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# Instruction and Maintenance Manual

## Internal Gear Pumps
## Type R
## in ATEX version

### INDEX



Pump No.

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# A. Declaration of conformity – ATEX certificate

We hereby declare that the internal gear pumps of the **R** series 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 ⟨Ex⟩ 2G c T4x

with code +3A for equipment of category II ⟨Ex⟩ 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

The technical documentation was deposited at TÜV NORD CERT (No. 0032), Order No. 8000317582.

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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 The operating instructions must always be available wherever the pump is in use.

1.3 The operating instructions must be read and applied by any person in charge of carrying out work on the pump.

1.4 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.

1.5 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.

2.9 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.

3.2 A photograph is helpful in any claims to be made against the carrier. Inform manufacturer or the local authorized distributor, too.

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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.

## 5. Pump description

5.1 R pumps are internal gear rotary pumps suitable for pumping liquids of any viscosity. Special versions can also pump liquids containing abrasive objects.

5.2 Pumps are self-priming and work on suction lifts up to a maximum of 8 meters water column. The suction lift is limited by fluid vapor pressure or by low viscosity.

5.3 The gear within a gear working principle produces a smooth, non-pulsating flow.

5.4 Pumps have only one shaft seal.

5.5 The axial position of the rotor can be adjusted without removing the pump.

5.6 Pumps are reversible. Full capacity is obtained in either directions of rotation.

**WARNING** If the pump is fitted with a safety valve, the cover, with the adjusting screw, must be on the suction port side. If the direction of pump rotation has to be reversed, the safety valve must also be inverted by losing the 4 screws of the valve. **THIS IS NOT POSSIBLE FOR CHOCOLATE OR MAGNETIC PUMPS!** Please contact your pump partner for alternatives.

5.7 Pumps are supplied with a bearing housing suitable for coupling with V-belts or flexible couplings.

5.8 Pumps are identified by the type and the serial number. The pump model is stamped on a nameplate fixed on the bearing housing. The serial number is punched on the pump casing, close to the nameplate.

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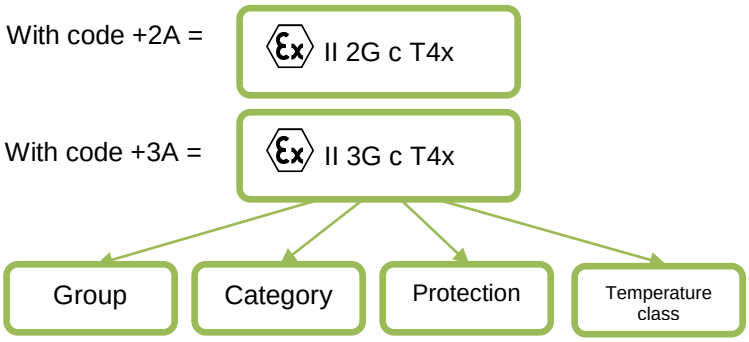
# C. ATEX - Information

## 1. Marking

1.1 The **R** internal gear pumps are marked as followed:




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

X = see section C.2.8, page 6.

## 2. Checklist

2.1 By pumps with mechanical seals, these can leak. If the pumped liquid is inflammable, in the outside of the pump you have to declare a Zone 1 (Category 2).

2.2 Pumps with packing seal will leak. If the pumped liquid will cause an ATEX Zone, it is forbidden to use the pump with packing seal, because it is not designed for Zone 0.

2.3 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.

2.4 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 2 mm.

2.5 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).

2.6 Use the pump only in the authorized performances levels indicated in these instructions, in the technical data sheet and in the performance curve! The liquid must never be pumped on

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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!

2.7 The pump materials must be compatible with the pumped liquid. The pump producer is not responsible if the pump is used with not compatible liquids.

2.8 The operating temperature of the pump must not exceed the values below mentioned. 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. On request other measures can be advised by the manufacturer. This will be indicated specifically in the technical data sheet.

| Temperature class according to DIN EN 13463-1 | Maximum operating temperature* for pump with | | |
|---|---|---|---|
| | Packing seal °C | Mechanical seal °C | Magnetic coupling °C |
| T1 | 200(300) | 150 | 200 |
| T2 | 200(240) | 150 | 200 |
| T3 | 140 | 150 | 160 |
| T4 | 75 | 95 | 105 |

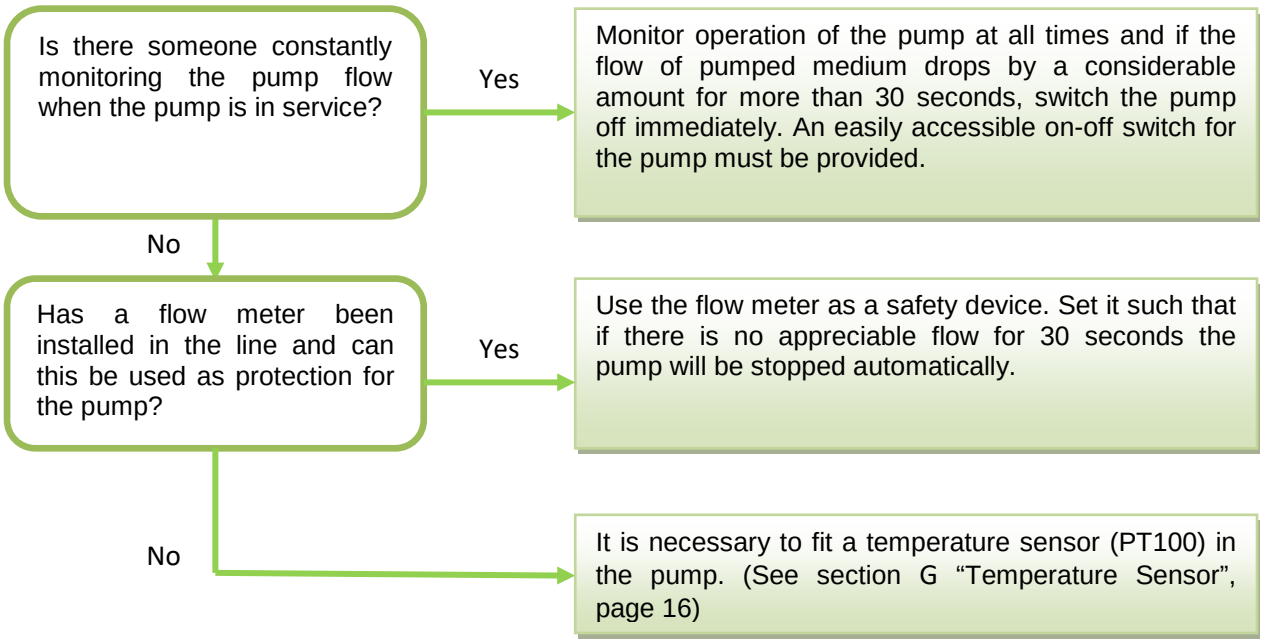
** Over 140°C the pump has to be painted with high temperature paint.*

*( ) H. version of the pump*

2.9 The R internal gear pump is a volumetric pump. It is not allowed to regulate the flow by closing the suction or discharge side or by regulating the pressure. Flow regulation can be achieved only through speed changing or an external by-pass line.

2.10 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. To secure the pump against a closed discharge line you can use the internal safety valve (+Y). Never use the internal safety valve as a standard by-pass line. As an alternative you can use an external by-pass line. This by-pass line has to be large enough, always able to work and preferably returning to the suction tank.

2.11 Measures as listed below must be taken against long dry running or against long operation of the safety valve:



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# D. Operating instructions

## 1. Installation

1.1 Check all points in paragraph C.2 “Checklist”, page 5.

1.2 Pumps are supplied with an internal protective liquid. If this liquid can pollute the product being pumped, flush the pump before installation.

**WARNING** Pumps must never be tested with water as they can be damaged.

1.3 Install the pump on a level surface as close as possible to the level of the liquid to be pumped, in an accessible position for maintenance and operation.

1.4 The diameter of the suction line should be at least equal to that of the pump suction port. The length of the suction line should be as short as possible. Avoid elbows, constrictions and valves as far as possible. Liquefied gases can be pumped only on flooded suction.

1.5 To easily mount the pump, it can be necessary to change the connecting pipe. It is necessary to loosen the screws on the rear cover and rotate the casing. For the right safety valve position see section D.2.4, page 8. To invert the safety valve, loosen the 4 screws of the valve and install it back to front.

**WARNING** The casing of chocolate or magnetic pumps must never be rotated. This action can damage the pump. Please ask to your pump partner for alternative operations.

1.6 It is advisable to fit a filter in the suction line near the suction port to protect the pump from foreign bodies, welding scarves, flakes of iron, etc. which can damage the pump.

1.7 The size of the delivery line must be calculated to reduce friction losses. High pressures may reduce the pump life especially if the liquid contains abrasive impurities.

1.8 Ensure that pipes are clean in order to prevent overpressures to the pump casing. Check the alignment of the flexible coupling.

1.9 If a non-return valve is fitted in the delivery line and a pressure higher than 2 bar is applied, the pump cannot self-prime because the air expelled from the pump cannot escape through the non-return valve. In this case fit an exhaust vent between the pump and the valve.

1.10 Safety valves (by-pass), available on request, are designed primarily to protect the pump casing and the piping against damage if the pump runs with closed or clogged delivery line. If the pump is used in both directions, double safety valves are also available.

**WARNING** Safety valves must not be considered as flow regulation valves. To change the pump capacity use either a variable speed drive or an external by-pass line.

1.11 Pumps supplied with a heating jacket can be heated with steam (max. pressure 10 bar) or with heat transfer oil up to 250 °C. If pumps have more than one heating jacket, they can be connected in series or in parallel.

1.12 It is suggested to install a vacuum and a pressure gauge near the suction and the delivery flanges. Pumps are provided with connections to this purpose. Vacuum and pressure gauges help to find possible causes of problems either in the pump or in the unit.

1.13 Electric motors must be protected by adequate overload cutoff switches that should be set to +10% with respect to the maximum current shown on the motor nameplate. Ensure that the surroundings are adequately ventilated (see the instructions of the motor producer).

1.14 Check that pipe threads, flange gaskets and quick couplings are completely airtight. If necessary, seal them with grease.

## 2. First start-up

2.1 Before the first start-up, it is suggested to pour some liquid into the pump casing to help self-priming.

2.2 Check by hand that the pump can rotate freely. In case of pumps with packing seal, the screws of the packing gland must be loosen before.

2.3 Check that all valves in the suction and delivery line are open.

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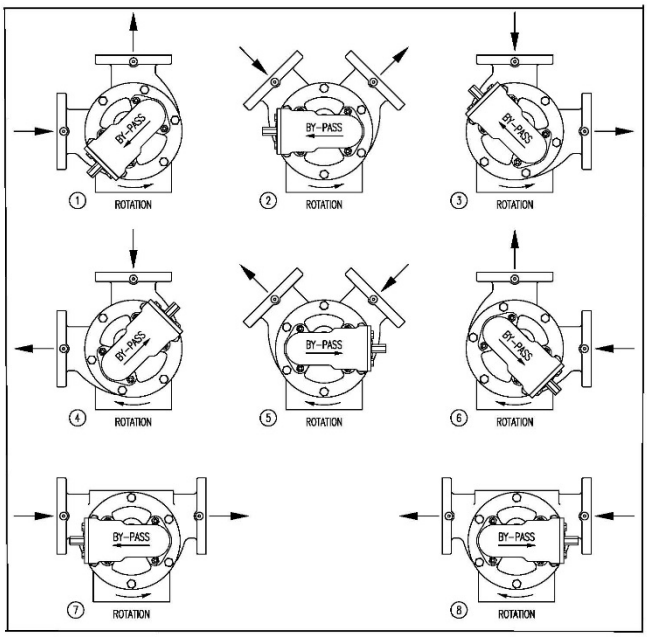
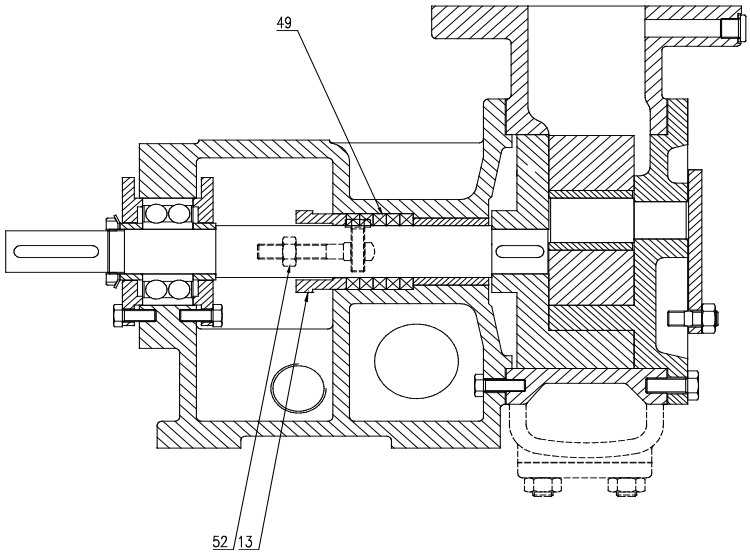



*Figure 1 - Direction of rotation*

2.4 Start the motor and check the direction of rotation. See Figure 1.

**WARNING** If the pump is fitted with a safety valve, the cover, with the adjusting screw, must be on the suction port side. If the direction of pump rotation has to be reversed, the safety valve must also be inverted by losing the 4 screws of the valve. **THIS IS NOT POSSIBLE FOR CHOCOLATE OR MAGNETIC PUMPS!** Please contact your pump partner for alternatives.

2.5 If present, fill the +O2 reservoir with the quench liquid. See section E.2 “Quench reservoir +O2”, page 12.




2.6 In case of pumps with packing seal, tighten up the Pos. 13 packing gland lightly using the screws (Pos. 52) (up to a maximum torque of 10 N) and then loosen them slightly again.

**WARNING** Never tighten up the packing gland so that it is skewed. This would create the risk of the shaft coming into contact with the packing gland with the risk to create sparks during operation.

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2.7 Start the pump and check after some minutes if the pump is working as planned.

**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!**

2.8 Check the pressure of the pump. In case of over pressure or too low pressure it is necessary to adjust the safety valve. See section F “Safety valve”, page 15.

2.9 In case of pumps with packing seal, during the running-in phase (approx. 20 min), watch the leakage and minimize it by tighten the screws gradually and evenly. The leakage rate will fall faster or more slowly, depending on pressure, viscosity, tolerances, temperature and speed. Leakage may be reduced until it is some drops per minute.

**WARNING** The pump must never work with no leakage. This could arise the temperature which is dangerous for operation in hazardous conditions.

2.10 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.

## 3. Operating troubles

3.1 In case of troubles, always check the pressure on the suction and delivery line of the pump, at first. Pumps are provided with ¼“ connections on the flanges for this purpose.

3.2 **PUMP DOES NOT PRIME.** Possible causes:

(a) Wrong direction of rotation (see section D.2.4).

(b) No liquid in pump casing to create a seal (see section D.2.1). The vacuum gauge needle hardly moves. Should the pump self-prime at every start and has difficulty in priming, it is recommended to fit either a goose neck (curve upwards and reverse curve) or a foot valve in the suction line to ensure that there will be always liquid in the pump.

(c) Closed valve in the suction line, suction line or filter clogged. Vacuum gauge reading is high. Check the suction line thoroughly.

(d) Air leaks in the suction line. Check that all flange screw threads and gaskets are airtight.

(e) Trapped air in the delivery line. Check that all valves are fully open. If necessary, let the air out by venting the delivery line.

(f) Excessive suction lift. Reduce static suction lift.

(g) Rotation speed too low. If the liquid has a viscosity less than 20 mm²/s (cSt), do not run at a speed less than ⅓ of the nominal speed.

(h) Safety valve (by-pass) blocked by impurities in open position. Clean the safety valve and its seat.

3.3 **LOW CAPACITY.** Possible causes:

(a) Rotation speed too low. Check that the speed corresponds to that necessary to obtain the required capacity.

(b) Suction line or filter obstructed. The vacuum gauge reading is high. Cavitation noise.

(c) Air leaks in the suction line. The vacuum gauge and the pressure gauge oscillate. Check connections, threads, gaskets, welds etc.. Air leaks in the suction line are very difficult to detect. They are nearly invisible in case of low pressure in the suction line.

(d) Pressure of safety valve is set too low causing some liquid to recycle. Tighten the safety valve adjusting screw (see section F ”Safety valve”, page 15). The pressure gauge will show a higher pressure.

(e) Suction line not sufficiently immersed in liquid causing air to enter suction line. The vacuum gauge oscillates.

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(f) Liquid viscosity too high. The vacuum gauge reading is very high. Cavitation noise. Reduce the viscosity of the liquid by heating, or increase the diameter of the suction line.

(g) Excessive suction lift or excessive suction friction losses. The vacuum gauge reading is high. Cavitation noise. Reduce static suction lift and shorten the suction line as much as possible by eliminating unnecessary valves, bends or external constrictions.

(h) Air leaks from the packing seal or the mechanical seal. Tighten or replace packing seal or replace mechanical seal. These defects occur primarily when the delivery pressure is lower than the suction pressure.

(i) Pump axial adjustment not correct. Please re-adjust. See section E.6 “Rotor axial adjusting”, page 14.

(j) Excessive wear of the internal parts of the pump. Please contact your pump partner.

3.4 **EXCESSIVE PUMP NOISE – CAVITATION.** Possible causes:

(a) Suction line is obstructed. Vacuum gauge always has a very high reading. Locate and clear obstruction. Open valves fully.

(b) Filter clogged. Examine and clean.

(c) Rotation speed too high for the viscosity of the liquid. Reduce the viscosity of the liquid by heating. Increase the diameter of the suction line. Reduce RPM. Change pulleys or gear box ratios.

3.5 **MOTOR OVERLOAD.** Possible causes:

(a) Valves partially closed in delivery line. Pressure gauge reading is high. Check all valves.

(b) Delivery line obstructed or too small in diameter, pressure gauge reading is high. Locate and clear the obstruction or change the line.

(c) Packing too tight. Shaft and packing seal box overheated. Loosen gland screws (see section E.3.2, page 12).

(d) Liquid with viscosity or density higher than that for which the pump was designed. Reduce the viscosity, reduce rotation speed, increase diameter of the delivery line or install a higher powered motor.

(e) Shaft bush or idler bush tend to seize and stop the pump. Rear cover or idler pin extremity overheated. Clean the shaft or the pin and bore the bushes to allow larger tolerances. Better to contact your pump partner.

3.6 **EXCESSIVE WEAR.** Possible causes:

(a) Liquid containing particles with a diameter greater than 0.5÷1 mm. Fit a suction filter. Liquid containing abrasive impurities. Decrease RPM. With abrasive liquids pump speed must be reduced to ⅓ of the rated speed.

(b) Excessive pressure. With abrasive liquids the pressure must not exceed 4 bar.

(c) Pump version not suitable for the pumped liquid. The pump is corroded by aggressive liquids. E.g.: solvents used in pumps designed for lubricating liquids.

(d) Distortion due to the pipe-work loads transmitted directly to the pump casing, couplings not aligned, V-belt too tight, overloaded shaft, uneven foundation.

3.7 **MAGNETIC COUPLING SLIDING.** Possible causes:

(a) Torque too high. Check pressure and viscosity.

(b) Start-up torque too high. Install a soft starter or a frequency converter.

(c) The pump is blocked. Check the rotor and the idler.

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

⇒ Pump type

⇒ Serial no.

⇒ Problem

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⇒ Running time

⇒ And possibly attach photographs of pump and piping.

## 4. Warranty

4.1 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.

4.2 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.

4.3 This warranty does not cover parts subject to deterioration or normal wear, or damaged by misuse or improper handling of the pump by the user.

4.4 This warranty is no longer valid if the pump is disassembled or modified without the authorization of the manufacturer.

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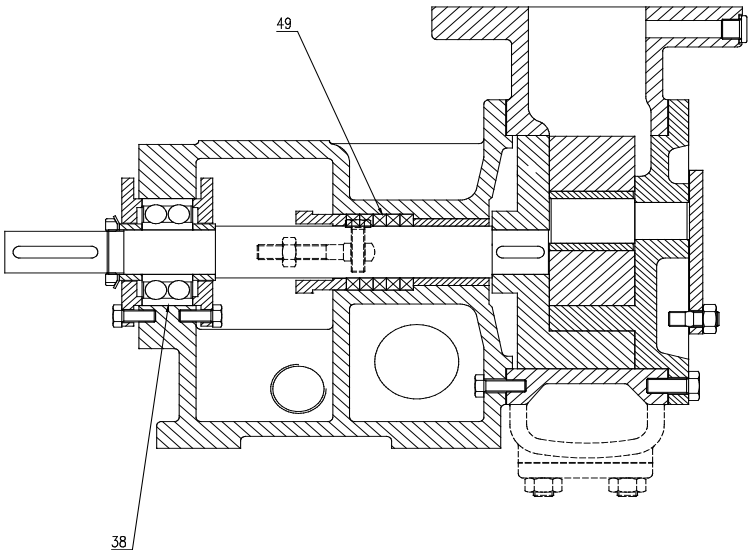
# E. Maintenance

## 1. Maintenance plan

1.1 After start-up the pump will need to be checked at least 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.

1.2 Every month, if present, check and adjust the packing seal. See section E.3.1, page 12.




1.3 Every month check the ball bearing (Pos. 38) with regard to wear or noise. If necessary replace it to avoid the explosion hazard due to high temperature.

1.4 Every 3 months, if present, lubricate the ball bearings. See section E.5 ”Bearing”, page 13.

1.5 Every 3 months, if present, change the quench liquid in the quench reservoir +O2. See section E.2 “Quench reservoir +O2”, page 12.

1.6 Every 6 months clean the pump and the motor. If necessary, check more frequently.

1.7 Every 5-10 years make a general pump recondition.

## 2. Quench reservoir +O2

2.1 The purpose of the reservoir is to keep a quench liquid inside the mechanical seal, preventing any contact between pumped liquid and air.

2.2 The most suggested quench liquids are viscous, thermo stable oils, compatible with the pumped liquid (e.g. Vaseline, glycerine, glycol, Balistol).

2.3 Install the quench reservoir after the ¼” curve, near the seal.

2.4 Unscrew the cap of the quench reservoir and fill half of the glass with the quench liquid.

2.5 The level of the quench liquid can increase or decrease according to the temperature and the tightness of the seal. Should the liquid overflow, drain the quench liquid up to half of the reservoir and each day during one week check if the mechanical seal is tight. If not, replace the mechanical seal.

2.6 Every 3-4 months drain the liquid through the ¼” taps near the mechanical seal and re-fill the reservoir with non-used quench liquid.

## 3. Shaft seal

3.1 The pump is equipped with one shaft seal of the following types:

3.2 **Packing seal:**

If the leakage along the packing is excessive, tighten the nuts of the eye bolts gradually.

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**WARNING** Do not over tight the gland nuts. During operation, liquid must leak through the packing for lubricating and cooling. If this loss is dangerous due to corrosion or fire, the pump must be equipped with a mechanical seal or a magnetic coupling.

**WARNING** Never tighten up the packing gland so that it is skewed. This would create the risk of the shaft coming into contact with the packing gland and sparking occurring during pump operation.

3.3 **Mechanical seal:**

⇒ Single: maintenance free.

⇒ Double, tandem: with reservoir (see section E.2 “Quench reservoir +O2”, page 12) or according to API Plan 52.

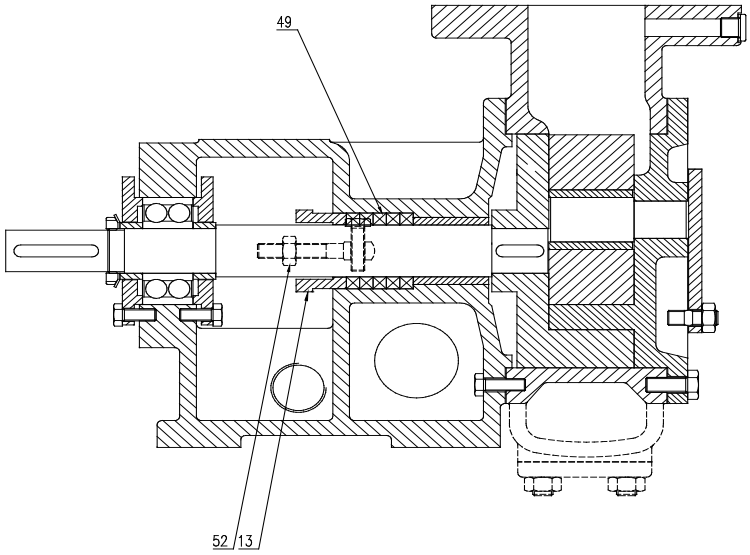
⇒ Double, back to back: according to API Plan 53 (min. 1 bar over the pump pressure).

⇒ Cartridge: see Data Sheet; normally this can operate with reservoir or according to API Plan 52 or Plan 53.

3.4 **Magnetic coupling:**

Is maintenance free.

## 4. Replacement of packing rings




4.1 Loosen the screws (Pos. 52) and push the packing gland (Pos. 13) to the rear.

4.2 Remove the old packing rings (Pos. 49) and clean the packing space.

4.3 Check the surface of the shaft with regard to wear and, if necessary, replace the shaft.

4.4 Insert new packing rings one by one, and pre-seal them with the cut ends offset by 180°.

**WARNING** Use only original Victor Pumps packing rings as incorrect materials may increase the packing temperature.

4.5 Slide in the packing gland (Pos. 13) and screw in the screws (Pos. 52) by hand.

4.6 Start-up the pump like a first time following section D.2 “First start-up”, page 7, to run the new packing seal correctly.

## 5. Bearing

5.1 The pump is equipped with bushings which are maintenance free as either lubricated by the liquid being pumped or self-lubricated.

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5.2 The ball bearing on the pedestal is generally maintenance free. Some have grease nipples and have to be lubricated every 500 operating hours or every 3 months with just one hub of grease.

## 6. Rotor axial adjusting

6.1 If pressure and/or capacity of the pump is no more sufficient, the axial clearance of the gears can be set-up by adjusting the rotors. This is not possible for magnetic coupling pumps that can only be adjusted with thicker cover gaskets (1-3 gaskets).

6.2 A high axial clearance is better against wear and high viscosity, but worse for the pumping pressure and self-priming with low viscosity products.

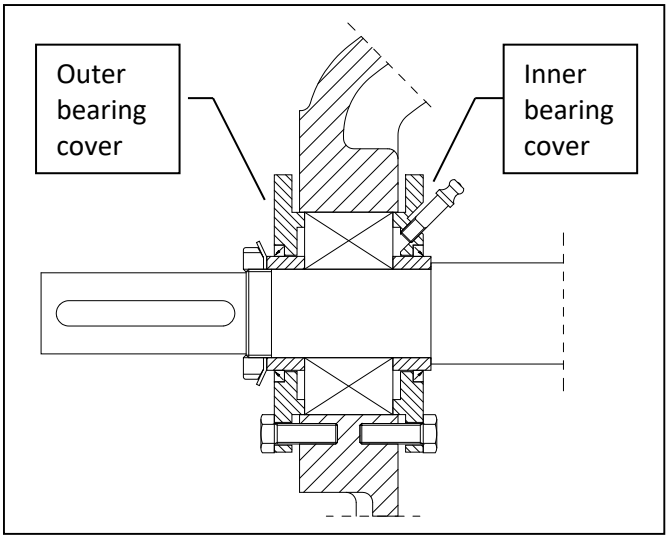
6.3 Adjusting:

(a) Loosen the inner bearing cover.

(b) Tighten the outer bearing cover.

(c) Loosen the outer bearing cover screws as shown in the following table.

(d) Re-tighten the inner bearing cover.




*Bearing covers*

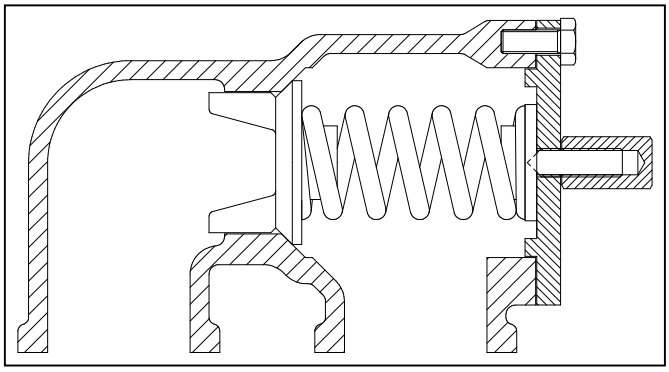
| | | | Class | | A | | B | | C | |
|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | | | | | mm²/s (cSt) | | mm²/s (cSt) | | mm²/s (cSt) | |
| -50°C ÷ 180 °C | | | | | <1000 | | 1000÷6000 | | >6000 | |
| >180 °C | | | | | | | <1000 | | >1000 | |
| Type | Screw | Pitch | | | R | mm | R | mm | R | mm |
| R 35,40 | M8 | 1,25 | | | 1/6 | 0,2 | 1/3 | 0,4 | 1/2 | 0,6 |
| R 50 | M8 | 1,25 | | | 1/3 | 0,4 | 1/2 | 0,6 | 2/3 | 0,8 |
| R 65 | M8 | 1,25 | | | 1/3 | 0,4 | 1/2 | 0,6 | 2/3 | 0,8 |
| R 80 | M8 | 1,25 | | | 1/2 | 0,6 | 2/3 | 0,8 | 1 | 1,2 |
| R105 | M10 | 1,5 | | | 1/2 | 0,7 | 2/3 | 1 | 1 | 1,5 |
| R151 | M10 | 1,5 | | | 1/2 | 0,7 | 2/3 | 1 | 1 | 1,5 |
| R180 | M12 | 1,75 | | | 1/2 | 0,8 | 2/3 | 1,2 | 1 | 1,8 |
| R200 | M12 | 1,75 | | | 1/2 | 0,8 | 2/3 | 1,2 | 1 | 1,8 |
| R250 | M16 | 2 | | | 1/2 | 1 | 2/3 | 1,4 | 1 | 2 |

R = Screw rotation

**Classes**:
A = pumps for low viscosity liquids (i.e. solvents)
B = standard
C = pumps for high temperature or viscous liquids

- Original -

# F. Safety valve



*Safety valve (by-pass)*

## 1. Introduction

1.1 The internal gear pump can arrive to an unlimited pressure that can damage the pump itself and the line. A safety over pressure valve prevents these damages.

1.2 Under request, the pump can be assembled with an integrated safety valve on the pump cover. As alternative, the pump must be protected by other controls (e.g. external return line, sliding clutch, pressure switch).

## 2. Adjustment

2.1 In case of double safety valves set-up the valves separately, according to the two directions of rotation.

(a) Unscrew the cap.

(b) Loosen or tight the adjusting screw in order to decrease or increase the pressure at which the by-pass is set. Pay attention to the motor performance. It is possible to make the adjustment with pipes full of liquid while the pump is running as slip losses from the screw are minimal.

**WARNING** Do not loosen the screw too much. When the spring is not compressed, the adjusting screw becomes loosen. At this point do not unscrew any further. Caution must be used when pumping inflammable or corrosive liquids.

**WARNING** Do not tight the screw to the end limit. This would compress the spring till the max. limit and the safety valve will not work properly.

(c) Screw on the cap again.

## 3. Direction of rotation

3.1 The safety valve is set for only one direction of rotation (except for double safety valve type +YY).

3.2 Please install the valve according to section D.2.4.

- Original -

# G. Temperature Sensor

## 1. Introduction

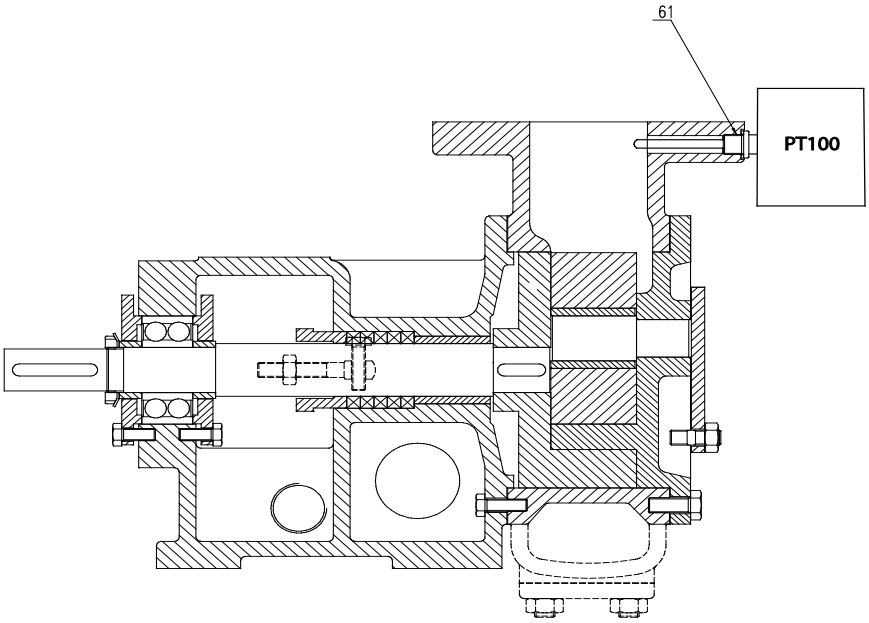
1.1 All pumps (magnetic pumps excluded) are provided with a hole in the pump flange for the installation of a pressure gauge and a temperature sensor. All magnetic pumps are provided with a hole for the installation of a temperature sensor of type PT100.

1.2 The sensor monitors temperature changes in the pumped medium. A temperature increase typical with closed pressure line or abnormal wear in the pump can be monitored. When the limit temperature is exceeded, the sensor trips to shut off power 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 In all pumps (magnetic pumps excluded) the holes for the temperature sensor are located on the side of the flange (Pos. 61). Use the hole at the discharge end of the pump (discharge flange).



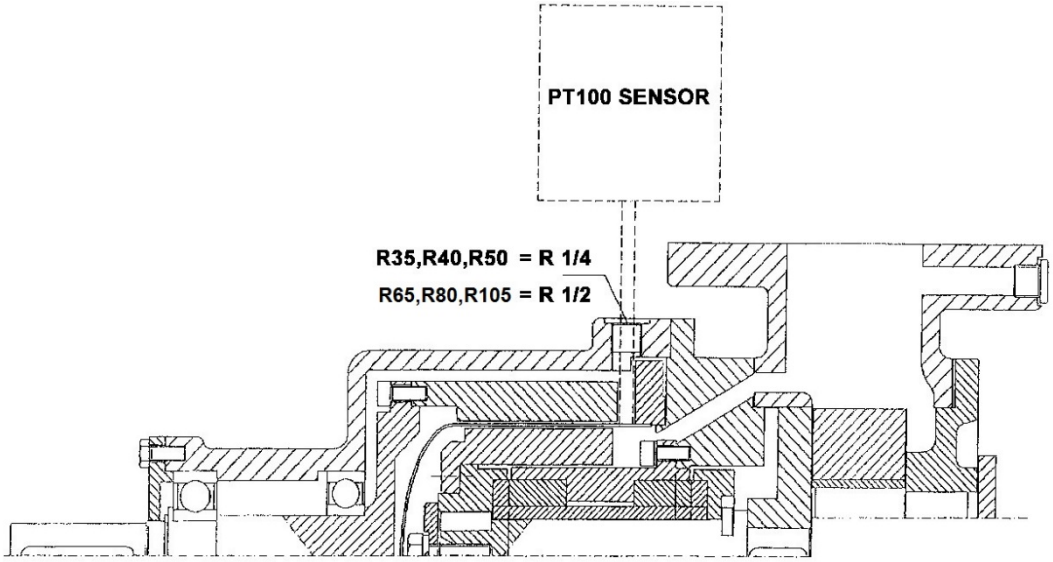

2.2 Put the gasket in the thread of the sensor. Insert and tight up the PT100 temperature sensor into the threaded connection of the pump flange.

## 3. Installation of the sensor into the magnetic pump

3.1 The delivered 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.

- Original -




3.3 Screw the plug with the gasket (if provided) in the selected hole up to half of the total length of the treads.

3.4 Insert the temperature sensor 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 Open the cover of the temperature sensor. There you will find the transmitter. Victor Pumps delivers the temperature sensor with integrated transmitter 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 tripping value must be set 10°C over the pumping temperature but it must not be over the value indicated in section C.2 “Checklist”, page 5. On request the manufacturer can allow other values. This will be specifically indicated in the technical data sheet.

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