

BEDU
≡ POMPEN ≡

Instruction for installation,
operation & maintenance



Internal Gear Pumps

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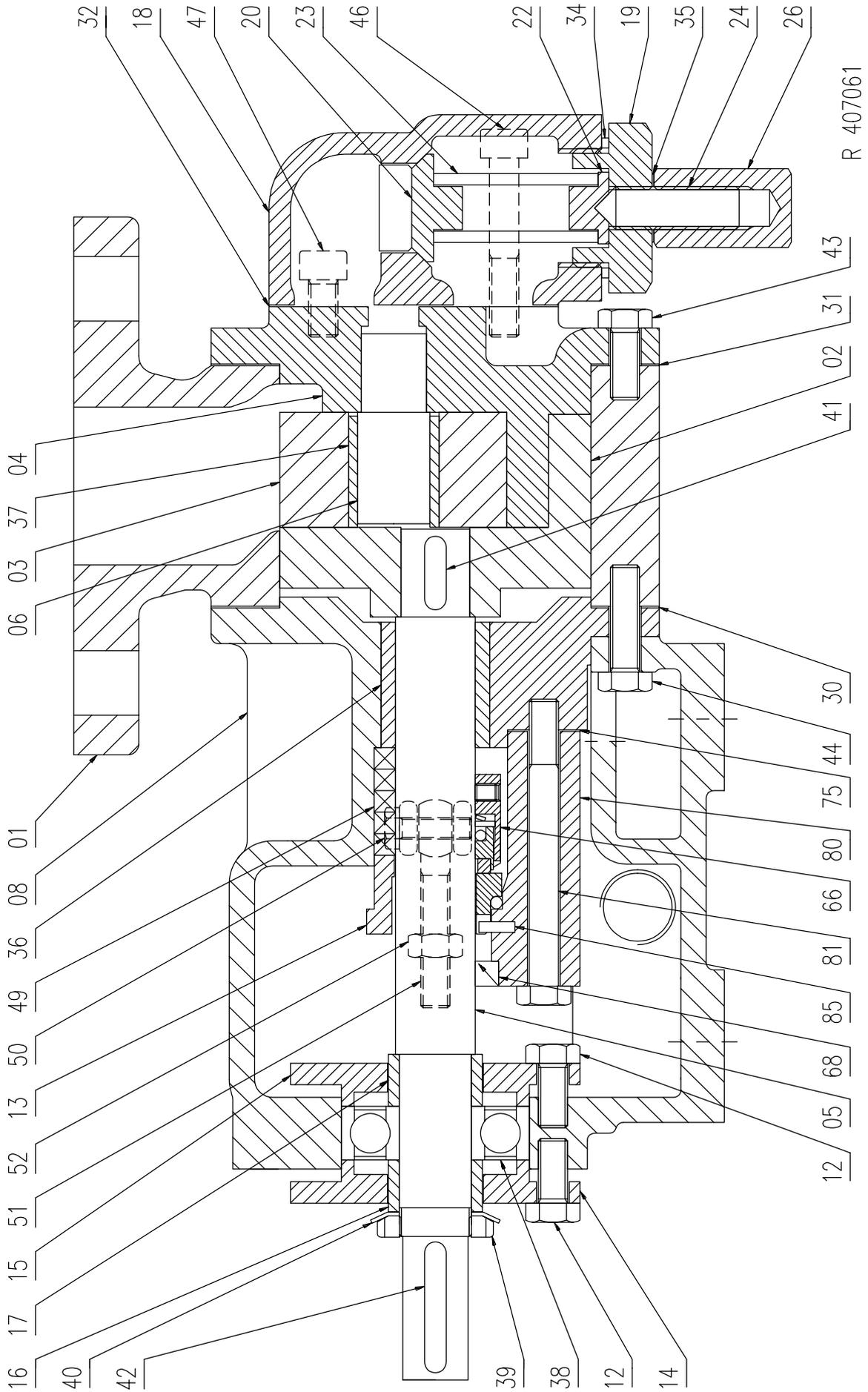
made for your process

Pos Ref. Rif.	Part Name		
01	Casing		
02	Rotor		
03	Idler		
04	Cover		
05	Shaft		
06	Pin		
08	Bearing Housing		
09	Rear Cover		
12	Screw, Bearing Cover		
13	Gland		
14	Bearing Cover		
16	Sleeve		
18	Casing, By-Pass		
19	Cover, By-Pass		
20	Valve		
22	Guide		
23	Spring		
24	Setting Screw		
26	Cap		
27	Flange, By-Pass		
30	Gasket, Casing		
32	Gasket, By-Pass		
34	Gasket, By-Pass Cover		
35	Gasket, Cap		
36	Bushing, Shaft		
37	Bushing, Idler		
38	Ball Bearing		
39	Lock Nut		
40	Washer		
41	Key, Rotor		
42	Key, Shaft		
43	Screw, Cover		
44	Screw, Casing		
46	Screw, By-Pass		
49	Packing Set		
51	Screw, Gland		
52	Nut, Gland		
61	Plug		
62	Gasket, Plug		
66	Mechanical Seal		
75	Gasket, Seal Box		
80	Seal Box		
81	Screw, Seal Box		
82	Oil Lubricator		
83	Bend		
85	Taper Pin, Mechanical Seal		

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Section Dwg.

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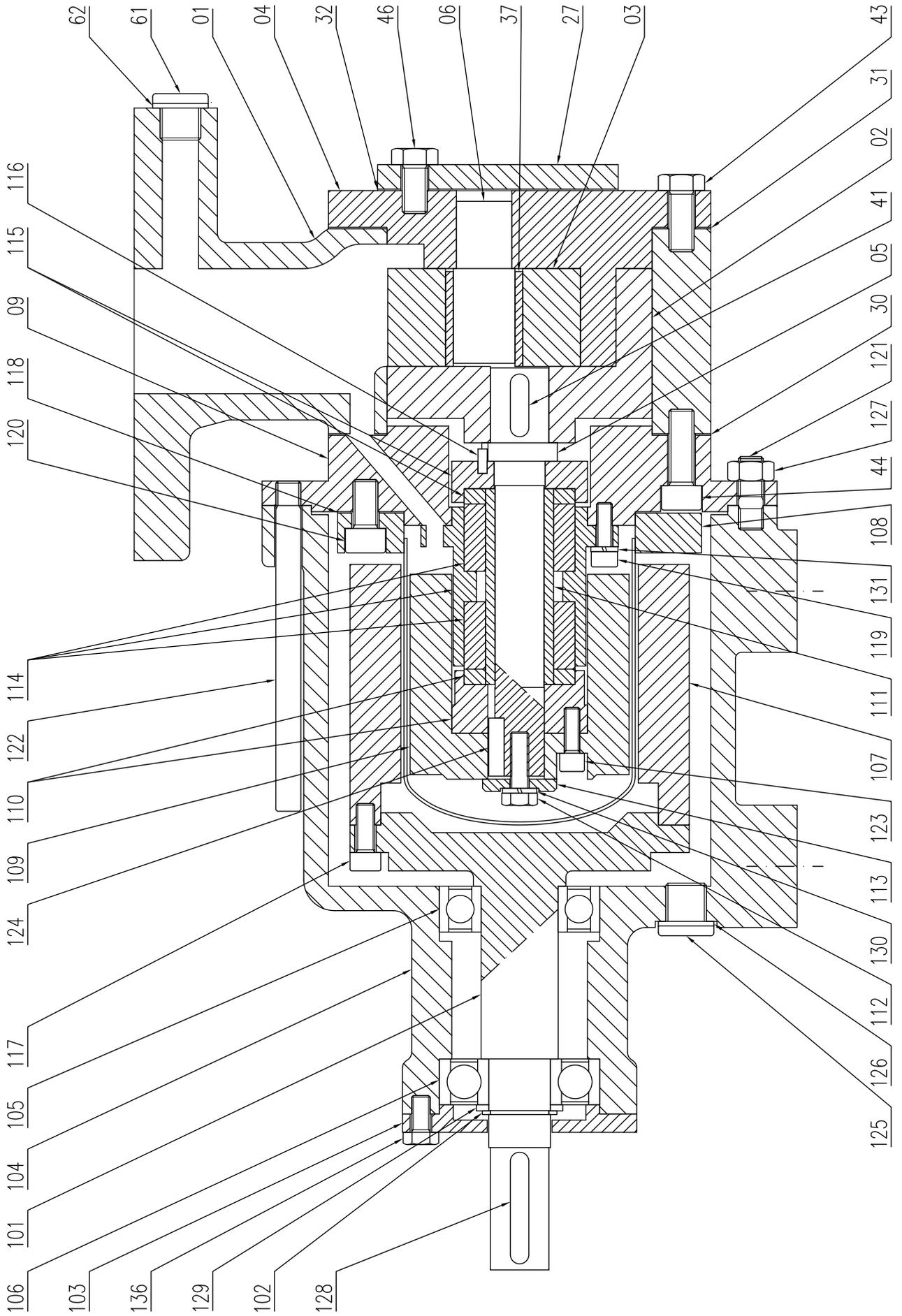
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Pos Ref. Rif.	Benennung	Part Name	Dénomination	Denominazione
01	Gehäuse	Casing		
02	Rotor	Rotor		
03	Ritzel	Idler		
04	Deckel	Cover		
05	Welle	Shaft		
06	Zapfen	Pin		
09	Hinterer Deckel	Rear Cover		
27	Flansch, By-Pass oder By-Pass	Flange, By-Pass or By-Pass		
30	Dichtung, Gehäuse	Gasket, Casing		
31	Dichtung, Deckel	Gasket, Cover		
32	Dichtung, By-Pass	Gasket, By-Pass		
37	Gleitlager, Ritzel	Bushing, Idler		
41	Paßfeder, Rotor	Key, Rotor		
43	Schraube, Deckel	Screw, Cover		
44	Schraube, Gehäuse	Screw, Casing		
46	Schraube, By-Pass	Screw, By-Pass		
61	Verschlussschraube	Plug		
62	Dichtung, Verschlussschraube	Gasket, Plug		
101	Welle, außen	Shaft, outer		
102	Sicherungsring, Welle	Circlip, Shaft		
103	Lagerdeckel	Bearing Cover		
104	Lagerbock	Bearing Housing		
105	Kugellager, innen	Ball Bearing, inner		
106	Kugellager, außen	Ball Bearing, outer		
107	Magnet, außen	Magnet, outer		
108	Spalttopf	Can		
109	Magnet, innen	Magnet, inner		
110	Mitnehmer, außen mit Axial Gleitlager	Collar, outer with Trust Ring		
111	Wellenhülse	Shaft sleeve		
112	Schraube, innen welle	Screw, inner shaft		
113	Scheibe, innen welle	Washer, inner shaft		
114	Lagerträger mit Radial Gleitlager SiC	Bush Housing with Radial Bushing SiC		
115	Mitnehmer, innen mit Axial Gleitlager	Collar, inner with Trust Ring		
116	Stift, innen mitnehmer	Pin, inner collar		
117	Schraube, Magnet, außen	Screw, Magnet, outer		
118	Dichtung, Spalttopf	Gasket, Can		
119	Schraube, Lager Träger	Screw, Bush Housing		
120	Schraube, Spalttopf	Screw, Can		
121	Schraube/ Stiftschraube, Lagerbock	Screw/ Stud, Bearing Housing		
122	Führungsstange	Slide Bar		
123	Schraube, Magnet, innen	Screw, Magnet, inner		
124	Paßfeder, Magnet, innen	Key, Magnet, inner		
125	Verschlussschraube, Lagerbock	Plug, Bearing Housing		
126	Dichtung, Verschlussschraube, Lagerbock	Gasket, Plug, Bearing Housing		
127	Mutter, Lagerbock	Nut, Bearing Housing		
128	Paßfeder, Welle, außen	Key, Shaft, outer		
129	Stutzscheibe	Supporting ring		
130	Federring, Welle, innen	Spring Washer, Shaft, inner		
131	Federring, Lagerträger	Spring Washer, Bush Housing		
132	Verschlussschraube, Lagerbock (für Fühler)	Plug, Bearing Housing (for sensor)		
133	Dichtung, Verschlussschraube, Lagerbock	Gasket, Plug, Bearing Housing		
134	Verschlussschraube, hinterer deckel	Plug, rear cover		
135	Dichtung, Verschlussschraube, hinterer deckel	Gasket, Plug, rear cover		
136	Schraube, Lagerdeckel	Screw, Bearing Cover		

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Section Dwg.

R...M II





EC - Declaration of Conformity

Manufacturer Details

Tradename

Bedu Pompen BV

Address

Poort van Midden Gelderland Rood 10, 6666 LT, Heteren, Netherlands

Product Details

Product Name

Gear pumps

Model (+series) Name

R

Applicable Standards Details

Directives

2006/42/EC (Machinery Directive)
2014/35/EU (Low Voltage Directive)
2014/30/EU (Electromagnetic compatibility)

Standards

EN-ISO 12100:2010
EN-IEC 60204-1:2006
EN 809+A1/C1

Additional information

No further details.

Declaration

We hereby declare under our sole responsibility that the product(s) mentioned above to which this declaration relates complies with the above mentioned standards and Directives.

Business Unit Manager: Issued Date:

01/10 2014

BEDU Pompen BV

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Signature of representative(s)

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-put 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.

<p>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.</p>

- 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.

C. Operating instructions

1. Installation

- 1.1 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.

- 1.2 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.
- 1.3 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 curves, constrictions and valves as far as possible. Liquefied gases can be pumped only on flooded suction.
- 1.4 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 C.2.4, Start the motor and check the direction of rotation. See Figure 1., page 6. 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.

- 1.5 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.
- 1.6 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.
- 1.7 Ensure that pipes are clean in order to prevent overpressures to the pump casing. Check the alignment of the flexible coupling.
- 1.8 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.
- 1.9 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.

- 1.10 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.
- 1.11 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.
- 1.12 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).
- 1.13 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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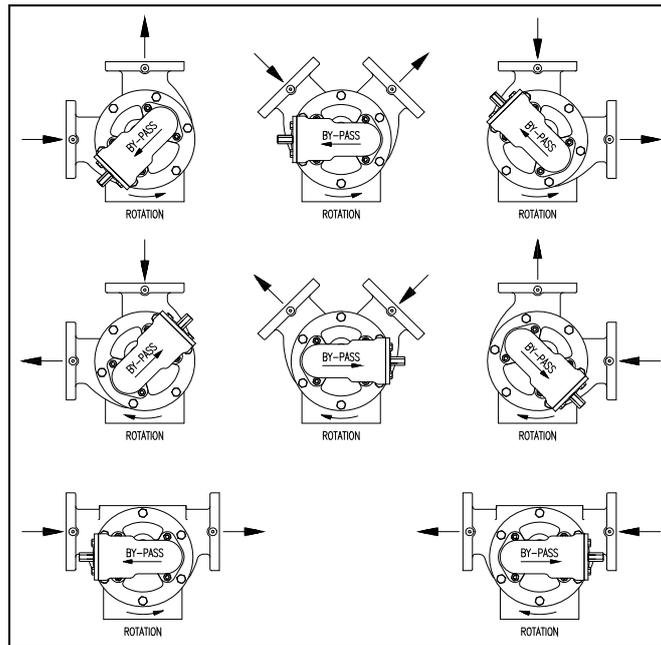
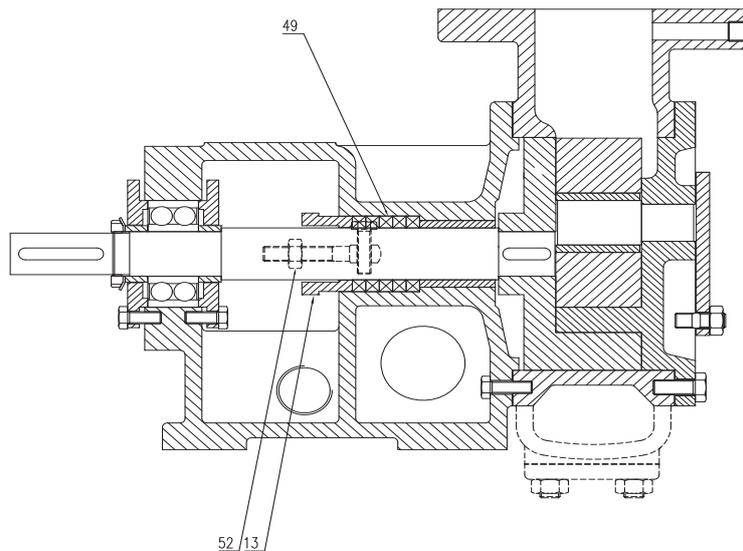


Figure 1 - Direction of rotation

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 pumps are coupled with engines, they are generally provided with clutches. Start the engine with the clutch disengaged, let the engine idle for some minutes and warm-up, then carefully engage the clutch. At last accelerate to reach the required speed.
- 2.6 If present, fill the +O2 reservoir with the quench liquid. See section D.2 "Quench reservoir +O2", page 10.



2.7 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.

- 2.8 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!

- 2.9 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 E "Safety valve", page 13.
- 2.10 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.

- 2.11 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 C.2.4 Start the motor and check the direction of rotation. See Figure 1., page 6).
 - (b) No liquid in pump casing to create a seal (see section C.2.1, page 5). 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.

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- (d) Pressure of safety valve is set too low causing some liquid to recycle. Tighten the safety valve adjusting screw (see section E "Safety valve", page 13). 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.
- (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 D.6 "Rotor axial adjusting", page 12.
- (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 D.3.2 "Packing seal:", page 10).
- (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 1/3 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.

- Original -

- 3.8 **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.

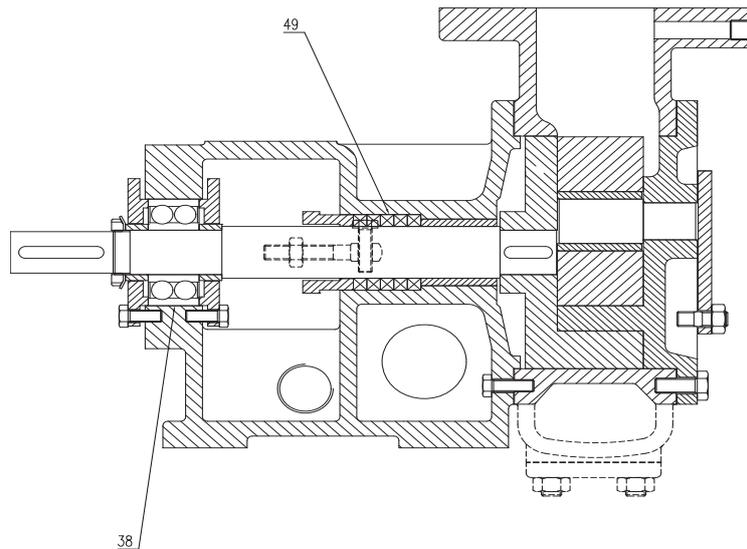
4. Warranty

- 4.1 The manufacturer warrants the pump against defects or faulty workmanship for a period of 12 months from the date of delivery.
- 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.

D. 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 D.3.1, page 10.



- 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 bearing. See section D.5 "Bearing", page 11.
- 1.5 Every 3 months, if present, change the quench liquid in the quench reservoir +O2. See section D.2 "Quench reservoir +O2", page 10.
- 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.

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.

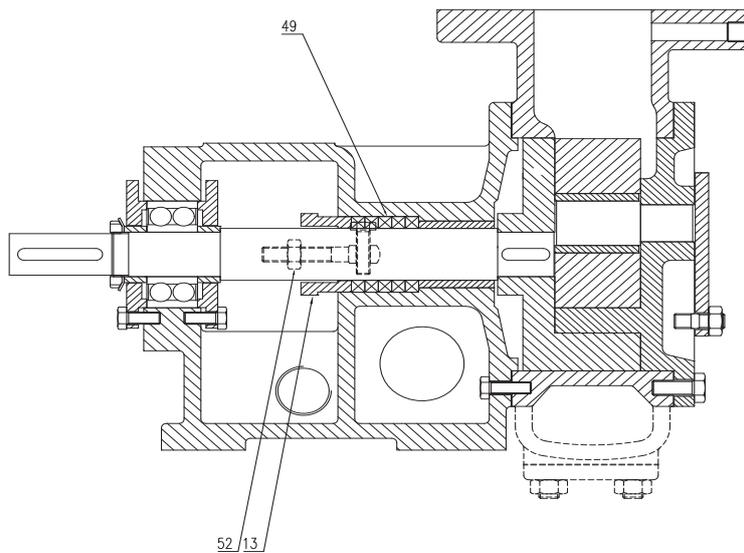
3.3 Mechanical seal:

- ⇒ Single: maintenance free.
- ⇒ Double, tandem: with reservoir (see section D.2 “Quench reservoir +O2”, page 10) 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 Bedu Pompen B.V. 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 C.2 “First start-up”, page 5, to run the new packing seal correctly.

5. Bearing

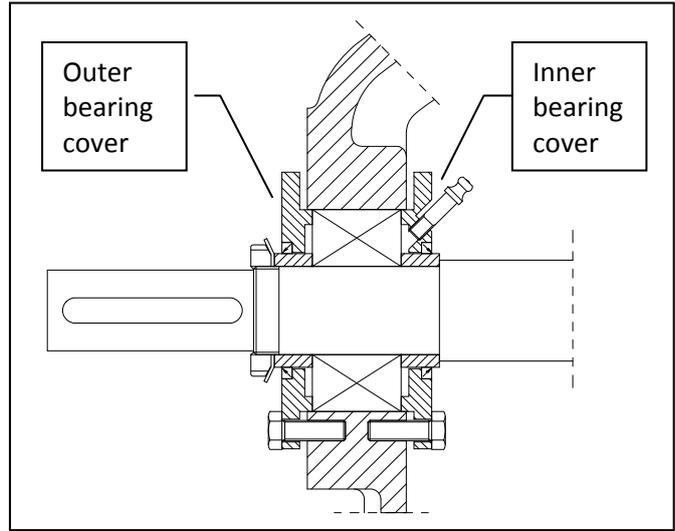
- 5.1 The pump is equipped with bushings which are maintenance free as either lubricated by the liquid being pumped or self-lubricated.

- 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

mm ² /s (cSt) °C			<200 <40		200÷4000 <180		>4000 >180	
Type	Screw	Step	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
Class			A		B		C	

R = Screw rotation

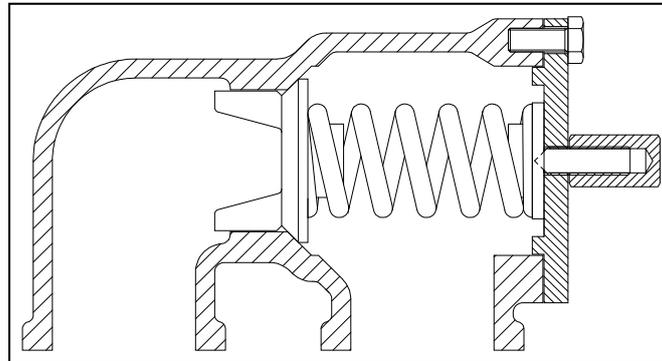
Classes:

A = pumps for low viscosity liquids (i.e. solvents)

B = standard

C = pumps for high temperature or viscous liquids

E. 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.

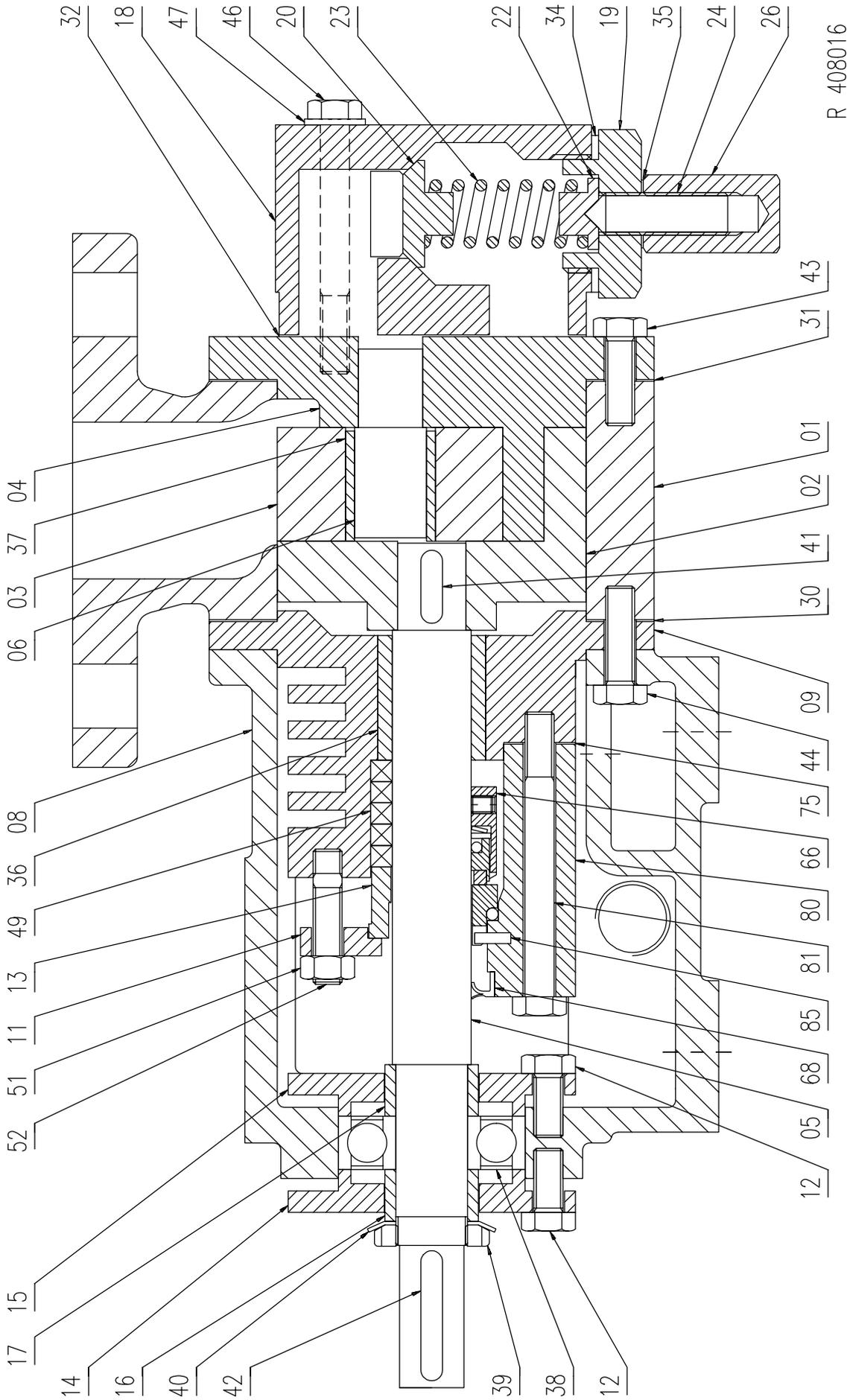
3. Direction of rotation

- 3.1 The safety valve is set for only one direction of rotation (except for double safety valve type +YY).
Please install the valve according to section C.2.4 Start the motor and check the direction of rotation. See Figure 1., page 6.

R

Schnittbild - Section Dwg.

R .. K.1,4.



R 408016

R

Spare Parts List

Pos Ref. Rif.	Part Name		
01	Casing		
02	Rotor		
03	Idler		
04	Cover		
05	Shaft		
06	Pin		
08	Bearing Housing		
09	Rear Cover		
12	Screw, Bearing Cover		
13	Gland		
14	Bearing Cover		
16	Sleeve		
18	Casing, By-Pass		
19	Cover, By-Pass		
20	Valve		
22	Guide		
23	Spring		
24	Setting Screw		
26	Cap		
27	Flange, By-Pass		
30	Gasket, Casing		
32	Gasket, By-Pass		
34	Gasket, By-Pass Cover		
35	Gasket, Cap		
36	Bushing, Shaft		
37	Bushing, Idler		
38	Ball Bearing		
39	Lock Nut		
40	Washer		
41	Key, Rotor		
42	Key, Shaft		
43	Screw, Cover		
44	Screw, Casing		
46	Screw, By-Pass		
49	Packing Set		
51	Screw, Gland		
52	Nut, Gland		
61	Plug		
62	Gasket, Plug		
66	Mechanical Seal		
75	Gasket, Seal Box		
80	Seal Box		
81	Screw, Seal Box		
82	Oil Lubricator		
83	Bend		
85	Taper Pin, Mechanical Seal		

Pos Ref. Rif.	Benennung	Part Name		
01		Casing		
02		Rotor		
03		Idler		
04		Cover		
05		Shaft		
06		Pin		
09		Rear Cover		
27		Flange, By-Pass or By-Pass		
30		Gasket, Casing		
31		Gasket, Cover		
32		Gasket, By-Pass		
37		Bushing, Idler		
41		Key, Rotor		
43		Screw, Cover		
44		Screw, Casing		
46		Screw, By-Pass		
61		Plug		
62		Gasket, Plug		
101		Shaft, outer		
102		Circlip, Shaft		
103		Bearing Cover		
104		Bearing Housing		
105		Ball Bearing, inner		
106		Ball Bearing, outer		
107		Magnet, outer		
108		Can		
109		Magnet, inner		
110		Collar, outer with Trust Ring		
111		Shaft sleeve		
112		Screw, inner shaft		
113		Washer, inner shaft		
114		Bush Housing with Radial Bushing SiC		
115		Collar, inner with Trust Ring		
116		Pin, inner collar		
117		Screw, Magnet, outer		
118		Gasket, Can		
119		Screw, Bush Housing		
120		Screw, Can		
121		Screw/ Stud, Bearing Housing		
122		Slide Bar		
123		Screw, Magnet, inner		
124		Key, Magnet, inner		
125		Plug, Bearing Housing		
126		Gasket, Plug, Bearing Housing		
127		Nut, Bearing Housing		
128		Key, Shaft, outer		
129		Supporting ring		
130		Spring Washer, Shaft, inner		
131		Spring Washer, Bush Housing		
132		Plug, Bearing Housing (for sensor)		
133		Gasket, Plug, Bearing Housing		
134		Plug, rear cover		
135		Gasket, Plug, rear cover		
136		Screw, Bearing Cover		

INSTRUCTIONS

Rotor axial adjusting

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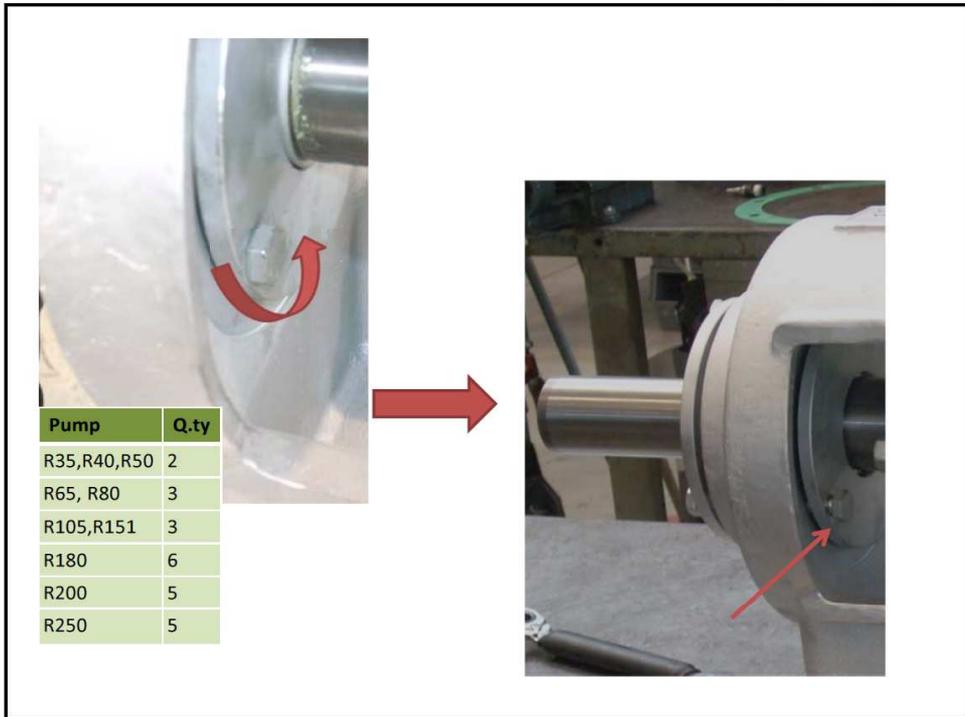
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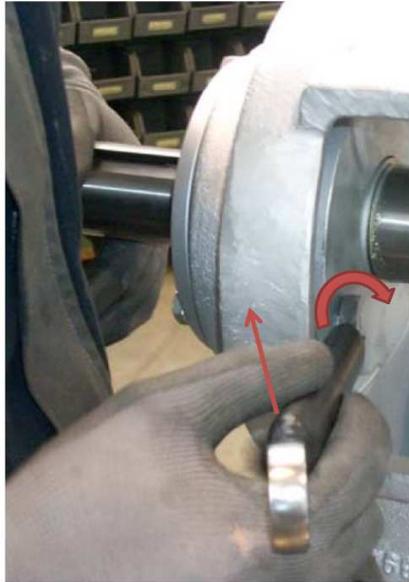
Fax: +31 88 4802 901

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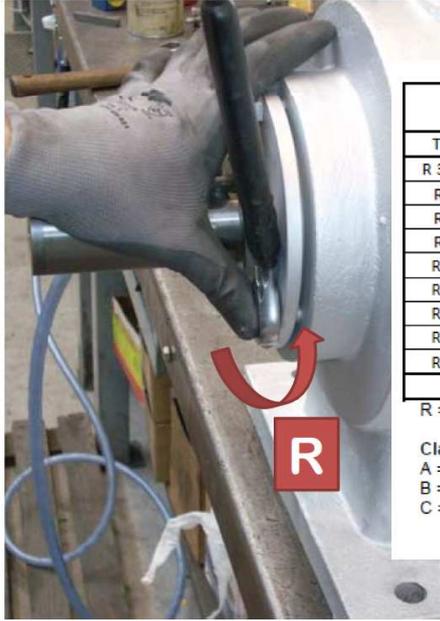






Pump	Screws	Q.ty	Nm
R35,R40,R50	M8x1,25	2	4
R65, R80	M8x1,25	3	4
R105,R151	M10x1,5	3	10
R180	M12x1,75	6	10
R200	M12x1,75	5	10
R250	M16x2	5	10





mm ² /s (cSt)			<200		200+4000		>4000	
°C			<40		<180		>180	
Type	Screw	Step	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
Class			A	B	C			

R = Screw rotation

Classes:

A = pumps for low viscosity liquids (i.e. solvents)

B = standard

C = pumps for high temperature or viscous liquids



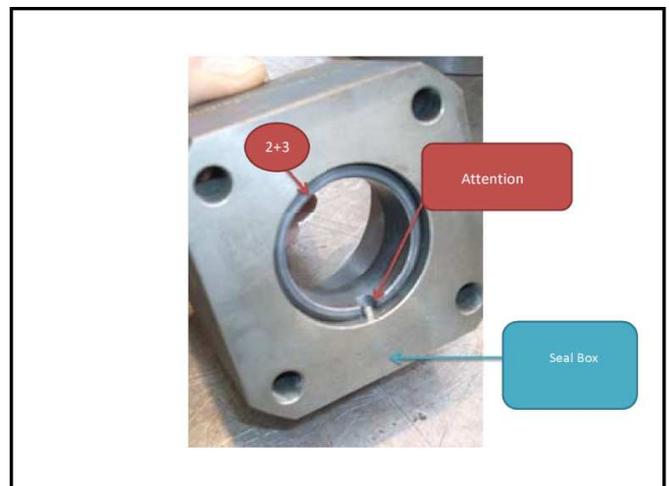
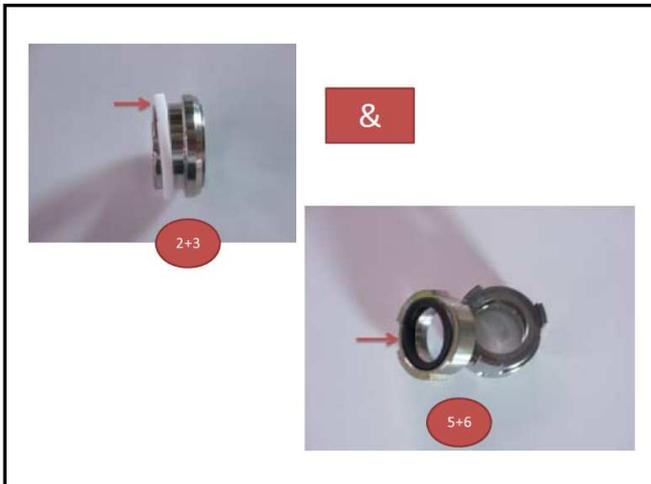
Pump	Screws	Q.ty	Nm
R35,R40,R50	M8x1,25	2	23
R65, R80	M8x1,25	3	23
R105,R151	M10x1,5	3	46
R180	M12x1,75	6	80
R200	M12x1,75	5	80
R250	M16x2	5	150

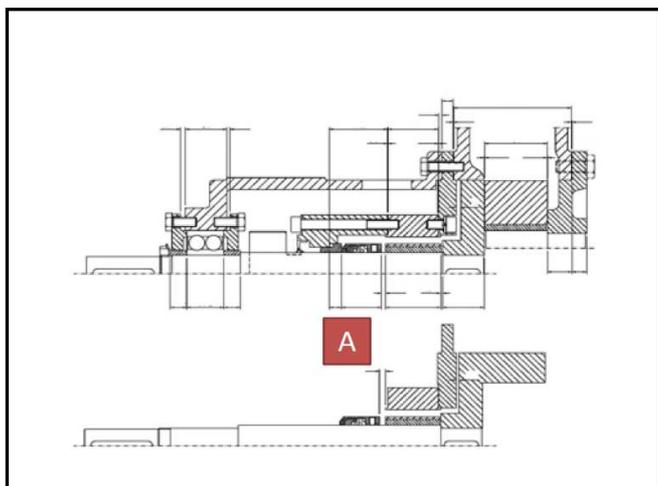
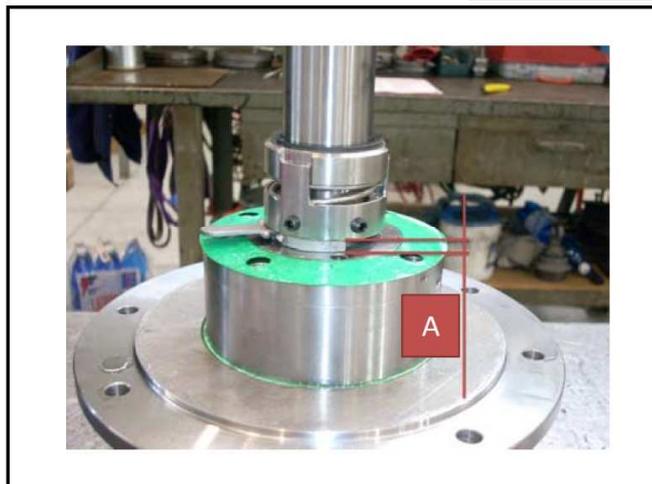


INSTRUCTIONS

Replacement of mechanical seal

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