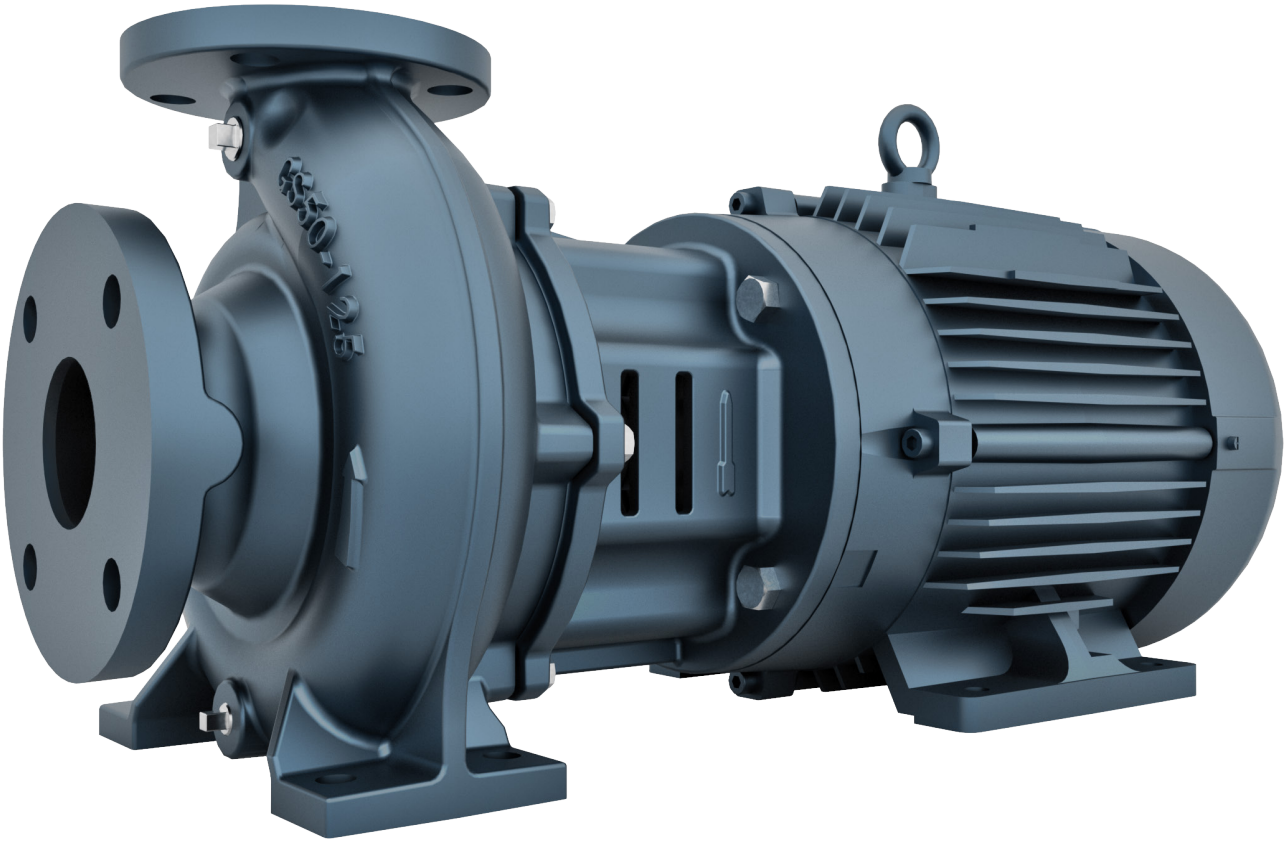
End Suction Centrifugal

GSDU Series



Operating Instructions, Installation & Maintenance Manual

Certified to NSF/ANSI/CAN 61 & 372

*__Note:__ *Model GSDU with seal code "E" is certified*

EBARA

EBARA Pumps Americas Corporation

Contents

1. INTRODUCTION

Thank you for choosing this EBARA GSDU 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..

When this equipment is delivered:

1. Check the nameplates. It is very important to check the voltage rating for the pump. Also, check the values for head, rate of flow, and speed of rotation of the pump, as well as the motor output power.

2. Double check the equipment to make sure there is no damage generated during the startup and that there are no loose screws or mountings.

3. Check that all the accessories, spare parts and required options are present.

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 consider applicable safety regulations and standards in the country where you want to use the equipment.

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. The responsibilities, skills, and supervision of the personnel are the responsibility of the employer. If the staff do not have the appropriate knowledge, they must be adequately 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 authorized by EBARA are suitable for meeting safety standards. Rebuilding, modifying or using other spare parts may lead to the invalidation of your warranty.

Sound levels produced during operation of the equipment depend 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.

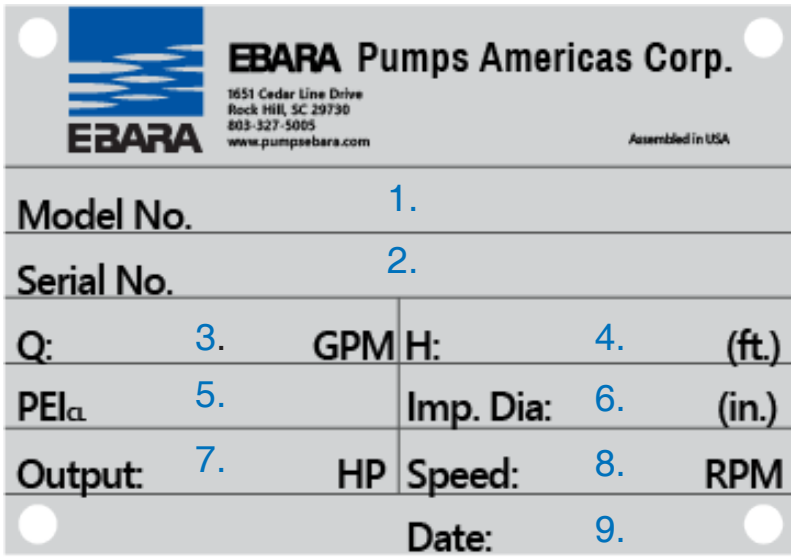
Always keep the nameplates legible and in good condition because the details shown will be needed for future reference or to request spare parts.

3. TRANSPORT AND STORAGE

This 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

Pump nameplate:



1. Model Number
2. Serial number
3. Flow rate
4. Head
5. PEI Value
6. Impeller Diameter
7. Motor HP
8. Motor Rotational Speed
9. Assembly Date

GSDU applications include climate control and building services, water supply, industry, etc. Standard specifications are shown in the following table. Options are available.

Description		Standard
		2 and 4 poles
Liquid	Temperature	14 to 250 °F
	Density	in accordance with requirements
	Viscosity	in accordance with requirements
Maximum operating pressure		200 psi (13.8 bar)
Construction	Impeller	Closed
	Seal	Mechanical
		Silicon Carbide/Carbon/EPDM
	Bearings	According to motor supplier
Flanges		ANSI B16.1 125lb FF
Material	Casing	Cast iron ASTM A48 CL35
	Impeller	Stainless Steel 316 (CF8M)
	Shaft sleeve	Stainless Steel 316
	Casing ring	Bronze CAC902
	O-ring/elastomer	EPDM

5. OPERATING LIMITS

It is generally recommended the equipment be mounted inside (below roof level), in adequately ventilated rooms and where access is restricted to authorized personnel, in addition to working within the following limits:

- **Ambient temperature:** must not exceed 104°F and the average temperature over 24 hours must not be above 95°F. The minimum air temperature in the space will be 39°F.
- **Humidity:** humidity must not exceed 50% and a temperature of 104°F. Higher humidity levels can be accepted at very low temperatures.
- **Pollution:** the surrounding air must be clean and non-corrosive.
- **Altitude:** the altitude where the pump is installed must not exceed 1000m/3300ft.

If the conditions of use are different from those indicated, consult the factory for guidance; such as installation outdoors or in places open to the public; any temperature, humidity, and altitude values other than those described; heavy pollution due to dust, fumes, vapors or salt; exposure to strong magnetic or electrical fields; locations exposed to risks of explosion, mechanical vibrations and significant shocks.

6. INSTALLATION

6.1 INSTALLATION POINT

(1) Install the equipment in an easily accessible place.

(2) Prohibit access to unauthorized persons.

(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.

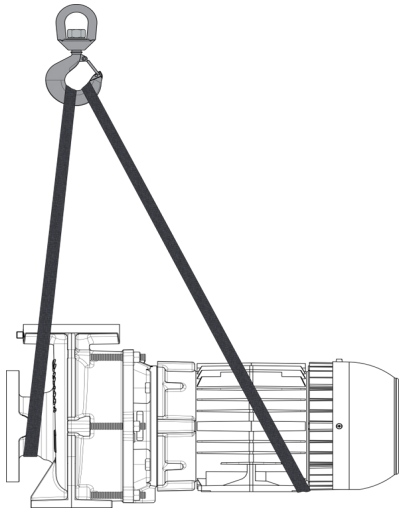
(4) The sum between the suction head and total head of the pump must always be less than the maximum operating pressure (see section 4 - Specifications).

6.2 LIFTING

OBSERVE ALL APPLICABLE SAFETY REGULATIONS. ONLY USE THE PROCEDURES PRESENTED BELOW AND THE LIFTING POINTS DESIGNED FOR HANDLING THE PACKAGING AND OF THE PUMP WHEN THE PACKAGING HAS BEEN REMOVED.

POSSIBLE RISK OF CRUCH INJURY. USE SAFETY SHOES AND PROTECTIVE GLOVES. FOR EXCESSIVE WEIGHT, USE SUITABLE HOISTS, FORKLIFTS OR OTHER LIFTING MEANS.

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:



Ensure that there are no personnel exposed to danger during the operation.
To lift the assembly, do not use the attachment points of the motor or the pump because they may not have been designed to bear the combined weight of the pump, motor and base.

HANDLE, LIFT AND MOVE THE MACHINE SLOWLY, AVOID SWAYING AND DANGER OF TIPPING OVER

6.3 CEMENTED BASE

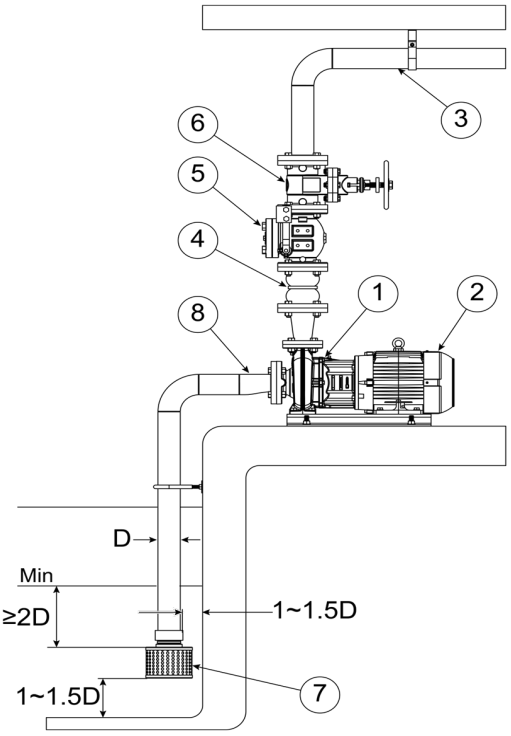
Pump units must be mounted on a solid cement base. The cement base must be sufficiently rigid, permanent, and aligned, and must be located on ground capable of bearing the entire load. The unit must rest completely on the cemented base.

If elastic dampers are used, they should not be placed directly under the metal profiles. Use a solid plate with a weight of one and a half times to two times the overall weight of the unit, arranging the dampers and plate under the pump assembly. There are several valid methods although this plate is typically made with concrete and its dimensions exceed those of the top by about 1.875" (0.2 meters) on all four sides.

Incorrect base design can contribute to premature failure and invalidate the warranty period.

6.4 PIPES

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



1	PUMP
2	MOTOR
3	MOUNT
4	EXPANSION JOINT
5	CHECK VALVE
6	SHUT-OFF VALVE
7	STRAINER
8	ECCENTRIC REDUCER

1. Make sure that the suction and discharge pipes do not transmit any stress to the pump by installing sufficiently strong supports. If this is not done, the pump could become misaligned and even break.

2. Use check valves (between the pump and the discharge valve) in the following cases:
   - If discharge pipes are very long.
   - If discharge head is high.
   - If the operation is automatic.
   - When you fill a tank under pressure.
   - When the operation is in parallel.

3. Install 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 installed at points where the pressure is less than atmospheric pressure since the valve would suck in air rather than expel it.

4. To reduce the effect of water hammer, mount a check valve with spring.

5. Suction systems:

   - The bottom end of the suction pipe must remain submerged at a depth of at least twice the diameter of the pipe (2D) and at a distance from the bottom of 1 to 1 and a half times the diameter (1~1.5 D).

   - Use a strainer with a filter at the beginning of the suction pipe to prevent the entry of any foreign bodies.

   -The suction pipe must be installed with an upward gradient towards the pump (of more than 1%) to avoid the formation of air bubbles. Pipes and other accessories must be connected in such a way so as not to create any air intake between the different elements.

   - Make sure that the suction pipe is as short and straight as possible and try to avoid any unnecessary bends or additional length. Do not install any shut-off valve in this section.

   - The following table contains recommended dimensions for suction pipes and eccentric reducer. Eccentric reducers must be installed with an upward gradient towards the pump to avoid the formation of air bubbles.

Suction x Discharge	4 Pole		2 Pole	
	Pipe Size	Reduction	Pipe Size	Reduction
50 x 32 2” x 1.25”	65 2.5”	65 x 50 2.5” x 2”	80 3”	80 x 50 3” x 2”
65 x 40 2.5” x 1.5”	80 3”	80 x 65 3” x 2.5”	100 4”	100 x 65 4” x 2.5”
65 x 50 2.5” x 2”	100 4”	100 x 65 4” x 2.5”	125 5”	125 x 65 5” x 2.5”
80 x 65 3” x 2.5”	125 5”	125 x 80 5” x 3”	150 6”	150 x 80 6” x 3”
100 x80 4” x 3”	150 6”	150 x 100 6” x 4”	200 8”	200 x 100 8” x 4”
125 x 100 5” x 4”	200 8”	200 x 125 8” x 5”	250 10”	250 x 125 10” x 5”
150 x 125 6” x 5”	250 10”	250x 150 10” x 6”	300 12”	300 x 150 12” x 6”
200 x 150 8” x 6”	300 12”	300 x 200 12” x 8”	---	---

6. In systems where a booster pump is present:

   -The installation of a shut-off valve is recommended in the suction pipe to facilitate dismantling and overhauls.

   -Install the suction pipe with an upward gradiant towards the pump to avoid the formation of air bubbles.

6.5 ELECTRICAL SYSTEM

Keep motor air inlets and outlets unobstructed for proper cooling. Our recommendation is to install the equipment in a ventilated place away from any heat source.

The condensate drainage outlets must be located in the lower part of the motor. The drainage caps can only be removed when the motor is protected from the water.

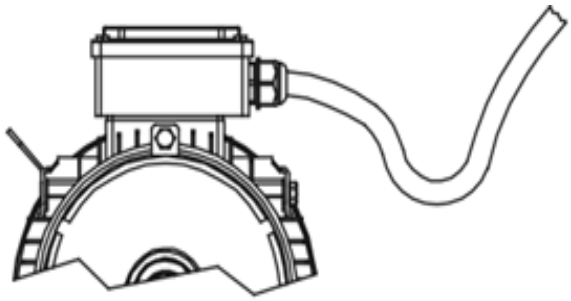
6.5.1 ELECTRICAL CONNECTION

ALL ELECTRICAL CONNECTIONS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL AND WITH THE POWER SUPPLY SWITCHED OFF.

DANGER OF ELECTRIC SHOCK. USE PROTECTIVE GLOVES AND OBSERVE SAFETY PROCEDURES AND REGULATIONS.

- Use power supply cables that are adequately sized to carry the maximum current absorbed by the motor, in addition to the margin set by local requirements; this will avoid any overheating and/or voltage drops (voltage drops must be less than 5% during the start-up phase).

- Make sure the cables reach the terminal box with a curve that prevents water from getting into or running over the box.



- Connections must be clean and protected against rust.

- Check sealing of the cable gland.

- Avoid any mechanical stress being transferred to the wire connections.

- Comply with the current and frequency limits indicated on the nameplate of the motor.

- Protective electrical devices must be used to prevent any accidents involving electrical discharges, and overload protection against power surges for motors with the aim of avoiding any damage due to overheating.

6.5.2 ELECTRICAL MAINTENANCE

DISCONNECT POWER BEFORE PERFORMING WORK ON THE MOTOR OR ON ANY POWERED ACCESSORY.

- Ensure that all requirements regarding installation and electrical connections are complied with.

- Follow the lubrication schedule and specifications of the motor manufacturer. However, it is advisable to replace the bearings after three years.

7. OPERATION

7.1 BEFORE STARTING THE PUMP

1. Make sure that the pipes are flushed after the installation is completed, since any impurities may ll lead to faults, noises and excessive wear around the mechanical seal and the other parts of the pump.
2. Check that the pump turns easily by spinning the shaft with your hand. If the movement is stiff or irregular, check the pump because the mechanical seal may be damaged or there may be rust inside the pump.
3. Check the operating details of the motor, which are listed on the nameplate.
4. Do not operate the pump before priming it first. If the system is a suction lift arrangement, the pump and the suction pipe must be filled with water. If the suction is pressurized, the pump must be filled with water by opening the suction and delivery valves. Rotate the shaft by hand to ensure that no air remains inside the pump.
5. Check rotation of the motor, as shown below:

   - Close the delivery and suction valves.

   - Switch on the motor for 1 or 2 seconds, then stop it.

   - Observe the direction of rotation of the motor fan as it stops. 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.

7.2 STARTING THE PUMP

DO NOT OPERATE THE PUMP BEFORE IT IS PLACED AND INSTALLED IN ITS FINAL POSITION OF USE. THE MOTOR JUNCTION BOX MUST BE SEALED.

1. Shut off the discharge valve. Open the suction valve if one is present.
2. Turn on and off the switch to start the motor once or twice, to ensure that there are no faults in the startup.

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.
5. Check that there are no significant vibrations and/or unusual noises.
6. Follow the same procedure during subsequent startups if the operating conditions are normal, observing the instructions in Chapter 8. Maintenance.

7.3 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.

8. MAINTENANCE

MAINTENANCE OPERATIONS MUST BE PERFORMED BY QUALIFIED PERSONNEL:AN ERROR MAY LEAD TO DAMAGE CAUSED BY ELECTRICAL DISCHARGE, FIRE OR MALFUNCTIONS THAT IN TURN COULD LEAD TO AN ACCIDENT.

MAKE SURE THAT THE POWER IS DISCONNECTED AND CANNOT BE REACTIVATED INADVERTENTLY DURING MAINTENANCE OPERATIONS; THE PUMP COULD START SUDDENLY IN CASE OF AUTOMATIC OPERATION. RISK OF CRUSHING AND ELECTROCUTION.

WHEN PUMPING HIGH TEMPERATURE FLUIDS, REMAIN AT A SAFE DISTANCE UNTIL ALL THE COMPONENTS .HAVE COOLED DOWN BEFORE MAKING ANY REPAIRS OR ADJUSTMENTS. SIMILARLY, DO NOT TOUCH THE SURFACE OF THE MOTOR WITHOUT MAKING SURE THAT THE TEMPERATURE HAS DROPPED TO A SAFE LEVEL

8.1 DAILY INSPECTION

1. Significant variations in pressure, flow, electricity, vibration or noise may be a sign of a malfunction of the pump. Refer to section 8.5 - Troubleshooting. It is advisable to keep a daily register on the operating conditions to allow discovery of any symptoms that may be the result of a potential failure.

2. Generally, the mechanical seal does not show any leaks. Sometimes, at the beginning of operation there is a small leak of water which then gradually decreases. If, during normal operation, there is a major leak of water from the seal, then it will need to be replaced.

8.2 PRECAUTIONS DURING OPERATION

1. Operating the pump for a long period of time with the discharge valve closed may cause damage to 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 $P \leq 10$ hp
   $N \leq 4$ when $15 \text{ hp} \leq P \leq 30$ hp
   $N \leq 3$ when $P > 30$ hp

   N = startup/hour

   P = motor power

8.3 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 bearing, shaft, coupling, etc.

8.4 REPLACING PARTS

Replace worn parts according to the following table:

Part	Condition	Replacement period
Mechanical Seal	Water leakage	Yearly
O-rings	After every disassembly	---
Bonded seal	After every disasembly	---

8.5 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 does not start	-The control panel is not working correctly.	-Check all conditions.
	-Motor failure.	-Repair the motor.
	-Faults in the power supply.	-Check the power supply.
	-Friction on rotation of the shaft.	-Check and repair. Rotate it by hand. Reassemble.
	-Pump clogged.	-Remove foreign bodies.
There is no priming	-Foreign bodies in the strainer.	-Remove foreign bodies.
	-Malfunction in the strainer.	-Replace the valve.
	-Water leakage from the suction pipe.	-Check the suction pipe.
	-Air entering the suction pipe or seal.	-Check the suction pipe and mechanical seal.
The pump has no flow rate	-The pump does not turn.	-Check that the impeller is free.
	-The discharge valve is closed or partially closed.	-Open the valve.
	-The suction head is too low for the pump.	-Check the installation.

Fault	Causes	Measures to be taken
Low flow rate	-The direction of rotation is not correct.	-Correct the electrical connections.
	-Low rotation speed.	-Measure the RPM with a tachometer.
	-Low voltage.	-Check the power supply.
	-Blocking in the strainer or in the filter.	-Remove foreign bodies.
	-Impeller is blocked.	-Remove foreign bodies.
	-Pipe is clogged.	-Remove foreign bodies.
	-Air entering the system.	-Check and repair the suction pipe and shaft seal.
	-Leakage in the discharge pipe.	-Check and repair.
	-Impeller worn.	-Check the impeller.
	-Significant head losses in the system.	-Review the installation.
	-Liquid temperature very high. The liquid is volatile.	-Review the installation.
	-Cavitation.	-Seek expert advice.
Water comes out initially and then stops abruptly.	-The pump has not been primed.	-Prime the pump correctly.
	-Air entering the system.	-Check and repair the suction pipe and shaft seal.
	-Air bubbles in the suction pipes.	-Vent the pipes.
	-The suction head is too high for the pump.	-Review the installation.
Excessive water leakage from the shaft seal.	-Defective installation of the mechanical seal.	-Fit correctly.
	-The mechanical seal is damaged.	-Replace the mechanical seal.
	-Overpressure in delivery.	-Review the installation.
	-The shaft is bent.	-Have pump repaired.

Fault	Causes	Measure to be taken
Excessive operating vibration and noise.	-Fault in installation.	-Check installation.
	-Flow rate too high.	-Throttle flow using the discharge valve.
	-Flow rate too low.	-Open discharge valve.
	-Impeller is blocked.	-Remove foreign bodies.
	-The direction of rotation is not correct.	-Check and correct the connection.
	-Friction in rotation. The shaft is bent.	-Have pump repaired.
	-Cavitation.	-Seek expert advice.
	-Vibration in the piping.	-Reinforce the piping or install an inverter.
Power Surge	-The voltage is low or imbalance between the phases is high.	-Check the power supply.
	-The flow rate is too high or the head is too low.	-Partially shut off the discharge valve.
	-Foreign bodies inside the pump.	-Remove foreign bodies.
	-The mechanical seal was not installed correctly.	-Reinstall or replace mechanical seal.
	-Friction in the rotation areas. The shaft is bent.	-Have pump installed.
	-The direction of rotation is not correct.	-Check and correct the connections.
	-The density and/or viscosity level of the liquid is high.	-Review the application.

MOTOR

Fault	Causes	Measure to be taken
Motor does not start	-The winding is brocken or has been cut. -Stator short-circuited. -The bearings are locked. -The voltage is low. -Loss of phase in the power supply.	-Have motor repaired. -Have motor repaired. -Replace the bearings. -Check the power supply. -Check the power supply.
Abnormal noise or exessive vibrations	-Loss of phase in the power supply. -Power surges. -Friction between the rotar and stator. -Obstructions in the cooling fan. -Fault in installing the motor. -Poor Star/Delta commutation.	-Check the power supply. -Correct the power surges. -Align and/or replace the bearing. -Remove foreign bodies. -Wire the motor correctly. -Correct the cabling.
Motor overheating. Appearance of smoke and/or bad smell.	-High power surges. -Fan is stuck. -Wrong voltage. -The bearings are blocked. -Stator short-circuited.	-Correct the power surges. -Release the fan. -Change the motor for one with the appropriate voltage. -Repair the bearings. -Have motor repaired.
Low rotation speed	-Low Voltage. -Poor Star/Delta commutation. -Overloading. -Defective electrical connection.	-Change the nominal voltage. -Correct the cabling. -Reduce the current. -Correct the electrical connections.

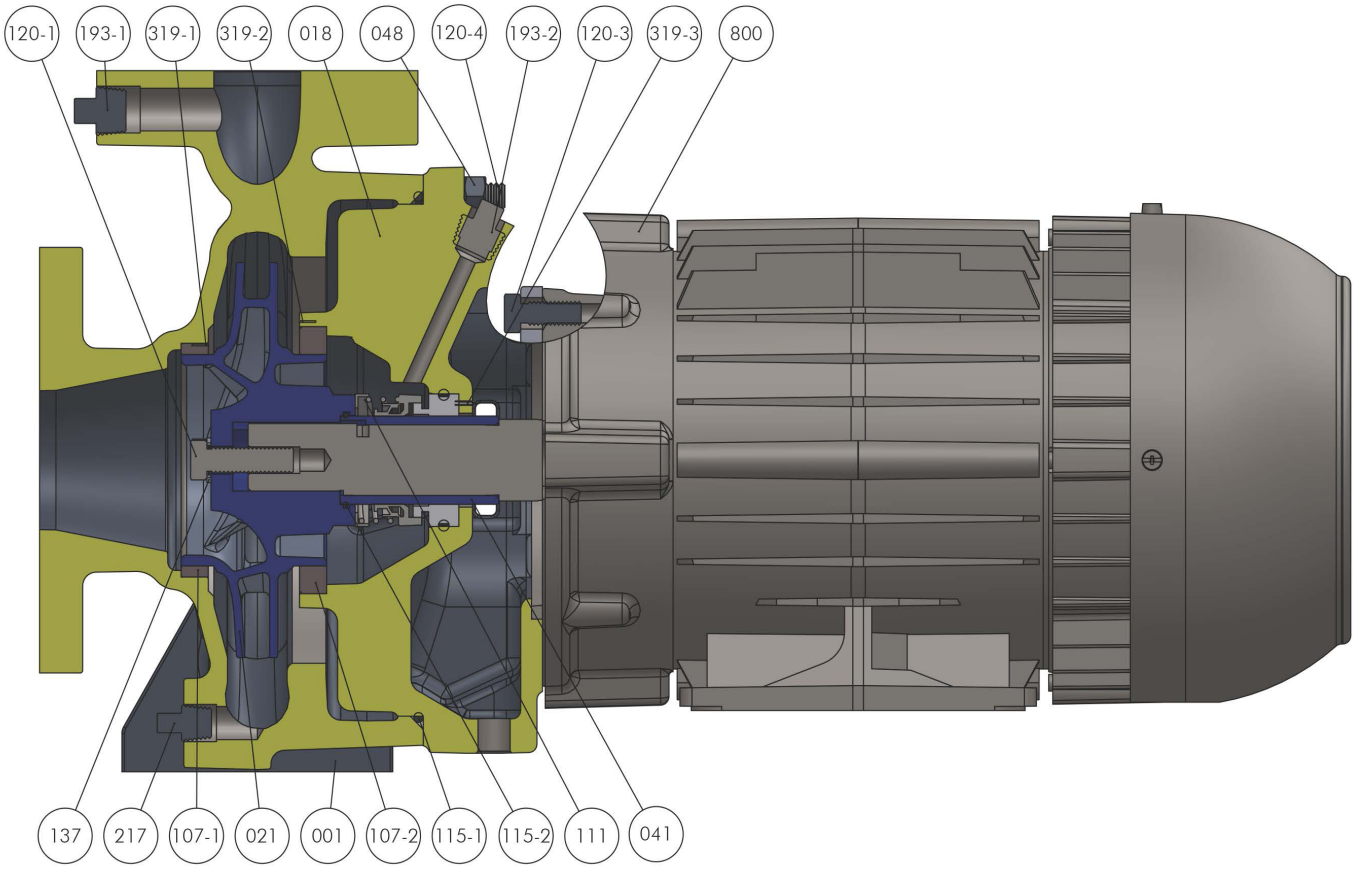
8.6 RESIDUAL RISKS

The use and maintenance of the 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 considered:

	WHILE MAINTENANCE IS BEING PERFORMED, THERE IS THE RISK OF WORKING ON MOVING PARTS WHILE THE MACHINE IS OPERATING. BE SURE TO DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE PERFORMING ANY WORK.
	THERE ARE MOVING PARTS INSIDE THE PUMP WHICH PRESENT A DANGER OF CRUSHING. DO NOT CONNECT THE MACHINE TO THE POWER SUPPLY BEFORE MAKING PIPE CONNECTIONS AS INDICATED IN THE CHAPTER 6.4
	DURING TRANSPORTATION AND LIFTING, THERE IS STILL THE RISK OF DAMAGE OR INJURY. HANDLE THE PUMP CAREFULLY AND PAY CLOSE ATTENTION TO THE DETAILS OF CHAPTER 6.2.
	WHEN PUMPING HIGH TEMPERATURE FLUIDS, REMAIN AT A SAFE DISTANCE UNTIL ALL THE COMPONENETS HAVE COOLED DOWN. SIMILARLY, DO NOT TOUCH THE SURFACE OF THE MOTOR WITHOUT MAKING SURE THAT THE TEMPERATURE HAS DROPPED TO A SAFE LEVEL

9. CONSTRUCTION

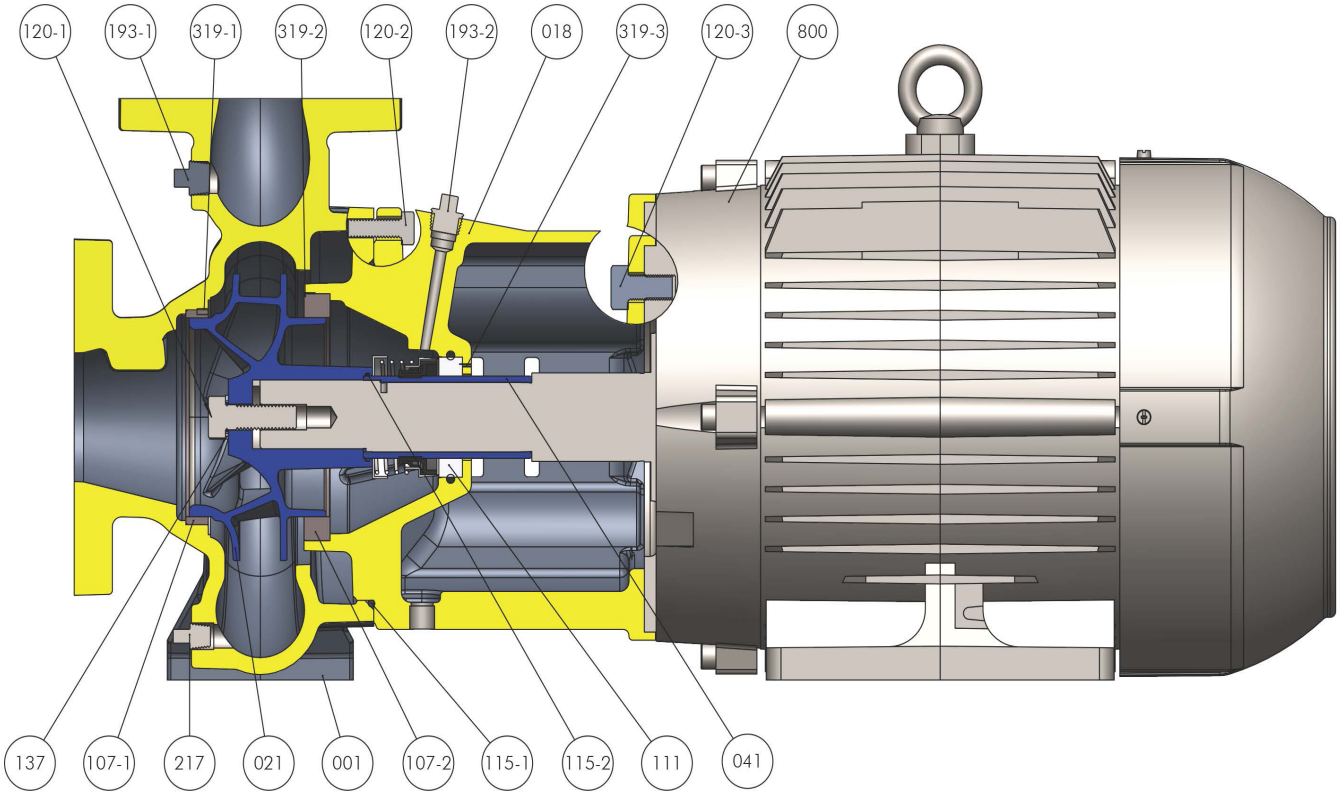
GSDU 32-125 Models



Nº	Description	Material	Qty
001	Casing	Cast iron A48 CL35	1
018	Bracket	Cast iron A48 CL35	1
021	Impeller	Stainless steel CF8M	1
041	Shaft sleeve	Stainless steaal 316	1
048	Nut	Steel	6
107-1	Casing ring	Bronze CAC902	1
107-2	Casing ring	Bronze CAC902	1
111	Mechanical Seal	SiC/C/EPDM/316SS	1
		SiC/SiC/EPDM/316SS	1
		SiC/C/Viton/316SS	1
		SiC/SiC/Viton/316SS	1
115-1	O-ring	EPDM	1
		Viton	1
115-2	O-ring	EPDM	1
		Viton	1

Nº	Description	Material	Qty
120-1	Bolt	Stainless steel 316	1
120-3	Bolt	Stainless steel 304	4
120-4	Stud	Steel	6
137	Bonded seal	316SS/EPDM	1
		316SS/Viton	1
193-1	Plug	Steel	1
193-2	Plug	Steel	1
217	Drain plug	Steel	1
319-1	Spring pin	Stainless steel 304	1
319-2	Spring pin	Stainless steel 304	1
319-3	Spring pin	Stainless steel 304	1
800	Motor	---	1

GSDU 32-160 & Larger Models



Nº	Description	Material	Qty
001	Casing	Cast iron A48 CL35	1
018	Bracket	Cast iron A48 CL35	1
021	Impeller	Stainless steel CF8M	1
041	Shaft Sleeve	Stainless steel 316	1
107-1	Casing Ring	Bronze CAC902	1
107-2	Casing Ring	Bronze CAC902	1
111	Mechanical Seal	SiC/C/EPDM/316SS	1
		SiC/SiC/EPDM/316SS	1
		SiC/C/Viton/316SS	1
		SiC/SiC/Viton/316SS	1
115-1	O-ring	EPDM	1
		Viton	1
115-2	O-ring	EPDM	1
		Viton	1

Nº	Description	Material	Qty (*)
120-1	Bolt	Stainless steel 316	1
120-2	Bolt	Stainless steel 304	---
120-3	Bolt	Stainless steel 304	4
137	Bonded seal	316SS/EPDM	1
		316SS/Viton	1
193-1	Plug	Steel	1
193-2	Plug	Steel	1
217	Drain plug	Steel	1
319-1	Spring pin	Stainless steel 304	1
319-2	Spring pin	Stainless steel 304	1
319-3	Spring pin	Stainless steel 304	1
800	Motor	---	1

(*) For the parts with Qty "---", the quantity varies according to each model.

10. DISASSEMBLY AND ASSEMBLY

Assembly, disassembly, and repair of the pump, should only be performed by qualified personnel.

1. Before performing any installation or maintenance tasks:
   - Disconnect and lock-out power to the driver.
   - Make sure that all replacement parts, and tools are available
2. Use proper lifting method: The unit and the components can be heavy.
3. To prevent injury, allow all system and pump components to cool before handling.
4. To eliminate possible exposure to any hazardous or toxic fluids:
   - Identify any fluid in the pump.
   - Observe proper decontamination procedures.
   - Wear proper personal protective equipment (PPE).
   - Handle and dispose of pumped fluid in compliance with the applicable environmental regulations.
5. To avoid injury:
   - Wear appropriate gloves while handling parts. Some components can have sharp edges.

Scan the QR Code to access the *GSDU DISASSEMBLY AND ASSEMBLY INSTRUCTIONS*

11. REPAIR AND WARRANTY

Scan the QR Code to access the *EPAC STANDARD WARRANTY*