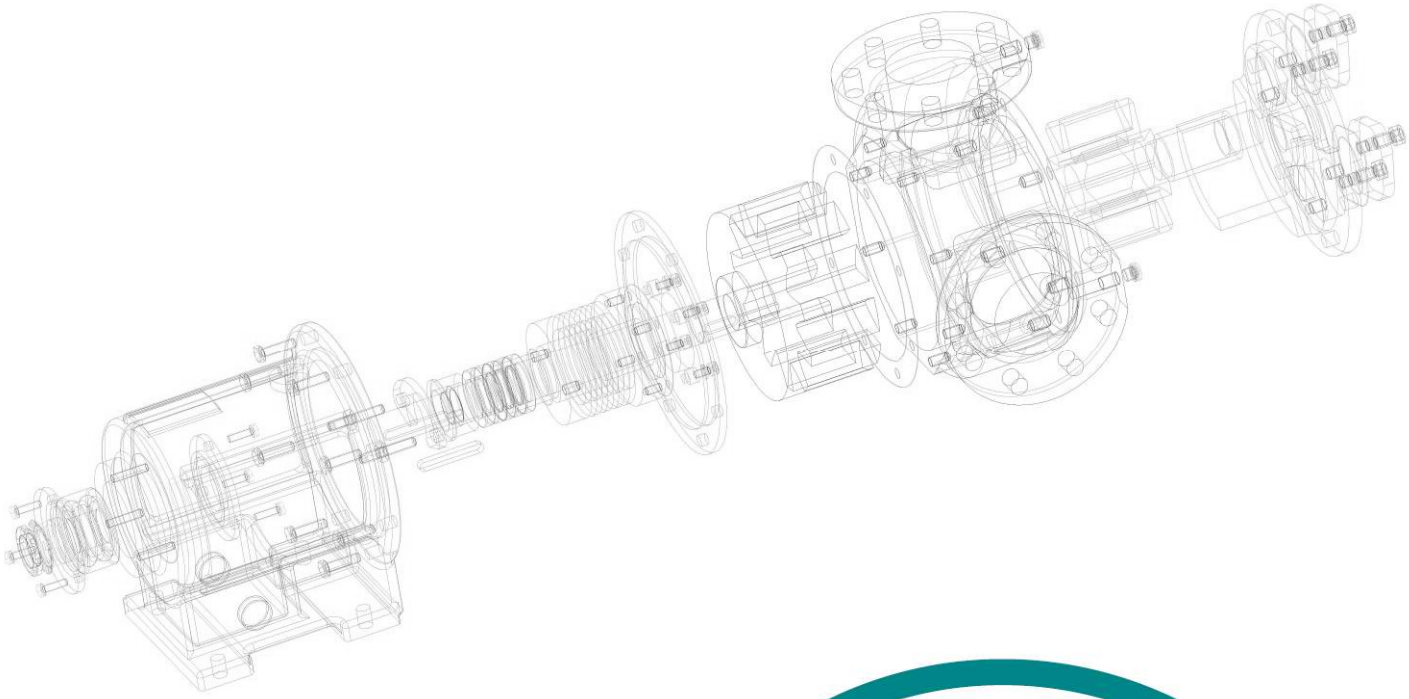
SIVAG
PUMPEN AUSTRIA

Maintenance and Service Manual



SELFPRIMING INTERNAL GEAR PUMPS R

CONTENTS

1. Introduction

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.
The operating instructions must always be available wherever the pump is in use.
The operating instructions must be read and applied by any person in charge of carrying out work on the pump.
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.
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. Description

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

2.2 R 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.

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

2.4 R pumps have only one shaft seal.

2.5 The axial position of the rotor can be adjusted and the gears inspected without removing the pump from its pipework.

2.6 R pumps are reversible. Full capacity is obtained in either direction of rotation.

2.7 R pumps are supplied with a bearing housing suitable for coupling with V-belts or flexible couplings.

2.8 The pumps are identified by the type and the serial number. the pump model is stamped on a name plate fixed on the bearing housing. The serial number is punched an the pump casing, close to the name plate.

3. Safety

3.1. 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.

3.2. Attention must be given to the safe handling of all items. Where pumps, pump units or components weigh in excess of 20 kg, 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.

3.3. 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.

3.4. 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.

3.5. 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.

3.6. Always drain the pump casing of product before removing the pump from its associated pipe work.

3.7. Flush out the pump casing and shroud with a compatible flush and drain away to a safe area.

3.8. Check with your process people to see if any special decontamination procedures have to be followed before working on a pump.

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

4. Warranty

4.1. The manufacturer guarantees R pumps, supplied according to the general sales conditions, against defects or faulty workmanship for a period of 12 month 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 were the pump should be confirmed in writing.

4.3. This guarantee does not cover parts subject to deterioration or normal wear, or damages by misuse or improrer handling of the pump by the user.

4.4. This guarantee is not longer valid pump is disassembled or modified without the authorization of the manufacturer.

5. Shipment Inspection

5.1. Pumps and units are shipped suitable 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.

5.2. A photograph is helpful in any claims to be made against the carrier; also, inform manufacturer or the local authorized distributor.

5.3. Shipment shortages, checked against the transport documents, should be reported to the carrier and likewise noted on the bill of lading.

5.4. Check the nameplate data against the shipping papers and against your purchase order to ensure that the proper pump is provided.

6. Storage

After receipt and inspection, a pump not immediately installed should be repackaged and placed in suitable storage.
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. Plastic or gasket type port covers should be left in place.
Pumps received wrapped with corrosion inhibiting treated material should be rewrapped. Select a clean, dry storage location. When moist, dusty atmosphere must be used for storage, further protect the pump or unit with a moisture repellent cover until it is to be installed.
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.

7. Installation

7.1. R pumps are supplied with an internal protective mantling liquid. If this liquid can pollute the product being pumped, flush the pump before installing it. Do not test the pump with water.

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

7.3. Unless otherwise specified, the diameter of the suction line should be 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.

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

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

7.6. Ensure that pipes are clean. Check that pipe threads and flange gaskets are completely airtight.

7.7. Pipes should have an independent support to reduce strain on the pump casing to a minimum. Check the alignment of the flexible coupling after pump installation.

7.8. If a non-return valve is fitted in the delivery line and a pressure greater 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 a vent between the pump and the valve.

7.9. By-pass relief valves available on request are designed primarily to protect the pump casing and piping against damage if the pump is run with the delivery line close or clogged. If the pump is used in both directions, double By-pass valves are also available.

ATTENTION: By-pass relief valves must not be considered as flow regulation valves. To change the pump capacity use either a variable speed drive or a return to tank line.

7.10. Pumps supplied with a heating jacket can be heated with steam (max. pressure 10 bars) or with heat transfer oil up to 230°C. If the pump has more than one heating jacket, they can be connected in series or in parallel.

7.11. Connections on the delivery and the suction ports are provided for pressure and vacuum gauges. Such connections are standard on all pump models. Vacuum

and pressure gauges often help to find possible causes of either operating or installation problems.

7.12. Electric motors must be protected by adequate overload cutoff switches that should be set to the maximum current shown on the motor name plate. Ensure that the surroundings are adequately ventilated.

8. Starting

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

8.2. Check that all the valves in the suction and delivery lines are open.

8.3. Start the motor and check the direction of rotation. See figure 1 and 2.

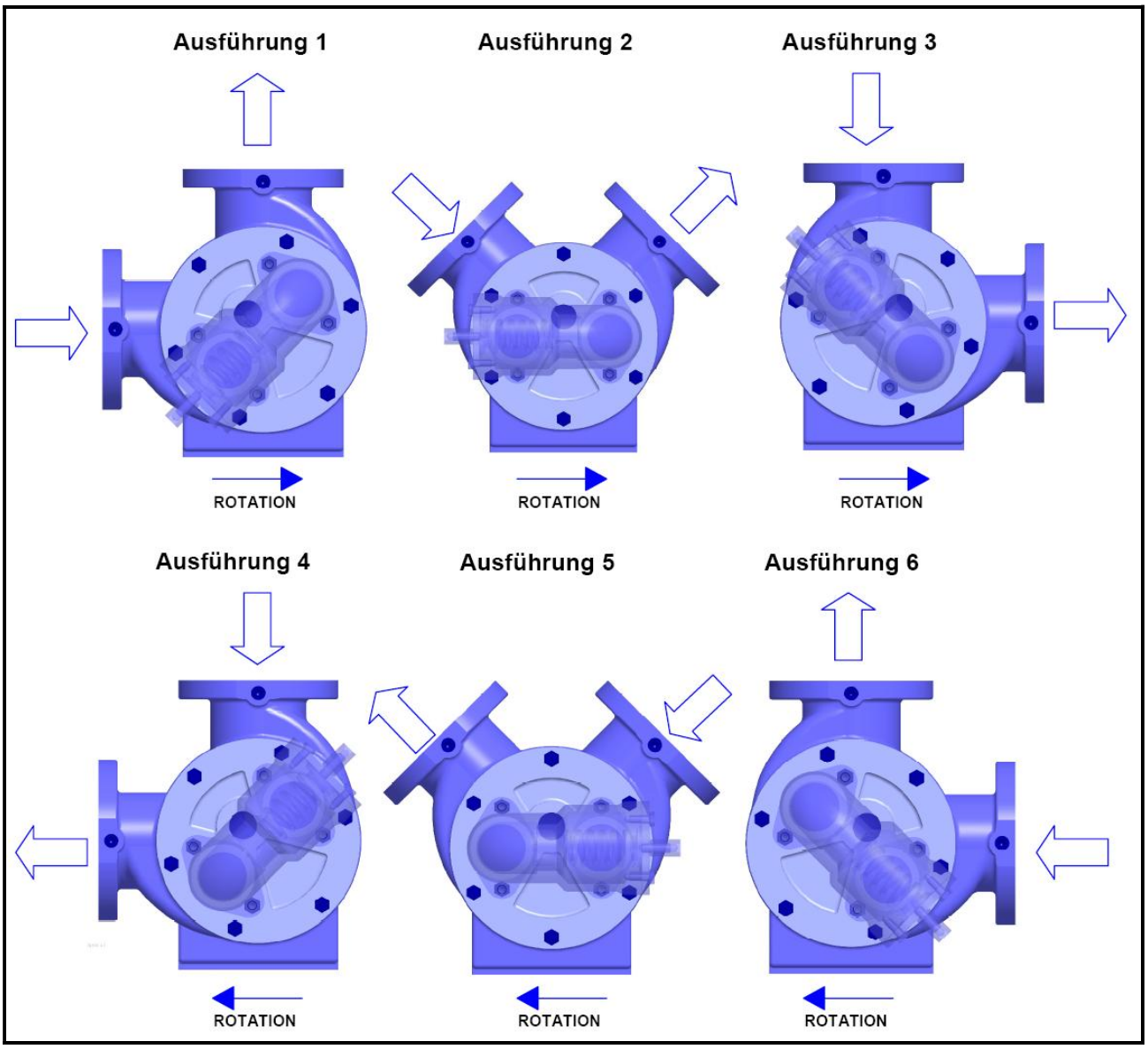
ATTENTION: If the pump is fitted with a by-pass relief valve (picture 4), the cover with the adjusting screw (Pos. 24) must be on the suction port side.

If the direction of pump rotation is to be reversed, the by-pass must also be inverted. During the first start up justify the default settings of the by-bass-relief valve

8.4. 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.

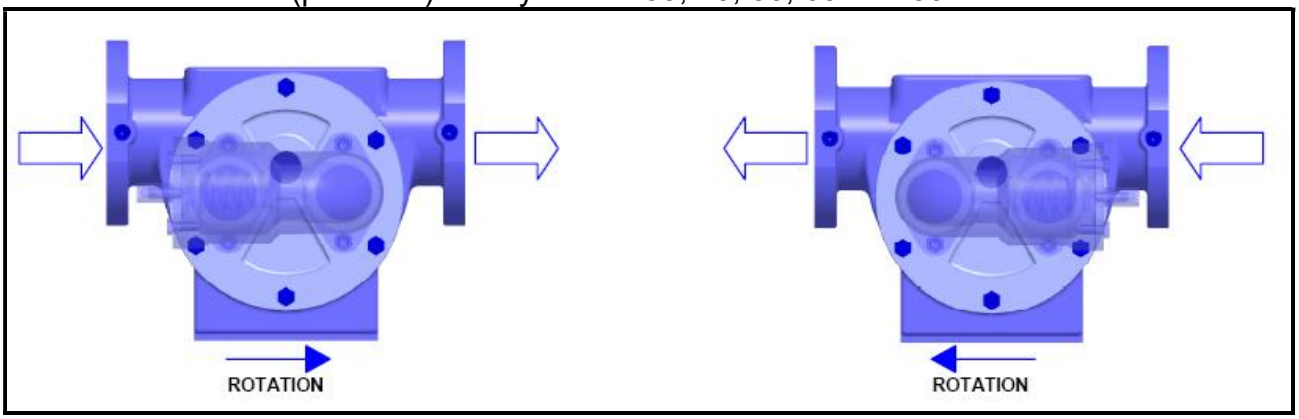
R Pumps can be used in either sense of rotation and are suited with a 45° turn able casing.(picture 1)

ATTENTION: By turning of the casing, you also have to turn the cover with the casing, otherwise the excentric idler pin would lie on the wrong location.
You have to look at the following picture for the right installation of the by-pass.



Picture 1: right angled version

The inline execution (picture 2) is only in size 35, 40, 50, 65 and 80 available.



Picture 2: Inline version

8.5. If present, fill the +O2 reservoir with the quench liquid. Please note that the quench liquid is compatible with the medium or the adjoining seals.

8.6. R Pumps with packing seal:
If the leckage along the packing is excessive, tighten the nuts of the eye bolts gradually. Don't over tight the gland nuts. During operation, liquid must leak through the packing for lubricating and cooling.
Never tighten up the packing gland so that is skewed. This would create the risk of the shaft coming into contact with the packing gland and sparking occurring during pump operation.

9. Trouble Shooting

9.1. Pump does not prime

a) **Wrong direction of rotation** (see section 8.3).

b) **No liquid in pump casing** to create a seal (see section 8.1). 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** (see section 7.8). Check that all valves are fully open. If necessary, let the air out by venting the delivery line.

f) **Excessive suction lift** has to be reduced in case of case of cavitation.

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 1/3 of the nominal speed.

h) **By-pass blocked in open position** by impurities in open position. Clean the relief valve and its seat.

9.2. Low Capacity

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

b) **Suction line or filter are blocked**. The vacuum gauge reading is high. Metallic cavitation noise.

c) **Air leaks in the line**. The vacuum gauge and the pressure gauge oscillate. Check connections, threads, gaskets, welds etc.

NOTE: 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 **by-pass** relief valve **is set too low** causing some liquid to recirculate. Tighten by-pass adjusting screw (see section 10.3). 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. Metallic 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 construction.

h) **Air leaks** from the packing seal or mechanical seal. Tighten or replace packing or replace mechanical seal. This defects occurs primarily when the delivery pressure is lower than the suction pressure.

i) **Excessive wear** of the internal parts of the pump (see section 10.2)

9.3. Excessive Pump Noise – Cavitation

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. Change pulleys or gear box ratios. Reduce RPM of engine.

9.4. Motor Overload

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 lines

c) **Packing too tight**. shaft and packing seal box overheated. Loose gland screws (see section 10.1.a).

d) **liquid with higher viscosity** or density 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.

9.5. Excessive Wear

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 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 liquid being pumped, (e.g. pumping solvents with pumps for lubricating liquids or corrosion due to aggressive liquids).

d) **Distorsion** due to the pipework loads transmitted directly to the pump casing, couplings not aligned, V-belt too tight, overloaded shaft, uneven foundation, etc.

9.6. 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.

10. Routine Maintenance

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 noise.
Every month, if present, check and adjust the packing seal. (See section 10.1)
Every month check the ball bearing with regard to wear or noise. If necessary replace it to avoid the explosion hazard due to high temperature.

10.1. Shaft seal

a) **Packing Seal**
If leakage along the shaft is excessive, gradually tighten the gland nuts.

ATTENTION: Do not overtight the gland nuts.
During operation, liquid must leak through the packing for lubrication and cooling. If this loss of liquid is dangerous due to corrosion or fire hazard, a mechanical seal must be fitted.

Replacement of packing rings:
Loosen the screws and push the packing gland to the rear. Remove the old packing rings and clean the packing space. Check the surface of the shaft with regard to wear and, if necessary, replace the shaft. Insert new packing rings one by one, and pre-seal them with the cut ends offset by 180°C. Slide in the packing gland and screw in the screws by hand. Start up the pump like a first time following section 8.6 to run the new packing seal correctly.

b) Mechanical seal:

- Single mechanical shaft seal with external quench liquid. Before starting pour the quench liquid into the reservoir. This liquid must be compatible with the liquid to be pumped. The shaft seal gaskets are all made of PTFE unless otherwise specified.
- Run double mechanical shaft seal back to back ranged with external quench liquid (min. 1bar over the pump pressure) This liquid must be compatible with the liquid to be pumped.

c) Magnetic coupling:
Is maintenance free

10.2. Bearing

a) R pumps internal bushes are either lubricated by the liquid being pumped or are self-lubricating and require no maintenance.
Some bearing housing have grease nipples for lubrication of the external ball bearings. Grease the bearings every 500 hours operation or every two month.
b) 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

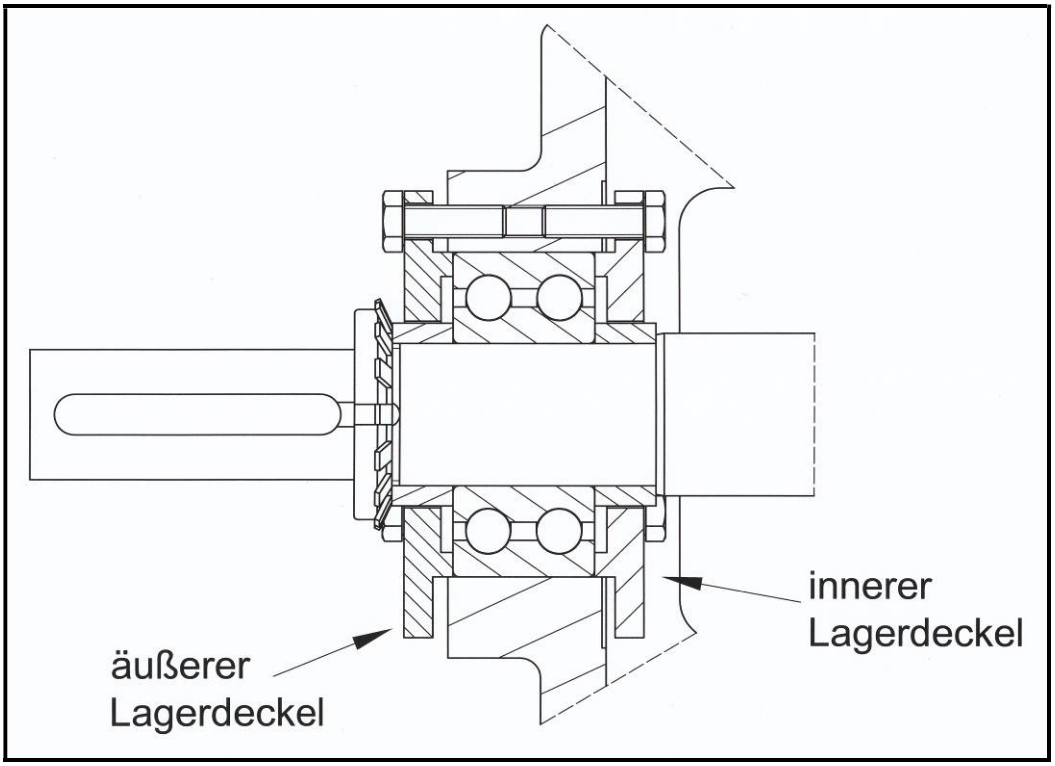
10.3. Adjusting the Position of the Rotor

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

Adjusting:

a) Loosen the inner bearing cover.
b) Tighten the outer bearing cover.
c) Loosen the outer bearing cover screws as shown on following table.
d) Retighten the inner bearing cover.



mm²/s (cSt) °C	<200 <40	200 ÷ 4000 <180	>4000 >180
	Rotation		
R 35	1/4	1/2	5/8
R 50	3/8	1/2	3/4
R 65	3/8	5/8	7/8
R 80	3/8	5/8	1
R 105	3/8	5/8	7/8
Class	A	B	C

Classes:
A = Version for solvents (S).
B = Standard version.
C = Version for high temperature (H) or viscous liquids.

10.4. By-Pass Regulation

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. Under request, the pump can be assembled with an integrated safety valve on the

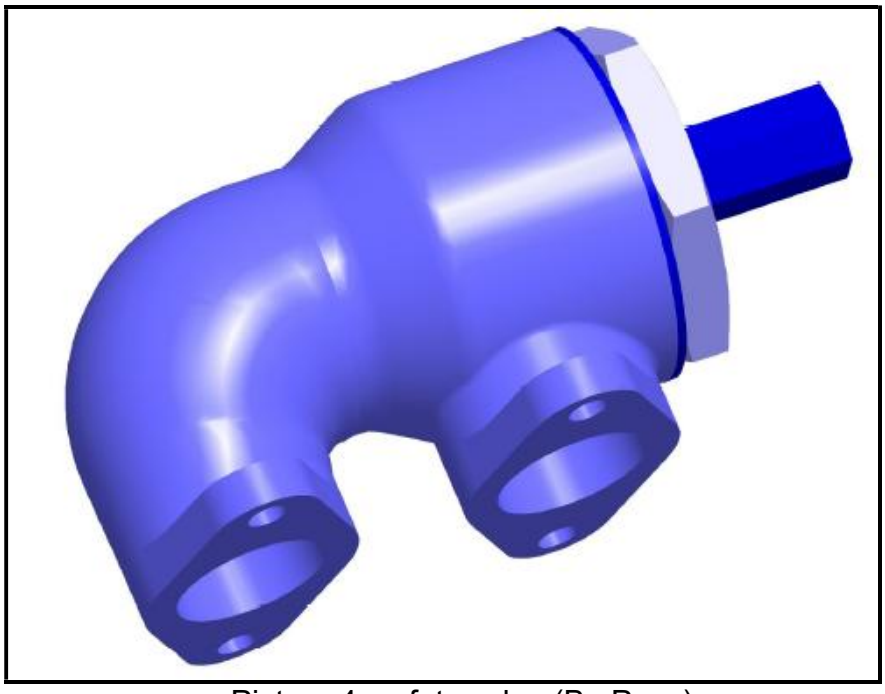
pump cover. As alternative, the pump must be protected by other controls (e.g. external return line, sliding clutch, pressure switch). In case of double safety valves set-up the valves separately, according to the two directions of rotation.

Adjusting:

a) Loosen the cap.

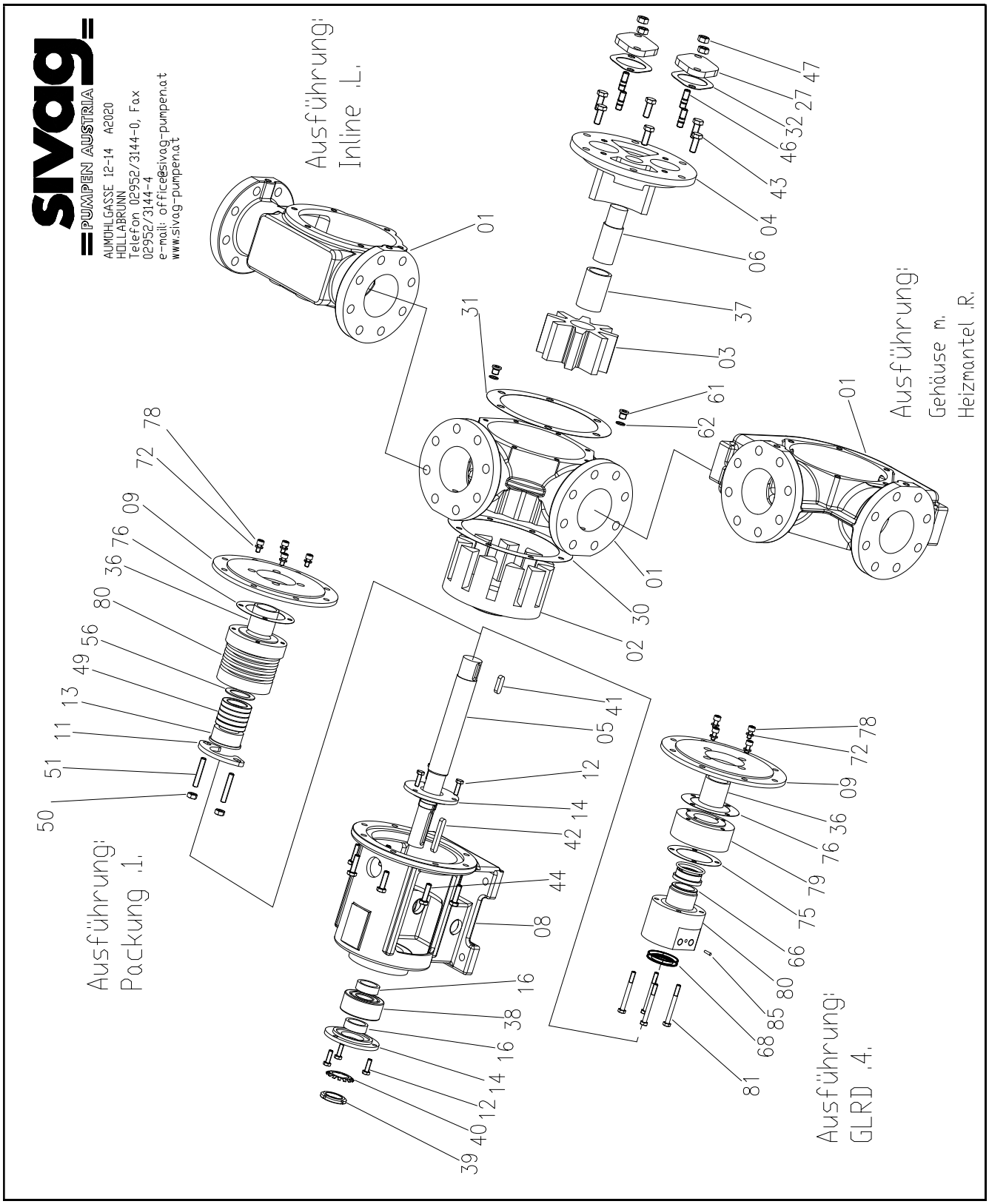
b) Loosen or tighten adjusting screw in order to decrease or increase the pressure at which the by-pass is set. Do not overload the motor. It is possible to make the adjustment with pipes full of liquid while the pump is running as slip losses from the screw are minimal.

ATTENTION:
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 should be used when pumping inflammable or corrosive liquids. Don't tight the screw to the end limit. This would compress the spring till the max. limit and the safety valve will not work properly.



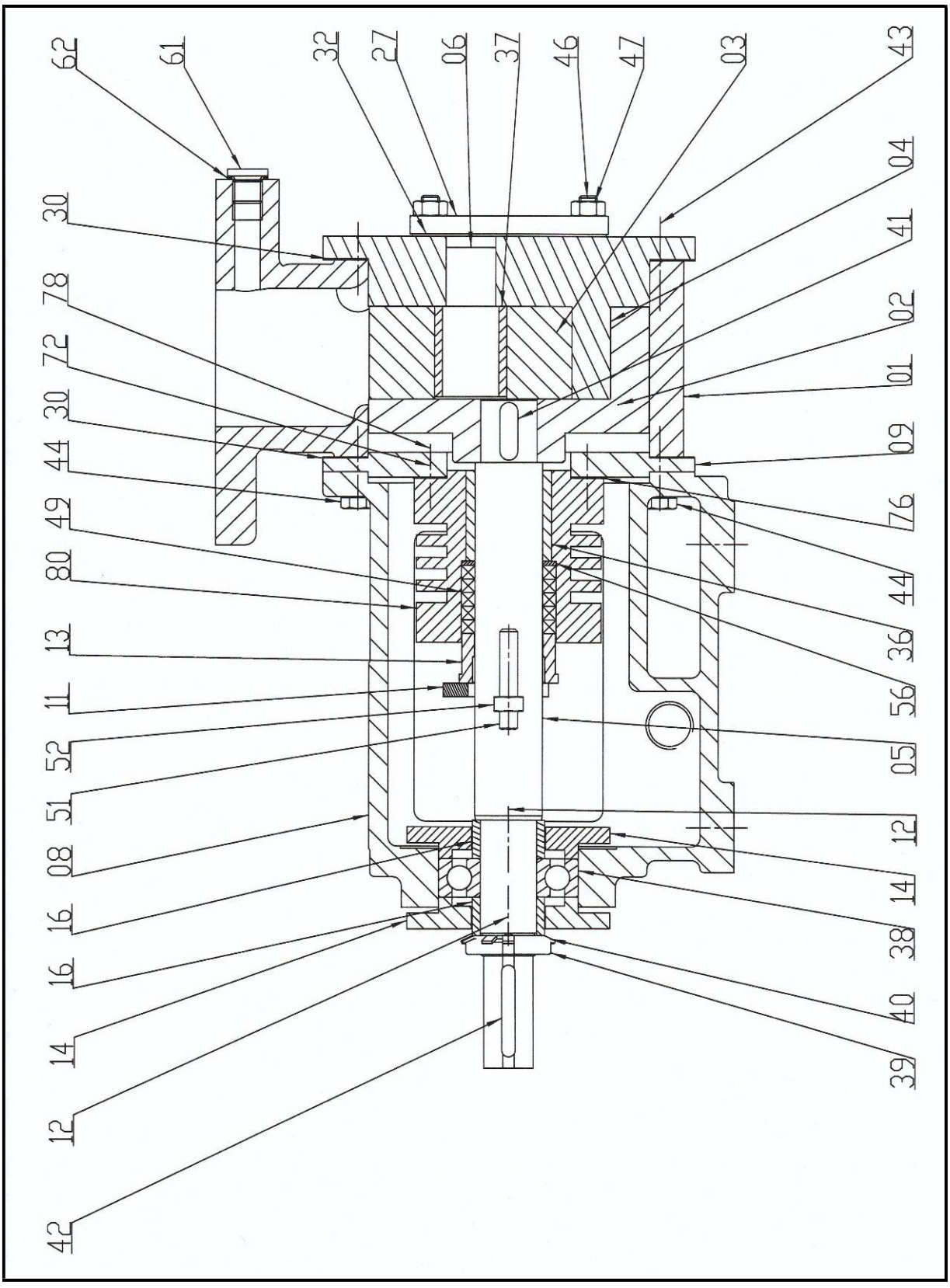
Picture 4: safety valve (By-Pass)

11. Explosion View



picture 5: explosion view

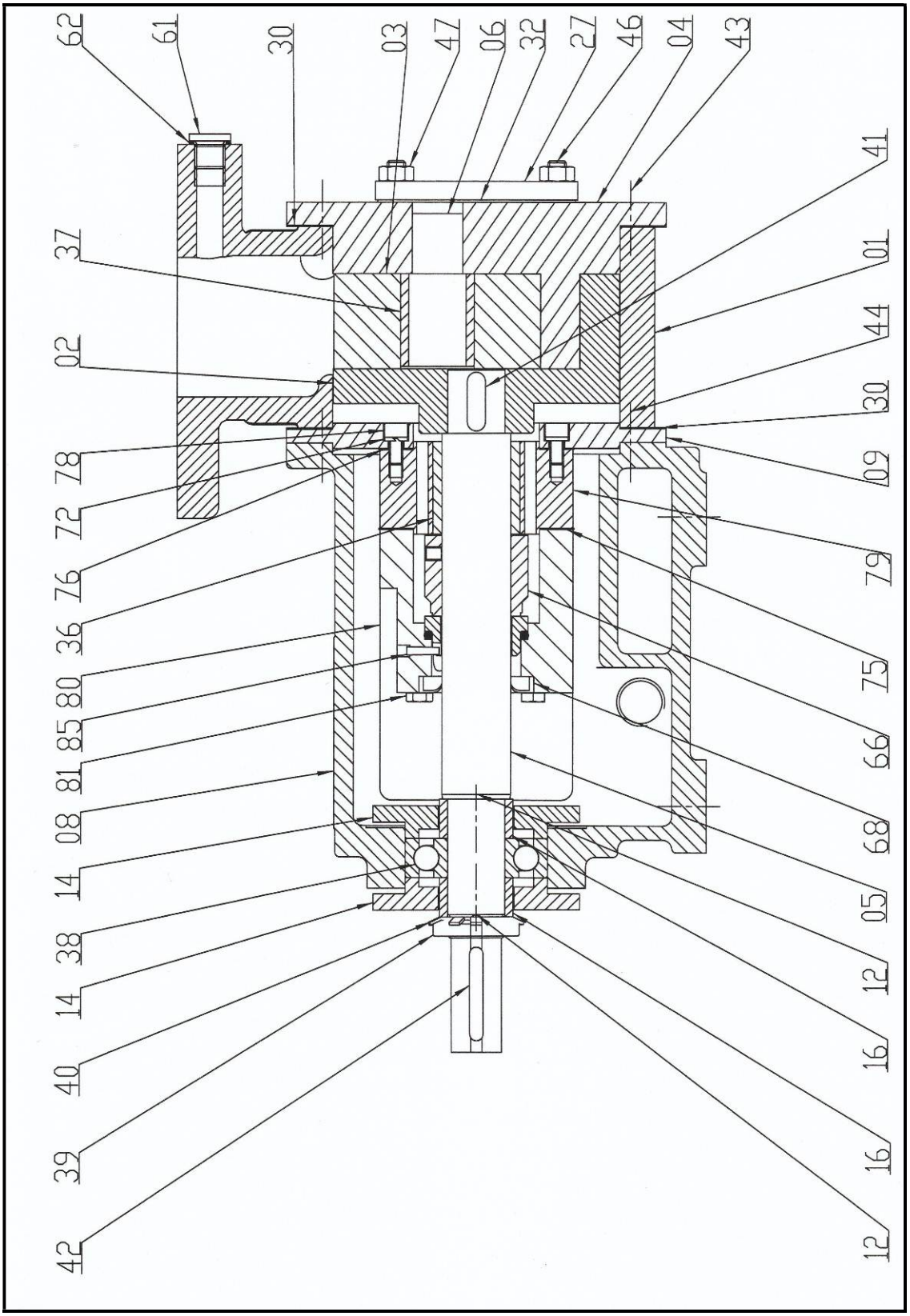
12. General Sectional Drawing – Pump with Stuffing Box



13. General Spare Part List – Pump with Stuffing Box

Pos.	Benennung	*Part Name*
01	Gehäuse	*Casing*
02	Rotor	*Rotor*
03	Ritzel	*Idler*
04	Deckel	*Cover*
05	Welle	*Shaft*
06	Zapfen	*Idler Pin*
08	Lagerbock	*Bearing Housing*
09	Hinterer Deckel	*Rear Cover*
11	Brillenflansch	*Gland Flange*
12	Schraube, Lagerdeckel	*Screw, Bearing Cover*
13	Brille	*Gland*
14	Kugellagerdeckel	*Bearing Cover*
16	Distanzhülse	*Sleeve*
27	Flansch, By-Pass	*Flange, By-Pass*
28	Flansch, Heizmantel	*Flange, Jacket*
29	Flanschdichtung, Heizmantel	*Flange gasket, Jacket*
30	Gehäusedichtung	*Casing Gasket*
31	Deckeldichtung	*Cover Gasket*
32	Dichtung, By-Pass	*Gasket, By-Pass*
36	Wellengleitlager	*Shaft Bushing*
37	Ritzelgleitlager	*Idler Bushing*
38	Kugellager	*Ball Bearing*
39	Nutmutter	*Lock Nut*
40	Sicherungsblech	*Washer*
41	Paßfeder, Rotor	*Key, Rotor*
42	Paßfeder, Welle	*Key, Shaft*
43	Schraube, Deckel	*Screw, Cover*
44	Schraube, Gehäuse	*Screw, Casing*
46	Stiftschraube, By-Pass	*Stud, By-Pass*
47	Mutter, By-Pass	*Nut, By-Pass*
49	Packungssatz	*Packing Set*
51	Stiftschraube, Brille	*Stud, Gland*
52	Mutter, Brille	*Nut, Gland*
56	Stützscheibe	*Trust Ring*
61	Verschlußschraube	*Plug*
62	Verschlußschraubendichtung	*Gasket, Plug*
63	Stiftschraube, Heizmantel	*Stud, Jacket*
64	Mutter, Heizmantel	*Nut, Jacket*
72	Federring	*Spring Washer*
76	Dichtung, Packungsträger	*Gasket, Stuffing Box*
78	Shraube, Packungsträger	*Screw, Stuffing Box*
80	Packungsträger	*Stuffing Box*

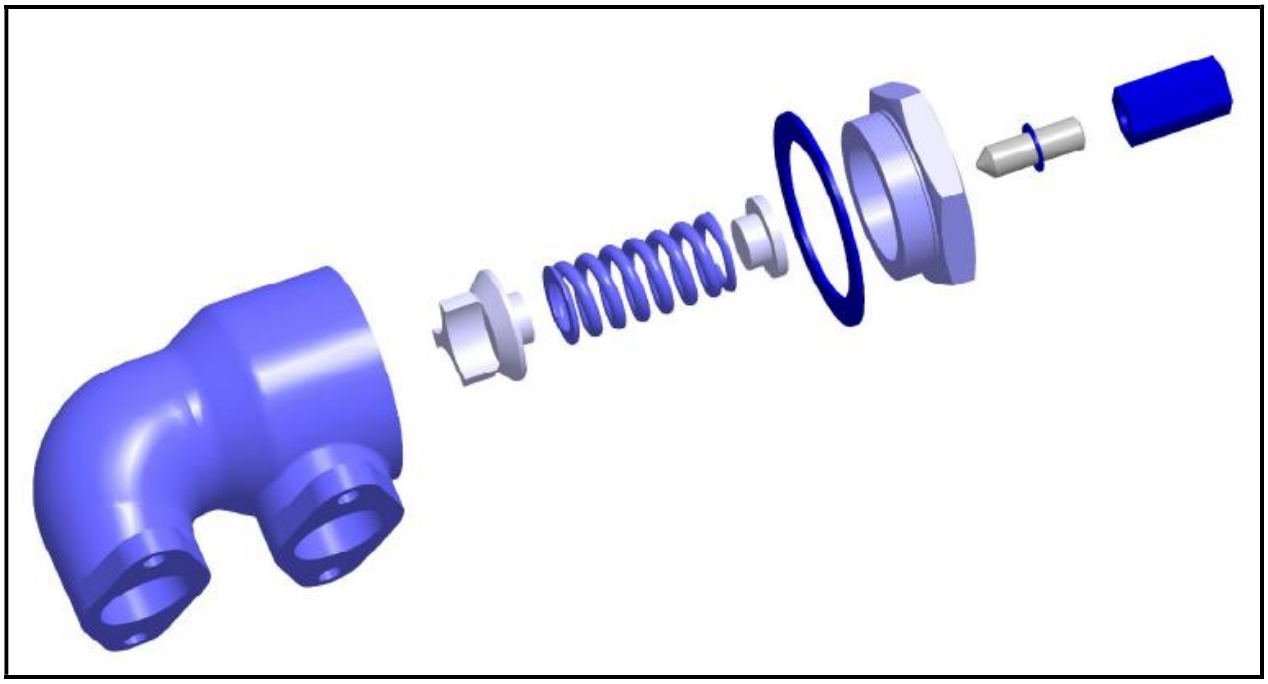
14. General Sectional Drawing – Pump with Mechanical Seal

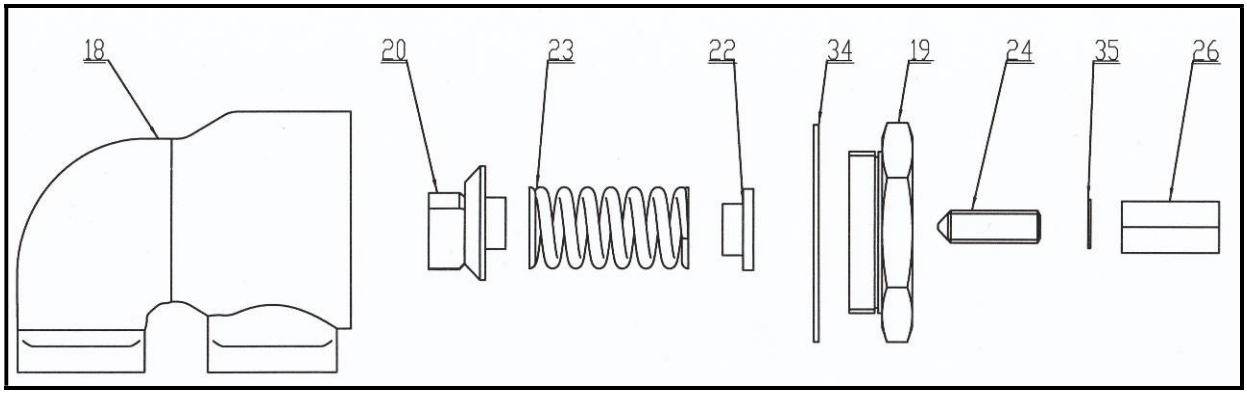


15. General Spare Part List – Pump with Mechanical Seal

Pos.	Benennung	*Part Name*
01	Gehäuse	*Casing*
02	Rotor	*Rotor*
03	Ritzel	*Idler*
04	Deckel	*Cover*
05	Welle	*Shaft*
06	Zapfen	*Idler Pin*
08	Lagerbock	*Bearing Housing*
09	Hinterer Deckel	*Rear Cover*
12	Schraube, Lagerdeckel	*Screw, Bearing Cover*
14	Kugellagerdeckel	*Bearing Cover*
16	Distanzhülse	*Sleeve*
27	Flansch, By-Pass	*Flange, By-Pass*
28	Flansch, Heizmantel	*Flange, Jacket*
29	Flanschdichtung, Heizmantel	*Flange gasket, Jacket*
30	Gehäusedichtung	*Casing Gasket*
31	Deckeldichtung	*Cover Gasket*
32	Dichtung, By-Pass	*Gasket, By-Pass*
36	Wellengleitlager	*Shaft Bushing*
37	Ritzelgleitlager	*Idler Bushing*
38	Kugellager	*Ball Bearing*
39	Nutmutter	*Lock Nut*
40	Sicherungsblech	*Washer*
41	Paßfeder, Rotor	*Key, Rotor*
42	Paßfeder, Welle	*Key, Shaft*
43	Schraube, Deckel	*Screw, Cover*
44	Schraube, Gehäuse	*Screw, Casing*
46	Stiftschraube, By-Pass	*Stud, By-Pass*
47	Mutter, By-Pass	*Nut, By-Pass*
61	Verschlussschraube	*Plug*
62	Verschlussschraubendichtung	*Gasket, Plug*
63	Stiftschraube, Heizmantel	*Stud, Jacket*
64	Mutter, Heizmantel	*Nut, Jacket*
66	Gleitringdichtung	*Mechanical seal*
68	Wellendichtring	*Shaft seal*
75	Dichtung, GLRD-Träger	*Gasket, Seal Box*
76	Dichtung, Gleitlagerträger	*Gasket, Bush Housing*
79	Gleitlagerträger	*Bush Housing*
80	GLRD-Träger	*Seal Box*
81	Schraube, GLRD-Träger	*Screw, Seal Box*
82	Öler	*Oil Lubricator*
83	Bogen	*Bend*
85	Kegelstift, GLRD	*Taper Pin, Mech. Seal*

16. General Spare Part List – By-Pass

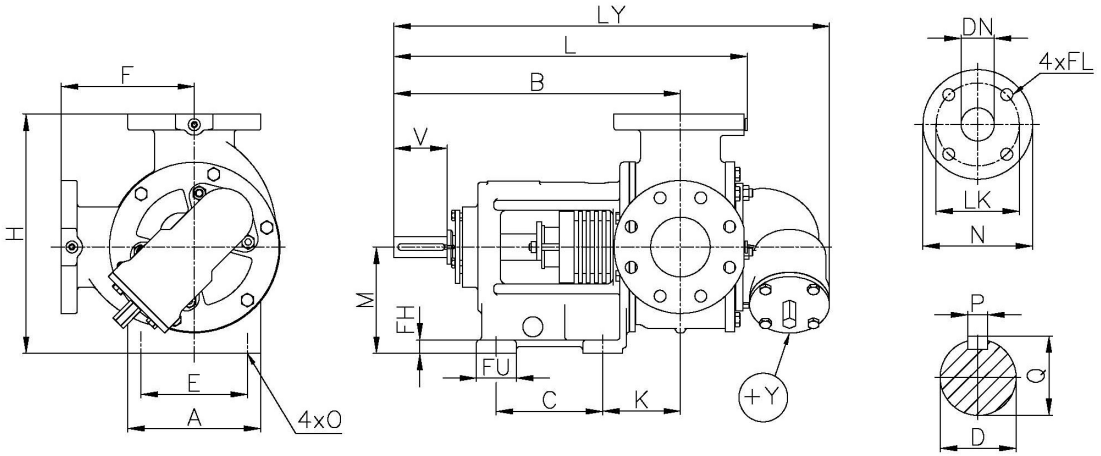




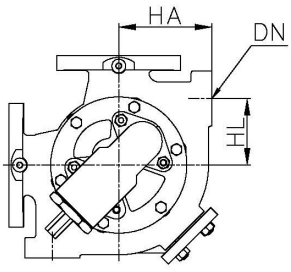
Pos.	Benennung	*Part Name*
18	Gehäuse	*Casing*
19	Deckel	*Cover*
20	Ventil	*Valve*
22	Teller	*Guide*
23	Feder	*Spring*
24	Schraube	*Screw*
26	Kappe	*Cap*
34	Dichtung	*Gasket*
35	Dichtung	*Gasket*
48	Schraube (ab Gr. R 80)	*Screw*

17. Dimensional Drawing

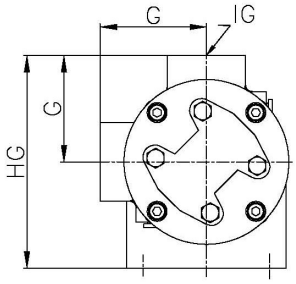
17.1. Orthogonal pump



Heating jacket .R.:



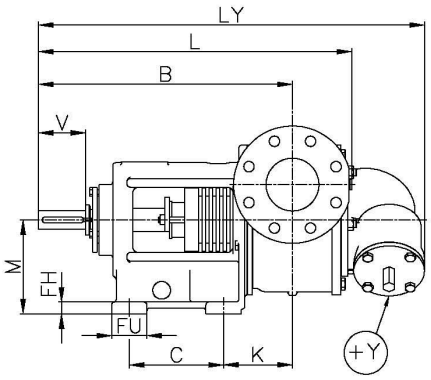
Female thread: (R35 and 40)

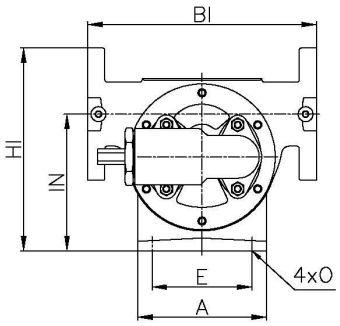


Größe	Allgemein													
	H	F	A	E	O	L	B	M	FH	FU	C	K	V	kg
R 35,40	180	100	120	94	Ø12	313	249	80	12	30	90	65	40	16
R 50	230	130	135	100	Ø12	400	313	100	15	40	125	81	50	29
R 65	297	165	180	140	Ø14	442	347	132	18	50	140	91	60	45
R 80	360	200	200	160	Ø14	533	430	160	20	60	160	117	80	76
R 105	405	225	220	180	Ø18	633	505	180	22	60	180	135	110	143
R 150	450	250	300	240	Ø18	680	539	200	22	80	185	164	110	200
R 180	540	300	340	270	Ø22	883	724,5	240	25	100	255	200,5	140	

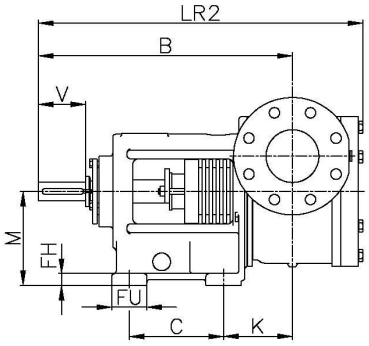
Größe	Welle			.R.				+Y		Gewinde				Flansch		
	D	Q	P	HA	HL	DN	kg	LY	kg	HG	G	IG	kg	LK	N	DN
R 35,40	18	20	6	62	80	-	16	350	2,2	160	80	5/4“	12	110	150	40
R 50	22	24	6	116	72	15	34	463	3					125	165	50
R 65	28	31	8	140	100	20	60	510	4,5					145	185	50
R 80	32	32	10	170	120	20	88	652	8					160	200	80
R 105	42	45	12	195	140	25	166	760	8,5					180	220	100
R 150	48	51	14	220	140	40	210	838	15					240	285	150
R 180	60	64	18	275	120	40		1161						240	285	150

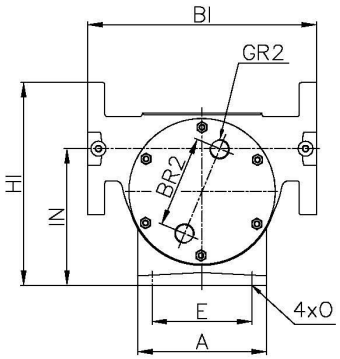
17.2. Inline pump



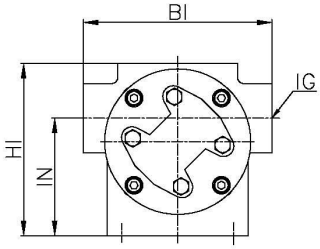


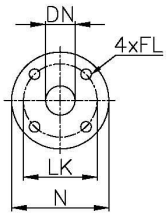
Heating jacket +R2:

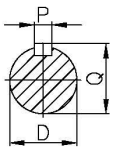




Female thread:
(R35 and 40)







Größe	Allgemein											
	HI	IN	A	E	O	B	M	FH	FU	C	K	V
R 35,40	149	90	120	94	Ø12	249	80	12	30	90	65	40
R 50	218	126	135	100	Ø12	313	100	15	40	125	81	50
R 65	279	187	180	140	Ø14	347	132	18	50	140	91	60
R 80	325	225	200	160	Ø14	430	160	20	60	160	117	80

Größe	Flansch			Gewinde			+R2			+Y	
	BI	DN	kg	BI	IG	kg	BR2	GR2	LR2	LY	kg
R 35,40	200	40	16	180	6/4“	13	58	G1/2“	339	350	2,2
R 50	250	50	29				100	G1/2“	406	463	3
R 65	320	65	45				125	G3/4“	448	510	4,5
R 80	390	80	76				170	G3/4“	554	652	8

18. CONFORMITY DECLARATION OF MACHINERY

We hereby declare that the **self-priming internal gear pumps type R** comply with the following relevant requirements:

EC Machinery Directive 2006/42/EC, Appendix II A.

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 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

Person authorized to form the technical documentation:
Sivag Pumpen Vertrieb GmbH, Aumühlgasse 12-14, 2020 Hollabrunn, Austria

Date: 09.09.2016

Sivag Pumpen Vertrieb GmbH
Aumühlgasse 12-14
2020 Hollabrunn
Austria

Ing. Jan Großschartner
CEO

NOTES:

NOTES:

SIVAG Pumpen GmbH

A-2020 Hollabrunn
Aumühlgasse 12-14
Tel.: +43/(0)2952/3144-0
Fax.: +43/(0)2952/3144-4
Mail: office@sivag-pumpen.at
www.sivag-pumpen.at