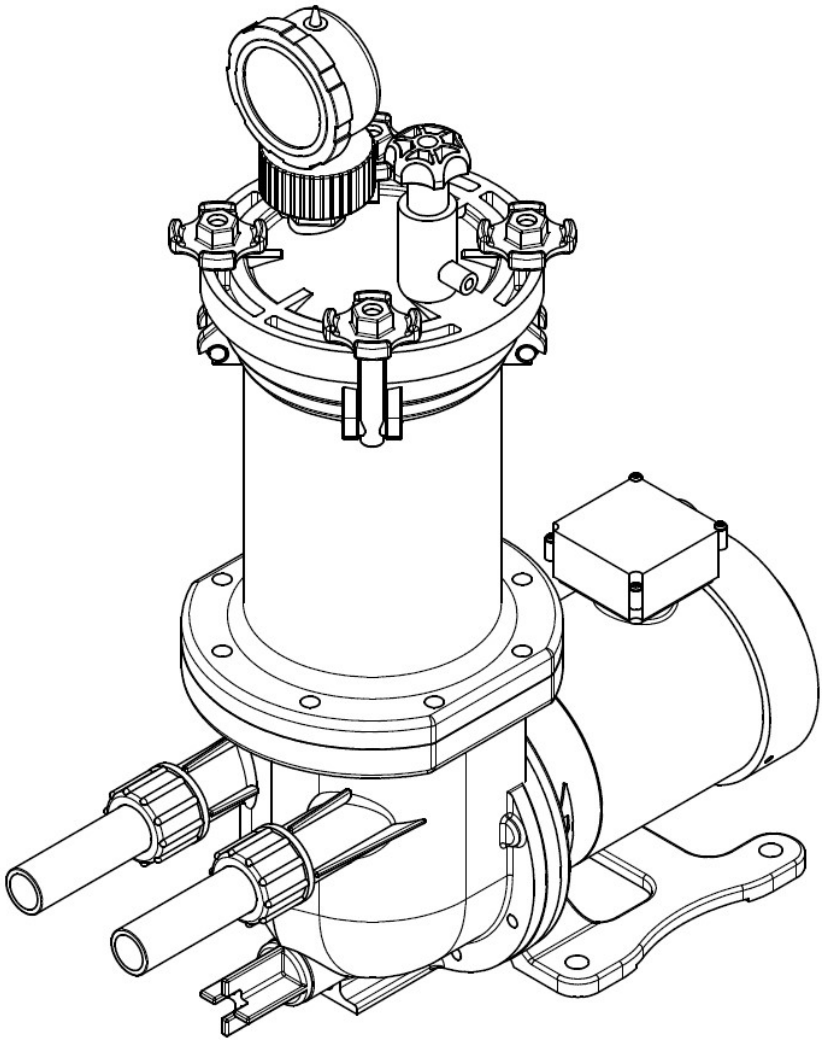
SELF-PRIMING FILTER PUMP

# CHEMIFINE

## INSTRUCTION MANUAL



World Chemical Co.,Ltd.

Ver.20241224

# Preface

Thank you for purchasing World Chemical's filter pump "CHEMIFINE". Please read this manual before use to ensure a thorough understanding of operations and safety precautions.
Store this manual where it can be easily accessed.

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# Safety precaution (To be observed as 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 may 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)

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

| | |
|---|---|
| ⚠ | 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) Use for dangerous liquid or in explosive atmospheres

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

Never use it for flammable gas or liquid. Also do not put them. (The motor is not explosion-proof.)

When handling chemical liquid, wear protect gears like glasses, gloves and rubber boots. If chemical liquid is contacted with, wash it with a large amount of water immediately. Submit to medical treatment depending on the condition.

If getting chemical liquid in eyes, wash them with a large amount of water with eyes open immediately and submit to medical treatment soon.

(2) Banning the use of damaged or modified pumps

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

(3) Caution in transporting and lifting pumps

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

(4) Banning the operation with the power on

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

(5) Connection of an earth wire

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

(6) Protection of the power supply cord

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

(7) Ground Fault Interrupter (GFI)

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

(8) Caution in removing a pump

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

(9) Stop / start an operation in a tank where possible hydrogen gas is produced

<u>At the time of stoppage</u>

Depending on a chemical bath*, hydrogen gas may generate at the time of stoppage by the action of the metal on the filter. If the suction and discharge valves are fully opened at the time of stoppage, the pump may be damaged for the pressure of gas. When close valves on the suction/discharge pipes at the time of stoppage, follow the below.

1) Open the air release cock to exhaust gas until the next operation.
2) At the same time, open the drain cock and discharge all liquid remaining in the housing. Drain cock remains open until the next operation.

<u>When starting</u>

Close the air release cock and drain cock and pour priming water. Then, turn on the power on.

(10) Maintenance

When maintaining, checking and repairing a pump, turn off the circuit breaker at the primary side of power and put the sign “Working” to prevent personal injuries by the power supply on at fault. Especially when many people work together, call together not to return the power on at fault.

Do not touch any appliances, wires or switches with wet hands or clothes to prevent and electric shock.

Never modify pumps by themselves. It may cause fatal accidents, equipment failure, damages or personal injuries.

Do not wash a motor with water directly. Wipe dirt with wet cloths and then wipe it with dry cloths.

## Caution

(1) Banning the unspecified use

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

(2) Restriction on persons handling a pump

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

(3) Caution in unpacking

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

(4) Ventilation

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

(5) Repair and return

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

(6) Plastic parts

The pump is made of plastic. If it receives strong impact, it may damage and lead to personal injuries. Do not hit and climb on it. Install a piping support to prevent the piping load.

It is made of plastic and the intensity of the pressure resistance is depending on temperature unlike metal pumps. That is why be careful of the allowed maximum pressure, when using for high temperature liquid.

Component parts: Carbon Fiber Reinforced Polypropylene /
Glass Fiber Reinforced Polypropylene / Alumina Ceramics / CFR-PTFE / etc.

O-ring: FPM or EPDM

Use a pump for liquid which has no impact on the above materials.

The chemical resistance to the material is much influenced by type of chemical, density, temperature and interaction, as well we stress, length of time in contact with liquid and other conditions. For this reason, the chemical resistance is not guaranteed

When using, test the chemical resistance to each materials under the condition to use before if at all possible.

Aging deterioration inevitably occurs for the surroundings and other factors, attend the daily check and early maintenance (parts replacement and repair) to use it safety for a long time.

(7) Start-up

When starting a pump at the beginning, make sure to check the rotational direction. At that time, open the suction/discharge valves and check no liquid leak at the pipe connection. Then, turn on the switch at once to check the direction after releasing air and the pump is full of liquid. If the pump is three phase and inverse rotation, switch the two of three wires. When wiring like this, make sure to turn off the power to be safe.

The pump has the self-priming ability, but check the fully priming water remains in the pump when operating. (If the priming water is not enough, pour it before turning on.)

The self-priming at the start-up pumps up from the suction pipe by using liquid in the pump. Make sure to fully open the suction pipe at the start-up.

Never run dry the pump. It makes the bearing and shaft burn and the thermoplastic resin parts melt. It leads to liquid leak or the pump damage.

(8) Check of the rotational direction of the motor

One turn on the power on/off and the other check the direction.

(9) Operation

Do not operate a pump intermittently like repeating the start and stop. It is not designed for the intermittent operation. The fluctuating load causes liquid leak from the connection and fatigue failure of the parts. Moreover, at the state of the continuous operation, do not repeat the open/close of the discharge valve.

(10) Air release

When release air in the housing, turn the air release cock 360 degrees counterclockwise. It is enough and do not turn more. If turn more, the air release cock comes off from the housing and liquid blows out.

(11) Disposal of pumps

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

(12) Leak protection

Take appropriate preventative measures in consideration of possible leak or pipe damage.

(13) Chemical liquid to be used

If using the pump for hazardous liquid like cyanogen, take adequate safety measures including preparation of protective measures and installing a drain pan. Install devices which works for sudden accidents.

Install a level sensor. When the liquid level decreases, the alarm rings and it makes the motor stop.

The impeller incorporates magnets. If using for liquid with iron powder, the parts are worn away and damage. Stainless is corrosive depending on liquid to use. When liquid attach the bolts and nuts, make sure to wipe it.

If the Polyolefin filter cartridge is used for sodium hypochlorite or hydrogen peroxide, oxidation and degradation of Polyolefin, it causes plating liquid or products failure for oxidation or degradation of the liquid. It is recommended to early exchange the filter cartridge. The kind of failure is not guaranteed.

**Limit of liquid to use** Temperature: 70 degrees or less
S.G.: 1.2 or less (at 20 degrees)
Viscosity: 30mPa・s or less (at 20 degrees, S.G.1.0)

**Maximum applicable pressure resistance** 0.25MPa (at 25 degrees)

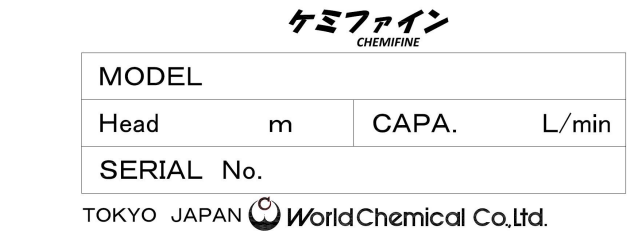
It is made of engineering plastic. The performance degradation of the plastic, degradation/damage for the temporal change or material elution may occur depending on the use conditions. Durability may extremely reduce.

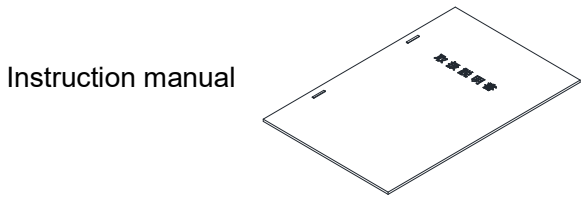
For above reasons, take a periodical check for early detection of abnormalities. Meanwhile, when new liquid is used, consult us.

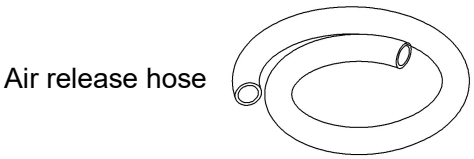
# Unpacking check

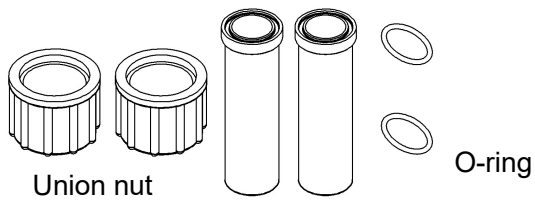
Check as follows. If you have any questions,
contact your supplier.

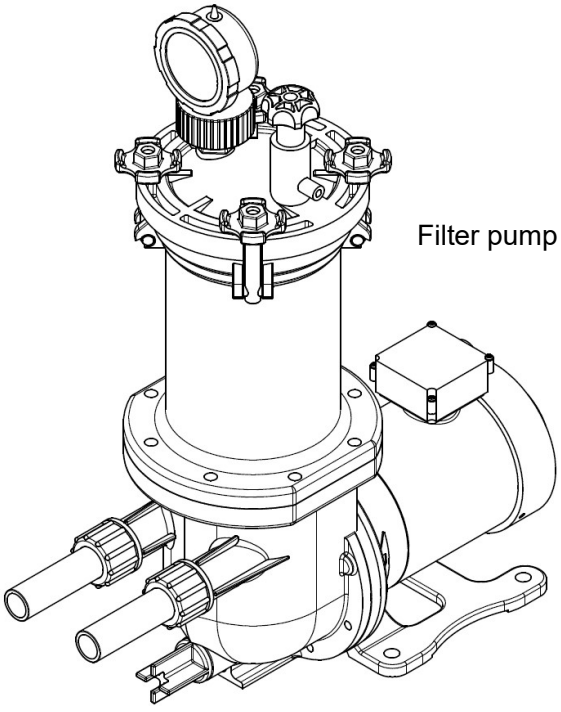
1. The model, total head, capacity and specification in the nameplate as well as the specifications in the motor nameplate are correct.
2. It is stocked with accessary.
3. No damage during the transportation. No loosened bolts.



## Model description

**YD – 20 Y6 CT 1 – CP – RD 5 2 - N**

(1) (2) (3) (4 ) (5 ) (6) (7) (8) (9)

(1) Bore
20: Suction 20A x Discharge 20A

(2) Motor output
Y6: 3 phase / 200V / 0.26kW
A6: 1 phase / 100V / 0.26kW
00: 3 phase / 200V / 0.4kW

(3) Model
CT1: Self-priming filter pump

(4) Motor type 1 : IE1

(5) Main material
CP: Carbon Fiber Reinforced Polypropylene

(6) Bearing / O-ring material
RD: CFR-PTFE / FPM
RE: CFR-PTFE / EPDM

(7) Frequency
5: 50Hz
6: 60Hz

(8) Limit of specific gravity
2: Until 1.2
6: Until 1.6 (only 0.4kW motor)

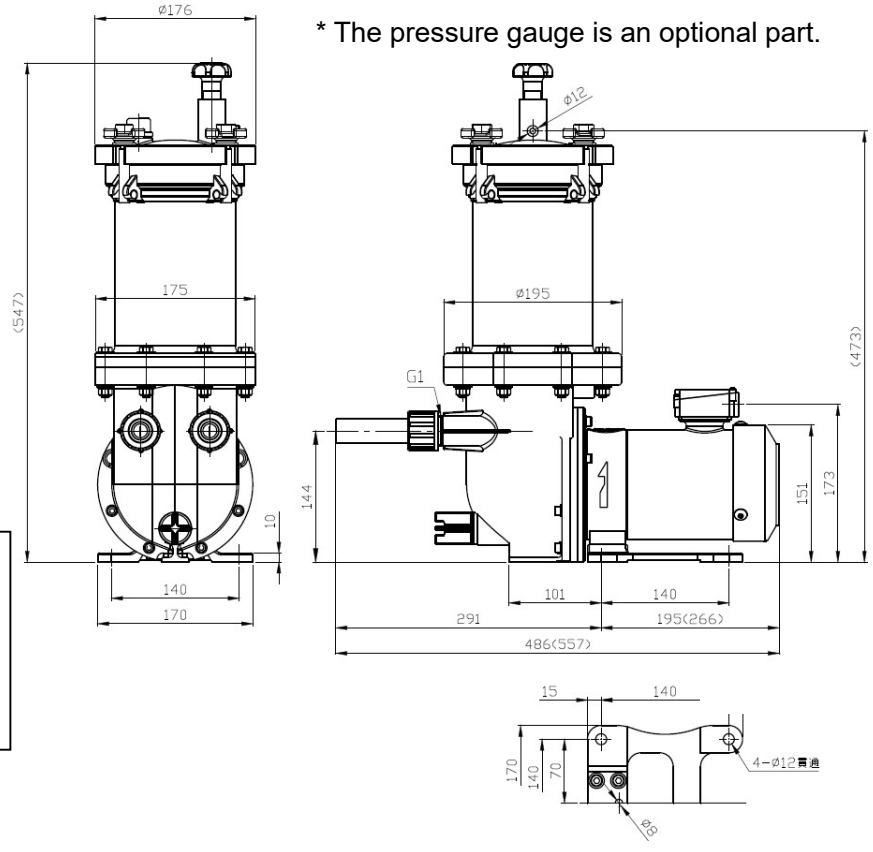
(9) Identifying code

## Performance

| Model | | YD-20xxCT1 | Filtration rate (Clear water) | 600-2400L/h |
|---|---|---|---|---|
| Bore (Suc. x Dis.) | | 20A x 20A | Min. flow (Clear water) | 5L/min |
| Motor output | | 0.26kW / 0.4kW | Applicable plating tank | 100-800L |
| Self-priming Ability (2m) | 50Hz | 90 seconds | Max. liquid temperature | 70 degrees |
| | 60Hz | 60 seconds | Max. pressure resistance | 0.25MPa |
| Limit height of self-priming (Clear water 25 degrees) | | 2.5m | Weight | 11.6kg / 13.1kg |

## Outline dimension

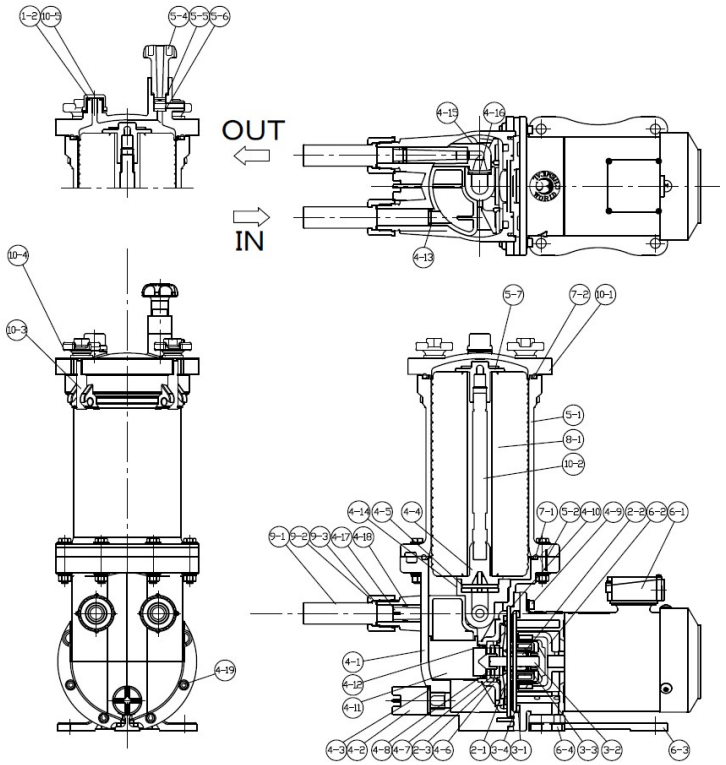
* The pressure gauge is an optional part.




* The dimension of ( ) is for the 0.4kW type pump.

Applicable filter cartridge
Length: 250mm
Inner bore: Φ26 mm and less
Outer bore: Φ125 mm and less

# Parts description / Material / Structure




| No | Parts name | Qty | Material | Set |
|---|---|---|---|---|
| 1-2 | O-ring for pressure gauge | 1 | EPDM/FPM (P-12) | |
| 2-1 | Impeller | 1 | PP | Impeller set |
| 2-2 | Bearing | 1 | CFR-PTFE | |
| 2-3 | Mouth ring | 1 | CFR-PTFE | |
| 3-1 | Rear casing | 1 | CFR-PP | Rear casing set |
| 3-2 | Shaft | 1 | Alumina ceramic | |
| 3-3 | Rear thrust ring | 1 | Alumina ceramic | |
| 3-4 | O-ring for rear casing | 1 | EPDM/FPM (AS568-247) | |
| 4-1 | Front casing | 1 | CFR-PP | Front casing set |
| 4-2 | Drain cock | 1 | CFR-PP | |
| 4-3 | O-ring for drain cock | 1 | EPDM/FPM (P-24) | |
| 4-4 | Filter cradle | 1 | CFR-PP | |
| 4-5 | O-ring for filter cradle | 1 | EPDM/FPM (P-38) | |
| 4-6 | Vortex chamber | 1 | CFR-PP | |
| 4-7 | Liner ring | 1 | Alumina ceramic | |
| 4-8 | Liner ring holder | 1 | CFR-PP | |
| 4-9 | Hex. socket head cap bolt (M6*25) W,SW | 4 | SUS304 | |
| 4-10 | O-ring for vortex chamber | 1 | EPDM/FPM (AS568-251) | |
| 4-11 | Self-priming tank | 1 | CFR-PP | |
| 4-12 | O-ring for self-priming tank | 1 | EPDM/FPM (S-36) | |
| 4-13 | O-ring for self-priming tank | 1 | EPDM/FPM (AS568-015) | |
| 4-14 | Filter cradle pipe | 1 | CFR-PP | |
| 4-15 | Discharge pipe A | 1 | CFR-PP | |
| 4-16 | O-ring for discharge pipe A | 1 | EPDM/FPM (AS568-119) | |
| 4-17 | Discharge pipe B | 1 | CFR-PP | |
| 4-18 | O-ring for discharge pipe B | 2 | EPDM/FPM (AS568-015) | |
| 4-19 | Hex. socket head cap bolt (M6*30) W,SW | 4 | SUS304 | |
| 5-1 | Housing | 1 | CFR-PP | |
| 5-2 | Hexagon bolt | 8 | SUS304 | |
| 5-4 | Air release cock | 1 | CFR-PP | |
| 5-5 | O-ring for upper air release cock | 2 | EPDM/FPM (P-11) | |
| 5-6 | O-ring for lower air release cock | 1 | EPDM/FPM (P-11) | |
| 5-7 | Filter adapter | 1 | CFR-PP | |
| 6-1 | Motor with bracket | 1 | | Motor set |
| 6-2 | Outer magnet | 1 | Ne-Fe-B+FCD450 | |
| 6-3 | Motor base | 1 | FC200 | |
| 6-4 | Hexagon socket head cap screw | 4 | SUS304 | |
| 7-1 | O-rint for housing | 2 | EPDM/FPM (P-130/P-132) | |
| 8-1 | Filter | 1 | | |
| 9-1 | Union socket | 2 | C-PVC | Accessary |
| 9-2 | Union nut | 2 | GFR-PP | |
| 9-3 | O-ring for union socket | 2 | EPDM/FPM (P-22) | |
| 10-1 | Cover | 1 | CFR-PP | |
| 10-2 | Core pole | 1 | PP | |
| 10-3 | Cover bolt | 4 | SUS304 | |
| 10-4 | Cover nut(M12 W) | 4 | CFR-PP | |
| 10-5 | Pressure gauge nut | 1 | PP | |

- Filters are not attached. Prepare them by yourself. (Compatible size: 10” [250 mm])

# Caution in handling

The magnet drive pump has strong magnets and it requires more attention to the handling as well as restrictions for normal pumps such as dry running and inverse rotation.

1) People, who are outfitted with heart pacer or electronic functional maintenance devices, do not handle the pump. The magnets in the pump are stronger than for everyday use.
2) Do not put your hands between the magnets. Meanwhile, if there are iron knives, scissors or masses at a nearby site, they stick instantaneously and hold your hands or plastic around magnets may have cracks on impact.
3) Do not put computer disks, memories or electromagnetic tapes near the pump to be subject to effects of magnetic force.

- Prohibitions against magnet drive pump

1. Dry running

   If a pump runs dry, the sliding parts of the shaft and bearing have a contact, and make resin around the shaft and bearing deform. Accordingly, the shaft of the impeller slant and the pump does not work normally. It causes the pump parts damage.

   * If operating the pump without priming water, dry running occurs.

2. Liquid with slurry

   Magnet drive pump is basically disapproved to transfer liquid with slurry. Even if it is liquid with a small amount of slurry, the pump life is shortened according to the pump damage and parts wear off. (If the pump is used for transferring of liquid with slurry, consult us in advance.)

3. Cavitation*1

   If the pump is continuously operated with cavitation, the vibration occurs, the basic performance becomes diminished or the inside of the casing is damaged.

   The reasons are that the suction piping is long, bending is thin and many, the liquid temperature is high or the strainer is clogged.

4. Corrosion

   The pump is mainly made of PP resin. When purchasing it, consider the corrosion against the liquid thoroughly and select the pump.

   The pump life may be shortened according to the kind of the liquid and temperature. If the liquid or the condition is changed, ask us.

*1: Cavitation

It is the phenomenon that liquid locally become low pressure and bubbles are produced by the movement of the liquid.

(When bubbles burst, noisy and vibration are occurred, The surface of the pump is ate and the performance is reduced for the impact.)

# Installation / piping precaution

1. Installation precaution
   (1) If large amount of air enters into the pump during operation, self-priming failure occurs and causes the pump damage.
   - Inside of the suction pipe conditions negative pressure during self-priming operation. If air enters for joint failure, the time of self-priming is longer and the pump is damaged by raising the temperature of the priming liquid.
   - Install the suction pipe whose bore is the same diameter as the suction inlet of the pump. If the pipe bore is bigger than the pump bore, the self-priming ability may be reduced and pumping failure.

   (2) Place the strainer at the suction inlet of the pipe to prevent foreign objects enter. In this case, clean the strainer periodically and remove the clogging to help minimize the loss resistance.
   (3) It is recommended to install check valves on the riser piping at the discharge outlet to prevent water hammer in such cases. Also install the bypass pipe for air release under it.
   - When the discharge pipe is long or the head is more than 10 m.
   - When the tip of the discharge pipe is 9m and more higher than the liquid surface of a tank.
   - When 2 and more sets of the pump are installed in parallel.

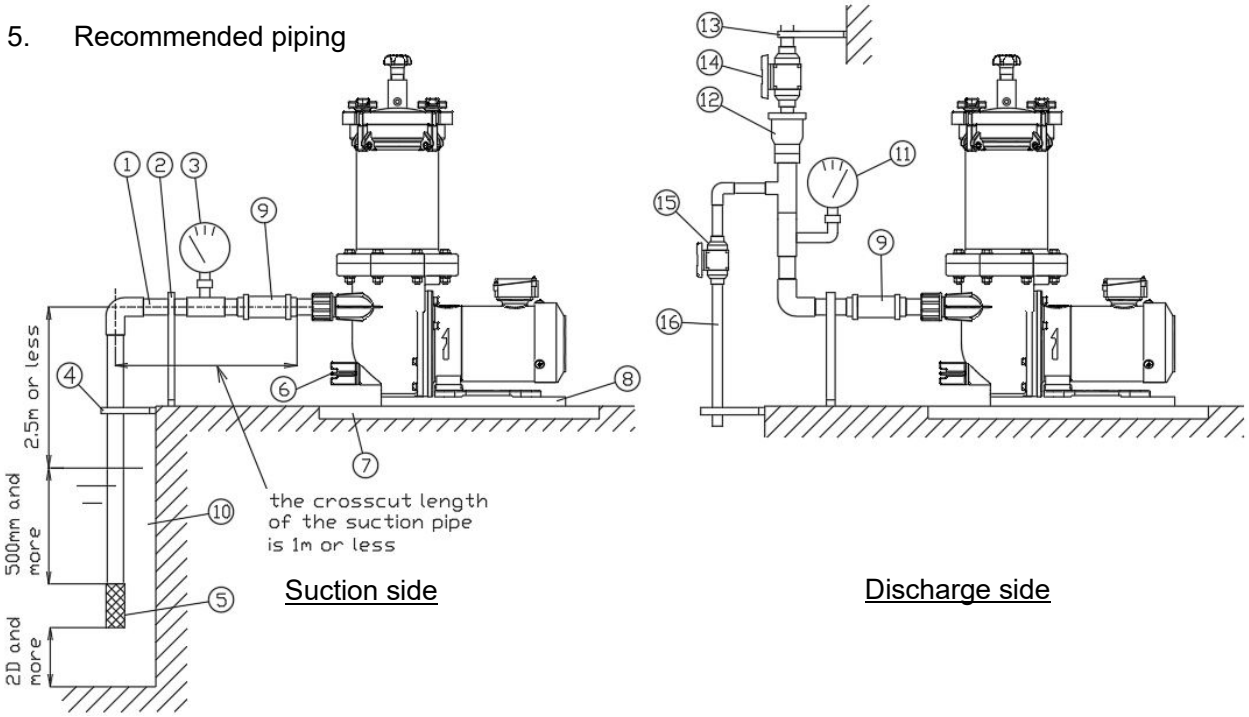
   (4) Place bending or extension joints not to leak liquid for heat expansion by the liquid temperature.
   (5) Be careful not to make an impact, because the main parts material inside of the pump is resin.
   (6) When piping, adjust the assembly dimensions to the pump. If not, the casing may be damaged.
   (7) Make sure to fix the motor base with anchor bolts.
   (8) Install the pump at the following conditions;
   - Nearby tank
   - The well-drained place where the pump does not get liquid or gas (Chlorine-based).
   - The place not to receive direct sun. (The keeping quality of plastic parts from ultraviolet)
   - The enough space to do maintenance easily.
   - Ambient temperature is from 5 to 40 degrees and relative humidity is 90% or less.

2. Prohibition of piping load
   (1) Support the pipe load completely by a piping support.
   (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) Avoid metal pipes and use resin pipes as much as possible.
3. Drain ditch
   (1) It is for liquid to run in a wastewater tank for the occasion of liquid spilled.
   (2) If it is impossible to open a drain ditch, install a drain pan.
4. Caution in priming liquid

   Tighten cover nut after pouring priming liquid. If loosened, self-priming failure may occur.

| Model | Minimum amount of priming liquid |
|---|---|
| YD-20**CT1 | 0.6 Liter |

5. Recommended piping




| | | | |
|---|---|---|---|
| ①Suction pipe (Pipe bore : D) | ⑤Strainer | ⑨Expansion joint | ⑬Piping support |
| ②Piping support | ⑥Drain plug | ⑩Pit | ⑭Sluice valve |
| ③Compound gauge | ⑦Drain ditch | ⑪Pressure gauge | ⑮Sluice valve |
| ④Piping support | ⑧Pump base | ⑫Check valve | ⑯Air release pipe |

☐ Suction piping

1. Be the same the diameter of the suction pip and the bore diameter of the pump.
2. The crosscut length of the suction pipe is less 1 m or less.
   If more than 1 m, the pump may be damaged to grow air in the suction pipe and reduce the self-priming ability.
3. Sink the suction pipe inlet 500 mm and more than liquid level to prevent air entrainment.
4. When the installation level of the pump is lower than the liquid level for up and down piping from a tank, install sluice valves on the suction pipe for maintenance and checking.
5. Do not make air pockets in the suction pipe and install the pump with a gently tilt.

☐ Discharge piping

1. Be the same the diameter of the discharge pipe and the bore diameter of the pump preferably.
   If the bore is smaller, the self-priming ability reduces to exhaust air efficiently during self-priming operation. Meanwhile, the flow may decline to increase the loss resistance of the pipe.
2. Install check valves to prevent water hammer in such cases.
   - When the discharge pipe is longer or the discharge head is more than 10 m.
   - When the head (from the liquid level to the end of the discharge pipe) is 9 m and more.
   - When 2 and more sets of the pump are installed in parallel.
3. Install sluice valves on the discharge pipe for maintenance and checking.
4. Attach a pressure gauge to check the operational condition of the pump in a daily check.

# Operational precaution

1. Before operation
   (1) Clean the inside of pipe and a tank.
   If the foreign objects enter the pump, the performance reduces and the pump is damaged.
   (2) Pour enough priming liquid from the cover of the pump.
   It is unnecessary to pour liquid from next time, because the liquid remains automatically.
   (3) Check that the union nuts for the suction/discharge pipe are tightened firmly.
   If the nuts are loosened, it may cause liquid leak, injury or other facilities failure.
   (4) Check the rotational direction.
   If the inverse rotation, switch two of the three phases in the three-phase power supply. In this case, it may have lack of priming liquid. Pour it again. The direction is clockwise as the viewed from the motor fan.
   (5) Operate the pump by the use of the power-supply voltage on the nameplate.
   (6) Re-tighten the drain cock.
   If the drain cock is loosened at the start, self-priming ability extremely reduce and it may cause the pump damage.
2. Banning of dry running
   The sliding parts are cooled by self-circulation of used liquid. If the pump is operated without liquid inside, the pump may be damaged by heat. Just in case, if the pump runs dry, do not pour liquid suddenly. Leave it for 1 hour and more, and start the operation. If liquid enters into the pump suddenly, the heated sliding parts are cooled suddenly and damaged. It has the possibility of causing irreparable damage to the pump.
3. When the pump is operated with the suction / discharge valve closed by mistake
   The temperature and pressure inside the pump are higher. If dismantling the pump in this condition, it is dangerous to blow out steam and hot liquid. Check that the temperature is enough cool.
   If the pump interior is damaged by the liquid seal operation, it may be necessary to replace the complete pump.
4. Range of liquid temperature to use
   The steam pressure, viscosity and corrosiveness are changed depending on the liquid temperature. In consideration of them, use the pump under the enough condition.
   - The range of liquid temperature: from 0 to 70 degrees

   * Consider the self-priming height by using high temperature liquid, because the self-priming height and time are varied according to the liquid temperature.
5. Change of specific gravity and viscosity of liquid to use.
   When the specific gravity or viscosity of the liquid is changed much, the pump performance, efficiency and bearing power are changed by the aspect of the liquid. Consider them adequately to use the pump under the enough condition.

6. Change of the condition in use

   The pump is produced under the specification of the agreement before purchasing. If it is changed, consult us.

7. Step-out of magnet coupling

   When the magnet coupling steps-out, stop the pump within one minute. If keeping the operation with step-out, the magnetic force reduces.

8. Limit of pressure resistance

   Be careful that the discharge pressure does not exceed the following.

| Model | YD-20**CT1 |
|---|---|
| The limit of pressure resistance (MPa) | 0.25 (at 25 degrees) |

9. Easy bubbling liquid

   Easy bubbling liquid makes self-priming ability extremely reduced. Consider it to use the pump.

10. Intermittent operation

    If start/stop of operation is repeated at short intervals, the pump life is shortened. The frequency of the intermittent operation is six times or less per hour.

11. Minimum flow

    Operate the pump as the discharge flow is the following value and more.

| Model | Minimum flow of the operational possibility |
|---|---|
| D-20**CT1 | 5 L/min |

12. When a long interval during cold months

    When the pump is not operated during cold months, the pump may be damaged by liquid freeze. Make sure to remove the drain cock and drain the inside liquid.

13. When restarting the pump after the long interval

    Liquid may be decreased inside the pump and pour the liquid.

14. The motor (1PH 115V, 3PH 200V/220V) is with a thermal protector.

    Operating temperature: 120±5 degrees

    Recovery temperature: 91 degrees or less

# Maintenance and consumables

1. Daily check

(1) Check that there are no vibration and abnormal sound, and the pump runs smoothly.

(2) Check the operational load is correct by comparing the current value and the motor current rating during operation. Check that the discharge pressure, capacity and current value is normal compared with before.

(3) Check the liquid level of a pit. If it is empty during operation, the pump may be damaged.

2. Periodical check

(1) Overhaul the pump periodically for smooth use.

(2) When the location change or moving the pump for repair, make sure to remove the liquid and clean the pump for your safe.

※Check term: Once every 12 months or once every 1000 hours. Please keep an inspection record

3. Check the following consumable parts periodically and replace them when needed.

(1) Impeller (No.2-1)

Check no abrasion, scratch or damaged around the impeller.

(2) Bearing (No.2-2) The inner diameter of the new one is $\phi$ 12.0mm

Check no crack or damage.

Check that the rattle between the bearing and the shaft is not big. (The limit of the inner diameter is $\phi$ 12.5mm)

If the total abrasion with the shaft is 0.5mm and more, recommend replacing it.

(3) Rear casing (No.3-1)

Check no abrasion, scratch or damaged inside / outside of the rear casing.

(4) Pump shaft (No.3-2) The outer diameter of the new one is $\phi$ 12.0mm

Check no crack or damage.

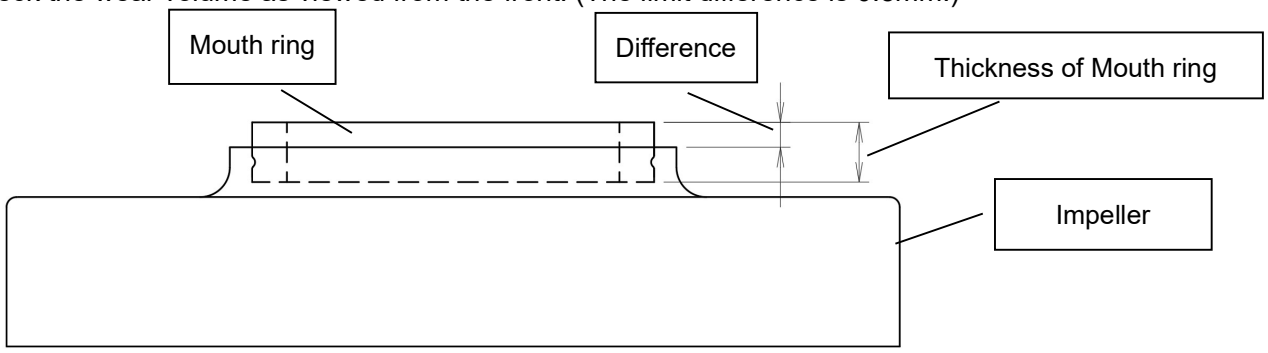
Check that the rattle between the shaft and the bearing is not big. (The limit of the outer diameter is $\phi$ 11.5mm)

If the total abrasion with the bearing is 0.5mm and more, recommend replacing it.

(5) Mouth ring (No.2-3)

Check no crack or damage.

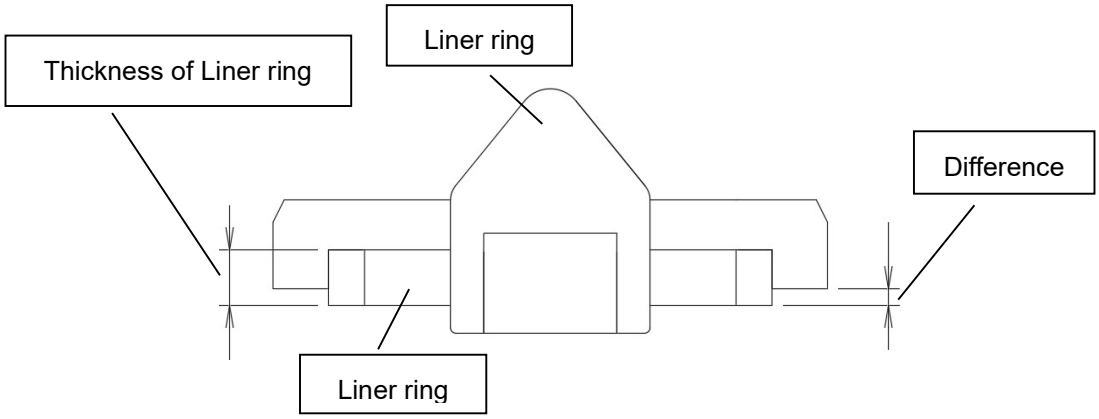
Check the wear volume as viewed from the front. (The limit difference is 0.5mm.)



(6) Liner ring (No.4-7)

Check no crack or damage.

Check the abrasion of the liner ring. (The limit difference is 0.5mm.)




(7) Front casing (No.4-1)

Check no foreign objects inside of the front casing.

(8) Vortex chamber (No4-6)

Check no foreign objects in the vortex chamber.

(9) O-ring (No.3-4, No.4-10, No.7-1, No.9-3)

Check that the rubber does not become hard and less-elasticity by degradation or swelling.

4. Change of the consumable parts

Replace the following parts in sets.

(1) Front casing set

Front casing (No.4-1) + Drain cock (No.4-2) + Filter cradle (No.4-4) + Vortex chamber (No4-6) + Liner ring (No.4-7) + Liner ring holder (No. 4-8) + Discharge pipe B (No. 4-12) + O-ring set + Bolt set

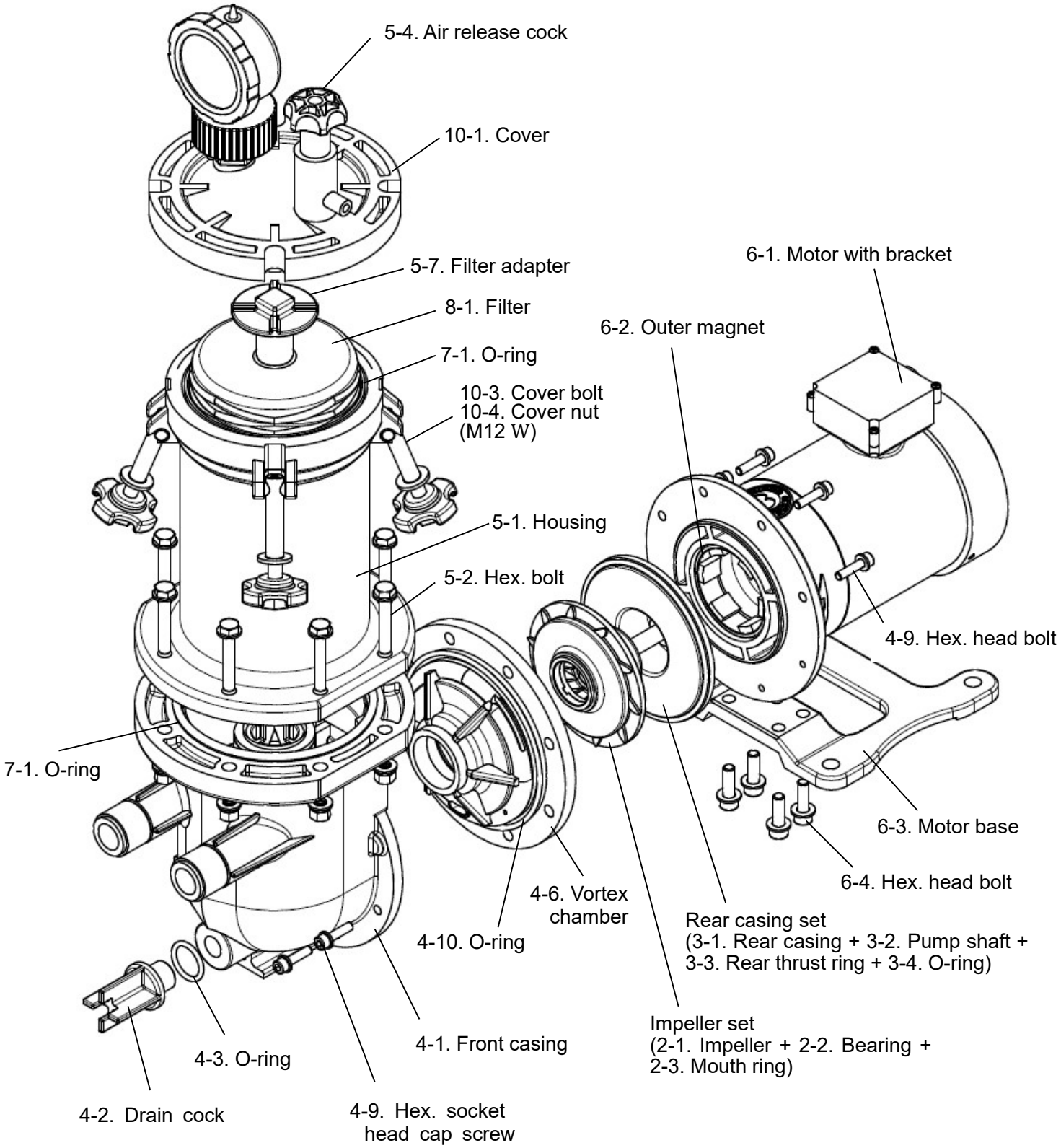
(2) Rear casing set

Rear casing (No.3-1) + Pump shaft (No.3-2) + Rear thrust ring (No.3-3) + O-ring (No. 3-4)

(3) Impeller set

Impeller (No.2-1) + Bearing (No.2-2) + Mouth ring (No.2-3)

## Exploded view



# Procedure to replace a cartridge filter

**Caution**

If using cartridge filters made of Polyolefin for Hypochlorite soda or Hydrogen peroxide, Polyolefin oxidizes and deteriorates, plating liquid or products may be failure for oxidation or degradation of Polyolefin. It is recommended to replace it early. They are not guaranteed.

Stainless may be corrosive depending on liquid. When the liquid adheres to bolts/ nuts, wipe it off.

O-ring for housing is a consumable part and it is recommended to replace it every time of replacing a cartridge filter.

1. Cartridge filter pretreatment

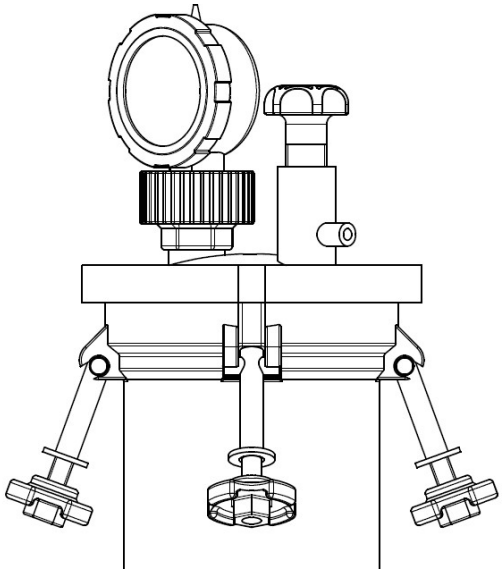
   Before using a new cartridge filter, immerse it in clear liquid thoroughly and release air from it as much as possible.

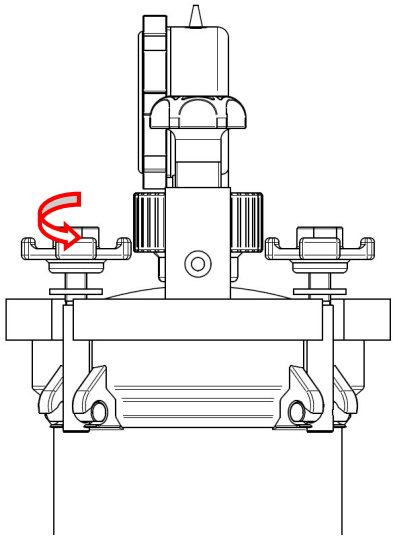
   After setting it in the pump, it is possible to release more air by the circulation operation for 20 - 30 minutes.

   The clear liquid is the same to use for plating.

2. Procedure to install a cartridge filter

   1) Turn and loosen 4 cover nuts (No.10-4), which fix the cover (No.10-1) on the housing, twice or three times counterclockwise.

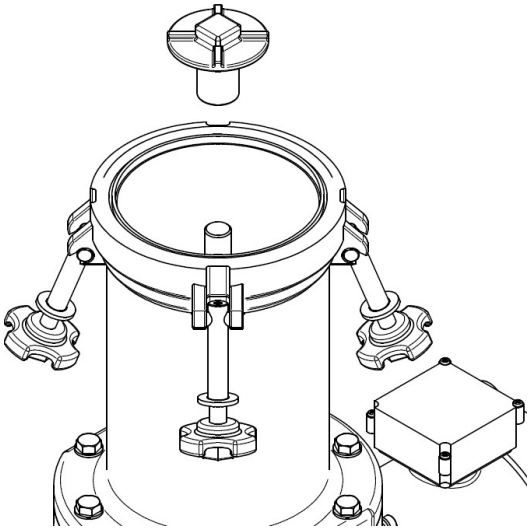




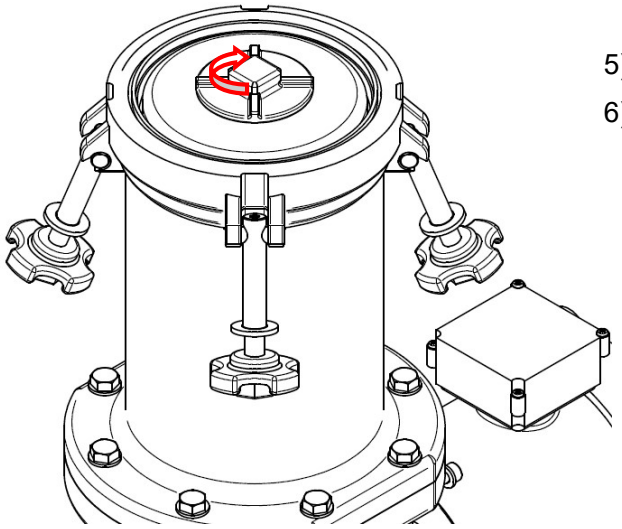
   2) Drop 4 cover bolts and nuts downward.

   3) Remove the cover.

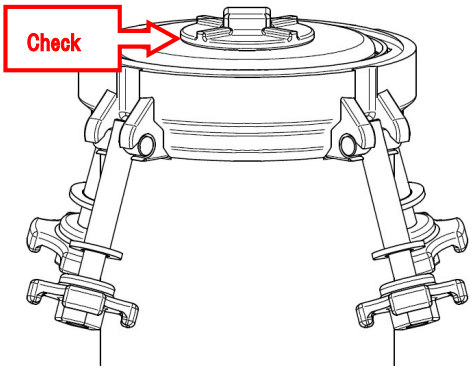
   In this case, the liquid may adhere on the back of the cover. Avoid for skin or eyes to contact with it.



   4) Turn the filter adapter (No.5-7) counterclockwise and remove it from the core bar (No.10-2)

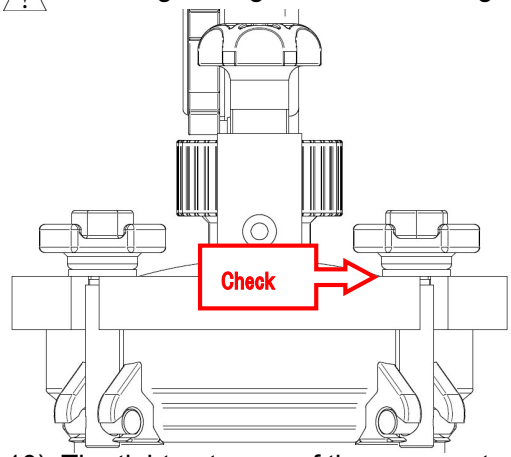


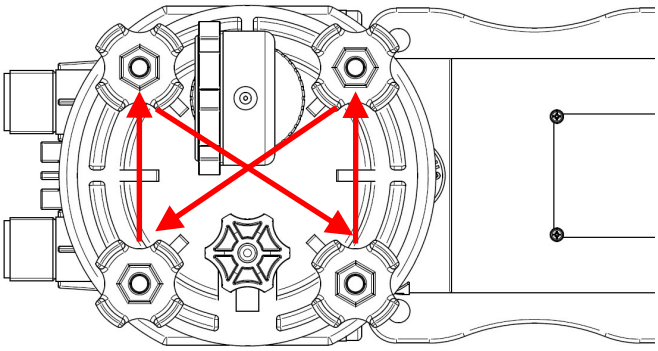
5) Insert the cartridge filter to the core bar.
6) Turn the filter adapter clockwise and tighten it until the brim is attached firmly to the filter.




7) Check no abnormality such as scratch or deformation on the O-ring (No.7-1).
8) Set the cover on the top of the housing. Adjust the groove to the position of the cover bolts.
9) Get the bolts up. Turn cover nuts clockwise and tighten them temporary until facing the cover.

⚠ When tightening the cover nuts, tighten them diagonally and gradually.



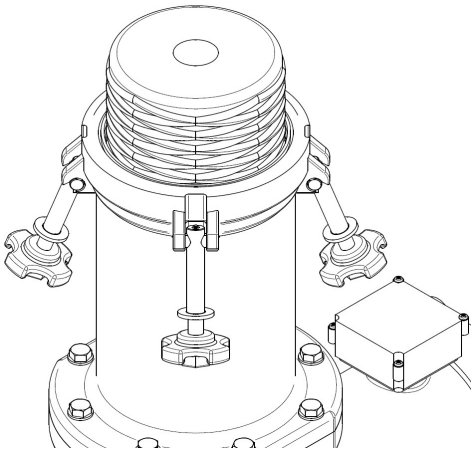
10) The tighten torque of the cover nuts is 4.0N・m.

⚠ When tightening the cover nuts, tighten them diagonally and gradually.

■ Turn them 1/2 times or less to lean to one side. If the cover opens/closes repeatedly, liquid may leak for degradation of a O-ring. In that case, replace to a new O-ring or tighten the cover nuts within the range of 4.0 – 6.0 N・m.
If liquid leaks when using the pump with the nuts above position, contact your supplier.

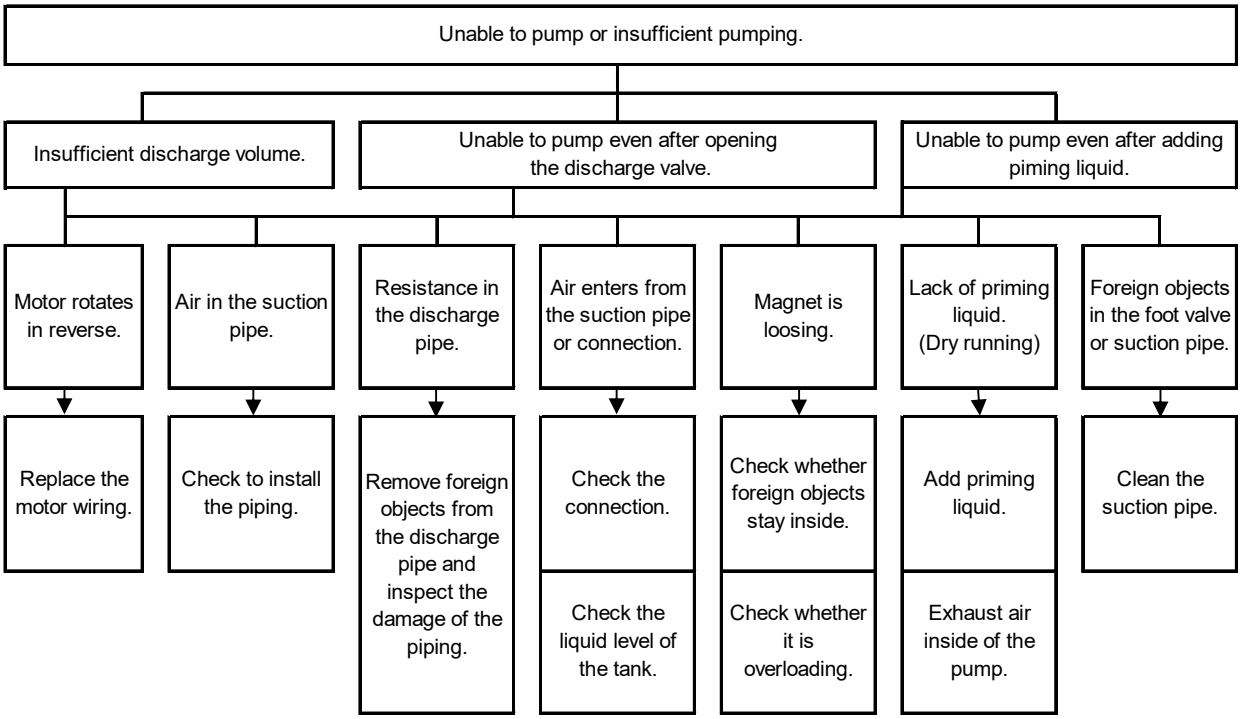
3. Removal procedure of a cartridge filter
1) Above from 1) to 4)
2) Remove the filter by inserting a finger into the center of the cartridge filter

⚠ Wear protective groves when the operation.

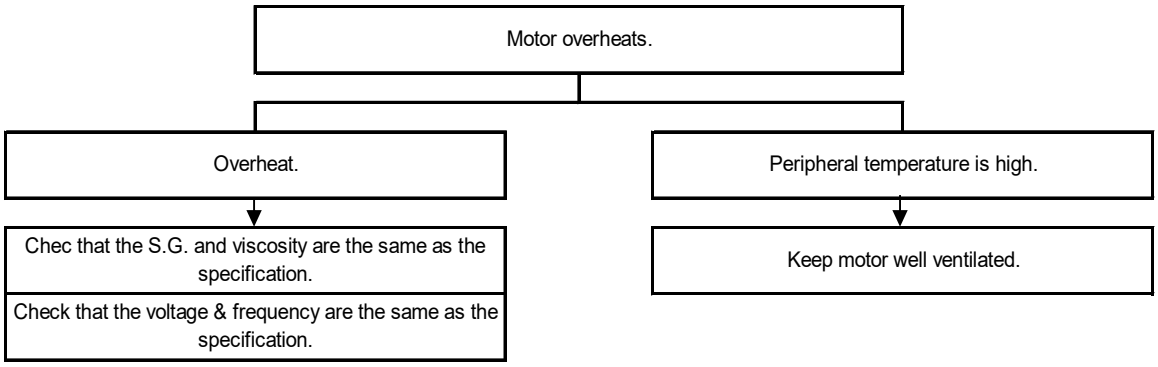


# Troubleshooting

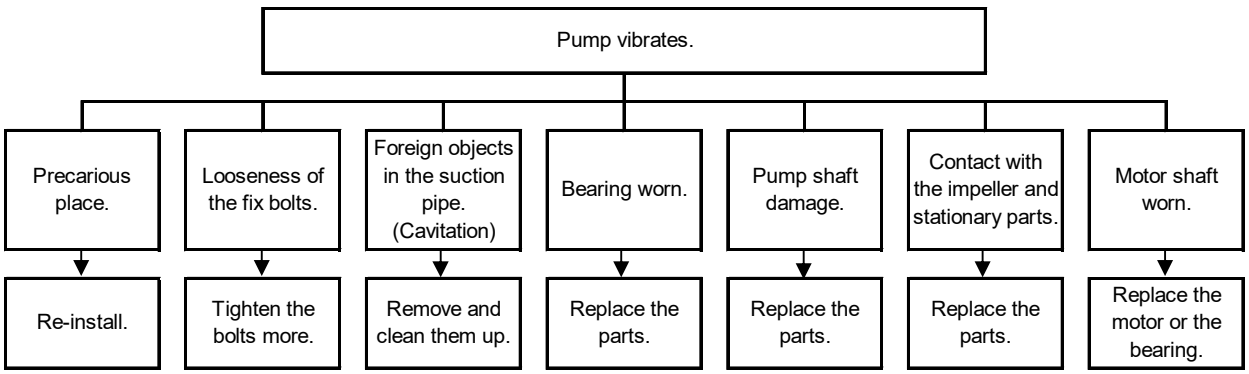
1. Pump up failure and insufficient pumping.




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 (P8). Although, inform the parts’ number and material, too.

**Installation record**

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

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