

# GV series

Valveless self-priming magnet drive pump  
SUPERMAG



# GV series

VALVELESS SELF-PRIMING MAGNET DRIVE PUMP

Commissioner of Patents  
Award

YD-2500GV YD-4003GV/GVF  
YD-2501GV/GVF YD-5002GV/GVF  
YD-2502GV/GVF YD-5003GV/GVF  
YD-4001GV/GVF YD-5005GV/GVF  
YD-4002GV/GVF

Suction head **5m2 minutes**



**Instand  
Self-  
priming**

## Fastest self-priming in the world!

The internal structure with vapor-liquid separation and the action of the whirl chamber, that the separating board and self-priming circulation hole prevent air suction, reduce self-priming loss and maximize the pump ability. While compact, the suction head is 5 m in just 2 minutes and the self-priming ability is the fastest in the world. It is our original valveless technology.

## Resist dry running!

- The world's recognized valveless structure.**  
Our original valveless structure (International patent) leaves self-priming liquid for restart without check valves and resists dry running.
- Bearing structure of heat release / insulation.**  
When dry running, usually sliding parts have friction heat and the shaft and bearing are raised to high temperature. It causes the pump damage. However, heat insulating material which we use for the sliding parts and our heat release structure reduce the temperature and cause less deformation.
- Air lock prevention function.**  
During self-priming, air enters and air spot occurs, but the internal rear casing and our original Impeller shape make air move and release.

## Smallest footprint in this class!

Compact and light body. The pump (1.5 kW and more) has powerful rare earth magnets and delivers intense power while compact. (Using for high specific gravity liquid is also available.)

## Design concept-changing our self-priming power 5m in 2 minutes!

### Applications

**For pumping/transferring liquid from the top of a tank or measures against environment / earthquake.**

The design concept of YD-GV is "More compact". In particular, the pump (1.5 kW and more) has powerful rare earth magnets. It is suitable for facility renewal or process line design suffering from installation space.

**For pumping up from a deep tank / to high.**

It is possible to pump up from a deep tank or to high (25 m) by incredible self-priming ability and maximizes the stable efficient self-priming ability regardless of large or small of the bore.

**Horizontal / up and down piping is available.**

It is possible to arrange the suction piping under stringent conditions which conventional pumps seem not to be used such as 10 m horizontal / up and down piping or no space near a tank. (Others: For transferring liquid from a clean room to outdoor.)

**For liquid which is easy of gas lock.**

For sparking liquid (hydrogen peroxide, hydrogen peroxide, sodium carbonate, etc.) that gas stays in the pump / piping, the valveless self-priming pump, which takes all possible measures, gives full scope to the ability.

**For transferring high specific gravity liquid.**

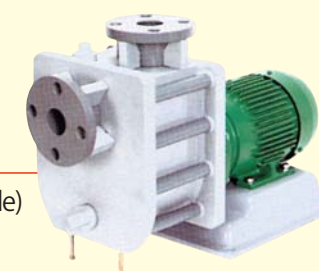
No need for impeller cut nor selection of the upper level pump for deficiency in performance. It is possible to select the pump efficiency by torque up of the motor or magnet without the performance down.

### Lead the world *Evolution of valveless self-priming pump*

The world's first valveless pump born in 1974. It was developed by the original idea which defied the pump's common wisdom that check valves, the main cause of the pump, was removed.

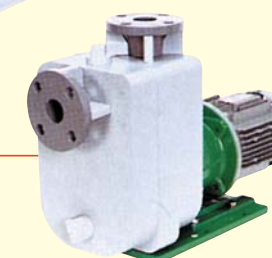
**1971**

No valve self-priming SV  
Mechanical type / PVC (polyvinyl chloride)



**1994**

Valveless self-priming magnet drive pump GV  
PP (polypropylene)



Valveless self-priming magnet drive pump GV  
PP (polypropylene) / molding


**2000**



Valveless self-priming magnet drive pump GVF  
ETFE (Tetrafluoroethylene, Ethylene copolymer) molding

**2002**






Thought-out shaft about durability with two points.

- The durability of the shaft gets dramatically better by the two points support structure.
- SiC shaft which resists abrasion well is available.


**A Shaft**



Air release structure of the rear casing with measures to prevent air lock.

- Air release structure of the rear casing and air stay prevention of the impeller fulfill measures against air lock.
- Carbon fiber is adopted to reinforce the rear casing and the pressure resistance gets dramatically better.


**B Rear casing**



Variety of Bearing against wide range of liquid.

- Selectable bearing depending on use liquid / with slurry or not.
- 4 types of material: Carbon / Ceramics / Rearfuron / SiC


**C Bearing**



No need to adjust the position of the bolt holes when installation.

- Loose flange is adopted to fit to the other side freely and possible to replace from other maker's pump with free from worry about connecting dimension.

**F ルーズフランジ**

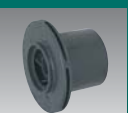


Exclusive motor (with Terminal box)

The exclusive motor is outdoor type as standard and the durability gets better.

- Reinforced plastic terminal box does not ruin and can be used in a chemical atmosphere. Besides, it is placed at the top of the motor to wire easily.
- Lip seal is attached for measures against gas caused corrosion and liquid leakage. It increases the motor life very much.
- When using the inverter with 400V, the motor is general one.

**E Exclusive motor (with Terminal box)**



Impeller & Magnet

Rare earth magnet is adopted and makes the impeller compact.

(1.5kW and more)

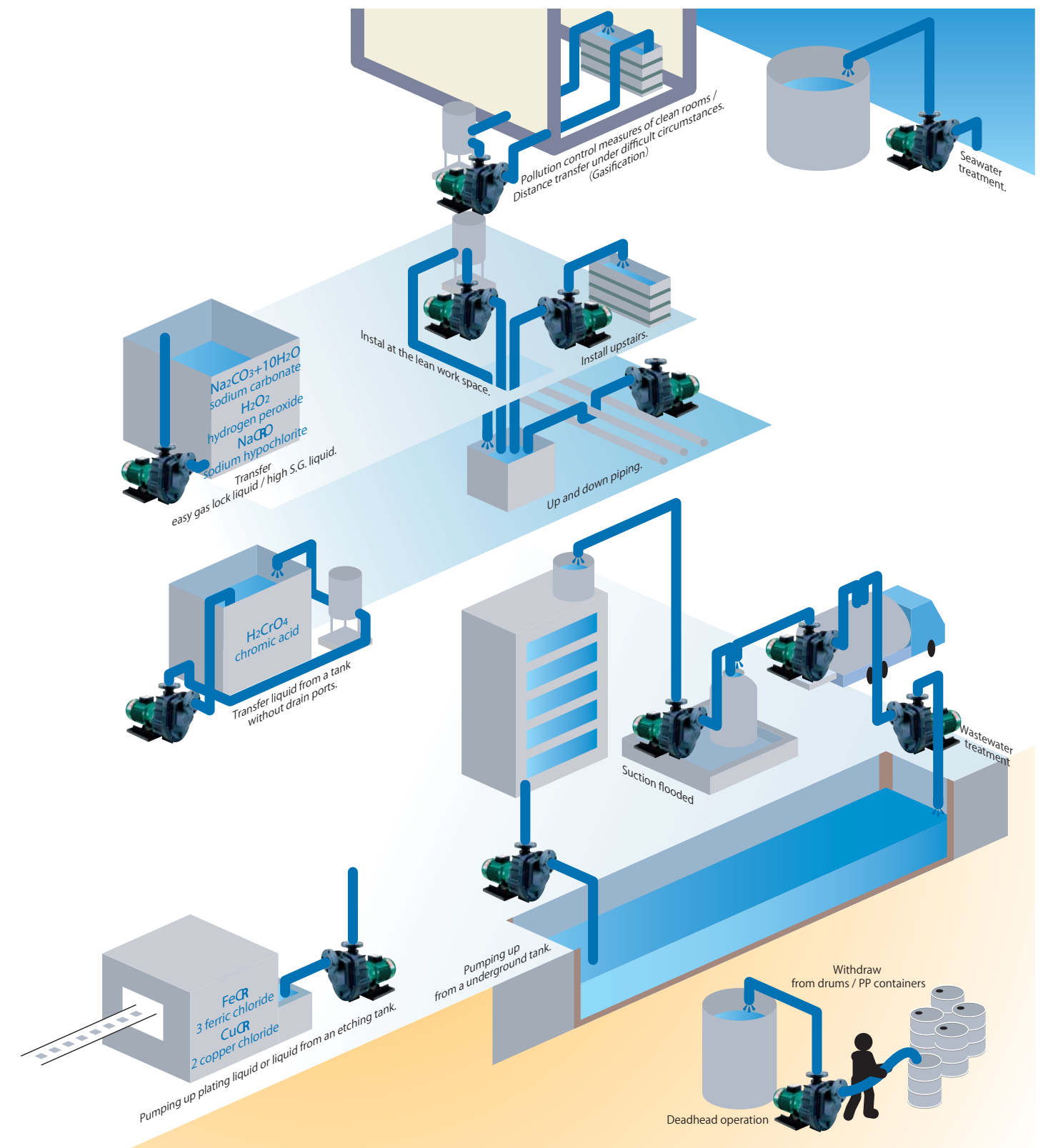
- Powerful rare earth magnet is adopted. (1.5kW and more) It delivers superior performance.
- The impeller is integrated with the magnet and has a resistance to inverse rotation and high temperature.
- Our original impeller shape is high efficiency.

**D Impeller & Magnet**

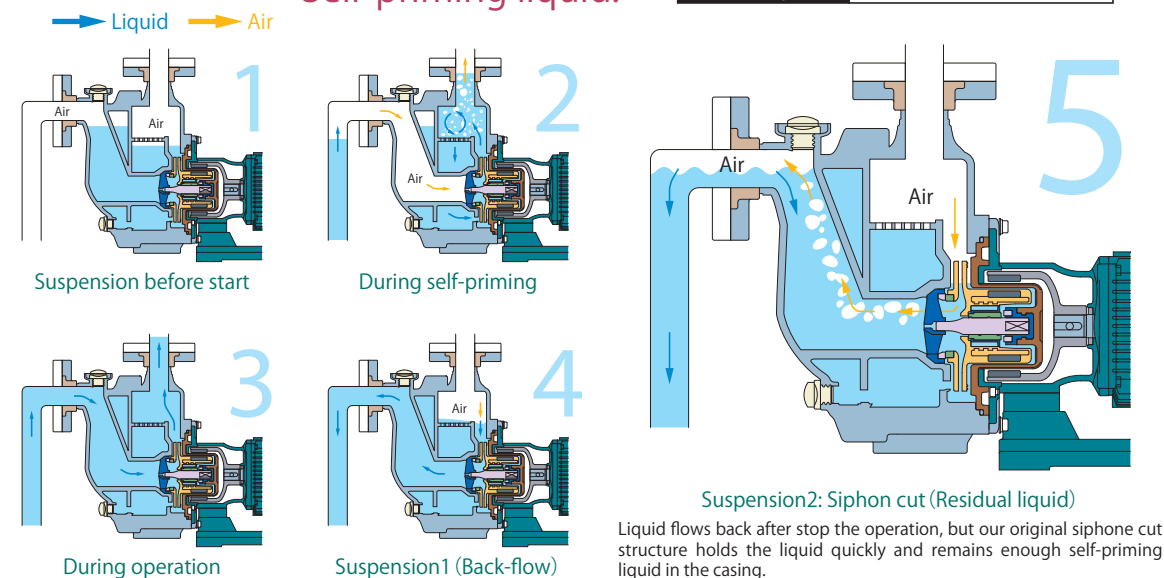
5m  
(Suction head)  
2分  
(Self-priming speed)

The pump can be used for all types of installation site such as horizontal suction piping or under stringent conditions. It is also effective to take measures against earthquakes or liquid leakage.

- No need a drain port when pumping up from the top of a tank.
- 5m self-priming ability expands versatility.
- For easy gas lock liquid, hazardous liquid, high S.G. liquid.
- Long horizontal suction piping is possible.
- Possible to install it far from a tank or filter.
- Stringent instal condition has a great reduction.
- Up and down suction piping is possible.
- No need foot valves.



### The principle of residual Self-priming liquid.



Model description

YD - 40 01 GV 3 - GP - AD 51

1

Discharge bore

25 : 25 A  
40 : 40 A  
50 : 50 A

2

Motor output

00 : 0.4  
01 : 0.75  
02 : 1.5  
03 : 2.2  
05 : 3.7

3

Model

GV  
GVF

4

Motor type

1 : Other than IE3  
3 : IE3

5

Main material

GP : GFR PP  
CF : CFR ETFE

6

Bearing material

C : High density carbon  
A : Alumina ceramics

7

O-ring material

E : EPDM  
D : Dai-el (FPM)

8

Frequency

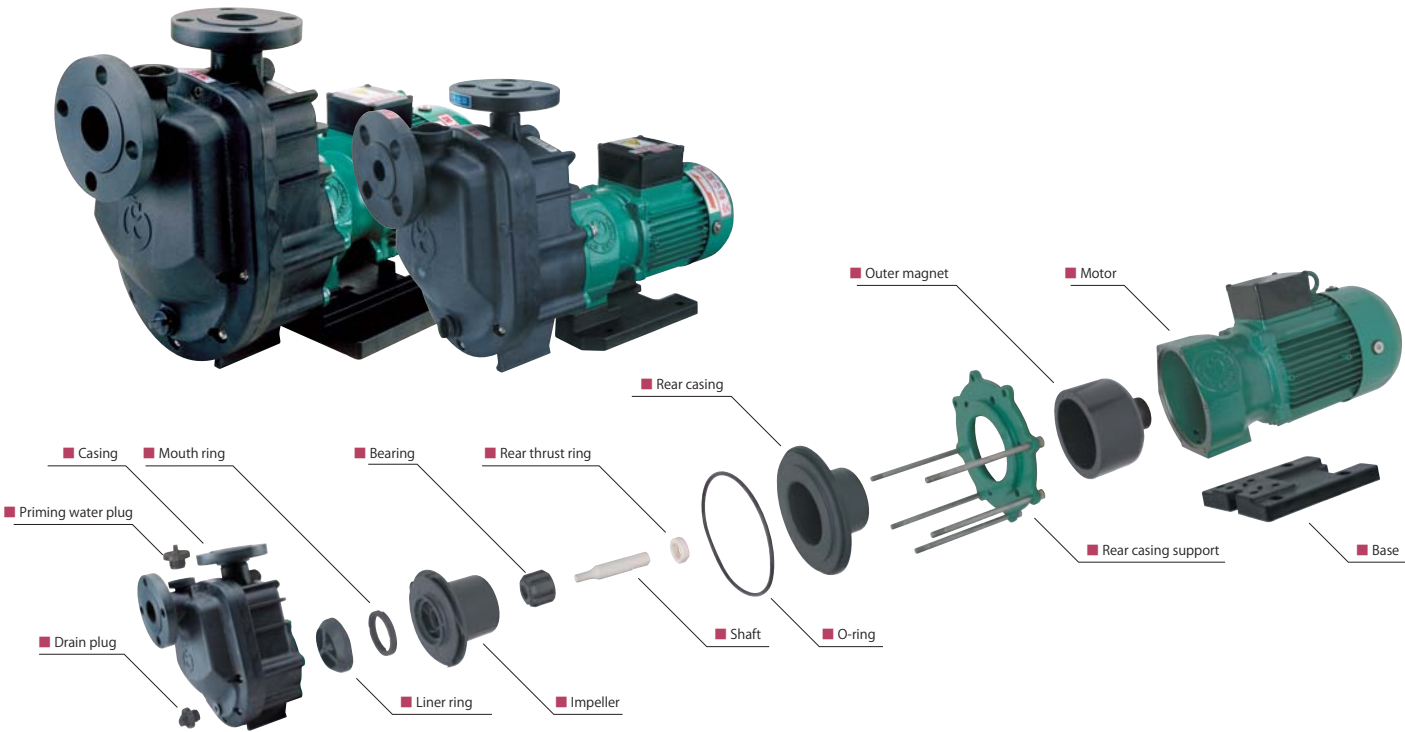
5 : 50Hz  
6 : 60Hz

9

Specific gravity

1 : 1.05/1.1  
2 : 1.2  
3 : 1.3  
4 : 1.4  
6 : 1.6  
8 : 1.8  
G : 2.0

Exploded view



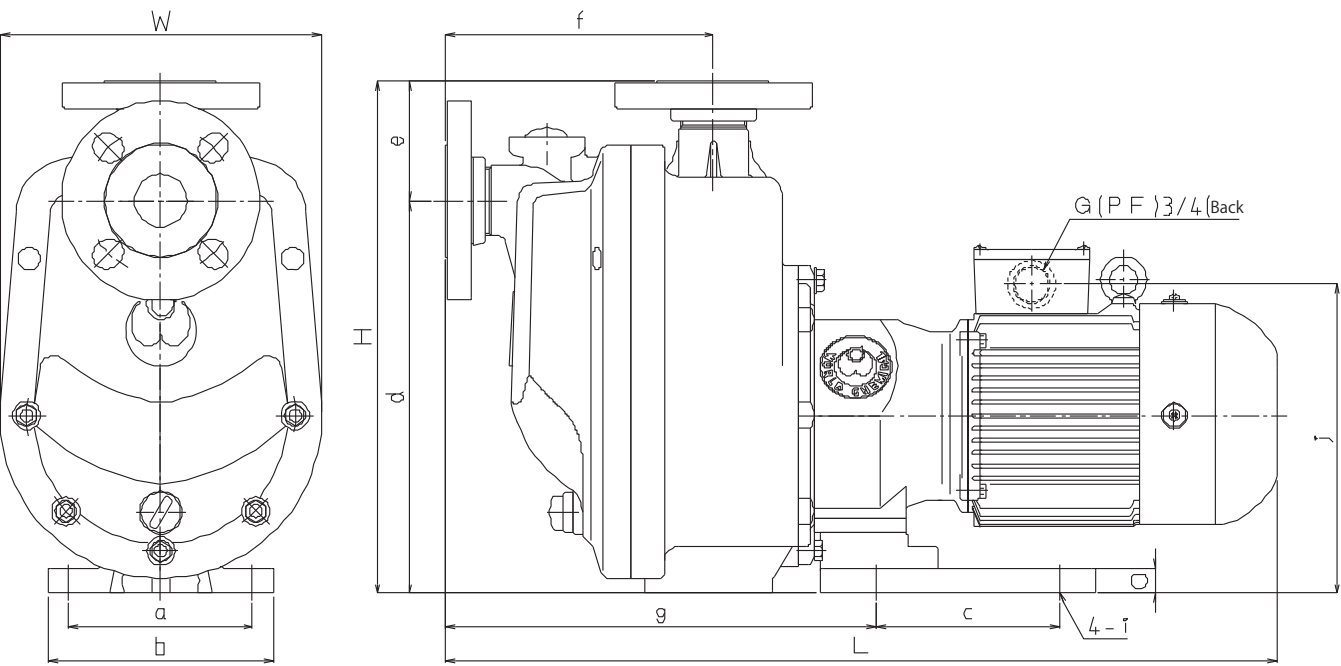
Material

Part name	Material	
	GV series	GVF series
Casing	GFR PP	CFR ETFE
Priming water plug	GFR PP	CFR ETFE
Drain plug	GFR PP	CFR ETFE
Liner ring	Alumina ceramics + GFR PPS	Alumina ceramics + CFR ETFE
Mouth ring	CFR PTFE	
Impeller	(GFR) PP + Magnet	CFR ETFE + Magnet
Bearing	Carbon / Ceramics / SiC	

※ The exploded view is for only explanation of the structure. Parts are sold as a set.  
For more information, contact us.

Part name	Material	
	GV series	GVF series
Shaft	Alumina ceramics / SiC	
Rear thrust ring	Alumina ceramics / SiC	
Rear casing	GFR PP	CFR ETFE
Rear casing support	FC200	
Outer magnet	FCD450-10 + Magnet	
Motor	FC200 + Alumi frame motor	
Base	GFR PP/FC200	
O-ring	EPDM/FPM	

Outline dimension



Dimension

(mm)														Weight(kg)
Model	W	H	L	a	b	c	d	e	f	g	i	j	o	
YD-2500GV1	196	325	533	130	160	130	255	70	167	275	φ 12	200	18	18.5
YD-2501GV(F)1(3)			560									207		20.5(23.0)
YD-2502GV(F)1(3)			592								215	24.5(27.0)		
YD-4001GV(F)1(3)	228	360	590	130	160	130	276	84	190	305	φ 12	217	18	22.5(25.0)
YD-4002GV(F)1(3)			622									225		26.5(29.0)
YD-4003GV(F)1(3)											29.0(31.5)			
YD-5002GV(F)1(3)	248	390	643	208	260	200	297	93	206	309	14-36	236	21	29.5(32.5)
YD-5003GV(F)1(3)														32.0(35.0)
YD-5005GV(F)1(3)		389	684			230	261				296	36-14		245

The figure in ( ) is shown GVF series.

Liquid tempaure and Self-priming ability

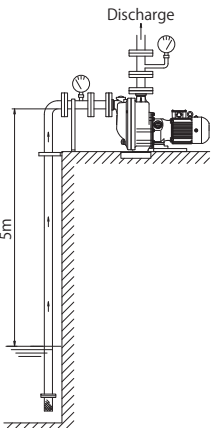
Test model: YD-4001GV3-GP-CD5 (Used fluid: Water)

(Our experimental data)

Liquid temperature		40 °C	45 °C	50 °C	55 °C	60 °C
Height 2m	Suction	29 sec.	36 sec.	35 sec.	44 sec.	49 sec.
	Full discharge	58 sec.	1min. 09 sec.	1min. 10 sec.	1min. 16 sec.	1min. 23 sec.
Height 4m	Suction	1min. 03 sec.	1min. 16 sec.	1min. 20 sec.	1min. 30 sec.	1min. 50 sec.
	Full discharge	1min. 31 sec.	1min. 47 sec.	1min. 52 sec.	2min. 07 sec.	2min. 20 sec.
Height 5m	Suction	1min. 39 sec.	—	—	—	—
	Full discharge	2min. 13 sec.	—	—	—	—

\* The time of discharge at Height 5m (20°C) is 1 min. 48 sec.

Suction: The time until which liquid starts to enter into the pump.  
Full discharge: The time until which liquid is stable the discharge from the pump.

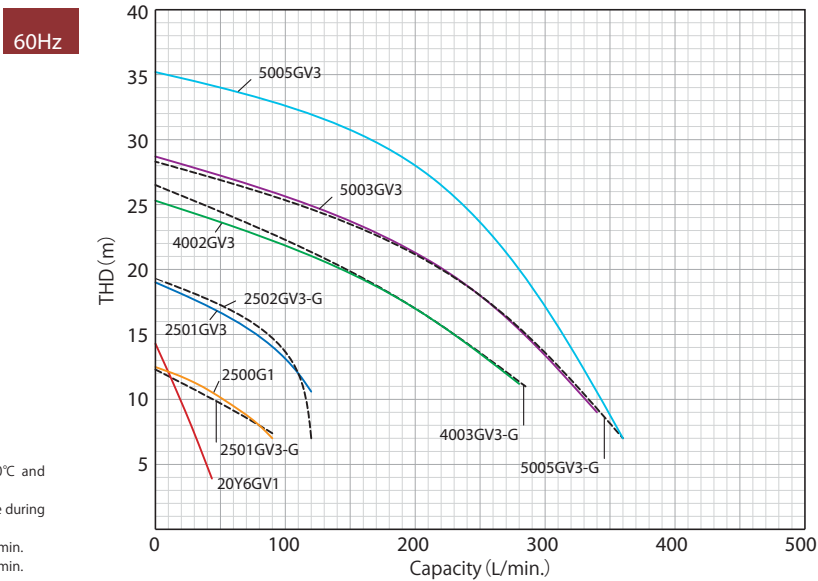
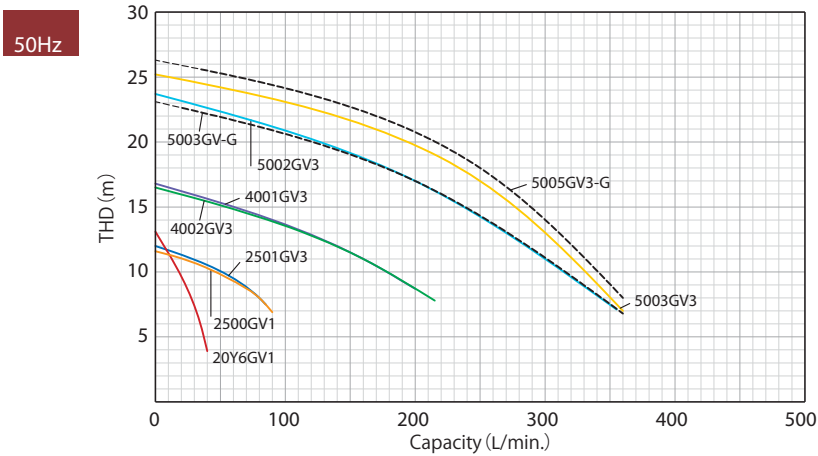


GV series (Main material:GFR PP)

Standard performance

Model	Bore (mm)		IE3 Standard performance (L/min. - m)				Outoput (kW)	Voltage (V)
	Suc.	Dis.	50Hz		60Hz			
			Std. spec.	Std. S.G.	Std. spec.	Std. S.G.		
YD-2500GV1	25	25	80-8	1.05	80-8	1.05	0.4	3PH/200V
YD-2501GV3			80-8	2.0	110-12	1.1	0.75	3PH/200V
YD-2502GV3					80-8	1.8		
YD-4001GV3	40	40	—	—	110-12	2.0	1.5	3PH/200V
YD-4002GV3			160-11	1.1	—	—	0.75	3PH/200V
YD-4003GV3			160-11	1.8	200-17	1.1	1.5	3PH/200V
YD-5002GV3	50	50	—	—	200-17	1.4	2.2	3PH/200V
YD-5003GV3			200-17	1.1	—	—	1.5	3PH/200V
YD-5005GV3			200-17	1.1	—	1.1	2.2	3PH/200V
			250-18	1.4				
YD-5005GV3	50	50	250-18	1.8	200-28	1.2	3.7	3PH/200V
YD-5005GV3					200-28	1.6		

Performance curve



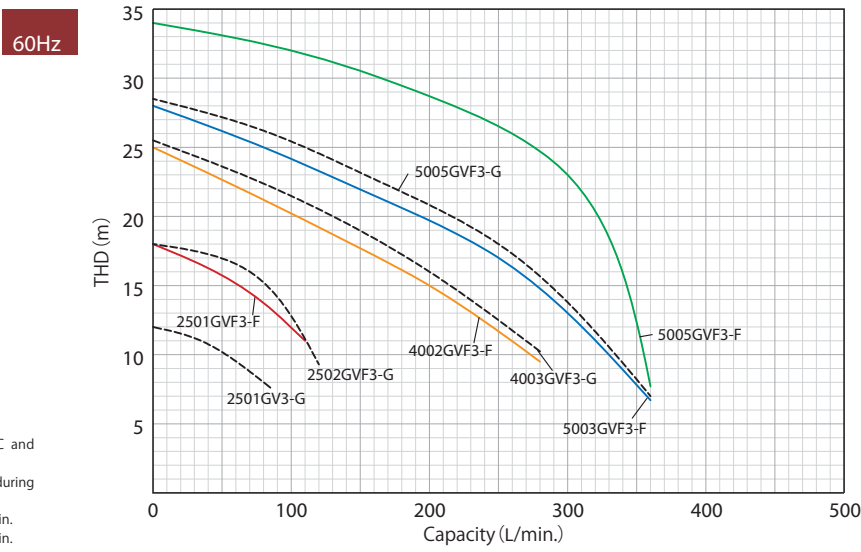
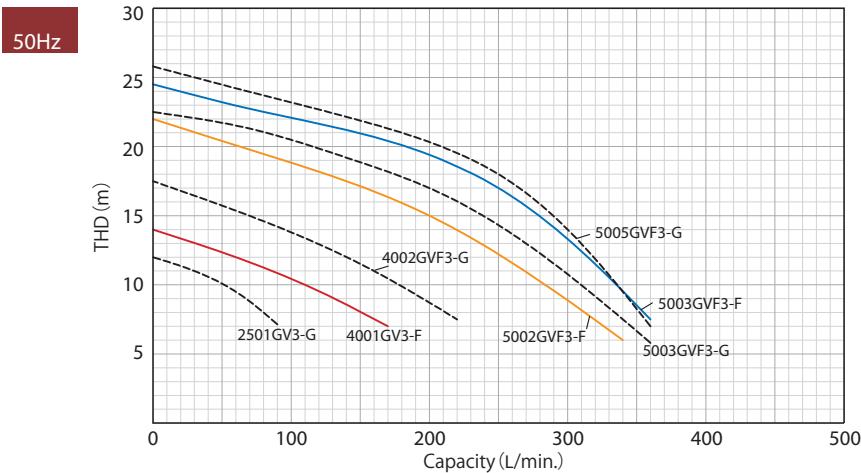
\* The data is for clear water at 20°C and flooded suction.  
\* Ensure the following min. flow rate during operation to cool sliding parts.  
• Motor output 0.4 ~0.75kW : 10 L/min.  
• Motor output 1.5 ~3.7 kW : 20 L/min.

GVF series (Main material:CFR ETFE)

Standard performance

Model	Bore (mm)		IE3 Standard performance (L/min. - m)				Output (kW)	Voltage (V)
	Suc.	Dis.	50Hz		60Hz			
			Std. spec.	Std. S.G.	Std. spec.	Std. S.G.		
YD-2501GVF3	25	25	80-8	2.0	100-12	1.1	0.75	3PH/200V
					80-8	1.6		
YD-2502GVF3			—	—	105-12	1.8	1.5	3PH/200V
YD-4001GVF3	40	40	110-10	1.1	—	—	0.75	3PH/200V
YD-4002GVF3			160-11	1.6	200-15	1.1	1.5	3PH/200V
YD-4003GVF3			—	—	200-16	1.3	2.2	3PH/200V
YD-5002GVF3	50	50	200-15	1.1	—	—	1.5	3PH/200V
YD-5003GVF3			200-17	1.1	250-17	1.1	2.2	3PH/200V
			200-17	1.4				
YD-5005GVF3					250-18	1.8	300-23	1.1
			250-18	1.6				

Standard performance



\* The data is for clear water at 20°C and flooded suction.  
\* Ensure the following min. flow rate during operation to cool sliding parts.  
• Motor output 0.4 ~0.75kW : 10 L/min.  
• Motor output 1.5 ~3.7 kW : 20 L/min.



## Small self-priming pump

CFRPP is adopted for the pump.

Possible to use for strong alkali and liquid with hydrofluoric acid!

< Model description >

YD - 20Y6GV1 - CP - RD52

Discharge bore

20 : 20A

Output

Y6 : 3 PH200V, 0.26kW  
A6 : 1PH100V, 0.26kW

Model

GV : Self-priming pump

Main material

CP : CFR-PP  
Carbon fiber reinforced  
hydrofluoric acid

O-ring material

D : FPM  
E : EPDM

S.G.

2 : Until S.G.1.2

Bearing material

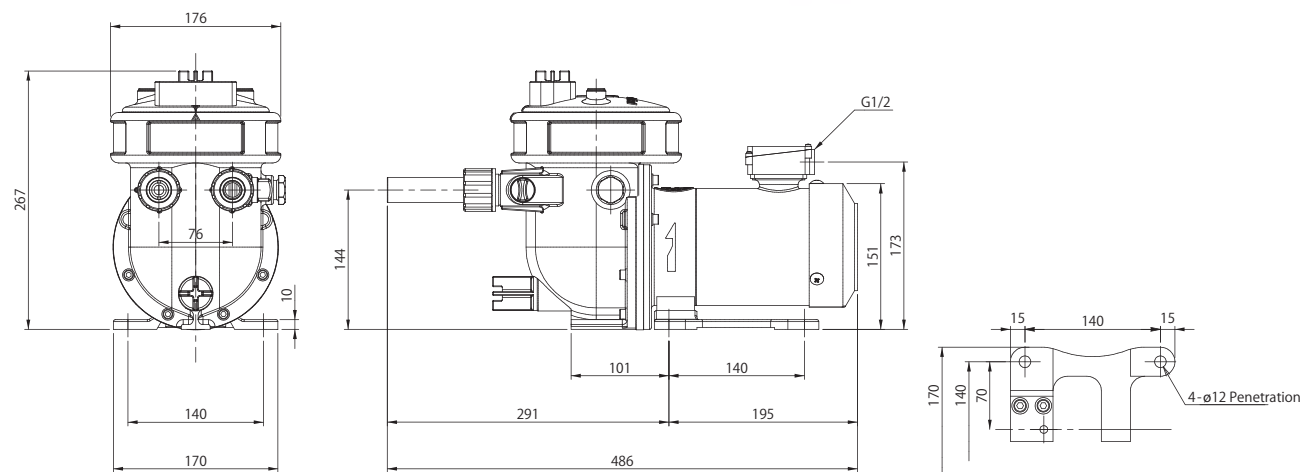
R : CFR-PTFE

Frequency

5 : 50Hz  
6 : 60Hz



< Outline dimension >



< Standard performance >

Model	Bore (mm)	Power supply	Limit of S.G.	Standard performance (m-L/min.)		Output (kW)	Weight (kg)
				50Hz Std. spec.	60Hz Std. S.G.		
YD-20Y6GV1	20A union (G1 thread)	3PH 200-220V	1.2	6 - 30	7 - 30	0.26	10.0
YD-20A6GV1		1PH 100-110V					

## Big self-priming pump

### High self-priming ability!

8005GV: Suction 3 m in 1 min. 30 sec.

The structure that gas and liquid are separated efficiently reduces the self-priming loss and maximizes the pump performance.

### Resistant to dry running !

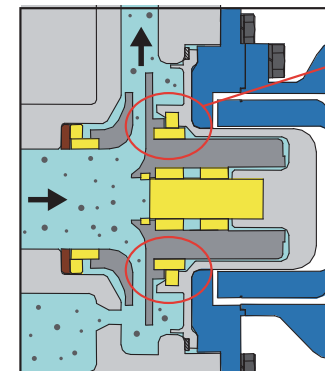
Our original valveless structure (Internatioanl PAT.) leaves enough priming liquid for restart without check valves.



- High performance.  
Max. TDH 25 m Max. Capacity 1,300 L/min. (YD-10010GV • 60Hz)
- Safe and efficient maintenance for back pull out method.
- High efficiency motor is adopted as standard. (\*IE2)
- No liquid leakage for magnet drive method.
- Resistant to deadhead operation.

### Resistant to slurry / sludge!

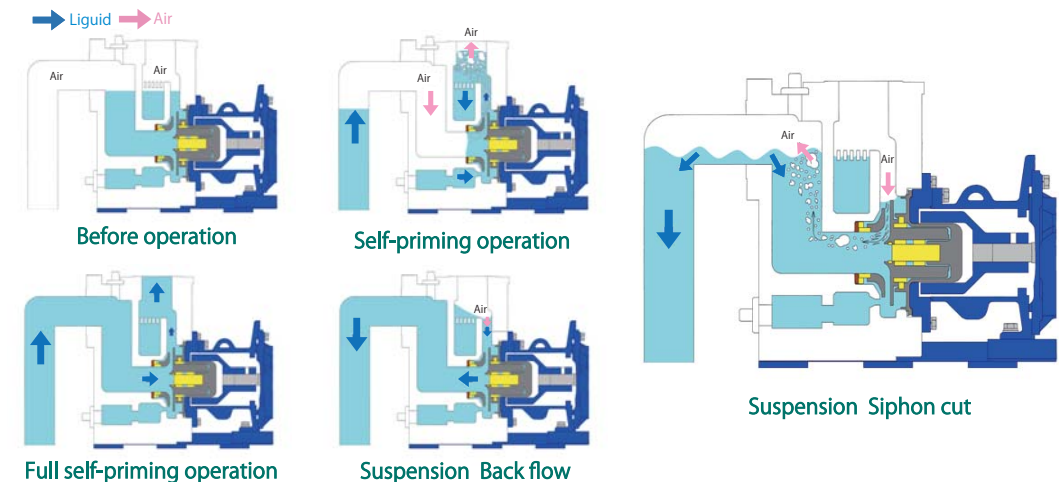
(Impeller wear ring structure)



- The size of slurry / sludge, which can pass through to the casing is **just only 0.127 mm or less** by the impeller wear ring. It protects the magnet can and rear casing from abrasion.  
※ If you would like to use the pump for liquid with slurry, contact us.
- SiC material is adopted as sliding parts.  
(Yellow parts in the left picture.)

### The principle of residual Self-priming liquid.

Internatioanl PAT. JPN, USA, CAN, TWN, GER, FRA, GBR, NLD, ITA, SWE, DNK



Liquid flows back after stop the operation, but our original siphon cut structure holds the liquid quickly and remains enough self-priming liquid in the casing. Therefore, it is not necessary to pour priming liquid after the second operation.

Big self-priming pump

Model description

YD - 80 05 GV3 - PP - KP 52

Discharge bore

80 : 80A  
100 : 100A

Output

05 : 3.7kW  
07 : 5.5kW  
10 : 7.5kW

Model

GV3

Pump material

PP : Polypropylene

Bearing / Gasket material

KP : SiC/FEP+FKM  
KE : SiC/EPDM

Frequency

5 : 50Hz  
6 : 60Hz

S.G.

1: 1.1\*  
2: 1.2

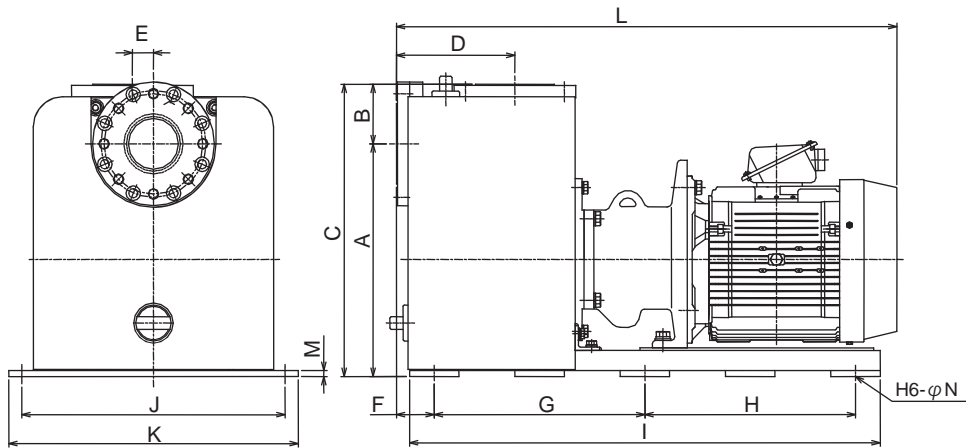
\* Only YD-10007GV3 60Hz

Standard performance

Model	Bore (Suc.× Dis.)	Output ( kW )	IE3 Std. performance (L/min - m)		Weight ( kg )	Self-priming limit height (m)
			50Hz	60Hz		
YD-8005GV1(3)	80A×80A	3.7	500 - 20		110	4.0 ( Clear water at 20°C )
YD-10007GV1(3)	100A×100A	5.5	800 - 14	800 - 12(SG1.1)	186	
YD-10010GV1(3)		7.5	1200 - 12		193	

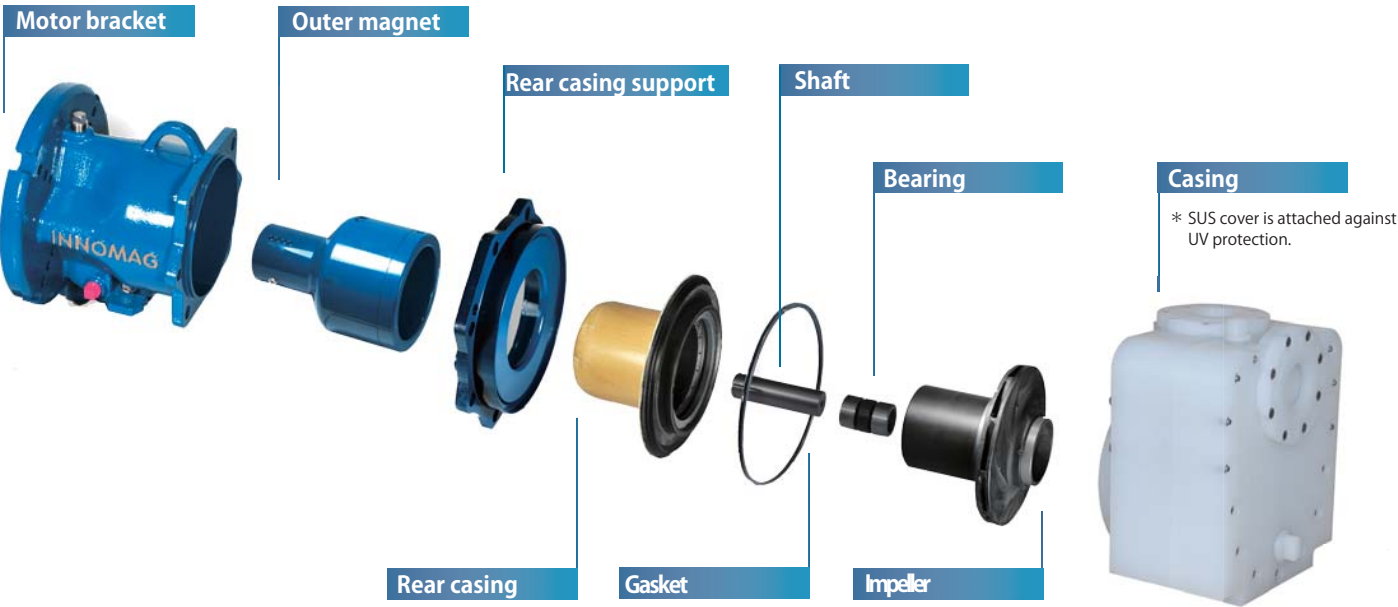
\* Impeller & Rear casing are subject to the list control. When export, it is necessary to get the permission from the Minister of Economy, Trade and Industry.  
\* The pump is subject to the catch-all control. When export, observe the Export Trade Control Order.  
\* The catalogue contents are subject to change without notice due to product improvement.

Outline dimension



Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N
YD-8005GV1(3)	348	89	437	180	32	57.5	320	320	715	400	440	763.5	9	φ15
YD-10007GV1(3)	380	102	482	211	31	212.5	310	310	850	460	500	908	9	φ15
YD-10010GV1(3)														

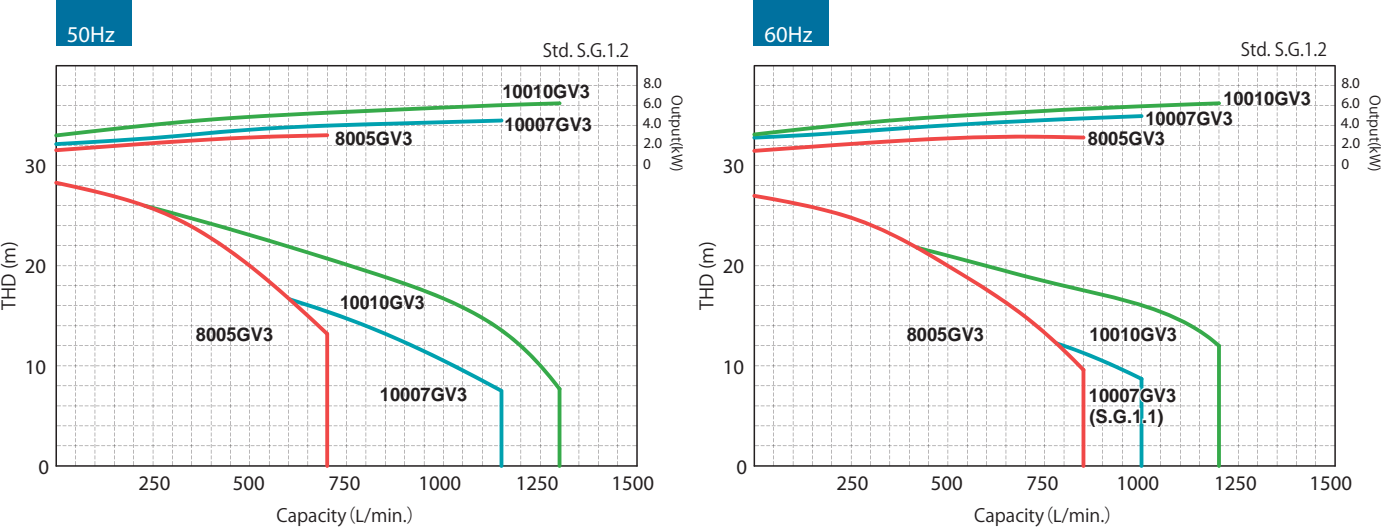
Exploded view



Material

Part name	Material	Part name	Material
Casing	PP + SUS cover	Rear casing	CFR-ETFE + Kevlar reinforced
Impeller	CFR-ETFE	Rear casing support	Ductile iron
Bearing	SiC	Outer magnet	Ductile iron + Rare earth magnet
Shaft	SiC	Motor bracket	Ductile iron
Gasket	FEP+FKM / EPDM (High chemical resistant gasket which FKM is covered with FEP capsule.)	Motor	Aluminum alloy
		Base	SS400

Performance curve



## ●2500~5005GV/GVF series

### < Installation >

The pump can be used for all types of installation site such as horizontal suction piping or under stringent conditions. It is also effective to take measures against earthquakes or liquid leakage.

- No need a drain port when pumping up from the top of a tank.
- 5m self-priming ability expands versatility.
- For easy gas lock liquid, hazardous liquid, high S.G. liquid.
- Long horizontal suction piping is possible.
- Possible to install it far from a tank or filter.
- Stringent instal condition has a great reduction.
- Up and down suction piping is possible.
- No need foot valves.

### 1) Caution when installation

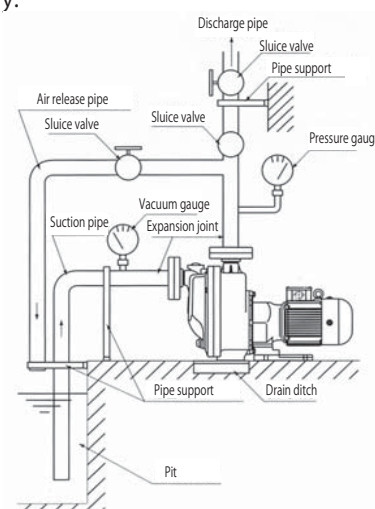
- ① If air enters from the joint of the suction pipe, it cause pumping failure and damage.
  - The suction pipe goes into the negative pressure. If air enters from the attachment failure of the joint, liquid does not enter and pumping failure happens. It may cause the pump breakdown.
  - Use the suction pipe whose bore is the same as the bore of the pump suction inlet. If the pipe bore is bigger than the pump bore, it may cause self-priming failure to reduce the self-priming ability.
  - Set that the suction pipe bore is more than twice and OFF level. If operate the pump at less than this, it cause dry running for air entrainment.
- ② Attache a strainer to the suction pipe to prevent dirty or foreign objects entering. However, clean the strainer to remove the clogging periodically and minimize the loss resistance.
- ③ It is recommended to place check valves at the discharge rising pipe to prevent water hammer as follows. Bypass pipes are also recommended to place underneath for air release. (If not, self-priming failure may occurs.)
  - The discharge pipe is long and the total head is 10 m and more.
  - The tip of the discharge pipe is 9 m and more higher than the suction tank.
  - The piping condition is to use 2 and more pumps in parallel.
- ④ Install bendings and expansion joints not to leak liquid by the pump deformation for the pipes' heat expansion.
- ⑤ Main parts insdie the pump are made of plastic. Handle them with care not to make an impact.
- ⑥ When the self-priming pump is used for easy bubbling liquid such as surfactant liquid, foot valves are recommended.
  - ※ If not, clean and check it for functional maintenance.

### 2) Prohogition of flange uneven tightening and overtightening

- ① Align the pipe flange parallel to the pump flange and do not tighten bolts excessively.
- ② When piping, adjust the assembling dimensions. If assemble while not fit in, the pump casing may be damaged. Moreover, uneven tightening may cause liquid leakage from packings. Tighten it diagonally and evenly.

### 3) Prohibition of piping load

- ① Be completely subjected to a piping load by pipe supports.
- ② When the temperature of liquid is high (40°C and more), install bendings and expansion joints not to be applied a load to the pump by heat expansion of pipes.
- ③ Do not use metal pipes as much as possible and use the plastic one.
  - ※Especially, metal pipes are often used for strong sulfuric adid and caustic soda and obey the above prohibitions ② & ③.

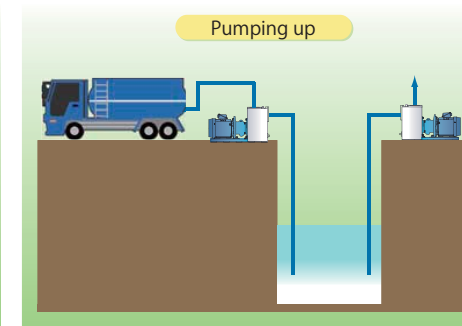
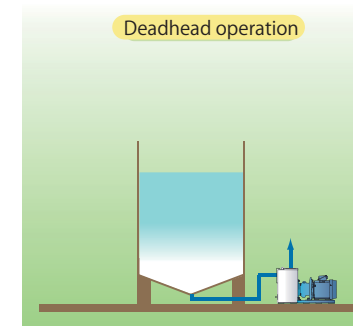
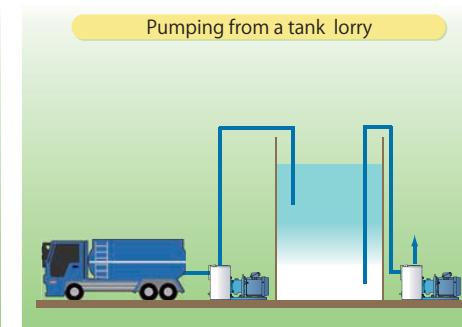
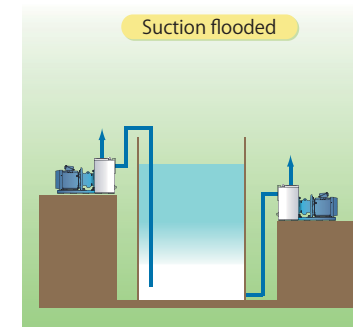


## ●8005~10010GV series

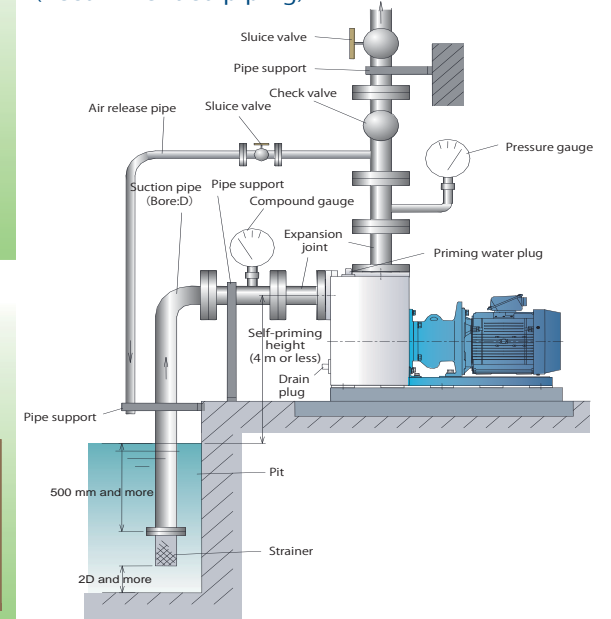
### < Installation >

The pump can be used for all types of installation site such as horizontal suction piping or under stringent conditions. It is also effective to take measure against earthquakes or liquid leakage.

- No need a drain port when pumping up from the top of a tank.
- Installation far from a tank is possible.
- Self-priming ability is 4 m.
- The conventional stringent condition is eased dramatically.
  - ※When the suction pipe is long or deadhead operaiont, contact us.
- Deadhead operation is possible.
- Up and down suction piping is possible.
- Long horizontal piping is possible.
- No need foot valves.



### <Recommended piping>



### 1) Suction piping

- ① Be in the same the bore of the suction pipe as the pump bore.
- ② The horizontal length of the suction pipe is 1 m or less.
  - If it is 1 m and more, air volume in the suction pipe becomes big and self-priming ability is dramatically reduced. It may cause the pump damage.
- ③ Submerge the tip of the suction pipe 500 mm and more to prevent air entrainment.
- ④ When the instal level is lower than the liquid level for up and down piping, install sluice valves for maintenance.
- ⑤ Do not make air pockets in the suction pipe and install the suction pipe up grade gently to the pump.
- ⑥ Install the air release pip as far as from the suction pipe possible.
- ⑦ Set that the suction pipe bore is more than twice and OFF level. If operate the pump at less than this, it cause dry running for air entrainment.
- ⑧ Place a strainer at the suction inlet of the pipe to prevent dirty or foreign objects. However, clean the strainer to remove clogging periodically and minimize the loss resistance.

### 2) Discharge pipe

- ① Be in the same the bore of the discharge pipe as the pump bore.
  - If the bore becomes small, air release failure occurs during self-priming operation and the ability is decreased. The flow rate also may increase for increasieing of the piping loss resistance.
- ② Install check valves to prevent water hammer as follows.
  - The suction pipe is long or the discharge head is 10 m and more.
  - The actual head (from the liquid leve in a suction to the tip of the discharge pipe) is 9 m and more.
  - The condition is to use 2 and more pumps in parallel.
- ③ Attache sluice valves to the discharge pipe for maintenance.
- ④ Install a pressure gauge to check operaiton in a daily check.





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Challenging the Liquid Transfer Technology,

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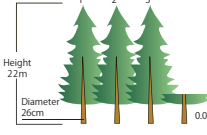


■Note:




This is printed by using a reused aluminum board  
(4.22 kg) and saves electric power, 66.77 kW.  
(CO<sub>2</sub> emission 43.09 kg)

The CO<sub>2</sub> reduction is certified and verified strictly and fair by Japan Smart Energy Co., Ltd.



CO<sub>2</sub> reduction (43.09 kg)  
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it is CO<sub>2</sub> absorbed by 3.09  
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26 cm diameter) which is 50  
years old in a year.  
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 Minus Carbon Printing systems

World Chemical Co., Ltd. joins a forest regeneration project (plant 3,000 trees) in Bali, Indonesia through printing by MCP.