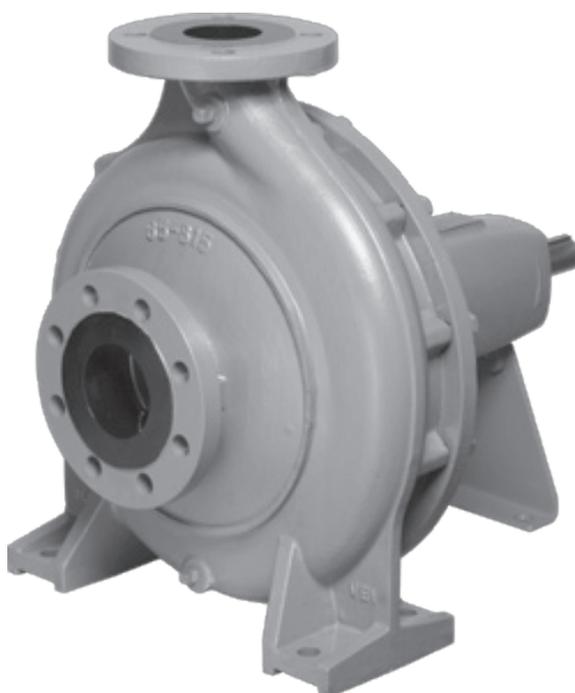




## STANDARDISED END SUCTION PUMPS

Instruction and maintenance manual

# Model GS







**CONTENTS**

- 1. INTRODUCTION..... 4**
- 2. SAFETY..... 4**
  - 2.1 PREPARATION AND TRAINING OF STAFF
  - 2.2 MAINTENANCE
- 3. TRANSPORT AND STORAGE..... 5**
- 4. SPECIFICATIONS..... 5**
- 5. INSTALLATION..... 7**
  - 5.1 INSTALLATION POINT
  - 5.2 LIFTING
  - 5.3 CEMENTED BASE
  - 5.4 PIPES
  - 5.5 ALIGNMENT
- 6. OPERATION..... 12**
  - 6.1 BEFORE STARTING THE PUMP
  - 6.2 STARTING THE PUMP
  - 6.3 STOPPING THE PUMP
- 7. MAINTENANCE..... 14**
  - 7.1 DAILY INSPECTION
  - 7.2 PRECAUTIONS DURING OPERATION
  - 7.3 PRECAUTIONS DURING STORAGE
  - 7.4 REPLACING PARTS
  - 7.5 TROUBLESHOOTING
  - 7.6 RESIDUAL RISKS
- 8. CONSTRUCTION..... 23**
- 9. DISMANTLING AND FITTING..... 24**
  - 9.1 DISMANTLING
  - 9.2 FITTING
- 10. REPAIR AND WARRANTY..... 25**

## 1. INTRODUCTION

Thank you for choosing this EBARA GS model pump. This operating manual describes the correct installation, operation and maintenance procedures of the product. EBARA pays great attention to the manufacturing of its products so that their use by end-users may be as safe as possible. However, using this pump improperly may reduce its operating performance and lead to personal injury and damage to property.

All our devices are delivered after being checked at our own plant and so they are in a condition to operate correctly after being connected to the power supply and the water system, as shown in this manual.

When this device is delivered:

- ① Check the nameplate
- ② Double check the equipment to make sure there is no damage generated during the start up and that there are no loose screws or mountings.
- ③ Check that all the accessories, spare parts and required options are included within the supply.

We recommend that you keep this manual in a safe place so that it may be consulted whenever needed.

## 2. SAFETY

This instruction and maintenance manual includes the basic instructions that should be taken into consideration during installation, operation and maintenance of the equipment.



**Generic hazard**



**Electrical Voltage**

It is essential that the worker/installer reads all the sections in this manual carefully before installation and operation. We recommend that you keep this manual in the place where you plan to install the equipment. In addition to the safety instructions found in this manual, it is also necessary to take into account the safety regulations and standards in force in the country where you want to use the equipment, in order to achieve greater protection.

Disregarding the safety instructions shown in this manual may lead to risks to persons and equipment.



## 2.1 PREPARATION AND TRAINING OF STAFF

The personnel involved in the installation, operation, maintenance and control of the equipment must be properly trained so as to carry out their tasks as effectively as possible. The responsibility, skills and supervision of the personnel fall within the remit of the employer. If the staff do not have the appropriate knowledge, they must be duly trained. If required, the employer may receive proper training directly from EBARA or from the distributor of this equipment.

## 2.2 MAINTENANCE

No technical or structural changes to the equipment are permitted without prior approval from EBARA. Only genuine spare parts and accessories authorised by EBARA are suitable for meeting safety standards. Rebuilding, modifying or using other spare parts may lead to the invalidation of your warranty.

Sound operation of the equipment depends on whether it is being used in accordance with the instructions given in this instruction manual. The working conditions and limits set out in this manual may not be exceeded in any way.

Always keep the nameplates legible and in good condition because the details shown will be needed for future reference or to request spare parts.

## 3. TRANSPORT AND STORAGE

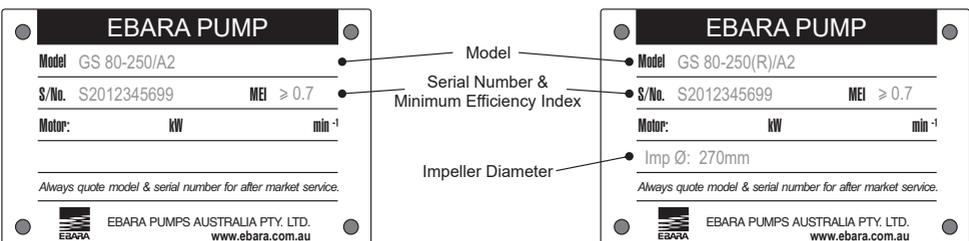
If necessary, the equipment must be handled and stored in appropriate packaging. It must not be stored in damp environments with strong variations in temperature or in corrosive atmospheres. Condensates may attack the seal areas, metal parts and its electrical operation. In this case, any claims made under the warranty will be refused.

## 4. SPECIFICATIONS

The basic specifications of the pump are listed on the nameplate. Read the data on the nameplate to check that the pump is the product that you ordered. When ordering parts or requesting technical information always quote pump model and serial number.

Standard model with full size impeller

Standard model with reduced impeller



The GS pump conforms to the dimensions required by EN 733.  
 Its applications include climate control and building services, water supply, industry, etc.  
 Other specifications are shown in the following table:

Description		Standard
Liquid	Temperature	-10 to 120 °C
	Density	In accordance with requirements
	Viscosity	
Maximum operating pressure		16 bar (1.6 Mpa)
Construction	Impeller	Closed
	Seal	Mechanical
	Rolling bearings	With shielded balls
Flange		DIN EN 1092.2
Material	Pump body	Cast iron (FC 250)
	Impeller	Bronze (CAC 406)
	Shaft	431 Stainless steel
	Casing ring	Bronze (CAC 406)
	Seal/Elastomers	Carbon/SiC/EPDM



Overall Sound Pressure Level dB(A)		
<i>Model</i>	2 Pole 2900 rpm	4 pole 1450 rpm
32-125	64	52
32-160	68	54
32-200	72	58
32-250	73	62
40-125	66	54
40-160	70	58
40-200	73	62
40-250	76	63
40-315	81	69
50-125	70	54
50-160	72	58
50-200	76	63
50-250	78	67
50-315	83	71
65-125	70	58
65-160	74	62
65-200	77	65
65-250	81	69
65-315	85	72
80-160	76	63
80-200	81	69
80-250	84	71
80-315	—	74
80-315L	87	—
80-400	—	78
100-160	77	65
100-200	81	69
100-250	85	72
100-315	—	74
100-315L	87	—
100-400	—	78
125-200	84	71
125-250	—	74
125-250L	87	—
125-315	89	77
125-400	—	79
125-500	—	81
150-200	84	71
150-250	89	77
150-315	—	79
150-400	—	80
150-500	—	84
200-400	—	85
200-500	—	88

*Note: The overall sound pressure level is the value measured 1m away from the pump unit, and does not include driver noise.*

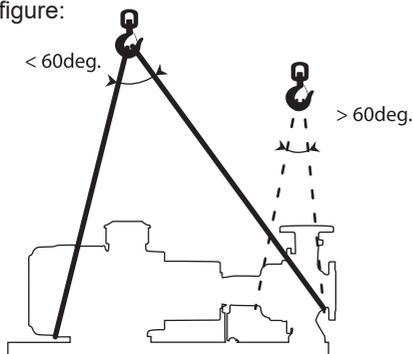
## 5. INSTALLATION

### 5.1 INSTALLATION POINT

- (1) Install the equipment in an easily-accessible place in order to carry out overhauls and maintenance.
- (2) Prohibit access to unauthorised persons by using related closure points.
- (3) Place the equipment as close as possible to the water supply, making sure that the difference in height between the water surface and the pump shaft is minimal and that the length of the suction pipe is as short as possible.
- (4) The sum between the suction pressure and the gauge pressure of the pump must always be less than the minimum permissible pressure (see section 4 - Specifications).

### 5.2 LIFTING

In order to move the electric pump or the individual pump you must lift the load by means of straps, creating an angle of less than 60 degrees, as shown in the figure:



One must make sure that there is no personnel exposed to danger during the operation. To lift the assembly, do not use the attachment points of the motor or the pump since they may not have been designed to bear such a weight.

### 5.3 CEMENTED BASE

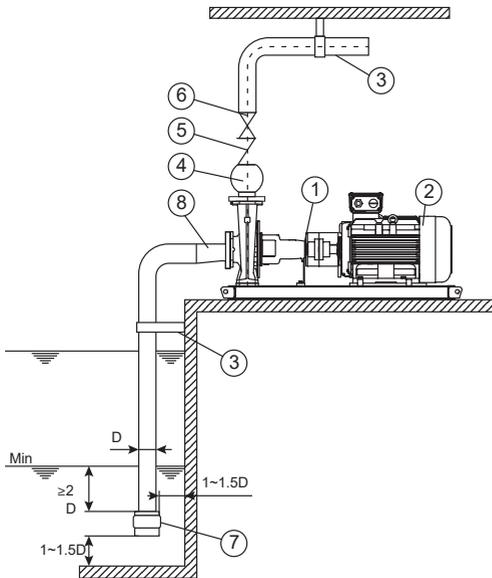
One should note that electric pump units must be fixed in a stable and durable manner to a solid cemented base so that the axes of the pumps and the motors always remain correctly and securely aligned. The cement base must be sufficiently rigid, permanent and aligned, as well as being located on ground capable of bearing a permitted load of adequate support facilities. The top part of the unit must rest completely on the cemented base; once the top part has been secured, the alignment of the coupling needs to be checked again.

If you need to limit, as much as possible, the vibrations of the equipment by using elastic dampers, the latter should not be placed directly under the metal profiles, but instead, you will need to produce a solid plate with a weight of one and a half times or two times the overall weight of the unit, arranging the dampers under the assembly that combines the top part with the plate. There are several valid methods although this plate is typically made with concrete and its dimensions exceed those of the top by about 0.2 metres on all four sides.

Generally, an incorrect cement base is the cause of premature failure and this invalidates the warranty period.

### 5.4 PIPES

The installation must be done according to the arrangement shown in the Figure:



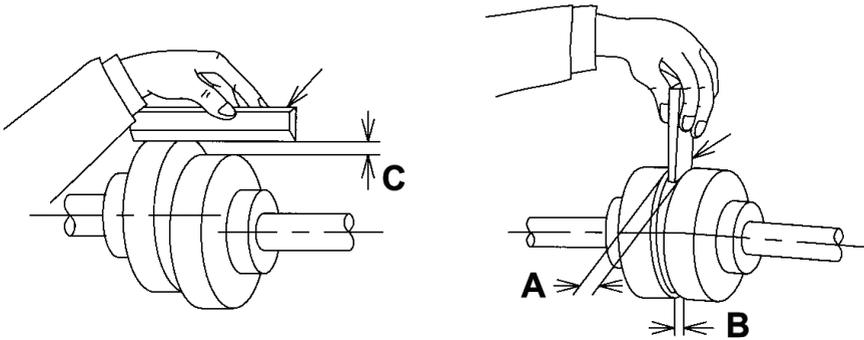
1	Pump
2	Motor
3	Mount
4	Elastic sleeve
5	Check valve
6	Shut-off valve
7	Bottom valve
8	Eccentric reduction

1. Make sure that the suction and delivery ducts do not transmit any stresses to the pump, by installing sufficiently strong supports. If this is not done, the pump could become misaligned and even break.
2. Fit any check valves (between the pump and the delivery valve) in the following cases:
  - In very long pipes.
  - If the head is high.
  - If the operation is automatic.
  - When you fill a tank under pressure.
  - When the operation is in parallel.
3. Mount air relief valves, if required, in those parts of the installation where it is impossible to avoid the formation of air bubbles. However, they must not be fitted at points where the pressure is less than atmospheric pressure, since the valve would suck in air rather than expel it.



### 5.5 ALIGNMENT

The common base may be distorted when foundation bolts are tightened during installation. Ensure correct alignment as indicated in table



External diameter	C	Dimensions [mm]					
		Without spacer			With spacer		
		A	B	A-B	A	B	A-B
68	< 0.1	2.0 - 4.0			< 0.1	-	
80	< 0.1	2.0 - 4.0			< 0.1	4.0 - 6.0	
95	< 0.1	2.0 - 4.0			< 0.1	4.0 - 6.0	
110	< 0.1	2.0 - 4.0			< 0.1	4.0 - 6.0	
125	< 0.15	2.0 - 4.0			< 0.1	4.0 - 6.0	
140	< 0.15	2.0 - 4.0			< 0.1	4.0 - 6.0	
160	< 0.2	2.0 - 6.0			< 0.1	5.0 - 7.0	
180	< 0.2	2.0 - 6.0			< 0.1	5.0 - 7.0	
200	< 0.2	2.0 - 6.0			< 0.1	5.0 - 7.0	
225	< 0.25	2.0 - 6.0			< 0.1	5.0 - 7.0	
250	< 0.25	3.0 - 8.0			< 0.1	7.0 - 9.0	

If the pump was purchased without a motor, but the intention is to connect one during installation, you will need to correct the shift of the coupling by inserting a plate under the feet of the motor, by adjusting the disparity according to the range shown in the Figure.

The alignment operation is achieved by removing the coupling guard, although this will need to be refitted carefully before starting up the pump.

## 6. OPERATION

### 6.1 BEFORE STARTING THE PUMP

1. Make sure that the pipes are flushed after the installation is completed, since any impurities may lead to faults, noise and excess wear on the mechanical seal and other parts of the pump.
2. Check that the pump turns easily by spinning the shaft with your hand.
3. Check the operating details of the motor, which are listed on the nameplate.
4. Do not operate the pump without priming first. For suction lift, the pump and the suction pipe must be filled with water via the relevant device duly installed on the delivery pipe. If the suction is primed, the pump must be filled with water by opening the suction and delivery valves. Make sure that no air remains inside the pump.
5. Check the direction of rotation of the motor, as shown below:
  - Close the delivery and suction valves
  - Switch on the motor for 1 to 2 seconds, then stop it.
  - Visually check that the direction of rotation is correct via the connection or the fan on the motor. The direction of rotation is indicated by an arrow on the pump body. Generally, it is Clockwise (to the right) when the observer is facing the fan on the motor.
  - After removing the coupling guard, put it back immediately after checking the rotation.

## 6.2 STARTING THE PUMP

1. Shut off the main delivery valve. Open the suction valve if it is closed.
2. Turn on and off the switch to start the motor once or twice, to ensure that there are no faults in the start up.
3. When the rotation speed remains stable at the nominal speed, gradually open the delivery valve.
4. Check that there are no significant variations in the pump pressure and in the current absorbed by the motor. Check that there are no significant vibrations and/or unusual noises.

## 6.3 STOPPING THE PUMP

Before stopping the pump you are advised to close the delivery valve gradually.

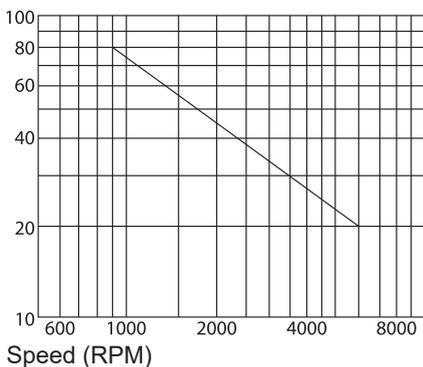
If the pump stops due to a sudden lack in the power supply, disconnect the motor switch. This will avoid the pump starting up again as soon as the power supply returns, thereby endangering staff.



## 7.1 DAILY INSPECTION

1. Significant variations in pressure, capacity, electricity, vibrations or noise may be sign of a malfunction of the pump. Refer to the table "Failures and Measures to be taken". It is advisable to keep a daily register on the operating conditions with a view to quickly discovering any symptoms that may be the result of a potential failure.
2. The maximum temperature for the bearing is 40°C above the ambient temperature, with a maximum total limit of 80°C.
3. Generally, the mechanical seal does not show any leaks. Sometimes, at the begin-ning of operation there is a small leak of water which then gradually decreases. If, during normal operation, there is a major leak of water, you need to replace the seal.
4. The following figure shows the vibration values for the system under normal operating conditions. Excessive vibrations may be due to wear, stressed pipes or the loosening of the anchor bolts of the top part.

Permitted vibration range (1/1000 mm)



## 7.2 PRECAUTIONS DURING OPERATION

1. Operating the pump for a long period of time with the delivery valve closed may cause damage to some of the pump components due to overheating inside the pump.
2. Too many stops and starts can cause damage to the pump. Limiting the number of starts is recommended in line with the following:

$N \leq 6$  when  $P \leq 7.5$  kW

$N \leq 4$  when  $11$  kW  $\leq P \leq 22$  kW  $N \leq 3$   
when  $P > 22$  kW

N = start ups/h

P = motor power



### 7.3 PRECAUTIONS DURING STORAGE

1. The pump body may fracture if the water inside freezes; insulate the pump or remove all the water from the inside.
2. If you have any spare pumps, you must perform test runs on them on a regular basis and keep them ready for use at all times.
3. When a pump remains off for a long period of time, you must take great care to prevent any oxidation on the surface of the bearings, shaft, coupling, etc.

### 7.4 REPLACING PARTS

Replace worn parts according to the following table:

Piece	Status	Replacement period
Mechanical seal	Water leakage	Yearly
Rolling bearings	Excessive noise or vibration	Every 2 or 3 years
Pump body O-ring	After every dismantling	---
Coupling rubber parts	As soon as any signs of damage appear	Yearly

This replacement period is an average and refers to normal operating conditions.

The table, below, shows the number and size of the parts to be replaced, according to the model of the pump:

Model	Shaft unit	Casing O' Ring	Wear Ring	
			Front	Rear
32-125	230#	3.53x183.74	76	76
32-160	230#	3.53x183.74	76	76
32-200	230#	3.53x234.54	76	76
32-250	230#	3.53x278.99	76	76
40-125	230#	3.53x183.74	88	88
40-160	230#	3.53x183.74	88	88
40-200	230#	3.53x234.54	88	88
40-250	230#	3.53x278.99	88	88
40-315	240#	3.53x355.19	100	100
50-125	230#	3.53x183.74	100	100
50-160	230#	3.53x183.74	100	100
50-200	230#	3.53x234.54	100	100
50-250	230#	3.53x278.99	100	100
50-315	240#	3.53x355.19	116	116
65-125	230#	3.53x183.74	116	116
65-160	230#	3.53x183.74	116	116
65-200	230#	3.53x234.54	116	116
65-250	240#	3.53x278.99	116	116
65-315	240#	3.53x355.19	132	132
80-160	230#	3.53x183.74	132	132
80-200	240#	3.53x234.54	132	132
80-250	240#	3.53x278.99	148	148
80-315	240#	3.53x355.19	148	148
80-315L	250#	3.53x355.19	148	148
80-400	250#	3.53x456.06	148	148
100-160	240#	3.53x183.74	148	153
100-200	240#	3.53x234.54	158	158
100-250	240#	3.53x278.99	158	158
100-315	240#	3.53x355.19	158	162
100-315L	250#	3.53x355.19	158	162
100-400	250#	5.33x456.06	168	168
125-200	240#	3.53x234.54	168	158
125-250	240#	3.53x278.99	178	168
125-250L	250#	3.53x278.99	178	178
125-315	250#	3.53x355.19	188	178
125-400	250#	5.33x456.06	188	188
125-500	260#	3.53x532.26	200	200
150-200	240#	3.53x234.54	178	162
150-250	250#	3.53x278.99	212	212
150-315	250#	3.53x355.19	212	212
150-400	250#	5.33x456.06	236	236
150-500	270#	5.33x532.26	250	250
200-400	270#	5.33x456.06	278	278
200-500	280#	5.33x532.26	278	278

Shaft unit	Mech. seal d <sub>1</sub> (mm)	Ball bearings
230#	28	6306ZZ
240#	38	6308ZZ
250#	48	6310ZZ
260#	55	6312ZZ
270#	65	6314ZZ
280#	75	6316ZZ

## 7.5 TROUBLESHOOTING

Although the equipment usually functions according to the user's requirements, in some cases its operation may not come up to expectations due to problems with the system or the power supply. The following table may be useful in finding possible solutions in the event of failures or malfunctions:

### PUMP

Fault	Causes	Measures to be taken
The motor will not start.	<ul style="list-style-type: none"> <li>- The control panel is not working correctly.</li> <li>- Motor failure.</li> <li>- Faults in the power supply.</li> <li>- Friction on rotation shaft.</li> <li>- Pump clogged.</li> </ul>	<ul style="list-style-type: none"> <li>- Check all conditions.</li> <li>- Repair the motor.</li> <li>- Check and repair.</li> <li>- Rotate it by hand. Reassemble.</li> <li>- Repair in specialist workshop.</li> <li>- Remove foreign bodies.</li> </ul>
There is no priming.	<ul style="list-style-type: none"> <li>- Foreign bodies in the bottom valve.</li> <li>- Malfunction in the bottom valve.</li> <li>- Water leakage from the suction pipe.</li> <li>- Air entering the suction pipe or seal.</li> </ul>	<ul style="list-style-type: none"> <li>- Remove foreign bodies.</li> <li>- Replace the valve.</li> <li>- Check the suction pipe.</li> <li>- Check the suction pipe and mechanical seal.</li> </ul>

<p>The pump has no flow rate</p>	<ul style="list-style-type: none"> <li>- The pump does not turn.</li> <li>- The delivery valve is closed or half-closed.</li> <li>- The suction head is too high for the pump.</li> </ul>	<ul style="list-style-type: none"> <li>- Check that the impeller is free.</li> <li>- Open the valve.</li> <li>- Check the project.</li> </ul>
<p>Low flow rate</p>	<ul style="list-style-type: none"> <li>- The direction of rotation is not correct.</li> <li>- Low rotation speed.</li> <li>- Low voltage.</li> <li>- Blocking in the bottom valve or in the filter.</li> <li>- Impeller is blocked.</li> <li>- Pipe clogged.</li> <li>- Air entering the system.</li> <li>- Leakage in the delivery pipe.</li> <li>- Impeller worn.</li> <li>- Significant head losses in the system.</li> <li>- Liquid temperature very high. The liquid is volatile.</li> <li>- Cavitation.</li> </ul>	<ul style="list-style-type: none"> <li>- Correct the electrical connections.</li> <li>- Measure the RPM with a tachometer.</li> <li>- Check the power supply.</li> <li>- Remove foreign bodies.</li> <li>- Remove foreign bodies.</li> <li>- Remove foreign bodies.</li> <li>- Check and repair the suction pipe and shaft seal.</li> <li>- Check and repair.</li> <li>- Check the impeller.</li> <li>- Review the project.</li> <li>- Review the project.</li> <li>- Seek expert advice.</li> </ul>
<p>Water comes out initially and then stops abruptly.</p>	<ul style="list-style-type: none"> <li>- The pump has not been primed.</li> <li>- Air entering the system.</li> <li>- Air bubbles in the suction pipes.</li> <li>- The suction head is too high for the pump.</li> </ul>	<ul style="list-style-type: none"> <li>- Prime the pump correctly.</li> <li>- Check and repair the suction pipe and shaft seal.</li> <li>- Vent the pipes.</li> <li>- Review the project.</li> </ul>

<p>Power surge</p>	<ul style="list-style-type: none"> <li>- The voltage is low or the imbalance between the phases is high.</li> <li>- 50 Hz pump is being used at 60 Hz.</li> <li>- Foreign bodies inside the pump.</li> <li>- The mechanical seal was not fitted correctly.</li> <li>- Bearings damaged.</li> <li>- Friction in the rotation areas. The shaft is bent.</li> <li>- The direction of rotation is not correct.</li> <li>- The density and/or viscosity level of the liquid is high.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the power supply.</li> <li>- Check the nameplate details.</li> <li>- Remove foreign bodies.</li> <li>- Fit it correctly.</li> <li>- Replace the bearings.</li> <li>- Repair in specialist workshop.</li> <li>- Check and correct the connection.</li> <li>- Review the project.</li> </ul>
<p>The bearings are overheating.</p>	<ul style="list-style-type: none"> <li>- Bearings damaged.</li> <li>- In operation for a long time with the valve closed or half-closed.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the bearings.</li> <li>- Avoid such a situation; open the valve or stop the pump.</li> </ul>
<p>Excessive operating vibration and noise.</p>	<ul style="list-style-type: none"> <li>- Fault in installation.</li> <li>- Bearings damaged.</li> <li>- Flow rate too high.</li> <li>- Flow rate too low.</li> <li>- Impeller is blocked.</li> <li>- The direction of rotation is not correct.</li> <li>- Friction in the rotation areas. The shaft is bent.</li> <li>- Cavitation.</li> </ul>	<ul style="list-style-type: none"> <li>- Check installation.</li> <li>- Replace the bearings.</li> <li>- Reduce the aperture of the delivery valve.</li> <li>- Increase the aperture of the delivery valve.</li> <li>- Remove foreign bodies.</li> <li>- Check and correct the direction.</li> <li>- Repair in specialist workshop.</li> <li>- Seek expert advice.</li> </ul>

Excessive water leakage from the shaft seal.	<ul style="list-style-type: none"> <li>- Defective fitting of the mechanical seal.</li> <li>- The mechanical seal is damaged.</li> <li>- Overpressure in delivery.</li> <li>- The shaft is bent.</li> </ul>	<ul style="list-style-type: none"> <li>- Fit it correctly.</li> <li>- Replace the mechanical seal.</li> <li>- Review the project.</li> <li>- Repair in specialist workshop.</li> </ul>
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## MOTOR

<b>Fault</b>	<b>Causes</b>	<b>Measures to be taken</b>
It does not work	<ul style="list-style-type: none"> <li>- The winding is broken or has been cut.</li> <li>- Stator short-circuited.</li> <li>- Earthed.</li> <li>- The bearings are blocked.</li> <li>- The voltage is low.</li> <li>- Lack of phases in the power supply.</li> </ul>	<ul style="list-style-type: none"> <li>- Repair in specialist workshop.</li> <li>- Repair in specialist workshop.</li> <li>- Repair in specialist workshop.</li> <li>- Repair the bearings.</li> <li>- Change the nominal voltage.</li> <li>- Check the power supply.</li> </ul>
Abnormal noise or excessive vibrations.	<ul style="list-style-type: none"> <li>- Operation without a phase.</li> <li>- Power surges.</li> <li>- Friction between the rotor and stator.</li> <li>- Obstructions in the cooling fan.</li> <li>- Fault in installing the motor.</li> <li>- Poor Star/Delta commutation.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the power supply.</li> <li>- Correct the power surges.</li> <li>- Align and/or replace the bearing.</li> <li>- Remove foreign bodies.</li> <li>- Connect the pump correctly.</li> <li>- Correct the cabling.</li> </ul>
Motor overheating. Appearance of smoke and/or bad smell.	<ul style="list-style-type: none"> <li>- High power surges.</li> <li>- Fan is blocked.</li> <li>- Wrong voltage.</li> </ul>	<ul style="list-style-type: none"> <li>- Correct the power surges.</li> <li>- Release the fan.</li> <li>- Change the motor for one with the appropriate voltage.</li> </ul>

	<ul style="list-style-type: none"> <li>- The bearings are blocked.</li> <li>- Stator short-circuited.</li> <li>- Stator earthed.</li> </ul>	<ul style="list-style-type: none"> <li>- Repair the bearings.</li> <li>- Repair in specialist workshop.</li> <li>- Repair in specialist workshop.</li> </ul>
Low rotation speed.	<ul style="list-style-type: none"> <li>- Low voltage.</li> <li>- Poor Star/Delta commutation.</li> <li>- Overloading.</li> <li>- Defective electrical connection.</li> </ul>	<ul style="list-style-type: none"> <li>- Change the nominal voltage.</li> <li>- Correct the cabling.</li> <li>- Reduce the current.</li> <li>- Correct the electrical connections.</li> </ul>

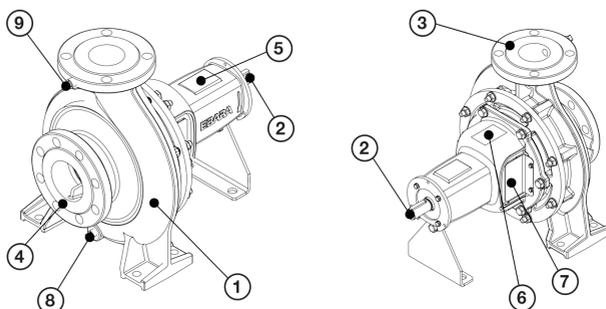
### 7.6 RESIDUAL RISKS

The use and maintenance of the following pieces of equipment may lead to risks beyond the capacity of the manufacturer and, therefore, the user must pay the utmost attention to maintenance work and the handling of the equipment. The following risks need to be taken into account:

Operation	Risk	Measures to be taken
Maintenance	<ul style="list-style-type: none"> <li>- Burns</li> <li>- Damage caused due to it being empty or due to pressure</li> <li>- Damage caused by entrapment</li> </ul>	<ul style="list-style-type: none"> <li>- Wait until the temperature goes down</li> <li>- Check the temperature before touching</li> <li>- Stop the pump and proceed very carefully</li> <li>- Stop the pump and proceed very carefully</li> <li>- Always fit protection guards</li> <li>- Keep your distance from rotating parts</li> </ul>
Transport and lifting	<ul style="list-style-type: none"> <li>- Impacts and falls</li> </ul>	<ul style="list-style-type: none"> <li>- Proceed with care</li> </ul>

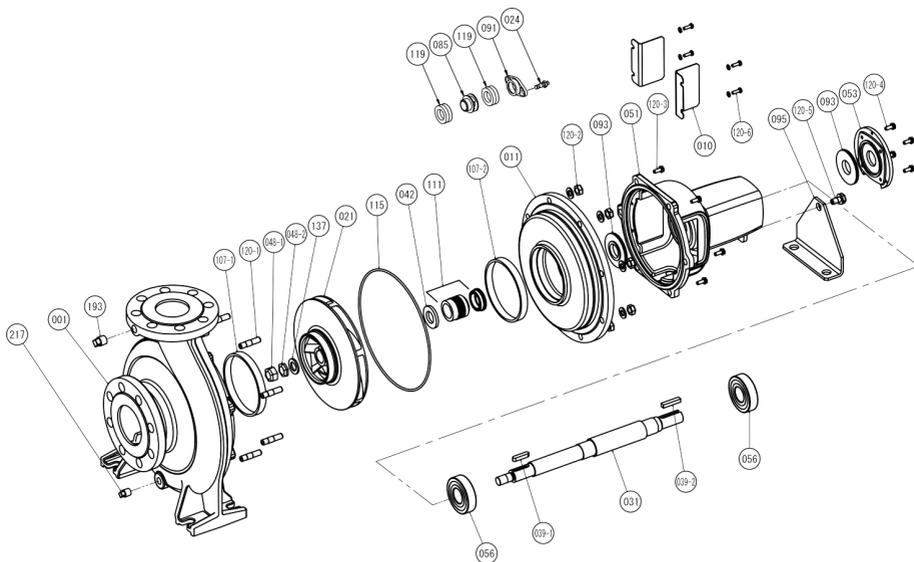
## 8. CONSTRUCTION

This figure shows a standard GS model. There may be some variations depending on the model.



Num.	Name	Num.	Name
1	Pump body	6	High temperature label
2	Shaft with key	7	Shaft guard
3	Delivery flange	8	Drainage cap
4	Suction flange	9	Air relief cap
5	Nameplate		

The following figure shows the exploded view of a pump from the GS series. This exploded view is purely as a rough guide. Here, you can identify the components of your pump, in case you need any spare parts or advice.



### Parts list for a pump with mechanical seal

Num.	Name	Quant.	Num.	Name	Quant.
001	Pump body	1	095	Foot	1
010	Protection	2	107-1	Clearance ring	1
011	Seal disk	1	107-2	Clearance ring	0/1
021	Impeller	1	111	Mechanical seal	1
031	Shaft	1	115	Pump body O-ring	1
039-1	Key	1	120-1	Tensioner bolt	6/..16
039-2	Key	1	120-2	Nut and washer	6/..16
042	Bottom closure ring	1	120-3	Bolt	0/6
048-1	Impeller nut	1	120-4	Bolt	4
048-2	Impeller nut	1	120-5	Bolt	1
051	Bearing mount support	1	120-6	Bolt and washer	4
053	Support cap	1	137	Impeller washer	1
056	Bearing	2	193	Cap	1
093	Splash guard washer	2	217	Drainage cap	1

## 9. DISMANTLING AND FITTING

### 9.1 DISMANTLING

When dismantling the pump, take care not to damage the components. Our advice is not to reuse the removed gaskets, but to replace them.

Before dismantling the pump you must make sure that it is not running and that the motor has been disconnected from the power supply.

1. Completely drain the water from inside the pump via the drainage cap (217).
2. Remove the motor from the base. Check the elastic coupling connection.
3. Remove the screws from the seal housing disk, and then separate the pump body from the rest of the pump. Check if there are worn or eroded parts or other anomalies. Replace the wear ring (107) when the clearance between the impeller and the ring is approximately 1 mm.

4. Release the impeller nuts (048) and washer (137) and remove the impeller (021). If there is any deposits on the impeller which might cause some resistance, clean and remove it gently.
5. Remove the key (039-1) of the shaft (031), after the seal, the seal housing body and the splash guard washer (093).
6. In a pump with a mechanical seal: the fixed portion of the seal is inserted in the seal housing disk (011) and can be removed by pushing it gently from the back using a screwdriver or similar instrument.
7. Remove the cap of the bearing mount support (053) from the bearing mount support (51) and remove the shaft, striking it with a hammer from the opposite side until the bearing has been removed from its position. Remove the second bearing by hammering it from the opposite side. Inspect the condition of the bearings (056) and replace them if they do not rotate smoothly and noiselessly. There must not be any leakage of grease or lubricant during this operation.

## 9.2 FITTING

The pump must be fitted by following the procedure for dismantling in the reverse order, paying attention to the following points:

1. In pumps with a mechanical seal: Wipe the surfaces of the mechanical seal with alcohol and a dry, delicate cloth.
2. Replace the gaskets on the pump body with new ones.
3. Change any worn or damaged parts.
4. Tighten the screws gradually and symmetrically with the following torque using a torque wrench: M6: 4.5 Nm, M8: 11 Nm, M10: 22 Nm, M12: 38 Nm, M16: 93 Nm, M20: 181 Nm, M24: 313 Nm.
5. Fit the motor and align it with the pump, in accordance with the procedure indicated in the section on Alignment.

## 10. REPAIR AND WARRANTY

Order any repairs for the equipment directly from our company or from our approved technical support services. EBARA warrants free repairs according to the conditions listed below:

1. The equipment warranty period is one year from the date of purchase.
2. During the warranty period, any faults or damage due to defects in design or assembly by our company will be repaired free of charge, even if it has been used correctly.



In such cases, EBARA will meet the costs of repairs or replacement of defective components that are recognised as faulty at our own production facility. We decline all liability for any additional costs.

3. No repairs will be carried out under warranty, if malfunctions occur after the warranty period has expired, or as a result of incorrect use of the pump, due to natural disasters, or the use of parts not approved by EBARA, or in the event of repairs or modifications carried out by unauthorised personnel.
4. EBARA assumes no liability for damage to the product or property and personal injury generated by misuse of the pump or electric pump.

If you notice anything unusual while using the product, switch it off immediately and check for any faults. (See section 8.5 Troubleshooting). In this case, contact EBARA as soon as possible, giving the details on the nameplate of the pump and the problem encountered.

Do not hesitate to contact EBARA if you need any clarification about the product you have purchased.