

Instruction and Maintenance Manual

Self-priming Centrifugal Pumps
Type S
in ATEX version

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Pump No.


- Original -

A. Declaration of Conformity - ATEX certificate

We hereby declare that the self-priming centrifugal pumps type **S** comply with the following relevant requirements:

- ⇒ EC Machinery Directive 2006/42/EC, Appendix II A.
- ⇒ EU Explosion Prevention Directive 2014/34/EU, referred to equipment

with code +2A for equipment of category II  2G c T4x

with code +3A for equipment of category II  3G c T4x

Pumps **without a drive unit** are intended to be connected to other machines. It is forbidden to start-up the machine in which the pump is installed if the machine has not been declared conform to the above-named EC/EU Directives.

By pumps **with a drive unit** that are modified and/or are not used for the purpose intended, will render null and void the validity of this declaration of conformity.

The following standards have been found helpful and have been used in their entirety or in part:

- ⇒ EN 809:2009
- ⇒ EN ISO 12100:2010
- ⇒ EN 13463-1: 2009
- ⇒ EN 13463-5: 2011

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B. Introduction

1. Introduction

- 1.1 The instruction manual contains important information on how to operate the pump safely, properly and most efficiently. Observing these instructions helps to avoid danger, to reduce repair costs, downtimes and to increase the reliability and life of pump.
- 1.2 This manual refers only to the pump. For the motor and the coupling please refer to the separate operating instructions.
- 1.3 The operating instructions must always be available wherever the pump is in use.
- 1.4 The operating instructions must be read and applied by any person in charge of carrying out work on the pump.
- 1.5 Observe the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the pump. The generally recognized technical rules for safe and proper working must also be observed.
- 1.6 It is presumed that fundamental project work as well as all work with regard to transport, assembly, installation, start-up, maintenance and repair is performed by qualified personnel or supervised by skilled labor taking overall responsibility.

2. Safety

- 2.1 A pump that is installed incorrectly, operated wrongly, or maintained poorly can present a hazard. If the following considerations are overlooked, the safety of personnel or satisfactory operation of the pump may be endangered.
- 2.2 Attention must be given to the safe handling of all items. Where pumps, pump units or components weigh in excess of 20 kg (44 lb.), it is recommended that suitable lifting equipment should be used in the correct manner to ensure that personal injury or damage to pump components does not occur.

WARNING Note that lifting eyes fitted to individual pieces such as pump and motor are designed to lift only this part and not the complete assembly.

- 2.3 Before starting to dismantle a pump all relevant and appropriate safety precautions must be taken, particularly if the pumps have been handling hazardous or toxic products. Seek advice from your safety officer or the manufacturer if you have any doubts.
- 2.4 Always wear adequate protective clothing and eye protection when dismantling pumps that have been used to pump toxic or hazardous products. Breathing apparatus may be necessary.
- 2.5 Always isolate the pump electrically before dismantling. Ensure that the electrical switch gear cannot be operated whilst any work is being carried out on the pump.
- 2.6 Always drain the pump casing of product before removing the pump from its associated pipe-work.
- 2.7 Flush out the pump casing and shroud with a compatible flush and drain away to a safe area.
- 2.8 Check with your process people to see if any special decontamination procedures have to be followed before working on a pump.

All pumps returned for factory servicing must be decontaminated and labeled to inform what precautions should be taken before dismantling.

3. Shipment inspection

- 3.1 Pumps and units are shipped suitably protected to prevent damage in transit from normal handling. When received, the shipment should be inspected immediately. Damages to the packaging or crating that may reveal content damages when unpacked should be reported to the carrier and possibly photographed.

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- 3.2 A photograph is helpful in any claims to be made against the carrier. Inform manufacturer or the local authorized distributor, too.
- 3.3 Shipment shortages, checked against the transport documents, should be reported to the carrier.
- 3.4 Check the nameplate data against the shipping papers and against your purchase order to ensure that the proper pump is provided.

4. Storage

- 4.1 After receipt and inspection, a pump not immediately installed should be repackaged and placed in suitable storage.
- 4.2 Protective coatings on unpainted surfaces should be inspected and left intact. Unpainted surfaces, not factory treated with a rust inhibiting coating, should have a protective coating applied.
- 4.3 Plastic or gasket type port covers should be left in place.
- 4.4 Pumps should be stored in a clean, dry location. When moist, dusty atmosphere must be used for storage, further protect the pump with a moisture repellent cover.
- 4.5 If the pump has been used please empty the pump casing by opening the clean-out cover or plug and fill with some corrosion inhibiting oil.

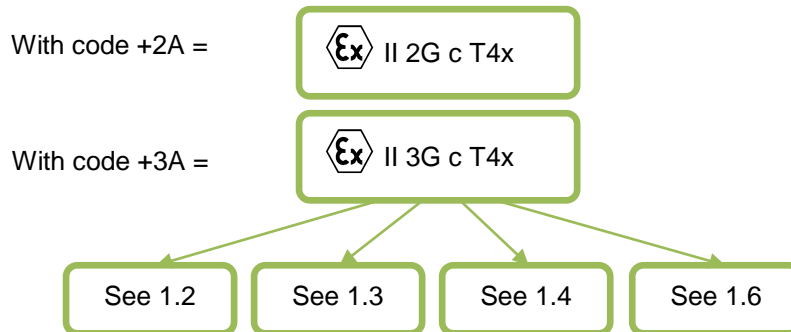
WARNING Never forget water inside pump casing during cold weather! Water may freeze and break the pump casing!

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C. ATEX - Information

1. Marking

1.1 The **S** self-priming centrifugal pumps are marked as follow:



1.2 **Group:**

⇒ II: non mining

1.3 **Category:**

⇒ 2G = high security on vapor

⇒ 3G = normal security on vapor

1.4 **Protection:**

⇒ Ex c = mechanical design security

1.5 **Vapor Explosion class:**

⇒ IIA, IIB, IIC are allowed

1.6 **Temperature class:**

⇒ T4 up to 135°C

⇒ T3 up to 200°C

⇒ T2 up to 300°C

⇒ T1 up to 450°C

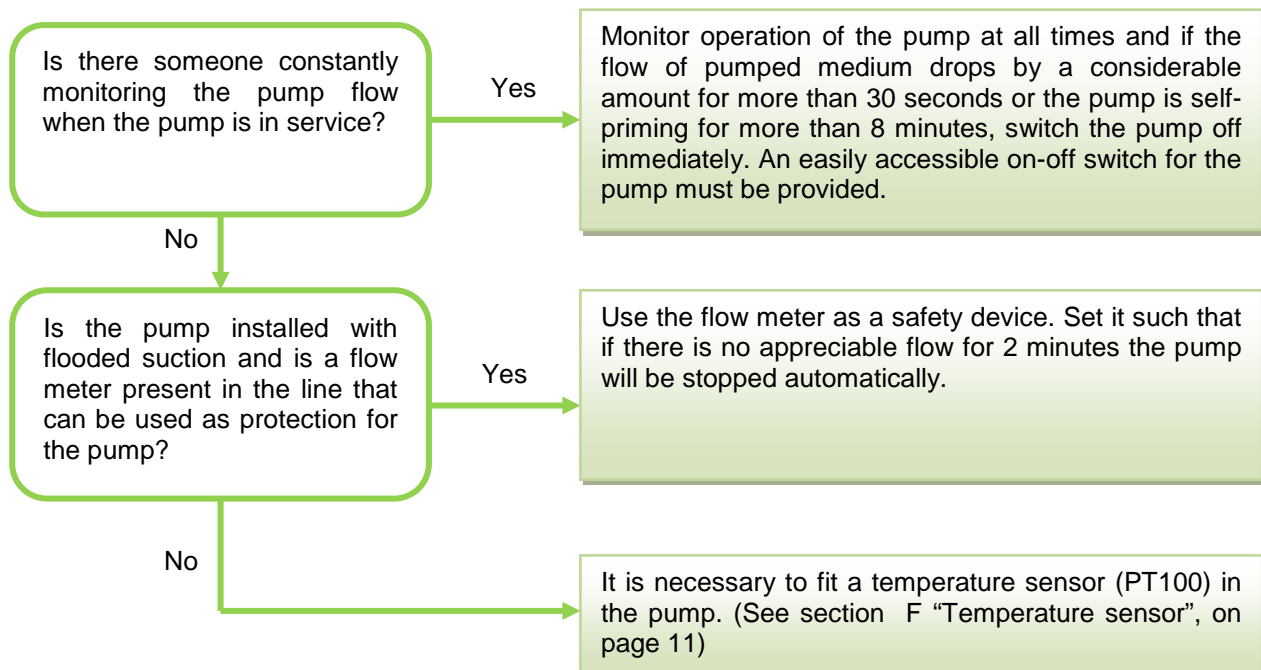
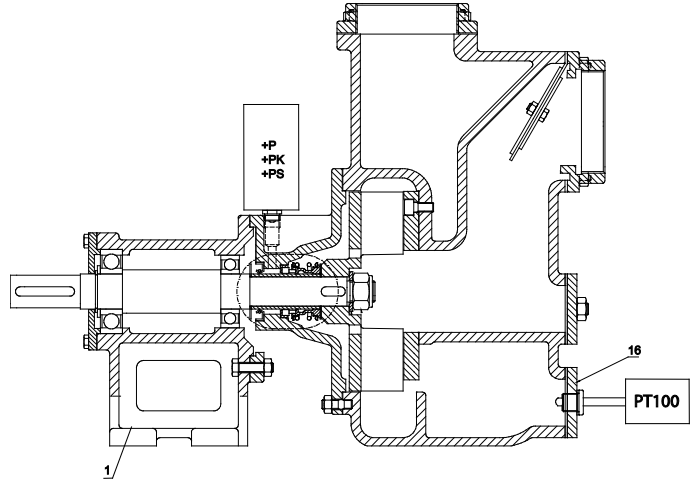
See also section 2.10.

2. Checklist

- 2.1 The pump must work within the conditions mentioned in the Data Sheet. When conditions have changed, please contact your pump partner in order to revise the Data Sheet.
- 2.2 The ball bearings must be checked for noise or wear on a monthly basis and replaced punctually as otherwise a risk of explosion could arise due to an excessive high bearing temperature. The service life of the ball bearings is strictly connected to the mechanical seal. When the mechanical seal is replaced, also the ball bearing must be changed.
- 2.3 The pump has a mechanical seal that can leak. If the pumped liquid is inflammable, in the outside of the pump you have to declare a Zone 1 (Category 2). (Not applicable for pumps with magnetic coupling)
- 2.4 In the case of mechanical seals type .31., .331., .38., .57. and .14., the automatic lubricator (+P, +PK, +PS) for the mechanical seal must be present and activated. The cartridge must be replaced every year.
- 2.5 If the pump is used with IIC Vapor Explosion Class, there is a danger of electrostatic charging if the paint on the unit has a coating thickness of more than 0.2 mm, if used in IIB more than 2mm.

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- 2.6 The pump can be blocked by solids. It is therefore necessary to mount an automatic switch on the electric motor (PTC if used with inverter).
- 2.7 Use the pump only in the authorized performances levels indicated in performance curve, technical data sheet and instructions! The liquid should never be pumped on the limit of vaporization, crystallization, polymerization or solidification. If the pump has to be used in a different duty not indicated in the request form (for which the pump was produced), please check the compatibility and ask for authorization of use to the manufacturer!
- 2.8 The pump has to be earthed. To connect the pump to earth use one of the 4 screws on the pedestal that fixes the base plate. To allow metal contact, take in the contact point the paint from the surface away (Pos. 1).
- 2.9 The pump must be compatible with the pumped liquid. The pump producer is not responsible if the pump is used with not compatible liquids.
- 2.10 The operating temperature of the pump should not exceed the following values:
 ⇒ with mechanical seal type .17..., .31..., .331..., .38..., .14..., .57..., .6...: T4, T3, T2, T1 -> 90°C
 ⇒ with mechanical seal type .10..., .30..., .35..., .55...: T4 -> 75°C / T3, T2, T1 -> 90°C
 ⇒ with mechanical seal type .36., .362.: T4 ->75°C / T3, T2, T1 -> 110°C
 ⇒ with magnetic coupling: T4 -> 100°C / T3, T2, T1 -> 130°C
 If a pumped medium is capable of reaching this temperature, it is not permitted to put the pump into service. A temperature sensor can be used for checking.
- 2.11 It is not permitted to start the pump with closed suction and/or discharge line. The pump owner should take the necessary safety measures to avoid this situation.
- 2.12 Measures such as are listed below must be taken against dry running or against blocked lines:



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D. Operation

1. Installation

- 1.1 Check all points in paragraph C.2 "Checklist", page 5.
- 1.2 Set up the pump on a flat surface as near as possible to the liquid to be pumped. Make sure that the surrounding is adequately ventilated.
- 1.3 Suction hose or pipe should be as short as possible and should have the same diameter as the pump port. It is recommended minimize the use of elbows, bends or necks. This will reduce the priming time and ensure full capacity.
- 1.4 Check that any connections (threads, welds, gaskets, quick-couplings, valves, etc.) are completely airtight: if necessary, coat them with grease.
- 1.5 If present, mount and fill the oil reservoir with oil or mount the automatic grease lubricator (see section E "Automatic Grease Lubricator" on page 10).
- 1.6 It is a good advice to use a suction strainer without valve (available on request).
- 1.7 If present, connect the temperature sensor, with authorized personal only (see section F "Temperature sensor" on page 11).
- 1.8 Connect the electric motor with authorized personal only (see the instructions of the supplier).

2. First Start-up

- 2.1 Use the pump only in the authorized performances levels indicated in performance curve, technical datasheet and instructions! The liquid should never be pumped on the limit of vaporization, crystallization, polymerization or solidification.
- 2.2 The material of the pump must be compatible with the pumped liquid. The pump manufacturer has no responsibility on this.
- 2.3 To self-prime the first time: Open the priming cover on the top of the pump. Fill the pump chamber completely with the liquid to be pumped. Close the cover.
- 2.4 Check that direction of rotation is the same as shown by the arrow on the back of the pump (clockwise when looking from the shaft or motor end).
- 2.5 Open all valves. Otherwise the mechanical seal can be damaged.
- 2.6 Start the pump and check after some minutes if the pump is working as planned.

<p>WARNING Any deviation from normal operating conditions (increased power consumption, temperature, vibrations, noise etc.) or warning signals by monitoring equipment suggest malfunction. Inform the responsible maintenance personnel at once to prevent the trouble from getting worse and causing, directly or indirectly, serious physical injury or material damage. In case of doubt disconnect the machine immediately!</p>

- 2.7 If present, check if the temperature sensor works properly.

3. Running

- 3.1 Start and stop the pump if necessary. The pump is designed for 6 starts per hour. More frequent start cycles must be approved by the pump producer.
- 3.2 If the suction line is empty, the pump will first suck in the air and then the liquid.
- 3.3 In case of pump stop, the integrated non-return valve (if present) prevents the flow back of the liquid.

4. Operating troubles

- 4.1 PUMP DOES NOT PRIME:
 - (a) Air leaks into the suction line (through couplings, threads, flanges, gaskets, hose clips, cuts, etc.). It is difficult to find the trouble place. You can take off the suction pipe from the suction port, start the pump and check if the pump sucks by placing the hand on the suction port.

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- (b) Level of liquid inside pump casing is too low or empty.
- (c) Wrong direction of rotation or too low speed.
- (d) Overpressure in the delivery line. Air does not escape. Exhaust air through priming cover or install an automatic air-release valve.
- (e) Liquid inside pump chamber overheated. Allow liquid to cool down or refill it with cold liquid.
- (f) Air leaks through the mechanical seal because of damage or lack of lubrication. Replace the mechanical seal.
- (g) Leading edge of the volute is worn out by the abrasive action of the liquid.
- (h) Clogged, broken or worn impeller.

4.2 LOW CAPACITY:

- (a) Strainer or filter clogged. Clean out.
- (b) Suction or delivery lines clogged or rubber hose collapsed. Locate and remove obstruction.
- (c) High friction losses in the line. Get rid of unnecessary elbows, valves and constrictions.
- (d) Static suction lift too high. Place the pump as close as possible to the surface of liquid to be pumped.
- (e) Low rotation speed. Increase RPM.
- (f) Impeller clogged. Free impeller through the inspection cover or open the pump casing.
- (g) Impeller and/or wear plate(s) worn out. Replace.

4.3 PUMP IS MAKING NOISE:

- (a) Discharge side or suction side closed or clogged. Install a manometer and a vacuum meter to inspect the piping.
- (b) Impeller clogged. Free impeller through the inspection cover or open the pump casing.
- (c) Cavitation. The pump is working outside the allowable curve. Check how the sound changes by slowly closing and opening the valve in the discharge side.
- (d) Ball bearing worn out; replace.

4.4 PUMP IS LEAKING:

- (a) Loosen screws. Check.
- (b) Loads on the pump and piping too high. Check.
- (c) Overpressure. Mechanical seal damaged.
- (d) Dry-running or closed lines. Mechanical seal overheated and broken. Replace.
- (e) Rubber components not compatible with the pumped liquid. Please contact your pump partner for alternative materials.

4.5 For any other operation troubles, please contact your pump partner by mentioning:

- ⇒ Pump type
- ⇒ Serial no.
- ⇒ Problem
- ⇒ Running time
- ⇒ And possibly attach photographs of pump and piping.

5. Maintenance

- 5.1 After start-up the pump will need to be checked at the following intervals to make sure it is pumping properly and not making strange noises: 10 min. / 1 hour / 10 hours / 1 day / 1 week / 1 month. Inspection may take place thereafter at monthly intervals provided the conditions of use do not change. With ATEX version, check also the ball bearings.

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WARNING When the pump is not used, never forget water inside the pump casing during cold weather! Water may freeze and break the pump casing!

- 5.2 Every 3 months, if necessary, lubricate the mechanical seal (see section D.6 "Lubrication of the mechanical seal" on page 9).
- 5.3 Every 6 months, open the inspection cover or the casing and check inside. Remove possible foreign parts blocked inside the casing. Clean the pump and the motor. If necessary, check more frequently.
- 5.4 Every 12 months, if necessary, change the automatic grease lubricator (see section E "Automatic Grease Lubricator" on page 10).
- 5.5 Every 5-10 years, make a general pump recondition.

6. Lubrication of the mechanical seal

- 6.1 Pumps with carbon seal (i.e. .30. / .302. / .35. / .10. / .16. / .55.) have no lubrication and do not need any maintenance.
- 6.2 The models with mechanical seal with diamond coating (.36., .362.) have no lubrication and therefore need no maintenance.
- 6.3 For models with automatic grease lubricator please follow the instructions in section E "Automatic Grease Lubricator" on page 10.
- 6.4 Models with grease nipple do not need any maintenance for the first 200 working hours. After this period lubricate every 3 months with only one hub of grease. Use standard grease with viscosity grade between 1 and 3. With alkaline products (ex. lime-milk) use the special grease of Victor Pumps (please contact your pump partner).

WARNING Do not over-grease, otherwise the next near ball bearing can be damaged!

7. Warranty

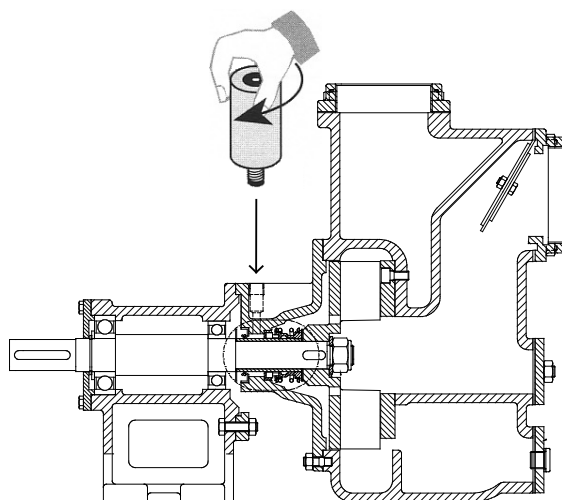
- 7.1 The manufacturer warrants the pump against defects or faulty workmanship for a period of 12 months from the date of delivery. Longer warranty periods are available on request.
- 7.2 Repair of the pump or replacement of parts or of the pump itself can only be carried out after careful examination of the pump in our workshop where the pump should be sent by carriage paid. Any exceptions must be confirmed in writing.
- 7.3 This warranty does not cover parts damaged by improper operation, handling and assembly, as well as parts subjected to deterioration and normal wear (especially impellers, wear plates and mechanical seals).
- 7.4 This warranty is no longer valid if the pump is disassembled or modified without the authorization of the manufacturer.

WARNING Never forget water inside pump casing during cold weather! Water may freeze and break the pump casing!

E. Automatic Grease Lubricator

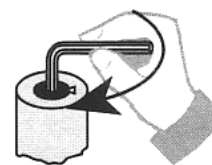
1. Description

- 1.1 The automatic lubricator (+PS) is a long-term grease dispenser activated by a hydrogen gas producing dry cell. The lubricator contains 125 ml of grease dispensed during a period of 12 months. The operating temperature is min -20°C and max +55°C (-4/+131°F). The weight of the full lubricator is approx. 190g (6.7oz) and empty approx. 75g (2.7oz). The grease is special water-repellent, suitable for alkaline products.
- 1.2 Storage time of the cartridge should not be longer than 3 years.



2. Installation and activation

- 2.1 Open the lubricator outlet by removing the plug.
- 2.2 Screw the lubricator in the hole with ¼" thread on the head of the pump. If the hole is already closed by a tap or grease nipple take this part away. If necessary, use the extension to mount the lubricator.
- 2.3 Set the gas generator to **position 12 (12 months)** using a size 3 mm Allen key.
- 2.4 With a waterproof pen register the starting date on the label. The life time of the lubricator is 12 Months. Replace afterwards the empty lubricator with the same type.



3. Notes

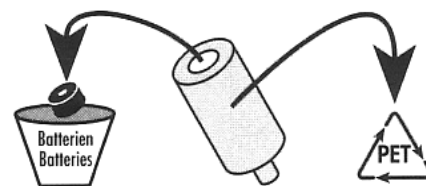
- 3.1 After activating, it can take some days, until grease is dispensed for the first time.
- 3.2 The lubricator can be readjusted or switched off (position 0) during operation. If you unscrew the lubricator the created pressure in the quench chamber will be lost and the life time of the lubricator will be less.
- 3.3 In order for the lubricator to function reliably it is important to have the quench chamber already filled with grease. If you change the mechanical seal it is important to refill the quench chamber and the line before installing the lubricator.

4. Recycling

- 4.1 Unscrew gas generator from the lubricator and dispose the complete part in the battery recycling.

WARNING Do not unscrew the gas generator from the lubricator near a naked flame.

- 4.2 Dispose of empty housing of the lubricator in the PET-recycling. If the lubricator still contains grease, please dispose it in accordance with the local regulations.



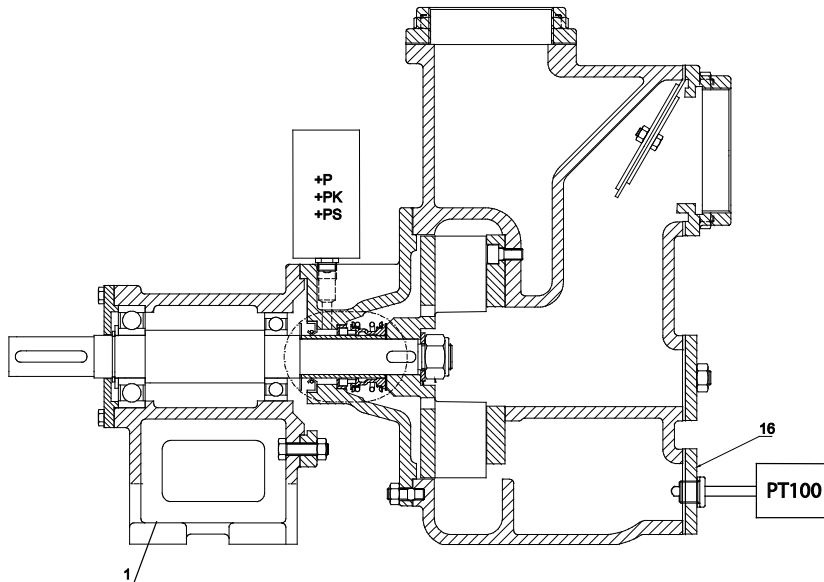
F. Temperature sensor

1. Introduction

- 1.1 In the pumps prepared for the temperature sensor (magnetic pumps excluded) a ¼" threaded port is present in the drain cover of the pump to fit a PT100 temperature sensor type.
- 1.2 The sensor monitors temperature changes in the pumped medium. This means that a closed pressure line or abnormal wear in the pump can be monitored by means of a temperature increase. When the limit temperature is exceeded, the sensor disconnects the power supply to the pump drive and the pump stops.
- 1.3 The shut off device and associated wiring are not included in the scope of supply of the pump. The pump owner is required to have this installed himself by a suitably qualified technician.

2. Installation of the sensor into the pump (magnetic pumps excluded)

- 2.1 The ¼" threaded port for the temperature sensor (PT100) is in the drain cover (Pos.16) (not valid for magnetic pumps).

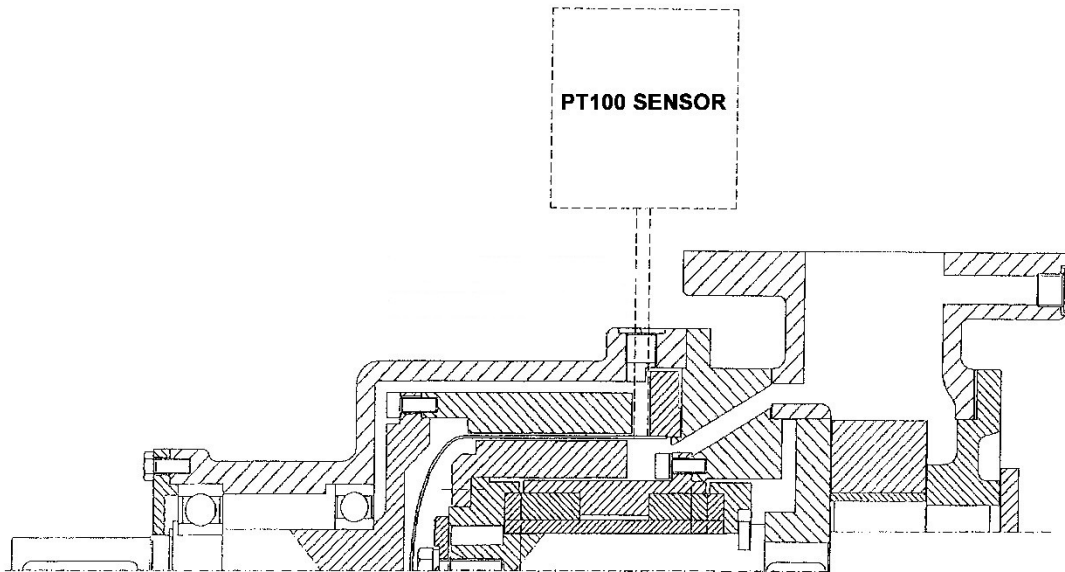


- 2.2 Unscrew the tap and screw the temperature sensor (PT100) provided for this purpose.

3. Installation of the sensor into magnetic pumps

- 3.1 The temperature sensor for magnetic pumps has 3 parts: the sensor with head, the plug and in some versions the gasket.
- 3.2 The holes for the temperature sensor are located on the side of the pedestal. You should use the hole that is more comfortable for the installation.

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- 3.3 Screw the plug with the gasket (if provided) in the selected hole up to half of the total length of the threads.
- 3.4 Insert the temperature sensor PT100 into the plug as far as the head touches the can.
- 3.5 Tight up the smaller threaded connection of the plug in order to fix the sensor to the plug.
- 3.6 Tight up the plug with sensor. By doing this a spring inside the plug will be pressed in order to increase the contact between head and can.

4. Connection of the transmitter

- 4.1 Victor Pumps provides the temperature sensor PT100 with integrated digital transmitter. The transmitter is regulated as follows:

Temperature range	OUT-Signal	Current
0-150 °C	4 - 20 mA, linear	8 - 30 VDC

- 4.2 Connect the transmitter to a reading unit on the control panel (not included) with an ATEX 2-Wire cable. The sensor's tripping value must be set at 10°C above the pumping temperature, but 5°C below the boiling point of the pumped liquid, and not exceeding the following values:

- ⇒ with mechanical seal type .17..., .31..., .331..., .38..., .14..., .57..., .6...: T4, T3, T2, T1 -> 92°C
- ⇒ with mechanical seal type .10..., .30..., .35..., .55...: T4 -> 78°C / T3, T2, T1 -> 92°C
- ⇒ with mechanical seal type .36., .362.: T4 ->78°C / T3, T2, T1 -> 112°C
- ⇒ with magnetic coupling: T4 -> 110°C / T3, T2, T1 -> 140°C

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