

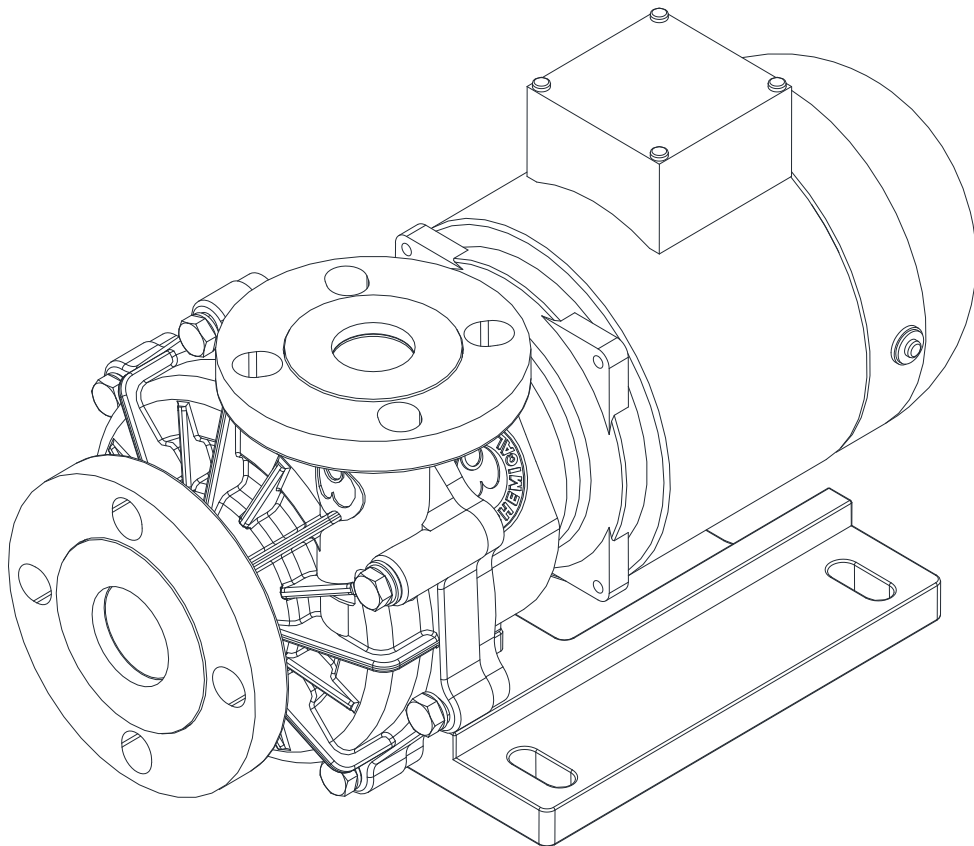
**CORROSION RESISTANT  
MAGNET DRIVE PUMP**

***Chemi-Free***

**YD-GS (F) series**

**INSTRUCTION MANUAL**

**Version: 180620**



 **World Chemical Co., Ltd.**

# 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.



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# Safety precaution (To be observed at all times)









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

- The following symbols classify the degree of danger and explain the damages that could occur when its contents are ignored, 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.            |
| <b>Warning</b>  |  |
|  | Non-compliance can lead to some injury and/or property damage. |
| <b>Caution</b>  |  |

|   |   |
|---|---|
|  | 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 facility's 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.



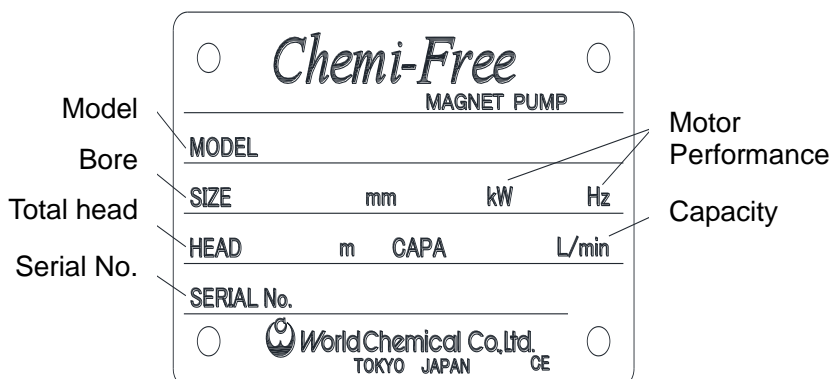
(9) Outflow protection.

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, total head, capacity, motor specification, voltage and motor specification) is the same as your 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, 3/4HP |
| 2501GS (F)1(3) | 25A          | 25A            | 0.75kW, 1HP  |
| 2502GS (F)1(3) | 25A          | 25A            | 1.5kW, 2HP   |
| 2503GS (F)1(3) | 25A          | 25A            | 2.2kW, 3HP   |
| 4000GS (F)1    | 40A          | 40A            | 0.4kW, 3/4HP |
| 4001GS (F)1(3) | 40A          | 40A            | 0.75kW, 1HP  |
| 4002GS (F)1(3) | 50A          | 40A            | 1.5kW, 2HP   |
| 4003GS (F)1(3) | 50A          | 40A            | 2.2kW, 3HP   |
| 4005GS (F)1(3) | 50A          | 40A            | 3.7kW, 5HP   |
| 5005GS1(3)     | 65A          | 50A            | 3.7kW, 5HP   |

### (2) Model

GS / 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 | 400*GSF series | 5005GS series |
|------------------|---------------|----------------|---------------|----------------|---------------|
| Specific Gravity | 0: 1.0        | 2: 1.2         | 1: 1.05/1.1   | 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        |
| Standard specification (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/lbs.)                 |      |         | 19.5/ 42           | 21.5/ 47     | 26.5/ 58    | 28.5/ 62     |
| Max. TDH & Capacity (ft./gpm)    | 60Hz | S.G.1.0 | 53.5 / 45          | 76.8 / 26.4  | 118 / 39.6  | -            |
|                                  |      | S.G.1.1 | -                  | -            | -           | 126.0 / 42.3 |
|                                  |      | S.G.1.3 | 39.7 / 39.6        | 63.00 / 26.4 | 95.1 / 39.6 | 116.8 / 42.3 |
|                                  |      | S.G.1.5 | 35.8 / 39.6        | 56.1 / 26.4  | 89.2 / 39.6 | 107.3 / 42.3 |

- The indication in the nameplate Max TDH and capacity in U.S.A.
- The weight is the pump with a Japan standard motor.

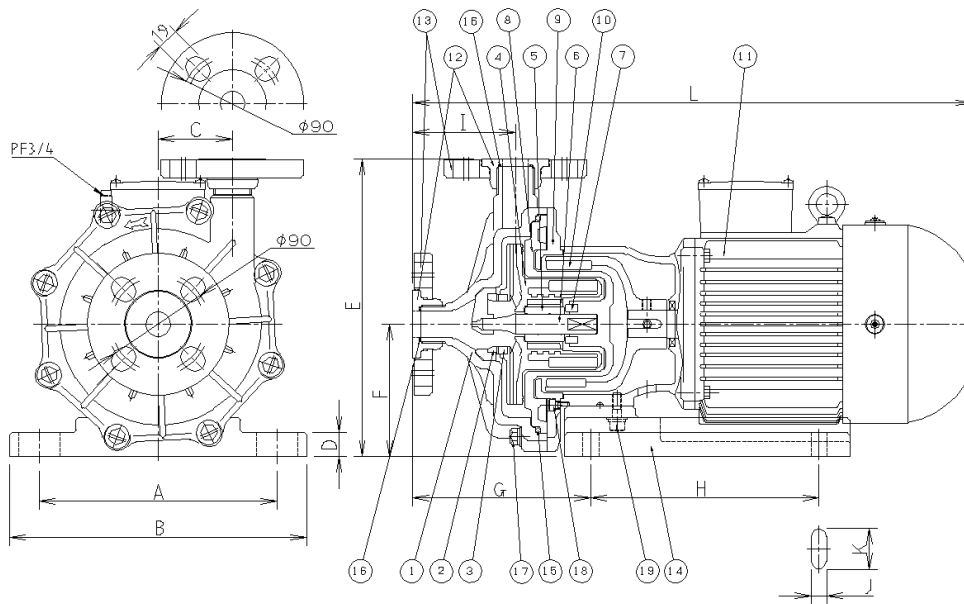
# YD-25\*GSF series

## Specification

| Model                            |      |         | 2500GSF1           | 2501GSF3    | 2502GSF3    | 2503GSF3     |
|----------------------------------|------|---------|--------------------|-------------|-------------|--------------|
| Bore (Suction x Discharge)       |      |         | 25A (G1) x 25A(G1) |             |             |              |
| Motor output                     |      |         | 0.4kW=3/4HP        | 0.75kW=1HP  | 1.5kW=2HP   | 2.2kW=3HP    |
| Standard specification (m_L/min) | 50Hz | S.G.1.2 | 9 - 50             | 16.5 - 50   | 24 - 50     | -            |
|                                  |      | S.G.1.5 | 7 - 50             | 14 - 50     | 22 - 50     | -            |
|                                  |      | S.G.1.9 | 5.5 - 50           | 11.5 - 50   | 18 - 50     | 23.5 - 50    |
|                                  | 60Hz | S.G.1.2 | 9 - 50             | 15 - 50     | 26 - 50     | 33 - 50      |
|                                  |      | S.G.1.5 | 6.5 - 50           | -           | 22 - 50     | 28 - 50      |
|                                  |      | S.G.1.6 | -                  | 11 - 50     | -           | -            |
|                                  |      | S.G.1.9 | -                  | -           | 18 - 50     | 25.5 - 50    |
| Weight (kg/lbs.)                 |      |         | 20.5/45            | 22.5/ 49    | 28/ 61      | 30/ 66       |
| 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.
- The weight is the pump with a Japan standard motor.

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 | Φ12 |    | 431 |
| 2501GS(F)3      | 130 | 160 | 65 | 18 | 260 | 115 | 173 | 130 | 90 | Φ12 |    | 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  | Lap joint                   | 2   | GFR PP                                   | CFR ETFE                    |                    |
| 13  | Flange                      | 2   | GFR PP                                   |                             | JIS10K             |
| 14  | Base                        | 1   | GFR PP                                   | GFR PP (Black)              |                    |
| 15  | O-ring                      | 1   | EPDM/FPM (G-180)                         |                             | FPM: Dai-el        |
| 16  | O-ring                      | 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)   |
| Standard specification (m <sub>L</sub> /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/ lbs.                             |      |          | 16.5/38                 | 19.5/ 42    | 25.5/56                 | 27.5/60      | 41.5/91     |
| Max TDH & Capacity (ft./gpm)                 | 60Hz | S.G.1.05 | 48.8 / 52.8             | 57.4 / 77.9 | -                       | -            | -           |
|  |      | S.G.1.1  | -                       | -           | 84.3 / 100.4            | 104.3/118.8  | 129.6/118.9 |
|  |      | S.G.1.3  | 36.1 / 47.6             | 52.5 / 68.7 | 75.1 / 92.5             | 96.5 / 113.6 | 120.1/118.9 |
|  |      | S.G.1.5  | -                       | 46.6 / 63.4 | 70.2 / 87.2             | 83.7 / 116.2 | 108.6/118.9 |

- The indication in the nameplate Max TDH and capacity in U.S.A.
- The weight is the pump with a Japan standard motor.

# YD-400\*GSF

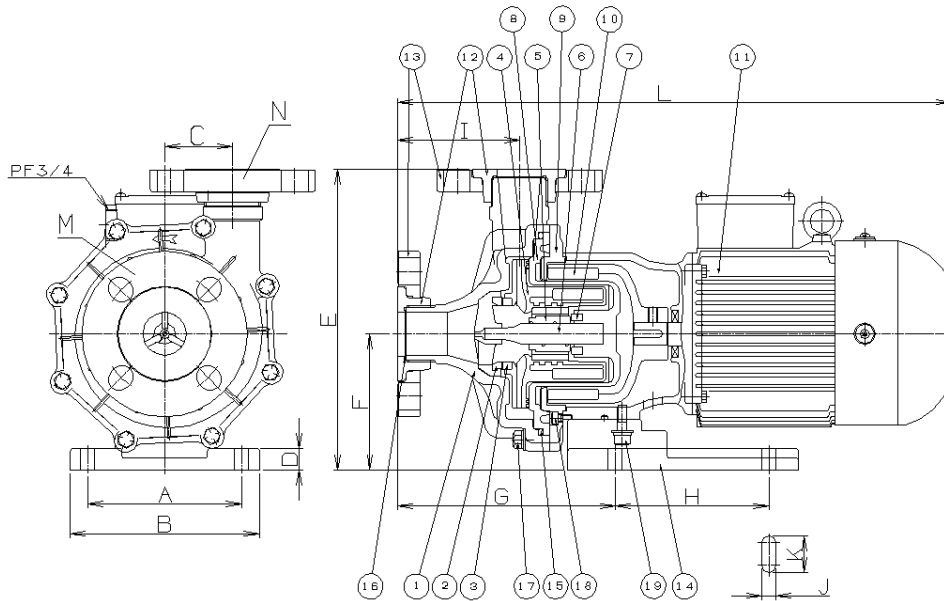
## Specification

| 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)    |
| Standard specification (m <sub>L</sub> /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/ lbs.                             |      |         | 17.5/ 38                | 20.5/ 45    | 27/ 59                  | 29/ 63       | 43/ 94       |
| Max TDH & Capacity (ft./gpm)                 | 60Hz | S.G.1.2 | 35.4 / 47.6             | 54.1 / 66.1 | 78.4 / 87.2             | 93.8 / 105.7 | 114.8/111.0  |
|  |      | S.G.1.5 | 31.2 / 42.3             | 44.3 / 60.8 | 68.6 / 79.3             | 85.3 / 95.1  | 107.0/105.7  |
|  |      | S.G.1.9 | -                       | 38.4 / 55.5 | 55.8 / 71.3             | 70.5 / 84.5  | 92.9 / 105.7 |

- The indication in the nameplate Max TDH and capacity in U.S.A.
- The weight is the pump with a Japan standard motor.



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 |
| 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  | Lap joint                   | 2   | GFR PP                                   | CFR ETFE                    |                    |
| 13  | Flange                      | 2   | GFR PP                                   | GFR PP (Black)              | JIS10K             |
| 14  | Base                        | 1   | GFR PP / FC200                           |                             | 4005GS(F):FC200    |
| 15  | O-ring                      | 1   | EPDM/FPM                                 |                             | FPM: Dai-el        |
| 16  | O-ring                      | 2   | EPDM/FPM                                 |                             | FPM: Dai-el        |
| 17  | Hexagonal bolts             | 6/8 | SUS304 (400.401: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         |

\*1: The SiC bearing is only +ETFE.

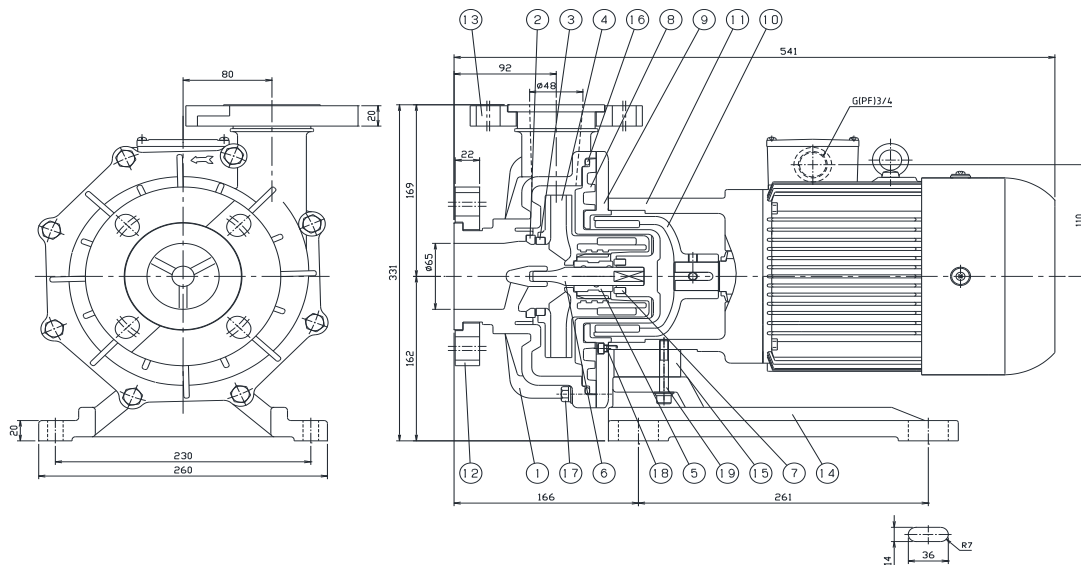
# YD-5005GS

## Specification

|                                     |      |            |          |
|-------------------------------------|------|------------|----------|
| Model                               |      | 5005GS1(3) |          |
| Bore (Suction x Discharge)          |      | 65A x 50A  |          |
| Motor output                        |      | 3.7Kw      |          |
| Standard specification<br>(m_L/min) | 50Hz | S.G.1.1    | 20 – 500 |
|                                     |      | S.G.1.3    | 18 – 500 |
|                                     |      | S.G.1.5    | 15 – 500 |
|                                     | 60Hz | S.G.1.1    | 20 – 500 |
|                                     |      | S.G.1.3    | 18 – 500 |
|                                     |      | S.G.1.5    | 15 – 500 |
| Weight (kg)                         |      | 45         |          |

- The indication in the nameplate Max TDH and capacity in U.S.A.
- The weight is the pump with a Japan standard motor.

## 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  | O-ring                     | 1   | EPDM/FPM       |
| 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.
  - 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.

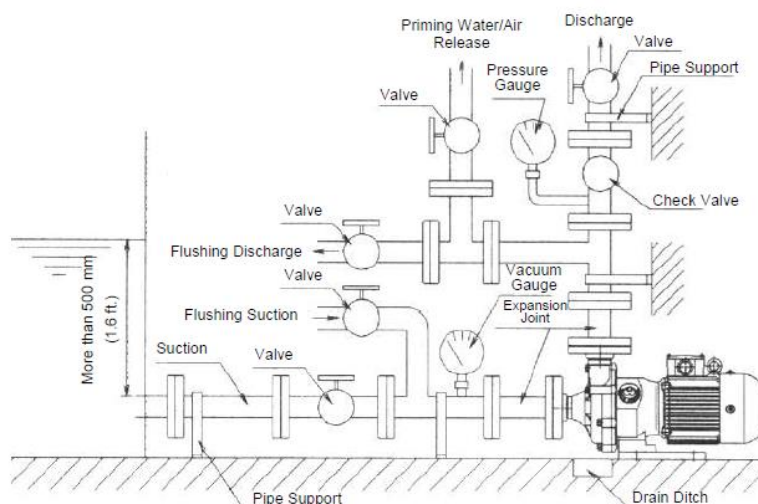
## 2 Do not apply piping load.

- (1) Install the piping support to apply the piping load completely.
- (2) When high temperature liquid (40 degrees and more), create bending or expansion joints in the pipe to prevent the pump from load for heat 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, 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: 32-158F/ 0 – 70 degrees  
 GSF: 32-176F/ 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           |               |            |
|             | 4000GS(F)1 | 4001GS(F)1(3) | 4002GS(F)1(3) | 4003GS(F)1(3) | 4005GS(F)1(3) | 5005GS1(3) |
|             | 0.23       | 0.32          | →             | →             | 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 rates

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(2.6gpm)  |
| 2502GS(F)1(3), 2503GS(F)1(3), 4002GS(F)1(3), 4003GS(F)1(3),<br>4005GS(F)1(3), 5005GS1(3) | 20 L/min(5.2gpm)  |

## Maintenance / Consumable parts

1 Daily check

- (1) Check that there are no vibrations, 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.)

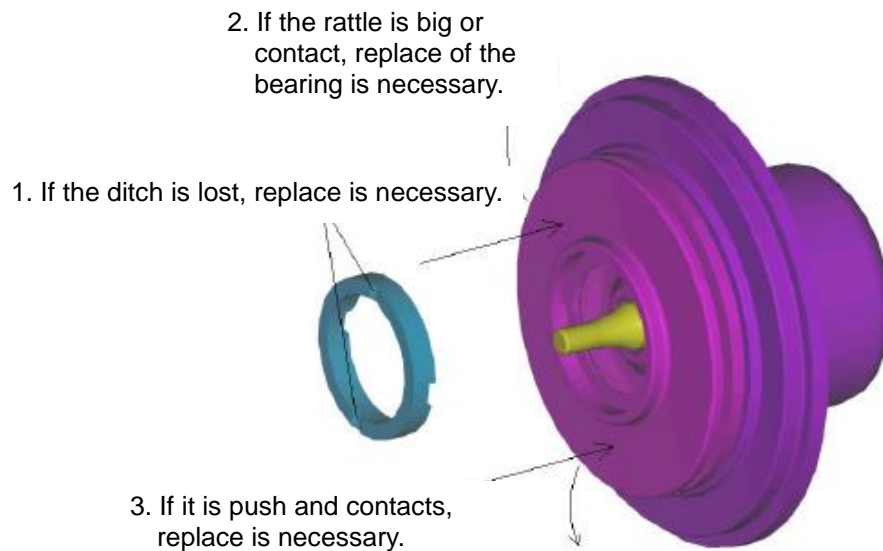
2 Periodical check

- (1) Periodically overhaul is recommended for a smooth operation.
- (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.

- (1) Mouth ring (P7, 9,10 list No.3)
  - Check the wear volume of the mouth ring as viewed from the side of the impeller. Replace the mouth ring in the absence of the ditch on it.
- (2) Bearing (No.5)
  - Check no crack and damage.
  - Check that the rattle between the bearing and shaft becomes big.
- (3) Rear thrust ring (No.7)
  - Check no crack and damage.
- (4) Shaft (No.6)
  - Check no crack and damage.
- (5) Liner ring (No. 2)
  - Check no crack and damage on ceramic.
- (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)



- 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

# 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)<br>2503GS(F)1(3), 4002GS(F)1(3), 4003GS(F)1(3)<br>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.  
2500-2503GE(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

4002-4005GS(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

401GS(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

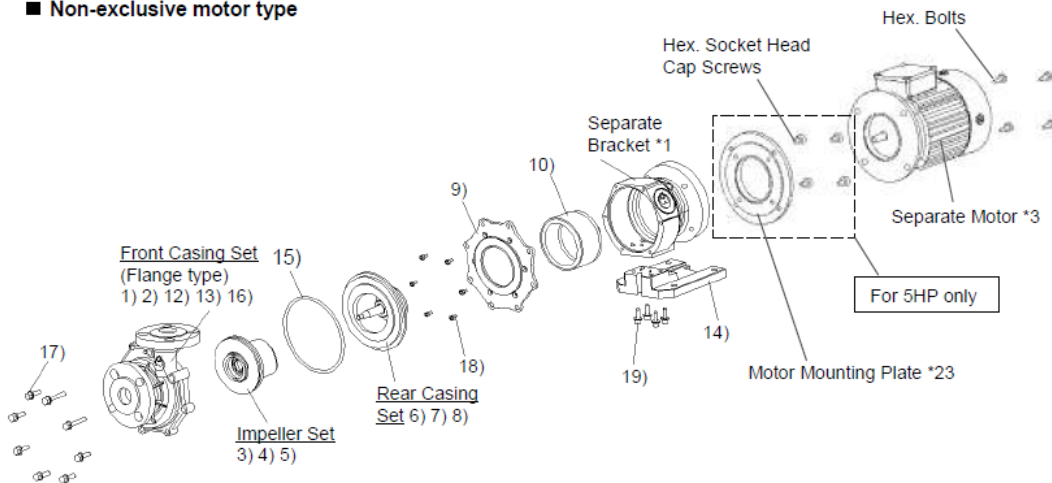
Assembling the pump delivered without separate motor

- (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 |
|----------------|-------|------------|-----------------|------|
| 2500/400GS(F)  | 4-Mar | 56C        | 3/8" x 1.5"     | 4    |
| 2510/4001GS(F) | 1     | 56C        | 3/8" x 1.5"     | 4    |
| 2502/4002GS(F) | 2     | 56C        | 3/8" x 1.5"     | 4    |
| 2503/4003GS(F) | 3     | 56C        | 3/8" x 1.5"     | 4    |
| 4005/5005GS(F) | 5     | 184TC      | 1/2" x 1"       | 4    |

■ Non-exclusive motor type

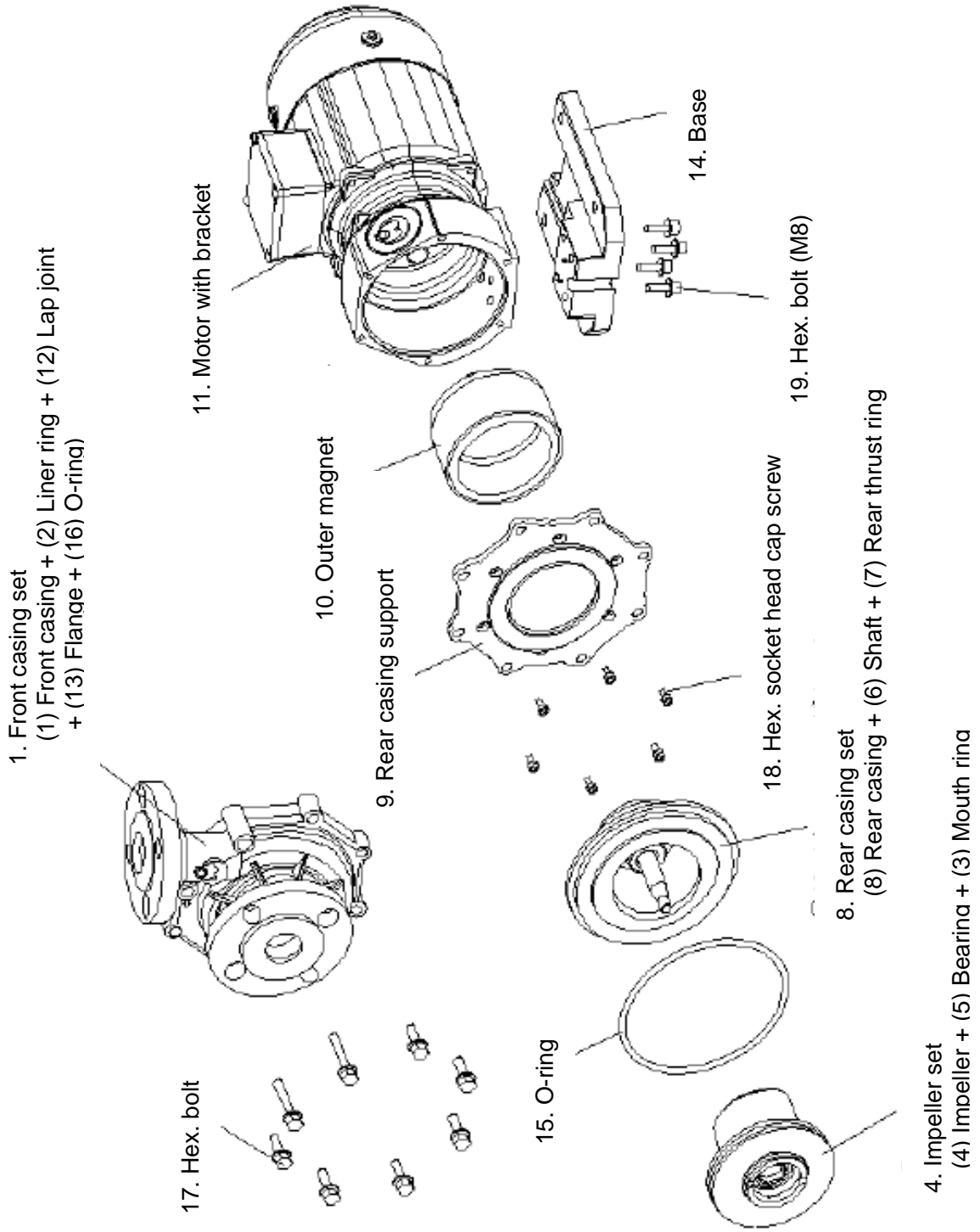


\*1: Separate bracket is used for non-exclusive motor as an individual part.  
(Separate NEMA bracket is used for the US version.)

\*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.)

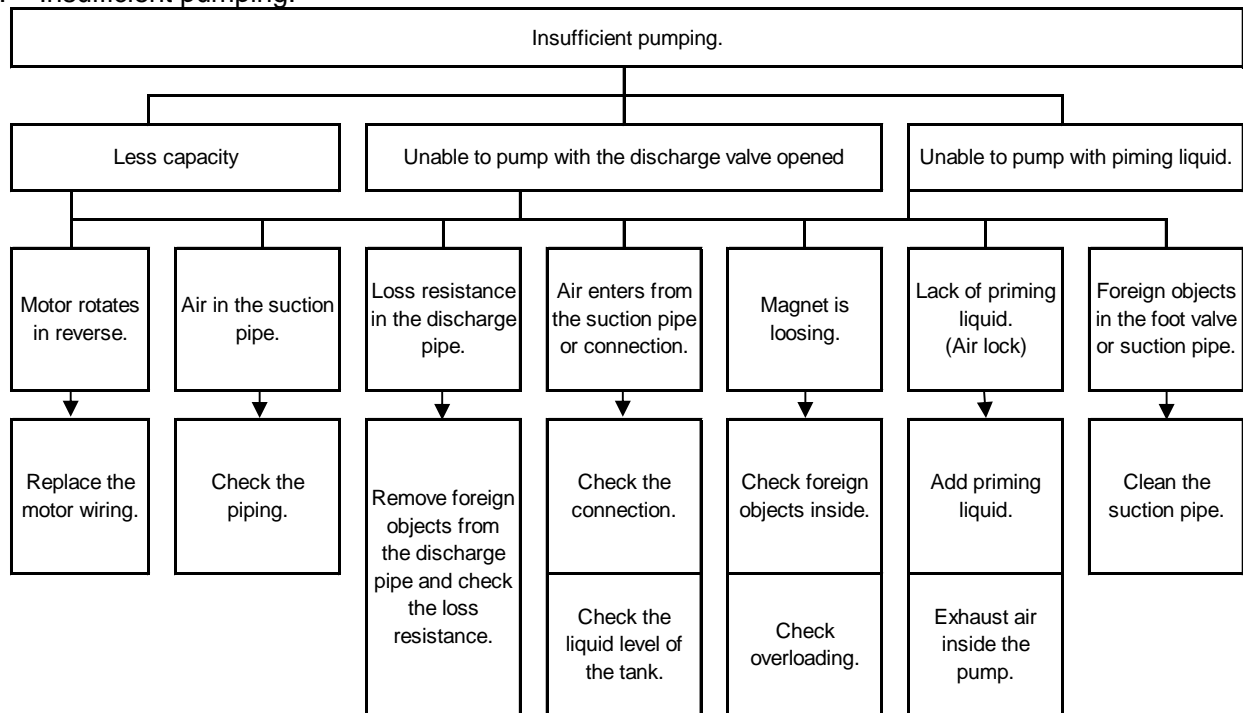
\*3: Separate NEMA motor is used for the US version.

# Exploded view

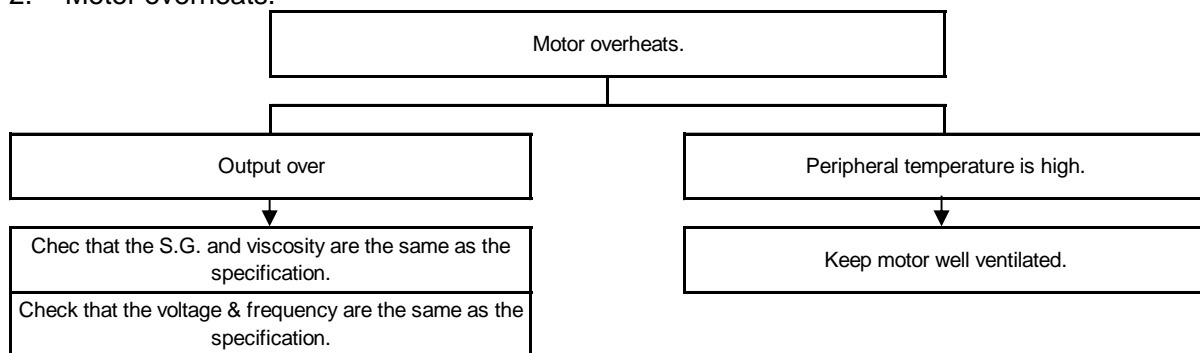


# Troubleshooting

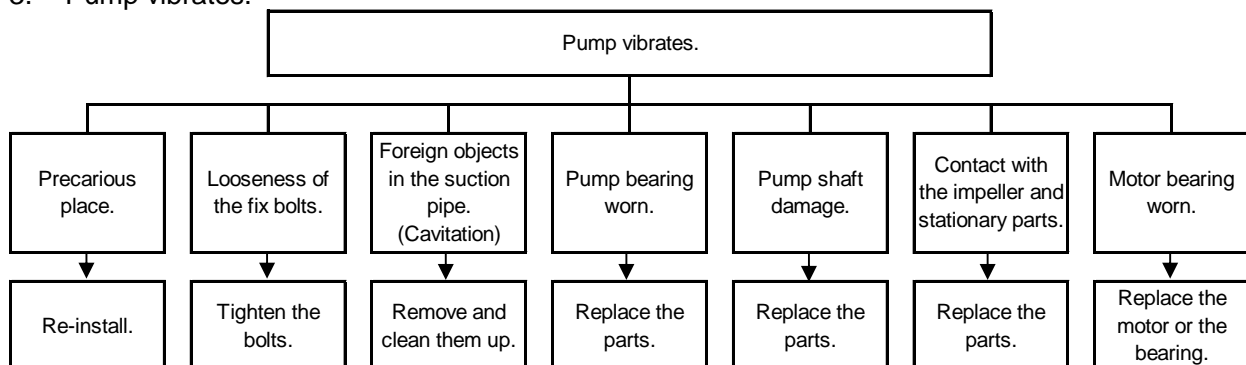
## 1. Insufficient pumping.



## 2. Motor overheats.



## 3. Pump vibrates.





**WORLD CHEMICAL USA (“WCUSA”)  
STANDARD ONE-YEAR LIMITED WARRANTY  
FOR SALES MADE ONLY IN THE UNITED STATES, CANADA**

**This limited warranty completely replaces the warranty issued by World Chemical Co., Ltd.  
relating to the below described Pumps.**

WCUSA warrants its Magnetic Drive Pumps, Self-Priming Pumps, Oil Skimmer Systems, Vertical Pumps and Submersible Pumps (“Pumps”) against defects in materials and workmanship for one year from the date of WCUSA’s invoice to you for the affected Pump. This warranty requires you to return the Pump to WCUSA.

If there is a manufacturing defect, WCUSA will replace or repair the Pump with new or rebuilt parts at no charge to you. Please return the Pump to: World Chemical USA, 30 Hughes, Ste 203, Irvine, CA 92618.

When returning the Pump, include your name, address, daytime telephone number, and a description of the problem. No warranty work can be performed without this information.

Properly pack the Pump (preferably in the original carton) to prevent damage to the Pump in transit.

The repaired or replaced Pump will be warranted for a period equal to the remainder of the original one-year warranty.

All replaced Pumps, parts and components, shall become the property of WCUSA

This Limited Warranty does not cover: (a) defects or damage resulting from accident, misuse, abnormal use, abnormal conditions, improper storage, exposure to dirt, neglect, or unusual physical, electrical or electromechanical stress; (b) scratches, dents and cosmetic damage, unless caused by WCUSA; (c) Pump that has the serial number removed, defaced, damaged, altered or made illegible; (d) ordinary wear and tear; (e) defects or damage resulting from the use of Pump in conjunction or connection with other equipment not furnished or approved by WCUSA; (f) defects or damage resulting from improper testing, operation, maintenance, installation, service, caused by the use of unauthorized parts of service; (g) defects or damage resulting from external causes such as collision with an object, fire, flooding, dirt, windstorm, lightning, earthquake, exposure to weather conditions, or improper use of any electrical source; (h) irregularities or breakdowns due to chemical or hydrodynamic corrosion by liquid. We do not warrant the chemical resistance of the Pump to any chemical or to corrosion.

You will be responsible for paying for your own shipping costs for delivering the Pump to us. If we determine the Pump is covered by this warranty, we will return the new or repaired Pump to you at our expense. If we determine that the Pump is not covered by this warranty, we will return it at your expense.

WCUSA does not warrant accessory components, including, but not limited to, Impeller (including mouth ring and bushing), Rear Casing set (include shaft), O-Ring for Casing and other consumable parts.

**REPLACEMENT OR REFUND OF THIS PUMP AS PROVIDED UNDER THIS LIMITED WARRANTY IS BE YOUR EXCLUSIVE REMEDY.**

WE ARE NOT RESPONSIBLE OR LIABLE FOR ANY LOSS, INCONVENIENCE OR DAMAGE, WHETHER SPECIAL, DIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE, AND WHETHER KNOWN OR SHOULD HAVE BEEN KNOWN TO US, INCLUDING LOST PROFITS, GOODWILL, DAMAGE TO OR REPLACEMENT OF OTHER PUMPS AND PROPERTY AND PERSONAL INJURY RESULTING FROM ANY BREACH OF WARRANTY, THE INABILITY TO USE THE PUMP OR UNDER ANY LEGAL THEORY IN CONTRACT OR TORT. THESE WARRANTIES AND REMEDIES ARE YOUR SOLE AND EXCLUSIVE WARRANTIES AND REMEDIES IN CONNECTION WITH THE SALE AND USE OF THE PUMP. NO OTHER WARRANTIES, ORAL OR WRITTEN, EXPRESS OR IMPLIED, ARE GIVEN. OUR LIABILITY IS LIMITED TO THE ACTUAL PURCHASE PRICE YOU PAID TO THE RETAIL SELLER OF THE DEFECTIVE PUMP. EXCEPT TO THE EXTENT PROHIBITED BY LAW, ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, or do not allow a limitation on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. You are advised to contact applicable state laws for a full determination of your rights. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

No dealer, agent or employee is authorized to make any modification, extension, change or amendment to this warranty. This warranty may not be assigned without the prior expenses written approval of WCUSA.

**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) Inform the followings when requesting repair.
  - Model name and serial number
  - Use duration and situation
  - Damages parts and condition
  - Liquid (Name, Specific gravity, Temperature, Slurry)

If liquid leaks during transportation, it is very dangerous and 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:      |





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