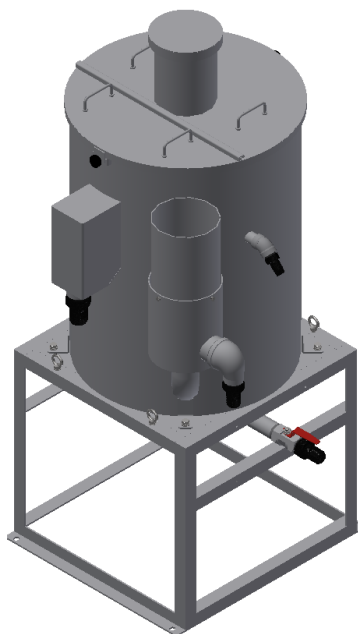


SEPARATOR with SCRAPER

YD-200FO / 400FO

INSTRUCTION MANUAL

Version: 202304



 **World Chemical Co.,Ltd.**

Preface

Thank you for purchasing our separator with scraper. The product consists the floating oil collecting system with the collecting skimmer such as our FLOAT SUCTION and pump. The system collects and separates floating oil in the grease trap which is installed in a factory or big restaurant or oily wastewater in a drainage tank at a food factory.

The product has a scraper as standard and possible to collect / separate less liquid high viscosity oil or scum smoothly. Besides, it is compact and made by metal, so has quality to last long.

Before use, read to use with fully understanding of the function and features of the product and keep the manual for reference when necessary.

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NOTICE: This instruction manual is based on the standard product. Regarding the special unit, substitute the specification with the appropriate article words.



SAFETY PRECAUTION

In this manual, the rank of safety precaution items is categorized into “Danger” and “Caution” and are defined as follows.



Mishandling may lead to death or fatal injuries.



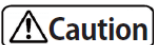
Mishandling may lead to minor to moderate injuries and/or property damage.

Even items with a “CAUTION” warning could lead to serious results depending on the situation. Since both cases contain important descriptions, please abide by the rules governing usage.

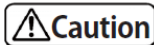
I. Caution When Transport or Installation



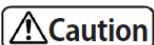
- (1) When transporting the product, make sure to drain fluid from the separator. After using, it is greasy by oil. Take extra care of fall and slip drop. Additionally, make sure to remove the power cable of the scraper motor before transporting.



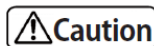
- (2) When opening the wooden box, be careful not to get injuries by nails or chips.



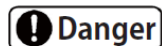
- (3) Install the mount on the level at the firm place with anchor bolts securely.



- (4) The power of the scraper motor should be connected by the qualified person under the electric install technical standards.



- (5) Use the crimp-type terminal to connect the power supply cable.



- (6) Make sure to connect the earth wire to avoid electric shock and/or the motor failure.

-  **Danger** (7) Do not bend, stretch or pinch interstitially the power supply cable and the motor lead wire. It may cause fire or electric shock.

II. Caution for Preparation and Operation

-  **Caution** 1. The correct rotational direction is the clockwise as viewed from above. If the motor rotates backward, make sure to turn off the power and switch two of three motor power cables.
-  **Danger** 2. When collecting the high temperature liquid, the flow passage such as the collecting skimmer, the pump, the separator and the hose raise nearly the liquid temperature. Therefore, be careful not to burn.
-  **Danger** 3. To prevent electric leakage or shock, remove the power supply cable of the scraper motor when the product is transported or stopped for a long time.
-  **Caution** 4. When the power blackout or the fail-safe device works, make sure to turn off the main power to prevent injuries by the sudden re-start.
-  **Caution** 5. At the emergency such as earthquake or fire, stop the operation immediately.
-  **Caution** 6. When any failure happens, stop the operation immediately and take appropriate measures.
-  **Danger** 7. Do not put obstructs to prevent ventilation around the scraper motor. It may cause fire or the motor damage by heat.
-  **Danger** 8. Do not use the product where the flammable gas enters, because fire or explosion may happen.
-  **Danger** 9. If the scraper motor heats up, it is at risk for fire. Never put combustible materials around.
-  **Danger** 10. If touching the rotating parts, it may injury. Do not put your hands or fingers closer.
-  **Caution** 11. If the rotating scraper during operation is stopped by compulsion, it may cause the motor damage or failure. Never do it like that.

III. Caution When Maintenance and Inspection

-  **Danger** (1) When maintenance of the scraper, make sure to turn off the main power. If not, electric shock may happen.
-  **Caution** (2) When repairing the product, contact your supplier or our sale department. Besides, when returning it, wash thoroughly not to adhere or leak collected liquid and pack it in wood or carton.

IV. Other Cautionary Items

-  **Caution** (1) Do not use the product with the uses other than the prescribed specifications. It is not covered by our warranty.
-  **Caution** (2) The product modified by yourself is not covered by our warranty.
-  **Caution** (3) When discarding the product, remove adhered oil on it and dispose it as industrial waste.
-  **Caution** (4) Contact your supplier or our sales department when collected chemical materials by the product. The product is impossible to collect solvents, organic acids, strong acids or alkali fluids. Also, never use it for flammable liquid.

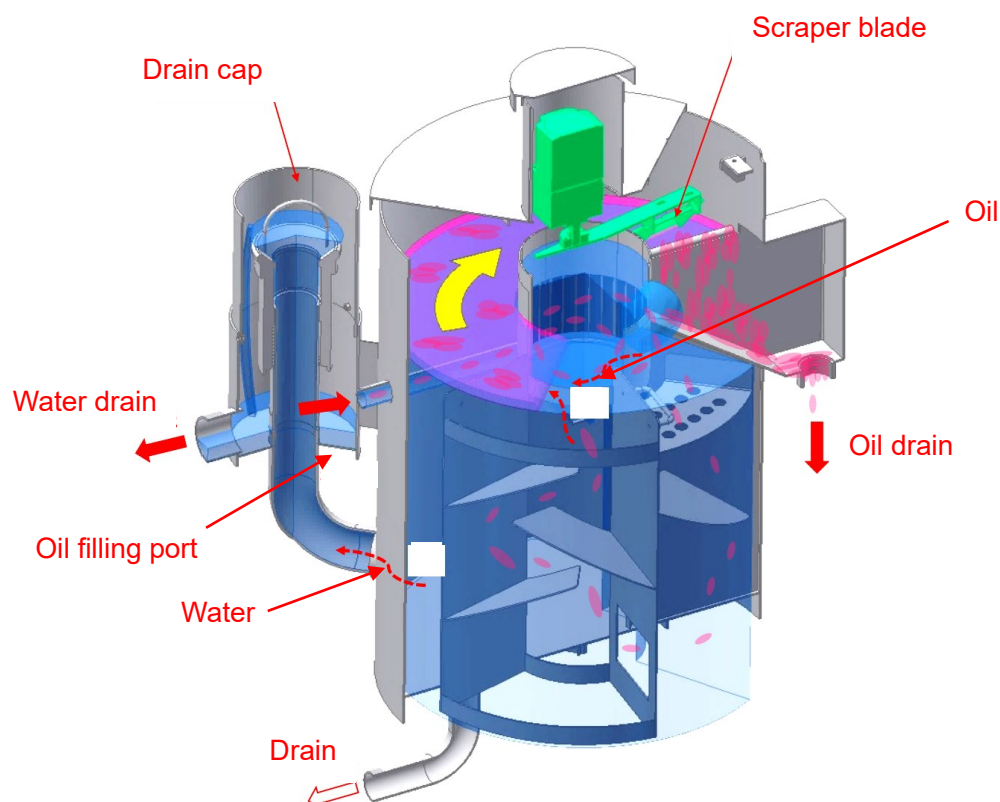
2. CONFIGURATION AND STRUCTURE

The product consists of the iron separator, drainage system with liquid level adjustment, drain system and scraper by consideration of easy maintenance and durability. There is the product with the power box also.

(1) Principle of floating oil collecting

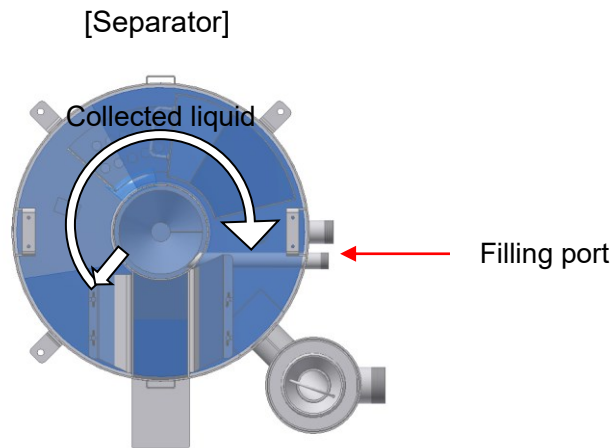
The product adopts the separation by difference in specific gravity and collects floating oil in the separator by buoyancy with the scraper. The flow of oil and water in the separator is as follows. The collected liquid from the collecting skimmer to the pump goes to the filling tube through the filling port of the separator. The filling tube forms cyclone and the oil overflows to the top of the donut-shape water pass while becoming coarse grain. The oil is separated by specific gravity during the entire loop and transferred to the oil drain port by the scraper. Moreover, the oil is scraped up to the slope and drained from the oil drain port. At that time, big drops adhered on the blades or oil is shook out and skimmed. After wastewater with tiny oil drop is transferred to the bottom of the main body, it is separated while becoming coarse gain while passing between the agglutinated unit that sloping boards are assembled and floats up the sloping board. The drain water less oil goes into the donut-shape water pass from the agglutinated unit and overflows from the drain cap after transferring from the bottom to the drain tube. It is drained from the drain port by natural drop.

[Flow of collected liquid]



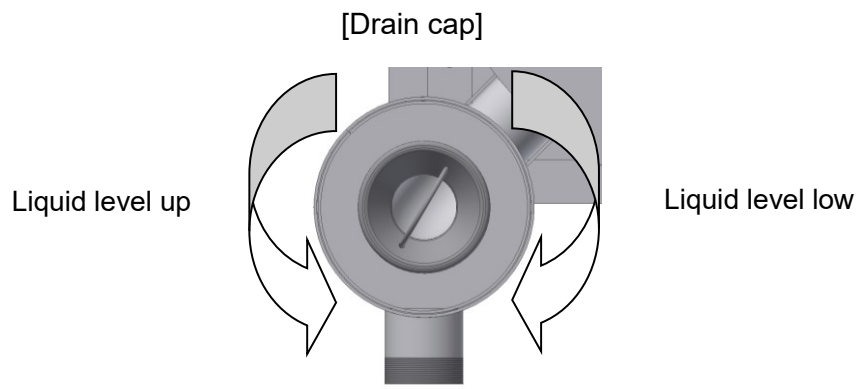
(2) Separator

The separator is attached the scraper on the top of the round main body and the filling port, drain tank and oil drain port are set around the body. There is the round filling tank at the center of the main body and the water pass between the main body and the filling tank is the donut-shape as viewed from above. The collected liquid is separated floating oil and water by the difference in specific gravity in the donut-shape pass and the oil is drained. The oil drain port is slop. When the scraper scoops the floating oil up, water falls into the separator and the oil is collected. The separator has a cover on the top to prevent dust or foreign objects.



(3) Drainage

The drain cap which is designed to adjust the liquid level of the separator is installed in the drain tank. The inside of the drain cap is screw and make the liquid level adjust by rotating. Rotating the drain cap makes the liquid level become low and the anti-clockwise rotating makes it up.



(4) Drain

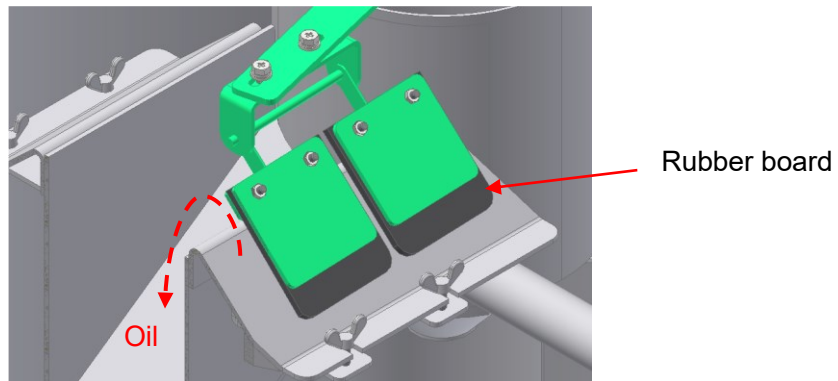
The valve for drain is installed at the bottom of the separator. When it is maintenance, the liquid in the separator is drained by opening the valve.

(5) Scraper

The scraper is configured the motor and scraper. It makes floating oil in the separator drain. The motor is 3 phase/200V or 1 phase/100V. The ingress protection is 66 (except the surface of the attachment) and it has a rain cover, so it is possible to use outdoor. The recommended rotating speed is around 4rpm and the inverter of the product with the control box is set about 4rpm when shipping.

If the collected oil is large in volume, it is possible to attach the scraper at either end (option). Two separated scraper collects floating oil in the donut-shape water pass. A rubber board is attached in front of the scraper and useful for oil drain and impact relaxation that it passes through the oil drain port during rotating.

[Scraper]



3. INSTALLATION

- (1) When lifting the product, use hoisting attachment. When transporting, make sure to drain liquid.
- (2) Install the product whose drain port is higher than the liquid surface in a pit and the drain line is always slop downwards, because the product separates the collected oil water from an oil pit from water and drains by the natural drop.
- (3) Install the mount on the firm and level place. If it is inclined, the function may not work properly.
- (4) Fix the mount with anchor bolts firmly. If not, it becomes unstable for vibration or earthquake. Make sure to fix it.
- (5) Connect the transferring hose from the pump to the filling port of the separator and fix it with the hose band firmly.
Wrong connection causes liquid leaks. Connect the hose without twisting or crashed.

- (6) Connect the water drain hose and piping line at the water drain port.

When returning drained water to the collecting pit, install the tip of the hose at the similar height of the water level and the position is as far as possible from the collecting skimmer.

If installing the water drain hose near the collecting skimmer, it may disturb the floating oil layer by force of drained water and the collecting efficiency may be down. Additionally, if installing it at the higher position than the water level, emulsification of floating oil is enhanced.

However, if the tip of the water drain hose is submersed, the drain efficiency is down. Therefore, do not submerge it.

On the other hand, when transferring the drained water to the other tank, install the water drain port of the tank at the lower position than the water drain port of the separator. In each case, always decline the water drain line for the natural drop.

- (7) Put the suitable tank for collected oil near the oil drain port of the separator.

However, the tank is not an accessory as standard, so prepare it by yourself.

4. PREPARATION FOR OPERATION

- (1) Check that the power specification on the nameplate of the scraper motor is the same as the AC power to be connected.

- (2) Connect with the AC power.

When connecting it, make sure to turn the main power off to prevent the electric shock or short circuit.

Without power supply box

Connect the power supply cable of the scraper motor with the AC power. Install the suitable switch as the power line.

With power supply box

Connect the cable of the power supply box with the AC power. The ground leakage breaker, the inverter and the terminal block are in the power supply box as standard.

[Guideline to set the inverter]

For the pump: Approx. 35 – 50/60Hz (depending on the specification of the submersible pump)

Adjust it according to the total head and capacity to use.

For the scraper of the separator: Approx. 25Hz

Refer to the attached manuals about the operation procedure of each electric devices.

Caution

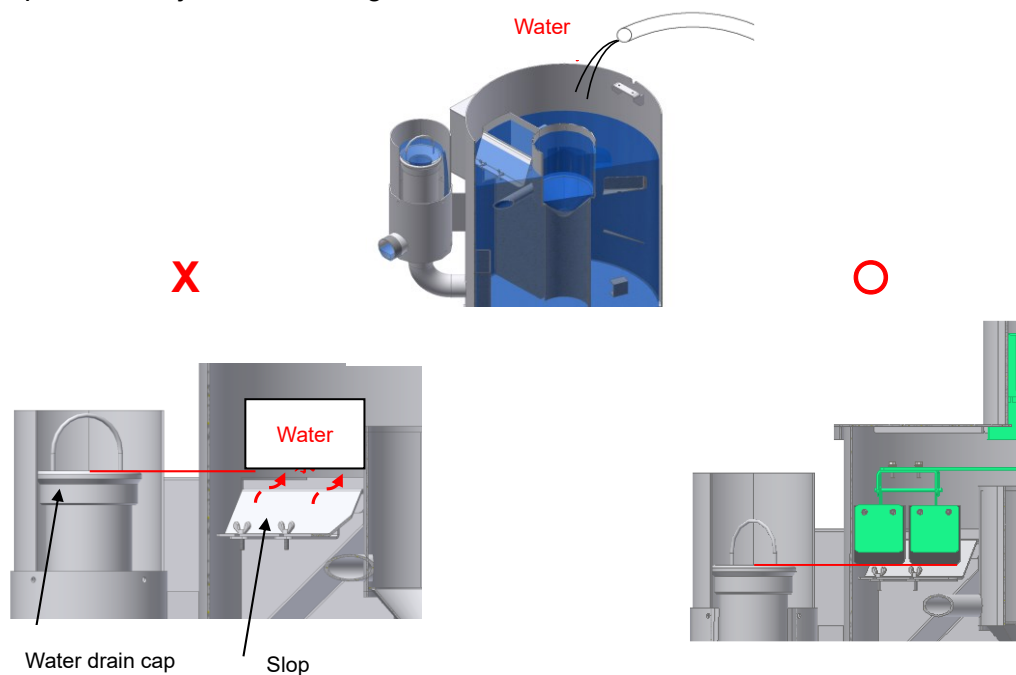
The above frequency is for the submersible pump used for our Gyro skimmer “YD-GYP series”.
If the other pump is used, set the suitable frequency according to the capability of the pump.

(3) Check that the drain valve is closed.

(4) Check again that the hose or piping line is fixed firmly and correctly.

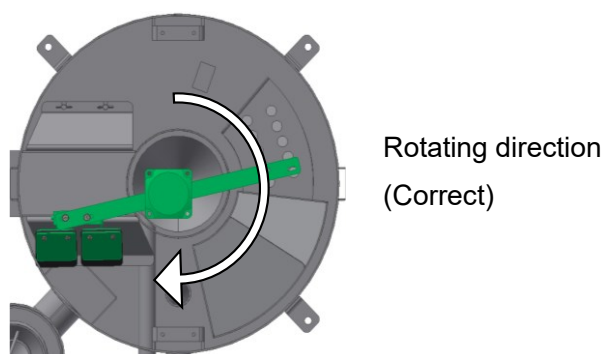
(5) Open the separator cover and pour tap water in.

Pour tap water until overflow from the water drain port cap. At that time, if the position of the top edge of the water drain cap is higher than the top edge of the slope of the oil drain port, tap water flows out from the oil drain port cap before the water drain cap. The recommended initial setting of the water drain cap is to adjust that the water surface contacts the rubber of the scraper a little. After operation, adjust it according to the condition and volume of oil.



(6) Check the rotating direction of the scraper motor.

The correct direction is the clockwise as viewed from above. If the motor is 3 phase / 200V and rotates backward, make sure to turn off the power and switch two of three motor power cables.



5. OPERATION AND ADJUSTMENT

The next is adjustment procedures after operation. When adjusting, follow the precautions.

- [A] Turn off the main power of the scraper motor unless the adjustment during operation.
- [B] When high temperature liquid is collected, the separator also becomes hot. Stop the operation and leave parts until the temperature is enough low.
When adjusting during operation, take care not to burn
- [C] Oblige to take safety measures of workers such as wearing rubber gloves and protective grasses depending on liquid to be collected.

The separator is tested by water and everything one needs is adjusted in our factory. However, if adjust as following procedure according to the condition of liquid to be collected.

The required part of the adjustment of the separator is only the height of the water drain cap.

Firstly, collect oil at the normal condition during the separator operation, then rotate the water drain cap and adjust the liquid level in the separator while checking the state of drain.

When the collected oil is low viscosity and reducing water in drain oil, rotate the water drain cap clockwise as viewed from above that the liquid level is lower in the separator.

When the collected oil is high viscosity and no problem to mix a small amount of water in drain oil, rotate the water drain cap anticlockwise that the liquid level is raise in the separator.

When the collected oil is high viscosity and reducing water in drain oil, rotate the water drain cap clockwise that the liquid level is lower in the separator.

The capability of the separator is approx. 20 L/min as YD-200FO, approx. 50 L/min as YD-400FO. Adjust the separator depending on capability of the collecting skimmer or pump.

When collected oily water is transferred with more than the separator can do, it may cause oil separation or drainage failure.

6. MAINTENANCE

If much oil or foreign objects are adhered and settle out in the separator, the ability may be an obstacle. Therefore, take a maintenance periodically or as necessary.

When taking a maintenance, follow the precautions.

- (1) Open the valve and drain the liquid in the separator at the time of maintenance.
- (2) Check the inside of the separator and clean it when oil or foreign objects are adhered.
- (3) Turn on the power and check that the scraper rotates correctly. If the action is prevented by oil or foreign objects, clean it.
Check not to loosen bolts. If so, tighten them. Before checking, make sure to turn off the power.
- (4) If oil or foreign objects accumulate on the scraper or in the separator, it causes failure to become overloaded with the motor. The efficiency of drain becomes low. Therefore, check and clean periodically according to the accumulation.
- (5) If oil or foreign objects accumulate at the oil drain port or on the slope, their contact gets bad and the efficiency of drain becomes low. Clean them as necessary.
- (6) The frequency of the check is depending on the condition or flow rate of the oil or foreign objects, but even if the product works correctly, check the inside at least once a month.
- (7) Clean scum or foreign objects are adhered at the bottom of the separator. If oil or foreign objects accumulate, it prevents drain or clog the drain line. Check and clean it periodically.
- (8) If oil or foreign objects are adhered in the drain tube or at the drain cap, clean them. If they accumulate, it prevents drain or it is impossible to adjust the liquid level to fix the drain cap. Check and clean it periodically.
- (9) The scraper is made of rubber. If it deformed or worn, replace to the new one.
- (10) The thermal protector is not installed in the scraper motor. When using our control box, the inverter is incorporated to protect the motor, but if our control box is not used, prepare the electric open/close device or inverter to protect the motor.

7. TROUBLESHOOTING

	Types of Breakdown	Cause	Countermeasure
Separation failure	A large amount of water is drained from the water drain port.	Adjustment failure of liquid level in the separator.	Adjust the drain cap and lower the liquid level in the separator.
		Too much liquid to be collected.	Adjust the capacity of the pump to meet the ability of the separator.
Water drain failure	Separated water is not discharged smoothly.	The separator is installed at the low position.	Re-install that the water drain port of the separator is higher than the liquid level.
		Grade defect of the drain line.	Re-install the drain line on the down grade.
		The tip of the drain hose is submerged.	Re-install that the tip of the drain line is higher than the liquid level.
		The drain line is clogged.	Check and clean the inside of the drain line.
		Oil or foreign objects accumulate at the bottom of the separator.	Open the valve of the separator and clean inside.
Oil drain failure	Collected oil is not discharged smoothly.	The oil drain port is clogged.	Remove oil or solids around the oil drain port.
		Foreign objects accumulate on the slope of the oil drain port.	Clean the slope.
	Scraper failure	Scraper blades are not contact with the surface of oil.	Raise the liquid level in the separator by turning the drain cap to adjust that the scraper blades are submerged in oily water.
			Check the slope of the separator and re-install the top horizontally.
			Check the scraper and replace it if it is deformed or worn.
		The scraper does not rotate.	check the loosen of the scraper and tighten it.
		The scraper motor does not work.	Clean the scraper and separator and remove oil or solids on in.
			Check the power supply cable for the motor.
Drain failure	Drain is not smooth.	The drain line is clogged	Clean the drain line and the valves to remove and clean scum or foreign objects.
	Drain failure	The drain valve does not work.	Clean the drain valve to remove scum and foreign objects.
			Check the power supply cable.
			Contact us, because the drain valve may be broken down.

8. WARRANTY / REPAIR

1. 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 and abrasion by the slurry 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.

Installation record

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

Ver.20240819



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