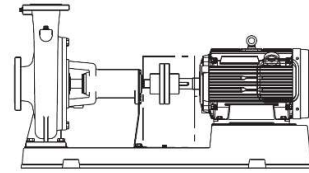


Bringing valuable "water" to you... 

# Centrifugal pump GE type Instruction Manual



Thank you very much for purchasing the GE centrifugal pumps.  
Before using the product, read this manual carefully and use it correctly and safely.  
Be sure to keep the watch where you can see it at any time after reading it.

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## Particular attention should be paid.

1. Prepare a spare unit for use in facilities of living things (fish farms, fish pond, aquariums, etc.) or important facilities. Oxygen deficiency, water quality deterioration, etc. may occur due to pump failure, which may affect the life of living organisms.
2. Do not install the product in a place that is neither treated with wastewater nor waterproofed. If water leaks, they may cause serious damage. ※We shall not be liable for damage caused without wastewater treatment or waterproof treatment.
3. Be sure to perform grounding before energizing. Failure to securely install the ground wire may result in failure, electric leakage, electric shock, or fire. Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Incomplete grounding may cause electric shock.
4. Install a leakage circuit breaker exclusively for this product. Earth leakage, electric shock, or fire may result.
5. The electrical work must be carried out with certainty by a specialist in accordance with the Electrical Equipment Technical Standards and the Extension Line Regulations. Insufficient wiring or connection may cause failure, electric leakage, electric shock or fire.
6. Do not run idle, shut off for a certain period of time, or mix air into the handling liquid. Otherwise, the casing, bearings, shaft seals, etc. may be damaged or the water cannot be pumped. The pump may overheat and burn.
7. Be sure to shut off the power before checking or replacing the product. Failure to observe this warning may result in electric leakage, electric shock, or injury.

Relevant parts of this manual also contain precautions to ensure that the product is used safely and correctly and to prevent harm or damage to you or others.

Precautions are classified into 3 categories: "Danger", "Warning" and "Warn" in order to clearly indicate the magnitude of the hazard or damage and the degree of urgency.

All of these are important matters related to safety. Be sure to observe them.

-  **Hazards:** Contents that are expected to cause imminent danger of death or serious injury.
-  **Warning:** Contents that may result in death or serious injury.
-  **Caution:** Content in which only the possibility of injury to a person and physical damage are expected to occur.

Conventional units in {} and numerical values based thereon are provided for reference.

## 1 Introduction

When the pump reaches you, check the following.

1. Check the pump or nameplate as ordered.  
Type, bore size, total head, frequency, number of phases, rated output, etc.
2. Check that the product is damaged during transportation and that the bolts, nuts, etc. are loose.
3. Check that all accessories are included in the order.

Note

1. Before using the product, be sure to read the instruction manual and use it correctly and safely.  
Precautions for preventing harm and damage are included in the instruction manual.  
※ I am not liable unless you observe the above.
2. Failure to comply with instructions, precautionary statements, improper repairs or alterations, natural disasters, installation environments (e.g., power supply abnormalities, foreign matter, sand, etc.), non-compliance with laws, ordinances, ministerial ordinances, or standards equivalent thereto, accidental or intentional failure or damage, replacement of consumable parts, resale, etc. may not be warranted.
3. When you contact us, please inform us model name and serial number.
4. Caution should be exercised when rust or corrosion or elution of metal is not acceptable depending on the application or liquid quality. Select and examine all pumps and equipment.
5. Confirm with local governments about how to dispose of unnecessary parts and packaging materials.

<< Please contact your supplier if you have any problems >>

## 2 Specification



### Warning

- Do not use the product outside the specified specifications, which may cause electric shock, fire, or water leakage.



### Caution

- Avoid using copper alloy in living organisms. Life may be adversely affected.
- Caution must be taken if rust, corrosion, or dissolution cannot be tolerated depending on the application and liquid quality. Select and examine all pumps and equipment. There is a risk of unexpected damage.
- Select products that suit your application. Use in inappropriate applications may cause an accident.
- The hazard, warning, and caution labels contain information that may cause personal injury or damage to property. Be sure to observe these instructions. Failure to observe this warning may result in equipment failure, electric shock, fire, or injury.
- Do not use liquids that are not listed as specified liquid quality. Failure of the pump may result in electric leakage, electric shock, or fire.
- Prepare a spare unit for use in facilities of living things (fish farms, fish pond, aquariums, etc.) or important facilities. Oxygen deficiency, water quality deterioration, etc. may occur due to pump failure, which may affect the life of living organisms.
- Be careful to check the materials used when water supply to foods. Foreign matter may be mixed in.

## 2.1 Specification

Pumping fluid	Liquid quality	Fresh water (pH5.8-8.6, chloride ion: 200 mg/L or less, solids/concentration: 50 mg/L or less, solids/diameter: 0.3mm or less)*1
	Liquid temperature	0 to 90°C (but not frozen)
Installation site		Indoor
Ambient temperature/humidity		Not more than 0~40°C/90%RH
Allowable indentation pressure		(1-Shutoff pressure) MPa {(10.2-Shutoff pressure) kgf/cm <sup>2</sup> }
Maximum suction total head		See below (20°C)
Motor	Type	Totally enclosed fan-cooled, indoor
	Phase	Three phase
	Voltage	50Hz:380V 60Hz:440V

※1 Liquid “fresh water” means tap water, industrial water and well water with water temperature, pH, and chloride ion concentration as described above.

※2 If you start the product with a reduced rotation speed by inverter, the suction performance may deteriorate.

※3 Consult the inverter manufacturer with the following precautions when driving with inverter.

(1) The operating power should be 50 Hz: 85% or less, 60 Hz: 100% or less, relative to the rated power.

(2) The minimum operating frequency should be approximately 20 to 30 Hz.

If the pump is started with the low frequency set, it may not be possible to start the pump due to the torque shortage of the motor. Therefore, it is recommended that the pump be operated at the set frequency after starting the pump.

(3) Compared to a commercial power supply, this may cause annoying sounds.

(4) Do not operate at a rotational speed at which the pump, motor, etc. resonate.

(5) For 400 V class motors, please consult.

Even with the insulation 400V motor, if the allowable surge voltage exceeds 1250V, suppress the surge voltage by installing surge voltage countermeasures such as control filters and reactors on the inverter side.

(6) The normal overload protection device cannot cope with this problem. Use the electronic thermal protection device built in the inverter to cope with this problem.

### 2 Pole

Bore size (mm)	50Hz	60Hz
Not more than 65 (×50)	-6m	-6m
	(-4.5m:40(×32)mm      0.4kW -0.5m:50(×40)mm      0.4kW -1.2m:65(×50)mm      0.75kW )	(-1.2m:0.4kW -3.2m:50(×40)mm      0.75kW -4.2m:65(×50)mm      1.5kW )
	80 (×65)	-6m(-3.5m:2.2kW)
100 (×80)	-5m	-3m

### 4 Pole

(mm) aperture	50Hz	60Hz
150 (×125) Not more than	-6m	-6m
	(4.5m:50(×40)mm      0.4kW 5.0m:65(×50)mm      0.75kW )	(-5.5m:150(×125)mm)

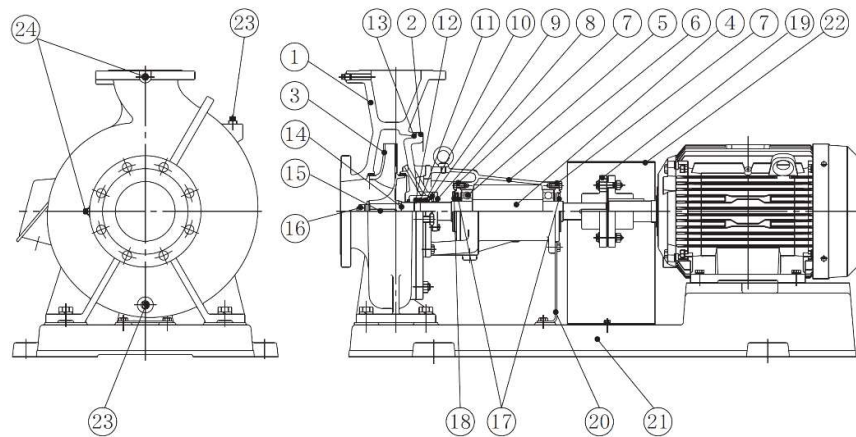
## 2.2 Special specification

Content		Applications conditions
Material	Impeller	CAC406: In case that standard model has FC impeller
	Shaft	SUS316 +S35C
Type	Motor	Totally enclosed fan-cooled, outdoor
Pumping fluid	Liquid quality/ temperature	Antifreeze (Nybrine Z-1, GD Brine 950, Brine PP Super) Concentration 35-50%/- 5-40°C,-15-40°C
Installation site		Outdoor

## 3 Product structure

### 3.1 Structural diagram

This drawing shows typical examples of the GE type, and some of them differ slightly from this drawing depending on the model.



No	Name	Remark	No	Name	Remark
1	Casing		13	O-ring	
2	Casing cover		14	Adjustment ring	
3	Impeller		15	Key	
4	Shaft		16	Nut	
5	Ball bearing		17	Deflector	
6	Bearing box		18	Deflector	
7	Bearing cover		19	Coupling	
8	Mechanical seal cover		20	Support	
9	O-ring		21	Base	
10	Mechanical seal		22	Coupling guard	
11	Stopper ring		23	Plug	
12	Set screw		24	Plug	

### 3.2 Standard accessories

Name	Quantity
Instruction Manual	1

### 3.3 Special Standard accessories

Name	Remark
Wedge	φ65 or more of GE-2M (excluding GEH-65) and φ50 or more of GE-4M
Priming funnel	When the product is used for negative suction at a GE-65 or bigger, except for GEH / I-65.
Check valve	
Flange set	

## 4 Installation



### Warning

- Do not connect directly to the water line. It is prohibited by the Water Supply Law. In addition, water may flow back and contaminate the tap water.
- Pumps may be installed in a keyed place, such as a pumping chamber, or may be inaccessible to third parties. Take measures such as providing fences and enclosures. Contact with rotating parts or high temperature parts may cause unexpected trouble, or the setting of the control panel and opening and closing of valves may be changed without permission, resulting in the pump not operating normally or water not flowing.
- Do not install the product outdoors or in a place subject to flooding, except for outdoor specifications. Earth leakage, electric shock, or fire may result from rust, failure, or insulation loss.
- If the pressure inside the discharge piping may rise due to temperature rise in summer, install equipment (safety valves, etc.) that can reduce the pressure. Otherwise, the piping or valves may be damaged due to pressure rise, resulting in injury.
- Do not incinerate resin or rubber parts on site. Burning may generate harmful gases. Please check with local governments for the treatment method.
- Considering the life of the equipment, choose a place that is well ventilated, free from dust, corrosive and explosive gases, salt, moisture, steam, and condensation, and free from wind and rain and direct sunlight. Failure to observe this warning may result in electric leakage, electric shock, or fire due to poor insulation of the motor and control panel.
- Do not use the product in an explosive atmosphere. Fires might occur if used near such locations.
- When suspending the product by unloading, carrying in, or installing it, check the mass in the catalog or the installation drawing, check the suspending method in the operation manual, and do not suspend the product beyond the rated load of the suspending tool. If the suspending is incomplete, it may cause injury due to fall.
- Install the product properly according to the instruction manual. Install it horizontally on the foundation and fix it with the foundation bolts. Failure to install the product may result in electric leakage, electric shock, fire, or injury due to falling or falling, which may cause vibration.
- Construction should be carried out in accordance with applicable laws and regulations (Electrical Equipment Technical Standards, Extension Regulations, Building Standards Law, Water Supply Law, etc.). In addition to violating laws and regulations, it may cause electric shock, fire, fall, or injury due to falling.
- Do not expose the watch to fires such as candles, cigarettes, flames, or sparks. Fires might occur if used near such locations.
- Consult the retailer (contractor) for installation work. Failure to do so may result in electric shock, fire, or injury due to falling or falling.



## Caution

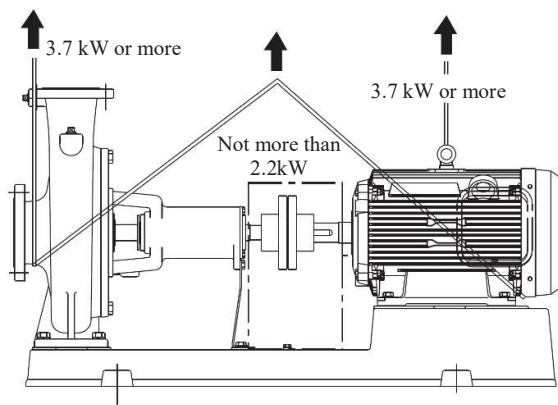
- Do not install the product in a place that is neither treated with wastewater nor waterproofed. If water leaks, they may cause serious damage. ※We shall not be liable for damage caused without wastewater treatment or waterproof treatment.
- Do not shock or overturn the equipment. This can damage the plug.
- If the product is used as drinking water, perform water quality inspections at the time of installation and periodically in accordance with instructions from the health center. If water quality deteriorates, there is a risk of loss of health if used for drinking.
- In case of negative suction, install the suction piping as follows. The pump may not operate properly.
  - Provide for each pump
  - Prevent from joining in the middle
  - Avoid right-angled loop piping (Torii-shaped piping)
  - Add an ascending slope (1/100 or more)
  - Short as much as possible and reduce the number of bends.
- Depending on the equipment, install an appropriate filter, etc. on the discharge side, perform sufficient flushing, and confirm that there is no foreign matter before use. Otherwise, cutting oil, rubber mold releasing agent, foreign matter, cutting oil contained in piping systems, foreign matter, etc. may be mixed into the handling fluid.
- Do not put anything on the equipment or put someone on it. Otherwise damage to the equipment or falls may result in injury.
- Use a sealant for the threaded part of the piping to ensure that water does not leak. If the product is not properly installed, water may leak.
- If there is a risk of freezing during winter, use a heat insulating material or a heater to prevent freezing. Failure to observe this warning may result in damage due to freezing.
- Before installing or inspecting the product, arrange the surrounding areas. Sliding, stumbling, or injuring may result.
- Adjust the centering correctly. Otherwise, damage to the equipment, vibration, noise, abnormality bearing wear, etc. may result.
- Do not allow air to accumulate in the piping. If there is an air pool in the piping, the pump may not operate properly.
- Do not install the product in a place where there are obstacles to prevent ventilation of motor cooling. It may cause damage, burns or fire.
- Mount the terminal box carefully with your fingers pinched. Hands may be injured.
- Do not wear plastic bags that package the product. Otherwise, asphyxiation may occur.
- Prepare a spare pump in case of stoppage of the pump. Water may be cut off due to pump failure, and the equipment may stop.
- Remove the phase flange from the pump and screw it into the piping. Otherwise damage or water leakage may result.
- Install the product at an altitude of 1000 m or less. Otherwise failure or accident of the pump may result, or normal function may not be achieved.
- If you are using a flush valve or other equipment with a rapid change in flow rate, please consult our nearest sales office in advance. If a flush valve is used while the pump is stopped, the pressure inside the pipe may drop sharply, resulting in pressure fluctuations and air contamination.
- Before installing the pump, be sure to clean the wells and remove foreign matter such as sand from the inside and outside of the piping. If foreign matter such as sand is sucked in, water may not be pumped up due to sand chewing.
- The water level of the well fluctuates. Be careful about the operating water level. If the water level drops, air may be sucked in and run idle.

#### 4.1 Installation Precautions

- (1) When moving or carrying in, hang a sling such as a nylon ring on the suction flange and motor as shown in Fig. 1.
- (2) Install the product horizontally and fix it firmly with the foundation bolts.  
If the foundation is not horizontal but uneven, the base may be torsionally damaged.

#### 4.2 Selecting a installation site

- (1) Install the product in a cool place that is easy to disassemble and assemble, has good ventilation, and is not exposed to rainwater or direct sunlight
- (2) Make sure that the ambient temperature of the pump does not exceed 40°C.
- (3) Install the product in a place convenient for maintenance and inspection of the pump.
- (4) Install the pump as close as possible to the water source, the suction height (height from the suction liquid level to the center of the pump) is low, and the lateral length of the suction piping is as short as possible.
- (5) Maximum suction lift (see Specifications) or less. Note, however, that the correction must be made as shown in the table on the right, for example, when hot water (exceeding 40°C) is used.  
(e.g.) Pump-type GEH-40 × 325M-2MN0. 4, Suction total head = -4.5 + 7.5 = 3.0 (m) when liquid temperature is 90°C...used in inflow 3.0m.



Temperature	Corrected value (m)
50	+1.5
60	+2.0
80	+5.0
90	+7.5

<Corrected value for fresh water exceeding 40°C>

Fig. 1

#### 4.3 Suction piping

< Common >

- (1) The piping should be as short as possible and should not bend.
- (2) Mount a strainer or sand strainer when foreign matter or sand may be mixed in.

< For suction > Refer to Fig. 2

- (1) The end of the suction pipe should be at least twice as deep as the pipe diameter (D) and not at least 30 cm from the bottom and wall surface.
- (2) Install a foot valve at the end of the suction pipe.
- (3) The suction piping should have an upward slope (1/100 or more) toward the pump to prevent air pooling.
- (4) Do not install a slotted valve in the suction piping.
- (5) The size of the suction pipe and the size of the connecting reducer should be as shown in <Table 1>. Mount the connecting reducer so that it cannot be filled with air.

< Table 1 >

Pump diameter	Foot valve	Connecting reducer
40	40	Unnecessary
50	50	Unnecessary
65	65	Unnecessary
80	100	100×80
100	125	125×100
125	150	150×125
150	200	200×150

< For flow-in / back pressure > Refer to Fig. 3

- (1) Install a sluice valve near the suction port for maintenance.

#### 4.4 Discharge piping

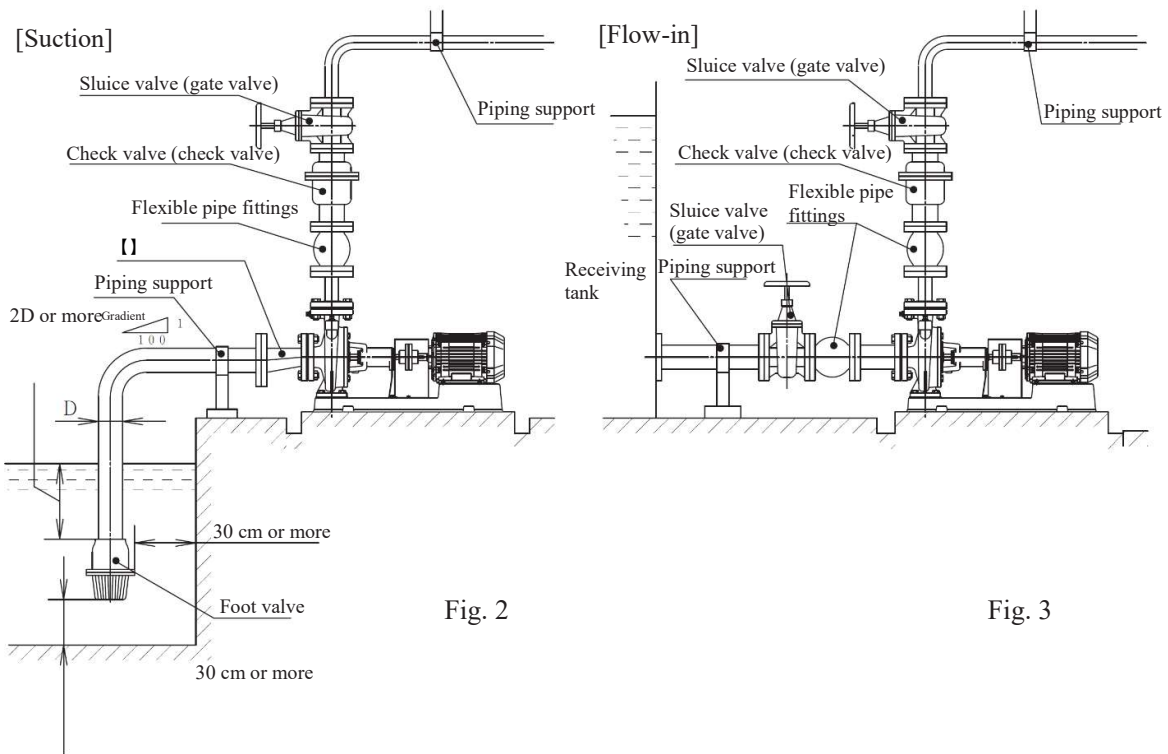
- (1) Install a sluice valve near the discharge port for maintenance.
- (2) Be sure to install a check valve when piping is long, when the actual lift is high, when automatic operation, when water is supplied to the pressure tank, or when 2 or more piping are operated in parallel.

Mount the check valve between the pump body and the slew valve.

- (3) If there is a danger of water hammer, take measures such as installing a shockless valve.
- (4) Install an exhaust valve at a location where air pools are unavoidable in the middle of piping.

#### 4.5 Common

- (1) Install and support vibration-proof fittings and piping brackets so that the piping load does not directly come into contact with the pump.
- (2) Wind a heat insulating material around the piping to prevent freezing. It is also recommended that the pump be equipped with a heater. (Use the mating flange for heater mounting as special accessory).



## 5 Electrical work

### Warning

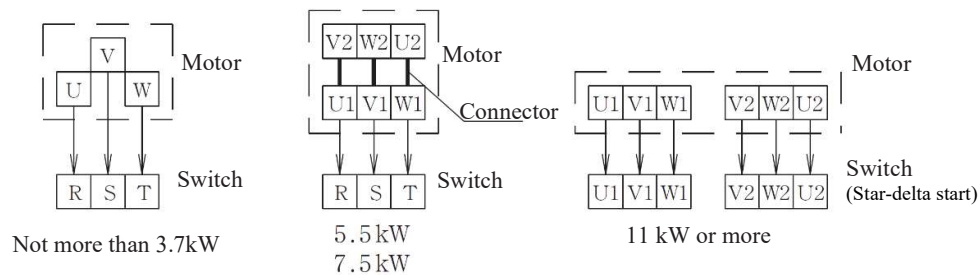
- The electrical work must be carried out with certainty by a specialist in accordance with the Electrical Equipment Technical Standards and the Extension Line Regulations. Insufficient wiring or connection may cause failure, electric leakage, electric shock, or fire.
- Do not connect the power strip wiring (connecting multiple electric devices) and install the wiring with the dedicated wiring. Earth leakage, electric shock, or fire may result.
- Remove dust from the power plug, wiring connections, wiring connections, and terminals. If the product is left with dust, it may generate heat and cause a fire.
- Before turning on the power supply, check that the wiring connections and connections are not loosened or disconnected. Loosening or disengagement of even one location may cause fire or electric shock.
- Be sure to install the terminal cover removed during wiring. Failure to observe this warning may result in electric shock or injury.
- Be sure to perform grounding before energizing. Failure to securely install the ground wire may result in failure, electric leakage, electric shock, or fire. Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Incomplete grounding may cause electric shock.
- Install a leakage circuit breaker exclusively for this product. Earth leakage, electric shock, or fire may result.

### Caution

- Do not install power cables or control wires in the same pipe or duct. Otherwise the product or other equipment may malfunction.

#### 5.1 Power supply

- (1) Install a leakage circuit breaker in the power supply.
- (2) When installing the pump, attach the overload protection device for the motor to the indoor wiring with reference to the rated current value on the pump nameplate. If there is a voltage fluctuation, the current value also fluctuates.
- (3) Connect the power supply line to the motor according to <Fig. 4>.



(Remove the connector if there is little margin in the power supply capacity and connect star-delta start.)

Fig. 4

## 5.2 Ground

- (1) There is a ground terminal in the motor terminal box. Perform grounding work.

For grounding, as shown in Fig. 5, solder a copper plate of 30cm square or more or a copper bar of 1cm in thickness and 40cm in length or more to bury the ground in a wet place to a depth of 30cm or more. For grounding, as shown in Fig. 5, solder a copper plate of 30cm square or more or a copper bar of 1cm in thickness and 40cm in length or more to bury the ground in a wet place to a depth of 30cm or more.

Turn off the original power supply when handling the ground wire.

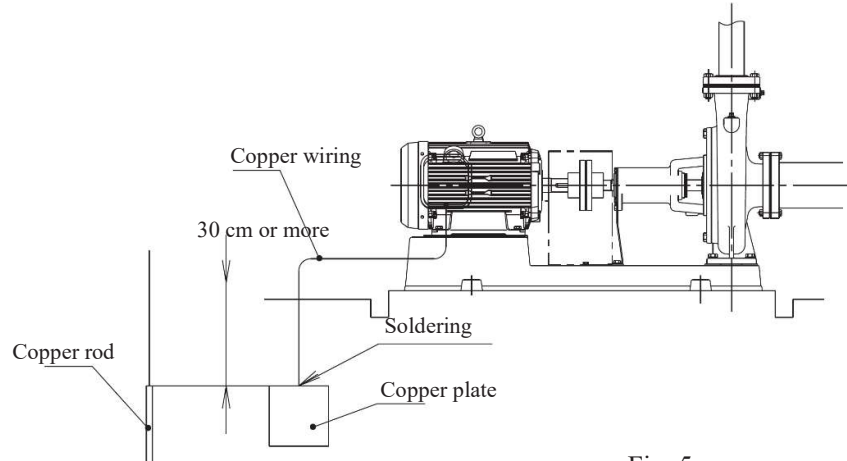


Fig. 5

## 6 Operations



### Warning

- Do not operate with the coupling guard removed. Injury may result from getting caught in the rotating parts or scattering of objects.
- Be sure to shut off the power before attaching or removing the wiring. May cause electric shock.
- Do not touch the charging part, motor terminal, or cable tip of the control panel after turning on the power supply or in the energized state. May result in electric leakage, electric shock or fire.
- Do not apply water to the motor or control panel. Failure to do so may result in electric shock, electric leakage, fire, or malfunction.
- Turn off the power switch in case of power failure. Otherwise damage to the product or equipment may result, or the pump may operate rapidly, resulting in injury.
- Do not use or work the product in a lifted state. Fall or injury may result.
- Keep hands and feet away from the suction port during operation. It may cause injuries due to inhalation.
- Do not touch the power supply or operation switch with wet hands after turning on the power supply. Doing so may result in electric shock or injury.



## Caution

- Do not use any voltage other than the rated voltage. It may cause a fire or an electric shock.
- Check that the rotation direction is normal. If you operate in the wrong rotation direction, the impeller nut or bolt may loosen due to vibration, causing an accident.
- Do not touch the rotating part or put fingers or foreign matter into the opening during operation. Electric shock, damage, or injury may result.
- Do not touch the pump or motor during operation or immediately after stopping. Otherwise, the temperature may be high, which may cause burns.
- If the product is not used for a long period of time, shut off the power supply. Failure to observe this warning may result in electrical leakage, electric shock, or fire due to insulation degradation.
- Do not run idle, shut off for a certain period of time, or mix air into the handling liquid. Otherwise, the casing, bearings, shaft seals, etc. may be damaged or the water cannot be pumped. The pump may overheat and burn.
- Do not operate a 50Hz pump at 60Hz. Otherwise damage due to excessive pressure or burning of the motor due to overload may result. Do not operate a 60Hz pump at 50Hz. The performance of the pump deteriorates.
- Do not touch the piping or other metal parts when hot water is used. There is a danger of burns.
- Use the valves in the normal condition. Failure to operate properly may result in damage to the unit.
- Place something around the pump, motor, cable, control panel, or pump cover that may burn. Do not cover or cover it. The product may overheat and ignite.
- After long-term storage and at the start of operation after stoppage, test runs are performed in the order of "Installation" and "Operation", and after long-term storage and at the start of operation after stoppage, test runs are performed in the order of "Installation" and "Operation". Otherwise, the pump may be restrained due to sticking, the motor may burn, or the motor may run idle due to falling water.
- Operate the equipment within the specified range. Operation outside the specified range may cause equipment failure or accident.
- Carry out adequate venting of air from the pump and piping during trial operation. The pump may cause an air lock or increase in temperature, which may result in failure or accident.
- When priming or exhausting water, prevent the product from being exposed to water. • Failure to observe this instruction could result in Leakage, electric shock, or fire and breakdowns.
- Do not suck in sand or foreign matter. Failure to start the product or malfunction may result.
- Set the operation switches of the control panel (electrical box) correctly. The equipment may be damaged or damaged by failure.

### 6.1 Before starting

- (1) Be sure to turn off the power before checking.
- (2) Check that the capacity, power supply voltage, and wiring of the leakage circuit breaker are correct.
- (3) Remove the coupling guard and rotate the coupling lightly. Inspect the product if it is hard or uneven, as it may cause rust inside the product.  
Check that the axis is not misaligned. If the error is more than <Fig. -6>, perform centering.

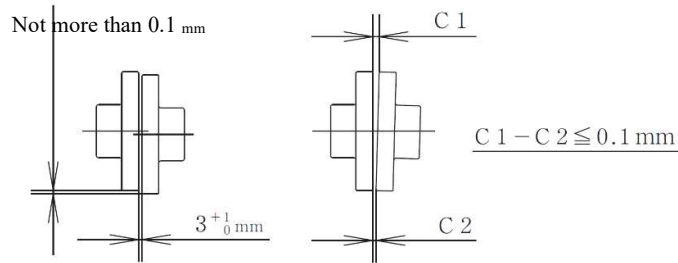
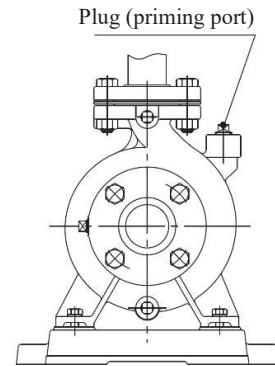


Fig. 6

- (4) The pump is primed.  
Do not run idle as this may cause failure. When priming water, turn the impeller hand to completely discharge air from the impeller.  
<For push-in or flow-in>: Open the sluice valves on the suction and discharge sides to prime water.  
<For inhalation>: Perform through a priming port or a priming funnel.
- (5) Mount the coupling guard.



### 6.2 Trial operation

- (1) When priming is completed, close the sluice valve on the discharge side and fully open the sluice valve on the suction side.
- (2) Turn on the power supply, turn on and off the switch once or twice, and check the rotation direction (right rotation as viewed from the motor side).  
In the case of reverse rotation in three phases, turn off the original power supply and replace two of the three power supply cables.
- (3) If there is no error, open the sluice valve on the discharge side slowly and start continuous operation.  
Check that there are no abnormalities such as pressure, current, vibration, noise, etc., or leakage from the mechanical seal.

### 6.3 Stopping method

- (1) If there is no check valve on the discharge side, close the discharge side sluice valve gradually before stopping the operation.

### 6.4 Normal operation

- (1) Keep the cock of the pressure gauge, coupling gauge, etc. closed except at the time of measurement. If it is left open, it may be damaged easily.

### 6.5 Adjust of gland packing (For gland packing type)



### Caution

- Operate with proper leakage from the gland packing.  
Excessive tightening may result in poor lubrication and damage to the spindle, such as wear.

(1) Adjustment method of leakage amount

If the initial leakage is large after starting operation, tighten the nut to adjust the leakage. Stable condition is achieved within about 30 minutes after starting operation. If the leakage is large, tighten it again to adjust the leakage to an appropriate level.

(2) Appropriate leakage (mL/min) standard

Shaft diameter (mm)	During initial operation	Stable operation
20	Not more than 20	7~20
30	Not more than 30	10~30
50	Not more than 50	15~50

## 7 Maintenance and Inspection



### Warning

- If the product is stuck or has an error (e.g., a broken cable or a burning smell), shut down the product immediately, shut down the power supply, and ask the supplier or our nearest sales office to check or repair the product. If the product continues to operate or is repaired incorrectly, it may cause a leakage of electricity, electric shock, fire, or water leakage.
- Personnel other than repair technicians must not disassemble, repair, modify or replace cables. Failure to do so may result in failure, damage, electric shock, or fire.
- Be sure to shut off the power before checking or replacing the product. Failure to observe this warning may result in electric leakage, electric shock, or injury.
- Contact your supplier or nearest sales office when moving and reinstalling the equipment. Failure to install the product may result in electric leakage, electric shock, fire, or water leakage.
- Before checking or replacing the control panel or other electrical components, check that the power supply is cut off and no voltage is applied to the tester. Failure to observe this warning may result in electric shock or injury.
- If the insulation resistance of the motor drops below  $1M\Omega$ , contact the supplier or nearest our sales office immediately, and the motor may burn or cause electric shock or fire.
- Use our genuine parts for repair. Use of parts other than genuine parts may cause failure or accident. In addition, the product may not function properly.
- Do not touch the power supply or operation switch with wet hands after turning on the power supply. Doing so may result in electric shock or injury.
- Before checking or replacing the control panel or other electrical components, check that the power supply is cut off and no voltage is applied to the tester. Failure to observe this warning may result in electric shock or injury.



### Caution

- Turn off the power supply and drain water from the pump and piping if not used in winter. If water is left in the pump or piping, the pump may be frozen and damaged.
- Disassemble and that the internal pressure is zero at the time of inspection. Water may spout and cause accidents or injuries.
- Do not remove the plug (priming port) when the pump is hot. Hot water may spout and cause burns.
- When starting operation after long-term storage or stoppage, follow the order of "Install" and "Operation" to perform trial operation. Otherwise, the pump may be restrained due to sticking, the motor may burn, or the motor may run idle due to falling water.
- If the product is not used for a long period of time, drain water from the pump and piping. Residual water may decay and contaminants may grow.
- We recommend that you perform both periodic and daily inspections to ensure that you can use the product for a long period of time with peace of mind. Failure to inspect the pump may result in pump failure or accident.
- Consult your supplier or nearest sales office for periodic inspections. Periodically check the operation of the protective relay. Failure to operate normally in the event of an accident may result in electric shock or failure.

- Periodically replace consumable parts. If the product is used without deterioration or wear, it may cause water leakage, seizure, or damage. Please contact your supplier or nearest sales office for periodic inspection, parts replacement, etc.
- Close the cock when using a pressure gauge or a combination gauge, etc., except when measuring the pressure gauge or combination gauge. Opening the pressure gauge at all times may cause failure of the pressure gauge, coupling gauge, etc.
- Be sure to perform the inspection according to the inspection items. Failure to prevent failure may result in an accident.
- Repair and paint the product for a period of time appropriate for the operating environment. Threads, rust inhibitor-coated parts, anti-rust paint parts, etc. may cause unexpected damage due to rust caused by high humidity, condensation, water exposure, etc.
- To test the insulation resistance of the motor, remove the wiring from the control panel and measure the distance between the ground terminal and the motor wiring with an insulation resistance meter. If the insulation resistance test is performed while the wiring is connected, failure of the control part may result.

### 7.1 Daily inspection

Confirmation item		Criteria
Gland packing		Suitability leakage
Mechanical seal		Do not leak dropwise.
Motor	Envelope temperature	Ambient Temperature +75°C
	Ball bearing	Operating noise and vibration shall not change from the initial level.
	Insulation Resistance	1MΩ or more
Pressure		No change above normal pressure value
Current		Nameplate current value or less
Voltages		Rated voltage 10% or less

In order to detect abnormalities quickly, it is important to know changes from day to day. For this purpose, it is recommended to make a daily operation report.

### 7.2 Consumable part

The in the table below parts are consumable parts. Replace the parts referring to the guidelines for replacement.

Parts name	Standard replacement period	Indication of the condition
O-ring 、 packing	Disassemble and inspection	-
Gland packing	1 years	Water leaks remarkably even after retightening.
Mechanical seal	2 years	Visible leakage
Ball bearing	Three years	When the bearing overheats or abnormal noise/vibration occurs

## 8 Troubleshooting



### Warning

- If you are stuck or have an error (e.g., a broken cable or a burning smell), stop the operation immediately, shut off the power supply, and ask your supplier or nearest sales office to check or repair the product. If the product continues to operate or is repaired improperly, it may cause electric leakage, electric shock, fire, or water leakage.
- Be sure to shut off the power before checking or replacing the product. Failure to observe this warning may result in electric leakage, electric shock, or injury.
- Personnel other than repair technicians must not disassemble, repair, modify or replace cables. Failure to do so may result in failure, damage, electric shock, or fire.

Phenomenon	Possible causes	Recommended action	Text page
The pump does not operate.	There is some trouble in power supply.	Check and repair	12
	Single-phase connection (three-phase connection)	Correctly connect	9
	Foreign matter is caught in the sliding part.	Remove foreign matter, etc.	-
	The rotating part is rusted.	Disassemble and repair	-
The pump rotates, but the specified discharge amount and pressure without water are not generated.	The sluice valve is closed.	Open the sluice valve	8
	Pump priming is insufficient	Prime the pump to fill it	12
	The suction pipe does not reach the water.	Extend the suction pipe and submerge in the water.	8
	The impeller is clogged with foreign matter.	Remove foreign matter	-
	The direction of rotation of the pump is reversed	Correct the connection	9,12
	Part is worn.	Check, repair, and replace	-
Result in overload (overcurrent)	Decrease in voltage and large imbalance of each phase	Examine the power supply	9
	The axis against which the rotating part hits is bent.	Repair at specialized factories	12
	Be off-axis	Adjust the centering	12
The operation noise of the pump is large.	Be poorly installed	Check the installation conditions	7
	The impeller is clogged.	Remove foreign matter	-
	The direction of rotation of the pump is reversed	Correct the connection	9,12
	The axis against which the rotating part hits is bent.	Repair at specialized factories	12
	Be off-axis	Adjust the centering	12
	The ball bearing is worn.	Repair at specialized factories	-
Leak water	The mechanical seal is damaged.	Replace the mechanical seal	-
	O-ring is damaged.	Replace the O-ring	-

© When the pump is started or stopped, a mechanical noise (noise) may be generated. However, this is not an error. (Mechanical seal specifications)

© Grease may bleed from the bearing cover in the initial stage of operation, but this is not an error.

Failure may occur unexpectedly. However, it is important to take immediate measures if any abnormality is detected.

If the cause of the failure is unknown, contact your supplier or nearest sales office. Please inform us of the pump type, serial number, and the status of the failure (error) when you contact us.

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

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