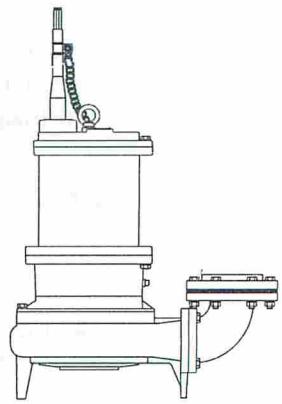
No. 87001250

Bringing valuable "water" to you・・・・ Kawamoto

CHAMPION
Submersible Sump Pump with Cutter
AU4 type Instruction Manual



Thank you for purchasing our AU4 type submersible sump pump.

Please read this manual thoroughly and fully comprehend its content before starting use, and use the product correctly and safely.

After reading this manual, be sure to keep it somewhere users can refer to it at all times.

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⚠ Things to be especially careful about

1. Do not use the product in places where there are people (bath houses, swimming pools, ponds, etc.).Electric leakage may cause electric shock.

2. Do not dangle the pump from the power cable. Doing so may damage the power cable and cause fire and electric shock.

3. Attach a grounding wire securely, and attach a dedicated earth leakage breaker on the power supply side. Failure to do so may cause electric leakage, electric shock and fire. (Except for models that have a built-in earth leakage breaker.) Please consult your distributor with regard to attaching grounding.

4. Only repair technicians may disassemble, repair, or modify the product. Improper repairs may result in electric shock, fire, water leakage, etc.

5. When carrying out maintenance, be sure to turn off the power and confirm that no electricity is being supplied to it. Failure to do so may cause electric shock and injury.

The relevant sections of this manual also include precautions for using the product safely and correctly in order to prevent danger or harm to yourself and others.

In order to state clearly the level of danger, harm and urgency, these precautions classify content that is predicted to occur as a result of improper handling into two groups: "Warning" and "Caution".

Both are important content regarding safety, so please always follow them.

⚠ Warning: Content predicted to involve the risk that someone will die or suffer serious injury.

⚠ Caution: Content predicted to involve the risk that someone will suffer injury or that only damage to property will arise.

1 Introduction

Check the following when the pump is delivered.

1.1 Check on the nameplate that the pump is the one you actually ordered.
Model, bore, total head, frequency, number of phases, power requirement, etc.

1.2 Check to see if any sections were damaged during transportation, and for loose bolts, nuts, etc.

1.3 Check that none of the accessories for the order are missing.

1.4 When making inquiries, tell us the "model" and "serial number."

If there are any defects, please contact the distributor

2 Specifications

⚠ Danger

- Never use this product with a pressure that exceeds the maximum operating pressure. Water leakage could cause serious damage.

⚠ Caution

- Select a product which is appropriate for your application. Inappropriate use of products may cause accidents.
- Do not use the product other than within the product specifications. Doing so may cause electric shock, fire, water leakage, etc.
- Danger, warning, and caution labels describe matters which may cause harm to people or damage to property. Please always follow them. Failure to do so may cause equipment failure, leading to electric shock, fires, injuries, etc.
- Do not use the equipment with any liquid other than water. (For example, do not use it with oil, salt water or organic solvents.) Doing so may cause pump failure, electric leakage and electric shock.
- Have spare equipment ready when using pumps for equipment for living things (fish farms, fish tanks, aquariums, etc.) or critical equipment. Pump failure may cause lack of oxygen and water quality deterioration, and may affect the lives of the living things.
- When using pumps for equipment for living things (fish farms, fish tanks, aquariums, etc.), do not install the pumps in the same tank as the living things. Leakage current or leakage of sealing liquid from mechanical seals may kill the living things.
- If the product is being used to transport food-related items, give due consideration to the materials used, and use the product on your own responsibility. Contamination by foreign objects and the occurrence of microorganisms may occur.
- Avoid using the product for living things which have an aversion to copper alloy. It may affect the lifespan of the living things.

Liquids handled	Liquid type	Sump water (pH 5 to 9)
	Liquid temperature	0 to 40°C
Installation location		Underwater
Power supply voltage fluctuation		Within ± 10% of the rated voltage
Submerged depth of the pump		Within 8 m

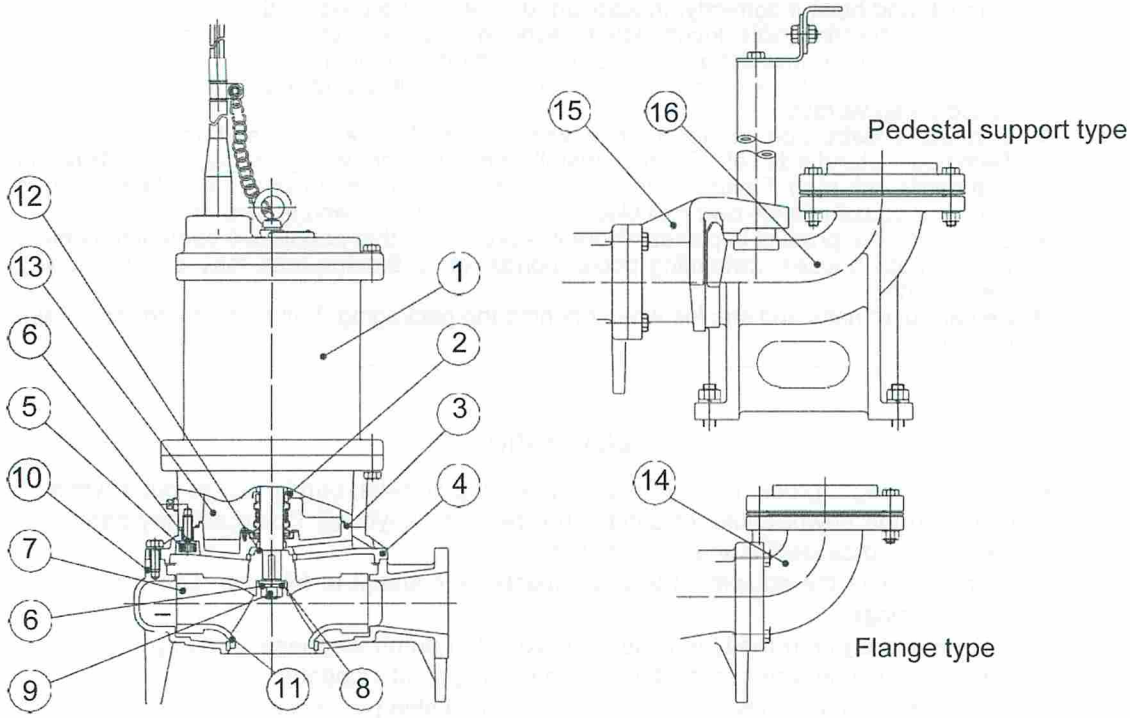
* For 7.5 kW or less, an auto-cut is built-in.

Ability to pass foreign objects	
Bore (mm)	Solids (spherical body diameter (mm)
50	17
65	17
80	24 (2. 2 kW or less) 26 (3. 7 kW or more)
100	26

3 Product configuration

3.1 Structure drawing

This diagram shows a typical AU4 model. Your product may vary from it depending on what model it is.



No	Name	Material	Notes	No	Name	Material	Notes
1	Motor	-		9	Nut	SUS304	
2	Mechanical seal	-		10	Casing	FC	
3	O-ring	Rubber		11	Cutter piece	SDK	
4	Casing cover	FC		12	Shim	SUS304	
5	Bolt with hole	SUS304		13	Turbine oil	-	
6	Spring washer	SUS304		14	Connecting bend	FC	Optional accessory
7	Impeller	FCD		15	Connecting pipe	FCD	Optional accessory
8	Plain washer	SUS304		16	Pedestal support	-	Optional accessory

3.2 Accessories

1. Standard accessories ····· Name plate, instruction manual
2. Optional accessories (separately packed) ·····

When installing the pump, the following parts will be required depending on the type.

Flange type	Connecting bend
Pedestal	Pedestal support, connecting pipe, chain

3.3 Special accessories ···· Control panel

4 Installation and piping

⚠ Warning

- If the product is going to be hoisted for unloading, carrying-in, or installation, check its mass in the catalog and installation diagram, check how to hoist it in the instruction manual, and hoist it correctly. In addition, do not hoist a product that exceeds the rated load of the hoisting tools. Incomplete hoisting may cause injuries due to falling.
- Perform a secure installation in accordance with the manual. Improper installation may result in electric shock or fire, and injuries due to falling and tipping over. It may also cause pump vibration.
- Conduct construction in accordance with the applicable laws and regulations (the Technical Standards of Electric Installation, interior wiring regulations, Building Standards Act, etc.). Failure to do so will not only violate the laws and regulations, but it may also cause injuries owing to electric shock, fire, falling and tipping over.
- Do not use the product in places where it is presumed that people will come into contact with it (bath houses, swimming pools, ponds, etc.). Electric leak may occur, causing electric shock.
- Be careful of nails and staples when opening the packaging. Failure to do so may result in injury.

⚠ Caution

- Do not damage, break, modify, forcefully bend, pull, twist, bundle up, or put anything heavy on the power cable, or sandwich it between anything. Doing so may damage the cable and cause fire and electric shock.
- Do not subject the equipment to any impacts, or cause it to fall over. Doing so may cause damage.
- Have a spare pump ready in case of unexpected pump stoppage. A pump failure may cause water shut-off, resulting in equipment stoppage.
- Depending on the equipment, perform thorough flushing to check that there is no contamination. Cutting oil, foreign objects, etc. from the pipeline may contaminate the liquid which is to be handled.
- Remove the companion flanges from the pump and screw them into the piping. Failure to do so may cause damage and water leakage.
- Do not put anything on the device, or allow anyone to get on it. Doing so may cause equipment damage or injury as a result of falling over.
- Use valves in the correct state. Failure to do so may result in improper operation and cause damage to the unit.
- Organize the surroundings before carrying out work such as installation and inspection. Failure to do so may cause injuries due to slipping or stumbling
- Do not put anything on the product, or allow anyone to get on it. Doing so may cause damage to the product and injury as a result of falling over.
- Ensure that no air pockets will form inside the piping. Air pockets in the piping may lead to abnormal operation of the pump.
- Do not install power cables and control wires in the same piping or duct. Doing so may cause this product or other devices to malfunction.
- Confirm with your own municipal authority with regard to how to dispose of unnecessary parts, packaging materials, etc.
- Do not dangle the pump from the power cable. Doing so may damage the power cable and cause fire and electric shock.

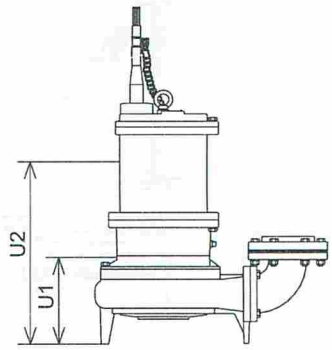
4.1 Installation

1. Install the pump in a flat and sturdy place.
2. If performing alternate/parallel operation with two pumps (AU4 - L+LN), install them on the same flat surface.

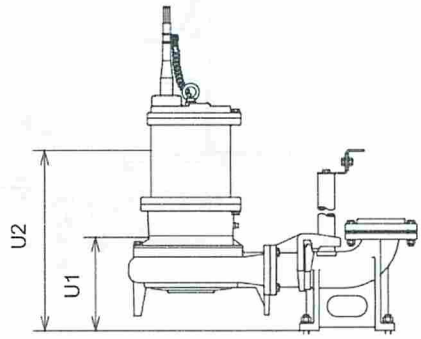
3. Operating water level

Pump	Flange type		Pedestal support type	
	U1	U2	U1	U2
AU4-50-0.75	160	315	190	345
AU4-50-1.5	175	370	205	400
AU4-65-1.5	175	370	205	400
AU4-65-2.2	190	400	240	450
AU4-65-3.7	200	450	245	495
AU4-65-5.5	175	440	225	485
AU4-80-1.5	195	390	220	435
AU4-80-2.2	200	410	220	493
AU4-80-3.7	220	470	250	518
AU4-80-5.5	200	460	250	510
AU4-80-7.5	200	485	250	510
AU4-100-3.7	220	470	250	518
AU4-100-5.5	200	460	250	535
AU4-100-7.5	200	485	250	535

<AU4: Flange type>

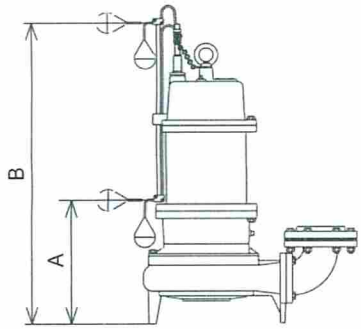


<AU4: Pedestal support type>

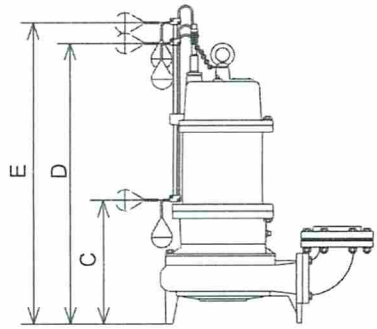


U1: Minimum water level for operation (Do not operate under this level. It may cause pumping failure and vibration.)
U2: Minimum water level for continuous operation (Do not operate it for more than 20 minutes under this level. The motor protection switch may activate and the pump may stop.)

<AU4-L: Flange type>



<AU4-LN: Flange type>



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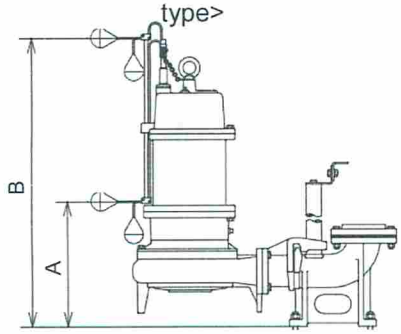
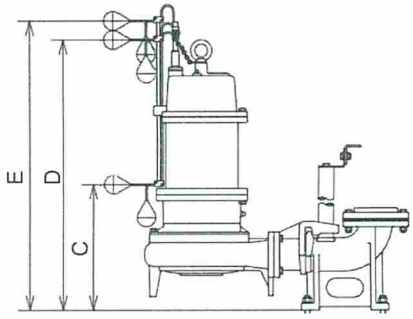


<AU4-LN: Pedestal support type>



Pump	Flange type					Pedestal support type				
	AU4-L		AU4-LN			AU4-L		AU4-LN		
	A	B	C	D	E	A	B	C	D	E
AU4-50-0.75	203	603	263	543	663	231	631	291	571	691
AU4-50-1.5	214	614	274	554	674	246	646	306	586	706
AU4-65-1.5	214	614	274	554	674	246	646	306	586	706
AU4-65-2.2	208	758	278	688	828	260	810	330	740	880
AU4-65-3.7	218	768	288	698	838	265	815	335	745	885
AU4-80-1.5	236	636	306	586	706	281	681	351	631	751
AU4-80-2.2	236	786	306	716	856	281	831	351	761	901
AU4-80-3.7	256	806	326	706	846	306	856	376	786	926
AU4-100-3.7	256	806	326	706	846	306	856	376	786	926

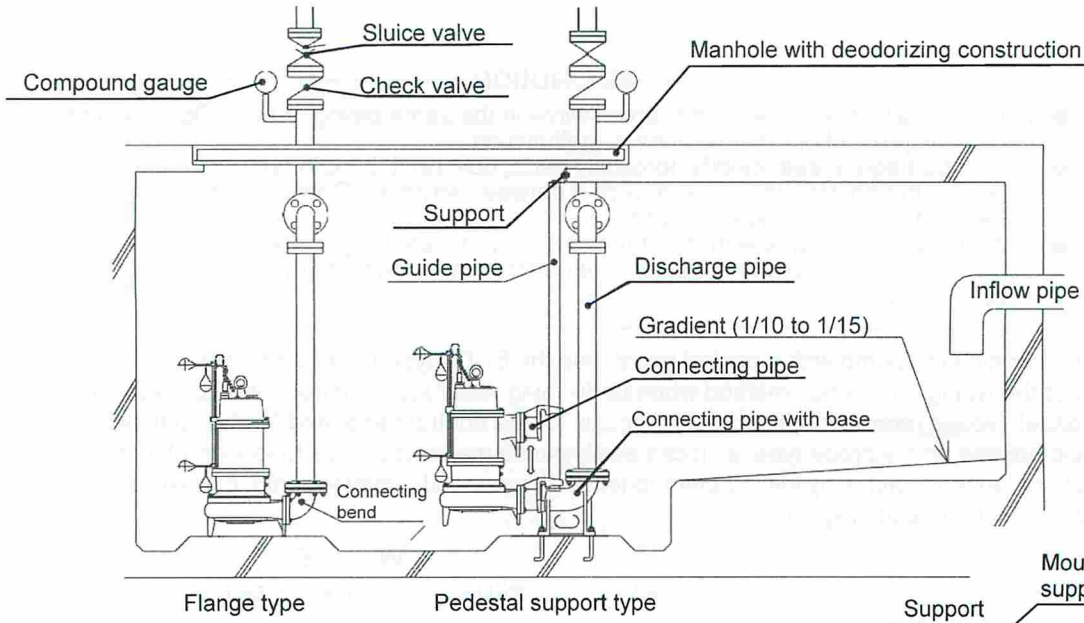
AU4-L type A: Stopping water level B: Starting water level
AU4-LN type C: Stopping water level D: Starting water level (alternate)
E: Parallel operation starting water level

4.2 Piping

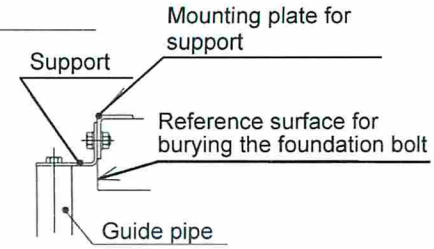
1. Install a separate check valve for each individual pump. When installing the valves, refer to the table below.

Pump head	Less than 15 m	15 m or more
Check valve	Sump check valve	Check valve with counterweight

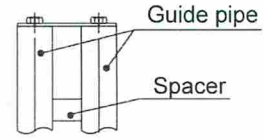
2. Support the piping sufficiently, so that the piping load will not be directly applied to the pump.
3. Install the manhole in a position where the the pump section and liquid-level controller inside the tank can be inspected just by looking in from the manhole.
4. Install the inflow pipe and aerator in a position where air will not get caught up in the pump's suction port. Failure to do so may cause pumping failure and vibration.
5. Ensure that the equipment is installed in such a way that the inflow water will not come into contact with the liquid-level controller. Failure to do so may cause malfunction.
6. Construct the foundation for the connecting pipe with base in such a way that it is flat and level.



7. If setting the pump on a pedestal support
   - Hoist the pump with a crane (chain block), engage the connecting pipe with the guide pipe, and slowly lower the pump as is.
   - If you raise the pump a little after it is connected and then slowly lower it, the connection will be even safer.
   - If the guide pipe is long, weld on a spacer to reinforce it.



Pump bore	Recommended material and bore for the guide pipe
50A, 65A (1.5 kW)	Stainless steel 32A (Sch40)
65A (2.2 kW and above), 80A, 100A	" 40A (Sch40)



5 Electrical work

⚠ Warning

- Get the electrical work carried out properly by a specialist engineer, in accordance with the "Technical Standards of Electric Installation" and "interior wiring regulations." Improper wiring and connections may result in failure, electric leakage/shocks, or fires.
- Attach a grounding wire securely and attach a dedicated earth leakage breaker on the power supply side. Failure to do so may cause electric leakage, electric shock and fire. (Except for models that have a built-in earth leakage breaker.)
- Be sure to carry out grounding work before power is supplied. Do not connect the grounding wire to the grounding wire for gas pipes, water pipes, lighting rods, or telephones. Improper grounding may cause electric shock.
- Remove any dust from the power plug, wiring connection sections, cabling sections, terminal sections, etc. Leaving dust on them, etc. may cause heat to be generated, resulting in fire.
- Before turning on the power, check that no wiring connection sections or cabling sections are loose, have come off, etc. Even if just one location is loose or has come off, it may cause fire or electric shock.

⚠ Caution

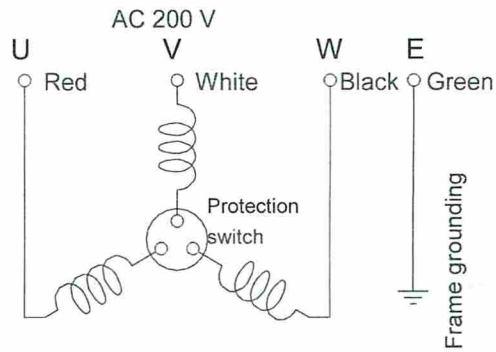
- Do not install power cables and control wires in the same piping or duct. Doing so may cause this product or other devices to malfunction.
- Do not damage, break, modify, forcefully bend, pull, twist, bundle up, or put anything heavy on the power cable, or sandwich it between anything. Doing so may damage the cable, and cause fire and electric shock.
- Cut the cable that came with the pump to an appropriate length, and insulate it. Tying it up may break the cable because of heat generation, causing disruption of the water supply and fire.

5.1 If operating the pump with a control panel, use the ECD2 type made by Kawamoto.

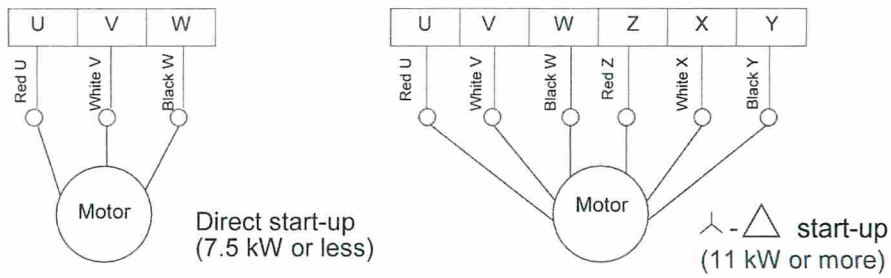
5.2 For the wiring connection method when performing water level control operation with a control panel, please refer to the instruction manuals for the control panel and for the float switch. Do not use an electrode type, as it can easily cause malfunction due to foreign objects, etc.

5.3 Do not extend cables by joining them together. If you need a longer cable, please contact the distributor.

5.4 AU4: Motor circuit diagram



5.5 Connect the wiring by following the diagrams below.



6 Operation

⚠ Warning

- When installing and removing wiring, be sure to turn off the power before performing the work.
  Failure to do so may cause electric shock.
- In the event of a power failure, turn off the power switch. Failure to do so may cause damage to the product and other equipment when the power is restored, or injury if the pump suddenly starts up.
- Keep your hands and feet away from the suction port during operation. Failure to do so may cause injury as a result of getting sucked in.

⚠ Caution

- Do not use the product other than with the rated voltage. Doing so may cause fire and electric shock.
- Confirm that the rotation direction is correct. If the direction is incorrect, it may result in leakage, etc.
- Turn off the power if the pump is not going to be used for a long time. Failure to do so may cause electric shock, electric leakage and fire as a result of insulation deterioration.
- During idling or when performing shut-off operation in a certain time, do not let air get mixed in with the liquid being handled. It may cause damage to the casing, bearings, shaft sealing, etc., and make it impossible to pump water. Also, it may cause the pump to overheat, resulting in burns.
- Do not operate in air for more than 5 seconds. Doing so may cause the motor's temperature to suddenly increase, resulting in burnout.
- Check whether there is an appropriate amount of oil in the mechanical seal chamber. (Once/6 months.) Operating the product with an insufficient amount may cause a significant reduction in the mechanical seal's service life.
- Do not run pumps with a specification of 50 Hz at 60 Hz. Damage may arise as a result of excess pressure or burnout of the motor, etc. due to overload. Do not run pumps with a specification of 60 Hz at 50 Hz. The pump's performance may be reduced.
- When starting operation after a long period of storage or inactivity, carry out a test run in accordance with the steps in "Installation" and "Operation." Failure to do so may cause pump restraint due to fixation, motor burnout, idling due to falling water, etc.
- Do not use the product in continuous operation for a long time or under conditions of strenuous repeated start-ups. Doing so may cause leakage from mechanical seals or pump failure.
- Operate the pump within the specifications. Operation outside the specification range may lead to pump failure and accidents.
- Thoroughly bleed any air inside the pump and piping when carrying out a test run. Failure to do so may cause an air lock in the pump or a temperature rise, resulting in failure and accidents.

6.1 Before starting

1. Check the capacity of the earth leakage breaker, the power supply voltage, and whether the wiring has been properly carried out.
2. Submerge the pump at or below the minimum water level for continuous operation. (Refer to 4- 1.) Otherwise, the protection equipment may activate.

6.2 Test run

1. Turn on the power and check the pump rotation direction.
   If the motor rotates in reverse, the vibration will be severe, the discharge rate will be less, and the electric current value will higher. If it is rotating in reverse, turn off the power source and switch 2 of the 3 motor cables.
2. Check that water gushes out vigorously from the discharge pipe. Also, check that there are no abnormalities regarding pressure, current, operation noise, vibration, etc.

6.3 Operation

1. If you continue to operate the pump for a long time at a low water level, the protection equipment might activate and the pump might stop. However, this is not a failure.
2. Please start up the motor no more than 6 times an hour. Operating it very frequently may damage the motor.

7 Maintenance/Inspection

⚠ Warning

- If the pump has stopped working or there is an abnormality with it (broken cable, burning smell, etc.), immediately stop operating it, turn off the power, and request inspection or repair from your distributor or our nearest sales office. Continuing to operate it in an abnormal state or having improper repairs may cause electric shock, fire, water leakage, etc.
- Only repair technicians may disassemble, repair or modify the product, or replace cables. Improper repairs may cause failure, damage, electric shock or fire.
- Only repair technicians may replace cables. If they are handled improperly, it may cause electric shock.
- When carrying out inspections or replacement, be sure to turn off the power before performing the work. Failure to do so may cause electric shock and injury.
- When transferring and re-installing the equipment, please consult your distributor or our nearest sales office. Improper installation may result in electric shock, fire, water leakage, etc.
- If the insulation resistance value has dropped below 1 MΩ, immediately request an inspection and repairs from your distributor or our nearest sales office. Failure to do so may lead to motor burnout, electric shock, or fire.
- Make sure your fully insert the power plug. Incomplete insertion may cause electric shock and fire. Do not use damaged plugs or loose outlets.
- For repairs, use our genuine parts. Using parts other than genuine parts may cause failure and accidents. Doing so may also interfere with normal functions.

⚠ Caution

- Check whether there is an appropriate amount of oil in the mechanical seal chamber. (Once/6 months.) Operating the product with an insufficient amount may cause a significant reduction in the mechanical seal's service life.
- When disassembling and inspecting the pump, confirm that the internal pressure is zero. Failure to do so may cause water to jet out, which may lead to accidents or injury.
- When starting operation after a long period of storage or inactivity, carry out a test run in accordance with the steps in "Installation" and "Operation." Failure to do so may cause pump restraint due to fixation, motor burnout, idling due to falling water, etc.
- We recommend performing both periodic and daily inspections in order to ensure that the pump will operate stably for as long as possible. Failure to perform inspections may lead to pump failure, accidents, etc. For periodic inspections, please consult your distributor or our nearest sales office.
- Periodically check the operation of the protection breaker. Failure to do so may cause it to not operate normally in the event of an accident, resulting in electric shock or failure.
- Periodically replace consumable parts. Using them in a deteriorated or worn state may cause accidents such as water leakage, seizure, or damage. For periodic inspections, parts replacement, etc. please consult your distributor or our nearest sales office.
- When using a pressure gauge, compound gauge, etc., close the stopcocks when not performing measurement. Keeping them open all the time may cause the pressure gauge, compound gauge, etc. to break.

7.1 Daily inspections

Item		Guide for condition	Guide for replacement timing	Consumable parts
Mechanical seal		The turbine oil is not cloudy or blackened	2 years	○
O-ring		Every time the pump is disassembled or inspected	Every time the pump is disassembled or inspected	○
Turbine oil		The turbine oil is not cloudy or blackened	1 year	○
Motor	Ball bearing	When the bearing heats up or abnormal sound or vibrations occur	3 years	○
Current		The current value on the nameplate or		
Voltage		Within ± 10% of the rated voltage		

1. Measure the insulation resistance at least once every six months. If the insulation resistance of the motor has fallen below 1 MΩ, please repair the motor or replace it with a new one.
2. Noticing daily changes is important for the early detection of abnormalities. For this reason, it is recommended that you maintain operation logs.

Output (kW)	Amount of turbine oil (L)
0.75 to 1.5	0.5
2.2 to 3.7	0.68
5.5 to 7.5	1.7

7.2 Inspect the motor once every 3000 hours of operation time, or once every six months.

8 Troubleshooting

⚠ Warning

- If the pump has stopped working or there is an abnormality with it (broken cable, burning smell, etc.), immediately stop operating it, turn off the power, and request inspection or repair from your distributor or our nearest sales office. Continuing to operate it in an abnormal state or having improper repairs may cause electric shock, fire, water leakage, etc.
- When carrying out inspections or replacements, be sure to turn off the power before performing the work. Failure to do so may cause electric shock and injury.

8.1 Protection switch

1. As an auto-cut (motor burnout prevention device) is built-in, the pump may stop in the following cases.
   - If the voltage has fluctuated to an extreme extent
   - If the frequency has fluctuated to a high degree
   - If you have kept it running in air for a long period of time
   - If phase-loss operation or restraint operation have arisen

   As the auto-cut will automatically reset after a certain period of time and the pump will start to operate, please turn off the power supply when inspecting.

8.2 Troubleshooting

Phenomenon	Causes	Measures	Page in the text
The motor does not rotate.	The motor is broken.	Repair at a specialized plant.	10,11
	There is an abnormality related to the power supply.	Check and repair.	8, 9, 10
	The wire connection is single-phase.	Connect the wires correctly.	8
	Foreign objects, etc. have gotten caught in the sliding section.	Repair at a specialized plant.	-
The motor rotates, but no water comes out. The specified discharge rate or specified head cannot be achieved.	Foreign objects are clogging the impeller.	Repair at a specialized plant.	-
	The piping is clogged.	Inspect inside the piping and remove any foreign objects.	-
	The actual head is too high.	Re-examine the plans.	-
	The loss in the piping is too large	Re-examine the plans.	-
	The impeller is worn out.	Repair at a specialized plant.	-
Overload (overcurrent) occurs.	The voltage drop or unbalance of each phase is large.	Check the power supply	8, 9, 10
	The motor is defective.	Repair at a specialized plant.	10,11
	The specific gravity and viscosity of the liquid are high.	Re-examine the plans.	-
	The rotating section is making partial contact.	Repair at a specialized plant.	-
The pump vibrates.	Foreign objects are clogging the impeller.	Repair at a specialized plant.	-
	The shaft is bent.	Repair at a specialized plant.	-
	The bearing is damaged.	Repair at a specialized plant.	-
The pump does not operate automatically.	There is an abnormality related to the electrical components.	Repair at a specialized plant.	-

Failures can be caused by something unexpected, but it is important to take action immediately if you find an abnormality. If the cause of the failure is unknown, please contact your distributor or our sales office.
When contacting us, please tell us the pump model, the serial number, and the circumstances regarding the failure (abnormality).