Pump & Oil collecting system

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(Catalogue、Manual)

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■ Note

● It is subject to change the contents without notice.

● This catalogue was issued in February 2026.

VALVELESS VERTICAL SELF-PRIMING PUMP

NSF/SF series

Vertical sealless selp-priming pump **SELFREE Taf**

World Chemical Co.,Ltd.

A highly reliable vertical seal-less self-priming pump with minimal failures and excellent resistance to malfunction.

Applications

- Ideal for transferring wastewater containing small amounts of slurry or foreign objects.
- Ideal for pumping slurry-containing wastewater from raw wastewater tanks.
- Ideal for eliminating problems caused by dry suction and dry-running operation.

Features

How a Self-Priming Pump Works (YouTube)

Highly resistant to dry running.

・Valveless self-priming pump

The pump features a siphon-cut function that prevents the siphon effect and retains priming liquid inside the pump; therefore, no internal valve mechanism is required.
Once the pump has been primed before the first operation, the liquid remains in the casing after shutdown, so priming is not required for the next operation.
There is no risk of failure due to dry running caused by forgetting to prime the pump.

・Sealless structure

As a seal-less pump with no sliding components in operation, it does not generate heat and is highly resistant even under dry-running conditions.

Highly resistant to slurry-containing liquid.

An open impeller design ensures durable performance for wastewater transfer with minor slurry or solid contamination.

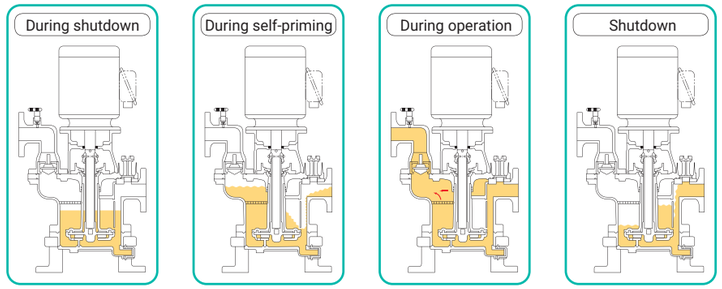
High chemical resistance.

The main components of the NSF type are made of carbon fiber–reinforced polypropylene (CFR PP), providing corrosion resistance even for wastewater containing hydrofluoric acid.

Less frequent replacement of consumable parts.

The seal-less design eliminates wear of shaft seal components, resulting in less frequent replacement of consumable parts.

Self-Priming Principle



After the pump is stopped, the suction chamber with the siphon-cut feature retains the liquid required for the next self-priming operation.

At the start of operation, the liquid in the suction chamber moves into the self-priming chamber, and the circulation action increases the vacuum, drawing the liquid upward.

All the air inside the pump body is discharged, ensuring normal operation. Even if a small amount of air is drawn in, it is discharged without affecting the pump's performance.

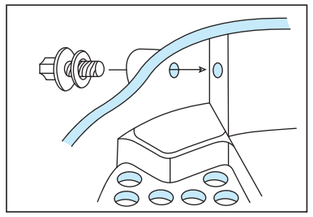
When the pump stops, the liquid may flow back, but the siphon-cut function ensures that liquid remains in the suction chamber.

NSF/SF series

Ⓐ Siphon-cut hole

The siphon-cut hole connects the self-priming chamber and the suction chamber. It is liquid-sealed by the discharged liquid, maintaining airtightness and keeping the suction chamber under vacuum during self-priming.
During operation, the negative pressure in the suction chamber allows air to flow in through the siphon-cut hole, ensuring that priming liquid remains.

If the siphon-cut hole becomes clogged by foreign objects or crystals, the amount of priming liquid decreases; in that case, open the cleaning hole plug and clean the clog.



※ The cleaning hole plug is installed only on the NSF series.

Ⓑ Separation plate

It is a component that separates the air-liquid mixture by specific gravity and is mounted inside the self-priming chamber.

Ⓒ Balance hole

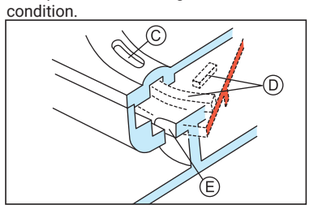
Air drawn in from the shaft is guided by the projection ring and discharged into the self-priming chamber through this balance hole. This ensures that the center of the impeller remains under high vacuum during self-priming.

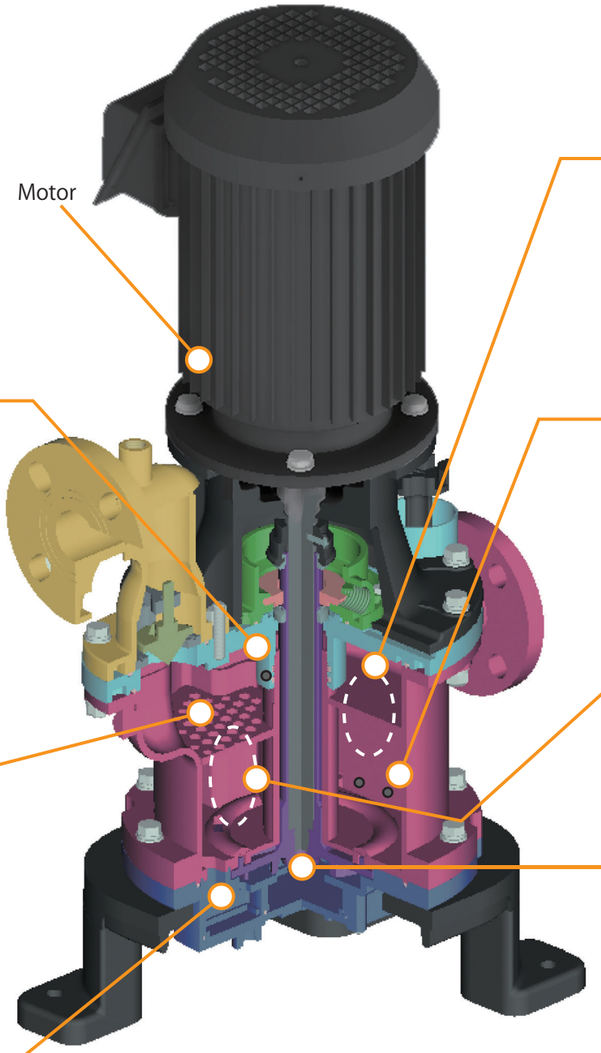
Ⓓ Seal blade & Protruding ring

The seal blade (back blade) functions to liquid-seal the liquid within the pump. During self-priming, the protruding ring directs the air drawn in along the shaft to the balance holes.

Ⓔ Self-priming hole

The liquid separated from the air in the self-priming chamber is injected into the impeller through this self-priming hole and operates under a high-vacuum condition.



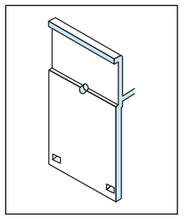


Ⓕ Suction chamber

The suction chamber is divided into a passage and a residual chamber.
When the pump stops, the liquid in the passage flows back rapidly; however, the liquid on the residual chamber side is air-cut by air introduced through the siphon-cut hole, allowing the priming water to remain for the next self-priming operation.

Ⓖ Suction-cut hole

This hole is provided to retain the liquid required for the next self-priming operation in the suction chamber by preventing backflow of liquid that occurs when the pump stops.
Therefore, this part is located on the passage wall of the suction chamber.

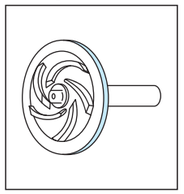


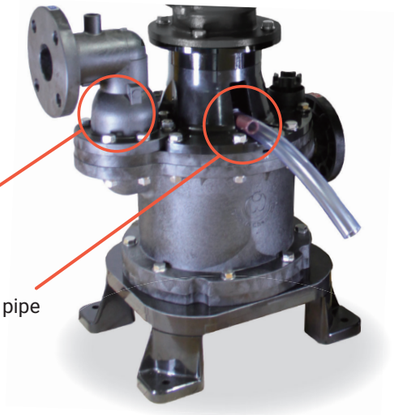
Ⓗ Self-priming chamber

The liquid discharged from the volute chamber enters this self-priming chamber, where air and liquid are separated by the difference in specific gravity; the air is directed to the discharge outlet, while the liquid is sent to the self-priming inlet.

Ⓘ Shaft sleeve & Impeller

The impeller is integrated with the shaft sleeve, and the shaft is completely isolated from the pumped liquid.
The open impeller has sufficient power to pass liquids containing a certain amount of slurry.





When the pump is stopped, liquid flows back from the discharge piping side, ensuring that the priming water required for the next operation is retained inside the casing.

At this time, dual protective measures are provided to prevent the liquid level inside the pump from rising excessively due to pressure effects or other factors and causing leakage.

① A valve installed in the discharge elbow reduces the flow velocity of the backflowing liquid.

② In the event that the liquid level rises excessively, the liquid is discharged to the outside through the overflow pipe.

<Model designation>

※ The allowable specific gravity is depending on the model. Please check the specifications.
※The "shaft type" and "internal sealing" at the end of the model designation are fixed for each model.

YD-2501NSF3-CP-DD61-J N

- **Discharge bore**: 25 : 25A / 40 : 40A / 50 : 50A / 80 : 80A / 100 : 100A
- **Motor output**: 00 : 0.4kW / 01 : 0.75kW / 02 : 1.5kW / 03 : 2.2kW / 05 : 3.7kW / 07 : 5.5kW / 10 : 7.5kW / 15 : 11kW
- **Model**: NSF / SF
- **Motor type**: 1 : IE1 / 3 : IE3
- **Main material**: CP : CFR-PP / EP : Epoxy resin
- **Seal type**: D : Dry seal / L : Linear seal (Only NSF)
- **O-ring material**: D : FPM / E : EPDM
- **Frequency**: 5 : 50Hz / 6 : 60Hz
- **Allowable S.G.**: 1 : 1.05 / 3 : 1.35 / 4 : 1.45 / 5 : 1.5 / 6 : 1.6 / 7 : 1.7 / 8 : 1.8 / G : 2.0
- **Shaft type**: J : Joint type / M : Long shaft motor
- **Internal seal**: N: O-ring / No mark : W seal

<Specifications>

NSF series = Material : CFR PP
SF series = Material : Epoxy

※ Please contact us if the pump is to be used at temperatures of 60°C or higher.

Frequency	Model		Bore Suction	Bore Discharge	Standard performance (THD: m - Capacity: L/min)	Output (kW)	Allowable S.G.	Weight (kg)	Limit of liquid temp. (℃)
50Hz	NSF	YD-2500NSF1-CP-D□51-JN	25A	25A	6-60	0.4	1.05	23	80
		YD-2501NSF3-CP-D□57-JN				0.75	1.7	26	
		YD-2502NSF3-CP-D□5G-JN			7-60	1.5	2.0	33	
		YD-4001NSF3-CP-D□51-JN	40A	40A	7-100	0.75	1.05	28	
		YD-4002NSF3-CP-D□58-JN				1.5	1.8	35	
		YD-4003NSF3-CP-D□5G-JN				2.2	2.0	40	
		YD-5002NSF3-CP-D□51-JN	50A	50A	9-200	1.5	1.05	40	
		YD-5003NSF3-CP-D□54-JN				2.2	1.45	44	
		YD-5005NSF3-CP-D□5G-JN				3.7	2.0	62	
	SF	YD-8005SF3-EP-D□51-M	80A	80A	15-350	3.7	1.05	150	70
		YD-8007SF3-EP-D□55-M				5.5	1.5	178	
		YD-10007SF3-EP-D□51-M	100A	100A	12-700	5.5	1.05	203	
		YD-10010SF3-EP-D□54-M				7.5	1.4	203	
60Hz	NSF	YD-2501NSF3-CP-D□61-JN	25A	25A	8-70	0.75	1.05	26	80
		YD-2502NSF3-CP-D□68-JN				1.5	1.8	33	
		YD-4002NSF3-CP-D□61-JN	40A	40A	9-150	1.5	1.05	35	
		YD-4003NSF3-CP-D□64-JN				2.2	1.45	40	
		YD-5003NSF3-CP-D□61-JN	50A	50A	11-200	2.2	1.05	44	
		YD-5005NSF3-CP-D□66-JN				3.7	1.6	62	
	SF	YD-8007SF3-EP-D□61-M	80A	80A	18-350	5.5	1.05	178	70
		YD-8010SF3-EP-D□63-M				7.5	1.35	178	
		YD-10010SF3-EP-D□61-M	100A	100A	17-700	7.5	1.05	203	

Self-priming capability by liquid specific gravity

(Temp. 20℃)

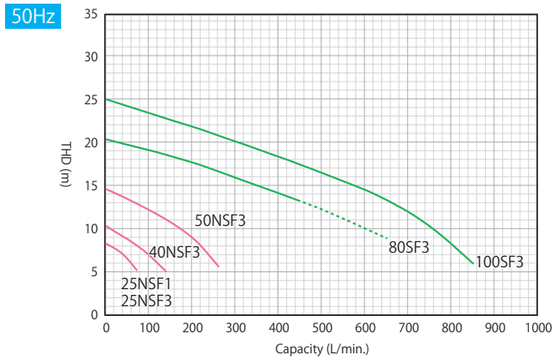
Model \ S.G.	1.0	1.1	1.3	1.5
YD-250*NSF(1)3	2.5m	2.3m	1.9m	1.7m
YD-400*NSF3	3.0m	2.7m	2.3m	2.0m
YD-500*NSF3	3.5m	3.2m	2.7m	2.3m
YD-800*SF3				
YD-100**SF3				

※ The left self-priming performance data are based on a liquid temperature of 20°C; self-priming capability decreases as the liquid temperature increases.
※ For the YD-250＊NSF-LR model, the self-priming limit is 2.0 m at a specific gravity of 1.0.YD-250

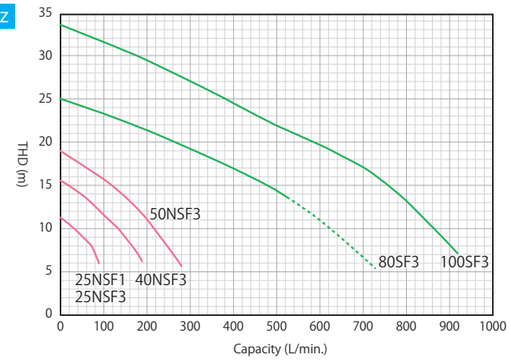
NSF/SF series

<Performance curves>

50Hz



60Hz



<Installation & piping instructions>

The pump will deliver its specified performance only when properly installed and piped.
In particular, for self-priming pumps, the following two points are essential requirements.
① Smooth discharge of air drawn in during self-priming.
② To ensure that the priming water required for the next self-priming operation remains completely inside the pump.
To ensure smooth self-priming operation, please carry out installation in accordance with the procedures described in the instruction manual.

<Suction-lift applications>

- ① Install a check valve and a valve on the discharge piping.
- ② On the discharge side, provide a vertical riser piping of at least 50 cm and install an air release line with a valve.
- ③ Be sure to install the pump so that the suction lift falls within the specifications shown on the right. (Values are based on clean water at normal temperature.)
- ④ Do not install a foot valve on the suction side for the dry seal type, as it may cause liquid leakage during shutdown.

Model	A (Limit of suction head)
YD-250*NSF	2.5 m or less (LR:2.0 m or less)
YD-400*NSF	3.0 m or less
YD-500*NSF YD-800*SF YD-100**SF	3.5 m or less

※ See P.3 for the self-priming limit in relation to liquid specific gravity.

- The maximum suction lift (self-priming capability) of the pump is based on clean water at normal temperature (20°C), with the suction piping installed vertically downward from the pump to the water surface.
  Actual self-priming performance may be reduced depending on the type of liquid, temperature, viscosity, specific gravity, as well as the configuration, length, and diameter of the suction piping, the number of valves, and air ingress from flanges and valves.
- Thermal expansion of the piping due to liquid temperature may cause deformation or damage to the pump.
  When handling high-temperature liquids, as a preventive measure, provide the piping with at least two bends or install an expansion joint.

Linear seal type (NSF-LR series)

The shaft is sealed with a magnetically energized sealing material, making the pump highly resistant to wear from slurry-containing liquids as well as to dry running.
Please contact the saleperson in charge for details.

Self-Priming / Flooded Suction Capable

Piping Example

※ Flooded suction head limit : 2 m
If the pump is to be used with a flooded suction head of 2 m or more, please contact us.

<During operation>

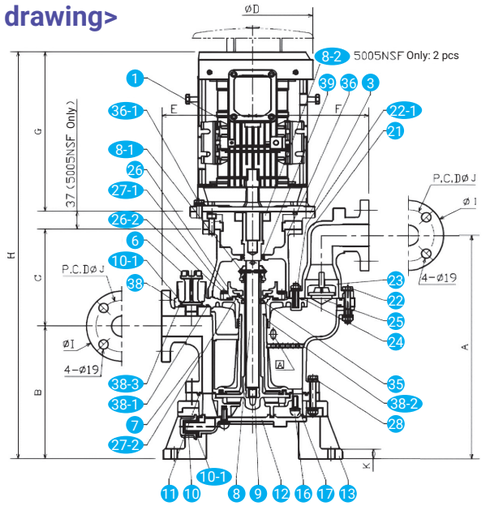
During pump operation, centrifugal force causes the magnetic poles of the magnets inside the rotating disk to change, and they repel the magnets in the movable seal, opening the seal faces that were previously attracted and in contact.
As the impeller continues to rotate, hydraulic balance is generated by the action of the back blades, preventing the liquid from rising above the area above the back blades.
As a result of these actions, all components operate in a non-contact (non-sliding) condition.

<During shutdown>

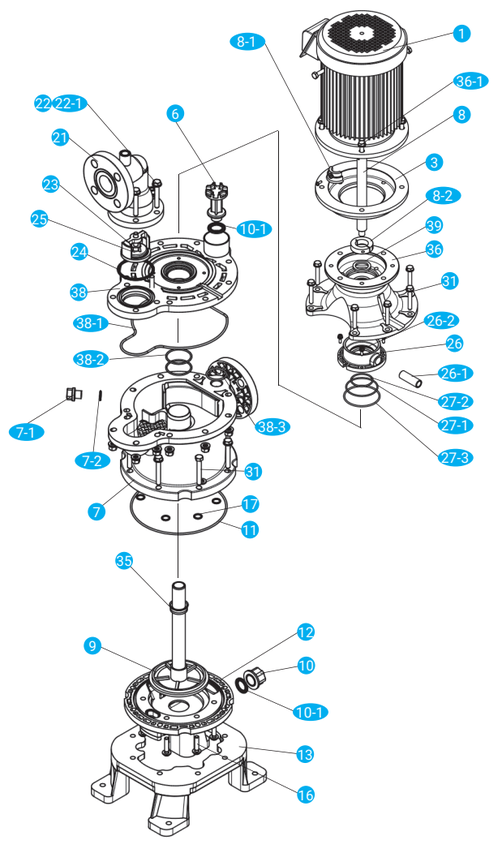
When the pump stops, the liquid flowing back from the discharge side and the liquid pushed in from the suction side cause the liquid level inside the pump to rise, tending to flow out through the shaft seal section.
To prevent this movement, the cut seal closes and functions as a liquid seal (it does not provide a completely tight seal).
In addition, at the moment the pump stops, the magnetic poles of the magnet inside the rotating disk change and attract (adhere to) the magnet inside the movable seal.
By sealing the shaft seal section, the air inside the pump is confined, suppressing the rise of the internal liquid level and preventing liquid leakage to the outside.
Since the shaft seal section does not come into contact with the liquid, reliable sealing performance is maintained even with slurry-containing liquids.

NSF series

<Outline drawing>



<NSF: Exploded view>



<Parts list>

No.	Parts name	Material
1	Motor	
※3	Motor flange	FC200・PP (Black)
6	Primig plug	CFR-PP
7	Main body	CFR-PP
7-1	Cleaning hole plug	CFR-PP
7-2	O-ring for cleaning hole plug	EPDM/FPM
8	Shaft	SUS
8-1	Locking Split Sleeve	Diallyl etc.
8-2	Slit collar	S45C
9	Impeller	CFR-PP
10	Drain cap	CFR-PP
10-1	Gasket for drain cap	EPDM/FPM
11	O-ring for casing	EPDM/FPM

No.	Parts name	Material
12	Casing	CFR-PP
13	Pump base	Polyester
16	Bolt for casing	SUS
17	O-ring for main body	EPDM/FPM
21	Discharge elbow	CFR-PP
22	Bolt for discharge elbow	SUS
22-1	Bolt for discharge elbow	SUS
23	Valve seat	CFR-PP
24	O-ring for discharge elbow	EPDM/FPM
25	Valve	CFR-PP
26	Seal case	CFR-PP
26-1	Overflow pipe	HT.PVC
26-2	Bolt for seal case	SUS

No.	Parts list	Material
27-1	O-ring for seal case	EPDM/FPM
27-2	O-ring for seal case	EPDM/FPM
※27-3	O-ring for seal case	EPDM/FPM
28	Bolt for main body	SUS
31	Bolt for bracket	SUS
35	Dry seal	FPM
36	Bracket	Polyester etc.
36-1	Bolt for motor	SUS
38	Upper flange	CFR-PP
38-1	O-ring for upper flange	EPDM/FPM
38-2	O-ring for inner pipe	EPDM/FPM
38-3	O-ring for priming water plug	EPDM/FPM
39	Oil seal	NBR

※1 No.3 i s for only 5005NSF3.
※2 No.27-3 is for only 40/50NSF3 series.

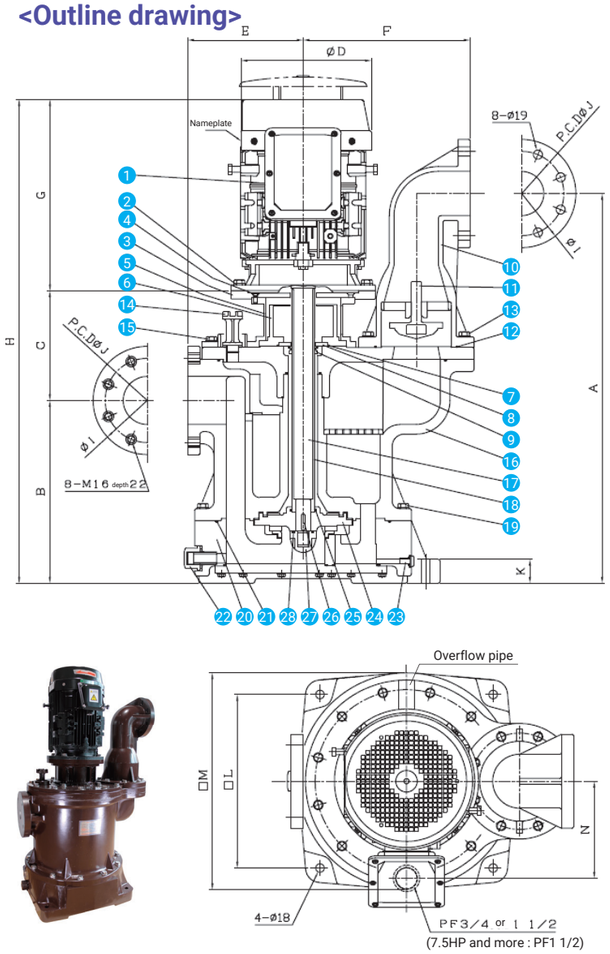
<Dimensions>

(mm)

Model	Output	A	B	C	φD	E	F	G	H	φI	J	K	L	M	N	O	P
YD-2500NSF1	0.4kW	435	256	177	154	175	202	231	664	125	90	20	280	200	340	244	135.5
YD-2501NSF3	0.75kW	435	256	214	172	175	202	235.5	705.5	125	90	20	280	200	340	244	144
YD-2502NSF3	1.5kW	435	256	214	202	175	202	273	743	125	90	20	280	200	340	244	168
YD-4001NSF3	0.75kW	460	272	199	172	185	238	235.5	706.5	145	105	20	300	230	360	274	144
YD-4002NSF3	1.5kW	460	272	199	202	185	238	273	744	145	105	20	300	230	360	274	168
YD-4003NSF3	2.2kW	460	272	199	202	185	238	302	773	145	105	20	300	230	360	274	168
YD-5002NSF3	1.5kW	489	294	206	202	194	264	273	773	155	120	20	320	260	380	304	168
YD-5003NSF3	2.2kW	489	294	206	202	194	264	302	802	155	120	20	320	260	380	304	168
YD-5005NSF3	3.7 k W	489	294	206	243	194	264	326	863	155	120	20	320	260	380	304	187

SF series

<Outline drawing>



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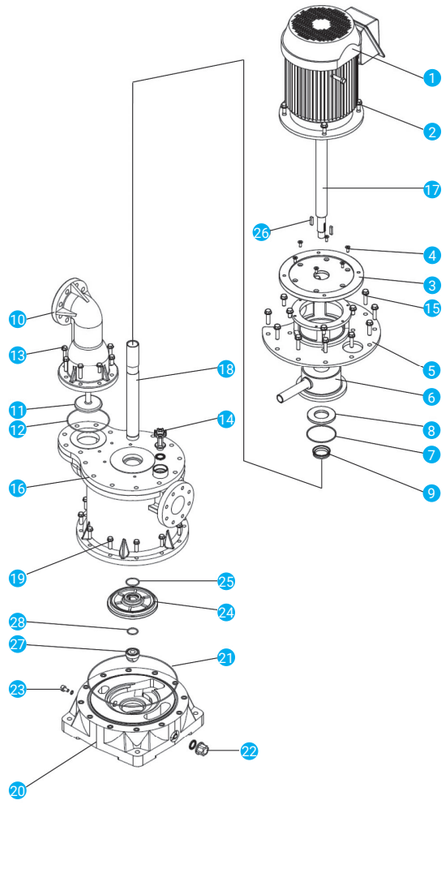

<Parts list>

No.	Parts name	Material
1	Motor	
2	Bolt for Motor	SUS
3	Motor flange	SS400
4	Bolt for motor flange	SUS
5	Motor mounting	SS400
6	Seal case	HT.PVC
7	O-ring for seal case	EPDM/FPM
8	Counter face ring	Carbon
9	Dry seal	FPM
10	Discharge elbow	Epoxy
11	Valve	HT.PVC
12	O-ring for discharge elbow	EPDM/FPM

No.	Parts name	Material
13	Bolt for discharge elbow	SUS
14	Priming plug	CFR-PP
15	Bolt for motor base	SUS
16	Main body	Epoxy
17	Shaft	S45C+Hastelloy
18	Shaft sleeve	HT.PVC
19	Bolt for main body	SUS
20	Casing	Epoxy
21	O-ring for casing	EPDM/FPM
22	Drain cap	CFR-PP
23	Auxiliary drain Bolt	CFR-PP
24	Impeller	HT.PVC

No.	Parts name	Material
25	O-ring for impeller	EPDM/FPM
26	Impeller key	Titanium
27	Impeller nut	HT.PVC
28	O-ring for impeller nut	EPDM/FPM

<Dimensions>

(mm)

Model	Output	A	B	C	φD	E	F	G	H	φI	J	K	□L	□M	N
YD-8005SF3	3.7 k W	810	380	228	243	240	347	359	967	195	150	50	360	450	151.5
YD-8007SF3	5.5 k W	810	380	228	285	240	347	397	1005	195	150	50	360	450	201.5
YD-8010SF3	5.5kW	810	380	228	285	240	347	397	1005	195	150	50	360	450	201.5
YD-10007SF3	5.5kW	810	380	228	285	240	347	397	1005	225	175	50	360	450	201.5
YD-10010SF3	7.5kW	810	380	228	285	240	347	397	1005	225	175	50	360	450	201.5