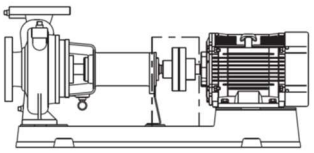
Bringing valuable "water" to you... Kawamoto

Centrifugal pump

GD, GDF type Instruction Manual



Thank you very much for purchasing the GD, GDF 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. 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.
4. Be sure to perform grounding before energizing. Failure to securely install the ground wire may result in failure, electric leakage, electric shock, or fire.
5. 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.
6. 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. 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.
2. When you contact us, please inform us with the model name and serial number.
3. 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.
4. 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

⚠ Danger

- Never use the product above the maximum operating pressure. Failure to observe this warning may result in serious.

⚠ Caution

- Do not use the product outside the specified product specifications. Failure to observe this warning may result in electric shock, fire, or water leakage.
- Avoid using copper alloys in living organisms. Service life may be adversely affected.
- 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.
- Be careful when it is used for recycling and corrosion or elution of rust or metal is not acceptable. Select and examine all pumps and equipment. The circulating water may concentrate and cause unexpected damage.
- Select products that suit your application. Use in inappropriate applications may cause an accident.
- Hazard, warning, and caution labels may cause personal injury or property damage. Be sure to comply with the following requirements. 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 transferring 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 and Concentrations: 50 mg/L or less, Solids and Diameters: 0.3 mm or less)*1
	Liquid temperature	0 to 80℃ (not frozen)
Installation site		Indoor
Ambient temperature/humidity		Not more than 0~40℃/90%RH
Allowable indentation pressure		GD : (1.4 - shut-off pressure)MPa{(14.2 - shut-off pressure) kgf/cm^2} GDF: not less than 0.5MPa and not more than 2.0MPa {5.1 kgf/cm^2 and not more than 20.4 kgf/cm^2 (200mm bore size model : 0.5MPa or more and 1.6MPa or less {5.1 kgf/cm^2 or more and 16.3 kgf/cm^2 or less}) However, the pumping pressure is 2.5MPa{25.5kgf/cm^2} or less.
Maximum suction total head		Exclusive use for pushing
Motor	Type	Totally enclosed fan-cooled indoor
	Phase	Three phase
	Voltage	

※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 us.
If the allowable surge voltage exceeds 1250V even in a 400V motor with reinforced insulation, install surge voltage measures such as control filters and reactors on the inverter side to suppress the surge voltage.

(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.

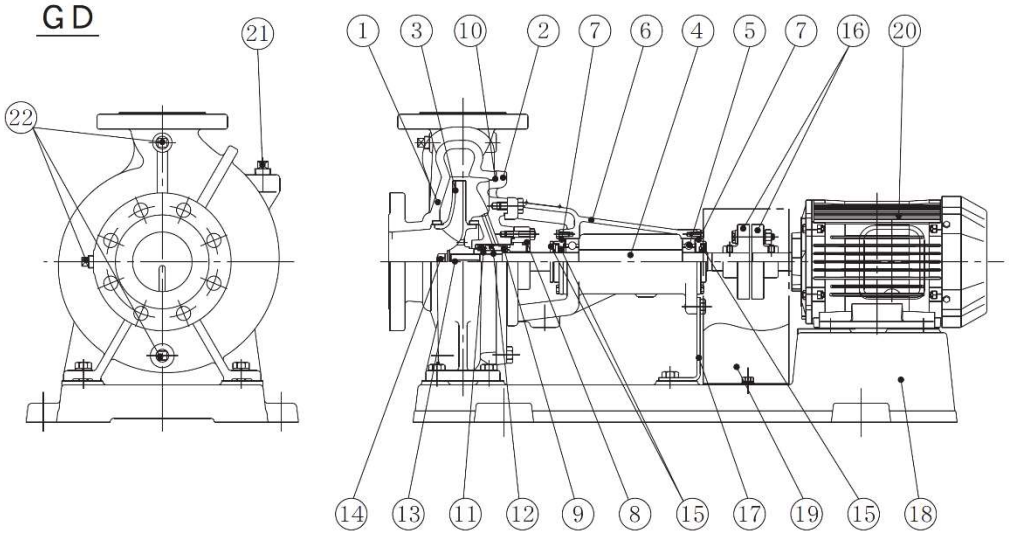
2.2 Special specification

Content		Applications conditions
Type	Motor	Totally enclosed fan-cooled, outdoor

3 Product structure

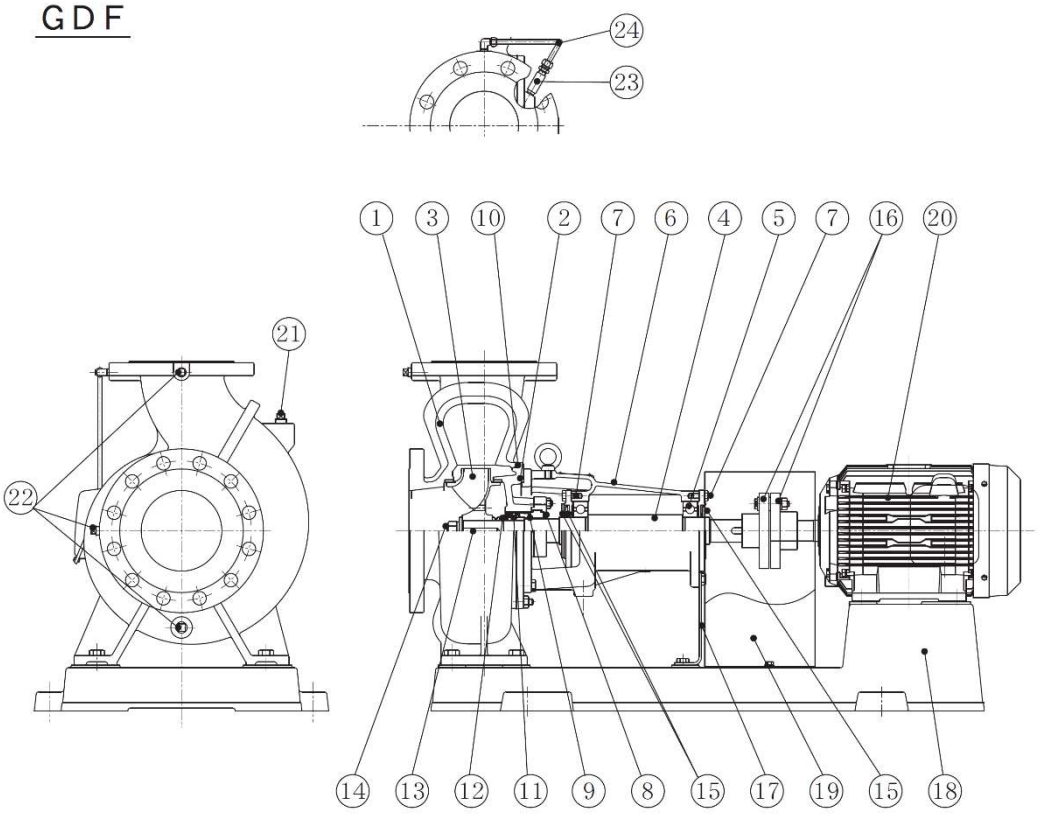
3.1 Structural diagram

This figure shows typical examples of GD, GDF models, and some models differ somewhat from this figure.



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

GDF



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5	Ball bearing		17	Support	
6	Bearing box		18	Base	
7	Bearing cover		19	Coupling guard	
8	Mechanical seal cover		20	Motor	
9	Mechanical seal		21	Plug	
10	O-ring		22	Plug	
11	Sleeve		23	Socket	
12	O-ring		24	Connecting bend pipe	

3.2 Standard accessories

Name	Quantity
Instruction Manual	1

3.2 Standard accessories

Name	Remark
Flange set	GD type only
Foundation bolt set	
Wedge	

4 Installation

⚠ Warning

- Do not connect the pump directly to the water line. It is prohibited by the Water Supply Law. In addition, water may flow back and contaminate the tap water.
- Unpack the product carefully with nails or staples. There is a risk of injury.
- Install the pump in a keyed place such as a pump room, or provide a fence or enclosure to prevent third parties from easily touching the pump. The pump may not operate normally or water may not flow due to accidental contact with rotating parts or high temperature parts, or the setting of the control panel or opening/closing of valves may be changed.
- 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, etc., the pressure can be reduced. Install the equipment (safety valves, etc.). 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 product mass and how to suspend it correctly according to the catalog, installation drawing, and operation manual. Also, do not suspend products with a load exceeding the rated load of the suspending tool. Failure to suspend the product may result in injury due to fall.
- Install the product properly according to the instruction manual. Incomplete installation may cause electric shock, fire, or injury due to fall.
- 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.). This may cause fire or injury in addition to violating laws and regulations.

⚠ 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 impact the equipment or cause it to fall, which may result in damage.
- 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 the water quality is deteriorating, drinking may harm your health.
- 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.
- Install the product at an altitude of 1000 m or less. If you are unavoidably installing the product in a location exceeding 1000 m above sea level, please consult your supplier or our nearest sales office.
- 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.

- Install the suction piping on each pump. Do not install the right-angled loop (Torii-shaped piping). Install the suction piping at an ascending slope (1/100 or more) to minimize the bending point. The pump may not operate properly.
- 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 cover carefully with your fingers pinched. Hands may be injured.
- Do not wear plastic bags that package the product. Otherwise, asphyxiation may occur.
- Do not install the product in a humid place such as a bathroom. Earth leakage may cause electric shock.
- Do not install the product in a place where harmful gases such as acids, alkalis, organic solvents, paints, etc. or gases containing corrosive components are generated, such as machinery and chemical plants, or where there is a lot of dust. Failure to observe this warning may result in electric leakage or fire.
- 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.
- Since cutting oil, foreign matter, etc. contained in the piping system may mix with the handling liquid, flush it thoroughly depending on the equipment and check that there is no foreign matter before use.
- Do not ride on the pump, motor, etc. Otherwise damage to the product or falls may result in injury.
- Confirm with local governments about how to dispose of unnecessary parts and packaging materials.

4.1 Installation Precautions

(1) When moving or carrying in, hang a sling such as a nylon ring on the inflow side flange and the 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 and uneven, the base may be torsionally damaged.

4.2 Selecting a 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.

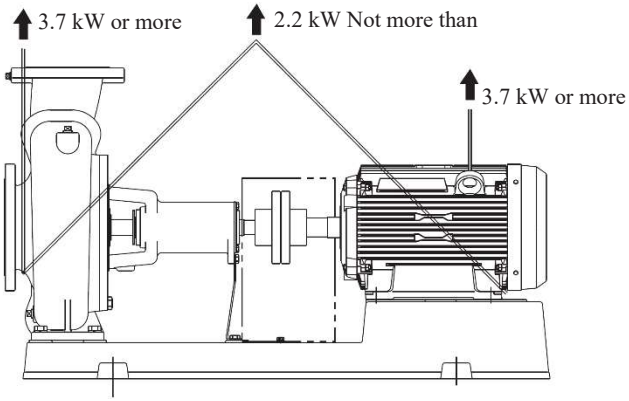


Fig. 1

5 Piping

⚠ Caution

- Do not draw in foreign matter or sand. The impeller may be locked or the mechanical seal. Otherwise, may be damaged.

5.1 Inflow piping

See Fig. 2.

(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.
(3) Install a sluice valve near the inflow port for maintenance.
(4) Keep the inflow pipe away from the water tank wall. A vortex may form and draw in air.

5.2 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.

5.3 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 to be equipped with a heater. (Use the mating flange for heater mounting as special accessory.)

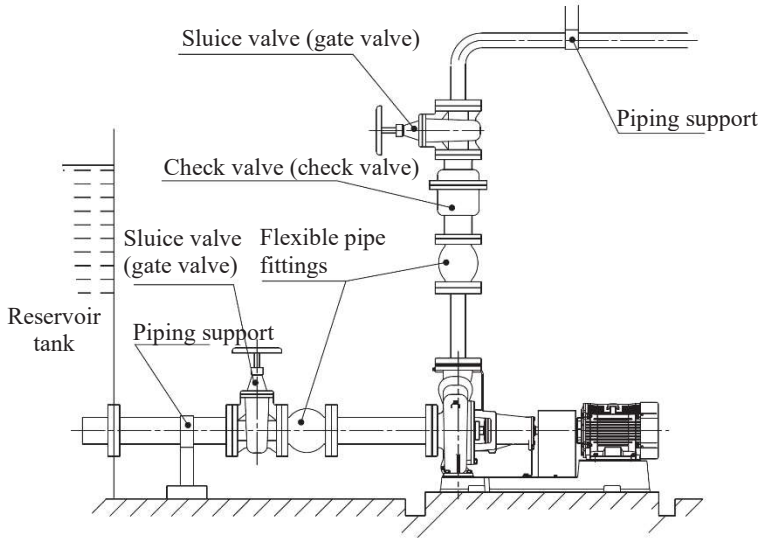


Fig. 2

6 Electrical work

⚠ Warning

- Electrical works are certainly carried out by specialist engineers in accordance with the Electrical Equipment Technical Standards and Extension Regulations. If the wiring or connection is incorrect, it may cause a failure, electric leakage, electric shock, or fire.
- 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 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 box cover removed during wiring. Failure to observe this warning may result in electric shock or injury.

⚠ Caution

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

6.1 Power supply

(1) Install a leakage circuit breaker in the power supply.

(2) Connect the power supply line to the motor according to <Fig. 3>.

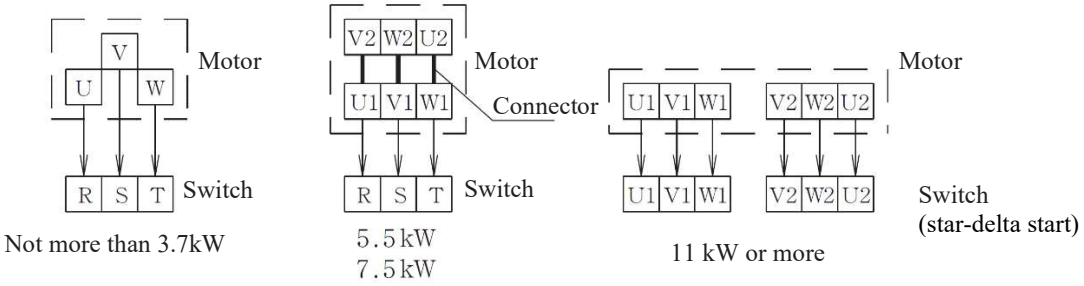


Fig. 3

6.2 Ground

(1) There is a ground terminal in the motor terminal box. Perform grounding work.
For grounding, as shown in Fig. 4, solder a copper plate of 30 cm square or more or a copper bar of 1 cm in thickness and 40 cm in length or more to bury the ground in a wet place to a depth of 30 cm or more. Turn off the original power supply when handling the ground wire.

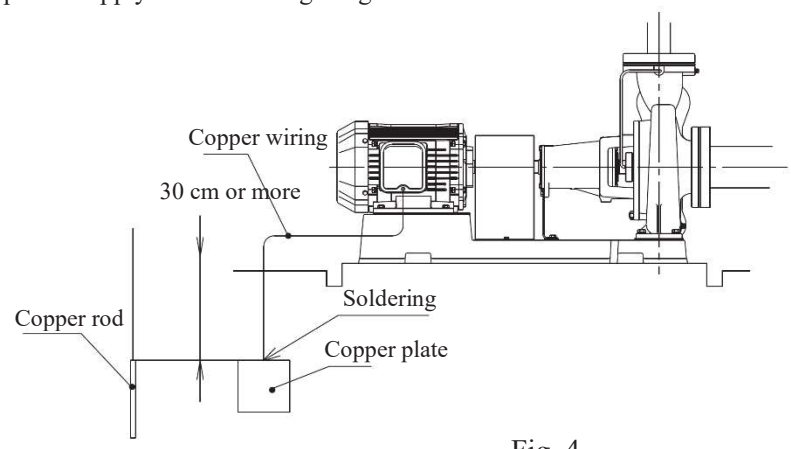


Fig. 4

7 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. Earth leakage, electric shock, or fire may result.
- Do not apply water to the motor or control panel (electrical box). 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.

⚠ Caution

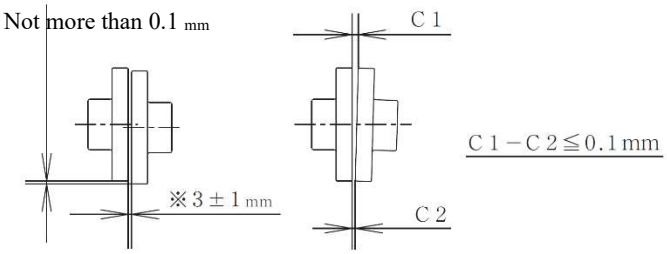
- Do not use any voltage other than the rated voltage. It may cause a fire or an electric shock.
- Check that the rotation direction is normal. If you operate in the wrong rotation direction, the impeller nut or bolt may loosen due to vibration, causing an accident.
- Do not touch the rotating part or put fingers or foreign matter into the opening during operation. Electric shock, damage, or injury may result.
- Do not touch pumps, motors, inverter cooling fins, heaters, etc. during operation or immediately after stoppage. 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.
- Do not place anything around the pump, cable, control panel, or pump cover that may burn. The product may overheat and ignite.
- 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.
- Operate the pump within the specified range. Operation outside the specified range may cause pump 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.
- When driving with an inverter, do not operate at a frequency exceeding the rated frequency. Failure to observe this warning may result in burning or fire. When driving with a 400V class inverter, install a suppression a reactor on the inverter side. Fire or damage due to dielectric breakdown may result.

7.1 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. -5>, perform centering.

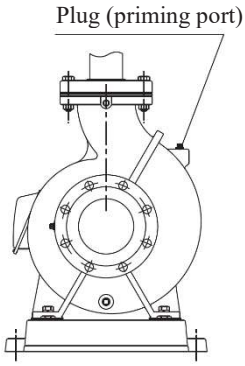


※ 4 ± 1 mm for 37kW or more

Fig. 5

(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.
Open the sluice valves on the suction and discharge sides to prime water.

(5) Mount the coupling guard.



7.2 Trial operation

(1) When priming is completed, close the sluice valve on the discharge side and fully open the sluice valve on the inflow 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.

7.3 Stopping method

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

7.4 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.

8 Maintenance and Inspection

⚠ Warning

- If the product is stuck or has an error (e.g., a broken cable or a burnt 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.
- When inspecting or replacing electrical components such as the control panel (electrical box), the power supply is cut off and no voltage is applied to the tester, etc. Confirm that this is true before performing the work. Failure to observe this warning may result in electric shock or injury.
- If the insulation resistance of the motor drops below 1MΩ, 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.

⚠ 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 product. 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.
- Do not tighten the gland packing in one place or over. Otherwise, it may cause abnormal heat generation in the shaft seal or damage to the spindle.
- Be sure to perform the inspection according to the inspection items. Failure to prevent failure may result in an accident.
- Do not remove the plug (priming port) when the pump is hot. Hot water may spout and cause burns.

8.1 Daily check

Confirmation item		Criteria
Mechanical seal		Do not leak dropwise.
Motor	Envelope temperature	Ambient Temperature +75℃
	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.

8.2 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
Mechanical seal	1 years	Visible leakage
Ball bearing	Three years	When the bearing overheats or abnormal noise/vibration occurs

9 Trouble shooting

⚠ Warning

- If the product is stuck or has an error (e.g., a broken cable or a burnt 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.
- 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.

Phenomenon	Possible causes	Recommended action	Text page
The pump does not operate.	There is some trouble in power supply.	Check and repair	-
	Single-phase connection (three-phase connection)	Correctly connect	11
	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 regulation discharge amount and pressure that are low in water do not occur.	The slew valve is closed.	Open the sluice valve	13
	The impeller is clogged with foreign matter.	Remove foreign matter	-
	The direction of rotation of the pump is reversed	Correct the connection	11
	Part is worn.	Check, repair, and replace	-
Result in overload (overcurrent)	Decrease in voltage and large imbalance of each phase	Examine the power supply	-
	The axis against which the rotating part hits is bent.	Repair at specialized factories	-
	Be off-axis	Adjust the centering	11
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	11
	The axis against which the rotating part hits is bent.	Repair at specialized factories	-
	Be off-axis	Adjust the centering	11
	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.
◎ 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.

MEMO

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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