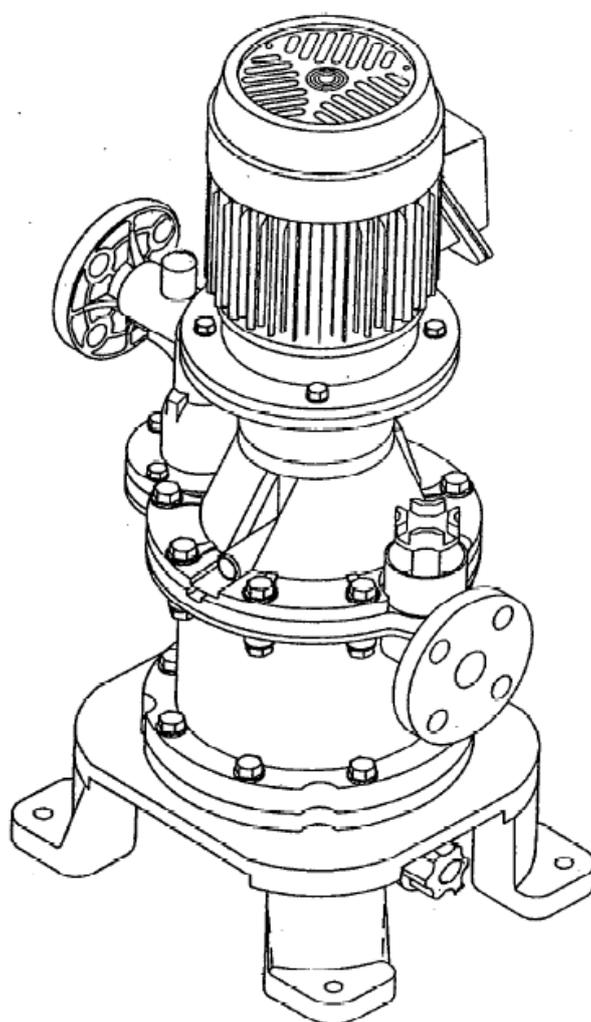


CORROSION RESISTANT SELF-PRIMING PUMP

YD-NSF / SF series

INSTRUCTION MANUAL

Version: 161221



 **World Chemical Co., Ltd.**

Preface

Thank you for purchasing our corrosion-resistant self-priming pump “SELFREE Taf”. The pump is used widely in an environment involving the use of general-specification chemical liquids at an ordinary temperature, like for non-electrolytic plating. The standard model is a maintenance-free pump using no mechanical seal or bearing.

This material explains how to operate and maintain your pump properly. Please read it so that you can use your pump effectively for an extended period.

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Safety precaution (To be observed at all times)

Warning

Dangerous liquid and surrounding

-  When using the pump for dangerous liquid or in potentially explosive atmospheres (only explosion-proof type), adhere to facility standards determined by law and check no liquid leak daily. If the pump is operated under abnormal conditions such as liquid leak, it leads to explosion, fire or personal injuries. Follow the manufacturers' instructions about handling the liquid.

Banning the use of damaged or modified pumps

If using the damaged or modified pump, it may cause personal injuries, electric shock or the pump damage. They are not covered by warranty.

Caution in transporting and lifting pumps

Use the hoist bolt when lifting a pump. If it does not own the hoist, use a belt sling and lift the pump with careful attention to the weight balance. Perform it by qualified personnel with the strong enough sling. The weight of the lightest pump is approx. 24kg at least. Do not carry a pump by hand as much as possible, because it may cause an accident.

Banning the operation with the power on

Do not check or disassemble a pump or motor while the power on. It leads to personal injuries from electric shock or getting caught in the rotor. Take the multiple safety precaution such as the switch for main power supply, the operation switch, and the hand switch for the pump.

Connection of an earth wire

Using the pump without connecting an earth wire may cause electric shock. Perform the connection by a qualified person according to the electric facilities technical standards and interior wiring regulations.

Protection of the power supply cord.

If stretching, pinching or damaging the power supply cords or motor lead wires, it causes fire or electric shock for the damaged cable. Install the cover of the terminal box in its proper position after wiring.

Ground Fault Interrupter (GFI)

If using a pump without a ground fault interrupter device, it may cause electric shock. Prevent the electric accidents and the pump damages applying circuit breakers, over-current protection devices and/or other protective devices.

Caution in removing a pump

When removing a pump from pipes, close the suction and discharge pipe valves and check no liquid leak. If direct contact with liquid, it may cause injury. Always wear protective gear when performing operations.

Caution



Banning the unspecified use

Do not use the pump for purposes other than those specified on the nameplate. Connect the pump after checking the power specification of motor (phase, voltage and frequency). Unspecified use may cause personal injuries or damages to the pump and peripheral equipment.



Restriction on persons handling a pump

Carry, install, wire, operate and maintain a pump by an expert who has full knowledge of the pump.



Caution in unpacking

Before opening the package, check the up side down. When it is a wooden crate, be careful to avoid injury yourself from nails and slivers.



Ventilation

Do not obstruct ventilation around the motor to prevent to overheat it. If handling toxic or odorous liquids, install the pump in a well-ventilated place to prevent symptoms of poisoning.



Repair and return

Contact your supplier or us to repair the damaged pump. When returning the pump by courier, clean up the inside and outside of the pump by water. Pack it with a plastic bag after checking no liquid.



Plastic parts

The pump is made of plastic. If it receives strong impact, it may damage and lead to personal injuries. Do no hit and climb on it. Install a piping support to prevent the piping load.



Pump start-up

Check the rotational direction when initially starting up the pump. Open the suction and discharge valves and check is no liquid leak from the pipe connection. Then, turn on the switch instantly after releasing air from the pipe and filling the liquid in the pump, and check the rotational direction. For reverse rotation, switch two of the three phases in the three-phase power supply. Before this, turn off the power supply and ensure safety.



Disposal of pump

When dispose the used pump, remove adhered liquid and dispose it as the industrial waste in accordance with the law.



Leak protection

Take appropriate preventative measures in consideration of possible leakage for the pump and pipe damage.

1. Features

- (1) The quality has a stabilized and the parts are timely supplied to be molded with commodity resin.
- (2) There is no sliding part for a sealless pump. Easy maintenance and reasonable.
- (3) The wet parts kit, pump base and motor bracket are made of corrosion resistant resin. It does not corrode by chemical or atmospheric gases or spray.
- (4) The enclosed structure of the main body and special liquid seal structure are adopted to prevent liquid leak.
- (5) The heat resistant resin and absorption of thermal expansion structure are adopted and it can be used for high temperature liquid.
- (6) The self-priming and suction ability is possible to pump when the liquid temperature is high.
- (7) "SELFREE Taf" is the same installing and piping dimensions as the previous pump.

2. Principle of self-priming

The priming water in the pump moves to the self-priming chamber by the impeller during start-up. Air and water are separated with circulation and water is pushed to the impeller through the self-priming hole. The self-priming ability occurs continuously. Air from the bearing is sealed by the seal blade and released to the self-priming chamber through the balance hole of the casing. The back flow by siphon action when the pump stops is cut off by the siphon cut hole between the self-priming chamber and the suction chamber. The enough self-priming water remains for the next self-priming action.

3. Performance

- (1) Standard performance

The standard performance curve (Normal temperature, clear water) is Picture 1 & 2. It is available to put 1 bigger motor output depending on the liquid specific gravity.

- (2) Performance for High temperature

Used liquid temperature: 0 – 99 degrees (NSF series), 0-70 degrees (SF series)

The self-priming height, time and the pump ability is changed depending on the liquid temperature.

Consider the self-priming height. * The temperature is higher, the ability is decreased.

4. Structure & dimension

The structure is Picture 3. Parts list & Dimension table are List 1 & 2.

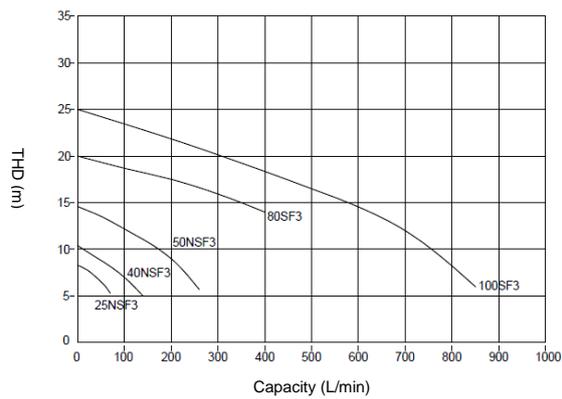
- (1) Pump and pump bearing

The motor is modified and reinforced supervisory functions. The bearing is extended and the frequency is reduced. It is easy install and removal. Explosion-proof motor, overseas standards motor and non-standard motor aver available to assemble for the adoption of the standard bracket. In this case, the joint shaft with shaft clamp collar is adopted.

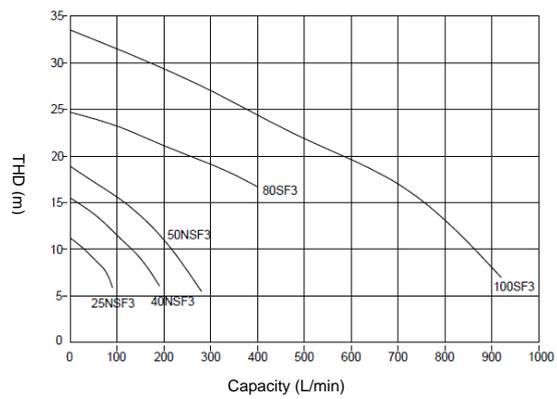
- (2) Absorption of thermal expansion

The main body extends to upward by thermal expansion, but the top is free and no restraint. On the other hand, the suction inlet and discharge outlet are restrained by pipes, but it can be alleviated by expansion joints and bending. It expands in millimeters units. The measures against thermal expansion for pipes are very important to protect the pump.

Picture 1: Standard performance (50Hz) S.G.1.05



Picture 2: Standard performance (60Hz) S.G.1.05



Self-priming limit against S.G. (Tem. 20 degrees)

Model \ S.G.	S.G.			
	1.0	1.1	1.3	1.5
YD-250*NSF(1)3	2.5m	2.3m	1.9m	1.7m
YD-400*NSF(1)3	3.0m	2.7m	2.3m	2.0m
YD-500*NSF(1)3	3.5m	3.2m	2.7m	2.3m
YD-800*SF(1)3				
YD-100**SF(1)3				

- The liquid temperature is 20 degrees. It is higher, the ability is lower.
- YD-250*NSF-LR type: S.G. is 2.0 and the limit is 2.0m.

The motor output and applicable S.G. at standard performance (50Hz)

Model	Std. performance	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
YD-250*NSF(1)3	6m-60L/min	1.05	1.7	2.0	-	-	-	-
YD-400*NSF(1)3	7m-100L/min	-	1.05	1.8	2.0	-	-	-
YD-500*NSF(1)3	9m-200L/min	-	-	1.05	1.45	2.0	-	-
YD-800*SF(1)3	15m-350L/min	-	-	-	-	1.05	1.5	-
YD-100**SF(1)3	12m-700L/min	-	-	-	-	-	1.05	1.4

- The standard performance of YD-2502NSF(1)3 is 7m-60L/min.

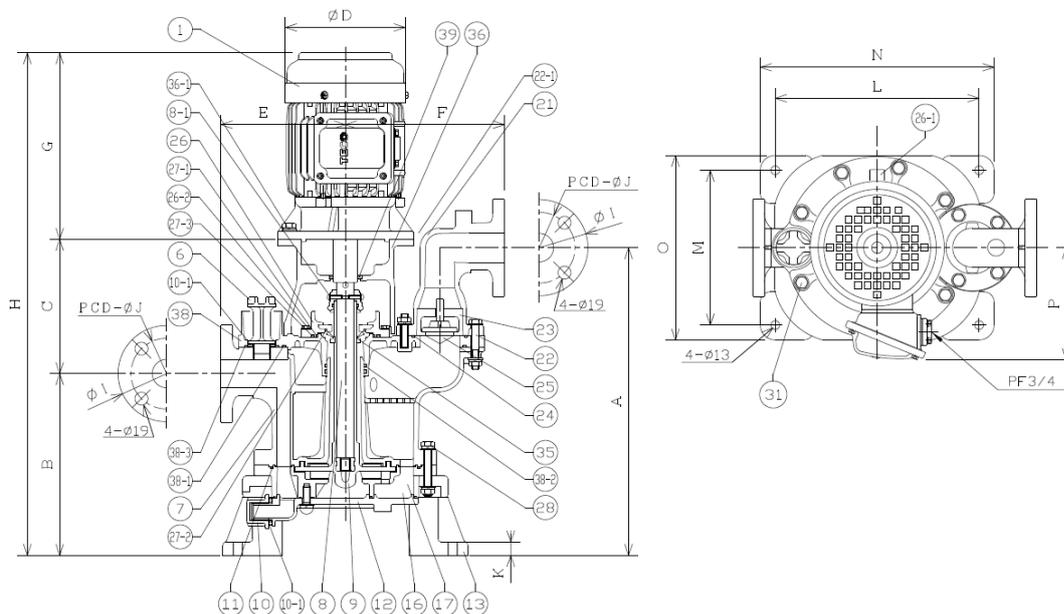
The motor output and applicable S.G. at standard performance (60Hz)

Model	Std. performance	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
YD-250*NSF(1)3	8m-70L/min	1.05	1.8	-	-	-	-
YD-400*NSF(1)3	9m-150L/min	-	1.05	2.0	-	-	-
YD-500*NSF(1)3	11m-200L/min	-	-	1.45	2.0	-	-
YD-800*SF(1)3	18m-350L/min	-	-	-	1.05	1.05	1.35
YD-100**SF(1)3	17m-700L/min	-	-	-	-	-	1.05

- The applicable specific gravity may be changed depending on the conditions.

[YD-NSF series]

Picture 3: Cross-sectional drawing



List 1: Parts list

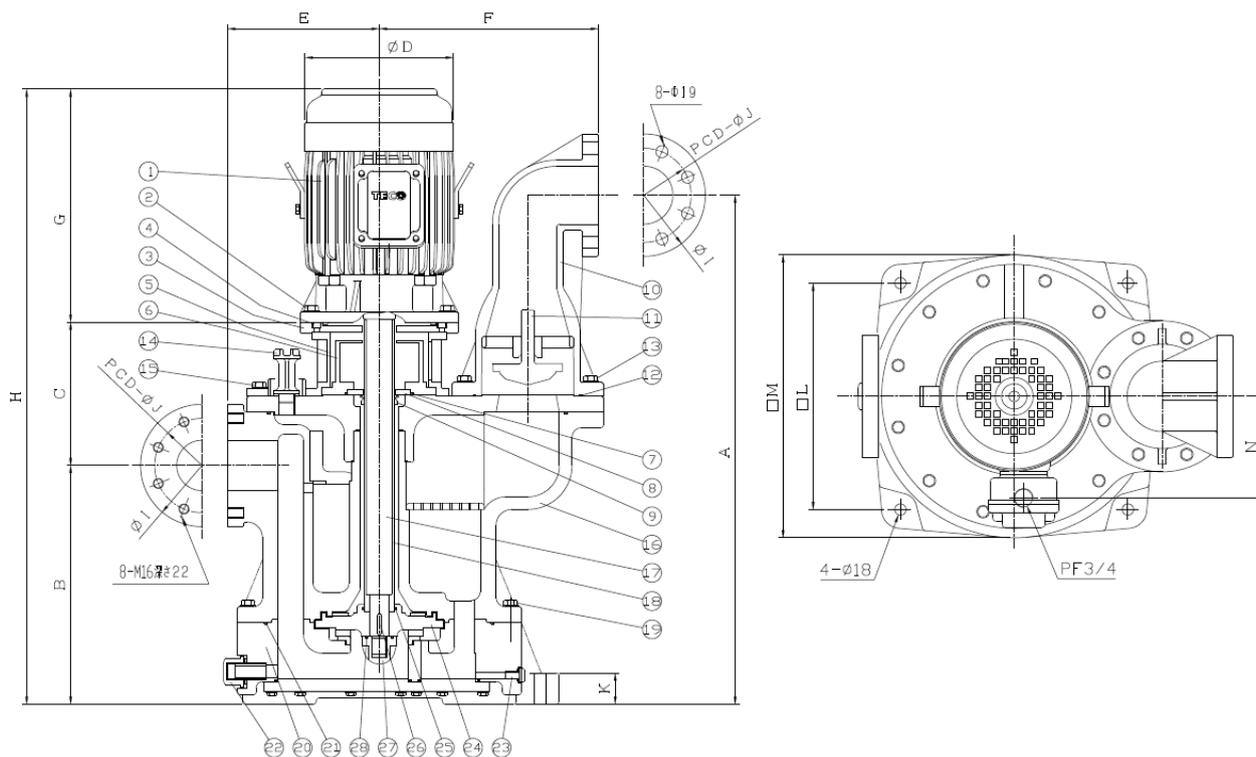
1	Motor	1		25	Valve	1	CFR-PP
6	Water priming plug	1	CFR-PP	26	Seal case	1	CFR-PP
7	Main body	1	CFR-PP	26-1	Overflow pipe	1	HT.PVC
8	Shaft	1	SUS	26-2	Hexagonal bolt	4	SUS
8-1	Bush	2	Diallyl	27-1	O-ring	1	EPDM/FPM
9	Impeller	1	CFR-PP	27-2	O-ring	1	EPDM/FPM
10	Drain cap	1	CFR-PP	27-3	O-ring	1	EPDM/FPM
10-1	Packing	1	EPDM/FPM	28	Hexagonal bolt	8	SUS
11	O-ring	1	EPDM/FPM	31	Hexagonal bolt	8	SUS
12	Casing	1	CFR-PP	35	Dry seal	1	FPM
13	Pump base	1	Polyester	36	Bracket	1	Polyester
16	Round screw	5	SUS	36-1	Hexagonal bolt	4	SUS
17	O-ring	5	EPDM/FPM	38	Upper flange	1	CFR-PP
21	Discharge elbow	1	CFR-PP	38-1	O-ring	1	EPDM/FPM
22	Hexagonal bolt	4	SUS	38-2	O-ring	2	EPDM/FPM
22-1	Stud bolt	1	SUS	38-3	O-ring	1	EPDM/FPM
23	Valve retainer	1	CFR-PP	39	Oil seal	1	NBR
24	O-ring	1	EPDM/FPM				

List 2: Dimension table

Model	A	B	C	ΦD	E	F	G	H	ΦI	J	K	L	M	N	O	P
YD-2500NSF1	435	256	177	136	175	202	250	683	125	90	20	280	200	340	244	142
YD-2501NSF(1)3	435	256	214	156.5	175	202	293.5	747	125	90	20	280	200	340	244	145.5
YD-2502NSF(1)3	435	256	214	202	175	202	273	743	125	90	20	280	200	340	244	168
YD-4001NSF(1)3	460	272	199	156.5	185	238	293.5	748	145	105	20	300	230	360	274	145.5
YD-4002NSF(1)3	460	272	199	176.5	185	238	309	792.5	145	105	20	300	230	360	274	153
YD-4003NSF(1)3	460	272	199	202	185	238	302	773	145	105	20	300	230	360	274	168
YD-5002NSF(1)3	489	294	206	176.5	194	264	309	821.5	155	120	20	320	260	380	304	153
YD-5003NSF(1)3	489	294	206	176.5	194	264	334	821.5	155	120	20	320	260	380	304	153
YD-5005NSF(1)3	489	294	206	243	194	264	326	863	155	120	20	320	260	380	304	187

[YD-SF series]

Picture 3: Cross-sectional drawing



List 1: Parts list

1	Motor	1		15	Hexagonal bolt	10	SUS
2	Hexagonal bolt	4	SUS	16	Main body	1	Epoxy
3	Motor flange	1	SS400	17	Shaft	1	S45C+Hastelloy
4	Flat head screw	6	SUS	18	Shaft sleeve	1	HT.PVC
5	Motor mount	1	SS400	19	Hexagonal bolt	12	SUS
6	Seal case	1	HT.PVC	20	Casing	1	Epoxy
7	O-ring	1	EPDM/FPM	21	O-ring	1	EPDM/FPM
8	Counter face ring	1	Carbon	22	Drain cap	1	CFR-PP
9	Dry seal	1	FPM	23	Drain bolt	1	CFR-PP
10	Discharge elbow	1	Epoxy	24	Impeller	1	HT.PVC
11	Valve	1	HT.PVC	25	O-ring	1	EPDM/FPM
12	O-ring	1	EPDM/FPM	26	Impeller key	2	Titanium
13	Hexagonal bolt	8	SUS	27	Impeller nut	1	HT.PVC
14	Water priming plug	1	CFR-PP	28	O-ring	1	EPDM/FPM

List 2: Dimension table

Model	A	B	C	φD	E	F	G	H	φI	J	K	□L	□M	□N
YD-8005SF(1)3	810	380	228	219	240	347	375	979	195	150	50	360	450	184
YD-8007SF(1)3	810	380	228	261	240	347	423	1032	195	150	50	360	450	203
YD-10007SF(1)3	810	380	228	261	240	347	423	1032	225	175	50	360	450	203
YD-10010SF(1)3	810	380	228	261	240	347	423	1032	225	175	50	360	450	203

5. Model description

YD – 2501 NSF3 – CP – D D 5 7

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

(1) Bore and Motor output

Model	Suction bore	Discharge bore	Output
YD-2500NSF1	25A	25A	0.4kW
YD-2501NSF(1)3			0.75kW
YD-2502NSF(1)3			1.5kW
YD-4001NSF(1)3	40A	40A	0.75kW
YD-4002NSF(1)3			1.5kW
YD-4003NSF(1)3			2.2kW
YD-5002NSF(1)3	50A	50A	1.5kW
YD-5003NSF(1)3			2.2kW
YD-5005NSF(1)3			3.7kW
YD-8005SF(1)3	80A	80A	3.7kW
YD-8007SF(1)3			5.5kW
YD-10007SF(1)3	100A	100A	5.5kW
YD-10010SF(1)3			7.5kW

- (2) Model name: NSF(1)3 SF(1)3
- (3) Material: CP: CFR-PP EP: Epoxy
- (4) Dry seal material: D: FPM
- (5) O-ring material: D: FPM (Fluorine-containing rubber (DAI-EL)) E: EPDM
- (6) Frequency: 5: 50Hz 6: 60Hz
- (7) Specific gravity: 1: 1.05 3: 1.35 4: 1.4/1.45 5: 1.5
6: 1.6 7: 1.7 8: 1.8 G: 2.0

6. Standard performance

Model	Standard performance (50Hz)	Standard performance (60Hz)	Weight (kg)
YD-2500NSF1	6m-60L/min	-	24
YD-2501NSF(1)3		8m-70L/min	37
YD-2502NSF(1)3			41
YD-4001NSF(1)3	7m-100L/min	9m-150L/min	41
YD-4002NSF(1)3			50
YD-4003NSF(1)3			58
YD-5002NSF(1)3	9m-200L/min	11m-200L/min	54
YD-5003NSF(1)3			56
YD-5005NSF(1)3			72
YD-8005SF(1)3	15m-350L/min	18m-350L/min	150
YD-8007SF(1)3			178
YD-10007SF(1)3	12m-700L/min	17m-700L/min	203
YD-10010SF(1)3			203

7. Disassembly / Assembly

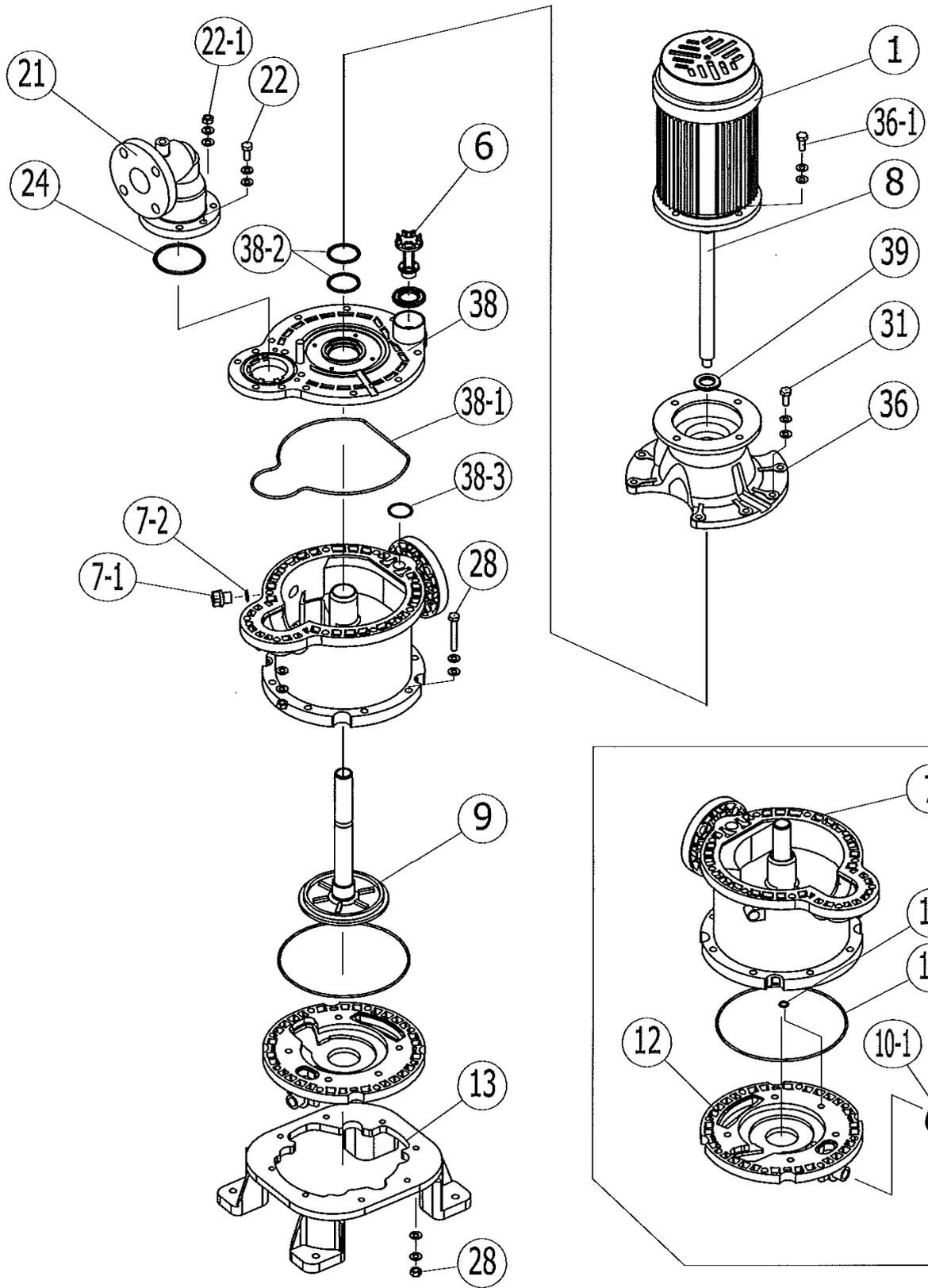
- A. Remove the pump from the pipe and drain the liquid completely through the drain plug (10). Inject water through the suction inlet / discharge outlet and priming hole to wash the inside of the pump.
- B. Remove the pump base...
- (1) The pump is placed face down.
 - (2) Remove eight bolts (28) to fix the pump base (13) and remove the pump base.
- C. Disassembling the pump
- (1) Remove the five bolts (16) to fix the casing. When removing the casing (12), the impeller (9) appears. They are set with care of 5 O-rings for main body when installing parts.
 - (2) Remove the over flow pipe (26-1) from the seal case (26).
 - (3) Put a screwdriver in the hole at the top of the bracket and loosen the two small screws to fix two locking sleeves (8-1).
 - (4) Likewise, put a screwdriver in the hole at the top of the bracket and lock the shaft. Clip the impeller nut (9) with a spanner and turn it counterclockwise. Unscrew and take the impeller out.
 - (5) Remove the pump body (7), the upper flange (38) and the discharge elbow (21) together from the bracket by loosening eight bolts to fix the bracket (31).
- D. Disassembling the upper flange
- (1) Remove the water priming plug (6) from the pump body (7).
 - (2) Remove the discharge elbow by loosening bolts to fix the discharge elbow (22) (22-1).
 - (3) Remove the upper flange (38) from the pump body (7).
If it is hard to remove the upper flange because of the O-ring (38-2), use the two cuts beneath the upper flange to remove it.
 - (4) Remove the seal case (26) by loosening four bolts to fix seal case (26-2).
- E. Remove the motor bracket
- (1) Remove the two locking sleeves (8-1) from the shaft.
 - (2) The motor bracket (36) is removed by loosening four bolts to fix the motor (36-1).
- Caution: The motor bracket (36) and the pump bracket (37) are adhered and all-in-one. Never disassemble them.

The above completes disassembling the pump unit. Assembly is followed these steps in reverse.

All screws are tightened by turning clockwise.

The tightening torque as reference (Motor bracket, Pump base (casing): 150kgf·cm (14.7N·m)

YD-NSF: Exploded view

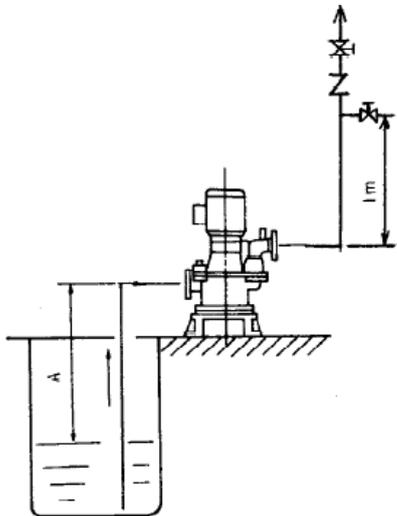


8. Handling precautions

- (1) Remove the bore stickers inlet and outlet of the pump before piping.
- (2) Don't rotate the pump backwards. (Except the reverse rotation instantly for checking the direction.)
- (3) The structure is that a certain amount of liquid remains in the casing when the pump is stopped.
- (4) If the self-priming liquid is easily bubbling, it may take a time or become impossible to pump up liquid and causes trouble.
- (5) If much slurry enters into the pump, it infills the behind of the impeller and lose the sealing ability. It may cause the liquid leak.
- (6) Liquid of a high specific gravity or temperature takes much time for self-priming. In such a case, it is necessary to take some appropriate measures like reducing the length of the suction pipe.
- (7) If much air enters, it becomes the self-priming failure. If the pump keeps to be operated for extended hours, it leads the deformation or burn out of the pump and casing to raise the liquid temperature.
- (8) To prevent to reduce the self-priming ability, have a vertical pipe of more than one meter on the outlet side with a bypass pipe for air exhaust.
- (9) Shorten the suction pipe length to minimize the resistance loss.
- (10) The suction height is depending on the type, specific gravity and temperature of the liquid. It is recommended to set it in consideration with the possible decrease.
- (11) It is recommended to place bending and expansion joints to prevent the deformation of the pump or liquid leak by the thermal expansion of pipes.
- (12) When using for waste liquid, install the strainer on the suction pipe to prevent foreign object.
- (13) When carrying the pump to change the installation site, repair or whatever, drain the liquid completely and wash the pump with water to ensure safety.
- (14) Handle the pump carefully not to make an impact, because of the resin base.
- (15) If the pump runs dry or liquid sealing by mistake, the inside may be high temperature. By this, if the priming plug or cock is opened, it spews the steam or hot liquid and is very dangerous. Make sure the temperature is fully-low and open it.
The minimum capacity of YD-25NSF1 (0.4kW) is 10L/min and other model is 20L/min during operation. Operate the pump with the capacity more than the above.
- (16) Turn on / off the pump is less than six times per hour. The frequent suspension strains the motor and the pump and it may cause their damage.
- (17) Tighten the drain plug and the priming plug periodically. The looseness may lead to liquid leak or the incapability of self-priming.
- (18) If using an inverter, the performance is possibly changed.
The self-priming ability decreases or failure occurs. By this, stop to use the inverter.

9. Installing & piping

The correct installation leads to the appropriate performance. The necessary requirements of a self-priming pump are to discharge the air enters during self-priming and the priming liquid for the next operation remains. Install the pump in accordance with the following instruction for smooth self-priming operation.

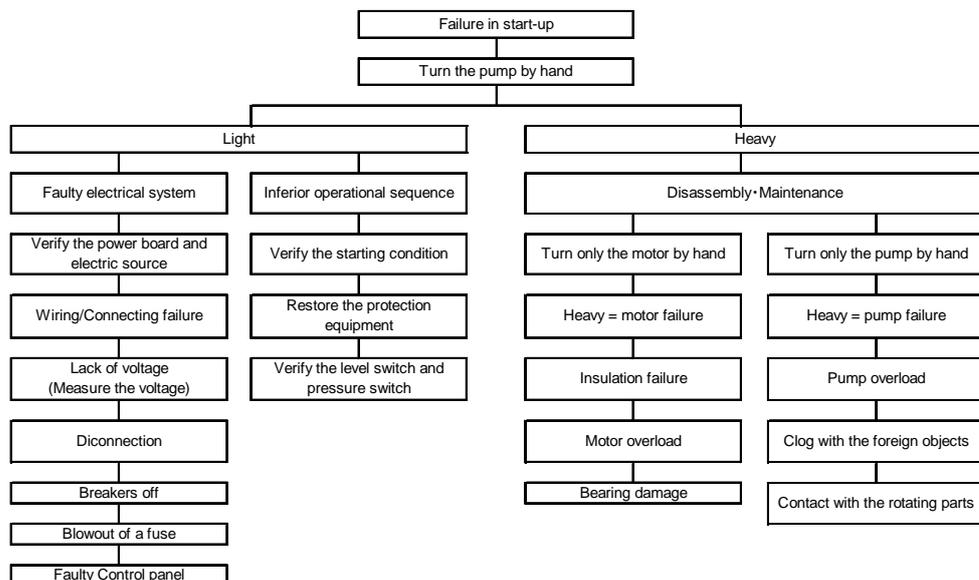


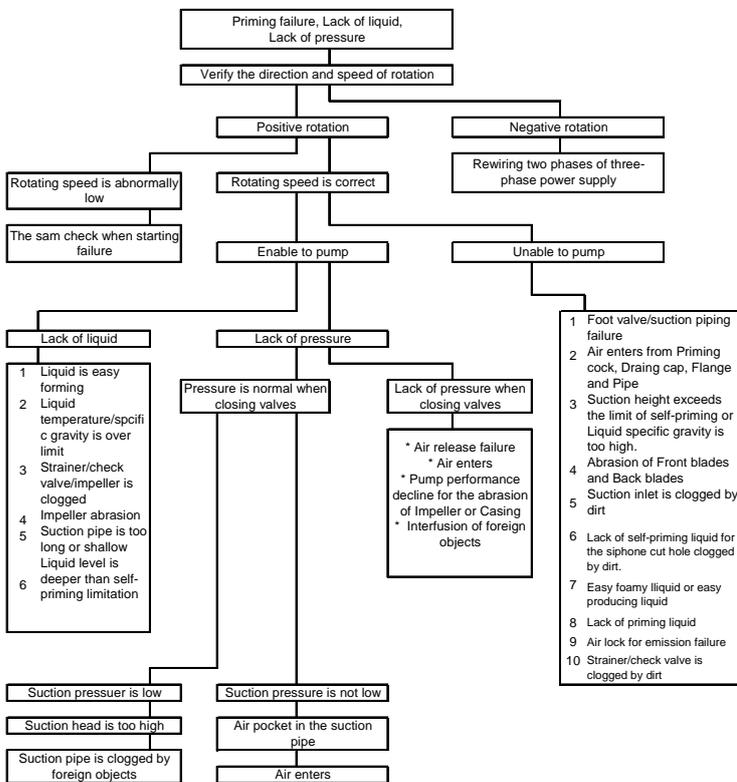
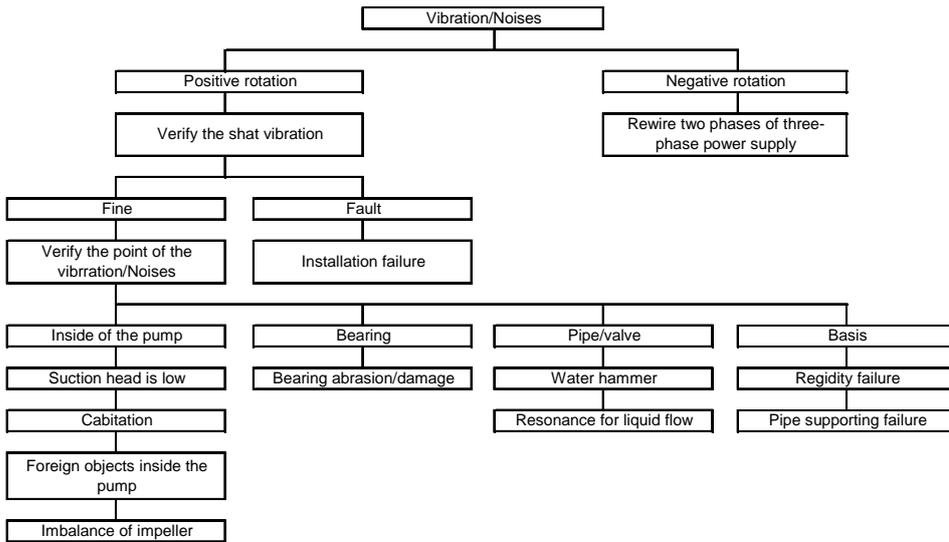
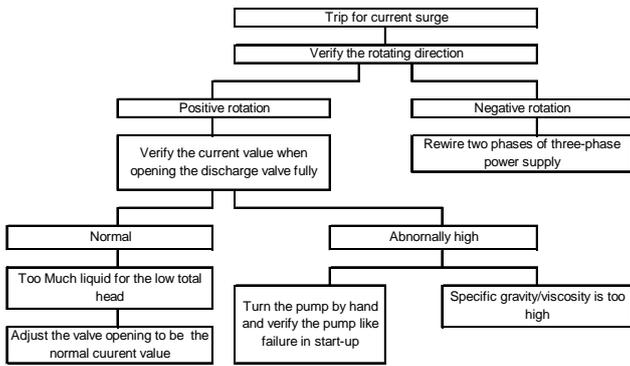
1. Provide the check valve at the discharge piping.
2. Be a vertical pipe of more than 1 meter at the discharge outlet and install the air release pipe with a valve.
3. Limit of suction height (Normal temperature / clear water)

Model	A (in terms of water)
YD-250*NSF(1)3	2.5m or less
	* LR: 2.0m or less
YD-400*NSF(1)3	3.0m or less
YD-500*NSF(1)3	3.5m or less
YD-800*SF(1)3	
YD-100**SF(1)3	

- (2) The limit of suction height “self-priming capacity” assumes that the suction pipe is provided vertically to the surface of water (clear water, 20°C). The actual self-priming capacity is affected by the type, temperature, viscosity, liquid specific gravity, shape and diameter of the suction pipe, the number of valves, the mixed air from the flange and valves, and other factors. It is recommended to use the pump with enough allowance in consideration with these conditions.
- (3) Provide the piping with 2 or more bends and expansion joints for heat release not to deform or damage the pump by thermal pipe expansion.

10. Troubleshooting





Warranty / Repair

1. Warranty period and coverage

- 1) The warranty period is one year from shipping out of our factory.
- 2) During warranty period, if the pump breaks down or becomes damaged in normal operating condition for our manufacturing defect(s), the parts of breakdown or damaged is repaired free of charge.
- 3) It is charged to repair for the following causes of breakdown(s) or damage(s) and replace parts.
 - Any breakdown or damage occurred after the warranty period.
 - Any breakdown or damage for improper use or safekeeping.
 - Any breakdown or damage to use parts manufactured by others or unauthorized parts.
 - Any breakdown or damage to repair or modify by an unauthorized agent.
 - Any breakdown or damage as a result of natural disaster.
- 4) Any breakdown or damage of a product manufactured using the specification or material designated by the customer are not covered by warranty.
- 5) Irregularities or breakdowns for chemical or hydrodynamic corrosion or the property of liquid that was pumped are not covered by 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 is resolved through discussion between the customer and the manufacturer.
- 7) Any travel expenses incurred for non-warranted repair service to a remote location is charged.
- 8) Any expense or other damage incurred as a result of a breakdown during operation is not covered by warranty.

2. Repair

Notice: When repairing, consult your supplier. Wash the wet parts kit for the returned pump adequately and pack it.

If any irregularity is detected during operation, stop the pump and check it. Refer to the section on "Troubleshooting".

1. To request a repair service, ask your supplier or us.
2. Before requesting a repair service, read this instruction manual carefully and check it, again.
3. When requesting a repair service, provide the following information:
 - Pump model and serial number
 - The period of use and the condition
 - The failure parts and the condition
 - Type of liquid (name, specific gravity, temperature, any slurry or not)

Clean the inside of the pump adequately when returning it, because if the residual liquid leaks out during shipment, it creates a hazardous condition.

Use names in the parts table (P6, 7) to order for replacement or spare parts. Nevertheless, also provide the part number and the material just in case.

Model:	
Purchase date:	S/No.
Start date:	Supplier:



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