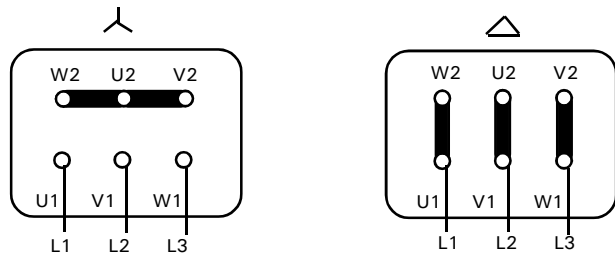
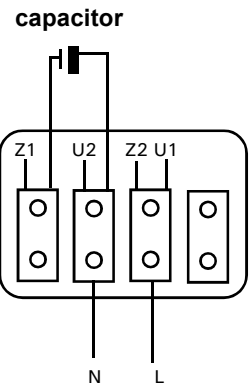


13. Motorwiring

three phase



single phase



MANUAL

Contents

1. Produktidentität
2. Exploded view
3. Parts list
4. Introduction
5. Safety instructions
6. Receipt
7. Installation
8. Operation
9. Trouble shooting
10. Assembly
11. EEC-Declaration
12. Extra, Pump priming chamber
12. Motorwiring

1. Productidentity

- # M10-M11-M15
- # M60-M90-M120
- # M110-M400



2

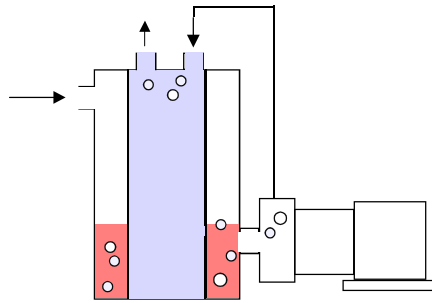
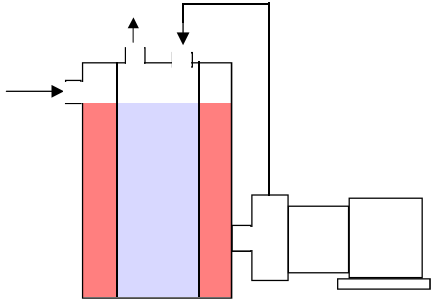


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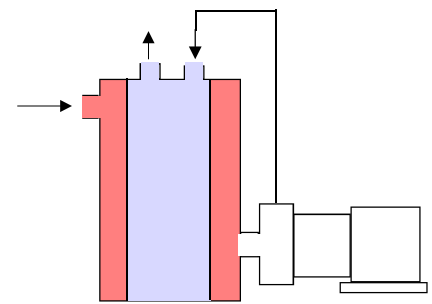


Notes: (motor wiring (12) see back-cover)

12. Extra Pump priming chamber



start



operation



How it works,

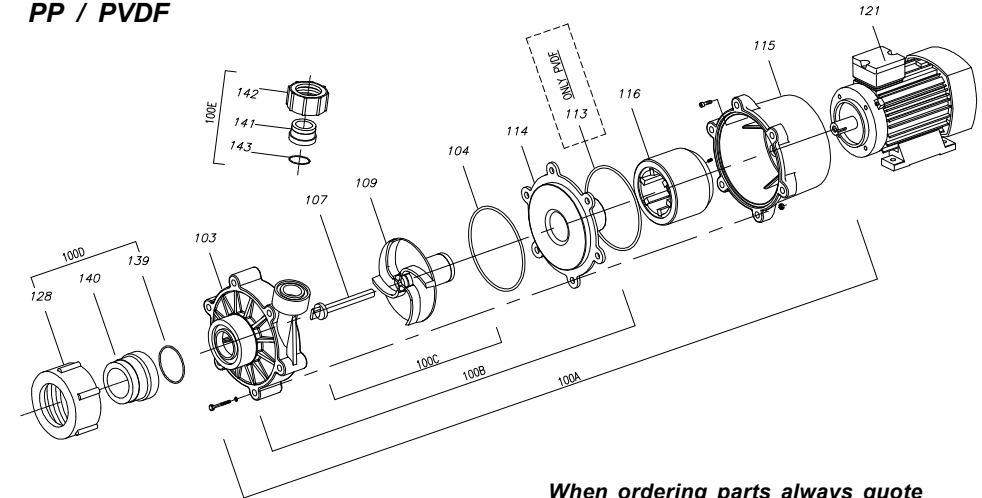
Upon installation, the priming chamber is filled with liquid (by vent release knob) to the suction connection. The pump primes the liquid, mixed with air, from the outer chamber. The pump discharge is connected back to the inner chamber. The pressurized inner chamber returns some of the liquid back to the outer chamber.

The main flow, however, containing air, is discharged through the inner chamber outlet. From this point the pump will automatically reprime when starting.

- * Please note - The pump's max flowrate will be slightly reduced when using this facility (Compared to the published flow curve, the max. pump pressure will not be affected).
- * The priming chamber has a maximum suction lift of 3m head.
- * The longer the suction lift, the longer it will take the pump to fully prime (up to 3 minutes)
- * Once the pump is initially filled with liquid the filler plug should be closed time, and remain closed at all times

2. Exploded view

M10/ M11 / M15
PP / PVDF



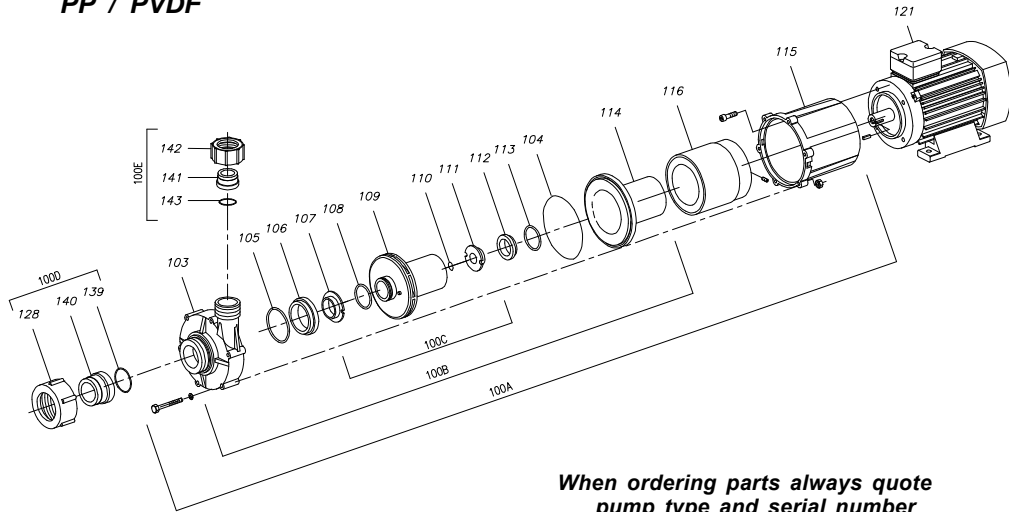
When ordering parts always quote pump type and serial number

3. Partslist (M10-M11-M15)

- 100a Pump without motor (103..116)
- 100b Wet end complete (103 ..114)
- 100c Impeller complete (107..111)
- 100d Pumpinlet coupling complete
- 100e Pumpoutlet coupling complete
- 103 Volute
- 104. O-ring Impeller housing
- 107. stationary pumpshaft
- 109. Impeller complete
- 113. O-ring rear side impeller housing (PVDF models only)
- 114. Impeller housing, with bearing included
- 115. Bracket
- 116. Drive magnet
- 121. Electric motor
- 139-140-128 O-ring, union-end, union pumpinlet
- 143-141-142 O-ring, union-end, union pumpoutlet

2. Exploded view

M60/ M90 / M120
PP / PVDF



**When ordering parts always quote
pump type and serial number**

3. Partslist (M60-M90-M120)

- 100a Pump without motor (103..115)
- 100b Wet end complete (103..114)
- 100c Impeller complete (107..111)
- 100d Pumpinlet coupling complete
- 100e Pumpoutlet coupling complete
- 103 Volute
- 104. O-ring Impeller housing
- 105. O-ring stationary bearing
- 106. Stationary front bearing
- 107. Rotating front bearing
- 108. O-ring frontside impeller
- 109. Impeller complete
- 110. O-ring rear side impeller
- 111. Rotating rear bearing
- 112. Stationary rear bearing
- 113. O-ring stationary rear bearing
- 114. Impeller housing
- 115. Bracket
- 116. Drive magnet
- 121. Electric motor
- 139-140-128 O-ring, union-end, union pumpinlet
- 143-141-142 O-ring, union-end, union pumpoutlet

11. EEC-Declaration

EEC-DECLARATION OF CONFORMITY FOR MACHINERY

(Derective 89/392/EEC, Annex II, sub A)

Manufacturer: **hendor pompen b.v.**

Address: P.O Box 9, 5530 AA Bladel (NL)
Leemskuilen 15, 5531 NK Bladel (NL)

Herewith declares that the product ;

- is in conformity with the provisions of the MachineryDirective, as amended, and with national implementing legislation;(Directive 98/37//EEC)
- is in conformity with the provisions of the following other EEC directives :
 - Low Voltage Directive (Directive 73/23/EEC)

Confirmed at Bladel,

Signature



Technical director **H.F.G. Bohncke.**

10. Assembly (# M110-M400-H)

1. disassembling “wet end “of pump.

- drain pump until pumphousing is empty.
- disconnect suction and discharge piping.
- loosen and remove five bolts of pump casing
- remove pump casing (103)
- impeller can be taken out

mind strong restraining magnetic force

replacing worn or damaged parts.

- Static front bearing (pump casing) and rear bearing (impeller casing) are shrunk by heat treatment. If necessary, it is recommended to replace these parts at works.
- Rotating front and rear bearing are mounted by thread ; front bearing by righthanded thread, rear bearing by lefthanded thread;
- changing O-ring (Pos 104) is recommended;
- check central and balancing holes for obstructions; clear these if necessary.

2. Assembling “wet end” of pump.

- put impeller casing onto bracket (do not forget O-ring, pos 104)
- replace impeller (**mind strong attracting magnetic force**)
- replace pump casing, mounting five bolts, secure these firm

3. dismounting drive magnet

- put socket head wrench trough hole down in bracket
 - loosen this screw by turning twice
 - put a lifting device in this hole, lift the drive magnet from shaft
 - **mind strong magnetic force**
- check drive magnet for metal particles.

4. mounting drive magnet

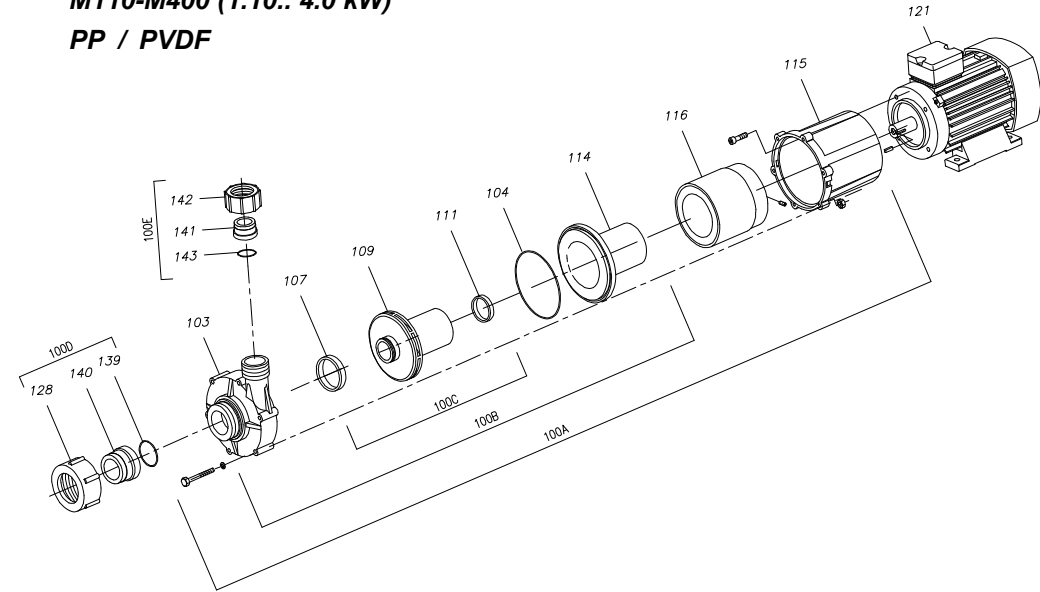
- slightly grease shaft and key
- replace drive magnet by hand, mind position of keyhole on drive magnet
- be sure, the drive magnet goes down on shaft up to the end
- secure socket head screw.

After completing assembly, check for free rotation by hand.

2. Exploded view (M110-M400)

M110-M400 (1.10.. 4.0 kW)

PP / PVDF



3. Partslist (M110-M400-H)

When ordering parts always quote pump type and serial number

- 100a Pump without motor (103..116)
- 100b Wet end complete (103 ..114)
- 100c Impeller complete (107..111)
- 100d Pumpinlet coupling complete
- 100e Pumpoutlet coupling complete
- 103 Volute
- 104 O-Ring
- 107. Static front bearing
- 109. Impeller complete
- 111. Static rear bearing
- 114. Impeller housing
- 115. Bracket
- 116. Drive magnet
- 121. Electric motor

4. Introduction

Thank you for choosing a Hendor product. Before you start to use it Hendor strongly recommends you read this owner's manual carefully and follow the instructions as closely as possible, so your product will function properly for years to come.

This owner's manual contains all obligatory safety- instructions and it should be furnished to the end-user of this product. This owner's manual should be present at site, so operator or maintenance crew can use this manual

5. Safety instructions

NOTICE

The following symbols are safety alert symbols. When you see the symbol(s) on the product or in the manual, be alert to the potential for personal injury



DANGER

This label warns that failure to observe the precautions involve a **risk of electric shock**



DANGER

This label warns about hazards that **will** cause **serious personal injury**, death or major property damage if ignored. Remind the product contains chemical liquids;



CAUTION

This label warns about hazards that **can** cause **serious personal injury**, death or major property damage if ignored



WARNING

This label warns about hazards that **will** or **can** cause **minor** personal injury or property damage if ignored.

The label **NOTICE** indicates special instructions which are important but not related to hazards

Carefully read and follow all safety instructions in this manual and on the pump.

Keep safety labels in good condition. Replace missing or damaged safety labels

6. receipt

At receipt of the product, and possibly in presence of the forwarding agent, the identity of the product (by checking the nameplate data), the completeness of delivery as well as the absence of visible damage should be ascertained. The end-user or representative must ascertain that the material specification match with the specific liquid used. Any problems arising from these checks, should be stated in writing and preferably signed by the forwarding agent for evidence.

10. Assembly (# M60-M90-M120)

1. Disassembling the "wet part of the pump"

- Let liquid run out of the pump till the pump casing is empty.
- Detach the suction pipe and pressure pipe from the pump.
- Remove the six pump casing bolts .
- Remove the pump casing (103) including the static ceramic front bearing (106).
 - The impeller (109) is free now and can be lifted from the impeller casing (114) together with the front and back wear rings (107,111) **(mind the restraining force of the magnetic drive magnet).**
 - Now the impeller casing (114) including the static ceramic back bearing (112) can be removed from the bracket (115).
- The static ceramic bearings (108,112) as well as the rotating wear rings (107,111) are kept in place by means of O-rings (105,108,110,113).
- If the play between the rotating rings (107,111) and the static ceramic rings (106,112) is more than 0.7 mm, the rotating rings are worn-out and will have to be replaced.
- In that case, O-rings (108) and (110) also need to be replaced.
- The static ceramic bearings (106,112) wear out much slower and normally do not need to be replaced, unless they have been damaged.



WARNING

2. Assembling the "wet part of the pump"

- Assembly occurs in reverse order.
- If the static ceramic bearings (106,112) are replaced, first moisten the O-rings concerned (105,113) with water (not oil or fat!) and be sure that they **fit closely**.
- Check whether (foreign) metal particles are attached to the impeller; these can damage the pump;



fig. 1

- While replacing the impeller casing (114), mind the vertical position of the two scavenging ports in the back; these ensure automatic bleeding of the back of the impeller.
- While replacing the impeller into the impeller casing, mind the strong magnetic force of the drive magnet.
- Ensure that the O-ring (104) is assembled correctly.
 - It is recommended always to replace the O-ring (104) after disassembling the pump casing (103).
 - A minimum axial clearance of 2mm is required
 - Tighten the pump casing bolts crosswise, but not too tight, or you might damage the bracket.



WARNING

3. Disassembling the drive magnet

- Put the socket head wrench through the hole below the bracket.
- Loosen the (2 or 3) socket head screws by giving them two turns.
- Put the motor with bracket upright on the work bench.
- Remove the fan casing.
- Remove the fan.
- Remove the bearing bracket bolts.
- Put the motor back on its foot in the normal position.
- Place a stylus on the motor axis at the side of the drive magnet and tap the rotor out of the drive magnet with a hammer (always use a stylus that is thinner than the bore of the drive magnet).

4. Assembling the drive magnet

- Put the rotor into the front end bracket (take care that the motor coil is not damaged).
- Assemble the back end bracket (do not forget to install the spring washer).
- Ensure the greased motor pin protrudes about 3 mm beyond the motor axis.
- Remove any foreign metal particles that may be attached to the drive magnet.
- Put back the drive magnet by pressing it with your hand (lightly grease the magnet first).
- Press the pin until it aligns with the motor axis.
- Tighten the socket head screws.
- While replacing the impeller into the impeller casing, mind the strong magnetic force of the drive magnet.
- Ensure that the O-ring (104) is assembled correctly.
- It is recommended always to replace the O-ring (104) after disassembling the pump casing (103).
- Tighten the pump casing bolts crosswise, but not too tight, or you might damage the bracket.



WARNING

10. Assembly (# M10-M11-M15)

1. Disassembling the “wet end of the pump”

Be sure the pump has been drained, so there are no residues of liquid

- disconnect suction and discharge piping from the pump
- remove the 6 bolts from the pumphouse casing
- remove the pumphouse casing
- take out the impeller, including impellerhousing, ceramic shaft and rear thrust ring

Mind the restraining force of the magnet!

- check the rotating bushing on wear and tear; the clearance between rotating and static parts should not exceed 0,5mm (0.02 inch)
- static thrust rings, made of ceramic, are less sensitive for wear and tear (mind thermal or mechanical shock)

2. Assembling the “wet end of the pump”

Assembly should be done in reverse order.

- before assembling check for any metal particles, attracted to the magnets of the impeller, as well as on the drive magnet
- put the rear static thrust ring in the impellerhousing
- put the impeller into the impellerhousing
- be aware of the magnetic force, when placing the subassembly into the bracket.
- before placing the pumpcasing take care of the right positioning of the O-ring
- mounting 6 bolts; securing not too tight, or you might tend to leakage

3. Disassembling drive magnet

- after dismantling “wet end”, disconnect the bracket from the motor:
- loosen the hex.screws on the drive magnet
- by means of lever(s) drive the magnet downwards the motorshaft
- checking condition of the electrical motor; when using the same motor again for reassembling, check for wear and tear on the ball bearings and the electrical condition of the interior wiring of the motor.

4. Assembling drive magnet.

- Check drive magnet on metal particles, attached to the magnets
- put the bracket onto the motorflange, and secure the 4 bolts
- put the drive magnet by hand upwards the motorshaft to the end (slightly greased)
- secure the hex.screws

- mounting of the pump (wet end) as above described

after having completed the assembly, check for free rotation by hand

7. Installation of magnetic drive pumps



DANGER



DANGER



CAUTION



WARNING

Electrical

1. The pump may only be connected by a qualified electrician, in conformity with the requirements of your local electricity supply company.
2. Ground motor before connecting to electrical power supply; failure to ground motor can cause severe or fatal electrical shock hazard. Do not ground to a gas supply line.
3. Check that the mains voltage corresponds to the voltage stated on the motor plate. Incorrect voltage can cause fire or seriously damage motor and voids warranty. If any doubt, consult licensed electrician. (See electrical diagrams on last page)
4. Avoid unexpected or accidentally starting of the motor by disconnect and lock out power supply
5. The pump contains parts, which are under electric tension; in case of repair or maintenance disconnect and lock out power supply.
6. Do not point a jet of water at the motor of the pump to avoid personal injury as a result of dangerous voltage
7. Check the dimension of the used electrical wiring in accordance to the power of the motor
8. Check the fuses of the power supply.
9. It is recommended that you fit the pump with a thermally safe-guarded switch, which is to be adjusted in accordance with the value stated on the motor plate.
10. **To avoid damage to the cord line:**
 - do not hoist the pump on the cord line
 - be sure the cord line is not jammed
 - do not guide the cord line along sharp edges

Plumbing (by hose or by piping)

The connection to the discharge side of the pump should be provided with reliable, persistent (also for pressure) material; for hoses take care of the use of correct hoseclamps. Use the correct O-rings for connections. Check the tightness of the connections before starting up; hoses and piping should be clean inside before starting up.

Thermoplastic pumps will not tolerate plumbing stress; to prevent distortion of the pumpbody and damage to the pump, be sure your plumbing is properly aligned and supported.

While installing the pump:

- be sure to leave enough space for easy access and/or maintenance
- do not place the pump close to any heater or heating coils
- do not install the pump where solution can be spilled on the motor
- To ensure proper stress-free assembly of the pipework, the pump should be attached to a sturdy base.

Piping

Since most problems with pumps are caused by **bad suction conditions**, it is absolutely necessary to respect the following rules:

1. Keep **suction piping** as short as possible (to reduce friction loss)
2. Increase **suction pipe size** by at least one diameter (compared to pump inlet)
3. Use excentric adaptors in case of varying diameters
4. **Avoid** elbows, bends and fittings at **suction side** and keep them a distance of ten pipe diameters away from the pump)
5. Slope up to the pump so that no airpockets can develop.
6. Ensure **piping** is completely leakfree.
7. Support piping near pump to prevent stress.
8. Allow sufficient liquid level to prevent intake of air into suction pipe.
9. Never throttle pump at suction side.
10. In case of doubt consult factory for proper pipesizing and NPSH calculation.

Discharge conditions are less stringent. In case of long discharge pipes the diameter may be increased to reduce loss of discharge head.

8. Operation of the magnetic pump

How it works

The permanently magnetized drive magnet on the axis of the electromotor transfers engine power to the pump system. Here the impeller casing forms a permanent partition between the drive magnet and the magnetic impeller that drives along the liquid. The pumped liquid lubricates the bearings. Before start up check recommendations, described in installation instructions; check also liquid level in tank. Hendor pumps are designed to pump liquids. A safety device is available to prevent the pump from dryrunning.



CAUTION

Initial start up

On first start up, and any time the motor is reconnected to an electrical outlet, check direction of motor rotation as follows:

1. Fill pump with liquid as directed in priming instructions below.
2. Turn switch "on" and then "off" immediately. Observe rotation. It should be in the direction of the arrow on the motor or pump.
3. To reverse rotation refer to instruction on the motor

Priming and starting

1. Flooded suction

Open all valves in suction and discharge lines. When pump is completely filled with liquid, turn motor on. Sometimes, especially when pumping higher specific gravity liquids, the pump cannot start pumping with an open discharge line. To overcome this, simply close the discharge valve after the pump is filled with liquid, then turn on motor. Wait several seconds for pressure to build up, then slowly open discharge valve to desired flow

2. Non flooded suction

Place the suction line under the surface of the liquid to be pumped. Slowly fill the pump and suction line from the discharge. Make sure that no entrapped air remains. Close the discharge valve. Turn on motor. Wait several seconds for pressure to build up, then slowly open discharge valve to desired flow

Restarting after power failure

Assuming that the stop due to a power failure will not cause the reverse rotation of the pump, i.e. that the check valve has protected the pump against reverse flow, there is generally no reason why the pump should not be started again once the current has been reestablished.

However if the pump sucks in from a lower level, it may lose its prime during the time that power is off. Therefore before restarting, it should be ascertained again that pump and suction line are actually filled with liquid.



WARNING

Hendor magnetic drive pumps are not designed to run dry. Improved pump construction though does no longer lead to pump damage if incidental dry running (short period) occurs.

Inspection (During normal operation, the pump should be checked periodically.)

1. Check the flow. (Check the front strainer regularly)
2. Check the piping (also for air pockets), tubes and tube clamps.
3. Periodically check the amperage, if the pump cannot be equipped with a thermally safeguarded switch.
4. Regularly clean the pump (but don't splash water onto the motor)
5. Check the pump inside for wear, once or twice a year. Be alert for any unusual noises and vibrations

9. Troubleshooting

Problem

possible cause:

1 Pump sucks no liquid.	01-02-03-04-05-07-08-11-12-14-16-17-18-23-26
2 Pump sucks too little liquid.	01-02-03-04-05-06-07-08-11-12-13-14-16-17-18-23-26
3 Pump produces insufficient pressure.	02-04-11-12-15-17-24-26
4 Pump uses more power than normal.	10-14-15-16-20-21-22-23-25
5 Pump uses less power than normal.	11-12-13-14-15-16-18-19-24
6 Pump vibrates or is noisy.	01-05-08-09-13-16-17-18-20-21-22-23-24-25
7 Pump stops for a thermal reason	10-13-14-15-17-21-22-23
8 Pump seizes up.	18-21-22-23-25
9 Bearings wear out too fast.	22-23-27

Causes:

01. pump and/or suction pipe insufficiently bled
02. air/gas in the liquid
03. air pocket in the suction pipe
04. leak in the suction pipe
05. manometric suction height is too high
06. suction pipe is too long or not wide enough
07. suction pipe and/or suction strainer completely or partly blocked
08. foot valve or suction pipe insufficiently submerged during operation
09. available NPSH (net positive suction head) is too low (see suction pipe!)
10. number of revolutions is too high
11. number of revolutions is too low
12. direction of rotation is incorrect
13. operating point of the pump is not properly adjusted
14. the specific gravity differs from the one assumed
15. the viscosity differs from the one assumed
16. the pump is being operated at a too low flow
17. wrong choice of pump
18. blocked impeller or pump casing
19. blocked pipework
20. pump incorrectly installed
21. a rotating part drags
22. rotating parts are out of balance
23. bearings are out of order
24. impeller is damaged
25. bearings incorrectly installed
26. a valve is completely or partly closed
27. abrasive particles in liquid