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# Horizontal Split Case Pump

Model CB



Operating Instructions, Installation & Maintenance Manual

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**EBARA**

EBARA Pumps Americas Corporation





Please submit this manual  
to the operator.

IM0023 Rev.3(EN)

## Ebara Horizontal split centrifugal Pump

Model:CSC/CNC/CB

### Instruction manual



#### Thanks

Thanks for choosing the Horizontal centrifugal pump of Ebara. Thank you very much.  
EBARA has fully taken into account the safety of its use in the production of this  
product, but in order to prevent accidents from occurring due to improper operation,  
please follow this instruction manual and use it correctly.

In addition, please keep this manual in good order to use it at all times.

#### To equipment construction management personnel.

Please give the instruction manual to the personnel who carry out the operation and  
maintenance of the pump.



### Table of contents

1 Warning Mark .....	2	6 Maintenance .....	17
2 Receiving inspection .....	3	6.1)Daily Inspection .....	19
2.1)Pump and accessories .....	3	6.2)During operation .....	21
2.2)Nameplate .....	3	6.3)Long-term deactivation and storage ..	22
2.3)Model Designation .....	3	6.4)Consumable parts .....	22
3.Specification .....	4	7 Troubleshooting .....	23
4. Installation .....	6	8 Construction .....	24
4.1)Installation location .....	7	8.1) Sectional view .....	24
4.2)Pipeline .....	8	8.2) Attachment .....	24
4.3)Center Alignment .....	10	9 Disassembly and Assembly .....	25
4.4)Electrical connection .....	14	10 Limited warranty terms .....	26
5. Operation .....	14	11 Repair and maintenance .....	27
5.1)Preparations before startup .....	15		
5.2)During the operation .....	16		



## 1. Warning



In this manual, the warnings record the information required for the safe operation of the pump, and its purpose is to prevent harm and injury to you and others. In order to allow you to grasp the degree of danger and urgency expressed by these warnings, this manual divides the warnings into two levels, namely "Warning" and "Attention", according to the severity of the events. Both levels of warnings contain important safety information that must be strictly followed.

Warning terms	Meaning
 Warning	Dangerous situations may occur. Failure to follow the instructions given here could result in death or serious injury.
 Attention	Failure to follow the instructions given may result in minor injury or damage to the pump.

<u>Precautions</u>	Used to emphasize important information.
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The specific description of the symbol in the figure.

	Indicates what is strictly prohibited (i.e. actions that should never be taken). Specific actions that must never be taken are represented by images or text, which may be inside or near the symbol circle.
	Indicates what must be obeyed (that is, what must be done). Specific actions that must be implemented are indicated by pictures or text near this symbol.

## 2. Receiving inspection

As soon as you receive the water pump, please confirm the following immediately.

### 2.1) Pumps and accessories


(1) Make sure that no damage occurred during transport.

Check all nuts and bolts for looseness.

(2) Verify that all accessories have arrived (see Chapter 8 “Construction”)

### 2.2) Nameplate

The nameplate is documented as the basic specifications of the pump. Confirm that the nameplate is not the specification you ordered.

EBARA PUMP			
No.	①		
MODEL	②		
CAP.		③	
HEAD		④	
⑤	kW	⑥	min <sup>-1</sup>
BEARINGS	⑦	UU	
 <b>EBARA</b> Machinery (China) Co., Ltd.			

(1) Serial Number

(2) Pump model

(3) Flow rate

(4) Head

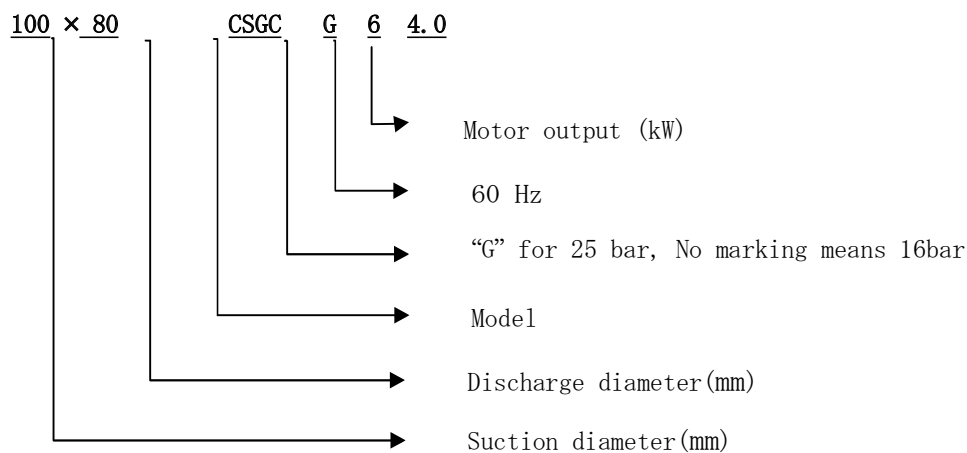
(5) Motor output kW

(6) Rated Speed

(7) Bearing model


















Figure 1 Pump nameplate description

### 2.3) Model designation



### 3. Specification

Please confirm the nameplate according to the performance of the pump you purchased, such as Head, Flow rate, and rotational speed. The table below gives the standard specifications. The pressure unit used in this manual is the International Unit(SI), and its reference values is in { }.

 <b>Warning</b>	Do not place the pump outside or in a rainy place. The deterioration of insulation is the cause of the electric shock fire.	
	If the working condition or power supply does not meet the specifications, it cannot be used. Otherwise, it will cause damage to the water pump or electric shock, leakage, fire and other accidents.	
	Be sure to implement ground operation. Failures and leakage of electricity can cause electric shock if operated without grounding.	
	Considering the life of the machine, please choose a place that is well ventilated, free from dust, corrosive or explosive gas, salt, moisture, steam, frost, and not exposed to the sun and rain. Otherwise, in harsh environments, the insulation of the motor and the control cabinet will be lowered, which may cause electric shock and fire accidents.	
	Please place the pump in a room managed by someone, or in a location that is not easily accessible by outsiders, separated by a fence. Touching the rotating parts and high temperature parts may cause personal injury.	
	Please install an earth leakage circuit breaker dedicated to this product. A wiring breaker with an earth leakage alarm output is recommended to avoid electric shock or fire accident.	
 <b>Attention</b>	Be sure to prepare a spare pump when using it with living things (fish farms, aquariums, etc.). In order to avoid the lack of oxygen caused by the failure of the water pump.	
	Please do not use inverter to drive, it may cause pump failure.	
	Do not use in copper-weary biological environments. so as not to significantly shorten the life span of the organism.	
	Set up a spare pump for use when the pump stops. To prevent the device from stopping by water-breaking.	
	When using important equipment (computer cooling equipment, cold storage cooling equipment, etc.), be sure to have a backup pump. To avoid water cut-off due to water pump failure, equipment can not run	
	In order to prevent the mixing of cutting oil, rubber agent and foreign material produced during manufacture, a suitable filter is set up at the outlet, the filter is fully cleaned and the debris is confirmed to be free of debris before it can be used.	
	Do not use liquids other than water, such as oil, seawater, organic solvents and other media. Otherwise, there will be water pump failure, electric leakage and electric shock.	
	In winter, in order to prevent ice, to do insulation, heating , drainage measures. To prevent damage caused by ice in the interior when the water pump is stopped.	
	Regularly confirm the operating status of the protection relay. To avoid accidents that do not work properly, resulting in electric shock and malfunction.	

■ Pump technical data

Description		Standard.	Optional
Handling Liquid	Liquid type	Clean water (PH: 5.8 – 8.6) *1	
	Temperature	0–80℃ *2	
Maximum working pressure		1. 6MPa	2. 5MPa
Structure	Impeller	Closed.	
	Shaft seal	Mechanical seal.	Gland packing
	Bearing	Sealed ball bearings	
Flange	Suction side	GB 16K R.F.	JIS 16K R.F./JIS 20K R.F.
	Discharge side	GB 16K R.F.	JIS 16K R.F./JIS 20K R.F.
Material	Pump casing	HT250	QT450–10
	Impeller	ZCuSn5Pb5Zn5	Stainless steel casting
	Shaft	20Cr13	Stainless steel (316, etc.)
	Bushing	N/A	With Bushing

■ Motor technical data

Number of poles		2P	4P	6P
Motor	Phase	3 Phase		
	Voltage	50Hz, 380V		
	Type	Totally enclosed air-cooled		
Installation site and environment		Indoor, ambient temperature: 0 – 40 ℃ Relative humidity: below 90% (no condensation) Altitude: Below 1000 meters No corrosive/explosive gases and vapors		











\*1 Fresh water, industrial water and well water, Water temperature 0 – 80 ℃, pH value is 5.8 to 8.6, and the Chloride ion concentration is below 200mg/L.

\*2 The water pump performance that should be achieved by suction ingesting the full head indicates the water temperature at 20℃. If the actual water pump is not running at a water temperature of 20℃, the water absorption performance of the pump will decrease, especially for the treatment of hot water.





\*3 The voltage and frequency fluctuations should be within the range of 5% +/-2%, respectively. The total value of these indicators at the same time should be within 5% of the absolute value. In either case, the motor characteristics and temperature rise are different from the rated status.

If a variable frequency motor with a frequency conversion range of 0Hz to 50Hz is required, special configuration is required.

## 4. Installation

 Warning	In order to prevent the risk of injury due to the overturning of the pump and damage to the pipes due to the vibration of the pump, please fix the pump firmly with the anchor bolts.	
	When moving this product, please work carefully in accordance with the lifting essentials (nameplates). Beware of falling.	
	Do not touch the motor with water to avoid electric shock, leakage, fire and failure.	
	For the operation and construction of the pump, please confirm its weight and shape for safe operation to avoid the risk of falling and personal accident.	
 Attention	When conducting the motor insulation resistance test during assembly, remove the wiring from the control cabinet, measure the insulation resistance with an insulation resistance meter that matches the power supply voltage, and confirm that the resistance between the motor wire and the ground wire exceeds 1MΩ before wiring. So as not to burn the motor, resulting in electric shock and fire accidents.	
	Do not cover the motor with blankets, cloth, etc. to avoid overheating and fire.	
	In order to prevent freezing in winter, measures such as heat preservation, heating and drainage should be taken. In order to prevent the water inside from freezing and causing damage when the pump is stopped.	
	In order to prevent the mixing of cutting oil, rubber agent, and foreign matter generated during manufacturing, a suitable filter is installed at the outlet, and it is fully cleaned and filtered, and it can be used after confirming that there is no foreign matter.	

4.1) Installation location.

 Warning	Do not place this product outdoors or in rainy places. Deterioration of insulation is the cause of leakage and electric shock fire.	
	Considering the life of the machine, please choose a place that is well ventilated, free from dust, corrosive or explosive gas, salt, moisture, steam, frost, and not exposed to the sun and rain. Otherwise, in harsh environments, the insulation of the motor and the control cabinet will be lowered, which may cause electric shock and fire accidents.	
	Please place the water pump in a room managed by someone, or in a location that is not easily accessible by outsiders, separated by a fence. Touching the rotating parts and high temperature parts may cause personal injury.	

- (1)The pump must be installed indoors.
- (2)The maintenance of the pump should be selected in a convenient place.
- (3)Put a fence next to the pump in case unrelated personnel approach.
- (4)The pump is installed as low as possible near the water source, the suction height (from the water to the water pump center) is low, and the suction pipe is short.

## 4.2) Pipeline

(1) If there is a phenomenon that foreign objects enter the pump delivery liquid (metal particles and sand particles from the pipeline, etc.), a filter should be installed at the suction end. Filters should be cleaned regularly to prevent clogging. Even if the liquid pumped by the pump is clean, attach the filter the first time the pump runs, because there are still some metal particles and sand left in the pipe.

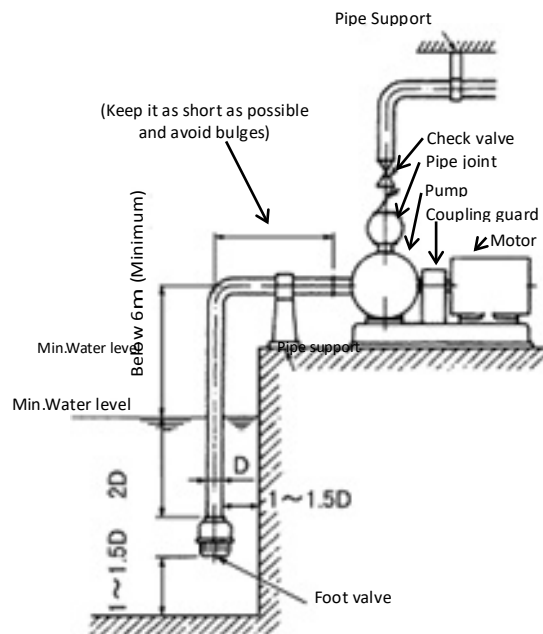
(2) If the weight of the suction or discharge piping is applied to the pump, the alignment of the pump may be damaged. At this time, take support measures for the pipeline as shown in Figure 2

(3) A check valve should be installed in the following cases, that is, when the pipeline is long, the actual pump head is high, the pump is running in automatic mode, the liquid is transported to a pressure storage tank, and when multiple pumps are running in parallel. The check valve should be installed between the pump and the discharge valve.

(4) Install an exhaust valve where air is unavoidably trapped. Exhaust valves should not be installed in the parts where negative pressure occurs in the suction pipe, because the valves installed in such parts will cause air to be sucked in.

(5) If there is a risk of water hammer, appropriate measures can be taken, such as installing a quick check valve.

(6) When the water pump is used for suction to a high place, the end of the suction pipe should be arranged at a depth of more than 2 times the pipe diameter ( $D$ ), as shown in Figure 2. And keep the pipe ends 1 to 1.5  $D$  or more from the bottom.



**Figure 2 Piping Installation**

(a) Equipped with a bottom valve with a filter at the end of the suction line to prevent the entry of foreign matter.

Table 1

Pump suction pipe diameter	Foot valve size	Reducer size of suction end
100	125	125×100
125	150	150×125
150	200	200×150
200	300	300×200
250	350	350×250
300	400	400×300
350	450	450×350
400	500	500×400
500	600	600×500

(b) The suction piping is to be as short as possible and to reduce bending up to the pump, as shown in Figure 3 and do not install gate valve. Keep the pipes tightly sealed to prevent air from entering from the connection of the suction pipe.

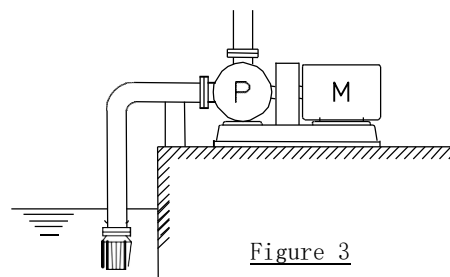


Figure 3

(c) The size of the foot valve and the size of the suction reducer shall be as specified in Table 1. The arrangement of the suction duct shall not have a bulge as shown in Figure 4 to prevent air stagnation. In addition, trapped air can cause the delivery medium to be blocked, or burn out rotating parts due to dry running of the water pump.

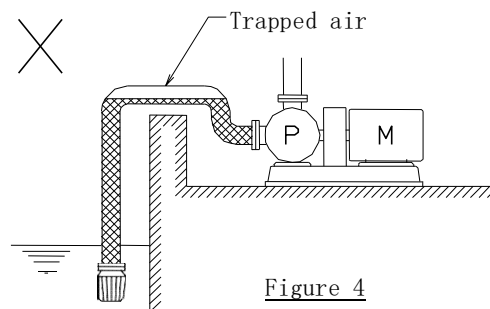


Figure 4

(d) Suction piping shall not branch, such as shown in Figure 5. Because when the single machine is running, air will enter from the pump that has stopped running, so that the pump cannot pump the liquid.

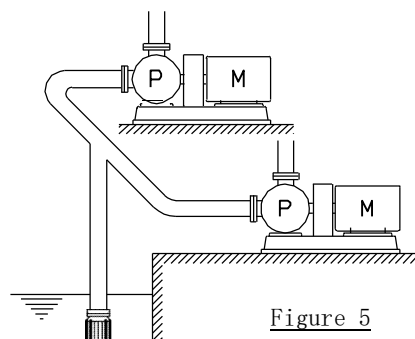


Figure 5

(7) Pouring and pressing

In backflow type operations, a gate valve is installed on the suction line. As shown in Figure 6. If a gate valve is not installed, the tank and piping will need to be completely drained during pump inspections and repairs.

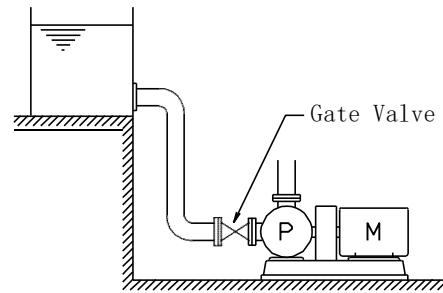




Figure 6

#### 4.3) Center Alignment

 <b>Warning</b>	After the coupling is centered, install the coupling guard. Also, keep away from rotating parts while the pump is running to prevent hazards.	
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The alignment of the pump has been correctly completed before shipment from the manufacturing plant, however when the anchor bolts are installed, the base would be twisted, and the center of the pump shaft and the motor shaft may be misaligned. During the operation of the pump, if there is a phenomenon that the pump shaft and the motor shaft are not aligned, various problems will gradually appear, such as vibration, noise and abnormal wear of the bearing. Be sure to perform the alignment adjustment as follows during installation.

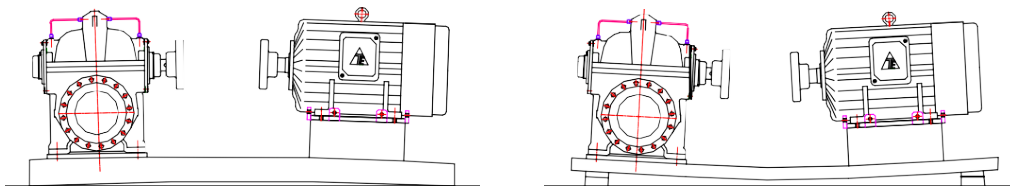


Figure 7 Misalignment of the center of the shaft between pump and motor during installation

**(1) Alignment accuracy**

Measured at 4 points on the outer surface of the coupling and the coupling clearance at each point, the alignment accuracy should be within the range shown below.

[Range of Alignment Accuracy]

- Tolerance of misalignment of outer surface: 0.05mm or less
- Tolerance of gap between couplings: 0.1mm or less

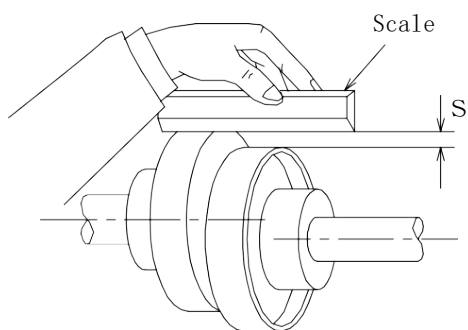


Figure 8 Radial alignment

The distance S is measured at 4 points on the outer surface of the coupling. Spacing S must be less than 0.05 mm.

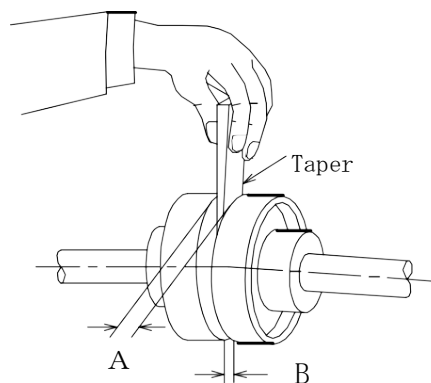


Figure 9 axial alignment

Use a feeler gauge or taper gauge to measure the distances A and B.

The gap between the couplings should be adjusted to 2-4 mm. The difference between A and B must be less than 0.1 mm.

## (2) Centering adjustment

Centering adjustments can be made by adding wedges under the base.

### (a) Position of inserting wedge

Wedges should be inserted on both sides of the anchor bolts and, if necessary, where the base has a tendency to bend (middle point between the anchor bolts and the anchor bolts).

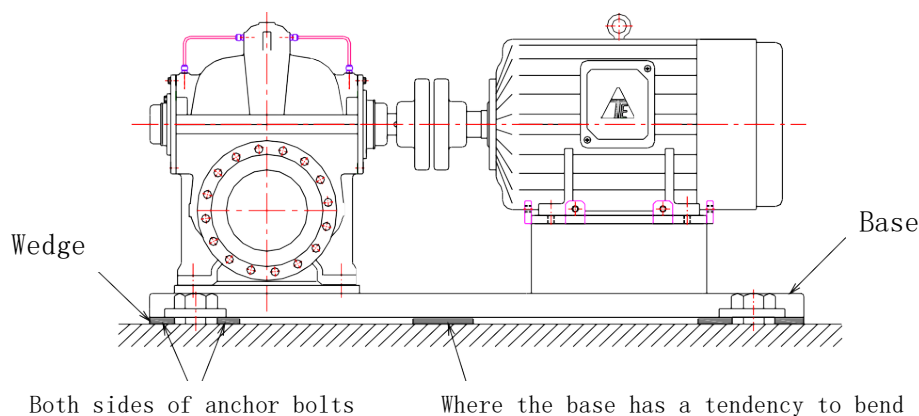


Figure 10 Where to insert the wedge

### (b) Centering adjustment

Check the condition of the coupling, and adjust the coaxiality of the coupling within the possible range by pushing the wedge appropriately.

Also, since the wedge location will be buried by the grout after installation, subsequent alignment adjustment should be done by inserting a liner under the motor. When installing the motor on a field base, align it by adding a liner to the motor in a similar manner. During alignment, the coupling guard is removed, but must be installed before operation.

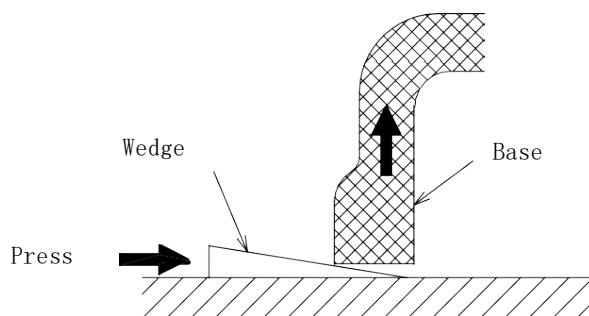







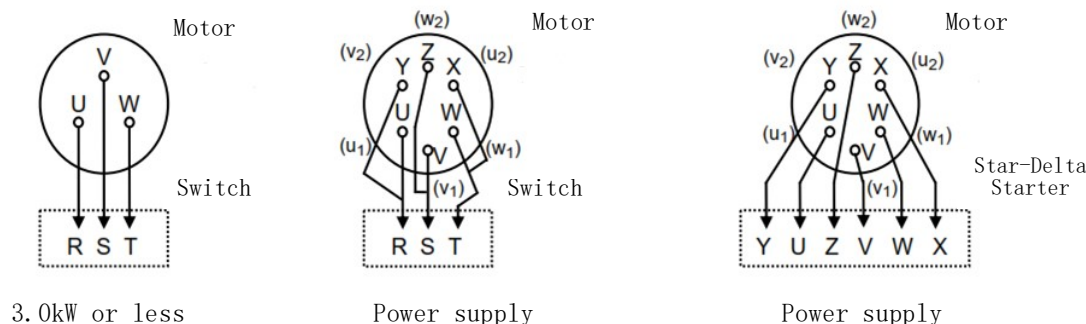


Figure 11 Centering adjustment

#### 4.4) Electrical connection

 Warning	Check that there is no looseness or foreign matter in the wiring parts of the motor, the primary and secondary sides of the control cabinet, and the connection parts and wiring parts of the power equipment in the control cabinet. Looseness of the wiring and connection parts may cause poor contact, and if there are foreign objects in the terminal parts, it may cause a fire due to high temperature.	
	Be sure to perform grounded operation. If it is operated without grounding, it may cause an electric shock accident in the event of failure and leakage.	
	When using and constructing the pump, please entrust professional and technical personnel to operate it. Otherwise, there is a risk of fire or injury.	
	Wiring work should be carried out by professionals in accordance with correct regulations and benchmarks. Make sure that the wiring terminals are not loose. Misoperation by unqualified personnel not only violates the law, but may also cause accidents such as electric shock and fire	
 Attention	Make sure that the motor terminals are not loose and fall off. Even if there is only one loose part, it will damage the motor due to phase loss operation.	

(1) Please follow Figure 12 to perform the wiring work.














If the motor is not standard with Ebara, please follow the wiring diagram in the motor terminal box or the operation manual of the motor.







Figure 12 Wiring connection

(2) Before turning on the switch, check the following items.

- (a) Whether the fuse is installed.
- (b) If there is an error in the wiring.
- (c) Whether the grounding is corrected

## 5. Operation

 Warning	After alignment, be sure to install the coupling guard. Also, keep away from rotating parts while the pump is running. High speed operation may cause personal injury.	
	When the pump is running, do not touch the rotating parts such as the main shaft and coupling. In addition, even if the pump is not running but the power is on, it may suddenly start running due to automatic operation, so do not touch the rotating parts such as the main shaft and the coupling at this time. High speed operation may cause personal injury.	
	Do not place dangerous or flammable materials near the pump and motor. Sparks or flames in the event of a malfunction can cause a fire.	
	Do not run the pump for more than 2 minutes with the discharge valve closed. The rise of pressure and temperature in the pump will cause damage to the casing and plug, etc., causing the motor to burn out.	
	Do not touch the electrically charged parts while the power is on. There is a risk of electric shock.	
	Do not let the motor get wet to avoid electric shock, leakage, fire and other accidents.	
 Attention	When the pump is stopped and then restarted, follow the requirements of "Installation" and "Operation" and conduct a trial operation. In order to prevent the pump from running poorly, the motor burnt out, and dry running.	
	Do not run dry to prevent air from being mixed into the liquid. In order to avoid damage to the casing, bearing and shaft seal, the pump cannot work. Also, overheating of the pump can cause damage.	
	If the liquid temperature exceeds 40°C, do not touch the pump to avoid high temperature burns.	

	In the event of a malfunction, please cut off the power immediately and have it repaired by your dealer or Ebara Machinery (China) Co., Ltd. in order to avoid accidents caused by misuse.	
	Keep people away from the suction port of the suction piping of the pump to prevent hands and feet from being inhaled.	
	When conducting the motor insulation resistance test during assembly, remove the wiring from the control cabinet, measure the insulation resistance with an insulation resistance meter that matches the power supply voltage, and confirm that the resistance between the motor lead-in wire and the ground exceeds 1MΩ, and then install the wiring. . So as not to burn the motor, resulting in electric shock and fire accidents.	
	Do not touch the motor to avoid hot burns.	
	Never turn on the power after draining the pipes in order to avoid idling, causing damage to the water pump, overheating damage.	
	Please operate the pump within the specifications. If it is used in the case of variable flow, the operation with less than the minimum water volume (equivalent to the suction diameter [mm] of the pump, for example, if the diameter is 50mm, the minimum water volume is 50L/min) should be avoided. In order to avoid air lock in the pump, the internal pressure and temperature rise, causing damage to the pump.	

### 5.1) Preparatooin before startup

- (1) Although grease has been added to the bearing, there is no need to add grease before operation, but just in case, please confirm it.
- (2) Flush the pipeline before the pump is put into operation. At this time, a filter should be installed on the suction side so that foreign matter (metal particles, sand, rust and oxide scale from the pipeline, etc.) will not enter the pump. Failure to flush may result in wear of mechanical seals and rotating parts.
- (3) Rotate the water pump by hand to check whether it rotates smoothly. If the rotation is not smooth, it indicates that there is rust in the pump, please check these matters.
- (4) Be sure to fill the water before starting the pump. Running the pump without water injection can cause a failure. Open the suction valve and the drain valve, and fill up with the water in the piping to the water outlet of the pump.
- (5) When injecting water, gently rotate the main shaft of the pump to completely discharge the air in the impeller.

## 5.2) During operation

- (1) After water is filled, close the drain valve. If there is a suction valve, open all the suction valve.
- (2) Jog (turn on the switch and then turn it off immediately) once or twice to confirm that there is no problem with the operation. Also confirm the direction of rotation. (Clockwise rotation when viewed from the motor fan side)

<u>Precautions</u>	Check the direction of rotation of the pump. When the three-phase power supply is running in reverse, the wiring should be exchanged to make it run in the forward direction.
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<u>Precautions</u>	It cannot be run in reverse. Vibration can loosen impeller nuts and bolts and cause accidents.
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- (3) After the rotation speed has reached the rated speed, slowly open the drain valve and enter continuous operation.
- (4) Confirm that there is no problem with pressure, current, vibration, sound, etc. (For others, refer to "6.Maintenance"). Except during measurement, the valves of pressure gauges and vacuum gauges should be kept closed. If its valve is left open for an extended period of time, it can cause damage.
- (5) If there is no check valve installed on the discharge side, when stopping the operation, slowly close the discharge valve and then stop the motor.
- (6) For the operation after the second time, please refer to the content of "6.Maintenance". If there is no abnormality, it can be operated immediately.

<u>Precautions</u>	To avoid operating in cavitation conditions. If the flow rate is too large during operation, it may cause cavitation. When vibration and noise occur and the specified flow rate (pressure) cannot be reached, cavitation will inevitably occur. At this time, close the gate valve of the discharge port and reduce the flow rate.
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<u>Precautions</u>	If the air mixed in the water pumping process is not discharged, it will cause damage to the bearing and shaft seal, so that the water cannot be pumped.
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## 6. Maintenance

 <b>Warning</b>	When stopping operation, please cut off the power. Otherwise, it may cause insulation aging, which may cause electric shock, leakage and fire.	
	After alignment, be sure to install the coupling guard. Also, keep away from rotating parts while the pump is running. High speed operation may cause personal injury.	
	When the pump is running, do not touch the rotating parts such as the main shaft and coupling. In addition, even if the pump is not running but the power is on, it may suddenly start running due to automatic operation, so do not touch the rotating parts such as the main shaft and the coupling at this time. High speed operation may cause personal injury.	
	Do not place dangerous or flammable materials near the pump and motor. Sparks or flames in the event of a malfunction can cause a fire.	
	Check that there is no looseness or foreign matter in the wiring parts of the motor, the primary and secondary sides of the control cabinet, and the connection parts and wiring parts of the power equipment in the control cabinet. Looseness of the wiring and connection parts may cause poor contact, and if there are foreign objects in the terminal parts, it may cause a fire due to high temperature.	
	Do not run the pump for more than 2 minutes with the discharge valve closed. The rise of pressure and temperature in the pump will cause damage to the casing and plugs, etc., and cause the motor to burn out.	
	Do not touch live parts while the power is on. There is a risk of electric shock.	
	Do not burn plastic products on site. harmful gases will be produced.	
	When this product is moved, please operate carefully according to the hoisting essentials (nameplate). Beware of falling.	
	Please be sure to turn off the power when the machine is inspected and maintained. In order to avoid the sudden start of the pump, causing electric shock or personal accident.	
	Do not let the motor get wet to avoid accidents such as electric shock, leakage and fire.	
	For the operation and construction of the pump, please confirm its weight and shape for safe operation to avoid the risk of falling and personal accident.	
	Except for professional repair technicians, no one can disassemble the pump for repair to avoid personal injury caused by electric shock, fire or abnormal operation.	
	When disassembling and inspecting, please first confirm that the suction and discharge valves are closed to drain through the water conduit, and ensure that the pressure in the pump does not rise or negative pressure. Otherwise, the casing may be damaged due to the abnormal operation of the pump due to the pressure difference between suction and discharge.	

 Attention	When the operation is stopped, drain the water in the pump and piping. If this is not the case, the stagnant water will rot and bacteria may flow out.	!
	When restarting the operation after stopping for a period of time, perform a trial operation according to the items of "installation" and "operation". Pump limitation, motor burnout, dry running, etc. may occur.	!
	Do not run dry to prevent air from being mixed into the liquid. In order to avoid damage to the housing, bearings and shaft seals, water should not be stirred. Also, overheating of the pump can cause damage.	⊘
	If the medium exceeds 40°C, do not touch the pump to avoid high temperature burns.	⊘
	In the event of a malfunction, please cut off the power immediately and have it repaired by your dealer or Ebara Machinery (China) Co., Ltd. In order to avoid misuse causing accidents.	!
	Replace consumable parts regularly. If it is used in an aged/worn condition, it may cause water leakage, burn/breakage, etc. Please entrust a dealer or Ebara Machinery (China) Co., Ltd. for overhaul or replacement of parts.	!
	Keep people away from the suction port of the suction piping of the pump to prevent hands and feet from being inhaled.	⊘
	Make sure that the wiring of the motor terminals is not loose or falling off. Even if there is only one loose part, the motor will be damaged due to lack of phase operation.	!
	Do not touch the motor to avoid high temperature burns.	⊘
	Do not cover the motor with blankets, cloth, etc. to avoid overheating and fire.	⊘
	Never turn on the power after draining the pipes. In order to avoid idling, causing damage to the water pump, overheating damage.	⊘
	Periodically check the operating status of the protective relay. In order to avoid the accident can not work properly, resulting in electric shock and failure accidents.	!
	Please operate the pump within the specifications. When used in applications where the water volume varies, avoid running the pump below the minimum water volume (equivalent to the suction diameter [mm] of the pump, for example, if the diameter is 50mm, the minimum water volume is 50L/min). In order to avoid air resistance in the pump, internal pressure and temperature rise, resulting in damage to the pump.	⊘

**6.1)Daily inspection.**

(1)The supply and replacement of bearing lubricants.

To supply grease, please inject it from the upper grease nipple, and the injection amount and injection interval are shown in Table 2. Too much grease can cause overheating. Available greases are "SH33M, Alvania No.2, GOLD No.3" or equivalent.

Table 2

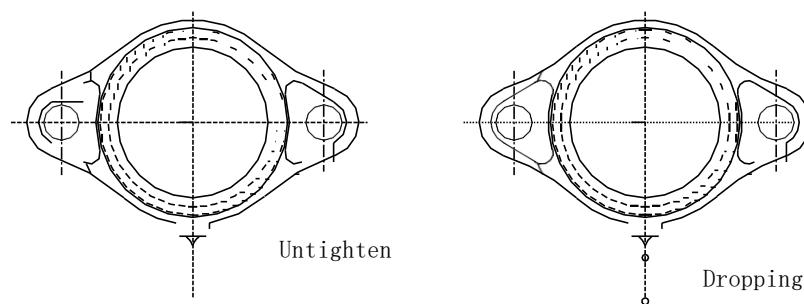
Nominal bearings		CUCFC206	CUCFC208	CUCFC210	CUCFC212	CUCFC214
Supply	Injection [g]	3.3	5.6	7.7	13.2	18.2
	Interval	3000 to 4000 hours				

Nominal bearings.		CUCFC216	CUCFC218	CUCFCX20	CUCFS322	CUCFS324
Supply	Injection [g]	25	38	69	198	237
	Interval	3000 to 4000 hours				

- (2)Please check the pressure, current, flow, vibration, noise, etc. If it is different from usual, it may be a precursor to an accident, so please refer to Chapter 7 "Fault finding and Troubleshooting" and take action as soon as possible. To do this, you need to do a good job of running logs.
- (3) The bearing temperature shall not be Kelvin higher than the room temperature, that is, shall not be more than 80° C.
- (4)Shaft seals are mechanically sealed and there is a little water leakage. However, if the amount of leakage increases, replace the seal.
- (5)Inspection of gland packing

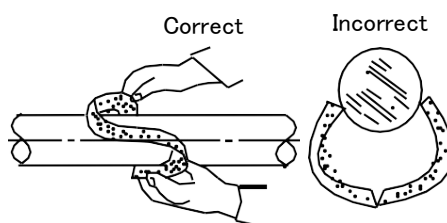
Check for leaks at glands

Adjust leakage at gland packing as shown below. When the leakage is excessive, tighten the nuts gradually and evenly. When the temperature is too high, loosen the nuts to increase the leakage. After the pump runs for a while to make it fit well with the shaft, then tighten the nuts. If the leakage volume at the gland packing is in the range shown in the figure below, the leakage volume is normal.



If excessive leakage occurs and cannot be adjusted by tightening the packing bolts and nuts, the packing should be replaced. Be careful when replacing packing, as incorrect installation of packing can cause continuous leakage or partial galling of the bushing. Replacement of gland packing.

- (a) Stop the operation of the pump
- (b) Remove the packing gland bolt nuts and gland packing.
- (c) Remove the used packing, taking care to avoid damage to the packing cavity and bushing.
- (d) If the bushing is worn or damaged, replace it.

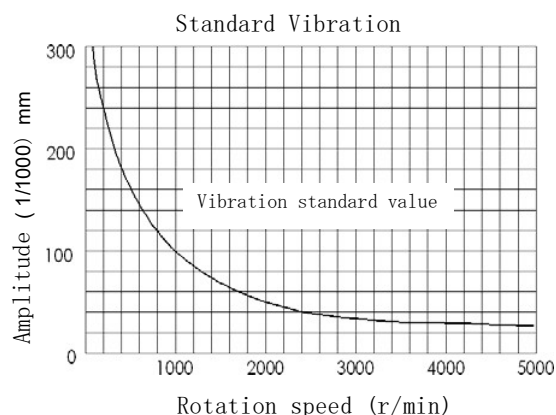


- (e) Apply lubricant to the inner surface of the packing cavity. Loosen the packing and put it on the bushing. Push the fillers into the filler cavity one by one, and the incisions of the filler must be staggered 90 to 180 degrees from each other. Install in the order of 3 (2) packings, 1 water seal ring, and then 2 (3) packings.
- (f) Install the gland packing, and tighten the gland packing bolts and nuts in the order of symmetrical exchange.

(6) In the case of correct installation and piping layout, the standard value of vibration is shown in the figure to the right. If there is excessive vibration, it may be caused by alignment problems, piping layout, loose anchor bolts, etc. Please check.

(7) Check whether the mounting bolts of the equipment and the connector screws of the electrical wiring are loose.

(8) Please measure the insulation resistance of the motor once a month. If the insulation resistance is more than  $1\text{M}\Omega$ , there is no problem in operation, but if it starts to drop suddenly even if it is more than  $1\text{M}\Omega$ , it can be regarded as abnormal, so repair is required.



<u>Precautions</u>	To avoid operating in cavitation conditions. If the flow rate of the pump is too large during operation, cavitation may occur. When vibration and noise occur and the specified flow rate (pressure) cannot be reached, cavitation will inevitably occur. In this case, close the gate valve of the discharge port and reduce the flow rate.
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<u>Precautions</u>	If the air mixed in the water pumping process is not discharged, it will cause damage to the bearing and shaft seal, so that the water cannot be pumped.
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## 6.2) During operation

Frequent start and stop operations can damage the pump. The starting frequency should meet the following requirements:

The motor outputs power	Below 7.5 kW	11 to 22 kW	Above 30 kW
Start frequency	Less than 6 times per hour.	Less than 4 times per hour.	Less than 3 times per hour.

### 6.3) Long-term discontinuation and storage

- (1) If there is a spare pump, please run it from time to time to ensure that it is in a ready-to-use state at all times.
- (2) When the pump is out of use for a long time (more than 3 months), care should be taken not to allow the finish surface of the bearing, shaft and coupling to corrode.
- (3) If it is not used for a long time (more than 3 months), please cut off the power.
- (4) If the pump is to be out of use for a long time (more than 3 months), follow the preparatory steps (check and inspection) during installation.

### 6.4) Consumable parts

The following table lists consumable parts. Replace these components according to the time given in the table.

Name of consumable parts	Guidance	Replacement cycle.
Mechanical seal	Increased leakage	8,000 hours of continuous operation or per year
gland packing	The water (liquid) leak cannot be stopped even if the bolts and nuts are tightened again.	Every Year.
Coupling rubber parts	When rubber parts are aging or worn.	Every Year
Sealed ball bearings	When noise increases, there is abnormal sound, grease leakage.	Per 2 to 3 years or 10,000 hours of continuous operation
O-ring	Every inspection.	Every time the pump is disassembled.

The above replacement cycles apply to pumps operating under normal conditions.

<u>Precautions</u>	Renovation and painting should be done in due time. The place where the screw and rust inhibitor are applied may rust due to high humidity, frost and water.
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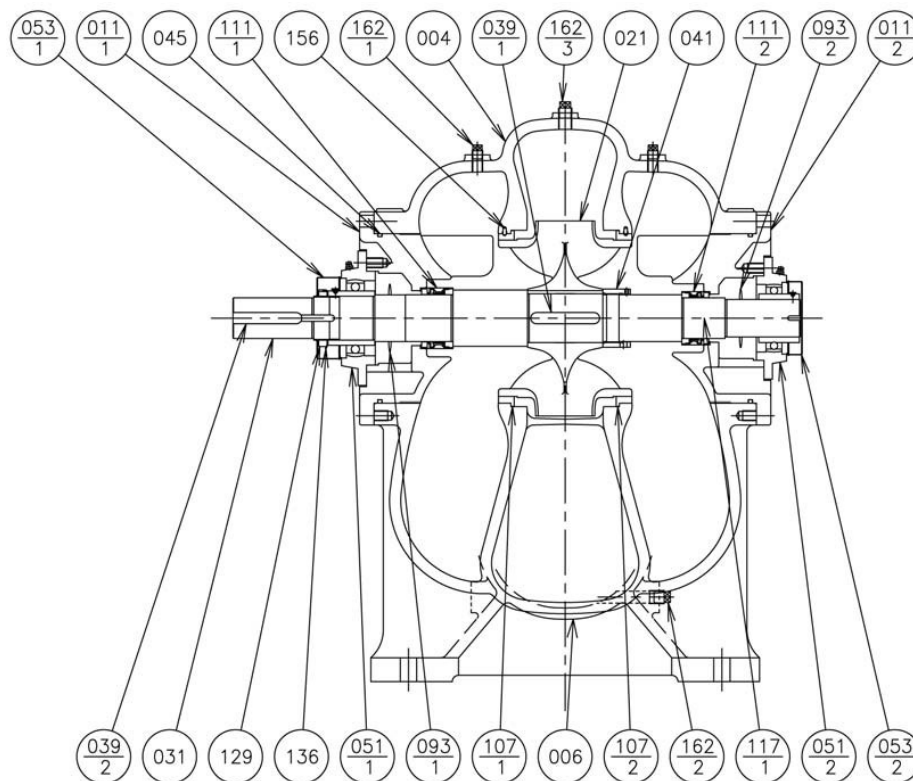
<u>Precautions</u>	You can use nameplates and warning signs to remind users. Signs, etc., should be posted in an easy-to-see position, and the signs should be kept clean.
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## 7. Troubleshooting

Fault	Causes	Measures to be taken.
The motor does not start, or whines but does not start.	<ul style="list-style-type: none"> <li>- The motor has failed.</li> <li>- Power is down.</li> <li>- Rotating parts stick together, rusted, or sintered.</li> <li>- A foreign object is caught in the rotating part.</li> </ul>	<ul style="list-style-type: none"> <li>- Please contact your nearest office</li> <li>- Replace or repair.</li> <li>- Turn the motor by hand, reassemble, or send to the manufacturer for repair.</li> <li>- Remove foreign objects.</li> </ul>
The motor can run, but no water. The specified flow rate has not been reached.	<ul style="list-style-type: none"> <li>- No water priming started.</li> <li>- Gate valve closed or half-open.</li> <li>- The motor rotates in the reverse direction.</li> <li>- The rotation speed is slow. <ul style="list-style-type: none"> <li>* The number of poles of the motor does not match the specification.</li> <li>* The voltage is too low.</li> </ul> </li> <li>- A foreign object stuck on the impeller</li> <li>- A foreign object is stuck in the piping</li> <li>- Foreign object stuck on foot valve/filter</li> <li>- Air entrapment occurs.</li> <li>- Foot valve or suction line port is not properly submerged under water.</li> <li>- There is a leak in the discharge line.</li> <li>- The impeller is corroded.</li> <li>-</li> <li>- The impeller is worn out.</li> <li>- The sealing ring is worn.</li> <li>- Excessive pipe resistance.</li> <li>- The suction head or discharge head is too high.</li> <li>- The liquid is hot, or the liquid is volatile.</li> <li>- Cavitation has occurred.</li> </ul>	<ul style="list-style-type: none"> <li>- Perform a priming water injection.</li> <li>- Open the gate valve.</li> <li>- Check and correct wiring.</li> <li>-</li> <li>* Check with nameplate and replace with correct motor.</li> <li>* Check the power status.</li> <li>- Remove foreign objects.</li> <li>- Remove foreign objects.</li> <li>- Remove foreign objects.</li> <li>- Inspect and repair suction line and shaft seal.</li> <li>- Extend the suction pipe and submerge its port to a depth of 2D.</li> <li>- Replace or repair.</li> <li>- Check liquid properties and change materials accordingly.</li> <li>- Contact the firm closest to you.</li> <li>- Contact the firm closest to you.</li> <li>- Reconsider the layout of the system.</li> <li>- Reconsider the layout of the system.</li> <li>- Reconsider the layout of the system.</li> <li>- Contact the firm closest to you.</li> </ul>
The pump was able to start but stopped for a short time.	<ul style="list-style-type: none"> <li>- Insufficient priming of the pump</li> <li>- Air entrapment occurs.</li> <li>- Air entrapment in the suction duct.</li> <li>- The suction head is too high.</li> </ul>	<ul style="list-style-type: none"> <li>- Fully carry out the pump filling operation.</li> <li>- Inspect and repair suction line and shaft seal.</li> <li>- Rearrange piping.</li> <li>- Reconsider the layout of the system.</li> </ul>
Overcurrent of motor	<ul style="list-style-type: none"> <li>- The rotation rate is too high. <ul style="list-style-type: none"> <li>* The number of poles of the motor does not match the specification.</li> </ul> </li> <li>- The head is too low, or the discharge flow is too large.</li> <li>- The bearing is damaged.</li> <li>- Contact with rotating parts, or the shaft is bent.</li> <li>- The specific gravity or viscosity of the liquid is too high.</li> </ul>	<ul style="list-style-type: none"> <li>* Check with the nameplate and replace with the correct motor.</li> <li>- Reduce the opening of the discharge valve to the specified flow rate.</li> <li>- Contact the firm closest to you.</li> <li>- Contact the firm closest to you.</li> <li>-</li> <li>- Reconsider the layout of the system.</li> </ul>
The bearing temperature is too high.	<ul style="list-style-type: none"> <li>- There was damage to the bearing.</li> <li>- Cut-off operation continued for too long.</li> </ul>	<ul style="list-style-type: none"> <li>- Contact your nearest firm..</li> <li>- Stop the operation.</li> </ul>
The pump vibrates or emits. Large noise.	<ul style="list-style-type: none"> <li>- The bearing is damaged.</li> <li>- Discharge flow is too large.</li> <li>- Foreign objects stuck on the impeller</li> <li>- The direction of rotation of the motor is reverse.</li> <li>- Cut-off operation continued for too long.</li> <li>- Contact with rotating parts, or the shaft is bent.</li> <li>- A cavitation has occurred.</li> <li>- Pipeline resonance has occurred.</li> </ul>	<ul style="list-style-type: none"> <li>- Contact your nearest firm.</li> <li>- Reduce the opening of the discharge valve to achieve the rated flow rate.</li> <li>- Remove foreign objects.</li> <li>- Check and correct the wiring.</li> <li>- Stop the cut-off operation.</li> <li>- Contact your nearest firm</li> <li>- Contact your nearest firm.</li> <li>- Improve the piping layout.</li> </ul>
Excessive leakage at the shaft seal.	<ul style="list-style-type: none"> <li>- The mechanical seal is damaged.</li> <li>- boost pressure too high</li> </ul>	<ul style="list-style-type: none"> <li>- Contact the firm closest to you.</li> <li>- Reconsider the layout of the system.</li> </ul>

## 8 Construction

### 8.1) Sectional view





053-1	Bearing cover	1	291	Oil nozzle	2
051-2	Bearing casing	1	156	Lock pin	2
051-1	Bearing casing	1	136	Bearing washer	1
041	Impeller nut	1	129	Bearing nut	1
039-2	Coupling keys	1	117-1	Gaskets (for pump casing)	1
039-1	Impeller keys	1	111-2	Mechanical seal	1set
031	Shaft	1	111-1	Mechanical seal	1set
021	Impeller	1	107-2	Casing ring (non-drive end side)	1
011-2	Side cover	1	107-1	Casing ring (drive end side)	1
011-1	Side cover	1	093-2	Retaining ring (non-drive end side)	1
006	Lower pump casing	1	093-1	Retaining ring (drive end side)	1
004	Upper pump casing	1	053-2	Bearing cover	1
No.	Part name	Qty	No.	Part name	Qty

### 8.2) Attachment

Standard attachment.

Base unit 1  
 coupling 1set  
 Coupling guard 1  
 Motor 1

## 9. Disassembly and Assembly

 Attention	In order to prevent accidents, when the pump stops running or abnormal phenomena occur, the power supply should be cut off immediately. Please contact the dealer where you ordered the pump or <b>EBARA MACHINERY (CHINA) CO., LTD.</b> , who will inspect and maintain the pump.	
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Please contact the following units for assistance.

<b>EBARA Machinery (China) Co., Ltd.</b>  Room 1202 Of Guanghai Road, Chaoyang District, C Beijing,100026.  Phone:010-65813265 .
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This pump is not equipped with separate accessories, so there is no need for other installations other than centering during installation. If the pump must be disassembled (due to malfunction or any other reason), the user must apply to the dealer or **Ebara Machinery (China) Co., Ltd.** Failure to comply with this provision will void the warranty.

## 10. Limited warranty terms

EBARA Machinery (China) Co., Ltd. is limited to the cost of the necessary parts for repairs under this warranty, and EBARA Machinery (China) Co., Ltd. does not bear all other costs in addition.

- (1) This warranty is valid for 18 months from the date of shipment or 12 months from the date the equipment is operational. Whichever comes first.
- (2) During the above-mentioned period of validity, EBARA Machinery (China) Co., Ltd. will repair the pump free of charge under the following conditions: the pump failure due to the design of EBARA Machinery (China) Co., Ltd. responsible for the design, production process defects caused, and in the event of a failure, the operation of the pump is correct and normal. EBARA Machinery (China) Co., Ltd. is solely responsible for the repair of the pump, including the necessary components for replacement, but EBARA Machinery (China) Co., Ltd. shall not be liable for any other losses resulting from the failure.
- (3) There is a charge for repair work under the following conditions:
  - (a) If the fault occurs after the warranty period.
  - (b) If the failure occurs due to operational negligence and the fault occurs during storage.
  - (c) If the fault is not caused by a fire, flood, earthquake or other condition within the control of EBARA Machinery (China) Co., Ltd.
  - (d) If the fault is caused by the use of components recommended by Non-EBARA Machinery (China) Co., Ltd.
  - (e) If the fault is caused by the repair or modification of the pump by non-EBARA Machinery (China) Co., Ltd.
- (4) The responsibilities of EBARA Machinery (China) Co., Ltd. are limited to the above warranty, and EBARA Machinery (China) Limited Company is not responsible for any other costs and losses that fall within the scope of the warranty.
- (5) Repair parts are retained for a period of 5 years after the repair component has stopped manufacturing.
- (6) Essential protection is only valid in China.

## 11. Repair and Maintenance

Please ask your dealer or Ebara Machinery (China) Co., Ltd. to request repair or maintenance of the pump.

If you notice any abnormality during pump operation, stop the pump immediately and check for faults (see chapter 7 "Troubleshooting and troubleshooting").

If a malfunction occurs, or when repair or service is required, please contact your dealer or EBARA MACHINERY (CHINA) CO., LTD.

Provide the data on the nameplate and details of the fault.

If you have any inquiries about the water pump, please contact your dealer or EBARA MACHINERY (CHINA) CO., LTD.

※ The contents of the instruction manual  
are subject to change without prior notice



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※ The "XX model" in the instruction manual is our company's model number

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