

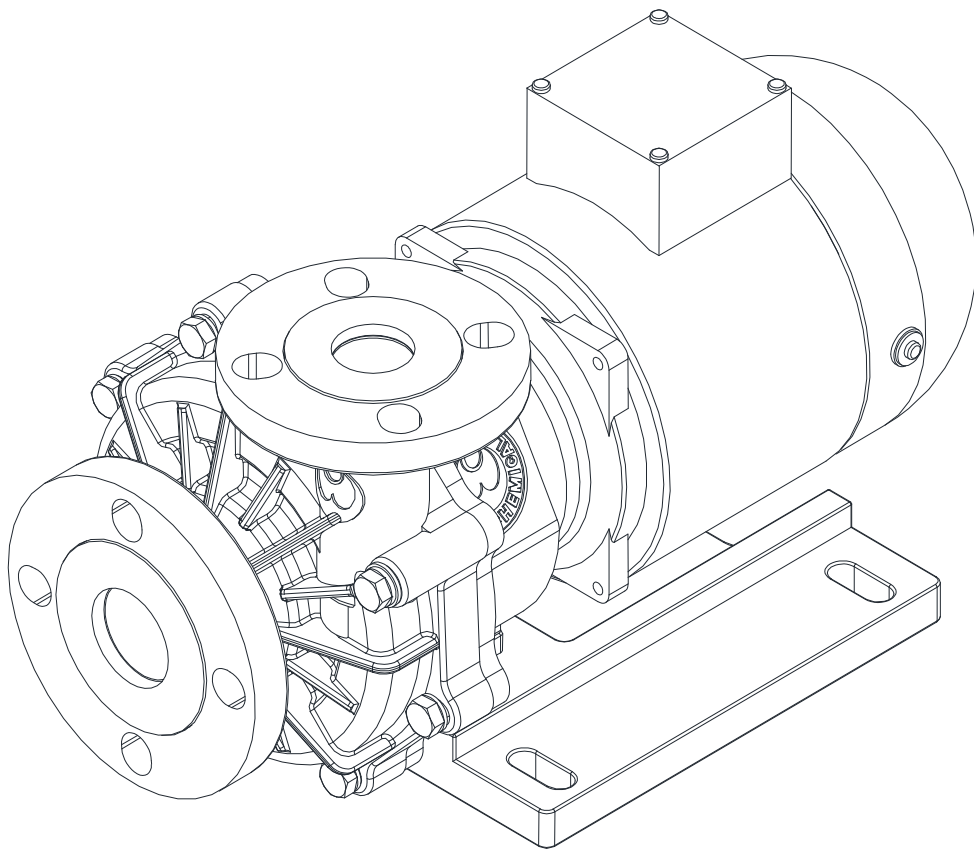
**CORROSION RESISTANT
MAGNET DRIVE PUMP**

Chemi-Free

YD-GS (F) / GSH series

INSTRUCTION MANUAL

Version: 20250611



Preface

Thank you very much for purchasing World Chemical's magnet drive pump "CHEMIFREE". 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.



Table of contents




| | |
|--|----|
| Safety precaution (To be observed at all times) | 2 |
| Unpacking check Model description | 5 |
| YD-250*GS (F) Specification / outline dimension / structure / | 6 |
| YD-250*GS (F) Parts name & material | 7 |
| YD-400*GS (F) / GSH Specification / outline dimension / structure / | 8 |
| YD-400*GS (F) / GSH Parts name & material | 9 |
| YD-5005GS3 Specification / outline dimension / structure / parts name / material | 10 |
| Handling instructions..... | 11 |
| Installing / piping precaution | 12 |
| Operating precaution | 13 |
| Maintenance / Consumable parts | 14 |
| Disassembly & Assembly..... | 16 |
| Exploded view..... | 20 |
| Troubleshooting | 21 |
| Warranty / Repair..... | 22 |

Safety precaution (To be observed at all times)

The following procedures are intended to protect you from personal injury and/or property damage.

- The following symbols classify the degree of danger and explain the damages that could occur when its contents are ignored or the pump is used improperly.
- Safety rules to be observed are classified and explained under the following symbols. (The following are examples of picture displays)

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

| | |
|---|---|
|  | This symbol cautions people to be careful. |
|  | This symbol signifies that this action must not be taken. |
|  | This symbol indicates that the action must be taken. |



WARNING



- (1) Dangerous liquids and surroundings.

When using the pump for dangerous liquids or in surroundings (only explosion prevention specifications), adhere to facility standards determined by law and conduct daily check to prevent leakage. If operate the pump under abnormal conditions, such as liquid leakage, it may cause serious accidents such as explosion or fire and personal injury. Regarding handling liquid, follow the liquid manufacturer.



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

Using the damaged or modified pumps may cause fatal accident, electric shock or pump damage. It is not covered by our warranty.



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

Always use the hoist belt for pumps that come with them. When pumps do not have hoist belts, lift them with bolt slings while watching the weight balance. It should be performed by qualified personnel with enough strong slings. The lightest pumps' weight is around 16kg (35 lbs.), and do not carry the by hands as much as possible.



- (4) Do not operate pumps with power on.

Do not inspect or dismantle pumps or motors with the power on. It may lead to personal injuries such as electric shock or getting caught in the rotor. Operate it with multiple safety devices such as the switch for main power supply, the operation switch, and the hand switch for the pump.



- (5) Connecting earth cable.

If using the pump without connecting earth cable to the motor, it may cause electric shock. Connect it by qualified personnel under the electric facilities technical standards and interior wiring regulations.



- (6) Protect power supply cord.

Over-stretching, pinching and damaging power supply cords or motor lead wires may cause fire or electric shock to damage it. Place the terminal box cover at the original position.



- (7) Install Current Leak Circuit Breaker.

The operation without a current leak circuit breaker may cause electric shock. Install it or an over current protection device, and prevent electric accidents or pumps damage.



- (8) Caution when removing pump.

When removing the pump from piping, make sure to close valves on the suction/discharge piping and check no liquid leakage. Direct contact with liquid may be harmful and wear protective gear when performing operation.



CAUTION



(1) Unspecified use.

Do not use pumps for purposes other than specification in the spec sheet or the nameplate. Especially, check the motor specification (phase, voltage and frequency). Unspecified use may cause personal injuries, the pump or peripheral equipment damage.



(2) Restrictions of operator.

Transportation, installation, wiring, operation, servicing, and inspection should be performed by qualified personnel who have full knowledge on the handling the pump.



(3) Caution when opening package.

Open the package after checking upside down of the product. When opening a wooden crate, be careful of nails and silvers to get the product out without hurting you.



(4) Ventilation.

Do not place objects around the pump that might obstruct ventilation as the motor heats 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 repairing the damaged pump, contact your supplier. If sending the pump back by express, wash the interior and exterior with fresh water and check it without liquid. Then, wrap with a vinyl bag and pack it.



(6) Plastic (resin) parts.

The pump is made of resin and it may cause fatal accident for strong impact. Do not hit and get on top of the pump. Also attach piping supports not to apply any pipe load to the pump.



(7) Pump starting.

Check the direction of rotation at the starting up of the pump. In this time, open the suction and discharge valves and check no liquid leakage from the pipe connection. After exhausting air and filling the pump with liquid, check the direction of rotation by switching quickly. If the rotation is in reverse, switch two of the three phases in the three-phase power supply to change the direction of rotation. Make sure to power off before wiring it.



(8) Disposing of scrapped pump.

When disposing scrapped pumps, remove adherent liquid and discard it as industrial waste in law.



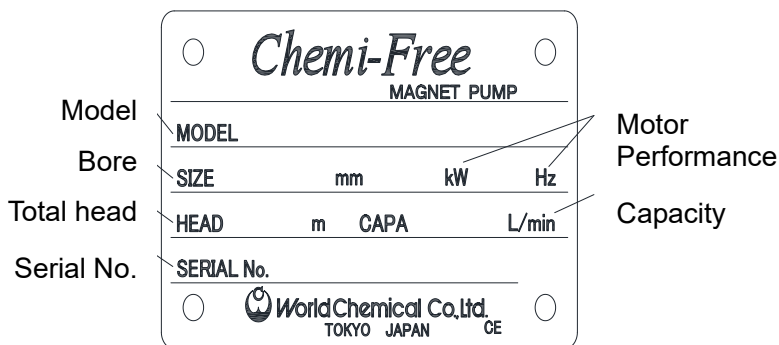
(9) Outflow protection.

Just in case liquid leaks to break the pump or pipes, take appropriate preventative measures.

Unpacking check

Check as follows and contact your supplier when you have any questions.

1. The indication in the nameplate (model, THD, capacity, motor spec. and voltage) is the same as the order.
2. Accessory is stocked with.
3. There is any damage and loose bolts during transportation.



Model description

YD – 2502 GS 3 – GP – C D 6 0

(1) (2) (3) (4) (5) (6) (7) (8)

- (1) Bore /Motor Output

| Model | Suction Bore | Discharge Bore | Motor Output |
|---------------|--------------|----------------|--------------|
| 2500GS (F)1 | 25A | 25A | 0.4Kw |
| 2501GS (F)1/3 | 25A | 25A | 0.75kW |
| 2502GS (F)1/3 | 25A | 25A | 1.5kW |
| 2503GS (F)1/3 | 25A | 25A | 2.2kW |
| 4000GS (F)1 | 40A | 40A | 0.4kW |
| 4001GS (F)1/3 | 40A | 40A | 0.75kW |
| 4002GS (F)1/3 | 50A | 40A | 1.5kW |
| 4003GS (F)1/3 | 50A | 40A | 2.2kW |
| 4003GSH1/3 | 50A | 40A | 2.2kW |
| 4005GS (F)1/3 | 50A | 40A | 3.7kW |
| 5005GS1/3 | 65A | 50A | 3.7kW |

- (2) Model

GS / GSH / GSF

- (3) Motor type

1: IE1 (Without Motor, With non-standard Motor) 3:IE3 (With IE3 Motor <High efficiency Motor>)

- (4) Main material

GS : GFR PP GSF: CFR ETFE

- (5) Bearing material

C: High density carbon A: Alumina ceramic
R: CFR PTFE K: SiC (Only SiC bearing is available for YD-5005GS1(3).)

- (6) O-ring material

E: EPDM D: FPM T: Special material

- (7) Frequency of motor

5: 50Hz 6: 60Hz

- (8) Limit of specific gravity

| Model | 250*GS series | 250*GSF series | 400*GS series | 4003GSH Series | 400*GSF series | 5005GS series |
|------------------|---------------|----------------|---------------|----------------|----------------|---------------|
| Specific Gravity | 0: 1.0 | 2: 1.2 | 1: 1.05/1.1 | 1: 1.1 | 2: 1.2 | 1: 1.1 |
| | 3: 1.3 | 5: 1.5/1.6 | 3: 1.3 | | 5: 1.5 | 3: 1.3 |
| | 5: 1.5 | 9: 1.9 | 5: 1.5 | | 9: 1.9 | 5: 1.5 |

YD-250*GS

Specification

| Model | | | 2500GS1 | 2501GS3 | 2502GS3 | 2503GS3 |
|-------------------------------------|------|---------|--------------------|-------------|--------------|--------------|
| Bore (Suction x Discharge) | | | 25A (G1) x 25A(G1) | | | |
| Motor output | | | 0.4kW | 0.75kW | 1.5kW | 2.2kW |
| Std. performance (m_L/min) | 50Hz | S.G.1.0 | 14 - 50 | 21 - 50 | - | - |
| | | S.G.1.3 | 10 - 50 | 17 - 50 | 25.5 - 50 | - |
| | | S.G.1.5 | 9 - 50 | 15 - 50 | 24 - 50 | - |
| | 60Hz | S.G.1.0 | 14 - 50 | 21.5 - 50 | 34 - 50 | - |
| | | S.G.1.1 | - | - | - | 37 – 50 |
| | | S.G.1.3 | 10.5 - 50 | 17 - 50 | 27 - 50 | 34 – 50 |
| | | S.G.1.5 | 9 - 50 | 15 - 50 | 25 - 50 | 31 – 50 |
| Weight (kg) *Japan std. motor | | | 19.5 | 21.5 | 26.5 | 28.5 |
| Max. TDH & Capacity (ft./gpm) | 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 | 61.3 / 34.3 | 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 |

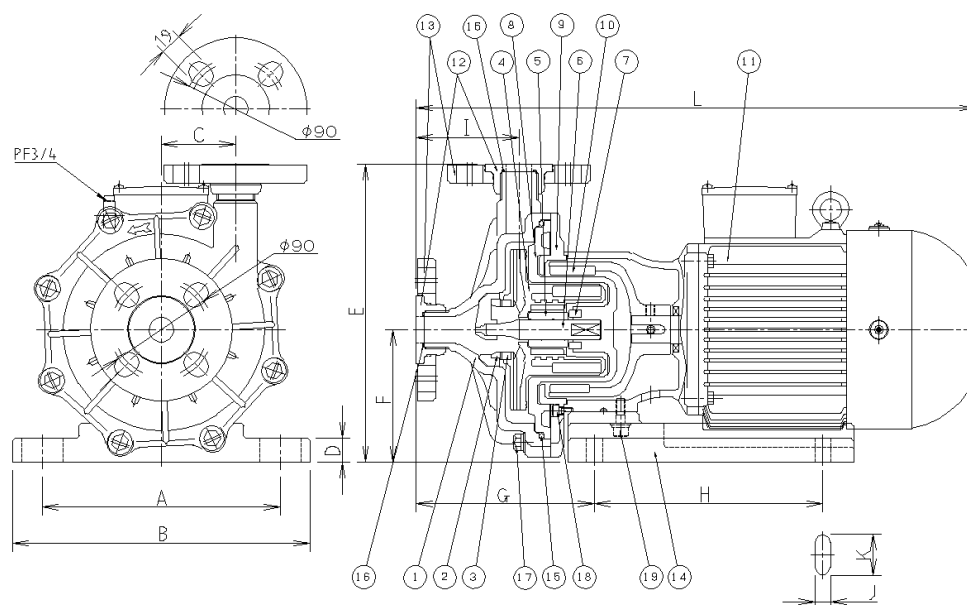
YD-25*GSF series

Specification

| Model | | | 2500GSF1 | 2501GSF3 | 2502GSF3 | 2503GSF3 |
|-------------------------------------|------|---------|--------------------|-------------|--------------|--------------|
| Bore (Suction x Discharge) | | | 25A (G1) x 25A(G1) | | | |
| Motor output | | | 0.4kW | 0.75kW | 1.5kW | 2.2kW |
| Std. performance (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) *Japan std. motor | | | 20.5 | 22.5 | 28 | 30 |
| Max. TDH & Capacity (ft./gpm) | 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 |

- The indication in the nameplate Max TDH and capacity in U.S.A.

Outline dimension / structure



Dimension of YD-250*GS (F) series

| | A | B | C | D | E | F | G | H | I | J | K | L |
|-----------------|-----|-----|----|----|-----|-----|-----|-----|----|------|----|-----|
| 2500GS(F)1 | 130 | 160 | 65 | 18 | 260 | 115 | 173 | 130 | 90 | Φ 12 | | 431 |
| 2501GS(F)3 | 130 | 160 | 65 | 18 | 260 | 115 | 173 | 130 | 90 | Φ 12 | | 457 |
| 2502/2503GS(F)3 | 208 | 260 | 65 | 21 | 261 | 116 | 156 | 200 | 90 | 14 | 36 | 490 |

Parts name & material

| No. | Parts name | Qty | Material | | Remarks |
|-----|-----------------------------|-----|--|-----------------------------|--------------------|
| | | | YD-GS | YD-GSF | |
| 1 | Front casing | 1 | GFR PP | CFR ETFE | |
| 2 | Liner ring | 1 | Alumina Ceramics + GFR PPS | Alumina Ceramics + CFR ETFE | Integrated molding |
| 3 | Mouth ring | 1 | CFR PTFE | | |
| 4 | Impeller | 1 | GFR PP + PP + Magnet | CFR ETFE + Magnet | Integrated molding |
| 5 | Bearing | 1 | CFR PTFE//Carbon/Alumina Ceramics/SiC *1 | | +GFRPPS/+ CFRETFE |
| 6 | Shaft | 1 | Alumina Ceramics | | |
| 7 | Rear thrust ring | 1 | Alumina Ceramics | | |
| 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 | | Standard motor |
| 12 | Lapjoint | 2 | GFR PP | CFR ETFE | |
| 13 | Flange | 2 | GFR PP | | JIS10K |
| 14 | Base | 1 | GFR PP | GFR PP (Black) | |
| 15 | Oring for Casing | 1 | EPDM/FPM G180 | | FPM: Dai-el |
| 16 | Oring for Lapjoint | 2 | EPDM/FPM AS568-120 | | FPM: Dai-el |
| 17 | Hexagonal bolts | 8 | SUS304 M10 x 35 | | With SW, W |
| 18 | Hex. socket head cap screws | 6 | SUS304 M6 x 12 | | |
| 19 | Hex. socket head cap screws | 4 | SUS304 M8 x 25 | | With SW, W |

*1: The SiC bearing is only +ETFE.

YD-400*GS

Specification

| Model | | | 4000GS1 | 4001GS3 | 4002GS3 | 4003GS3 | 4005GS3 |
|------------------------------------|------|----------|-------------------------|-------------|-------------------------|--------------|-------------|
| Bore (Suction x Discharge) | | | 40A (1.5") x 40A (1.5") | | 50A (2.0") x 40A (1.5") | | |
| Motor output | | | 0.4kW (1/2) | 0.75kw (1) | 1.5kW (2) | 2.2kW (3) | 3.7kW (5) |
| Std. performance (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 - 150 | 17 - 200 | 21 - 200 | - |
| | | S.G.1.4 | - | - | - | - | 25 – 200 |
| | | S.G.1.5 | 7.5 - 100 | 10.5 - 150 | 14.5 - 200 | 19.5 - 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 | 16 - 200 | 24 - 200 | 31 – 200 |
| | | S.G.1.5 | - | 10 - 150 | 14.5 - 200 | 20.5 - 200 | 28 – 200 |
| Weight (kg) *Japan std. motor | | | 16.5 | 19.5 | 25.5 | 27.5 | 41.5 |
| Max TDH & Capacity (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 |

YD-4003GSH

Specification

| Model | | | 4003GSH3 |
|---|------|---------|-----------------------|
| Bore (Suction x Discharge) | | | 50A(2.0") x 40A(1.5") |
| Motor output | | | 2.2kW |
| Std. performance (m _L /min) | 50Hz | S.G.1.1 | 32 - 100 |
| | 60Hz | S.G.1.1 | 33 - 100 |

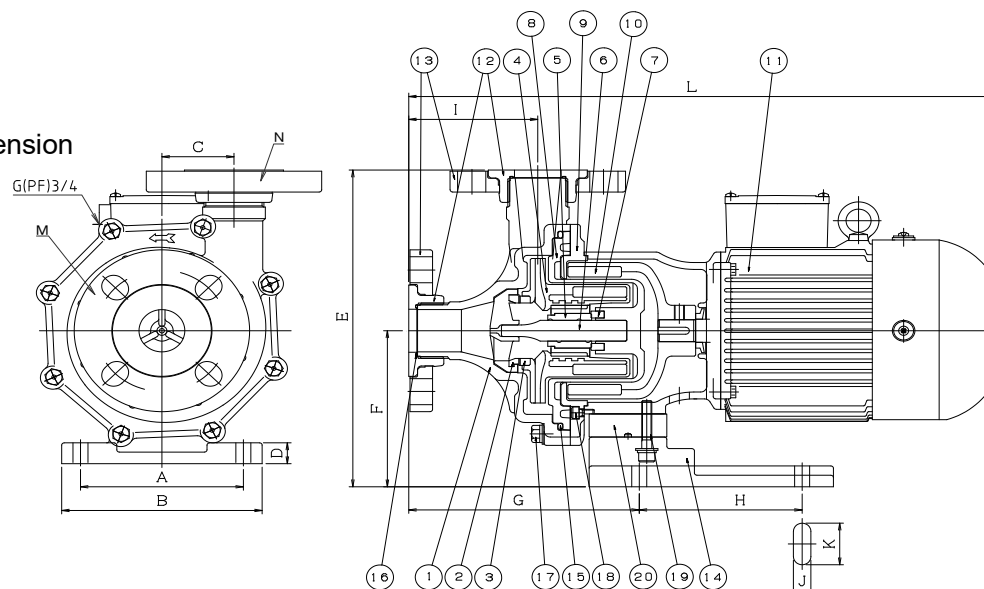
YD-400*GSF

Specification

| Model | | | 4000GSF1 | 4001GSF3 | 4002GSF3 | 4003GSF3 | 4005GSF3 |
|------------------------------------|------|---------|-------------------------|-------------|-------------------------|--------------|--------------|
| Bore (Suction x Discharge) | | | 40A (1.5") x 40A (1.5") | | 50A (2.0") x 40A (1.5") | | |
| Motor output | | | 0.4kW (1/2) | 0.75kw (1) | 1.5kW (2) | 2.2kW (3) | 3.7kW (5) |
| Std. performance (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 - 150 | 15 - 200 | 19 - 200 | - |
| | | S.G.1.9 | 5.5 - 100 | 8 - 150 | 12.5 - 200 | 15.5 - 200 | - |
| | 60Hz | S.G.1.2 | 9 - 100 | 11.5 - 150 | 17.5 - 200 | 22.5 - 200 | 30 - 200 |
| | | S.G.1.5 | 6 - 100 | 9 - 150 | 14 - 200 | 19.5 - 200 | 27.5 – 200 |
| | | S.G.1.9 | - | 9 - 150 | 10.5 - 200 | 15 - 200 | 23 - 200 |
| Weight (kg) *Japan std. motor | | | 17.5 | 20.5 | 27 | 29 | 43 |
| Max TDH & Capacity (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 |

- The indication in the nameplate Max TDH and capacity in U.S.A.

Outline dimension
/ structure



Dimension of YD-400*GS (F) series

| | A | B | C | D | E | F | G | H | I | J | K | L | M/N |
|-----------------|-----|-----|------|----|-----|-----|-----|-----|-----|------|----|-----|---------|
| 4000GS(F)1 | 110 | 140 | 51 | 18 | 216 | 95 | 150 | 98 | 87 | 12 | 18 | 423 | 40A/40A |
| 4001GS(F)3 | 130 | 160 | 57.5 | 18 | 254 | 115 | 184 | 130 | 103 | Φ 12 | | 468 | 40A/40A |
| 4002/4003GS(F)3 | 208 | 260 | 65 | 21 | 261 | 116 | 156 | 200 | 89 | 14 | 36 | 490 | 50A/40A |
| 4003GSH3/50Hz | 208 | 260 | 80 | 21 | 305 | 136 | 164 | 200 | 93 | 14 | 36 | 498 | 50A/40A |
| 4003GSH3/60Hz | 208 | 260 | 80 | 21 | 296 | 136 | 156 | 200 | 89 | 14 | 36 | 490 | 50A/40 |
| 4005GS(F)3 | 230 | 260 | 65 | 20 | 280 | 135 | 156 | 261 | 89 | 36 | 14 | 531 | 50A/40A |

Parts name & material

| No. | Parts name | Qty | Material | | Remarks |
|-----|-----------------------------|-----|---|-----------------------------|--------------------|
| | | | YD-GS | YD-GSF | |
| 1 | Front casing | 1 | GFR PP | CFR ETFE | |
| 2 | Liner ring | 1 | Alumina Ceramics + GFR PPS | Alumina Ceramics + CFR ETFE | Integrated molding |
| 3 | Mouth ring | 1 | CFR PTFE | | |
| 4 | Impeller | 1 | GFR PP + PP + Magnet | CFR ETFE + Magnet | Integrated molding |
| 5 | Bearing | 1 | CFR PTFE//Carbon/Alumina Ceramics/SiC *1 | | +GFRPPS/+ CFR ETFE |
| 6 | Shaft | 1 | Alumina Ceramics | | |
| 7 | Rear thrust ring | 1 | Alumina Ceramics | | |
| 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 | | Standard motor |
| 12 | Lapjoint | 2 | GFR PP | CFR ETFE | |
| 13 | Flange | 2 | GFR PP | GFR PP (Black) | JIS10K |
| 14 | Base | 1 | GFR PP / FC200 | | 4005GS(F):FC200 |
| 15 | Oring for Casing | 1 | EPDM/FPM 4000 : G140/4001 : G160/etc. : G180 | | FPM: Dai-el |
| 16 | Oring for Lapjoint | 2 | EPDM/FPM Suc:4000•4001:AS568-129/etc.AS568-136 Dis:AS568-129 | | FPM: Dai-el |
| 17 | Hexagonal bolts | 6/8 | SUS304 (4000.4001:M8/other:M10) | | With SW, W |
| 18 | Hex. socket head cap screws | 6 | SUS304 M6 | | |
| 19 | Hex. socket head cap screws | 4 | SUS304 M8 | | With SW, W |
| 20 | Base biscuit | 1 | FC200 (only for 4003GSH) | | H=20mm |

*1: The SiC bearing is only +ETFE.

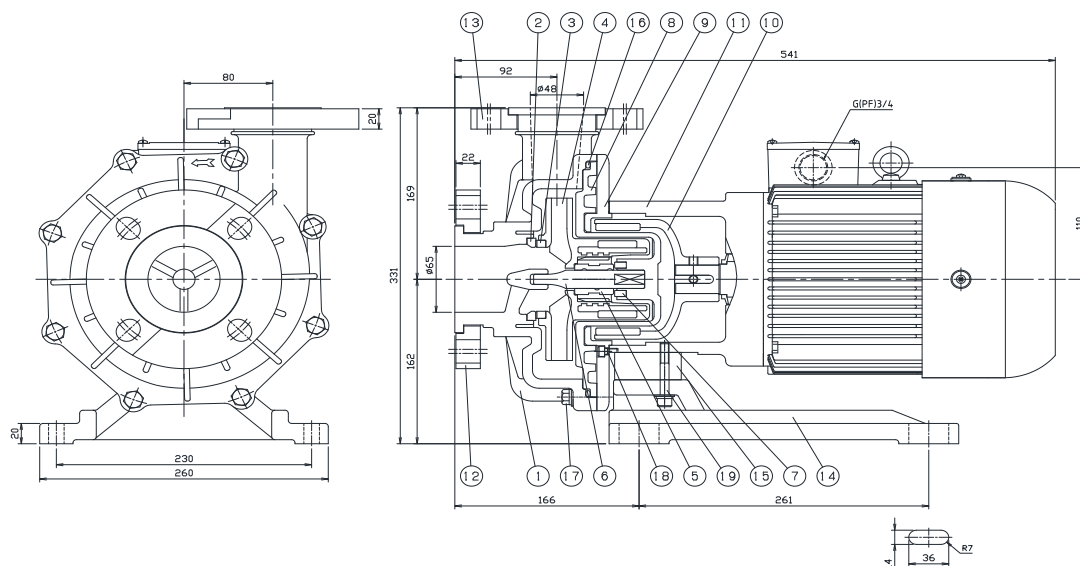
YD-5005GS

Specification

| | | | |
|-------------------------------|------|---------|------------|
| Model | | | 5005GS1(3) |
| Bore (Suction x Discharge) | | | 65A x 50A |
| Motor output | | | 3.7Kw |
| Std. performance (m_L/min) | 50Hz | S.G.1.1 | 19 – 500 |
| | | S.G.1.3 | 16.5 – 500 |
| | | S.G.1.5 | 14 – 500 |
| | 60Hz | S.G.1.1 | 18 – 500 |
| | | S.G.1.3 | 15.5 – 500 |
| | | S.G.1.5 | 13 – 500 |
| Weight (kg) *Japan std. motor | | | 45 |

- The indication in the nameplate Max TDH and capacity in U.S.A.

Outline dimension / structure



Parts name & material

| No. | Part name | Qty | Material | No. | Part name | Qty | Material |
|-----|---------------------|-----|------------------|-----|----------------------------|-----|----------------|
| 1 | Front casing | 1 | GFR PP | 11 | Motor with bracket | 1 | Aluminum frame |
| 2 | Liner ring | 1 | Alumina ceramics | 12 | Separated flange 65A | 2 | GFR PP |
| 3 | Mouth ring | 1 | CFR PTFE | 13 | Separated flange 50A | 2 | GFR PP |
| 4 | Impeller | 1 | GFR PP+PP+Magnet | 14 | Pump base | 1 | FC200 |
| 5 | Bearing | 1 | CFR ETFE+SiC* | 15 | Base biscuit | 1 | FC200 |
| 6 | Shaft | 1 | Alumina ceramics | 16 | Oring for Casing | 1 | EPDM/FPM G215 |
| 7 | Rear thrust ring | 1 | Alumina ceramics | 17 | Hex. bolt | 8 | SUS304 M10 |
| 8 | Rear casing | 1 | GFR PP | 18 | Hex. socket head cap screw | 6 | SUS304 M6 |
| 9 | Rear casing support | 1 | FC200 | 19 | Hex. socket head cap screw | 4 | SUS304 M8 |
| 10 | Outer magnet | 1 | FCD450-10+Magnet | | | | |

* The bearing material is only CFR ETFE+SiC.

Handling instructions

The magnet force of the pump is powerful, so it requires scrupulous attention to handling the pump other than the normal prohibited matter such as dry running or inverse rotation operation.

- 1) People with pacemakers and other electronic devices for maintaining bodily functions do not use the magnet drive pump. The inside magnet is several times more powerful than ordinary magnets used every day.
- 2) Do not place your hands between the magnets. If there are articles made of iron such as knives, scissors or heavy iron masses nearby, the magnets attract to them in an instant, causing injury to the hand holding the article or crack of the plastic surrounding the magnets.
- 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 Dry Running

Dry running generates friction heat at sliding parts such as the shaft and bearing and plastic parts around them become deformed. As the result, the impeller eccentrically rotates, the pump does not work properly and damaged.

If the pump is operated without priming liquid during the suction valve is closed, dry running occurs.

2 Liquid with slurry

Basically, do not use the magnet drive pump for liquid with slurry. Even if thin liquid with slurry is transferred by the pump, the pump and parts are damaged and make the life shorten.

- When piping to pump up from the bottom of the tank, it occurs.
(If using the pump for liquid with slurry, consult us in advance.)

3 Cavitation*

If the pump is used with cavitation, it may cause the pump vibration, the basic performance degradation or damage inside the casing.

The causes may be that suction pipes are long, thin, many bending, high temperature liquid or strainers clogged.

*Cavitation is the phenomenon that the liquid inside becomes low pressure locally by liquid action and air bubbles occur.

(When air bubbles break, impact occurs and makes noise & vibration. It also causes the surface erosion and the performance degradation.)

4 Erosion

The product is mainly made of GFR PP or CFR ETFE. When purchasing it, consider the corrosion resistance against liquid and select the pump. The pump life may be shortened depending on the liquid type and temperature. When changing the transferred liquid or condition, consult us.

Installing / piping precaution

1 Installing precaution

- (1) If a large amount of air enters in pumps during operation, it does not pump properly and causes a breakdown.
 - Set the height from the suction inlet to the liquid surface in a tank at 50cm and more.
If the liquid level falls below the recommended value, there is a possibility of air being drawn in through the suction port or difficulty in removing the air that has entered.
Therefore, we recommend installing an anti-dry-run device, an air release valve, and return piping.
 - Do not allow any place air stay or up-and-down piping in the suction pipe.
 - Arrange the suction pipe to have a gradient of more than 1/100 facing the pump.
 - Use the suction bigger than the pump bore. If the bore is different, connect an eccentric reducer and level the upper side.
- (2) Place a strainer at the suction inlet to prevent foreign objects from entering the pipe. However, clean the strainer periodically to prevent clogging and minimize loss resistance.
- (3) It is recommended to place check valves on the discharge pipe to prevent “water hammer”. At the bottom, place a bypass for air exhaust.
 - The discharge pipe is long or the capacity is 10m and more.
 - The tip of the discharge pipe is 9 m and more from the liquid level in a suction tank.
 - Two or more pumps that are parallel to one another are used.
- (4) Create bending sections or expansion joints on the piping to prevent pump deformation and liquid leakage caused by thermal expansion of pipe.
- (5) The pump is mainly made of resin. Do not create any impact.
- (6) Arrange the pipe flange and the pump flange parallel to one another and do not tighten the bolts excessively.
Bolt: M16, Recommended tightening torque: 19.6N · m or 200kgf · cm
- (7) When installing, fit the dimension of the pump. If not, the casing may be damaged.
- (8) Do not turn the piping after fixing the pump flange to the pipe.
- (9) When using the pump outside, use the water proof cable at the service entrance to prevent rain into the terminal box.

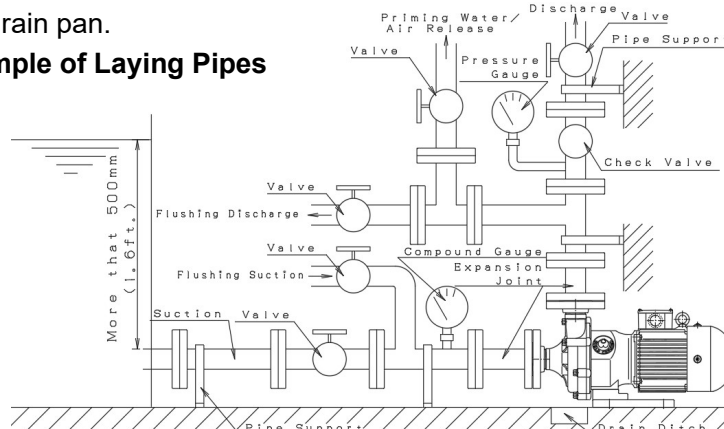
2 Do not apply piping load.

- (1) Install the piping support to apply the piping load completely.
- (2) If it is possible for the piping to be expanded by high temperature liquid, the pump may be damaged by expansion. Therefore, install the extendable or flexible joint to prevent the load to the pump at the expansion.

3 Drain Ditch

- (1) Arrange drain ditches if liquid leaks, it flows to a wastewater pit.
- (2) If not, set a drain pan.

Recommended Example of Laying Pipes



Operating precaution

1 Before starting operation.

- (1) Clean pipes and tanks. If foreign objects enter the pump, not only the performance decrease, but also cause a breakdown.
- (2) Check that the flange bolts are tightened firmly. A loose bolt may cause liquid leakage, injury to people and damage to other facilities.
- (3) Open the suction and discharge valves to enter priming liquid in use, and air release. In this time, check no liquid leakage, again.
- (4) Check the rotation direction of motor. If the motor rotates in reverse, rewire two phases of the three-phase power supply. It is clockwise as viewed from the motor fan.

2 No dry running.

Sliding parts are cooled by self-circulation with pumped liquid. If the pump is operated with no liquid, it may damage by heat. If dry running occurs, do not suddenly pour liquid in it rather than leave it an hour and more. A sudden flow of liquid may rapidly cool the heated sliding parts and severely damage them beyond repair.

3 Liquid seal operation by mistake (Suction & discharge valves are closed.)

When operating pumps with the suction & discharge valves closed, the inside is subjected to high pressure and temperature. If the pump is disassembled in this situation, steam and hot water are spewed. Make sure to check decreasing in temperature completely and do it.

When the pump inside is damaged by liquid seal operation, not only parts but also pump may have to be replaced.

4 Range of the used liquid temperature

Vapor pressure, viscosity, and corrosiveness are changed depending on the temperature of the used liquid. Use the pump under allowing leeway of the pump performance in mind of them.

- Range of the used liquid temperature:

GS / GSH: 0 – 80 degrees (If the pump is used for liquid 70 degrees and more, consult us.)

GSF: 0 – 80 degrees

5 Change of the used liquid specific gravity or viscosity

If the specific gravity and viscosity are changed a lot, the pump's performance capacity, efficiency, and axial movement power may be changed by pumped liquid. Take this into consideration and use the pump within an appropriate leeway.

6 Limit of the pump pressure resistance

Avoid going over the discharge pressure of the pump as the following the limit of the pump pressure resistance.

| | | | | | | | |
|----------------|----------------|------------------|------------------|------------------|----------------|------------------|---------------|
| Model | 2500GS(F) 1 | 2501GS(F) 1/3 | 2502GS(F) 1/3 | 2503GS(F) 1/3 | | | |
| Limit (MPa) | 0.6 | 0.6 | 0.6 | 0.6 | | | |
| Model | 4000GS(F) 1 | 4001GS(F) 1/3 | 4002GS(F) 1/3 | 4003GS(F) 1/3 | 4003GSH 1/3 | 4005GS(F) 1/3 | 5005GS 1/3 |
| Limit (MPa) | 0.23 | 0.32 | 0.54 | 0.54 | 0.54 | 0.6 | 0.4 |

7 Use conditions change

The pump is manufactured under the specification based on the meeting before purchase. If the use condition is changed, consult us.

8 Frequent on / off switching

Frequent switching on / off of a pump may hasten pump damage. Turn on the pump less than six times in an hour.

9 Minimum flow rate

Operate pumps at the capacity higher than the following figure.

| Model | Minimum flow rate |
|--|-------------------|
| 2500GS(F)1, 2501GS(F)1/3, 4000GS(F)1, 4001GS(F)1/3 | 10 L/min |
| 2502GS(F)1/3, 2503GS(F)1/3, 4002GS(F)1/3, 4003GS(F)1/3, 4003GSH1/3, 4005GS(F)1/3, 5005GS1/3 | 20 L/min |

Maintenance / Consumable parts

1 Daily check

- (1) Check that there are no vibration or any abnormal noises and it works smoothly.
- (2) Compare the current value during operation with the rated current value and check that the operating load is normal. Also, check that the discharge pressure, capacity and current value is on the level than ever before.
- (3) Check the liquid level in the suction tank. (The height is 50 cm and more from the pump suction inlet.)

2 Periodical check

- (1) Periodically overhaul is recommended for a smooth operation.
Recommended period of periodical check:
Check every 12 months or every 10,000 hours, whichever comes first.
- (2) When replace or carrying for repair, drain and wash the pump thoroughly.

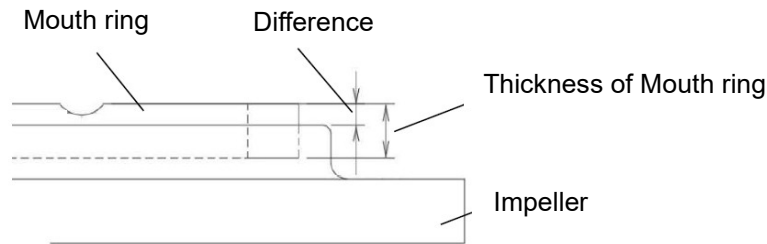
3 Consumable parts check

Periodically check the following consumable parts and replace them if necessary.

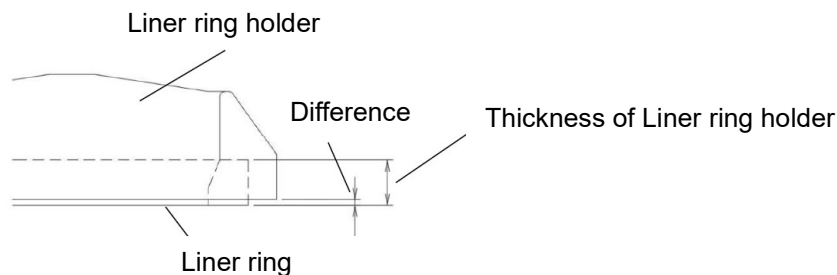
The following number indicates the parts number in the page 7, 9 and 10.

(1) Mouth ring (No.3)

- Check the wear volume of the mouth ring as viewed from the side of the impeller.
(The max. difference is 0.5mm.)



- Replace the mouth ring when scratch or bump are shown.
- (2) Bearing (No.5) The inner diameter of the new one: $\phi 18$
 - Check no crack and damage.
 - Check that the rattle between the bearing and shaft is not big. (Min. inner dia.: $\phi 18.5$)
If the total abrasion with the shaft is more than 0.5mm, recommend to replace it.
- (3) Rear thrust ring (No.7)
 - Check no crack and damage.
- (4) Shaft (No.6) The outer diameter of the new one is $\phi 18$.
 - Check no crack and damage.
 - Check that the rattle between the shaft and bearing is not big. (The max. diameter is $\phi 17.5$.) If the total abrasion is 0.5mm and more, recommend to replace it.
- (5) Liner ring (No. 2)
 - Check no crack and damage on Alumina ceramic.
 - Check the abrasion of the liner ring. (The max. difference is 0.5mm.)



- (6) Impeller (No. 4)
 - If there are wear track or corrosion around the impeller, replace it.
- (7) Rear casing (No. 8)
 - Check no wear track and corrosion in the rear casing / wear track and crack in the back.
- (8) Front casing (No. 1)
 - If there are wear track or corrosion in the front casing, replace it.
- (9) O-ring (No. 15, 16)
 - If the rubber cures, is less elastic or has cracks by the degradation or swollen, replace it.

4 Replace consumable parts (Replace the following as a set.)

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

- (1) Front Casing set
 - Front casing + Liner ring + Lap joint + Flange + O-ring
- (2) Impeller set
 - Impeller + Mouth ring + Bearing
- (3) Rear Casing set
 - Rear casing + Rear thrust ring + Shaft

5 Long time storage

When store the pump for long time, it is recommended to store as follows.

- (1) Avoid outdoors, the place where direct sunlight affects, the place where with high temperature or high humidity, the place where condensation occurs, the place where to freeze, the place where possibility of infiltrate foreign substance or dust, in the corrosive gas.
(Recommended temperature : 10°C ~ 30°C Relative humidity : Lower than 95%)
- (2) Operate the pump at least once every 6 months.
(If it is not possible, try rotating the fan to rotate the motor shaft.)
- (3) Confirm that the insulation resistance is higher than 10MΩ before operation.
- (4) Make sure there are no foreign objects on the pump and no dust or liquid on the electrical parts.
- (5) If the liquid used is prone to solidification or sedimentation, remove the pump, drain and rinse it with water before storing.

Disassembly & Assembly

The magnet force which is used in a pump is powerful, be careful of it during disassembly or assembly. As well make sure to close the suction and discharge valves during them.

1. Disassembly

- (1) Drain the liquid in the pump and wash the inside of the pump thoroughly.
- (2) Loosen hex. bolts of the front casing and remove the rear casing support.
- (3) Pull out of the impeller to forward. Do not scratch them with care.
It tries to go back forward by magnet force and be careful not to catch a finger.
- (4) When putting sharps such as scraper between the rear casing and rear casing support and lifting the rear casing, the rear casing is pull out to forward.
- (5) When removing the flange from the front casing, hit the parts lightly by a plastic hammer and pull it out of the lap joint.

2. Assembly

Assembly is in the reverse order of disassembly. Clean the sliding parts and O-rings thoroughly with no entering dust or scratch. As well tighten the bolts evenly.

| Model | Tightening torque |
|---|-------------------|
| 4000GS(F)1, 4001GS(F)1/3 | 7.5N · m |
| 2501GS(F)1, 2501GS(F)1/3, 2502GS(F)1/3 2503GS(F)1/3, 4002GS(F)1/3, 4003GS(F)1/3 4003GSH1/3, 4005GS(F)1/3, 5005GS1/3 | 10.0N · m |

NOTE:

- (1) The magnet force is very powerful and use plastic or wooden spacers not to catch your fingers.
- (2) When re-assembling the pump after disassembly, it is recommended to always replace new O-rings. If using O-rings deformed shape, it may cause liquid leakage.
- (3) After assembly, remove the motor fan cover and turn the fan. Check that the impeller rotates smoothly.

Assembling the pump with standard off-the-shelf motor

- (1) Put the standard off-the-shelf motor on the workbench with the motor shaft-side up. The opposite side of terminal box should be located right in front of you.



- (1)' Only for 5HP

Insert and tighten the screws to secure the bracket firmly to the motor mounting plate.
Screws: CAP M10x20 4pcs.



- (2) Insert and tighten the bolts with washers to secure the bracket (with mounting plate for 5HP) to the motor. The base installation side of the bracket should be located at the opposite side of the terminal box.

Bolts and washers:

4000GS(F) : Hex. Bolts M8x25 4pcs.
Spring washers M8 4pcs

4001-4003GS(F) : Hex. Bolts M10x25 4pcs.
2500-2503GS(F) Spring washers M10 4pcs.

4005,5005GS(F) : Hex. Bolts M12x30 4pcs.
Spring washers M12 4pcs.



- (3) Insert the motor shaft into the hole of the outer magnet until the upper face of the outer magnet has located at 13mm (0.05 inches) above the upper surface of bracket.

Insert two screws into the fixing holes of outer magnet with hex wrench from the hole (see arrow) of the bracket. Tighten them to secure the outer magnet to the motor shaft.



- (4) Tighten the bolts to secure the base to the bracket.

Screws: 4000-4003GS(F) : CAP M8x25(W/SW) 4sets
2500-2503GS(F)

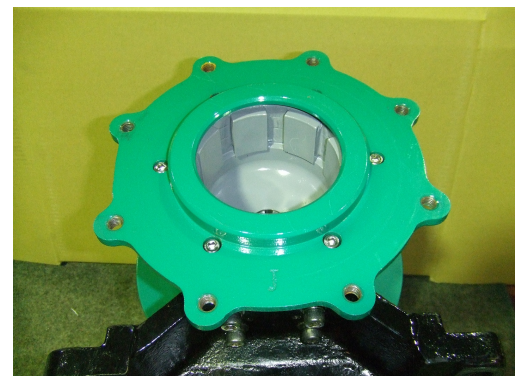
4005GS(F) : CAP M8x30 (W/SW) 4sets

5005GS: CAP M8x45 (W/SW) 4sets



- (5) Tighten the screws to secure the rear casing support to the bracket which the marked "S" is the downside (side of the base).

Screws: CAP M6x12 6pcs.



- (6) Install the rear casing into the opening of the rear casing support. Carefully insert the impeller set into the rear casing along the pump shaft. There is a strong magnetic attraction between the impeller and the outer magnet. Do not pinch your fingers. Then, install the O-ring to the rear casing.

O-rings:

4000GS(F) --- P-140

4001GS(F) --- G-160

4002-405GS(F) --- G-180

2500-2503GS(F)

5005GS --- G-220



- (7) Tighten the bolts to secure the casing to the rear casing support.

For front casing

4000GS(F) --- Hex. Bolts M8×35 (W/SW)4sets

Hex. Bolts M8×60 (W/SW)2sets

4001GS(F) --- Hex. Bolts M8×35 (W/SW)6sets

Hex. Bolts M8×60 (W/SW)2sets

4002-4005GS(F) --- Hex. Bolts M8×35 (W/SW)6sets

2500-2503GS(F) Hex. Bolts M8×60 (W/SW)2sets

5005GS --- Hex. Bolts M10×35 (W/SW)6sets

Hex. Bolts M10×80 (W/SW)2sets



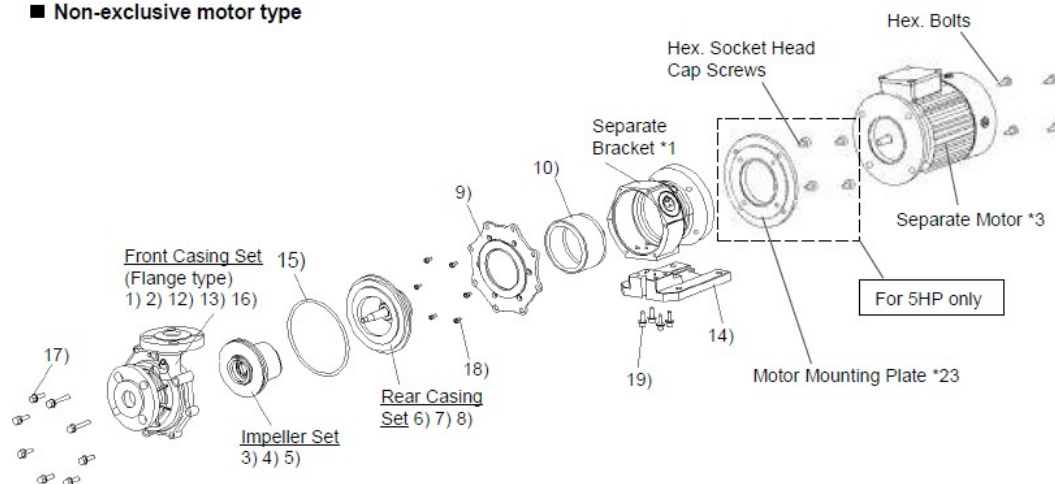
Assembling the pump delivered without separate motor

- (1) Remove the Hex. bolts (6 or 8 pcs) at the front side and the front casing .
- (2) Remove the pump base from the bracket.
- (3) Fix the bracket to the motor (see (3) on P25), and insert the motor shaft into the outer magnet. (see (4) on P26)
- (4) Assemble the rest parts in the same procedure of “2-3. Assembling the pump with standard off-the-shelf motor” from (5) on P26.

The following is the NEMA frame No. and the motor bolt size for the NEMA motor used in the U.S.A.

| Model | HP | NEMA frame | Motor bolt size | Q'ty |
|----------------|-----|------------|-----------------|------|
| 2500/4000GS(F) | 3/4 | 56C | 3/8" x 1.5" | 4 |
| 2501/4001GS(F) | 1 | | | |
| 2502/4002GS(F) | 2 | | | |
| 2503/4003GS(F) | 3 | | | |
| 4005/5005GS(F) | 5 | 184TC | 1/2" x 1" | |

■ Non-exclusive motor type

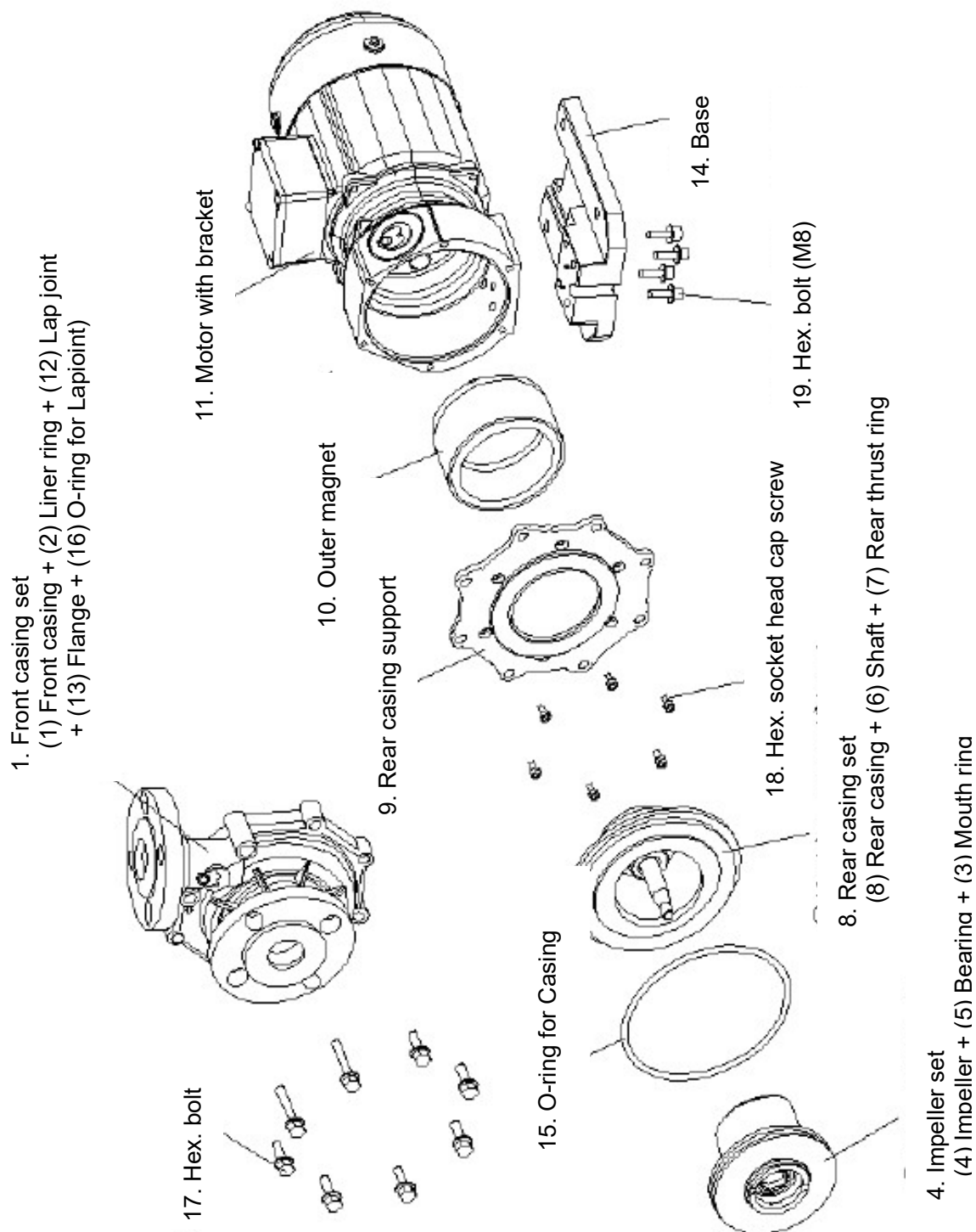


*1: Separate bracket is used for non-exclusive motor as an individual part.
(Separate NEMA bracket is used for the US version.)

*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.)

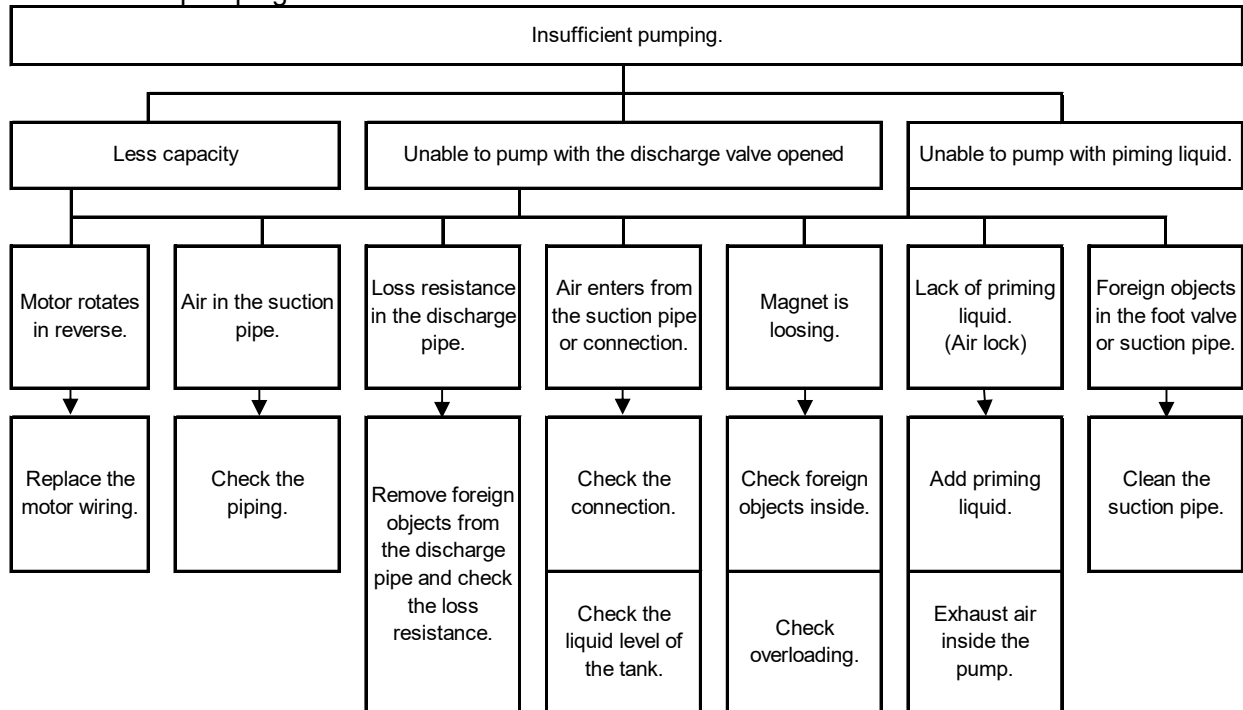
*3: Separate NEMA motor is used for the US version.

Exploded view

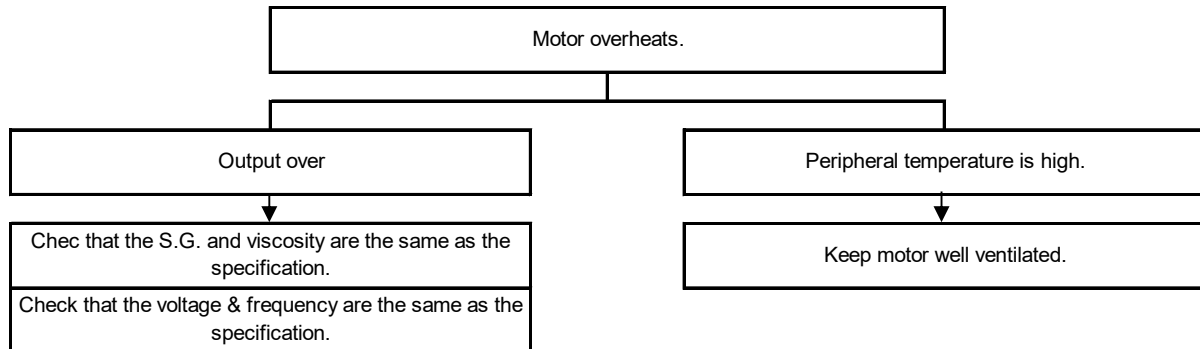


Troubleshooting

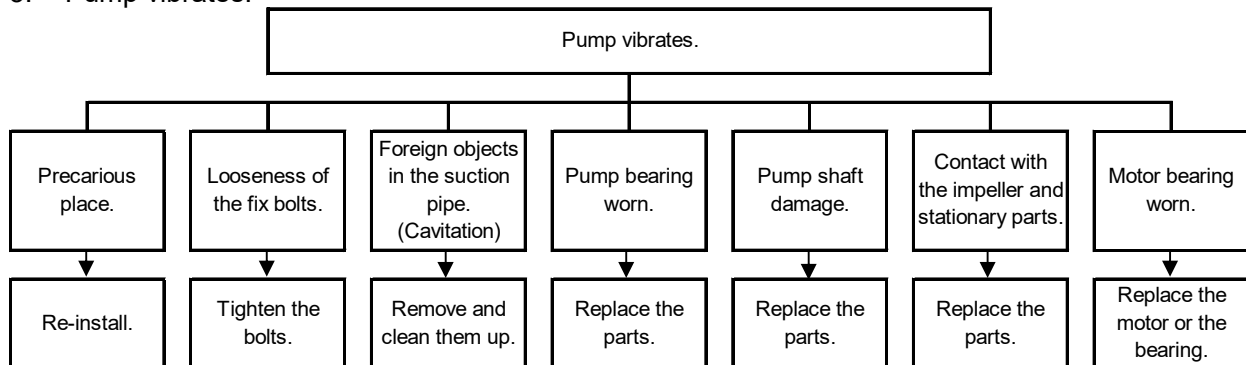
1. Insufficient pumping.



2. Motor overheats.



3. Pump vibrates.



Warranty / Repair

1. Warranty period and coverage

- (1) The warranty period is 12 months from dispatched from our factory.
- (2) During warranty period, if the pump breaks down or is damaged at the use under the condition instructed in this manual due to manufacturing defect(s), the failure parts are repaired free of charge.
- (3) Even if the failure occurs within the warranty period, the followings are repaired or replaced for compensation in principle.
 - Breakdown or damage due to different use or safekeeping from the instructions in this manual.
 - Breakdown or damage due to incorrect use or unjust repair or modification.
 - Breakdown or damage as result of pollution, salt damage, gas damage, abnormal voltage or undesigned power (voltage, frequency) as well as fire, earthquake, flood disaster, lightning strike or other natural disaster.
 - Abrasion or degradation of consumable parts like a Gasket or O-ring.
 - Breakdown or damage during transportation, for relocation or fall after your purchase
- (4) We cannot be responsible for the break down or damage of the customer-specified pump.
- (5) Irregularities or breakdowns due to chemical or hydrodynamic corrosion by liquid are not covered under the warranty. The material chosen at the time of the contract is only a recommendation. We do not guarantee the chemical resistance of the material.
- (6) If the determination of the cause for the breakdown or damage is questionable, it attributes to the negotiation between the customer and us.
- (7) Expenses or other damage incurred as a result of breakdowns at the use under the different condition from the instruction in this manual are not covered under the warranty.

2. Repair

Notice:

For repair, consult the supplier. When returning a pump, thoroughly clean and pack the wet parts kit.

If irregularities are detected during operation, stop the operation immediately for check. (Refer to the section on “troubleshooting”).

- (1) Consult your supplier or us for repair.
- (2) Read this manual again and re-check before requesting repair.
- (3) When visiting to a distance location for repair, the travel expenses are charged.
- (4) Inform the followings when requesting repair.
 - Model name and serial number
 - Use duration and condition
 - Damages parts and condition
 - Liquid (Name, Specific gravity, Temperature, Slurry)

If liquid leaks during transportation, it is very dangerous, so make sure to clean inside thoroughly. When ordering replaced parts, specify the name in the parts name list (P7, 9, 10). Although, inform the parts' number and material, too.

Installation record

| | |
|----------------|----------------|
| Model: | |
| Purchase date: | Serial number: |
| Start date: | Supplier: |