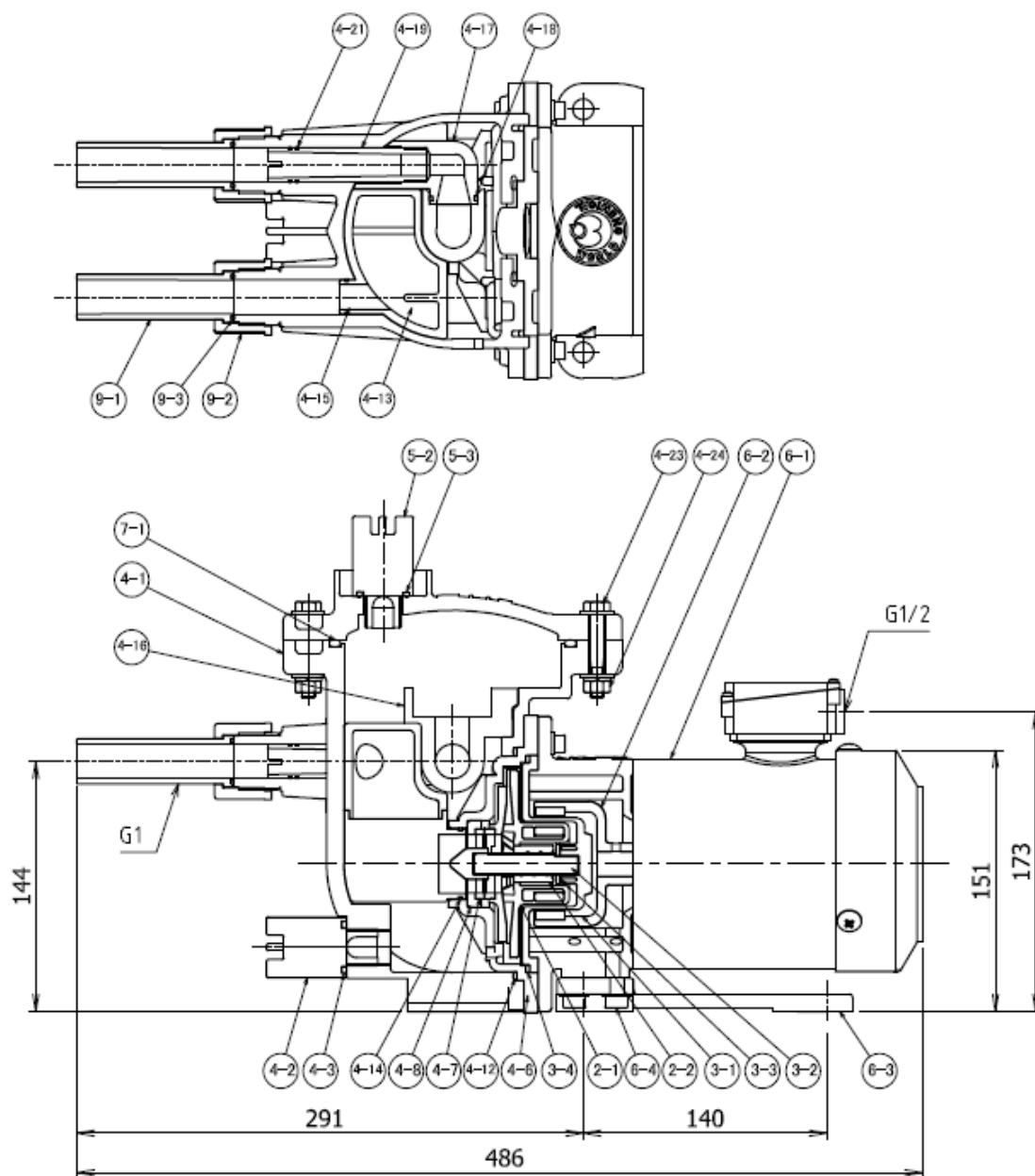
YD-5005GV(F)3



	A	B	C	D	E	F	G	H	I	J	K	4-LxM	N
5002GV(F)3	297	94	391	206	643	309	200	208	260	248	21	14 x 36	PF3/4
5003GV(F)3			390		713		261	230			20	36 x 14	
5005GV(F)3	296												

Parts name / Material / Structure

YD-20Y6GV1 / 20A6GV1

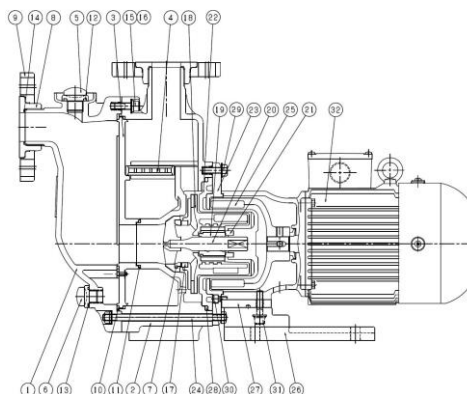


No.	Parts name	Qty	Material	Set condition
2-1	Impeller	1	PP + Magnet	Impeller set
2-2	Bearing	1	CFR PTFE	
2-3	Mouth ring	1	CFR PTFE	
3-1	Rear casing	1	CFR PP	Rear casing set
3-2	Pump shaft	1	Alumina ceramics	
3-3	Rear thrust ring	1	Alumina ceramics	
3-4	O-ring for rear thrust ring	1	EPDM / FPM	
4-1	Front casing	1	CFR PP	Front casing set
4-2	Drain cock	1	CFR PP	
4-3	O-ring for drain cock	1	EPDM / FPM	
4-6	Vortex chamber	1	CFR PP	
4-7	Liner ring	1	Alumina ceramics	
4-8	Liner ring holder	1	CFR PP	
4-9	Hex socket head cap bolt (M6*25) W.SW	4	SUS304	
4-12	O-ring for vortex chamber	1	EPDM / FPM	
4-13	Self-priming tank	1	CFR PP	
4-14	O-ring for self-priming tank	1	EPDM / FPM	
4-15	O-ring for self-priming tank	1	EPDM / FPM	
4-16	Filter receiving pipe	1	CFR PP	
4-17	Discharge pipe A	1	CFR PP	
4-18	O-ring for discharge pipe A	1	EPDM / FPM	
4-19	Discharge pipe B	1	CFR PP	
4-21	O-ring for discharge pipe B	2	EPDM / FPM	
4-22	Cover	1	CFR PP	
7-1	O-ring for cover	1	EPDM / FPM	
4-23	Hex. bolt M8 x 45 (W, SW)	8	SUS304	
4-24	Hex. nut M8	8	SUS304	
4-25	Hex socket head cap bolt (M6*30) W.SW	4	SUS304	
5-2	Priming water plug	1	CFR PP	Motor set
5-3	O-ring for priming water plug	1	EPDM / FPM	
6-1	Motor with bracket	1	FC200	
6-2	Outer magnet	1	Ne-Fe-B + FC450	
6-3	Motor base	1	FC200	Accessory
6-4	Hex. socket head cap bolt (M8 x 25)	4	SUS304	
9-1	Union socket	2	C-PVC	
9-2	Union nut	2	GFR PP	Accessory
9-3	O-ring for union socket	2	EPDM / FPM	

*1: The motor is indoor type. If it is used outdoor, consult us.

Parts name / Material / Structure

YD-250* / 400* / 500*GVF(F)*



No.	Parts name	Qty	Material		Set condition
			YD-GV*	YD-GVF*	
1	Suction casing	1	GFR PP	CFR ETFE	Casing set
2	Discharge casing	1	GFR PP	CFR ETFE	
3	Separate board	1	GFR PP	CFR ETFE	
4	Grating board	1	GFR PP	CFR ETFE	
5	Priming water plug	1	GFR PP	CFR ETFE	
6	Drain plug	1	GFR PP	CFR ETFE	
7	Liner ring	1	Alumina ceramic + GFR PPS	Alumina ceramic + CFRETFE	
8	Lap joint	2	GFR PP	CFR ETFE	
9	Flange	2	GFR PP	GFR PP (Black)	
10	Gasket	1	(EPDM / FPM) *1		
11	O-ring for inner pipe	1	(EPDM / FPM)		
12	O-ring priming water plug	1	(EPDM / FPM)		
13	O-ring drain plug	1	(EPDM / FPM)		
14	O-ring for lap joint	2	(EPDM / FPM)		
15	Hex. socket head cap screw	4	SUS(M6:for 25* / M8: for 40*, 50*)		
16	Hex. socket head cap screw	10	SUS(M6:for 25* / M8: for 40*, 50*)		
17	Mouth ring	1	CFR PTFE		Impeller set
18	Impeller	1	GFR PP+PP+Magnet	CFR ETFE + Magnet	
19	Bearing	1	GFRPP+Carbon/Ceramic/Sic	CFRETFE+Carbon/Ceramic/Sic	
20	Shaft	1	Alumina ceramic		Rear casing set
21	Rear thrust ring	1	Alumina ceramic		
22	Rear casing	1	GFR PP	CFR ETFE	
23	Rear casing support	1	FC200		Rear casing support set
24	Stud bolt	3 / 5	SUS(25*GV(F): 3pcs)		
25	Outer magnet	1	FCD450-10+Magnet		
26	Base	1	GFR PP / FC450-10		
27	Base biscuit	1	FC200 (25*GV(F)*/505GV(F)*: No)		
28	O-ring for casing	1	(EPDM / FPM)		
29	Hex. bolt	3	SUS M8x25		
30	Hex. socket head cap screw	6	SUS M6 x 12		
31	Hex. socket head cap screw	4	SUS M8		
32	Motor with bracket *2	1	FC200 + Alumina alloy		

*1: FPM: Dai-el

*2: When the 5HP general motor is assembled, the mounting plate is necessary.

Handling precaution

The magnetic force of the magnet drive pump is more powerful than everyday use and the extra precaution is necessary. Pay attention the followings as well as the normal one such as dry running or reverse rotation operation.

1. People with a pacemaker and other electronic devices for maintaining bodily functions do not use the magnet drive pump.
2. Do not put your hands between the magnets. If there are iron articles such as knives, scissors or iron masses nearby, they are attracted to the magnets in an instant and may cause to injury the hand holding the article or crack the plastic around the magnets.
3. Do not place floppy disks, computer memory or magnetic tapes, because they are easily magnetized.

Prohibition for the magnet drive pump

1. Dry Running

When the pump runs dry, friction heat is generated at sliding parts of the shaft and bearing and the plastic parts around them become deformed. As the result, the impeller eccentrically rotates. The pump does not work properly and is damaged.

- The operation without priming water*1 causes dry running and the pump parts damaged.

*1 Priming water should be the liquid in use to prevent the parts deformation by heat.

2. Liquid with slurry

Basically, do not use the magnet drive pump for liquid with slurry. Even if liquid with slurry is thin, the pump and parts are damaged and make the lifetime shorten.

(If using the pump for liquid with slurry, consult us in advance.)

3. Cavitation*2

If the pump runs with cavitation, it causes the pump vibration, the basic performance degradation or the inside of the casing damaged. The causes may be that suction pipe is long, thin, many bending, the liquid temperature is high or strainers are clogged.

- *2 Cavitation is the phenomenon that the liquid inside becomes low pressure locally by liquid action and air bubbles occur. (When air bubbles break, noise & vibration are occurred by the impact. It corrodes the surface of the pump or the performance is decreased.)

4. Corrosion

The pump is mainly made of GFR PP or CFR ETFE. When purchasing the pump, consider the corrosion resistance against liquid in use to select the pump. The pump life may be shortened depending on the liquid type and temperature. When changing the liquid or condition, consult us.

- CFR PP Tolerable temperature: 0 – 80°C (32 – 176F)
Incompatible liquids: Nitric acid, concentrated sulfuric acid, chromium acid and strong oxidant such as sodium hypochlorite
- GFR PP Tolerable temperature: 0 – 70°C (32 – 158F)
Incompatible liquids: Nitric acid, concentrated sulfuric acid, chromium acid, sodium hypochlorite, caustic soda
- CFR ETFE Tolerable temperature: 0 – 80°C (32 – 176F°) (If the pump is used for liquid 60 degrees and more, consult us.)
Incompatible liquids: Trichloroethane, Trichloroethylene

Installing / piping precaution

1. Installing precaution

- (1) A large amount of air entered in the pump during operation makes the pump self-priming failure and causes a breakdown.
 - It is the negative pressure in the suction pipe during self-priming operation. If air enters for the joint installing failure, liquid does not go into and the temperature of priming liquid is raised. It may cause the pump damage.
 - Use the suction pipe whose bore is the same as the suction inlet. If not, do not use it because it may cause pumping failure by the self-priming ability declines.
- (2) Place a strainer at the suction inlet to prevent foreign objects. However, clean the strainer periodically to prevent clogging and minimize loss resistance.
- (3) It is recommended to place check valves on the discharge pipe to prevent "water hammer". At the bottom, place a bypass for air exhaust.
 - When the discharge pipe is long or the head is 10m (30ft.) and more.
 - When the tip of the discharge pipe stays 9 m and more from the liquid level in a suction tank.
 - When two or more pumps are installed in parallel.
- (4) Create bending or expansion joints on the piping not to leak liquid by the pipe deformation for the liquid temperature.
- (5) The inside of the pump is mainly made of plastic and do not give any impact.
- (6) Arrange the pipe and pump flange parallel and do not tighten the bolts excessively.
Bolt: M16, Recommended tightening torque: 19.6N·m or 200kgf·cm (14.45lbw-ft)
- (7) When installing, fit the dimension of the pump and pipe.
- (8) Never turn the pipe after attaching the pump flange to the piping.
- (9) Raise the piping 500mm and more at the discharge side not to reduce the self-priming ability.
- (10) When using outside, use a water-proof cable clamp at the open to prevent rain into the terminal box.

2. No apply piping load.

- (1) Be subject to the piping load with a piping support completely.
- (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) Prevent metal pipes as much as possible and use plastic ones.
 - Observe (2) (3), because metal pipes are used for strong sulfuric acid or caustic soda.

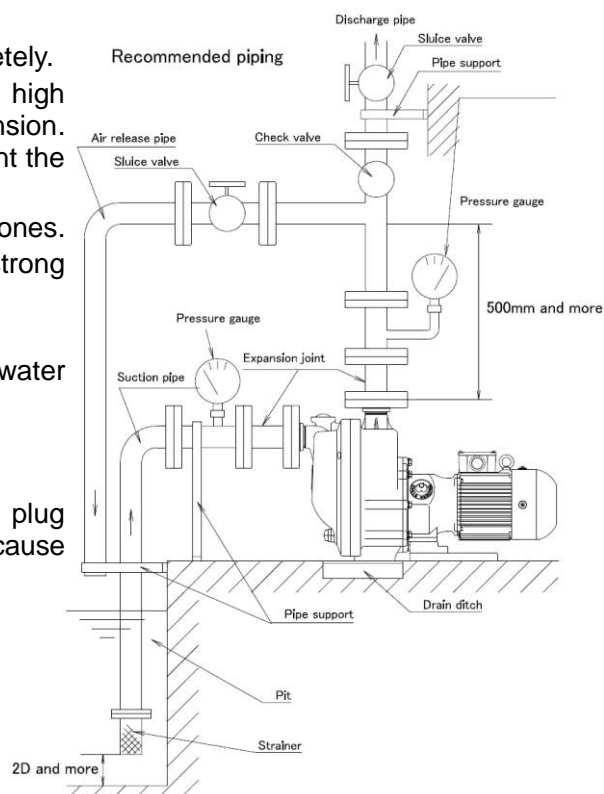
3. Drain Ditch

- (1) Arrange drain ditches as spilled liquid flows to a wastewater pit.
- (2) If not, set a drain pan.

4. Precaution for priming liquid

After pouring priming liquid, tighten the priming water plug firmly. If the pump is operated with loosen O-ring, it may cause self-priming failure.

Model	Min. priming liquid
20*GV1	0.6L
250*GV(F)*	2.0L
400*GV(F)3	3.0L
500*GV(F)3	4.0L



Operating precaution

1. Before operation.

- (1) Clean pipes and tanks. If foreign objects enter the pump, not only the performance decrease, but also cause a breakdown.
- (2) Pour priming water from the priming water plug on the top of the suction casing and release air. From next time, it is not necessary to do to remain self-priming water automatically.
- (3) Check to connect the flange with bolts firmly. Loose bolts may cause liquid leakage, injury or damage to other facilities.
- (4) Check the rotating direction of motor (clockwise as viewed from the motor fan). If the motor rotates in reverse, switch two of three wires in the three-phase power supply. Priming water may not be enough, so pour it again.
- (5) Tighten the drain plug more. If the drain plug is loosened at the start, the self-priming ability is dramatically decreased and it may cause the pump damage.

2. No dry running.

Sliding parts are cooled by self-circulation with pumped liquid. If the pump is operated without liquid, the pump may be damaged by heat. If it runs dry, do not suddenly pour liquid in it rather than leave it an hour and more. A sudden flow of liquid may rapidly cool the heated sliding parts and severely damage them beyond repair.

3. Liquid seal operation by mistake (Suction & discharge valves are closed.)

When operating pumps with the suction & discharge valves closed, the inside is subjected to high pressure and temperature. If the pump is disassembled in this situation, steam and hot water are spewed. Make sure to check decreasing the temperature completely before.

When the pump inside is damaged by liquid seal operation, the whole pump may have to be replaced.

4. Range of the used liquid temperature

Vapor pressure, viscosity, and corrosiveness are changed depending on the temperature of the used liquid. Use the pump under arrowing leeway of the pump performance in mind of them.

- Range of liquid temperature in use:

0 – 80°C (32 – 176 F) <20**GV1 series>
0 – 80°C (32 – 176F) <GV* series>
0 – 80°C (32 – 176 F)<GVF* series>

(When the pump is used for liquid 60 degrees and more, contact your supplier or our sales department.)

* The self-priming height and time are changed depending on the liquid temperature.

5. Change the specific gravity or viscosity of the liquid in use

If the specific gravity and viscosity are changed a lot, the pump's performance, efficiency and axial movement power may be changed by the liquid condition. Consider them sufficiently and use the pump within an appropriate leeway.

6. Change the use conditions

The pump is manufactured under the specification based on the meeting before purchase. If the use condition is changed, consult us.

7. Limit of the pump pressure resistance

Avoid going over the discharge pressure as the following listed limit. (at 25 degrees)

Model	20**GV1	250*GV*	400*GV3	500*GV3	250*GVF*	400*GVF3	500*GVF3
Limit (MPa)	0.25	0.32	0.41	0.53	0.32	0.41	0.45

8. Easy bubbling liquid

Easy bubbling liquid by stirring for surfactant may reduce self-priming ability dramatically and prevent self-priming. In this case, take measures such as placing foot valves.

9. Frequent operation

Frequent switching on / off of a pump may hasten the pump damage. Turn on / off the pump less than six times in an hour.

10. Minimum flow rate

Operate pumps at the capacity higher than the following figure.

Model	Minimum flow rate
20Y6GV1, 2A6GV1, 2000GV1	5 L/min
2500GV1, 2501GV(F)3, 4001GV(F)3	10 L/min
2502GV (F)3, 4002GV(F)3, 4003GV(F)3, 5002GV(F)3, 5005GV(F)3	20 L/min

11. The motor of model 20*GV1 (1PH 115V, 3PH 200V/220V) is with a thermal protector.

Operating temperature: 120 ± 5 degrees

Recovery temperature: 91 degrees or less

*If the thermal protector is activated, please do not restart the device for one hour after it has stopped.

Maintenance / Consumable parts YD-20**GV1 series

1. Daily check

- (1) Check that there is no vibration or any abnormal noises and it works smoothly.
- (2) Compare the current value during operation with the rated current value and check that the operating load is normal. Also, the discharge pressure, capacity and current value is on the level than ever before.
- (3) Check the liquid level in the suction tank. (The empty tank during operation = the pump damaged)

2. Periodical check

- (1) Periodically overhaul is recommended for a smooth operation.

Recommended period of periodical check:

Check every 12 months or every 10,000 hours, whichever comes first.

- (2) When replace or carrying pumps for repair, drain and wash the pump thoroughly.

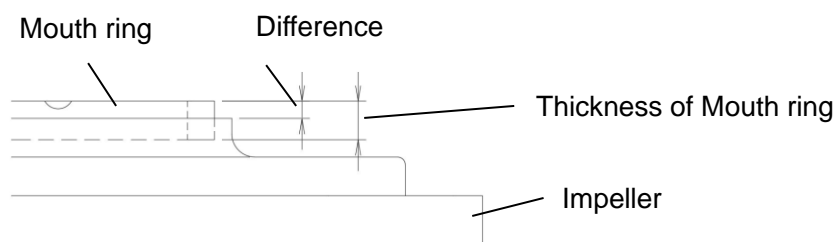
3. Consumable parts check

Periodically check the following consumable parts and replace them if necessary.

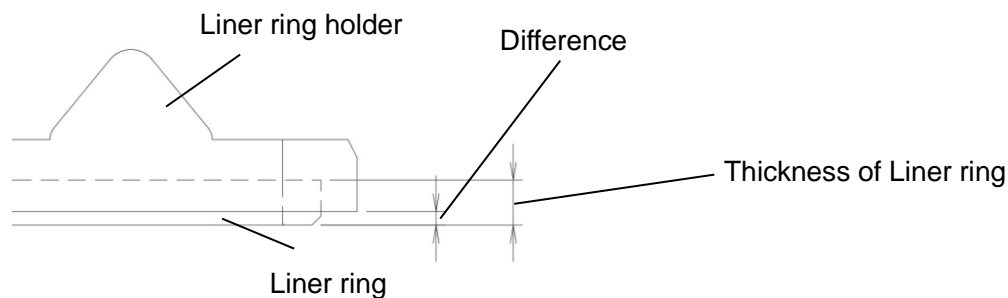
- (1) Mouth ring (No. 2-3)

Replace it if it has dents.

Check the wear volume as viewed from the front. (The limit difference is 0.5mm.)



- (2) Bearing (No. 2-2) The inner diameter of the new one is $\phi 12.1$.
Check no crack or damage.
Check that the rattle between the bearing and the shaft is not big. (The limit of the inner diameter is $\phi 12.5$.)
If the total abrasion with the shaft is 0.5mm and more, recommend replacing it.
- (3) Rear thrust ring (No.3-3)
If it has crack, damage or abrasion, replace it.
- (4) Pump shaft (No.3-2) The outer diameter of the new one is $\phi 12$.
Check no crack or damage.
Check that the rattle between the pump shaft and the bearing is big. (The limit of the outer diameter is $\phi 11.5$.)
If the total abrasion with the bearing is 0.5mm and more, recommend replacing it.
- (5) Liner ring (No.4-7)
Check no crack and damage on Alumina ceramic.
Check the abrasion of the liner ring. (The limit difference is 0.5mm.)



- (6) Impeller (No. 2-1)
If there are wear track or degradation by corrosion on the surface of the impeller, replace it.
- (7) Rear casing (No. 3-1)
If there is wear track or degradation by corrosion in and out of the rear casing, replace it.
- (8) Front casing (No.3-1)
If there is wear track or degradation by corrosion in and out of the front casing, replace it.
- (9) O-ring (No.3-4, 4-3, 4-12, 4-14, 4-15, 4-18, 4-21, 5-3, 7-1, 9-3, 10-2)
If the rubber cures, is less elastic or has cracks by the degradation or swollen, replace it.

4. Consumable parts replacement

Replace the following parts as set parts.

- (1) Front casing set
- (2) Rear casing set
- (3) Impeller set

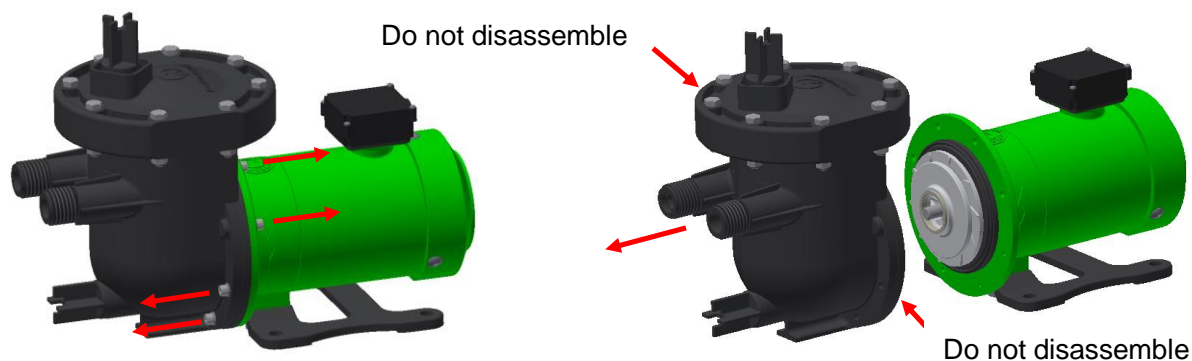
Refer to the list in the page 12 for the parts structure of each set.

Disassembly / Assembly YD-20**GV1 series

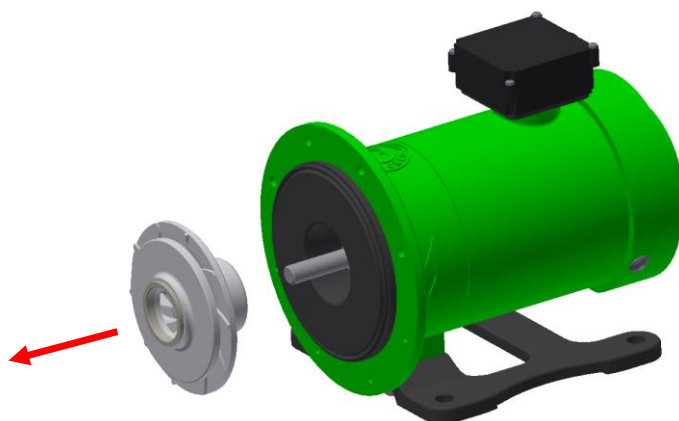
The magnet force to be used in a pump is powerful, be careful of it during disassembly or assembly. As well make sure to close the suction and discharge valves during them.

1. Disassembly

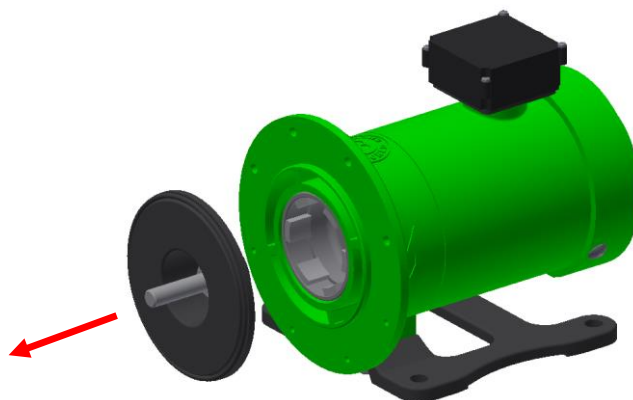
- (1) Drain the liquid remaining inside the pump and wash the interior thoroughly.
- (2) Remove 8 hex socket head cap bolts (M6) (No.4-9) and remove the front casing.
(Do not disassemble the front casing set to maintain the proper function.)



- (3) Pull the impeller out to forward. Do not scratch them with care.



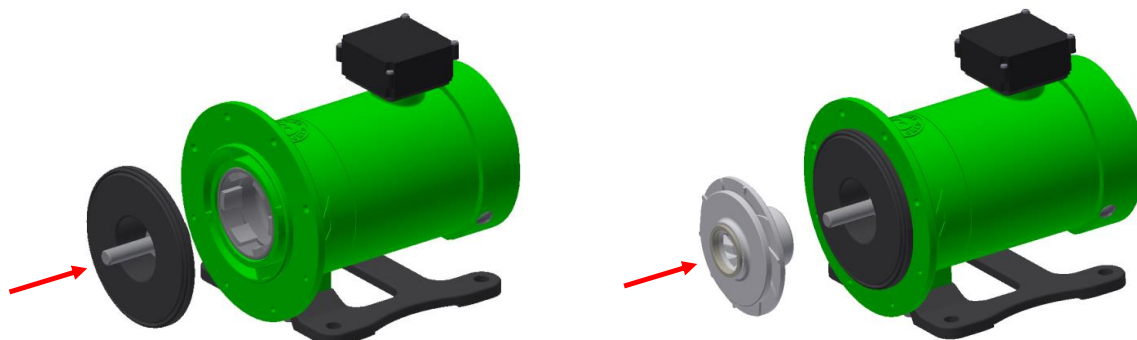
- (4) Lift slightly and move forward the rear casing (No.3-1) by sharps such as scraper which is put between the rear casing and motor (No. 6-1).



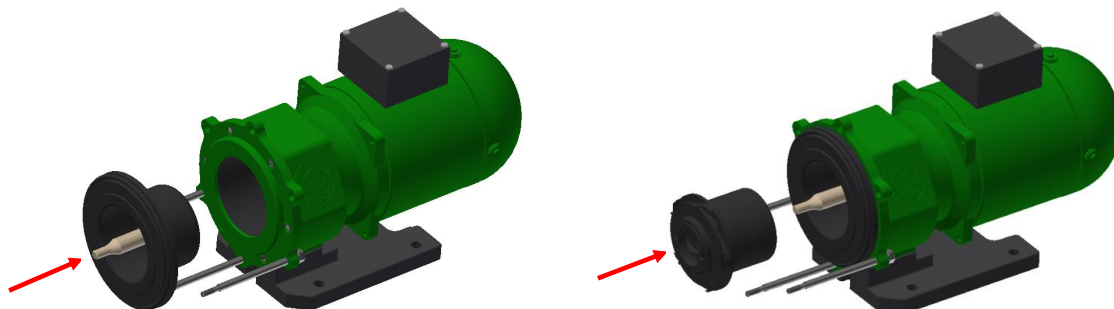
2. Assembly

The assemble order is as follows. Be careful not to put dirt or scratch on the sliding parts and O-rings. As well tighten the bolts evenly.

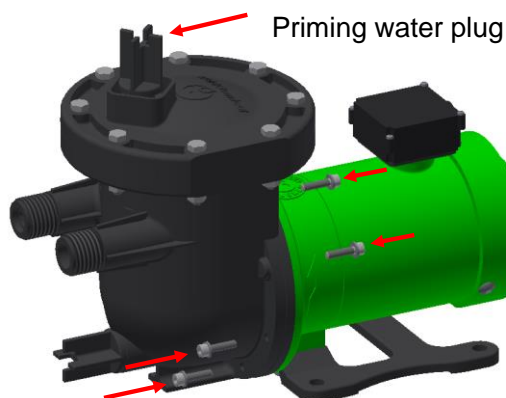
- (1) Install the rear casing (No.3-1), pump shaft (No.3-2) and the rear thrust ring (No.3-3) to the motor with bracket (No.6-1) attached with the outer magnet (No.6-2).



- (2) Attach the O-ring (No.3-4) to the rear casing (No.3-1) and assemble the front casing (No.4-1).



- (3) Tighten 8 hex. socket head cap bolts (M6) (No.4-9) with the required torque.
Required torque:
2.5N·m



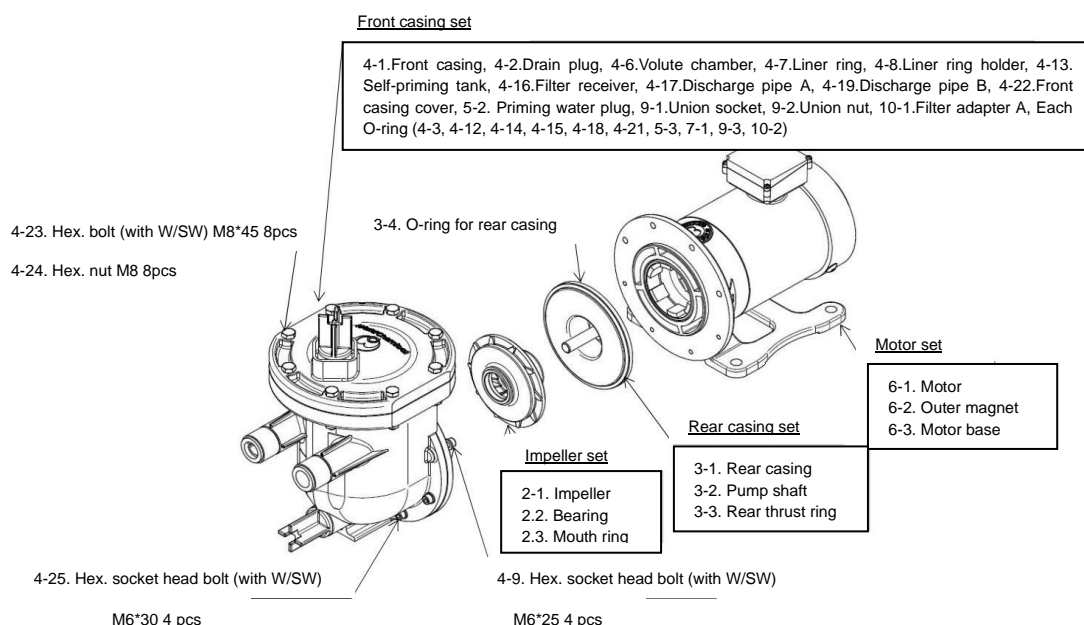
- (4) Install the pipe and pour the sufficient liquid (0.6L) from the priming water plug.

Note: At the time of disassembly or assembly, it is recommended to always replace new O-rings. After assembling, remove the motor fan cover and turn the fan by a hand to check that the impeller rotates smoothly.

<Rotating direction of the motor at the start.>

Check that the fan rotates clockwise as viewed from the motor fan cover at the start. If it is in reverse, switch two of the three phases in the three-phase power supply.

Exploded view YD-20**GV1 series

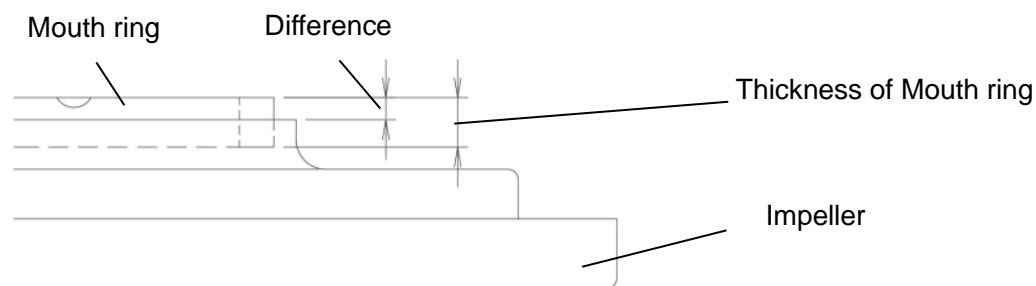


Maintenance / Consumable parts YD-250* / 400* / 500*GV(F)* series

1. Daily check
 - (1) Check that the pump works smoothly without vibration or any abnormal noises.
 - (2) Compare the current value during operation with the rated current value and check that the operating load is normal. Also, the discharge pressure, capacity and current value is on the level than ever before.
 - (3) Check the liquid level in the suction tank. (Operation without liquid in a tank causes the pump damaged.)
2. Periodical check
 - (1) Periodically overhaul is recommended for a smooth operation.
Recommended period of periodical check:
Check every 12 months or every 10,000 hours, whichever comes first.
 - (2) When replace or carrying pumps for repair, drain and wash the pump thoroughly.
3. Check the consumable parts periodically. If necessary, replace it.
The number is shown the parts number of the structure in the page 13.

(1) Mouth ring (No. 17)

Check the wear volume as viewed from the front. (The limit difference is 0.5mm.)



Replace the mouth ring if scratch or bump is shown.

(2) Bearing (No. 19) The inner diameter of the new one is $\phi 18$.

Check no crack or damage.

Check that the rattle between the bearing and the shaft is not big. (The limit of the inner diameter is $\phi 18.5$.)

If the total abrasion with the shaft is 0.5mm and more, recommend replacing it.

(3) Rear thrust ring (No.21)

Check no crack or damage.

(4) Shaft (No.20) The outer diameter of the new one is $\phi 18$.

Check no crack or damage.

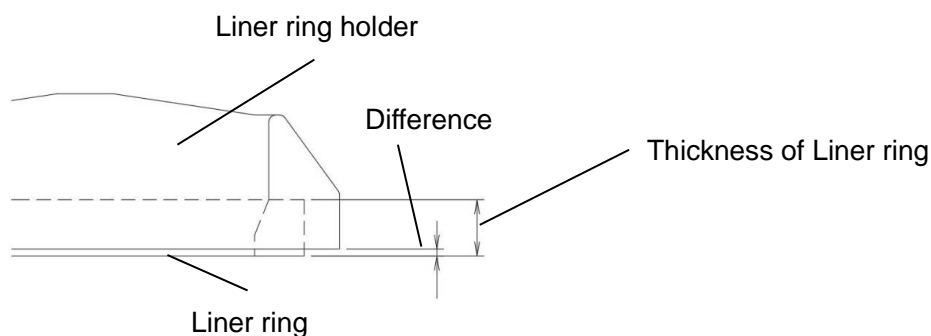
Check that the rattle between the pump shaft and the bearing is big. (Max. outer diameter is $\phi 17.5$.)

If the total abrasion with the bearing is 0.5mm and more, recommend replacing it.

(5) Liner ring (No.7)

Check no crack and damage on Alumina ceramic.

Check the abrasion of the liner ring. (The limit difference is 0.5mm.)



(6) Impeller (No. 18)

If there are wear track or degradation by corrosion on the surface of the impeller, replace it.

(7) Rear casing (No. 22)

Check no wear track or degradation by corrosion in and out of the rear casing, replace it.

(8) O-ring, Gasket (No. 10, 11, 12, 13, 14, 28)

If the rubber cures, is less elastic or has cracks by the degradation or swollen, replace it.

4. Consumable parts replacement

Replace the following parts as set parts.

(1) Front casing set

(2) Rear casing set

(3) Impeller set

(4) O-ring for casing (No. 28)

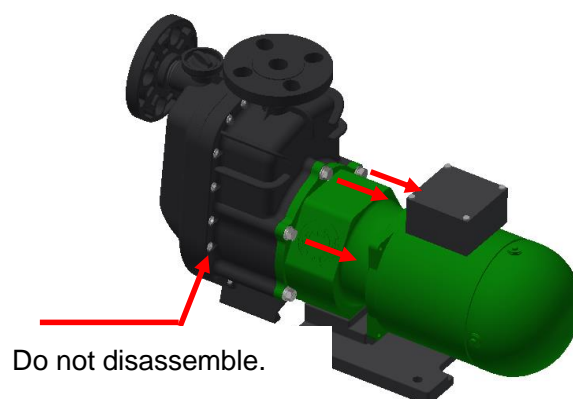
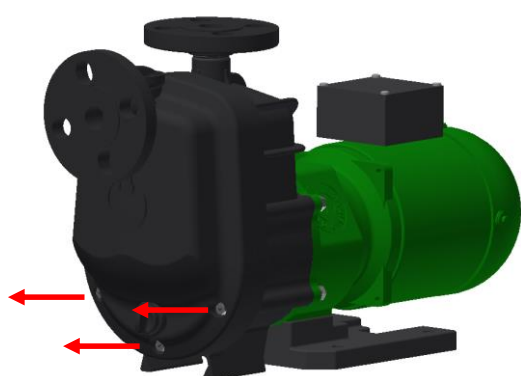
Refer to the list in the page 13 for the parts structure of each set.

Disassembly / Assembly YD-250* / 400* / 500*GV(F)* series

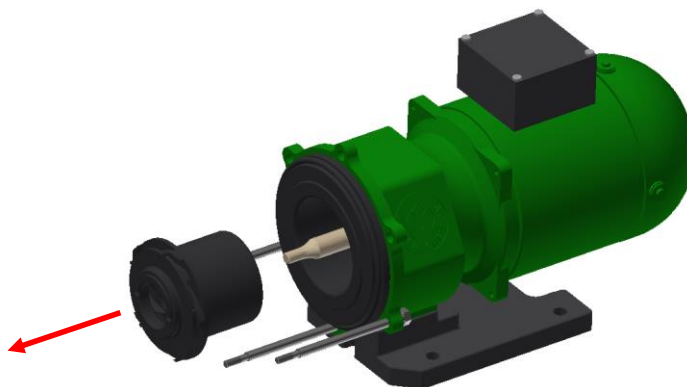
The magnet force to be used in the pump is powerful, so be careful of handling it during disassembly or assembly. As well make sure to close the suction and discharge valves during them.

1. Disassembly

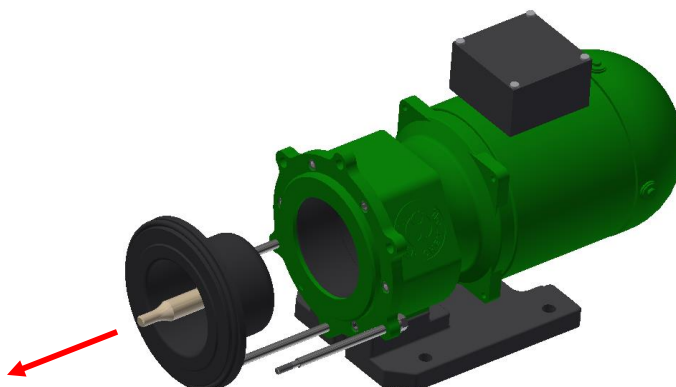
- (1) Drain the liquid remaining inside the pump and wash the interior thoroughly.
- (2) Remove hex. nuts (3 or 5 pcs) at the front of the casing and 3 hex. bolts (No. 29) and separate the front casing from the rear casing support (No. 23). (Do not disassemble the front casing set to maintain the proper function.)



- (3) Pull the impeller (No. 18) out to forward. Be careful not to scratch other parts.



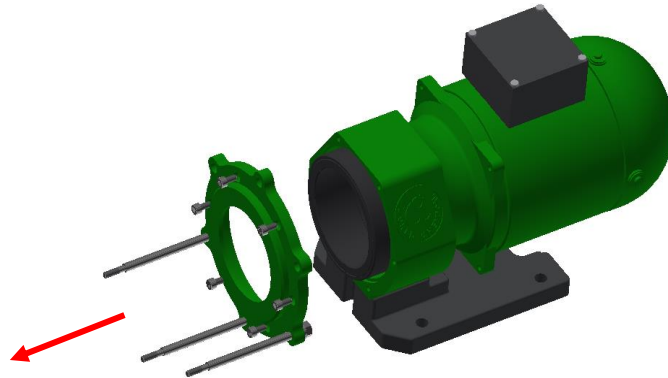
- (4) The rear casing (No.22) can be separated by pulling out forward by sharps such as scraper which is put between the rear casing and rear casing support (No.23).



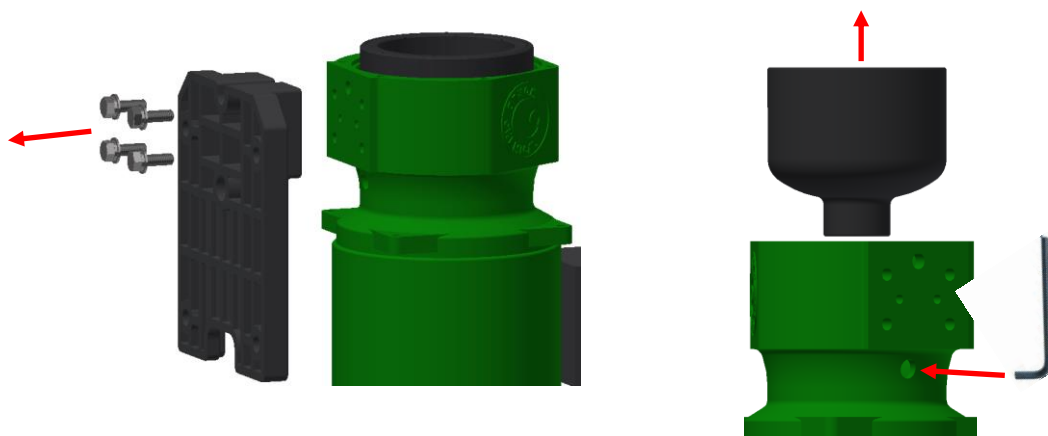
- (5) When the flange (No.9) is separated from the lap joint (No.8), hit the parts lightly by a plastic hammer without damage on the parts.



- (6) Remove M6 hex. socket head cap bolts (No.30) in the front which fix the motor bracket and rear casing support (No.23). Then, separate the rear casing from the motor bracket.



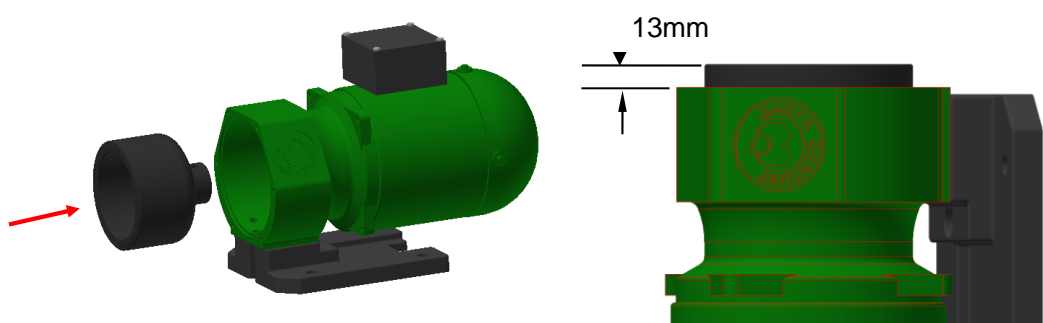
- (7) Remove M8 hex. socket head cap bolts (No.31) which fix the motor bracket and pump base (No.26). Then, separate the pump base from the motor bracket. Bolts are loosened and the outer magnet (No. 25) is separated by putting a hex. wrench into the holes on the side of the motor bracket and loosen the bolts.



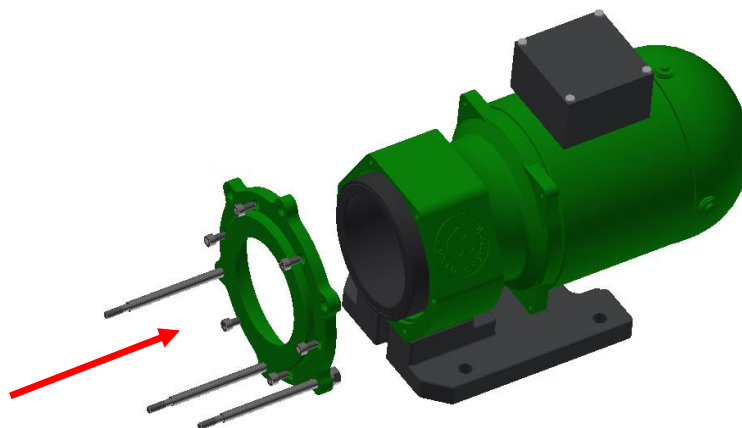
2. Assembly

Assembly is in the reverse order of the disassembly. Be careful not to get dirt or scratch the sliding parts and O-rings. As well tighten the bolts evenly.

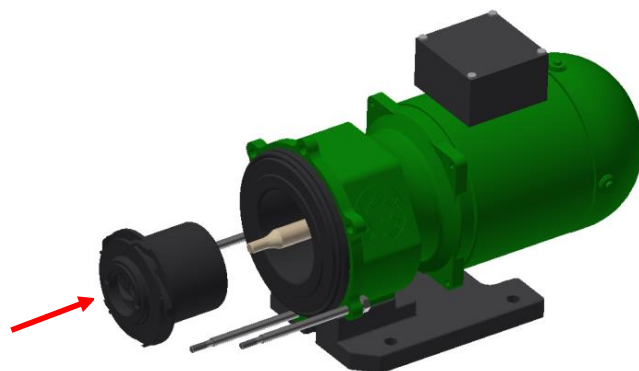
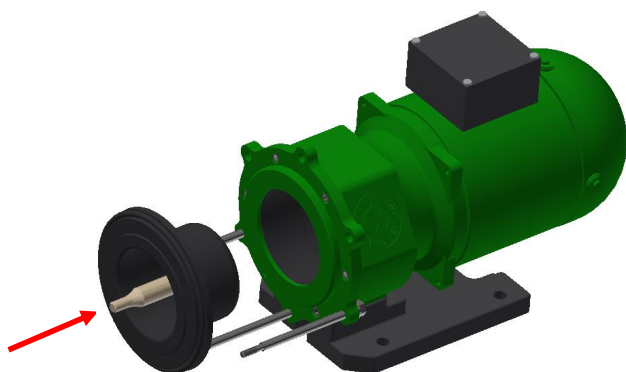
- (1) Assemble the outer magnet (No.25) with the motor (No.32). This time, adjust that the height of the bracket and outer magnet is 13 mm. (When the motor is exclusive, it is completed to push the shaft to the end.)



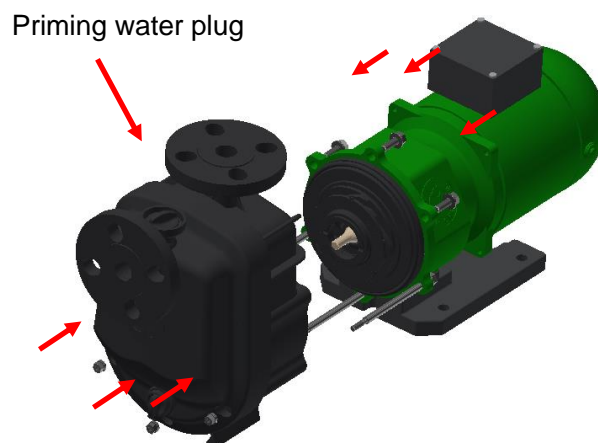
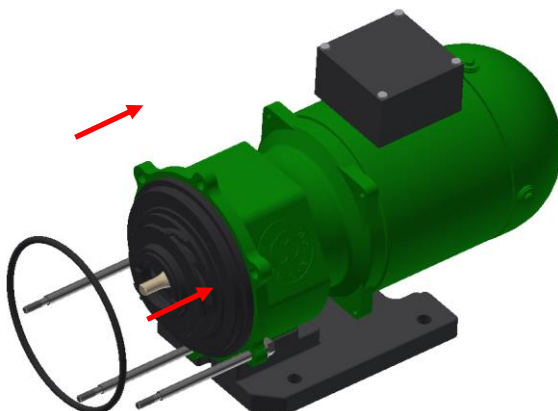
- (2) Fix the rear casing support (No.23) to the motor bracket with M6 hex. socket head cap bolts (No.30).



- (3) Place the rear casing (No.22) and insert the impeller (No.18) to the shaft (No.20) with care not to hold your hand.



- (4) Put the O-ring (No.28) to the rear casing (No.22) and assemble the front casing without the O-ring stuck.



- (5) Regarding the order of the bolts for casing, temporary fix 3 hex. bolts (No.29) on the back side of the casing. After that, tighten other bolts evenly. (Diagonally)

The recommended tightening torque is as follows.

Model	Torque
250*GV(F)*	7.0N·m
400*GV(F)3, 500*GV(F)3	10.0N·m

When all bolts are completely tightened, install the pump and pour sufficient priming liquid in it.

Note:

- (1) The magnet force is strong. Use the plastic or wood spacer not to get fingers.
- (2) When disassembly and re-assembly, it is recommended to replace new O-rings. If using the old O-rings, it may cause liquid leakage.
- (3) After assembly, remove the motor fan cover and rotate the fan by a hand. Check the impeller rotates smoothly.

<Rotating direction>

Check that the fan rotates clockwise as viewed from the motor fan cover at the start. If it is in reverse, switch two of the three phases in the three-phase power supply.

Assembling the pump with standard off-the-shelf motor

- (1) Put the standard off-the-shelf motor on the workbench with the motor shaft-side up. The opposite side of terminal box should be located right in front of you.



- (1)' Only for 5HP
Insert and tighten the screws to secure the bracket firmly to the motor mounting plate.
Screws: CAP M10x20 4pcs.



- (2) Tighten the stud bolts into the holes of the rear casing support.
Hex. Nuts:
2500-2502GV(F) --- M6 5pcs.
4001-5003GV(F) --- M8 5pcs.



- (3) Insert and tighten the bolts with washers to secure the bracket (with mounting plate for 5HP) to the motor. The base installation side of the bracket should be located at the opposite side of the terminal box.

Bolts and washers:

2500GV(F) --- Hex. Bolts M8x25 4pcs.

Spring washers M8 4pcs

2501-5003GV(F) --- Hex. Bolts M10x25
4pcs.

Spring washers M10

4pcs.

5005GV(F) --- Hex. Bolts M12x30 4pcs.

Spring washers M12 4pcs.

- (4) Insert the motor shaft into the hole of the outer magnet until the upper face of the outer magnet has located at 13mm (0.5 inches) above the upper surface of bracket.

Insert two screws into the fixing holes of outer magnet with hex wrench from the hole (see arrow) of the bracket. Tighten them to secure the outer magnet to the motor shaft.

- (5) Tighten the bolts to secure the base to the bracket.

Screws: 2500-2502GV(F) --- CAP
M8x25(W/SW) 4sets

The following bolts should be installed with the base joint.

4001-4003GV(F) --- CAP M8x35 (W/SW)
4sets

5002-5003GV(F) ---CAP M8x45 (W/SW)
4sets

5005GV(F) --- CAP M8x30 (W/SW) 4sets

- (6) Tighten the screws to secure the rear casing support to the bracket. The stud bolts side should be located at the base side.

Screws: CAP M6x12 6pcs.



- (7) Install the rear casing into the opening of the rear casing support. Carefully insert the impeller set into the rear casing along the pump shaft. There is a strong magnetic attraction between the impeller and the outer magnet. Do not pinch your fingers. Then, install the O-ring to the rear casing.

O-rings:

2500-2502GV(F) --- P-140

4001-4003GV(F) --- G-160



- (8) Insert the front casing along the stud bolts. Tighten the bolts to secure the casing to the rear casing support.

Bolts:

For rear casing support (Common use)

Hex. Bolts M8x25 (W/SW) 3sets

For front casing

2500-2502GV(F) --- Hex. Nuts M6 (W/SW)

5sets

4001-5005GV(F) --- Hex. Nuts M8 (W/SW)

5sets



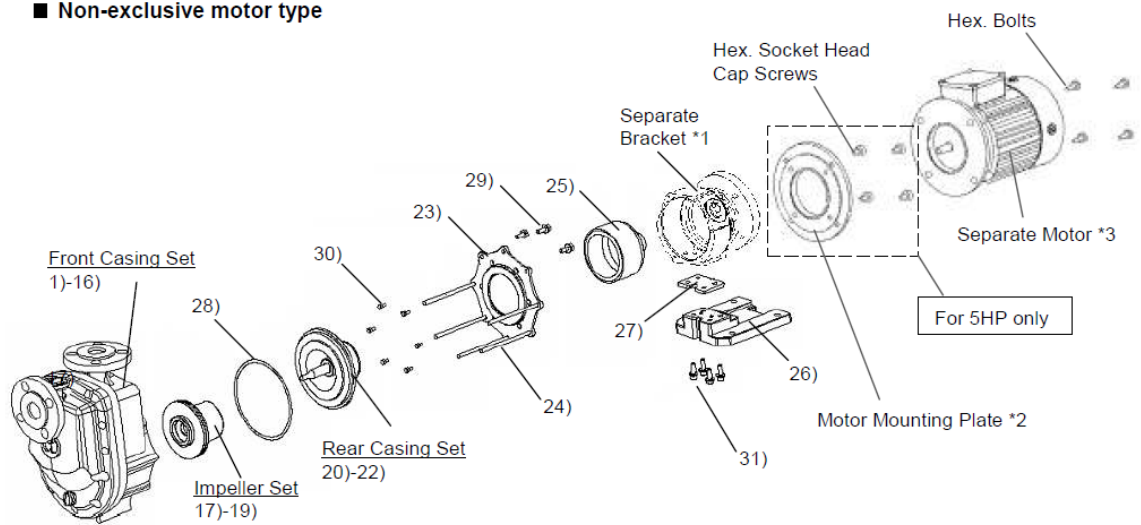
Assembling the pump delivered without separate motor

- (1) Remove the Hex. Nuts (M6 or M8, 5pcs.) on the front side of the casing (lower part), and Hex. Bolts (M8x25, 3pcs.) on the rear side (upper part). Separate the casing, rear casing support and bracket from each other.
- (2) Remove the pump base from the bracket.
- (3) Fix the bracket to the motor (see (3) on P25), and insert the motor shaft into the outer magnet. (see (4) on P26)
- (4) Assemble the rest parts in the same procedure of "2-3. Assembling the pump with standard off-the-shelf motor" from (5) on P26.

The following is the NEMA frame No. and the motor bolt size for the NEMA motor used in the U.S.A.

Model	HP	NAMA frame	Motor bolt size	Qty
2500GV	3/4	56C	3/8" x 1.5"	4
2501GV(F)	1			
2502GV(F)	2			
4002GV(F)	2			
4003GV(F)	3			
5003GV(F)	3	184TC	1/2" x 1"	
5005GV(F)	5			

■ Non-exclusive motor type



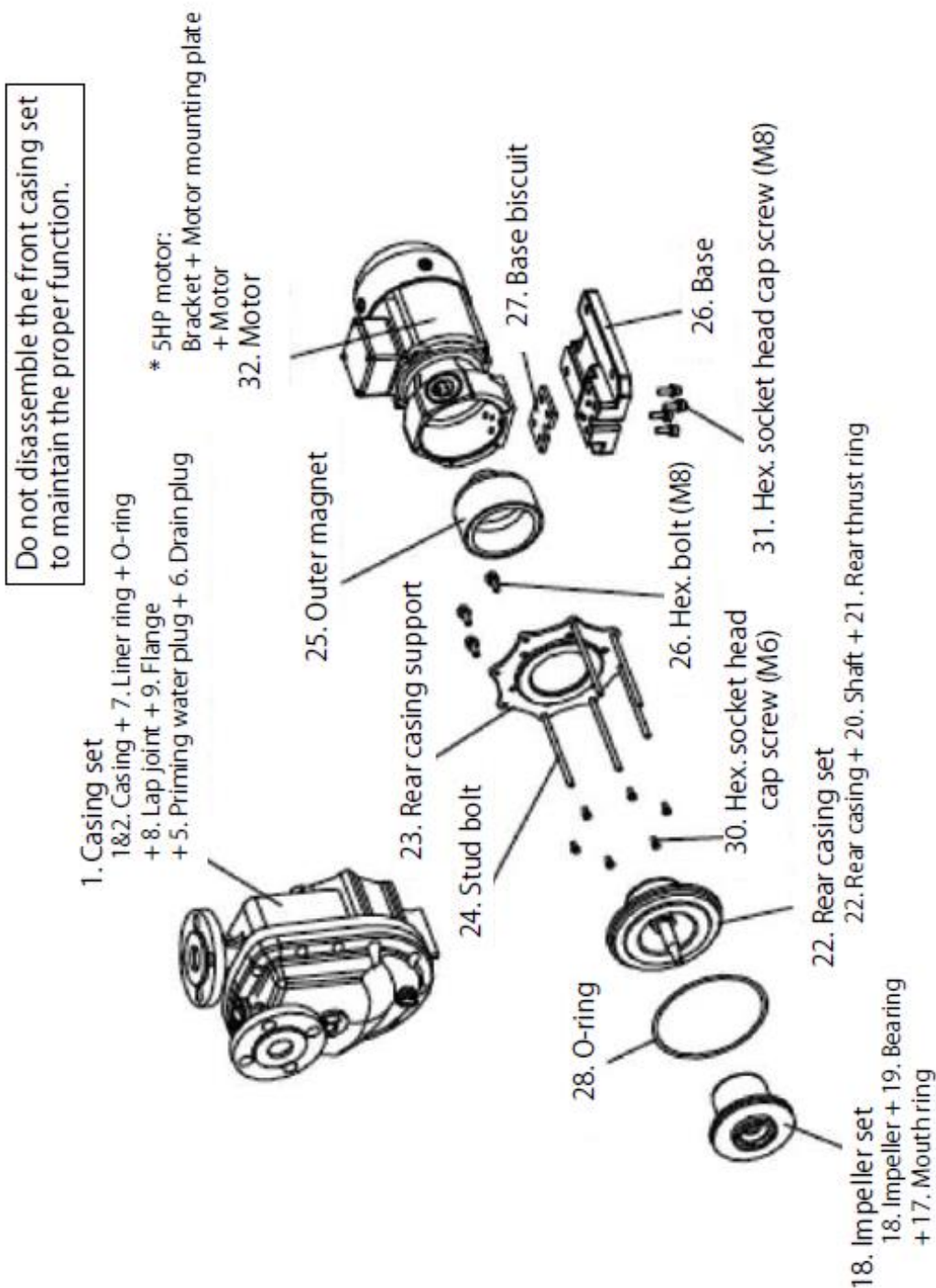
*1: Separate bracket is used for non-exclusive motor as an individual part.
(Separate NEMA bracket is used for the US version.)

*2: For 5HP motor, a motor mounting plate (FC) is added between the separate bracket and motor.
(NEMA motor mounting plate is used for the US version.)

*3: Separate NEMA motor is used for the US version.

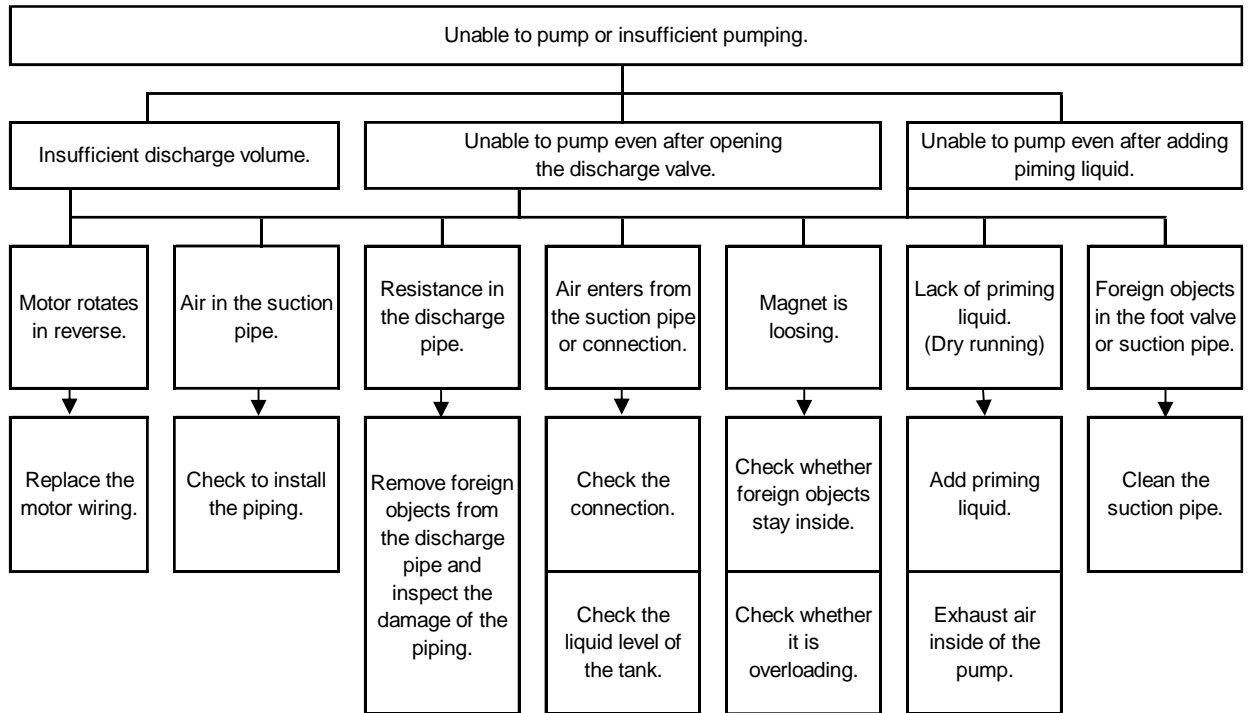
Exploded view

250* / 400* / 500*GV(F) series

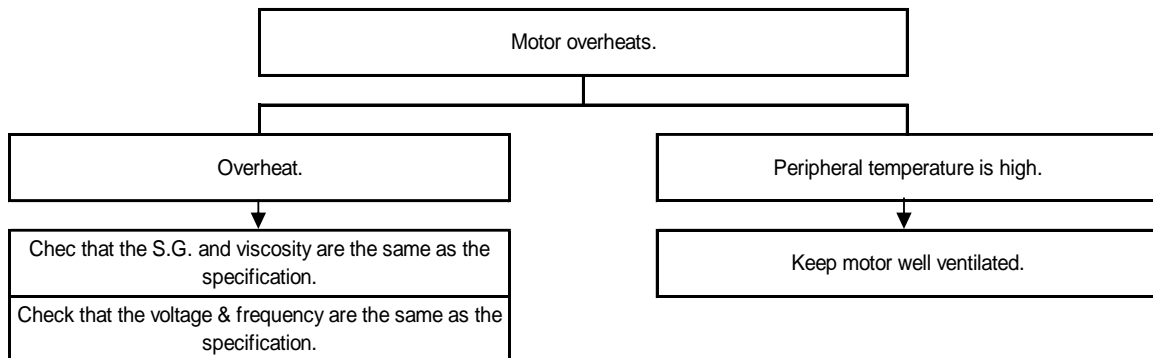


Troubleshooting

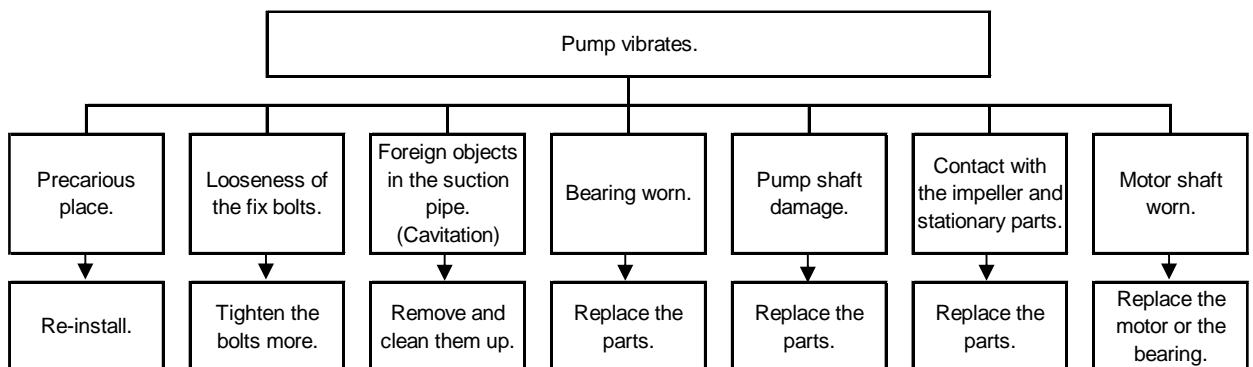
1. Pump up failure and insufficient pumping.



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 / damage for 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 gasket 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 (P10, P11). Although, inform the parts' number and material, too.

Installation record

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



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