

Installation, Operation  
and Maintenance Instruction

# External Monobloc Pumps Series MB

Basic Version

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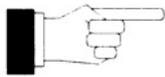
## 1. FOREWORD

You are to be congratulated on choosing a pump, which will undoubtedly serve you both reliably and economically for a long time, providing you observe the Maintenance Instructions given in this booklet.

The **MB / BG** pump is a Non-Clogging Vortex pump designed to pump sewage and other solids containing waste water. Proper use and maintenance will prolong the operational life of your F.I.P.S. pump.

This manual contains different warnings and safety prescription.

Read this booklet properly, so that dangerous situations, physical injury or damage can be avoided.



The **MB / BG** pump is designed for professional use only. Service and maintenance may be done only by authorised personal, after reading this manual.

When you order spare-parts, please always quote :

1. Pump type
2. Code
3. Serial number

This information are found on the data-plate (See appendix 1).

Sectional drawings and part lists are available on request.

All products manufactured by F.I.P.S. S.r.l. are made with great care and according to our high internal standards. Should you however have any suggestion concerning our pump range or this instruction manual, which will contribute to the quality of our product, please do not hesitate to contact us to our address:

## 2. GUARANTEE

We refer to the warranty agreement with your local dealer.

### 3. SAFETY AND ENVIRONMENT

#### 3.1 Symbols

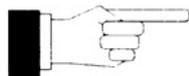
- In this manual



General warning  
Danger!



Electrical hazard!



Attention!

- On the pump



Danger of physical injury!  
Rotating parts!



Electrical hazard!



EC - conformity symbol

#### 3.2 General safety instructions

- Only trained and authorized personal may install and maintain the pump after careful reading of this manual
- Only use the pump for its intended purpose and under the regulated circumstances.
- Don't stay near rotating parts
- Clean the pump before maintenance and inspection
- Observe the local regulations when working with aggressive, corrosive, toxic, flammable and explosive chemicals.
- Never remove safety signs, keep them clean
- Always connect to a grounded circuit
- Before maintenance and inspection always disconnect the pump from the mains.
- Use a proper handle for lifting and handling the pump.
- Do not leave a large loop of cable in the sump, as the pump may eventually damage it.
- Never drop the loose cable end in water. The water may enter the cable and finally enter the motor housing, eventually causing motor failure.

#### 3.3 Environment

The use of a toxin-free lubricating oil, will help prevent pollution of the environment.

Parts which are replaced during repair, maintenance or renewal, could contain materials which could be harmful to the environment.

Please take care in the disposal of these parts. Do this in accordance with the local environmental regulations.

## 4. TECHNICAL DATA

### 4.1. General

The **MB / BG** pumps are vortex impeller pumps, designed to pump a wide variety of solids contaminated liquids.

The hydraulic components of the pumps are made in NIHARD IV.

These pumps are suitable for dredging, mining and other industry applications.

The impeller leaves a wide unobstructed passage through the volute, in which a strong vortex is created that carries most of the solids.

### Construction:

- Two independent mechanical seals, running in oil, form an effective barrier between pump and motor
- Heavy duty bearings, greased for life
- Clog-free vortex impeller.  
Vaness at the backside prevent solids entering the seal area and reduce the pressure on the seal.

### 4.2 Main parts

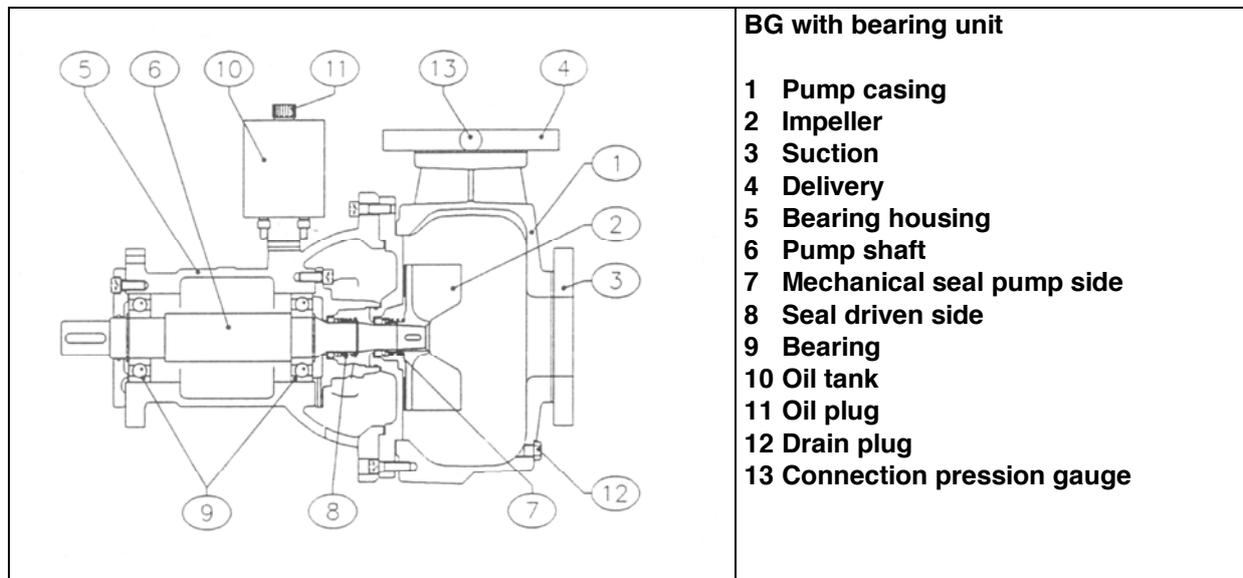


Fig. 4.1

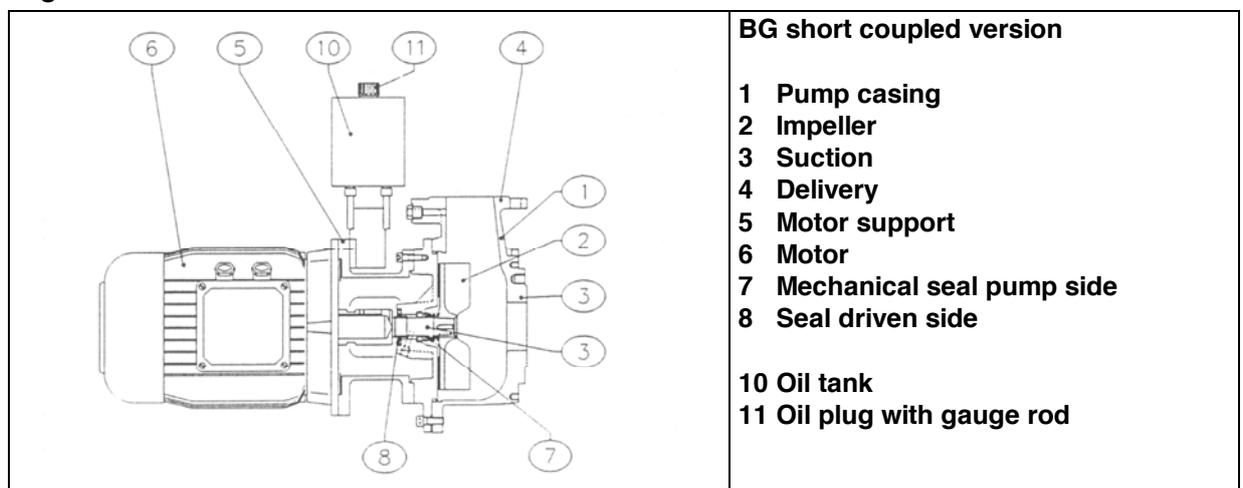


Fig. 4.2

**4.3 Sound level**

Depending on duty point and speed, the pump will produce a certain sound level. Next to this the piping system may produce some noise and vibration. By altering the pipe support and using rubber compensators the vibration will be reduced.

In the next table the sound levels of the MB/BG pumps are shown.

**Sound levels BG and MB pumps**

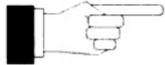
Type	speed [min-1]	sound level [dB]
<b>BG20</b>	960-2900	<60
<b>BG40</b>	960-2900	<60
<b>BG60</b>	960-1450	<60
<b>BG60</b>	2900	<80
<b>MB40</b>	960-1450	<60
<b>MB60</b>	960-1450	<60

## 5. CHECK POINTS BEFORE INSTALLATION

After unpacking the pump, carry out the following check points :

### 5.1 Delivery check

Check for possible transport damage.



Check for complete delivery

In case that delivery is incomplete or damaged, please, contact your dealer immediately.

### 5.2 Oil level

Check the oil level in the oil tank

The oil plug has a gauge rod and the level should be between the 2 marks.

### 5.3 Power supply

Before making the electrical connections, check if the line voltage and frequency are the same as on the pump data plate.

If thermostats are supplied make sure that they are correctly connected.

For examples of electrical diagrams and pump cable coding, see appendix 2,3 and 4.

### 5.4 Motor protection

The pump should always be connected to the line by means of a suitable motor protection circuit-breaker.

If the pump is started Direct-On-Line (DOL), the protection breaker should be set to the current, as given on the data plate.

For star delta starting (Y/Δ), it's good practice to install the over current relay directly after the main contactor. In this case, the pump is also adequately protected in star-connection. The maximum setting of the over current relay is 0.6 x the current as given on the data-plate.

It is good practice to set the protection breaker to 10% lower current, because all breakers require at least 110% of the adjusted current before tripping.

### 5.5 Motor check

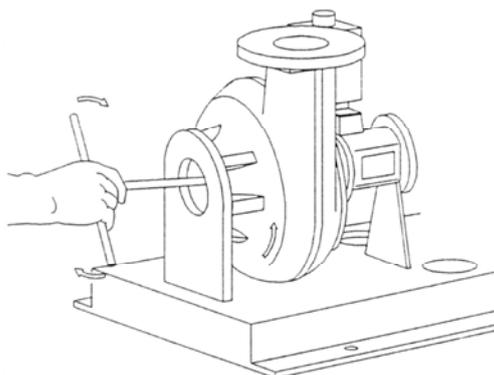
If in doubt about the condition of the motor, Megger test motorwindings against grounding wire. The value should be at least 1 Mohm.

### 5.6 Pump seals

Turn the impeller clockwise by hand, using a proper socket wrench (see fig. 5.1). With this procedure sticking mechanical seal surfaces will be loosened smoothly.

### 5.7 Installation

Check if all components for your installation are delivered. See also chapter 6.



## 6. FIRST PUMPSTART

### 6.1 Direction of rotation

A correct direction of rotation is essential for proper operation. This can be checked as follows: Check the direction of rotation with the arrow on the pump casing. This can be done by observing the direction of rotation of the motor or coupling

### 6.2 Current-check

The current must be checked during normal operation. Apply an ammeter to one of the phase wires and check that the current is not higher than the value on the motor data plate. If so check for:

- Voltage (too low)?
- Specific gravity or viscosity of the fluid (too high)?
- Blocked impeller?
- Correct direction sense ?

If the problem cannot be solved contact your dealer.

### 6.3 Start frequency

When the pump is controlled by level regulators, the ON and OFF levels should be adjusted in such a way that the pump does not do more than 20 starts per hour.

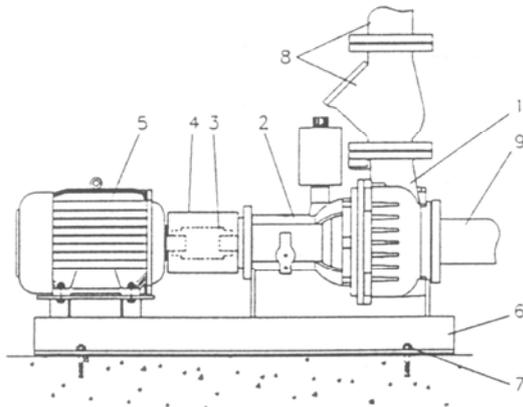


Fig. 7.1

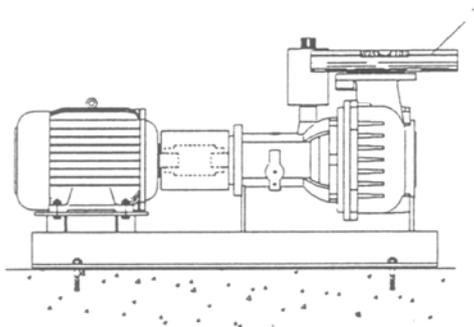


Fig. 7.2

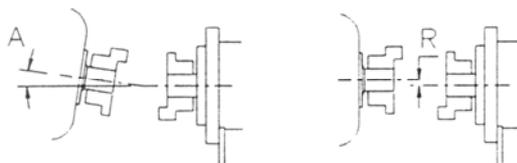


Fig. 7.3

## 7. INSTALLATION OPTIONS

### 7.1 General:

For the **MB/BG** pumps the following installations are possible:

- H** Horizontal, on base plate
- V** Vertical, on support
- SH** Short coupled, horizontal
- SV** Short coupled, vertical
- K** V-belt driven

### 7.2 Installation type H

Horizontal, on base plate.

See fig. 7.1

The main parts are:

1. pump unit;
2. bearing unit;
3. flexible spacer coupling;
4. protection hood;
5. electromotor;
6. base plate;
7. fixing bolts;
8. delivery pipe;
9. suction pipe;

Checkpoints before operation:

- - fixation of the base plate to the floor, see fig. 7.1 pos. 7
- flanges straight horizontal and vertical see fig. 7.2 pos. 1.
- pump and motor shaft aligned, see 7.2.1.
- maximum flange forces and moments, see 7.5
- adjust start and stop levels in such a way that the pump does not make more than 20 starts per hours

#### 7.2.1 Alignment of pump and motor shaft

After the base plate is fixed to the floor, the alignment of pump and motor shaft must be checked.

When the base plate is fixed to the floor, forces on the base plate might have disturbed the alignment.

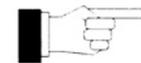
Remove the protection hood, (see fig. 7.1 pos. 4).

Check for:

1. radial deflection (R) max 0.4mm.
2. angular deflection (A) max. 1°

See fig. 7.3

To correct the alignment, use skims underneath the motor and pump fixing bolts.



Reinstall the protection hood in the original position.

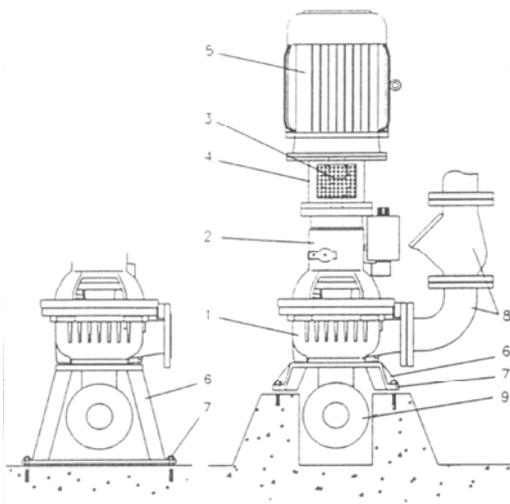


Fig. 7.4

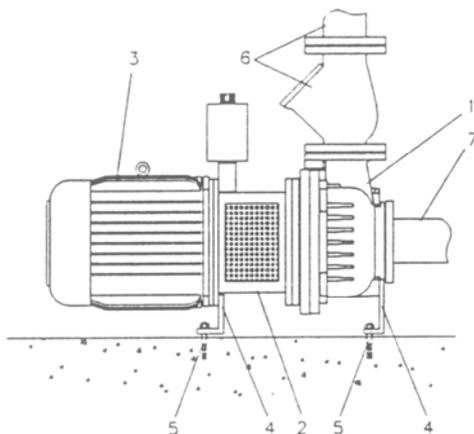


Fig. 7.5

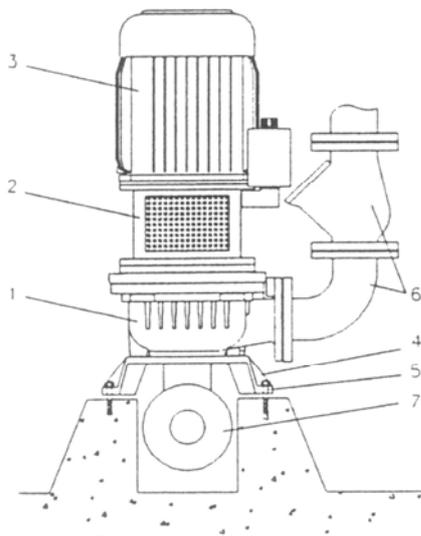


Fig. 7.6

### 7.3 Installation type V

Vertical installation on support.  
Like fig.7.4

The main parts are:

1. pump unit;
2. bearing unit;
3. flexible coupling;
4. motor support;
5. electromotor;
6. pump support;
7. fixing bolts;
8. delivery pipe;
9. suction pipe;
10. level regulation

Checkpoints before operation:

- fixation of the base plate to the floor, see fig.7.4 pos. 7.
- flanges straight horizontal and vertical
- maximum flange forces and moments, see fig. 7.6
- adjust start and stop levels in such a way that the pump does not make more than 20 starts per hour.

### 7.4 Installation type SH and SV

Short coupled version, horizontal or vertical.  
See fig.7.5 or 7.6

The main parts are:

1. pump unit;
2. motor support;
3. electromotor;
4. pump support;
5. fixing bolts;
6. delivery pipe;
7. suction pipe;
8. level regulation;

Checkpoints before operation:

- fixation of the base plate to the floor, see fig.7.5 and 7.6 pos. 5.
- flanges straight horizontal and vertical
- maximum flange forces and moments, see fig. 7.6
- adjust start and stop levels in such a way that the pump does not make more than 20 starts per hour.

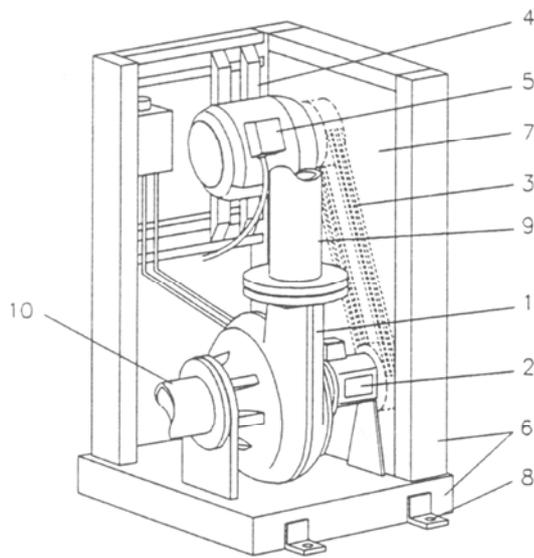


Fig. 7.7

### 7.5 Installation type K

V-belt driven with high placed motor and frame.  
(see fig.7.7)

The main parts are:

1. pump unit;
2. bearing unit;
3. pulleys;
4. tensioned;
5. electromotor;
6. frame;
7. protection plate (2x);
8. fixing bolts (4x);
9. delivery pipe;
10. suction pipe;
11. level regulation;

Checkpoints before operation:

- fixation of the base plate to the floor, see fig.7.7 pos. 8.
- flanges straight horizontal and vertical
- maximum flange forces and moments, see fig. 7.6
- adjust start and stop levels in such a way that the pump does not make more than 20 starts per hour.
- correct tension of the V-belts. (see fig. 7.5.1)

#### 7.5.1 Tension of the V-belts

Check the correct tension of the V-belts are follows:

Remove one of the protection plates.

Put a force of 75N on one of the V-belts in the middle of the 2 pulleys, see fig. 7.8.

The pressing-in (A) must be about 1 cm.

In the value too small (tension too high), move the electromotor (1) downwards.

Is the value too high (tension too low), move the electromotor upwards.

The difference between the 3 belts may not be more than 0.5 cm. In that case renew all 3 V-belts.

To move the electromotor, use the tensioning rail (2).

Place both tensioners (3) underneath the motor.

Loosen the motor fixing bolts a bit, and screw-in the tensioners (taut) or screw-out (slack), until the correct tension is reached.

Retention the fixing bolts of the motor, and recheck the tension again.

Check afterwards if both pulleys are still aligned (see Fig. 7.9)

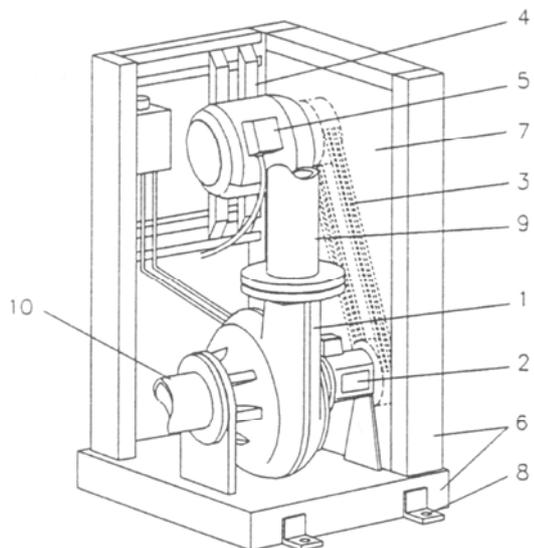


Fig. 7.8

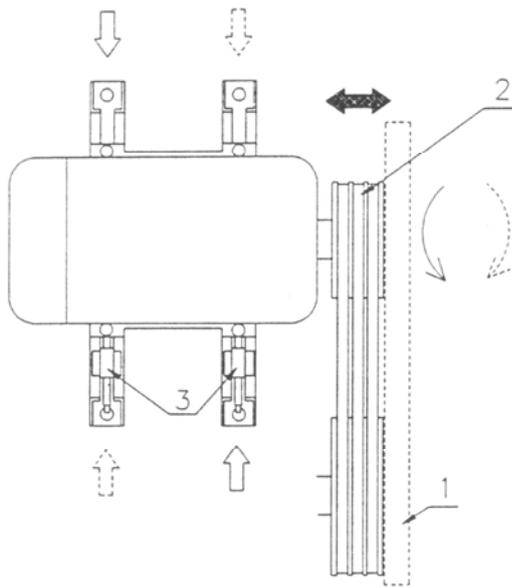


Fig. 7.9

Use a ruler (1) to align the pulleys.  
 If necessary the motor pulley can be moved on the shaft.  
 Loosen the 3 cup screws from the hub and push the pulley towards the motor to set it free from the shaft.  
 Move the pulley to the right position and fasten the cup screws.  
 Check the alignment again and repeat until the right position is achieved.  
 When the motor shaft is not parallel to the pump shaft, the motor can be rotated as shown in fig. 7.9. Loosen the motor fixing bolts and use the tensioners (3) to rotate the motor. If necessary, one of the tensioners can be placed into the rail above the motor.  
 Check the current tension of the V-belts!  
 Replace the protection plate.

The pump is now ready to use.

## 8. MAINTENANCE

### 8.1 General



Always disconnect the pump from the mains before inspection or disassembly.



Clean the pump thoroughly.

### 8.2 Maintenance schedule

- After the first 20 running hours:  
Check the oil level (see chapter 5.2).  
If more than few drops of water are present in the oil, contact your dealer.
- Every 6 months or 500 running hours:  
Check the oil and oil level (see chapter 5.2).  
If there is more than few cm<sup>3</sup> of water in it, contact your dealer
- Refresh the oil every year or when it is no longer transparent. (see chapter 8.5)

### 8.3 Lubricants

- The bearings are long-life greased and they need no refill.
- Normally the oil reservoir is filled with Shell Naturelle HF-R or an equivalent.  
This oil is environmental friendly but can also be mixed with a mineral type.  
When another kind of oil is used this is marked on a label on the pump.

### 8.4 Oil level

Check the oil level in the oil tank.

The oil plug has a gauge rod and the level should be between the 2 marks.

### 8.5 Oil change



Collection, storage and removal of the oil should be done according to the regulations of local authorities.



Always use the right kind of oil!

To drain the oil, remove one of the oil pipes, or use the drain pipe (not applicable for all types).

We advise to flush the system with fresh oil, before filling it up.

### 8.6 1 Flexible coupling

Between motor and pump a flexible coupling is used to absorb vibrations and misalignment. Also the dismounting of the bearing housing or motor will become easy.

(not applicable for version – S and –k)

For maintenance and renewal of elastomers version –H, see 8.6.1 and 8.6.2. For version - V see 8.6.3 and 8.6.4



When working on the pump make sure it cannot start unexpectedly!

### 8.6 1 Flexible coupling installation - H

To check the coupling remove the protecting hood.

Check if the spacer (4) has not too much clearance with regard to the flanges (1). Remove the rings (2) and check the elastomers for wear. Renew if necessary. Check the metal parts (1) and (4) for wear and renew if necessary (see 8.6.2).

Check the alignment of motor-and pump shaft by using a ruler at the 2 flanges. Measure at several points.

Check for:

- |    |                        |         |
|----|------------------------|---------|
| 1. | radial deflection (R)  | max.    |
|    | 0.4mm.                 |         |
| 2. | angular deflection (A) | max. 1° |

See fig. 8.1.

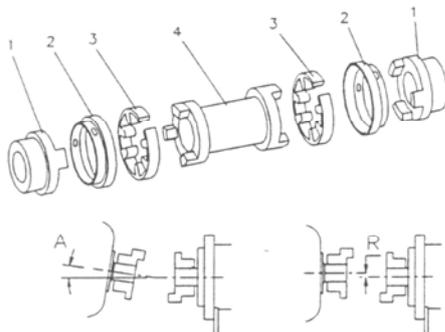


Fig. 8.1.

To correct the alignment, use skims underneath the motor and pump fixing bolts.

Reinstall the spacer, elastomers, rings and protecting hood.

### 8.6.2 Renewal of the coupling -H

If necessary the coupling can be renewed as follows:

1. Loosen the cup screws from the flanges (1) and pull the flanges from the shaft with a proper tool.
2. Heat-up the new flanges and put them on the shafts. The distance between the flanges must be about 5 mm more than the length of the spacer. Fasten the cup screws from the flanges.
3. Check the alignment of motor-and pump shaft (see 8.6.1)
4. Place the new spacer, elastomers and rings.
5. Replace the protecting hood.

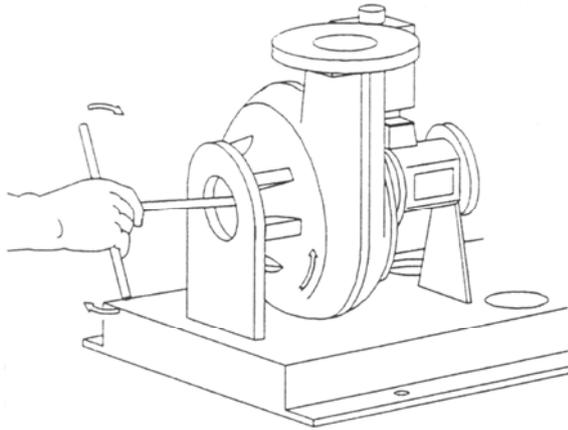


Fig. 9.1

## 9. TRANSPORT AND STORAGE

The pump can be transported and stored in both horizontal and vertical position.

The pump must be stored in the same position as the installation. Otherwise oil may come out of the oil tank.

In case of long storage, the pump must be protected against moisture and heat.

Before storing the pump after use, clean it with a water jet.

On a regular base (every three months), turn the impeller by hand. This is necessary to prevent sticking of the mechanical seal surfaces (see Fig. 9.1).

After 6 months of storage, a general inspection is advisable, before installing the pump.

## 10. OPTION

### 10.1 Seal flushing

The pump can be delivered with a seal flushing. See fig. 10.1

A ring (1) is mounted in the seal housing, with a small fitting around the impeller hub or sealing parts. The flushing water inlet is connected to (3).

The flushing water keeps the sealing room (2) behind the impeller free from the pumped liquid.

We advise to use an electromagnetic valve and a flow indicator in the flushing system so to be sure to have flushing water during pump operation.

The needed flushing pressure must be at least 2/3 of the pump pressure.

When your pump is equipped with seal flushing this can be found on the data plate. See appendix 1: at position 9, a "F" is stamped.

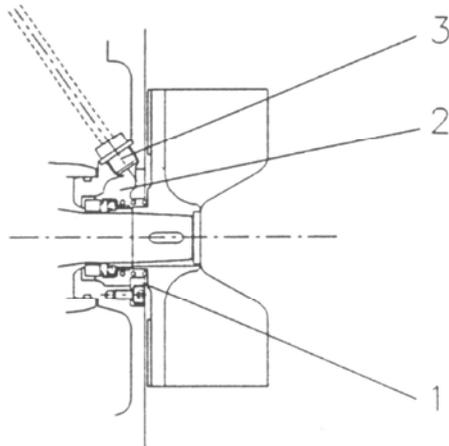


Fig. 10.1

## 11. TROUBLE SHOOTING

### 11.1 Safety



When working on the motor, make sure that power is switched off.



When working on the pump make sure it cannot start unexpectedly



Only qualified electrician may do the electrical work.



When pump starts ensure nobody goes near rotating parts.



Observe local electrical and safety regulations.

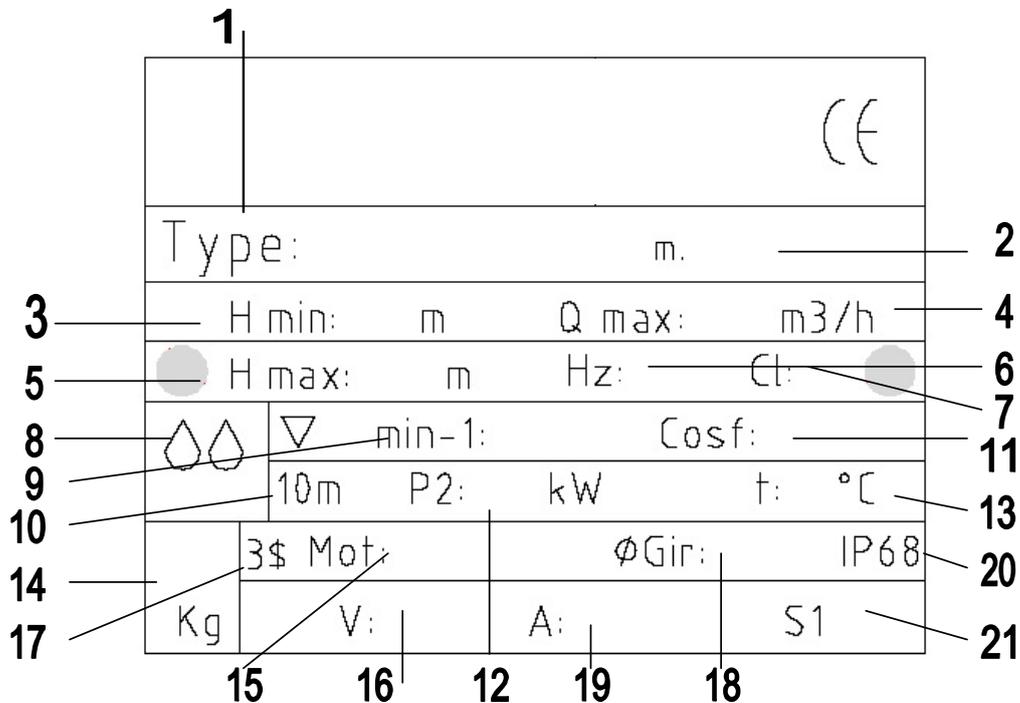
### 11.2 Trouble shooting list

PROBLEM	POSSIBLE CAUSE	REQUIRED ACTION	CHECKPOINTS
Pump does not start	No voltage on motor terminals	Check power supply	<ul style="list-style-type: none"> <li>No power</li> <li>Main isolator switch</li> <li>Fuses</li> </ul>
		Check motor protection	<ul style="list-style-type: none"> <li>Earth leakage relay</li> <li>Motor protection relay</li> <li>Motor temperature</li> <li>Water detector</li> </ul>
		Check start and stop signals	<ul style="list-style-type: none"> <li>Too low water level</li> <li>Obstructed level switches</li> <li>Switches interchanged</li> <li>Control panel</li> </ul>
	Motor failure	Check motor wiring	<ul style="list-style-type: none"> <li>Continuity and isolation</li> <li>Phase resistance</li> </ul>
Pump does not stop	No stop signal	Check level regulation	<ul style="list-style-type: none"> <li>Float switches</li> <li>Control panel</li> </ul>
Pump starts and stops repeatedly	Wrong starting and stop level	Check level regulation	<ul style="list-style-type: none"> <li>Obstructed level switches</li> <li>Adjust start and stop level</li> </ul>
	Fault in power supply	Check power supply	<ul style="list-style-type: none"> <li>Power supply not stable</li> <li>Low voltage</li> <li>Not all 3 phases available</li> <li>Setting of motor protection</li> </ul>
	Motor overloaded	Check pump	<ul style="list-style-type: none"> <li>Wrong direction of rotation</li> <li>Impeller blocked</li> <li>Motor protection in automatic reset mode</li> </ul>
	Motor overheated	Check cooling Check motor	<ul style="list-style-type: none"> <li>Continuity and isolation</li> </ul>
Current too high	Fault in power supply	Check power supply	<ul style="list-style-type: none"> <li>Fuses</li> <li>Low voltage</li> </ul>
	Pump failure	Check pump	<ul style="list-style-type: none"> <li>Impeller blocked</li> <li>Viscosity or spec. Gravity too high</li> <li>Wrong direction of rotation</li> </ul>
Pump runs but no flow or too low flow	Clogging or air lock	Check discharge or coupling	<ul style="list-style-type: none"> <li>Discharge obstructed</li> <li>Valve fully or partially closed</li> <li>Air pocket</li> <li>Coupling leaks</li> <li>Impeller or volute blocked</li> </ul>
	Pump failure	Check pump	<ul style="list-style-type: none"> <li>Pump is sucking too much air</li> <li>Worn or blocked impeller</li> </ul>
	Fault in power supply	Check power supply	<ul style="list-style-type: none"> <li>Control panel</li> <li>Fuses</li> <li>Low voltage</li> <li>Discharge obstructed</li> </ul>
High level alarm	Too low capacity	Check discharge	<ul style="list-style-type: none"> <li>Valve fully or partially closed</li> <li>Air pocket</li> <li>Impeller or volute blocked</li> </ul>
	Pump failure	Check pump	<ul style="list-style-type: none"> <li>Pump is sucking too much air</li> <li>Worn or broken impeller</li> <li>Worn or broken bearings</li> <li>Fuses</li> </ul>
	Fault in power supply	Check power supply	<ul style="list-style-type: none"> <li>Low voltage</li> <li>Control panel</li> </ul>
	Motor failure	Check motor	<ul style="list-style-type: none"> <li>Continuity and isolation</li> </ul>

**APPENDIX 1 : data plate**

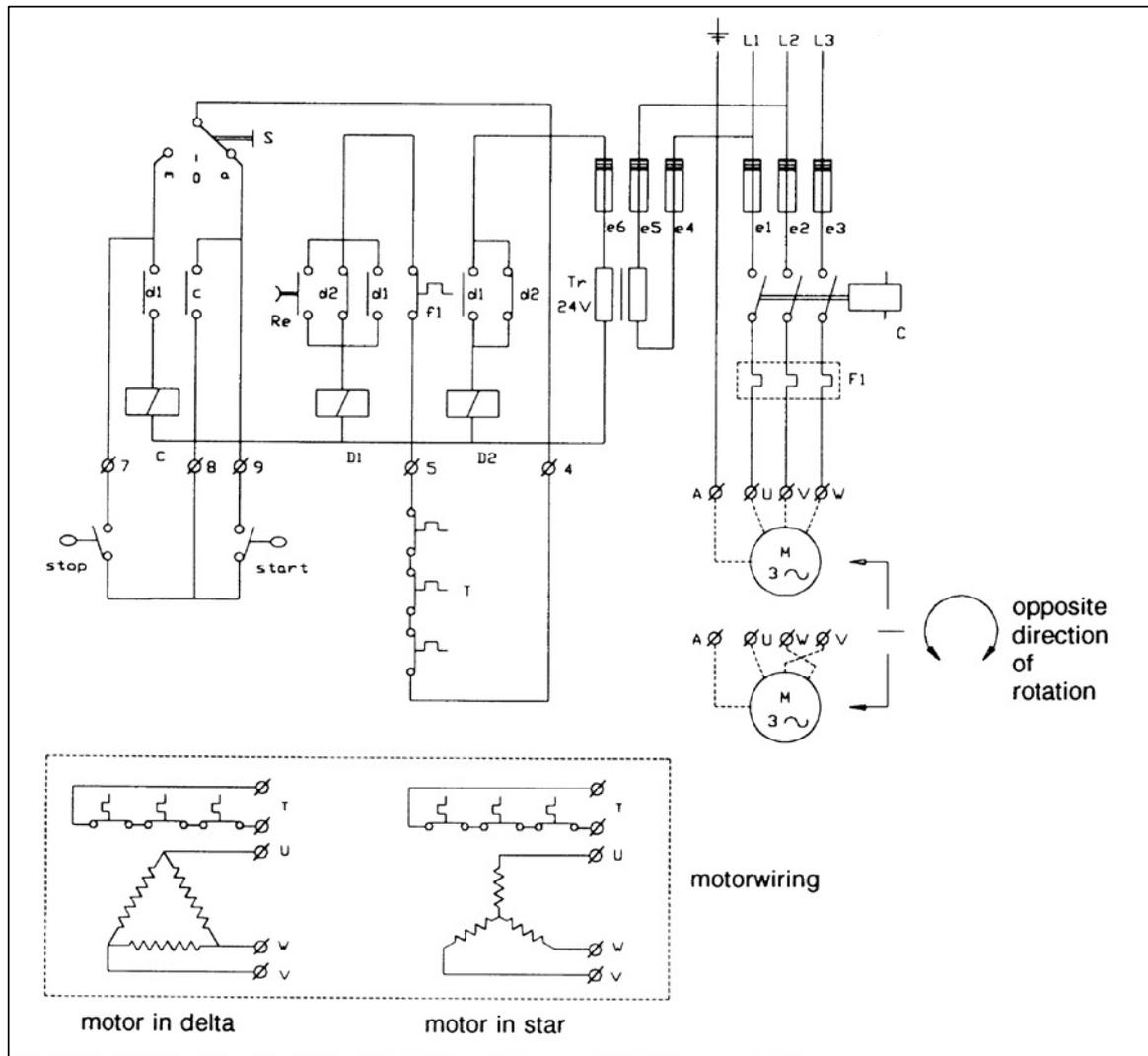
The main characteristics of the pump are given on the data-plate. At the first page of this book a label is found containing all the relevant information.

The data plate can be found at one side of the bearing housing or the motor support (version-S).



No. Description	Dimension	Remarks
1. Pump type		
2 Serial Number		
3 Minimum Head	m	
4 Maximum flow	m <sup>3</sup> /h	
5 Maximum Head	m	
6 Frequency	Hz	
7 Temperature class		F = 155°C
8		
9 Speed		
10 Max. submersion depth		
11 Cos f		
12 Rated shaft power	kW	
13 Max. media temperature	°C	
14 Pump Weight	Kg	
15 Motor code		
16 Rated Voltage	V	Y = DOL start motor in star Δ = DOL start motor in delta Y/Δ = Star – Delta start
17 Number of phases		
18 Impeller size	mm	
19 Max rated current	A	
20 Degree of protection		
21 Duty cycle		S1= continue

**APPENDIX 2 : EXAMPLE OF A DIRECT-ON-LINE (DOL) CONNECTION DIAGRAM**



CODING	
e1, e2, e3 e4, e5 e6 C F1 D1 D2 Tr S Start Stop Re M T	Line fuses Fuses, primary control-circuit Fuses, secondary control-circuit Maincontactor Motor protection circuit breaker with manual reset Auxiliary relay for motor protection Auxiliary relay for power failure Transformer Manual-off -auto selector switch Level switch pump start Level switch pump stop Reset push button Pump motor Thermostats (if fitted)



### Warranty

The warranty covers the material and machining failures. The products must be sent back complete of original label without any change from no-authorized people. Charges for pump removing, pump displacement, technical interventions are not covered by F.I.P.S.

The warranty is not valid if the product has got:

- Failures due to shipment
- Failures due to wrong connection to the main power or wrong hydraulic connection
- Failures due to application not foreseen from technical specifications
- Failures due to incompatibility of pumped fluid with construction materials, too much presence of sand, galvanic currents, technical modifications not approved from F.I.P.S. staff, electric and hydraulic parameters not according to the product, insufficient thermal protection.
- Wear due to normal wear of materials
- Failures due to lacking of maintenance
- Failures due to wrong technical selection of the product
- Failures due to installation not according to the laws into force
- The warranty is not valid on old products never used or installed

### Application

The products are covered by warranty for 24 months from delivery to the customer. The customer must inform F.I.P.S. about possible failures within 8 days from material receipt. In order to apply the warranty F.I.P.S. must receive the products together with a fiscal document where the product is identified as well as the delivery date and the serial number shown on the label above on the right.

The warranty is not valid if the fiscal document or the original label are missed.

The products must arrive to F.I.P.S. free port our warehouse in Rozzano. After the technical inspection if the warranty is approved F.I.P.S. will pay to the customer a transport price according to standard transport prices into force. Only F.I.P.S. could decide if the warranty is valid, if the product should be repaired or changed in the shortest time. Warranty repairs only must lead from the manufacturer or an authorized agency. Trials of repair by the customer or non-authorized persons during the warranty, causes and extinguishing of the warranty. A warranty repair achieved by us does not extend the warranty period. Replaced spare parts give no reasons for a new warranty period. The accordance of warranty do not authorize anyone to ask F.I.P.S. for damages direct or indirect caused by F.I.P.S. products. F.I.P.S. reserves the possibility to change the products without previous advise.