

# CORROSION RESISTANT MAGNETIC CENTRIFUGAL PUMP

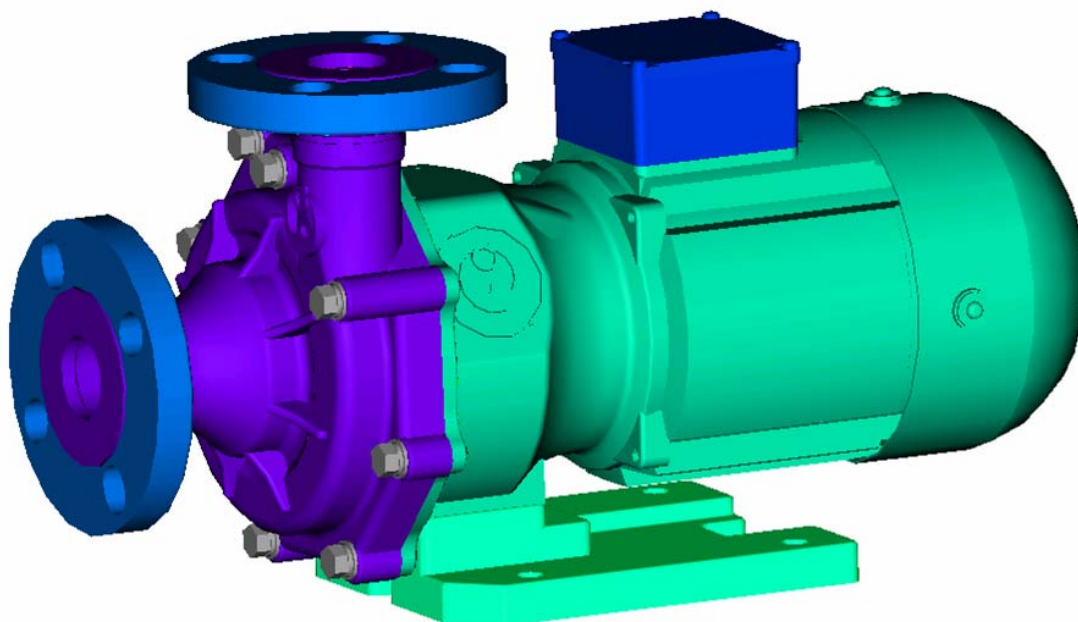
# *Chemi-Free*

YD-250, 251, 252, 253GS (F) series

YD-400, 401, 402, 403, 405GS (F) series

INSTRUCTION MANUAL

Version: 101021



**World Chemical Co., Ltd.**

# PREFACE

Thank you very much for purchasing World Chemical's magnetic drive pump "Chemi-Free". Please read this manual carefully. 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 could occur when its contents are ignored and the pump is used erroneously.





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

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







	This symbol <b>cautions people to be careful.</b>
	This symbol signifies that a <b>particular action is banned.</b>
	This symbol indicates that the <b>action must be taken.</b>

## **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.  
Please do not use damaged pump or modify the pump. World Chemical will 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 belt for pumps that come with them. For pumps without hoist belts, 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 not carry pumps by hand as even the lightest pump weights more than 16kg (35 lbs.), and could thus cause accidents.
-  (4) Do not inspect or dismantle the pump or motor with the power turned on. This could lead to personal injuries caused by electric shock or injuries caused from getting caught in the rotor. This work should be performed only after verifying the multiple safety devices such as the switch for main power supply, the operation switch, and the hand switch for the pump.

-  (5) Connecting grounding line.  
Using the pump without attaching the ground line from the motor could cause electric shock. The ground 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.  
Over-stretching, pinching and damaging power supply cords or motor lead wires could damage the cable and cause fire or electric shock. Always replace the cover of the terminal box in its original position before use.
-  (7) Attaching current leak circuit breaker.  
Electric shock might result if the pump is used without attaching a current leak circuit breaker. 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.  
When removing the pump from piping, always do so after closing the intake and discharge pipe valves and verifying there are no liquid leaks. 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 stipulated by the specifications on the nameplate. Please note to wire a motor only after verifying the power specification of motor (phase, voltage and frequency). 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 on the handling the pump.
-  (3) Opening package.  
Please open the package only after verifying which side of the package is the top and which side is the bottom. When opening a wooden crate, be careful so as not to injure yourself from nails and silvers when removing the product.
-  (4) Ventilation.  
Do not place objects around the pump that might obstruct ventilation as the motor could heat up. In handling toxic or odorous liquids, have the pump situated in a well-ventilated place to prevent poisoning.
-  (5) Repairs and returning the pump.  
When the pump breaks down, contact World Chemical or your nearest sales agent for repairs. If the pump is to be sent back for repairs., wash the inside and outside of the pump with clean water and package it in a vinyl bag wrapping after verifying that it is free of any chemical agents.
-  (6) Regarding plastic (resin) parts.  
The pump is made of resin material. Therefore, it could cause injuries if it becomes damaged through impact with other objects. Since the material is no very strong, refrain from having people hit a pump against any objects. Attach piping support to avoid any pipe load burdening the pump.



(7) 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 within a second to see if the direction of rotation is correct. If the rotation is in reverse, switch two of the three phases in the three-phase power supply to change the direction of rotation. Always 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, dispose any chemical agents clinging to the pump and discard as industrial waste in accordance with the law.



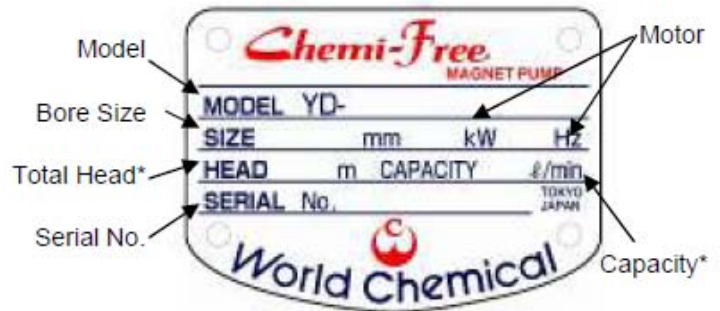
(9) Outflow protection.

Always take appropriate preventative measure to safeguard against liquid leaks in the event of breakdown of pump or piping.

# INSPECTION WHEN UNPAKING 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

**Y D – 252 G S – C D 6 0**  
 (1) (2) (3) (4) (5) (6)

(1) Bore diameter/Motor Output

Model	Suction Bore	Discharge Bore	Motor Output
250GS (F)	25A (1")	25A (1")	0.4kW – 1/2HP
251GS (F)	25A (1")	25A (1")	0.75kW – 1HP
252GS (F)	25A (1")	25A (1")	1.5kW – 2HP
253GS (F)	25A (1")	25A (1")	2.2kW – 3HP
400GS (F)	40A (1.5")	40A (1.5")	0.4kW – 1/2HP*
401GS (F)	40A (1.5")	40A (1.5")	0.75kW – 1HP
402GS (F)	50A (2")	40A (1.5")	1.5kW – 2HP
403GS (F)	50A (2")	40A (1.5")	2.2kW – 3HP
405GS (F)	50A (2")	40A (1.5")	3.7kW – 5HP

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

(2) Material for Casing

GS : GFR PP  
 GSF: CFR ETFE

(3) Bushing Material

C: High density carbon  
 R: CFR PTFE  
 A: Alumina ceramic  
 T: Special material

- (4) O-ring Material
  - E: EPDM
  - D: FPM
  - T: Special material
- (5) Operating Frequency for Motor
  - 5: 50Hz
  - 6: 60Hz
- (6) Limitation of specific Gravity

Model	25*GS series	25*GSF series	40*GS series	40*GSF series
Specific Gravity	0: 1.0	2: 1.2	1: 1.05/1.1	2: 1.2
	3: 1.3	5: 1.5/1.6	3: 1.3	5: 1.5
	5: 1.5	9: 1.9	5: 1.5	9: 1.9

**Note:**

Following is the symbols in the US version.  
 None : NPT Thread type for 400GS series only  
 F: Flange type

# SPECIFICATION

## YD-25\*GS series

Model		250GS	251GS	252GS	253GS	
Bore - Suction x Discharge		25A (1") x 25A (1") / G1 x G1				
Motor output - kW (HP)		0.4 (1/2) *1	0.75 (1)	1.5 (2)	2.2 (3)	
Standard Specific Point m-L/min	50Hz	S.G.1.0	14.0 – 50	21.0 – 50	-	-
		S.G.1.3	10.0 – 50	17.0 – 50	27.0 – 50	-
		S.G.1.5	9.0 – 50	16.0 – 50	24.0 – 50	-
	60Hz	S.G.1.0	14.0 – 50	21.5 – 50	34.0 – 50	-
		S.G.1.1	-	-	-	40.0 – 50
		S.G.1.3	10.5 – 50	17.0 – 50	27.0 – 50	34.0 – 50
		S.G.1.5	9.0 – 50	15.0 – 50	25.0 – 50	31.0 – 50
Weight - kg (lbs.)*3		19.5 (43)	21.5(47.4)	26.5(58)	28.5(62.8)	

Max. TDH & Capacity (ft./gpm) *2	60Hz	S.G.1.0	(51.4/ 23.7)	(75.4/ 34.3)	(117.7/ 39.6)	-
		S.G.1.1	-	-	-	(135.1/ 39.6)
		S.G.1.3	(40.0/ 23.7)	(61.3/ 34.3)	(94.7/ 39.6)	(118.0/ 39.6)
		S.G.1.5	(36.4/ 23.7)	(55.1/ 34.3)	(86.9/ 39.6)	(107.5/ 39.6)

\*1: 0.55kW (3/4HP) in the U.S.

\*2: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

\*3: These figures indicate the weight of pump with the exclusive motor (Japan standard motor). Weight varies with motor type and manufacturer.

## YD-25\*GSF series

Model		250GSF	251GSF	252GSF	253GSF	
Bore - Suction x Discharge		25A (1") x 25A (1") / G1 x G1				
Motor output - kW (HP)		0.4 (1/2) *1	0.75 (1)	1.5 (2)	2.2 (3)	
Standard Specific Point m-L/min	50Hz	S.G.1.2	9 - 50	16.5 - 50	24 - 50	-
		S.G.1.5	7 - 50	14 - 50	22 - 50	-
		S.G.1.9	5.5 - 50	11.5 - 50	18 - 50	23.5 - 50
	60Hz	S.G.1.2	9 - 50	15 - 50	26 - 50	33 - 50
		S.G.1.5	6.5 - 50	-	22 - 50	28 - 50
		S.G.1.6	-	11 - 50	-	-
		S.G.1.9	-	-	18 - 50	25.5 - 50
Weight - kg (lbs) *3		20.5 (45)	22.5 (49.6)	28 (61.7)	30 (66)	

Max. TDH & Capacity (ft./gpm) *2	60Hz	S.G.1.2	(37.7/37)	(58.7/43.6)	(96/59.4)	(119.4/60.8)
		S.G.1.5	(30/33)	-	(83.3/54.2)	(103.4/60.8)
		S.G.1.6	-	(45/41)	-	-
		S.G.1.9	-	-	(70/49)	(91.5/56.8)

\*1: 0.55kW (3/4HP) in the U.S.

\*2: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

\*3: These figures indicate the weight of pump with the exclusive motor (Japan standard motor). Weight varies with motor type and manufacturer.

**YD-40\*GS series**

Model		400GS	401GS	402GS	403GS	405GS	
Bore - Suction x Discharge		40A (1") x 40A (1")		50A (2") x 40A (1")			
Motor output - kW (HP)		0.4 (1/2)*1	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	
Standard Specific Point m-L/min	50Hz	S.G.1.05	11 – 100	15 – 150	-	-	
		S.G.1.1	-	-	19 – 200	23 – 200	
		S.G.1.3	9 – 100	12.5 – 150	17 – 200	21 – 200	
		S.G.1.4	-	-	-	-	25 – 200
	60Hz	S.G.1.05	11 – 100	15 – 150	-	-	
		S.G.1.1	-	-	19 – 200	25 – 200	34 – 200
		S.G.1.3	7.5 – 100	12 – 150	17 – 200	24 – 200	31 – 200
		S.G.1.5	-	10.5 – 150	14.5 – 200	20.5 – 200	28 – 200
Weight - kg (lbs.)*3		16.5 (36.4)	19.5 (43.0)	25.5 (56.2)	27.5 (60.6)	58.5(129)	

Max. TDH & Capacity *2 (ft./ gpm)	60Hz	S.G.1.05	(48.8/ 52.8)	(67.8/ 76.5)	-	-	
		S.G.1.1	-	-	(86.5/ 105.6)	(105.9/ 118.8)	(129.2/ 145.2)
		S.G.1.3	(36.4/ 47.5)	(57.4/ 69.9)	(76.7/ 100.3)	(99.3/ 114.8)	(120.7/ 137.2)
		S.G.1.5	-	(53.7/ 66)	(68.8/ 97.6)	(88.2/ 109.5)	(107.9/ 134.6)

\*1: 0.55kW (3/4HP) in the U.S.

\*2: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

\*3: These figures indicate the weight of pump with the exclusive motor (Japan standard motor). Weight varies with motor type and manufacturer.

**YD-40\*GSF series**

Model		400GSF	401GSF	402GSF	403GSF	405GSF	
Bore - Suction x Discharge		40A x 40A		50A x 40A			
Motor output - kW (HP)		0.4 (1/2)*1	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	
Standard Specific Point m-L/min	50Hz	S.G.1.2	8.5 – 100	12 – 150	18 – 200	21 – 200	
		S.G.1.3	-	-	-	-	25 – 200
		S.G.1.5	7 – 100	9.5 – 150	15 – 200	19 – 200	-
	60Hz	S.G.1.2	5.5 - 100	8 – 100	12.5 – 200	16.5 – 200	-
		S.G.1.5	9 – 100	11.5 – 150	17.5 – 200	22.5 – 200	30 – 200
		S.G.1.9	6 – 100	9 – 150	14 – 200	19.5 – 200	27.5 – 200
Weight - kg (lbs.)*3		17.5 (38.6)	20.5 (45.2)	27 (59.5)	29 (63.9)	60 (132.2)	

Max. TDH & Capacity *2 (ft./ gpm)	60Hz	S.G.1.2	(38.7/ 47.5)	(57.4/ 68.6)	(82.6/ 101.6)	(98.4/ 114.8)	(119.7/ 137.2)
		S.G.1.5	(31.8/ 42.2)	(46.5/ 63.3)	(66.9/ 93.7)	(88.2/ 105.6)	(106.9/ 129.3)
		S.G.1.9	-	(42.3/ 54.1)	(57.4/ 85.8)	(72.4/ 96.3)	(93.1/ 118.8)

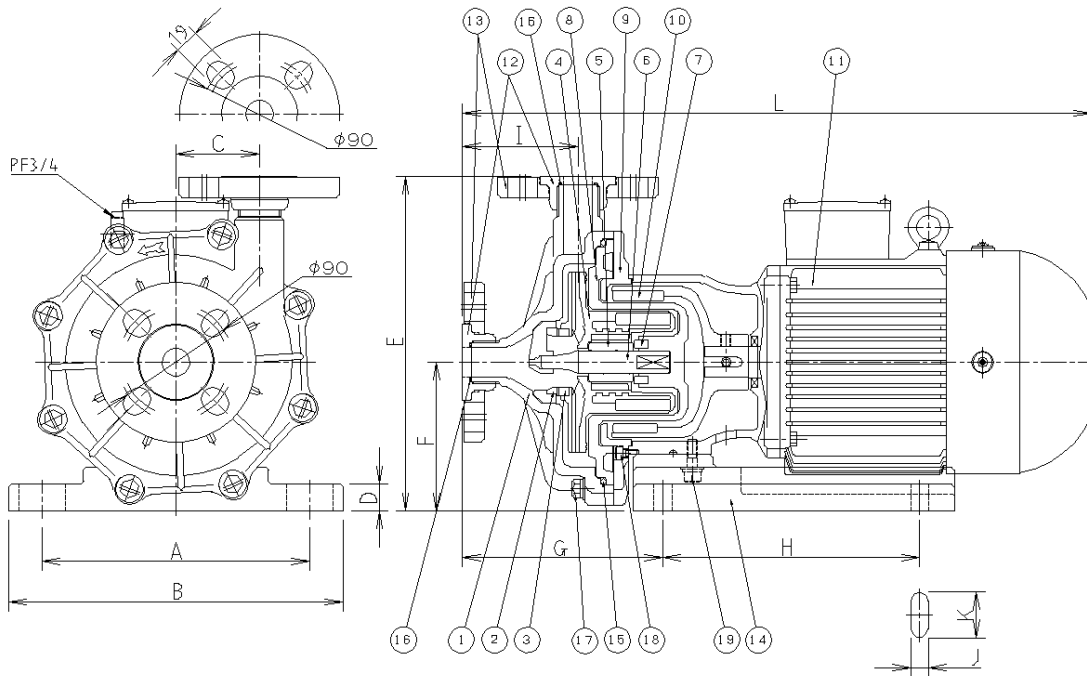
\*1: 0.55kW (3/4HP) in the U.S.

\*2: Please note US version indicates Max TDH (ft.) and capacity (gpm) for the nameplate.

\*3: These figures indicate the weight of pump with the exclusive motor (Japan standard motor). Weight varies with motor type and manufacturer.

# OUTLINE DIMENSION

## YD-25\*GS (F) series



Unit: mm(in)

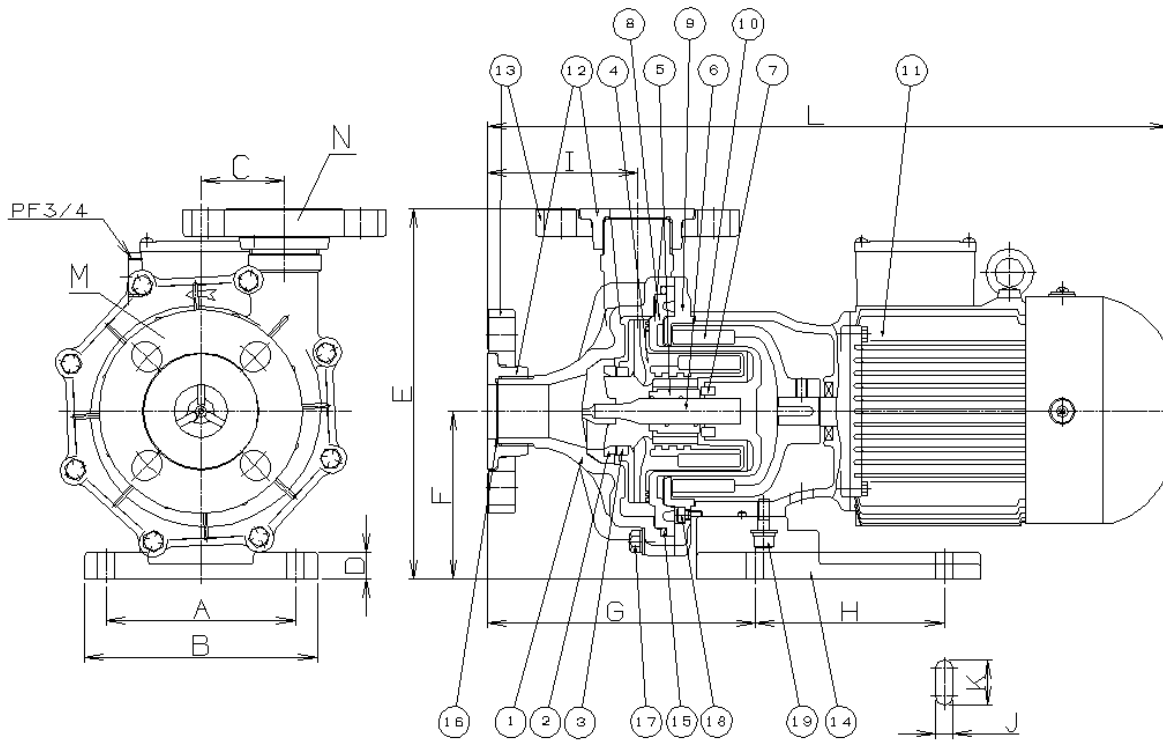
Model	A	B	C	D	E	F	G	H	I	J	K	L*
250GS (F)	130 (5.12)	160 (6.3)	65 (2.56)	18 (0.71)	260 (10.24)	115 (4.53)	173 (6.81)	130 (5.12)	90 (3.54)	$\phi 12$ ( $\phi 0.47$ )		431 (16.97)
251GS (F)	130 (5.12)	160 (6.3)	65 (2.56)	18 (0.71)	260 (10.24)	115 (4.53)	173 (6.81)	130 (5.12)	90 (3.54)	$\phi 12$ ( $\phi 0.47$ )		457 (17.99)
252,253GS(F)	208 (8.19)	260 (10.24)	65 (2.56)	21 (0.83)	261 (10.28)	116 (4.57)	156 (6.14)	200 (7.87)	90 (3.54)	14 (0.55)	36 (1.42)	490 (19.29)

\* Length of "L" varies with motor type and manufacturer.

### Note:

1. Above figures indicate the measurement of pump with the exclusive motor (Japan standard motor).
2. Measurements are subject to change without notice.

## YD-40\*GS (F) series



Unit: mm(in)

Model	A	B	C	D	E	F	G	H	I	J	K	L*	M/N
400GS (F)	110 (4.33)	140 (5.51)	51 (2.01)	18 (0.71)	216 (8.5)	95 (3.74)	150 (5.94)	98 (3.86)	87 (3.43)	R6 (R0.24)	18 (0.71)	423 (16.65)	JIS10K 40A/40A (1.5"/1.5")
401GS (F)	130 (5.12)	160 (6.3)	57.5 (2.26)	18 (0.71)	254 (10.0)	115 (4.53)	184 (7.24)	130 (5.12)	103 (4.06)	$\phi$ 12 ( $\phi$ 0.47)		468 (18.43)	JIS10K 40A/40A (1.5"/1.5")
402,403GS(F)	208 (8.19)	260 (10.24)	65 (2.56)	21 (0.83)	261 (10.28)	116 (4.57)	156 (6.14)	200 (7.87)	89 (3.5)	R7 (R0.28)	36 (1.42)	490 (19.29)	JIS10K 50A/40A (2"/1.5")
405GS (F)	230 (9.06)	260 (10.24)	65 (2.56)	20 (0.79)	280 (11.02)	135 (5.31)	156 (6.14)	261 (10.28)	89 (3.5)	36 (1.42)	R7 (R0.28)	531 (20.91)	JIS10K 50A/40A (2"/1.5")

\* Length of "L" varies with motor type and manufacturer.

### Note:

1. Above figures indicate the measurement of pump with the exclusive motor (Japan standard motor).
2. Measurements are subject to change without notice.

# PARTS DESCRIPTION

## YD-25\*GS (F) Series

No.	Parts Name	Qty	Material		Remarks
			YD-GS	YD-GSF	
1	Front casing	1	GFR PP	CFR PP	
2	Shaft support	1	Alumina Ceramic + GFR PPS	Alumina Ceramic + CFR ETFE	
3	Mouth ring	1	CFR PTFE		
4	Impeller	1	GFR PP + PP + Magnet	CFR ETFE + Magnet	
5	Bushing	1	CFR PTFE /Carbon /Alumina Ceramic + GFR PPS	CFR PTFE /Carbon /Alumina Ceramic + CFR ETFE	
6	Shaft	1	Alumina Ceramic		
7	Rear Thrust Ring	1	Alumina Ceramic		
8	Rear Casing	1	GFR PP	CFR ETFE	
9	Rear Casing Support	1	FC200		
10	Outer Magnet	1	FCD450- 10 + Magnet		
11	Motor with bracket	1	FC200 + Aluminum Frame Motor		(Japan standard motor: exclusive motor fixed with bracket)
12	Lap Joint	2	GFR PP	CFR ETFE	
13	Flange	2	GFR PP		
14	Base	1	GFR PP		
15	O-ring	1	EPDM/FPM (G-180)		
16	O-ring	2	EPDM/FPM (AS568-120)		
17	Hexagonal bolts	8	SUS304 (M10 x 35)		With spring washer & flat washer
18	Hex. Socket Head Cap Screws	6	SUS304 (M6 x 12)		
19	Hex. Socket Head Cap Screws	4	SUS304 (M8 x 25)		With spring washer & flat washer

### Note:

1. See Fig. 1 & 2, page 6 & 7 for finding the item No.
2. Bracket is an integral part of the exclusive motor (Japan standard motor) that can not be separated each other.
3. Separate bracket is used for non-exclusive motor as an individual part.

**YD-40\*GS(F) Series**

No.	Parts Name	Qty	Material		Remarks
			YD-GS	YD-GSF	
1	Front casing	1	GFR PP	CFR ETFE	
2	Shaft support	1	Alumina Ceramic + GFR PPS	Alumina Ceramic + CFR ETFE	
3	Mouth ring	1	CFR PTFE		
4	Impeller	1	GFR PP + PP + Magnet	CFR ETFE + Magnet	
5	Bushing	1	CFR PTFE / Carbon / Alumina Ceramic + GFR PPS	CFR PTFE / Carbon / Alumina Ceramic + CFR ETFE	
6	Shaft	1	Alumina Ceramic		
7	Rear Thrust ring	1	Alumina Ceramic		
8	Rear Casing	1	GFR PP	CFR ETFE	
9	Rear Casing Support	1	FC200		
10	Outer Magnet	1	FCD450-10 + Magnet		
11	Motor with bracket	1	FC200 + Alumina Frame Motor for exclusive motor		
12	Lap Joint	2	GFR PP	CFR ETFE	
13	Flange	2	GFR PP	GFR PP (black)	
14	Base	1	GFR PP / FC200		FC200: 405GS only
15	O-ring	1	EPDM / FPM		
16	O-ring	2	EPDM / FPM		
17	Hexagonal Bolts	6/8	SUS304 (M8 / M10)		With spring washer & flat washer
18	Hex. Socket Head Cap Screws	6	SUS304 (M6)		
19	Hex. Socket Head Cap Screws	4	SUS304 (M8)		With spring washer & flat washer

**Note:**

1. See fig. 3, page 8 for finding the item No.
2. Bracket is an integral part of the exclusive motor (Japan standard motor) that can not be separated each other.
3. 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 precautions 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 magnets 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 using priming water and with the intake valve closed, 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.

- This occurs when the intake pipe is attached to the bottom of the liquid tank. (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 conceivable 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 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.)

### 4 Erosion

This product uses GFR PP or CFR ETFE resin in the main parts. When making your purchase, select after fully consulting us on the corrosive quality of the liquid. As the life of the pump can be shortened by the type of liquid used or the temperature of the liquid, be sure to check with our company when changing the liquid used or when the condition for use is changed.

# CAUTION WHEN INSTALLING, LAYING PIPES

## 1 Caution when installing.

- (1) If a large amount of air mixes during operation, the pump will not be able to pump the liquid, causing a breakdown.
  - Set the height from the pump intake mouth to the liquid surface in the tank at more than 50cm (1.6 ft.).
  - Do not allow any projection or up-and-down bending in the intake pipe, as it may block the passage of air.
  - Arrange the intake pipe to have a gradient of more than 1/100 facing the pump. Use an intake pipe with a diameter same or larger than that of the pump suction bore. In case of a larger diameter pipe, connect an eccentric reducer to the intake pipe so that the upper side of it is level.
- (2) Place a strainer at the intake mouth of the piping to prevent foreign objects from entering the pipe. However, you must periodically clean the strainer to prevent clogging so as to minimize resistance.
- (3) It is recommended that a check valve be attached to the start up pipe on the discharge side to prevent “water hammer”. Place a bypass for air exhaust on the lower section of the check valve when:
  - The discharge pipe is to be long or when the discharge head is more than 10m (30ft.).
  - The tip of the discharge pipe is more than 9 m (27 ft.) in height over the water surface of the intake tank.
  - The pipe conditions call for using two or more pumps that are parallel to one another.
- (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 so as not to create any impact, as the main parts within the pump are made of 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.

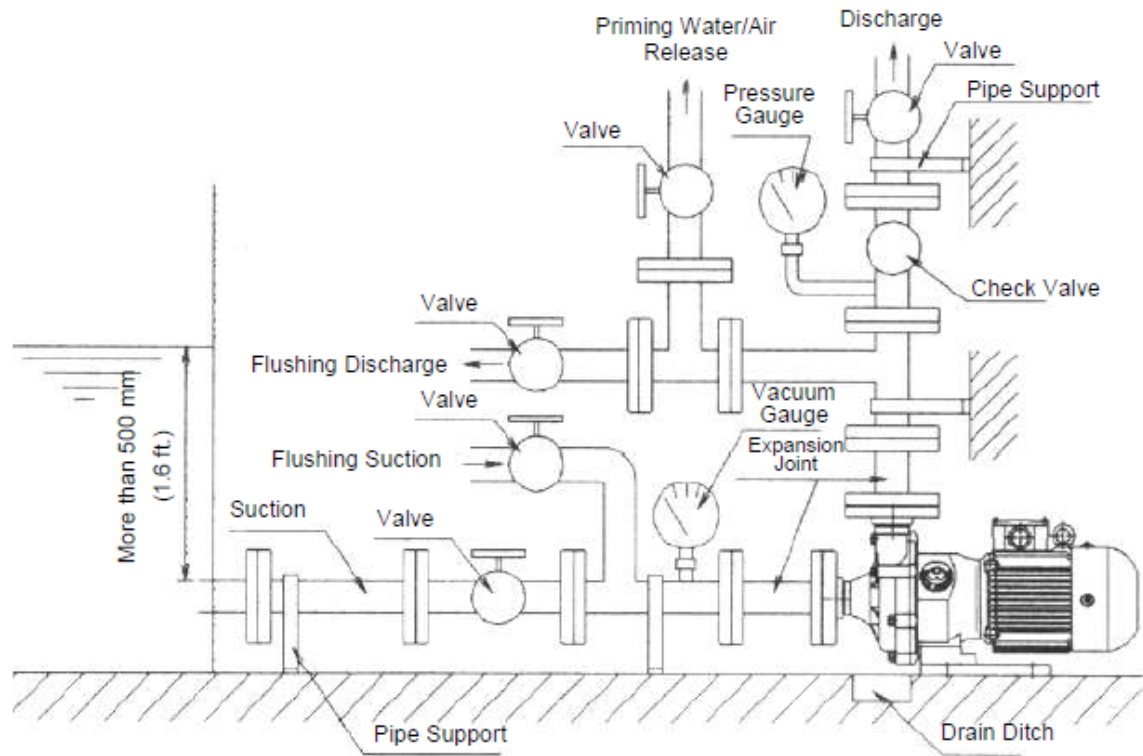
## 2 Do not apply weight on the pipes.

- (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 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 it can not be set up.

### 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) 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 other facilities.
- (3) Open the intake and discharge valves so as to fill the interior of the pump and intake pipe with the liquid and let out the air inside the pump. Then, verify again there is no leakage.
- (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.

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. Rather, run the pump after allowing it to stand for more than one hour. 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 erroneously (intake, discharge valve both closed), the temperature and pressure within the pump will increase to high levels. If the pump is dismantled and inspected at this state, steam and hot water 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 Keep in mind that there will be 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:

GS: 0 - 70°C (32 – 158 F)

GSF: 0 - 80°C (32 – 176 F)

5 In the event the specific gravity and viscosity increases, the pump's performance capacity, efficiency, and axial movement power will change. Please take this into consideration and use within an appropriate margin of leeway.

6 The pump has been made under specifications decided at the time of purchase. In the event you decide to change the specification conditions, please verify it with our company first.

7 The limited capacity to resist pressure

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

Type	250GS (F)	251GS (F)	252GS (F)	253GS (F)	
The limited capacity (MPa)	→	→	→	0.6	
	400GS(F)	401GS(F)	402GS(F)	403GS(F)	405GS(F)
	0.23	0.32	→	→	0.6

- 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  
Operate pump at flow rate higher than the minimum flow rate stated below.

Type	Minimum flow rate
250GS(F), 251GS(F), 400GS(F), 401GS(F)	10 L/min
252GS(F), 253GS(F), 402GS(F), 403GS(F), 405GS(F)	20 L/min

# 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. (The surface level is required upper than 50cm (1.6 ft.) from the inlet of the pump.)

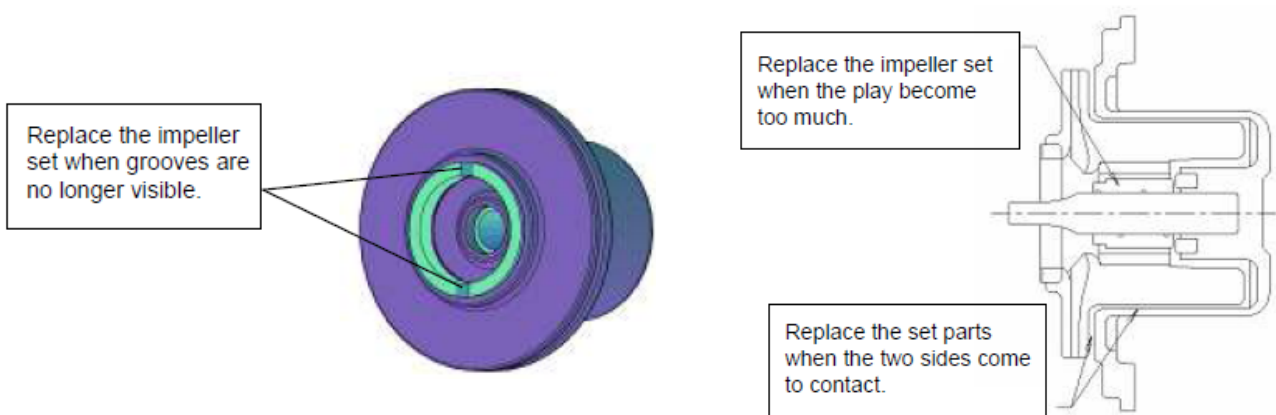
## 2 Periodic Inspection

- (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 on P.11 and 12)
  - Replace the front casing set if you see signs of wear and tear and deterioration from corrosion in the front casing.
- (2) Shaft Support (No.2)
  - Check for cracks or chips on the alumina ceramics.
- (3) Mouth ring (No.3)
  - 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.4)
  - Replace the impeller set if there are signs of wear, tear and corrosion on the surface surrounding it.
- (5) Bushing (No.5)
  - Check for cracks or chips on it.
  - Verify that there is not too much play between the shaft and the bushing.



(6) Shaft (No.6)

- Check for cracks or chips on it.

(7) Rear Thrust Ring (No.7)

- Check for cracks or chips on it.

(8) Rear Casing (No.8)

- 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 (No.15)

- When the rubber stiffens and loses its elasticity or cracks, exchange the part accordingly.

4 Replacement of Consumable Parts

Replace a set part listed below whole when the component is damaged.

(1) Front Casing set

- Front Casing + Shaft Support + Lap Joint + Flange + O-ring (No.16)

(2) Impeller set

- Impeller + Mouth Ring + Bushing

(3) Rear Casing set

- Rear Casing + Rear Thrust Ring + Shaft

# DISMANTLING AND ASSEMBLING

Please 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 that remains inside the pump and wash the interior of the pump thoroughly.
- (2) Remove the hexagonal bolts on the front casing so as to pull out the front casing from the bracket.
- (3) Remove the impeller by pulling forward. Since the impeller is easily pulled back by the magnetic force, be very careful not to catch your hands and fingers between them when handling.
- (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.

## 2. Assembling

Assemble the pump in the reverse order of dismantling. Clean the friction parts and o-ring thoroughly so that the surface is not damaged or filthy. Also, tighten the bolts for each section uniformly.

### Caution:

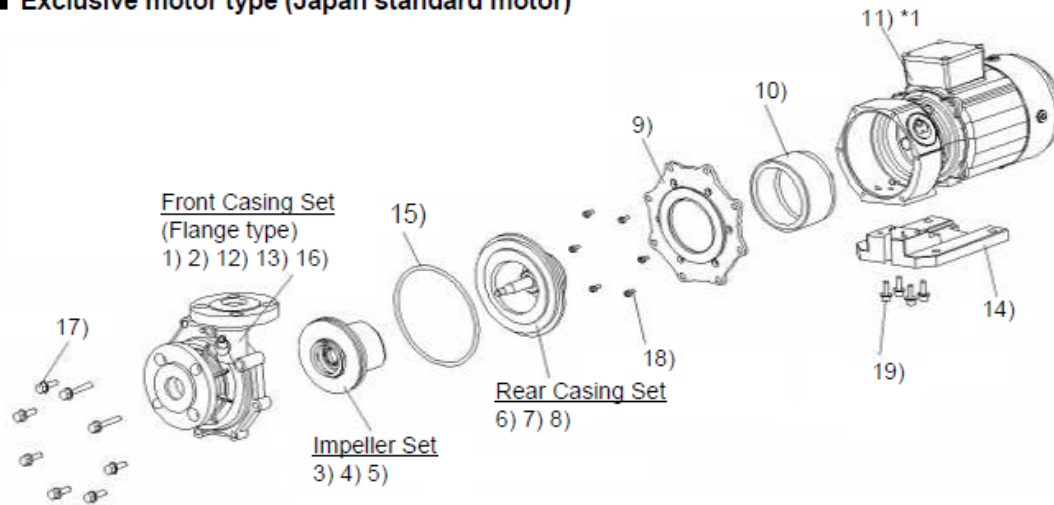
- (1) Use plastic or wooden spacers not to catch your hands and fingers between any parts, as the magnetic force of the magnet used in the pump is very powerful.
- (2) When re-assembling the pump after it has been dismantled, it is recommended that the o-ring be replaced. If the o-ring is used in its deformed shape, it could cause liquid leakage.
- (3) After assembling the pump, remove the motor fan cover and turn the fan with something stick-shaped to ensure that the impeller rotates smoothly.

\*Note that tightening all bolts is the following torque.

Type	The tightening torque
400GS(F), 401GS(F)	7.5N · m
250GS(F), 251GS(F), 252GS(F), 253GS(F) 402GS(F), 403GS(F), 405GS(F)	10.0N · m

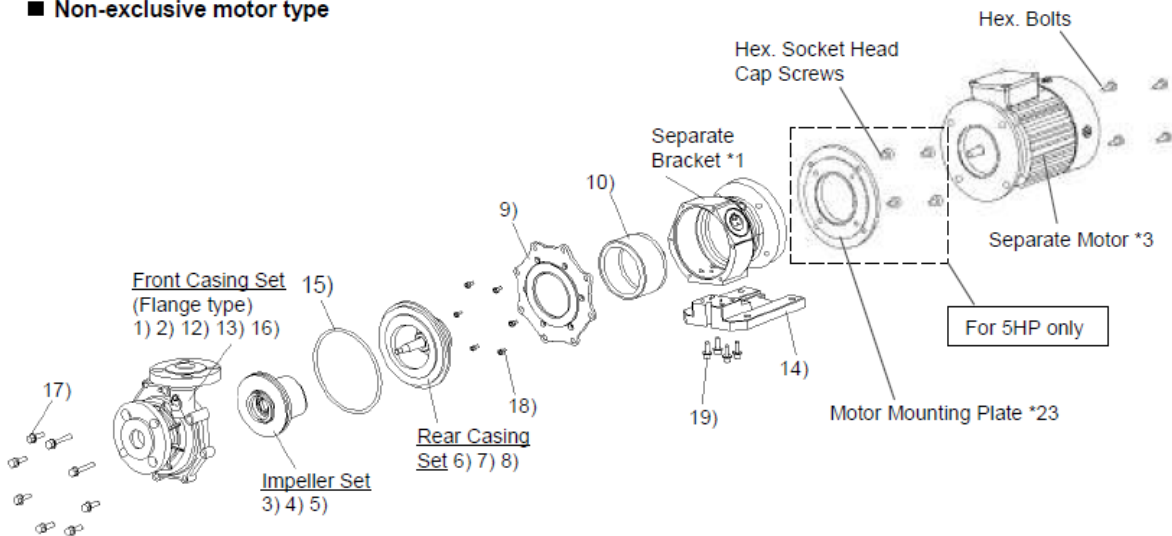
# EXPLODED VIEW

## ■ 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.)

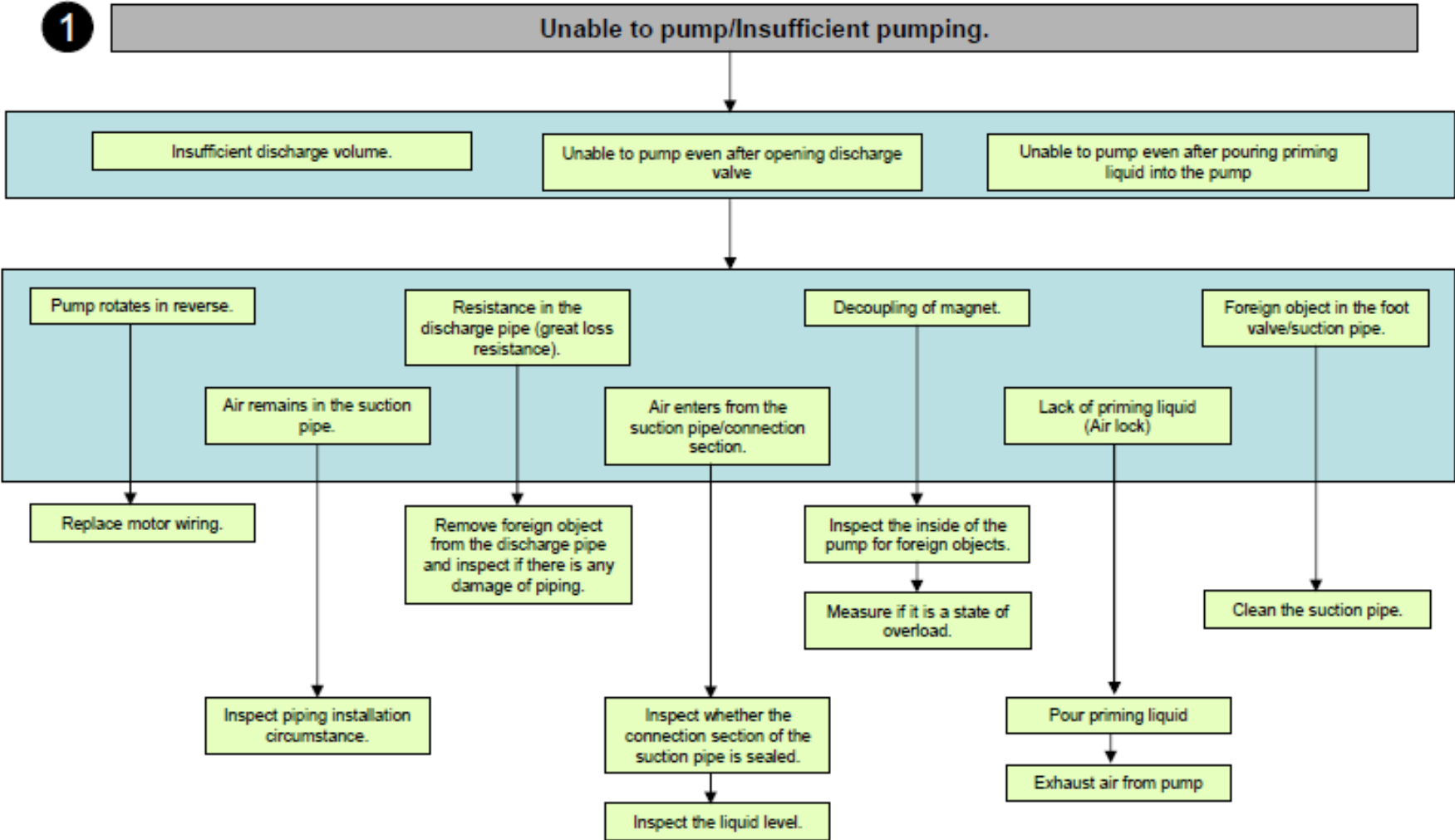
\*2: For 5HP motor, a motor mounting plate (FC) is added between the separate bracket and motor.  
(NEMA motor mounting plate is used for the US version.)

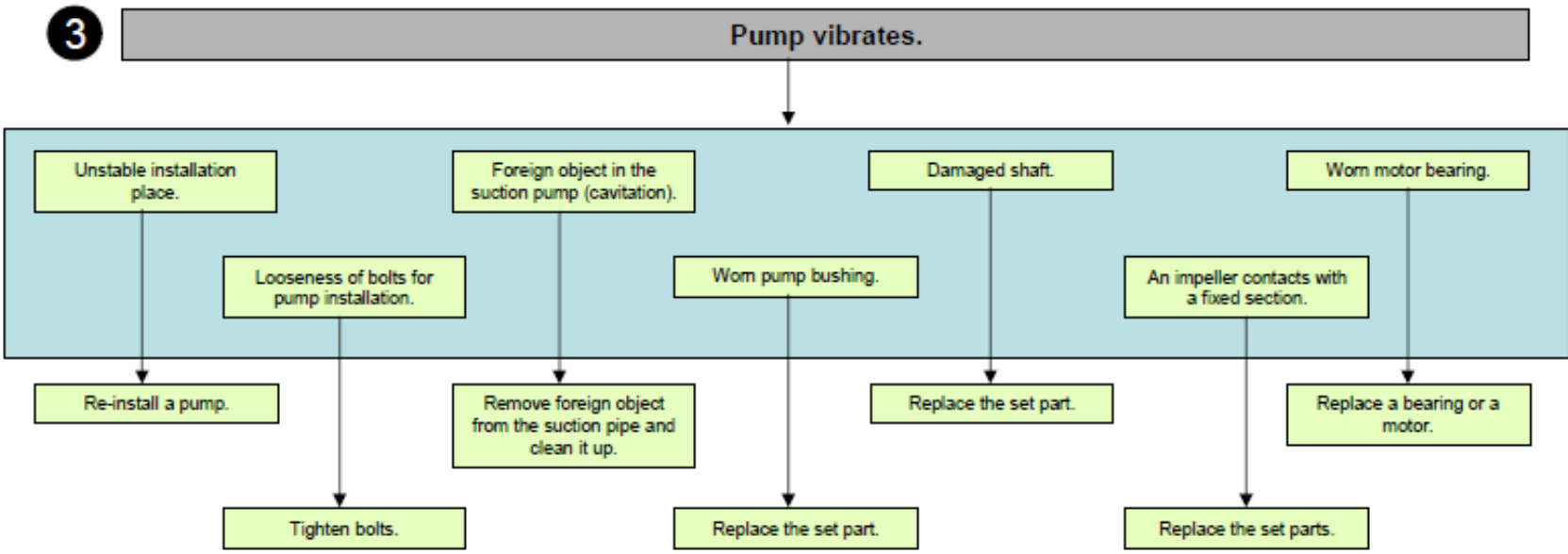
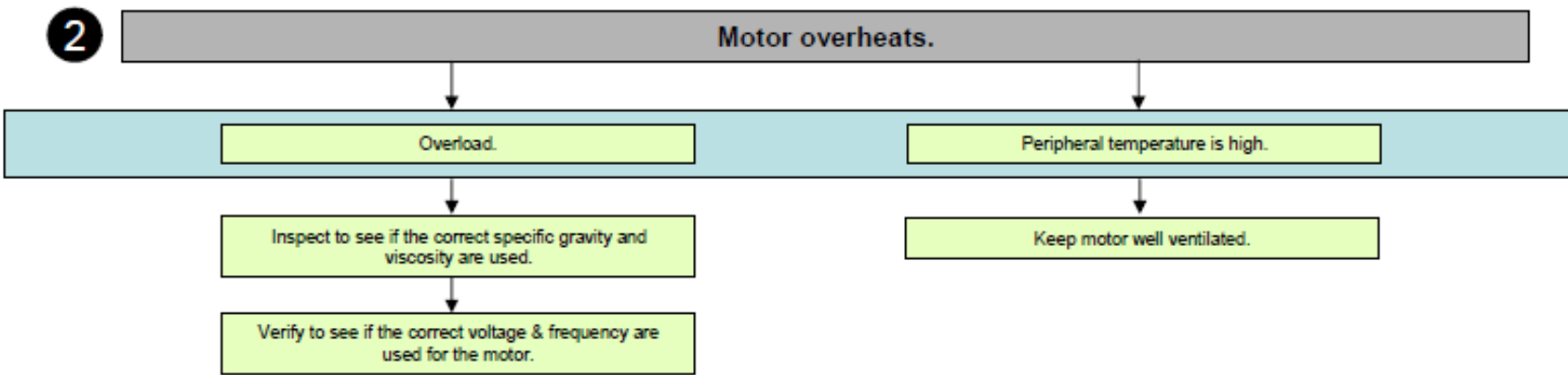
\*3: Separate NEMA motor is used for the US version.

### Note:

1. See page 11 & 12 for finding the item names.
2. Front casing set of thread type consists of item 1) and 2) only. (NPT thread type for the US version)

# 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 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.

<b>MODEL</b>	YD-
<b>SERIAL NO.</b>	
<b>DISTRIBUTOR</b>	
<b>DATE OF PURCHASE</b>	
<b>DATE OF STARTING OPERATION</b>	

# CONTACT INFORMATION

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