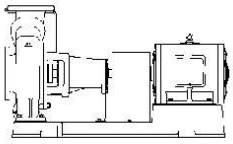
No.	8710137

Centrifugal Pump
GF Type Operation Manual



Thank you for purchasing the GF Type Centrifugal Pump.
This instruction manual provides information for the construction company to safely use this pump unit, and for handlers of fire prevention targets to carry out maintenance and inspection, etc. Always read this manual thoroughly and fully comprehend the contents before starting work.
Please keep this instruction manual in a handy place for quick reference.

<Contents>

⚠ Special Notes

1. Install the spare pump for using this pump at fish breeding farm and aquarium etc. In case of pump trouble, the life of fish etc could be affected by shortage of oxygen or deterioration of water quality.
2. Do not install this pump unit in a place that has not been treated for drainage or waterproofing. Major disasters could occur if water leaks.
3. Turn OFF the power when not using the pump for long periods of time. Failure to observe this could result in electric shock, short circuit, or fire due to deterioration of the insulation.
4. The electrical work must be completed according to the "Electrical Installation Technical Standards", "Wiring Regulations" and any other applicable regulations. Improper wiring and connections could lead to earth leakages or fires.
5. Securely earth the equipment, and install a dedicated residual current circuit breaker on the power supply side.
   Failure to observe this could result in earth leakages, electric shocks or fires.
6. Do not run the pump in a dry mode (without water in the pump) or in a shutoff mode (without water inflow to, or discharge from, the pump). Such operations could cause the pump to become extremely hot, possibly resulting in burns.

Precautions for using this product safely and for preventing personal injuries or physical damage are given in this manual.
The precautions are classified as "Warning" and "Caution" to alert of the degree of injury or damage that could occur if handling is mistaken.
In either case, these are important matters related to safety, and must be observed.

⚠ Warning : Details which if ignored could lead to fatalities or serious injuries.
⚠ Caution : Details which if ignored could lead to personal injuries or physical damage.

(Note) The conventional unit and values based on these given in parentheses are provided as reference.

[1] Introduction

Please check the following items upon receipt of the product.

(1) Check the nameplate to ensure that the correct pump has been delivered. (Model etc.)

(2) Check that no parts have been damaged during transportation, and that none of the bolts, nuts, etc., are loose. Tighten any part that is loose.

(3) Are all accessories supplied?

【Note】

1. Usage outside the scope of application, non-compliance with precautionary statements, improper repair / remodeling, caused by natural disasters, things due to installation environment (power supply abnormality, foreign matter, sand, etc.), laws, ministerial ordinance or similar standards those with nonconformity, accidental or intentional failure or damage, replacement of expendable parts, defects due to resale, etc. may not be covered by the warranty.
2. In case of inquiry or question to us, please inform us the “model name” and “serial number”.
3. Care is necessary when rusting and corrosion / elution of metal can not be performed due to application or liquid quality. Please select and consider including pumps and equipment as a whole.
4. For disposal methods such as unnecessary parts and packing materials, please check with each municipality.

<<If there is any problems, contact your dealer>>

[2] Specifications

⚠ Caution

● Always use this pump within the specified product specifications.
Failure to do so could result in electric shock, fire, residual currents, etc.

2.1 Specifications

Pumped, fluid	Fluid quality	Fresh water (PH 5.8 to 8.6, Chlorine ion : 200mg/L or less, Solid matter concentration : 50mg/L or less, Solid diameter : 0.3mm or less)
	Fluid temp.	0 to 90°C
Installation location		Indoor
Ambient temp./humidity		0 to 40°C/90% RH or less
Max. working pressure		1.37MPa {14kgf/cm^2}
Permissible back pressure		(1.4- shutoff pressure) MPa or 0.7MPa {(14.2 – shutoff pressure) kgf/cm^2 or 7.1kgf/cm^2 }
Max. suction total head		Positive suction only
Motor	Type	Totally enclosed Fan cooled motor
	Phase	3-phase
	Voltage	380V

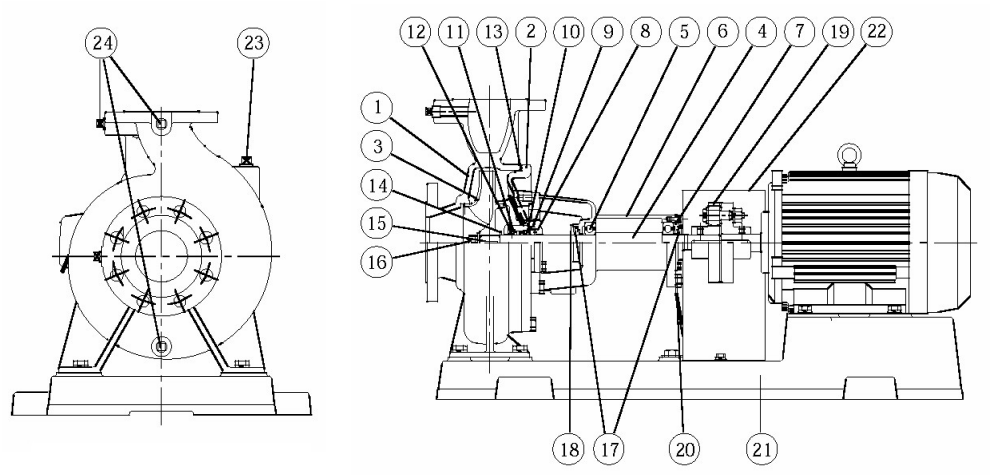
2.2 Special Specifications

Content		Applicable Conditions
Material	Shaft	SUS304
Type	Motor	TEFC outdoor
	Shaft sealing part	Negative suction specification : Back pressure 0.1MPa{1kgf/cm^2} or less. High back pressure specification : Back pressure 0.5MPa{5.1kgf/cm^2} or more.

[3] Product Configuration

3.1 Structure

The drawing below represents a typical example of a GF Type Centrifugal Pump and may differ slightly depending on the model.



No.	Name	Note	No.	Name	Note
1	Casing		13	O-ring	
2	Casing cover		14	Adjusting ring	
3	Impeller		15	Key	
4	Main shaft		16	Nut	
5	Ball-bearing		17	Deflector	
6	Bearing box		18	Deflector	
7	Bearing cover		19	Shaft coupling	
8	Mechanical seal cover		20	Strainer	
9	O-ring		21	Base	
10	Mechanical seal		22	Shaft coupling guard	
11	Stopper ring		23	Plug	
12	Half point set screw		24	Plug	

3.2 Standard Accessories

Part name	Qty
Instruction Manual	1

3.3 Optional Accessories

Part name	Note
Flange set	
Foundation bolt set	

[4] Installation

⚠ Warning

- Before hoisting the pump unit during unloading, positioning, and installation, check the product catalog, the installation drawing, and the operation manual, etc., to verify the pump unit weight and the hoist method. Do not attempt to hoist a pump unit that exceeds the hoist's rated load.
  Incorrect hoisting can result in drops and injuries.
- Securely install the pump as explained in the instruction manual. Incomplete installation could result in electric shock, fires or injury from dropping.

4.1 Installation Cautions

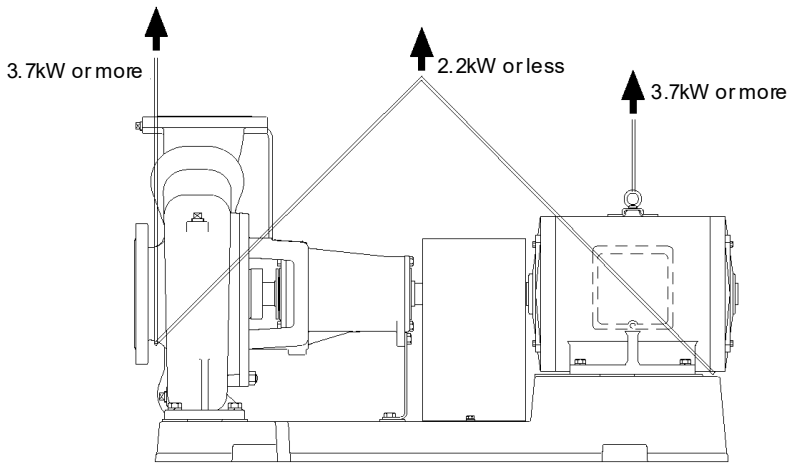
(1) Use a nylon sling attached to the inflow side's flange and the motor as shown in Fig.1 when moving and positioning the pump unit onsite.
(2) Install the pump unit in a horizontal posture, and secure it firmly with the foundation bolts.
An uneven foundation (not horizontal) can cause base twisting damage.

4.2 Selecting the Installation Place

⚠ Caution

- Do not install the pump that is not waterproof or that has not drainage facility. Major disasters could occur if water leaks.
- Do not install the pump in a highly humid place such as a bathroom. Failure to observe this could result in electric shock should a residual current occur.
- Do not install this pump in places such as machine and chemical factories where toxic gases including acid, alkaline, organic solvents or paint are present, where gases containing corrosive elements are generated, or where there are high levels of dust. Failure to observe this could result in residual currents or fires.

(1) Install in a cool, well ventilated location which permits easy disassembly and assembly, and which is not exposed to rain or direct sunlight.
(2) The installation site's ambient temperature must not exceed 40°C.
(3) Install in a location which allows easy maintenance and inspection.



<Fig. 1>

[5] Piping

⚠ Caution

- Foreign matter and sand, etc., must not be allowed to flow into the pump. Such matter can cause impeller lock conditions and mechanical seal damage.

5.1 Inflow Pipe

Refer to Fig.2.

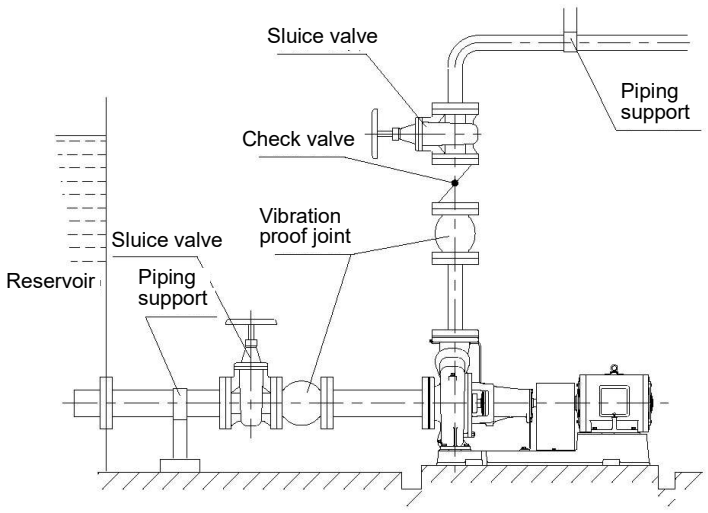
(1) The pipe should be as short as possible, with no bends.
(2) A strainer and sand filter should be installed in cases where foreign matter and sand, etc., are likely to be present in the water.
(3) Install a sluice valve near the inflow port for maintenance purposes.
(4) The inflow pipe must not run near the water tank wall. This can cause swirling, resulting in air being sucked in.

5.2 Discharge Pipe

(1) Install a sluice valve near the discharge port for maintenance purposes.
(2) Be sure to install a check valve in cases where the pipe is long, where the actual head is high, where automatic operation occurs, where water is being fed to a pressure tank, and where 2 or more pumps are running in a parallel format. The check valve should be installed between the pump body and the sluice valve.
(3) A shockless valve, etc., should be installed in cases where there is a risk of water hammer conditions.
(4) An exhaust valve should be installed is cases where air accumulation in the piping cannot be avoided.

5.3 Common Items

(1) Install a vibration proof joint and piping support to prevent the piping weight from being applied directly to the pump.
(2) Wrap the piping with insulating material to prevent freezing. The use of a pump heater is recommended. (The pump has a flange for connecting the optional heater.)



<Fig. 2>

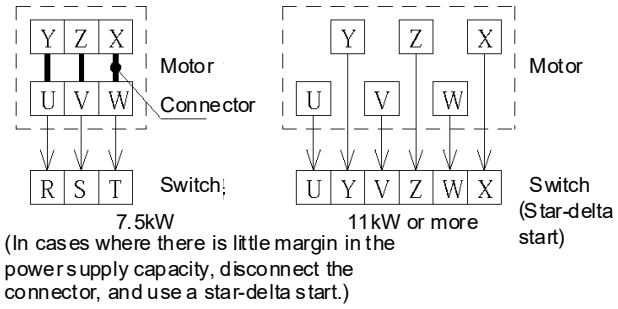
[6] Electrical Work

⚠ Warning

- The electrical work must be completed according to the "Electrical Installation Technical Standards", "Wiring Regulations" and any other applicable regulations. Improper wiring and connections could lead to electric shock or fire.
- Securely earth the equipment, and install a dedicated residual current circuit breaker. Failure to observe this could result in trouble, electric shock or fire.
- Always earth the pump before turning the power on. Do not connect the earthing wire to gas pipes, water pipes, lightning rods or telephone earthing wires.
  Failure to earth the equipment correctly could result in electric shocks.

6.1 Power Supply

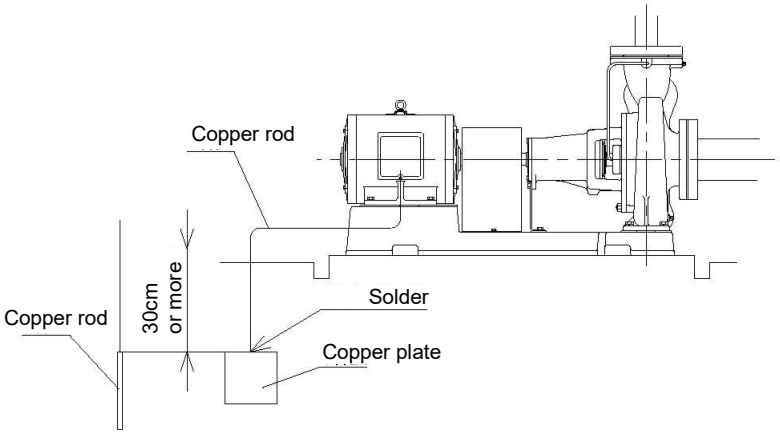
(1) Install an earth leakage breaker at the power supply.
(2) Connect the power cable to the motor as shown in Fig.3.



<Fig. 3>

6.2 Ground

Perform the necessary ground connection work for the ground terminal in the motor's terminal box. As shown in Fig.4, grounding should be performed using either a copper plate 30cm square or larger, or a 1cm thick copper rod of 40cm or longer, buried to a depth of 30cm or more in a moist location.
Always turn the source power supply OFF when handling the ground wire.



<Fig. 4>

[7] Operation

⚠ Warning

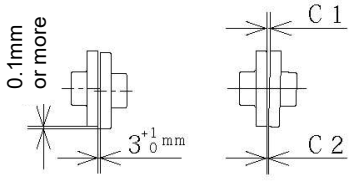
- Always turn OFF the power and ensure that no power is being supplied to the pump when attaching or disconnecting wiring. Failure to observe this could result in electric shock.
- Do not run the pump with the shaft coupling guard removed. The operator could become entangled in the rotating area, possibly resulting in injury.

⚠ Caution

- Do not use this product out of the rated voltage. Failure to observe this could result in fire or electric shock.
- Verify that the motor is rotating in the prescribed direction. Rotation in the wrong direction can cause water leakage, etc.
- Do not touch the rotating areas during operation, and do not insert fingers or rods, etc., into the motor openings. This could cause electrical shocks and injury.
- Do not touch the pump or motor during operation. The pump could reach high temperatures and lead to burns.
- Turn OFF the power when not using the pump for long periods of time. Failure to observe this could result in electric shock, short circuit, or fire due to deterioration of the insulation.
- Do not idle the pump (operating the pump with no water inside).Failure to observe this could lead to a rapid rise in the motor temperature, resulting in burnout.

7.1 Before Operation

(1) Make sure to shut off the power source
(2) Verify that the earth leakage breaker capacity, the power supply voltage, and the wiring are correct.
(3) Remove the shaft coupling guard and verify that the pump can be turned easily by hand. Stiff or uneven rotation can be caused by internal rust, etc., and the pump should be inspected in such cases. Also check for shaft alignment deviations. If deviated more than the amount shown in Fig.5, an alignment procedure should be performed.



C1 – C2 ≤ 0.1mm

※In case of 37kW or more, 4±1mm

<Fig. 5>

(4) The pump must be primed. Do not perform dry operation, as this can cause a pump failure. When priming the pump, turn it by hand to remove all the air from the impeller.
Open the sluice valves at the inflow and discharge sides, then prime the pump.
(5) Reattach the shaft coupling guard.

7.2 Trial Operation

(1) After priming the pump, close the sluice valve at the discharge side, and fully open the sluice valve at the inflow side.
(2) Turn the power ON, then turn the switch ON and OFF one or two times to verify the rotation direction (CW direction as viewed from motor side). If 3-phase rotation is reversed, turn the source power supply OFF, then switch the connections of 2 of the 3 wires.
(3) If the system appears normal, gradually open the sluice valve at the discharge side to establish a continuous operation mode.
Verify that the voltage, current, vibration, and noise conditions, etc., are normal, and verify that there is no leakage from the mechanical seal.

7.3 Stopping Operation

(1) If there is no check valve at the discharge side, operation should be stopped while gradually closing the discharge side sluice valve.

7.4 Standard Operation

(1) The pressure gauge and compound gauge cocks should be closed except when performing measurements. Leaving these cocks open will increase the risk of damage.

7.5 Adjusting the gland packing (Gland packing specifications)

⚠ Caution

● A small amount of water should leak from the glad packing direction operation.
If the gland packing is too tight, the lubrication will drop, and the main shaft could wear, etc.

(1) Adjusting the leakage amount
If a large amount of water leaks initially when starting operation, tighten the nut and adjust to an appropriate leakage amount.
The state should stabilize approx. 30 minutes after operation is started, but if a large amount still leaks, tighten again and adjust to the appropriate leakage amount.

(2) Guide to appropriate leakage amount (ml/min)

Shaft diameter (mm)	At initial operation	At stable operation
20	40 or less	7 to 20
30	60 or less	10 to 30
50	100 or less	15 to 50
70	140 or less	25 to 70

[8] Maintenance and Inspection

⚠ Warning

- If the pump does not operate or if an abnormality is sensed (such as a burning smell), stop operation immediately and turn OFF the main power. Then, contact the place of purchase or a designated Kawamoto Pump service center for inspections and repairs. Failure to do so could result in electric shock, fire, residual currents, etc.
- Always turn the power OFF and make sure that power is not being supplied before starting maintenance servicing. Failure to observe this could result in electric shock.

8.1 Daily Inspection

Check Item		Determination Reference
Mechanical seal		There must be no dripping (leakage) from the seal.
Motor	Surface temperature	Ambient temperature + 75°C
	Bearing	Operation noise & vibration should be unchanged from initial condition.
Pressure		No increase from the normal pressure.
Current		Nameplate rated current value or less.
Voltage		Within ±10% or rated voltage

Daily inspections are essential for detecting problems quickly. The maintenance of a daily operation log is therefore recommended.

Bearing box ball-bearing Application list

8.2 Consumable parts

The following parts are consumable parts. Refer to the replacement guidelines and replace the parts.

Part name	Determining the replacement period	Guide for replacement period
O-ring	At each disassembly and inspection	-
Gland packing	When large amounts of water leak even when tightened	One year
Ball-bearing	When bearings abnormally heat up, or when abnormal noise or vibration occurs	3 years

[9] Troubleshooting

Problem	Cause	Countermeasure	Manual page No.
Pump does not run	Power supply problem.	Inspect and repair.	
	Single-phase connection is being used (for 3-phase).	Correct the wiring.	6
	Foreign matter embedded in slideway.	Remove the foreign matter.	
	Rust at rotating area.	Disassemble and repair.	
Pump rotates, but no water is discharged. Prescribed discharge amount/pressure is not obtained.	Sluice valve is closed.	Open the sluice valve.	7-8
	Impeller is clogged with foreign matter.	Remove the foreign matter.	
	Pump rotation direction is reversed.	Correct the wiring.	6
	Worn parts.	Replace the worn parts.	
Overload (over-current) occurs	Voltage drop, or unbalanced phase conditions exist.	Check the power supply.	
	Obstruction at rotating area. Shaft is bent.	Request repair from a facility specializing in this procedure.	
	Shaft alignment r deviation.	Perform an alignment procedure.	7-8
Pump vibrates / abnormal noise	Improper installation.	Check the installation condition.	4
	Clogged impeller.	Remove the foreign matter.	
	Pump rotation direction is reversed.	Correct the wiring.	6
	Obstruction at rotating area. Shaft is bent.	Request repair from a facility specializing in this procedure.	
	Shaft alignment deviation.	Perform an alignment procedure.	7-8
	Worn ball-bearings	Request repair from a facility specializing in this procedure.	
Water leakage occurs	Damaged mechanical seal.	Replace the mechanical seal.	
	Damaged O-ring.	Replace the O-ring.	

◎ The pump may emit a squeaking sound at starts and stops, but this is normal.
◎ Some grease may be ooze from the bearing cover when the pump is first operated, but this is normal.

Unexpected trouble could occur. However, it is important to take appropriate measures immediately when an abnormal condition is found. If the cause of the trouble is not clear, contact your dealer or designated service center. Notice the pump type, serial No. and trouble (fault) state making an inquiry.