

CORROSION RESISTANT MAGNETIC Self-Priming PUMP

Super MAG

YD-250/251/252GV(F) Series
YD-401/402/403GV(F) Series
YD-502/503/505GV(F) Series

INSTRUCTION MANUAL

Version: 110415



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.



TABEL OF CONTENTS

PREFACE	1
TABEL OF CONTENTS	1
SAFETY PRECAUTION (To be observed at all times).....	2
WARNING	2
CAUTION	3
INSPECTION WHEN UNPACKING THE PUMP.....	5
MODEL DESCRIPTION.....	5
SPECIFICATION	8
OUTLINE DIMENSION	10
PARTS DESCRIPTION	13
CAUTION WHEN HANDLING	15
CAUTION WHEN INSTALLING, LAYING PIPES.....	16
CAUTION WHEN OPERATING	19
MAINTENANCE INSPECTION, CONSUMABLE PARTS.....	21
DISMANTLING AND ASSEMBLING	23
EXPLODED VIEW	28
TROUBLESHOOTING	29
WARRANTY PERIOD AND COVERAGE	31
REPAIR	31
CONTACT INFORMATION	33




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 could occur when its contents are ignored or the pump is used improperly.

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


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

	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) Dangerous liquids, and dangerous surroundings.






When using the pump to move dangerous liquids or when using in surroundings (only explosion prevention specifications) Liable to cause explosions, you must adhere to facility standards determined by law and always conduct daily check-ups to look for and prevent leakage. If the pump is operated under abnormal conditions, such as usage during a liquid leak, it could lead to serious accidents such as explosion or fire and personal injury. Please follow the manufacturer’s instructions for handling liquid agents.

-  (2) Do not use damaged or modified pumps.



Do not use the pump if it has been damaged or modified. World chemical is not be responsible for any accident or damage of any kind caused by the user remodeling the pump without first obtaining permission or instruction from World Chemical.








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

Always use the hoist bolt for pumps that come with them. For pumps without hoist bolts, hoist them carefully while watching the weight balance by using a belt sling. This operation must be performed by qualified personnel and the slings to be used should have sufficient strength. Do no carry pumps by hand as even the lightest pump weights more than 18kg (40lbs.), and could cause accidents.

-  (4) Do not inspect or dismantle the pump or the motor with the power on.
Do not inspect or dismantle the pump or motor with the power turned on. This could lead to personal injuries from electric shock or from getting caught in the rotor. Work should be performed only after verifying that multiple safety precautions have been taken, such as the switch for main power supply is off, the operation switch is off, and the hand switch for the pump is off.
-  (5) Connecting grounding line.
Using the pump without attaching the ground line from the motor could cause electric shock. The grounding operation must be performed by a qualified person in accordance with electric facilities technical standards and interior wiring regulations.
-  (6) Protecting the power supply cord.
Stretching, pinching or otherwise damaging the power supply cords or motor lead wires could cause fire or electric shock. Always replace the cover of the terminal box before use.
-  (7) Installing Ground Fault Interrupter (GFI)
Electric shock might result if the pump is used without attaching ground fault interrupter device. Protect the pump from accidents and damages caused by current overload by always attaching circuit breakers, over-current protection devices and/or other protective devices.
-  (8) Caution when removing pump
Before removing the pump from piping, close the intake and discharge pipe valves and verifying there are no liquid leaks. Drain all liquid from the pump. Always wear protective gear when performing these operations as direct contact with the fluids could cause injuries.

CAUTION

-  (1) Unspecified use.
Do not use the pump for purposes other than those specified on the nameplate. Verify the power specification of motor (phase, voltage and frequency) prior to wiring the motor. Unspecified use could cause personal injuries or damage to the pump and peripheral equipment.
-  (2) Restrictions on persons handling the pump.
Transportation, installation, wiring, operation, servicing, and inspection should be performed only by an expert who has full knowledge of the handling the pump.

-  (3) Opening package.
Before opening the package verify that the top side of the package is up. When opening a wooden crate, be careful to avoid injury from nails and silvers when removing the product.
-  (4) Ventilation.
Do not obstruct ventilation of the motor. This could cause the motor to overheat. If handling toxic or odorous liquids, have the pump situated in a well-ventilated place to prevent poisoning.
-  (5) Repairs and returning the pump.
In the event of a pump failure, contact World Chemical or your nearest sales agent for repairs. If the pump is to be returned for repairs, decontaminate and clean interior and exterior of the pump before returning.
-  (6) Regarding thermoplastic (resin) parts.
The pump is made of thermoplastic resin material. Therefore, it could cause injuries if it becomes damaged through impact with other objects. Refrain from having people hit a pump against any objects. Attach piping support to avoid any pipe load stress on the pump.
-  (7) Verifying rotation direction of the motor and starting the pump.
Verify the direction of rotation when initially starting up the pump. Open the intake and discharge valves first, and check that there is no liquid leakage from the pipe connection. Verify the pipe is emptied of air and the pump is filled with liquid, and then, turn on the switch for a split second to check the direction of rotation. If the rotation reversed, switch two of the three phases in the three phase power supply to change the direction of rotation. Turn off the power supply and confirm that it is safe before switching the two phases.
-  (8) Disposing of scrapped pump.
When disposing a scrapped pump, thoroughly flush any hazardous materials from the pump and discard as industrial waste in accordance with the law.
-  (9) Leak protection.
Always take appropriate preventative measure to safeguard against liquid leaks in the event of a breakdown of the pump or piping.

INSPECTION WHEN UNPACKING THE PUMP

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

1. Check to see if the model, total head, capacity, motor specification and voltage specification on the pump and motor nameplates comply with the ordered specifications.

* Please note US version indicates Max.

TDH (ft.) and capacity (gpm) for the nameplate.

2. Check for all auxiliary parts.
3. Check for any loose bolts or any damages caused by mishandling during transportation.



MODEL DESCRIPTION

YD – 251 GV – CD 6 – G
 (1) (2) (3) (4) (5)

- (1) Bore Diameter / Motor Output

(1) Fig.	(2) Fig.	Suction	Discharge	Motor Output
250	GV	25A (1")	25A (1")	0.4kW - 1/2HP*
251	GV, GVF	25A (1")	25A (1")	0.75kW - 1HP
252	GV, GVF	25A (1")	25A (1")	1.5kW - 2HP
401	GV, GVF	40A (1.5")	40A (1.5")	0.75kW - 1HP
402	GV, GVF	40A (1.5")	40A (1.5")	1.5kW - 2HP
403	GV, GVF	40A (1.5")	40A (1.5")	2.2kW - 3HP
502	GV, GVF	50A (2.0")	50A (2.0")	1.5kW - 2HP
503	GV, GVF	50A (2.0")	50A (2.0")	2.2kW - 3HP
505	GV, GVF	50A (2.0")	50A (2.0")	3.7kW - 5HP

* 0.55kW (3/4HP) in the U.S.

- (2) Material for Casing
 GV: GFR PP
 GVF: CFR ETFE

(3) Bushing Material / O-ring Material

(3) Fig.	Bushing	O-ring
CD	Carbon	FPM
CE	Carbon	EPDM
AD	Alumina Ceramic	FPM
AE	Alumina Ceramic	EPDM
TT	*Specialized Material	*Specialized Material

* Specialized Material: Materials specially ordered by the customer.

(4) Operating frequency for Motor

5: 50Hz

6: 60Hz

(5) Limitation of Specific Gravity

None: Standard specific gravity for GV

F: Standard specific gravity for GVF

G: High specific gravity

(3) Fig.	250GV		251GV		252GV	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
None	1.05	1.05	-	1.1	-	-
G	-	-	2.0	1.8	-	2.0

(5) Fig.	401GV		402GV		403GV	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
None	1.1	-	-	1.1	-	-
G	-	-	1.8	-	-	1.4

(5) Fig.	502GV		503GV		505GV	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
None	1.1	-	1.1	1.1	-	1.2
G	-	-	1.4	-	1.8	1.6

(5) Fig.	251GVF		252GVF	
	50Hz	60Hz	50Hz	60Hz
F	-	1.1	-	-
G	2.0	1.6	-	1.8

(5) Fig.	401GVF		402GVF		403GVF	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
F	1.1	-	-	1.1	-	-
G	-	-	1.6	-	-	1.3

(5) Fig.	502GVF		503GVF		505GVF	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
F	1.1	-	1.1	1.1	-	1.1
G	-	-	1.4	-	1.8	1.6

SPECIFICATION

■GV Series

Model	Bore In x Out	Motor output kW (HP)	Standard Specified Point m-L/min						Max. TDH & Capacity*1 gpm & ft.		Weight		
			50Hz			60Hz			60Hz		w/o motor kg *2	w/o motor kg *3	w/o NEMA motor lbs*4
			m-L/min	S.G.	S.G. Symbol	m-L/min	S.G.	S.G. Symbol	gpm.	ft.			
250GV	25A (1") x 25A(1")	0.4 (1/2) *5	8-80	1.05	None	8-80	1.05	None	32	41	18.5	10.2	25.8
251GV		0.75 (1)	8-80	2.0	G	8-80	1.8	G	30	43	20.5	11.6	27.3
252GV		1.5 (2)	-	-	-	12-110	2.0	G	42	65			
401GV	40A (1.5") x 40A (1.5")	0.75 (1)	11-160	1.1	None	-	-	-	-	-	22.5	13.1	30.6
402GV		1.5 (2)	11-160	1.8	G	17-200	1.1	None	81	84	26.5	13.9	32.4
403GV		2.2 (3)	-	-	-	17-200	1.4	G	92	87	29	13.9	32.4
502GV	50A (2") x 50A (2")	1.5 (2)	17-200	1.1	None	-	-	-	-	-	29.5	20.0	45.9
503GV		2.2 (3)	17-200	1.4	G	18-250	1.1	None	110	98	32	20.0	45.9
		18-250	1.1	None	-	-	-	-	-				
505GV	3.7 (5)	18-250	1.8	G	18-250	1.6	G	115	103	53	20.0	45.9	
	28-200	1.2	None	131	115								

*1: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

*2: These figures indicate the weight of pump with the exclusive motor (Japan standard motor).
Weight varies with motor type and manufacturer.

*3: These figures indicate that the weight of pump without separate motor, but including separate bracket.

*4: These figures indicate that the weight without NEMA motor, but including separate NEMA bracket.

*5: 0.55kW (3/4HP) in the U.S.

■ GVF Series

Model	Bore In x Out	Motor output kW (HP)	Standard Specified Point m-L/min						Max.TDH & Capacity*1 gpm & ft.		Weight		
			50Hz			60Hz			60Hz		w/o motor kg *2	w/o motor kg *3	w/o NEMA motor lbs*4
			m-L/min	S.G.	S.G. Symbol	m-L/min	S.G.	S.G. Symbol	gpm.	ft.			
251GVF	25A (1") x 25A (1")	0.75 (1)	8-80	2.0	G	8-80	1.6	G	30	42	23	12.5	29.3
12-100						1.1	F	41	62				
252GVF		1.5 (2)	-	-	-	12-105	1.8	G	42	64	27	13.0	30.4
401GVF	40A (1.5") x 40A (1.5")	0.75 (1)	10-110	1.1	F	-	-	-	-	-	25	14.9	34.6
402GVF		1.5 (2)	11-160	1.6	G	15-200	1.1	F	79	76	29	15.3	35.5
403GVF		2.2 (3)	-	-	-	16-200	1.3	G	85	85	31.5	15.3	35.5
502GVF	50A (2") x 50A (2")	1.5 (2)	15-200	1.1	F	-	-	-	-	-	32.5	22.0	50.3
503GVF		2.2 (3)	17-200	1.4	G	17-250	1.1	F	111	93	35	22.0	50.3
			17-250	1.1	F								
505GVF	3.7 (5)	18-250	1.8	G	18-250	1.6	G	116	100	56	22.0	50.3	
					23-300	1.1	F	124	111				

*1: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

*2: These figures indicate the weight of pump with the exclusive motor (Japan standard motor).
Weight varies with motor type and manufacturer.

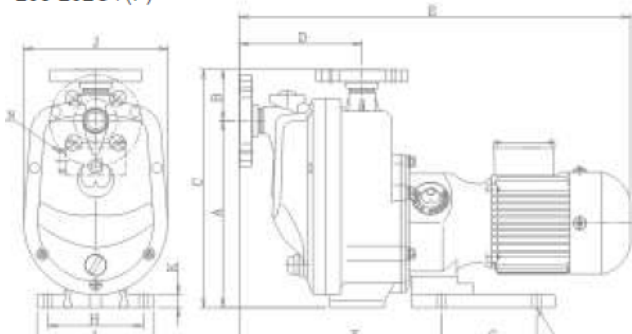
*3: These figures indicate the weight of pump without separate motor, but including separate bracket.

*4: These figures indicates that the weight without NEMA motor, but including separate NEMA bracket.

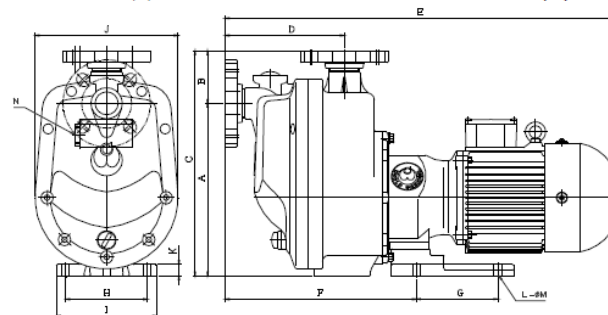
OUTLINE DIMENSION

■ Exclusive motor type (Japan standard motor)

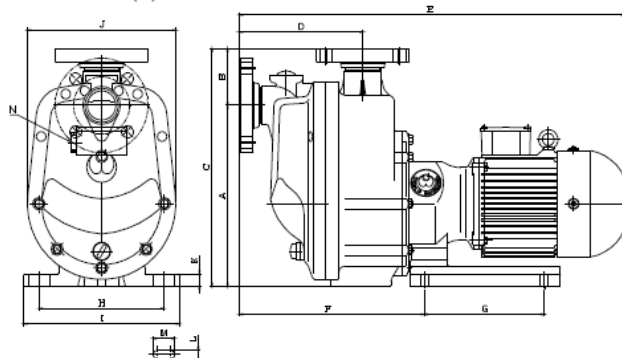
250-252GV(F)



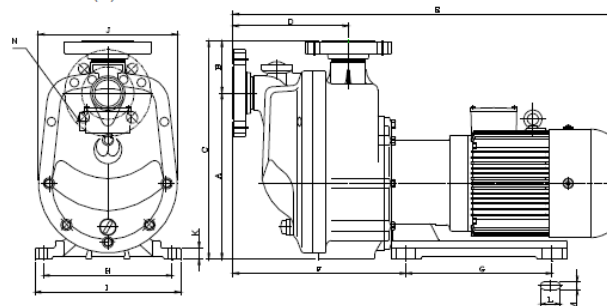
401-403GV(F)



502-503GV(F)



505GV(F)



Model	A	B	C	D	E	F	G	H	I	J	K	L-Φm	n
250GV					533 (20.98)								
251GV	255 (10.04)	70 (2.76)	325 (12.80)	167 (6.57)	562	275 (10.83)	130 (5.12)	130 (5.12)	160 (6.30)	196 (7.72)	18 (0.71)	4-φ 12 (φ 0.47)	PF 3/4
251GVF					(22.13)								
252GV					592								
252GVF					(23.31)								
401GVF					592								
401GVF					(23.31)								
402GV	276 (10.87)	84 (3.31)	360 (14.17)	190 (7.48)		305 (12.01)	130 (5.12)	130 (5.12)	160 (6.30)	228 (8.98)	18 (0.71)	4-φ 12 (φ 0.47)	PF 3/4
402GVF					622								
403GV					(24.49)								
403GVF													
Model	A	B	C	D	E	F	G	H	I	J	K	4-LxM	
502GV													
502GVF					643		200	208				14 (0.55)	
503GV	296 (11.65)	93 (3.66)	389 (15.31)	206 (8.11)	643	309 (12.17)	200 (7.87)	208 (8.19)	260 (10.24)	248 (9.76)	20 (0.79)	X 36 (1.42)	PF 3/4
503GVF					(25.31)								
505GV					713								
505GVF					(28.07)		261 (10.28)	230 (9.06)				36 (1.42) x 14 (0.55)	

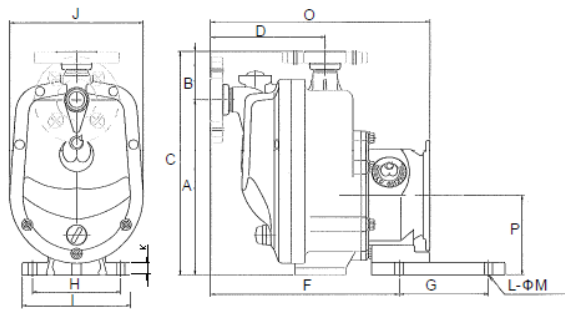
* Length of "E" varies with motor type and manufacturer.

Note:

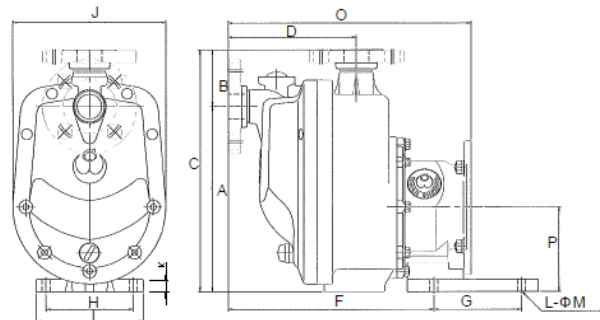
- Above figures indicate the measurement of pump with the exclusive motor (Japan standard motor).
The total length of the pump varies with motor type and manufacturer.
- Measurements are subject to change without notice.

■ Pump without separate motor

250-252GV(F)

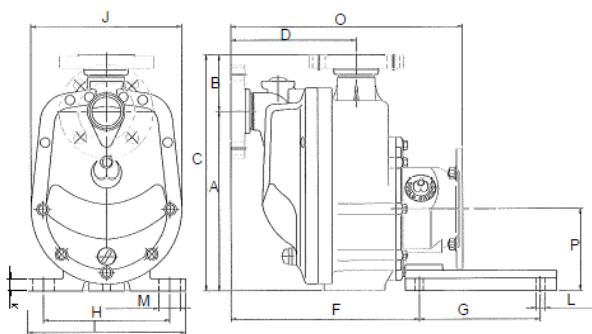


401-403GV(F)

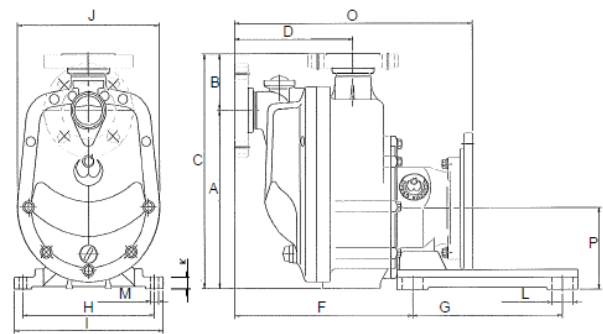


Unit: mm (in)

502-503GV(F)



505GV(F)



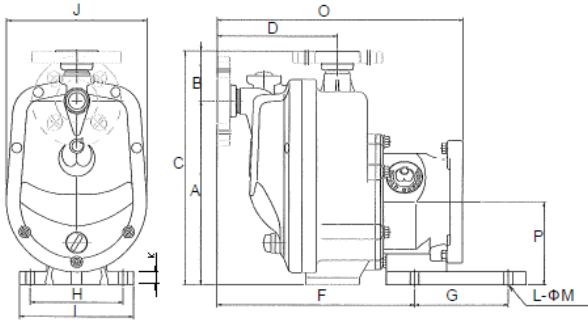
Model	A	B	C	D	F	G	H	I	J	K	L-Φm	O	p
250GV													
251GV 251GVF	255 (10.04)	70 (2.76)	325 (12.80)	167 (6.57)	275 (10.83)	130 (5.12)	130 (5.12)	160 (6.30)	196 (7.72)	18 (0.71)	4--φ 12 (φ 0.47)	320 (12.60)	115 (4.53)
252GV 252GVF													
401GVF 401GVF													
402GV 402GVF	276 (10.87)	84 (3.31)	360 (14.17)	190 (7.48)	305 (12.01)	130 (5.12)	130 (5.12)	160 (6.30)	228 (8.98)	18 (0.71)	4--φ 12 (φ 0.47)	360 (14.17)	125 (4.92)
403GV 403GVF													
Model	A	B	C	D	F	G	H	I	J	K	4-LxM	O	P
502GV 502GVF						200 (7.87)	208 (8.19)				14 (0.55) X 36 (1.42)	381 (15.00)	
503GV 503GVF	296 (11.65)	93 (3.66)	389 (15.31)	206 (8.11)	309 (12.17)			260 (10.24)	248 (9.76)	20 (0.79)			135 (5.31)
505GV 505GVF						261 (10.28)	230 (9.06)				36 (1.42) x 14 (0.55)	413 (16.26)	

Note:

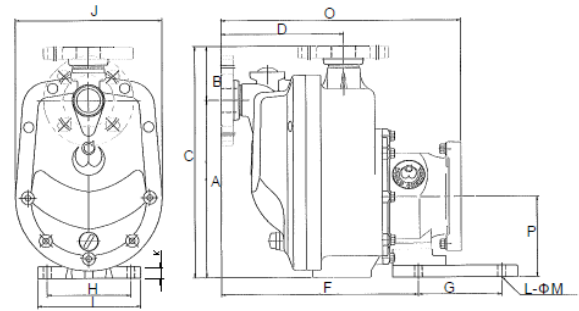
1. Above figures indicate the measurement of pump without separate motor, but including separate bracket.
2. Measurements are subject to change without notice.

■ Pump without separate NEMA motor

250-252GV(F)

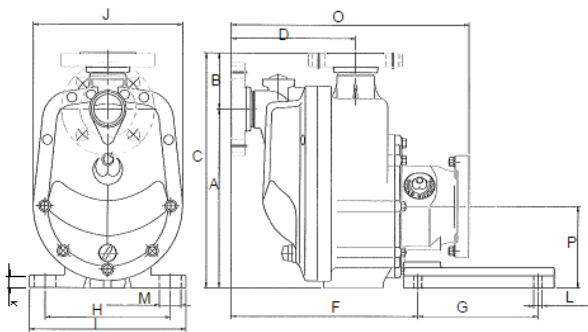


401-403GV(F)

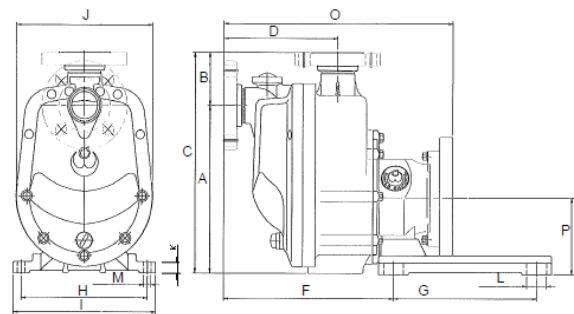


Unit: mm (in)

502-503GV(F)



505GV(F)

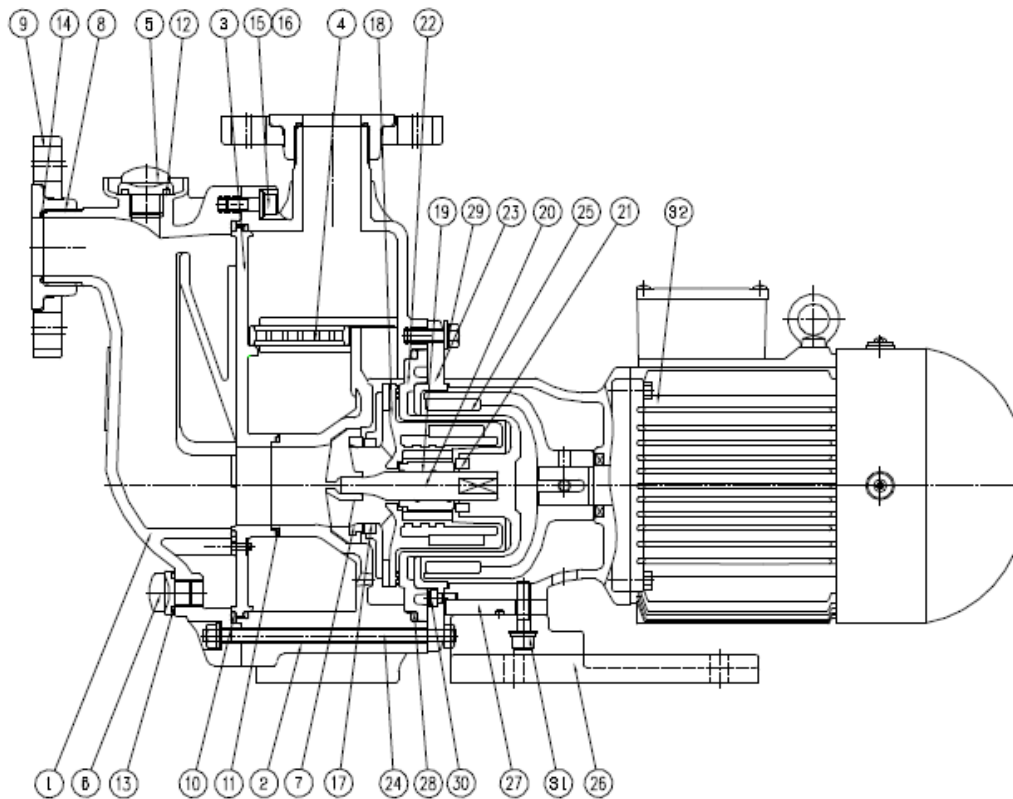


Model	A	B	C	D	F	G	H	I	J	K	L-Φm	O	p
250GV													
251GV 251GVF	255 (10.04)	70 (2.76)	325 (12.80)	167 (6.57)	275 (10.83)	130 (5.12)	130 (5.12)	160 (6.30)	196 (7.72)	18 (0.71)	4--φ 12 (φ 0.47)	320 (12.60)	115 (4.53)
252GV 252GVF													
401GVF 401GVF													
402GV 402GVF	276 (10.87)	84 (3.31)	360 (14.17)	190 (7.48)	305 (12.01)	130 (5.12)	130 (5.12)	160 (6.30)	228 (8.98)	18 (0.71)	4--φ 12 (φ 0.47)	360 (14.17)	125 (4.92)
403GV 403GVF													
Model	A	B	C	D	F	G	H	I	J	K	4-LxM	O	P
502GV 502GVF						200 (7.87)	208 (8.19)				14 (0.55) X 36 (1.42)	381 (15.00)	
503GV 503GVF	296 (11.65)	93 (3.66)	389 (15.31)	206 (8.11)	309 (12.17)		260 (10.24)	248 (9.76)	20 (0.79)				135 (5.31)
505GV 505GVF						261 (10.28)	230 (9.06)				36 (1.42) x 14 (0.55)	413 (16.26)	

Note:

1. Above figures indicate the measurement of pump without separate NEMA motor, but including NEMA bracket.
2. Measurements are subject to change without notice.

PARTS DESCRIPTION



No.	Set parts Name	Parts Name	Qty	Material		Remarks
				YD-GV	YD-GVF	
1	Front Casing Set	Suction Casing	1	GFR PP	CFR ETFE	
2		Discharge Casing	1	GFR PP	CFR ETFE	
3		Separating Board	1	GFR PP	CFR ETFE	
4		Porous Plate	1	GFR PP	CFR ETFE	
5		Priming Plug	1	GFR PP	CFR ETFE	
6		Drain Plug	1	GFR PP	CFR ETFE	
7		Shaft Support	1	Alumina Ceramic + GFR PPS	Alumina Ceramic + CFR ETFE	
8		Lap Joint	2	GFR PP	CFR ETFE	
9		Flange	*1	GFR PP	GFR PP (black)	
10		Packing	1	(EPDM/FPM)		
11		O-ring	1	(EPDM/FPM)		
12		O-ring	1	(EPDM/FPM)		
13		O-ring	1	(EPDM/FPM)		
14		O-ring	2	(EPDM/FPM)		
15		Hex. Socket Head Cap Screws	4	SUS (M6/M8)		M6: 250-252GV(F)
16		Hex. Socket Head Cap Screws	10	SUS (M6/M8)		M6: 250-252GV(F)

No.	Set parts Name	Parts Name	Qty	Material		Remarks
				YD-GV	YD-GVF	
17	Impeller Set	Mouth ring	1	CFR PTFE		
18		Impeller		GFR PP + PP + Magnet	CFR ETFE + Magnet	
19		Bearing		Carbon/ Alumina Ceramic + GFR PPS	Carbon/ Alumina Ceramic + CFR ETFE	
20	Rear Casing Set	Shaft	1	Alumina Ceramic		
21		Rear Thrust Ring		Alumina Ceramic		
22		Rear Casing		GFR PP	CFR ETFE	
23	Rear Casing Support Set	Rear Casing Support	1	FC200		
24		Stud bolts	3/5	SUS		3 pcs: 250-252GV(F)
25		Outer Magnet	1	FCD450-10 + Magnet		
26		Base	1	GFR PP / FC200		FC200: 5HP only
27		Base Joint	1	FC200		Not used for 250-252GV(F), 505GV(F)
28		O-ring	1	(EPDM/FPM)		
29		Hexagonal Bolts	3	SUS M8 x 25		
30		Hex. Socket Head Cap Screws	6	SUS M6 x 12		
31		Hex. Socket Head Cap Screws	4	SUS M8		
32		Motor with bracket	1	FC200 + Alumina Frame Motor for exclusive motor		

*1: Components of those set parts are described only for design feature, and not available as spare parts.

Note:

1. Bracket is an integral parts of the exclusive motor (Japan standard motor) that can not be separated each other.
2. Separate bracket is used for non-exclusive motor as an individual part. For 5HP motor, a motor mounting plate (FC) is added between the separate bracket and motor.

CAUTION WHEN HANDLING

Because of the powerful magnetic force of this pump, extra precaution is necessary in addition to the normal precaution taken for conventional pumps. Normal precautions include no dry running and no operating the pump in reverse rotation.

1. People with pacemakers and other electronic devices for maintaining bodily functions must not use this magnet pump. The magnet used in the interior is several times more powerful than ordinary magnets used every day.
2. Do not place your hand between the magnets. If there are articles made of iron such as knives, scissors or heavy iron masses nearby, the magnet could attract to them in an instant, causing injury to the hand holding the article or causing the plastic surrounding the magnets to crack.
3. Do not place products that could be easily de-magnetized such as floppy disks, computer memory and magnetic tapes close to the pump.

Prohibited on Conventional Magnet Pumps

1. No Dry Running

If the pump is run dry, the heat from the friction between the shaft and bushing could cause the resin materials around the shaft and bushing to be deformed. This could cause the impeller to eccentrically rotate and the resin material to come in contact with other parts, damaging the pump.

- If the pump is operated without priming water, dry running will occur.

2. Slurry Liquid

Slurry liquid can not be handled by the magnet pump. Even if the density of slurry is very low, it will increase wear and tear of the pump, thus shortening the replacement period of pump and parts to an extreme degree.

(Please consult with us first when using liquid containing slurry.)

3. Cavitation*

If the pump is used in a state where "cavitation" has occurred, it could cause the pump to vibrate or its basic performance to deteriorate, causing damage to the interior of the casing.

- Some of the possible causes include 1) the intake pipe is too long or too small, 2) there are many bent sections, and 3) the liquid temperature is too high or the strainer is clogged.

* Cavitation is a phenomenon that occurs when air bubbles are generated when the fluid pressure is reduced partially due to the movement of fluid. (When the air bubbles collapse, they cause a shock which leads to erosion of the inner face or insufficient performance, generating noise and vibration.)

- The pipe conditions call for using two or more pumps that are parallel to one another. When a check valve is installed also place a bypass for air exhaust on the lower section of the check valve.

(4) Create bending sections or expansion joints on the piping to prevent pump deformation and leakage caused by thermal expansion of pipe.

(5) Handle the pump with care and avoid any impact, as the main parts within the pump are made of thermoplastic resin.

(6) Arrange the pipe flange surface and the pump flange surface parallel to one another and do not tighten the bolts excessively.

Bolt: M16, tightening torque: 19.6N·m or 200kgf·cm (14.45lbw-ft)

(7) Connect the pipes to pump at the correct installation positions. Connecting them at an unfitted position can break the pump casing.

2. Do not apply weight on the pipes.

(1) The weight of the pipes should be completely supported by pipe support apparatuses.

(2) Create bending sections and use expansion joints on the pipes so that the pump will not be burdened with load from the thermal expansion of the pipe when the temperature is high (more than 40°C or 104°F).

(3) Avoid using metal pipes. Use thermoplastic resin pipes only.

* Be careful with (2) and (3) as metal pipes are frequently used for concentrated sulfuric acid and caustic acid.

3. Drain Ditch.

(1) Arrange a drain ditch so that the leaked chemical can flow into the wastewater pit.

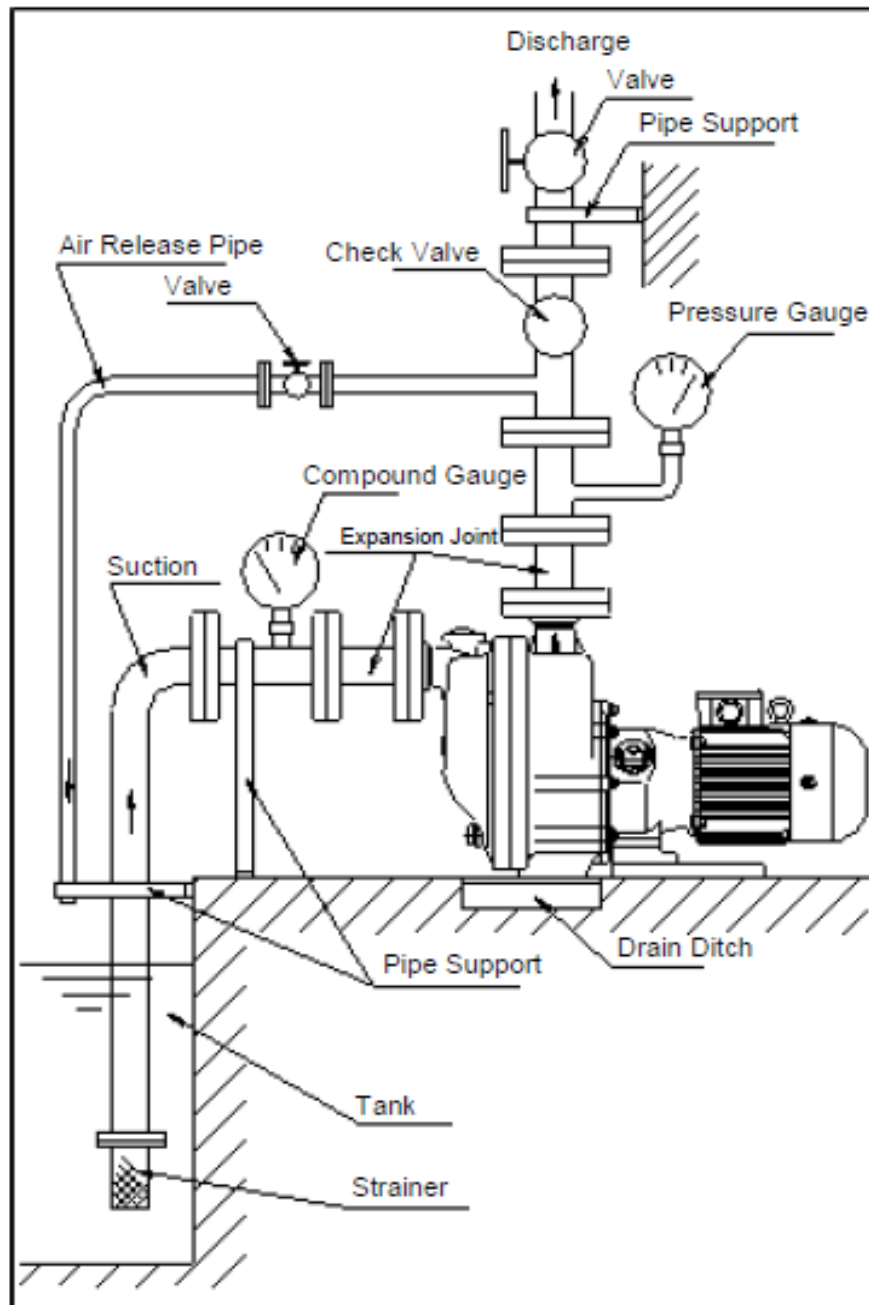
(2) Place a drain pan instead of a drain ditch, if a drain ditch can not be set up.

4. Caution when priming.

Tighten the priming plug firmly when priming the pump. If operating the pump as the priming plug stays loosen, self-priming becomes nearly impossible.

Type	Minimum priming water
25*GV(F)	2.0L
40*GV(F)	3.0L
50*GV(F)	4.0L

Recommended Example of Laying Pipes



CAUTION WHEN OPERATING

1. Before starting operation.

- (1) Clean inside the pipes and tank. The performance of the pump deteriorates if foreign objects enter the pump, causing a breakdown.
- (2) Remove the priming plug at the top of the suction casing to fill the interior of the pump with liquid and let out the air inside the pump. It is not necessary to prime the pump with liquid after the initial priming, as the pump has a structure to leave priming liquid in the casing automatically when stopping the operation.
- (3) Verify that the flange connector bolt is connected firmly. A loose bolt could cause leakage, and streaming liquid could cause injury to people and damage to the facilities and other equipment.
- (4) Verify the rotation direction of motor is clockwise when facing the fan end of the motor. If the motor is turning in reverse, rewire two phases of the three-phase power supply (take safety precautions to ensure the power is off before rewiring). Prime the pump with liquid again before operation, as the priming liquid will be lost after the reverse rotation of the motor.
- (5) Check and re-tighten the drain plug before operation. Looseness of the drain plug at the start of operation could cause deterioration of its self-priming performance, leading to damage of the pump.

2. Do not run dry

As the parts in friction are designed to be cooled by pumped liquid through self-circulation, dry running the pump could damage its parts. Therefore, do not run pump dry. In the event the pump is run dry, do not suddenly pour liquid in it. Allow the pump to stand 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. In the event liquid is sealed accidentally (intake, discharge valve both closed), the temperature and pressure within the pump will increase to high levels. If the pump is dismantled and inspected in this state, steam and hot fluid could spew out. Because of the danger involved, perform these operations only after the temperature fully declines. Be careful not to operate the pump with its liquid sealed, as this could damage the pump, requiring replacement.

4. There are differences in vapor pressure, viscosity, and corrosiveness depending on the temperature of the liquids handled when using the pump. Allow a certain margin of temperature when using the pump.

Scope of liquid temperature for using the pump:

GV: 0 – 70°C (32 – 158F°)

GVF: 0 – 60°C (32 – 140F°)

The maximum suction lift and self-priming time vary depending on the temperature of the liquid. Take suction lift capabilities into consideration when selecting pumps for high temperature liquids.

5. In the event the specific gravity and viscosity of the fluid being pumped increases, the pump's performance capacity, efficiency, and power input rating will change. Take this into consideration and use within an appropriate margin of leeway.
6. The pump has been made to operate under specifications decided at the time of purchase. In the event you decide to change the specification conditions, verify pump compatibility with our company first.
7. When the liquid to be used is prone to foam, self-priming ability is greatly decreased. Please take this into the consideration.
8. Frequent on/off switching
Frequent switching on/off of a pump could hasten pump damage. Do not turn on the pump more than six times in an hour.
9. Minimum flow rate
Note that GV and GVF series have a minimum flow rate requirement specified according to the pump model. Operate pumps at flow rate higher than the minimum flow rate stated below.
0.4* - 0.75kW (1/2* -1HP): 10L/min (38gpm)
1.5 – 3.7kW (2 – 5HP): 20L/min (79gpm)
* 0.55kW (3/4HP) in the U.S.

10. the limited capacity to resist pressure

Be careful that discharged pressure of the pump does not exceed the following limits.

Type	25*GV	40*GV	50*GV	25*GVF	40*GVF	50*GVF
The limited capacity (Mpa)	0.32	0.41	0.53	0.32	0.41	0.45

MAINTENANCE INSPECTION, CONSUMABLE PARTS

1. Routine Inspection

- (1) Verify that there are no vibrations or any abnormal noises from the pump and that it operates smoothly.
- (2) Compare current value during operation with the rated current value and verify that the operating load of the motor is normal. Also, verify whether the discharge pressure, discharge volume and current value during operation are usual values of previous operations.
- (3) Inspect the surface level of the intake tank. (Pump operation with no liquid in the intake tank will cause pump breakdown).

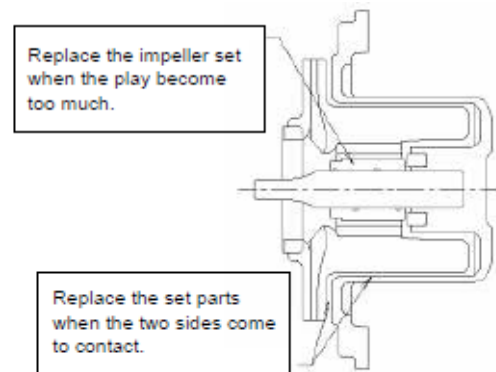
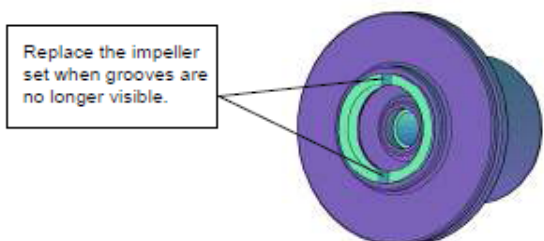
2. Periodic Inspection

- (1) Periodically overhaul the pump to ensure a smooth operation.
- (2) Completely drain the pump and wash with water for safety purposes when moving the pump to change installation sites or for repairs.

3. Inspection of Consumable Parts

Periodically inspect the following consumable parts, and replace them if necessary.

- (1) Front Casing (No.1 & 2 on "PARTS DESCRIPTION")
 - Replace the front casing set if there are signs of wear and tear and deterioration from corrosion in the front casing. (Do not dismantle the front casing set to maintain the proper function.)
- (2) Shaft support (No.7)
 - Check for cracks or chips on the alumina ceramics.
- (3) Mouth Ring (No.17)
 - Mouth ring has two grooves on its surface initially. Replace the impeller set when the mouth ring is worn out so that the grooves are no longer visible.
- (4) Impeller (No.18)
 - Replace the impeller set if there are signs of wear, tear and corrosion on the surface surrounding it.
- (5) Bearing (No.19)
 - Check for cracks or chips.
 - Verify that there is not too much play between the shaft and the bearing.



- (6) Shaft (No.20)
 - Check for cracks or chips.
- (7) Rear Thrust Ring (No.21)
 - Check for cracks or chips.
- (8) Rear Casing (No.22)
 - Examine the interior of the rear casing for signs of wear and tear and deterioration caused by corrosion, and look for wear and tear and or cracks on the rear side of the rear casing.
- (9) O-ring for casing (No.12, 13, 28)
 - When the rubber stiffens loses its elasticity or cracks, exchange the part accordingly.

4. Replacement of Consumable Parts

Replace a set part listed below when the component is damaged. Components of those set parts are not available as spare parts.

- (1) Front Casing set
 - Suction Casing + Discharge Casing + Separating Board + Porous Plate + Priming Plug + Drain plug + Shaft Support + Lap Joint + Flange + Packing (No.10) + O-ring (No.11-14) + Hex. Socket Head Cap Screws (No.15, 16)
- (2) Impeller set
 - Impeller + Mouth ring + Bearing
- (3) Rear Casing set
 - Rear Casing + Rear Thrust Ring + Shaft

DISMANTLING AND ASSEMBLING

Be careful when handling the magnet used in the pump during dismantling or assembling as its magnetic force is powerful. Also, when dismantling or assembling the pump, completely close the intake and discharge valves.

1. Dismantling

- (1) Drain the liquid remaining inside the pump and wash the interior of the pump thoroughly.
- (2) Remove the hexagonal nuts (3 or 5) on the front side of the casing and hexagonal bolts (3) on the back side of the casing, and remove the casing from the rear casing support. (Do not dismantle the front casing set to maintain the proper function.)
- (3) Remove the impeller by pulling forward. Be very careful when handling, so as not to damage the sections.
- (4) The rear casing can be easily removed by inserting something sharp- edged such as a scraper between the circumference section of the rear casing and the rear casing support, lightly lifting it up and removing it forward.
- (5) When removing the flange from the front casing, tap the flange lightly with a resin hammer for removing it from the lap joint, so as not to damage the resin part.

2-1. Assembling

Assemble the pump following these procedures. Clean the friction parts and o-ring thoroughly so that the surface is not damaged. Tighten the bolts for each section uniformly.

Caution:

- (1) Use plastic or wooden spacers to avoid catching hands and fingers between parts, as the magnetic force of the magnet used in the pump is very powerful.
- (2) When re-assembling the pump after it has been dismantled, it is recommended that the o-ring be replaced. If the o-ring is used in its deformed shape, it could cause liquid leakage.
- (3) After assembling the pump, remove the motor fan cover and turn the fan to ensure that the impeller rotates smoothly.

2-2. Assembling the pump with exclusive motor (Japan standard motor)

- (1) Insert the motor shaft into the hole of the outer magnet until the upper face of the outer magnet has located at 13 mm (0.05 inches) above the upper surface of bracket. (see (4) on P26)
- (2) Tighten the screws to secure the rear casing support to the bracket. (see (6) on P26)
- (3) 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. (see (7) on P26)
- (4) Install the O-ring to the rear casing. Insert the front casing (see (7) on P26) along the stud bolts. Tighten the bolts to secure the casing to the rear casing support. (see (8) on P27)

(5) After tightening all the screws, bolts and nuts, connect the pump to the piping. Then, prime the pump sufficiently through the priming cock.

* Note that tightening all bolts is the following torque.

Type	The tightening torque
25*GV	7.0N·m
25*GVF	6.5N·m
40*GV, 50*GV	10.0N·m
40*GVF, 50*GVF	7.0N·m

2-3. 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:

250-252GV(F) --- M6 5pcs.

401-503GV(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:

250GV(F) --- Hex. Bolts M8x25 4pcs.

Spring washers M8 4pcs

251-503GV(F) --- Hex. Bolts M10x25 4pcs.

Spring washers M10 4pcs.

505GV(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 (0.05 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: 250-252GV(F) --- CAP M8x25(W/SW) 4sets

The following bolts should be installed with the base joint.

401-403GV(F) --- CAP M8x35 (W/SW) 4sets

502-503GV(F) ---CAP M8x45 (W/SW) 4sets

505GV(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:

250-252GV(F) --- P-140

401-403GV(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

250-252GV(F) --- Hex. Nuts M6 (W/SW) 5sets

401-505GV(F) --- Hex. Nuts M8 (W/SW) 5sets



2-4. Assembling the pump delivered without separate motor

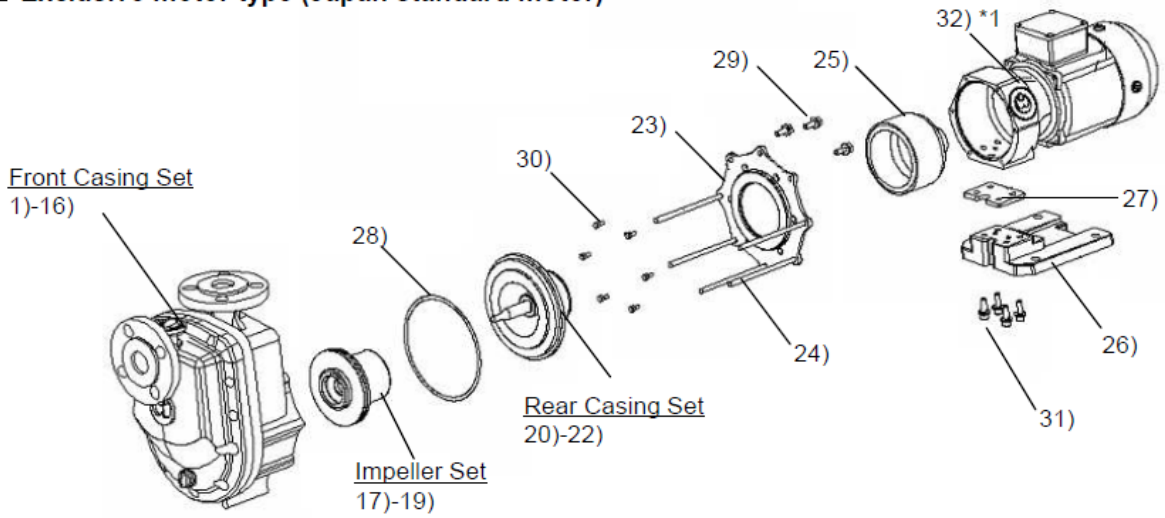
- (1) Remove the Hex. Nuts (M6 or M8, 5pcs.) on the front side of the casing (lower part), and Hex. Bolts (M8x25, 3pcs.) on the rear side (upper part). Separate the casing, rear casing support and bracket from each other.
- (2) Remove the pump base from the bracket.
- (3) Fix the bracket to the motor (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.

Model	HP	NEMA frame	Motor bolt size	Q'ty
250GV	3/4	56C	3/8" x 1.5"	4
251GV(F)	1			
252GV(F)	2			
402GV(F)	2			
403GV(F)	3			
503GV(F)	3			
505GV(F)	5	184TC	1/2" x 1"	

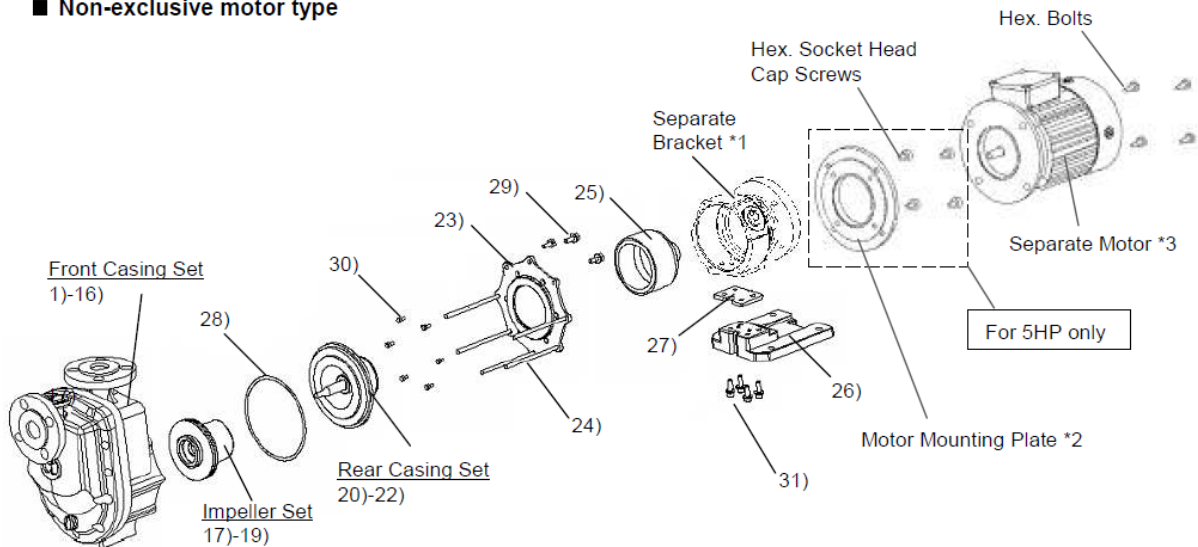
EXPLODED VIEW

■ Exclusive motor type (Japan standard motor)



* Bracket is an integral part of the exclusive motor that can not be separated each other.

■ Non-exclusive motor type

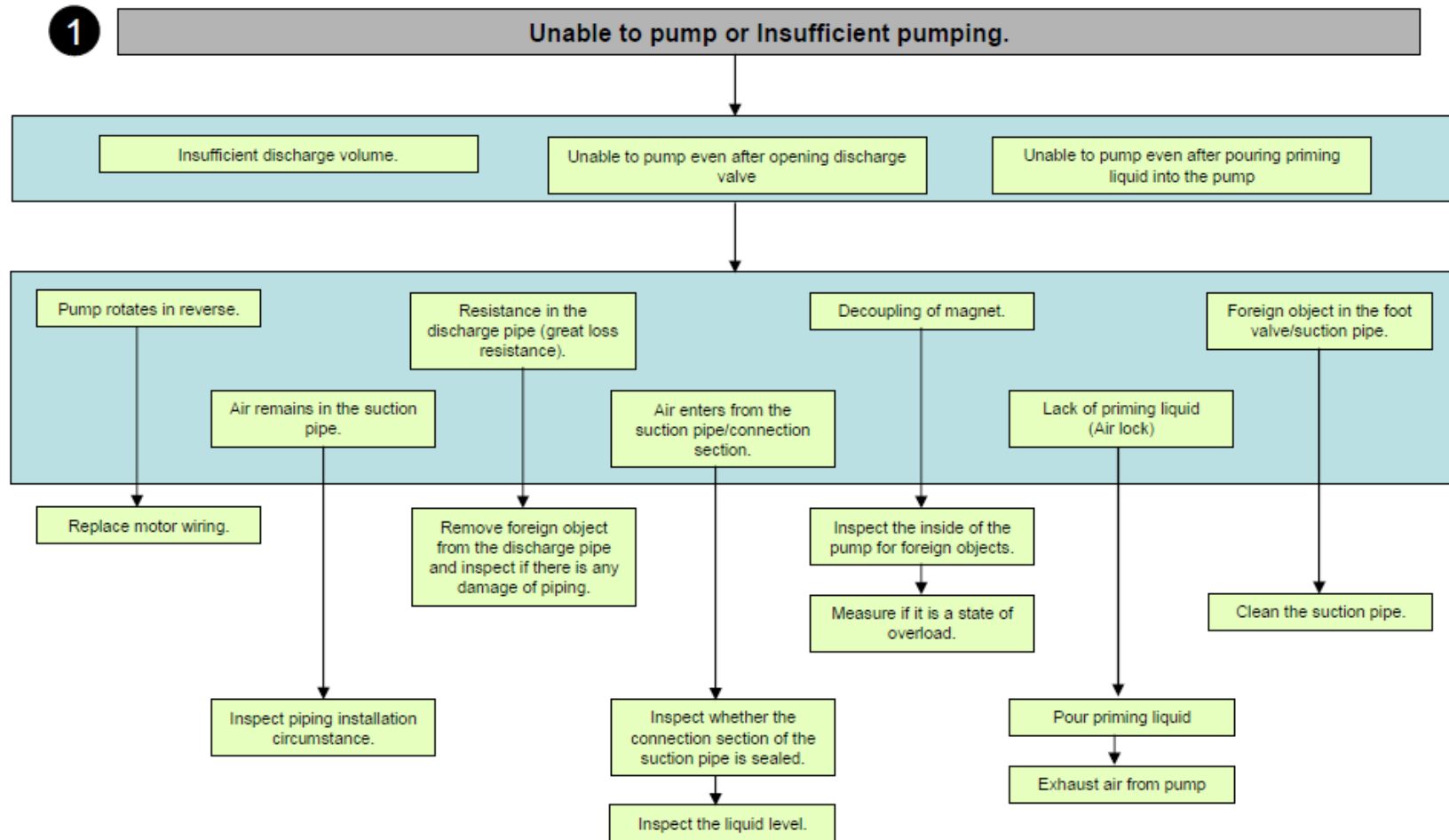


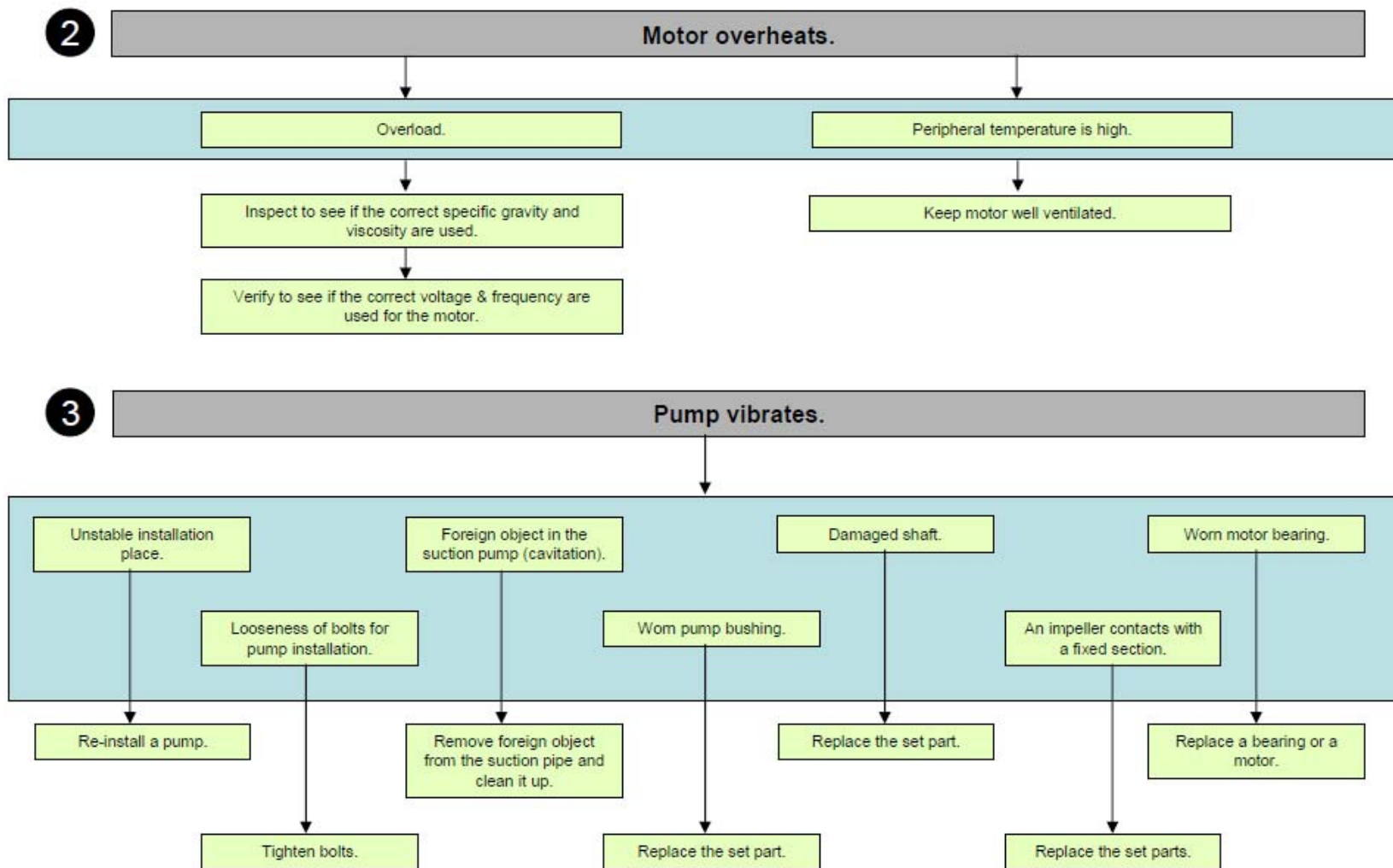
- *1: Separate bracket is used for non-exclusive motor as an individual part.
(Separate NEMA bracket is used for the US version.)
- *2: For 5HP motor, a motor mounting plate (FC) is added between the separate bracket and motor.
(NEMA motor mounting plate is used for the US version.)
- *3: Separate NEMA motor is used for the US version.

Note:

1. See "PARTS DESCRIPTION" for finding the item names.

TROUBLESHOOTING





WARRANTY PERIOD AND COVERAGE

1. The warranty period is one year from the date of factory shipment.
2. During warranty period, if the unit breaks down or becomes damaged in normal operating condition due to manufacturing defect(s), the cause of breakdown or damaged part(s) will be repaired free of charge.
3. There will be a service charge for repairing the following breakdown(s) or damage(s) and for replacement of worn out part(s):
 - Any breakdown or damage occurred after the warranty period.
 - Any breakdown or damage due to improper use or safekeeping.
 - Any breakdown or damage due to the use of part(s) manufactured by others or the use of unauthorized parts.
 - Any breakdown or damage stemming from repair or modification performed by an unauthorized agent.
 - Any breakdown or damage as a result of natural disaster or act of God.
4. We cannot be responsible for any breakdown or damage of a product manufactured using the specification or material designated by the customer.
5. Irregularities or breakdowns due to chemical or hydrodynamic corrosion or the property of liquid that was pumped will not be covered under the warranty. The material chosen at the time of contract is only a recommendation; we do not guarantee the chemical resistance of such material.
6. In case the determination of the cause for a breakdown or damage is questionable, it shall be resolved through discussion between the customer and the manufacturer.
7. We will bill the customer for any travel expenses incurred for non-warranted repair service to a remote location.
8. Any expense or other damage incurred as a result of a breakdown during operation is not covered under the warranty.

REPAIR

Notice:

For repair, consult the distributor where the pump was purchased. When returning a pump, the pump chamber should be adequately cleaned.

If any irregularity is detected during operation, the pump should be stopped for inspection (refer to the section on "TROUBLESHOOTING").

1. To request a repair service, please call your distributor or the manufacturer.
2. Before requesting any repair service, please carefully read the instruction manual again and repeat the inspection.

3. When requesting a repair service, please be prepared to provide the following information:

- Model type and manufacturing serial number
- How long the unit has been used and its condition
- The part in question and its condition
- Type of liquid pumped (name, specific gravity, liquid temperature any slurry or not)

Since the residual liquid in a pump can leak out during shipment, creating a hazardous condition, make sure the inside of the unit is adequately cleaned when returning a pump.

Customers may order spare parts using names displayed in the parts table. Nevertheless, it is safer to also provide the part number.

MODEL	YD-
SERIAL NO.	
DISTRIBUTOR	
DATE OF PURCHASE	
DATE OF STARTING OPERATION	

CONTACT INFORMATION

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