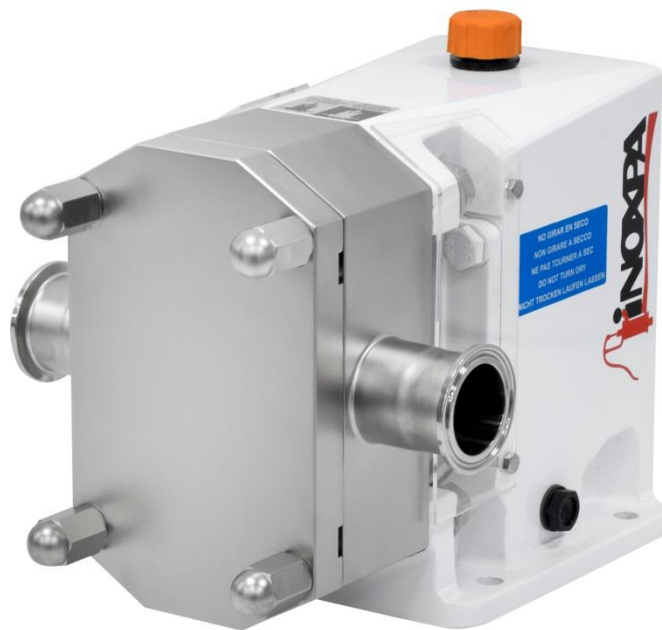


INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

LOBE PUMP

SLR



01.500.32.0001



EC Declaration of Conformity



INOXPA S.A.U.

Telers, 60
17820 - Banyoles (España)

hereby declare under our sole responsibility that the

Machine: **LOBE ROTOR PUMP**

Model: **SLR**

Type: **SLR 0-10, SLR 0-20, SLR 0-25 SLR 1-25,
SLR 1-40, SLR 2-40, SLR 2-50, SLR 3-50,
SLR 3-80, SLR 4-100, SLR 4-150,
SLR 5-125,SLR 5-150**

Serial number: **IXXXXXXXXXX to IXXXXXXXXXX
XXXXXXXXXXIINXXX to XXXXXXXXXXXIINXXX**

fulfills all the relevant provisions of the following directive:

**Machinery Directive 2006/42/EC
Regulation (EC) n° 1935/2004
Regulation (EC) n° 2023/2006**

and with the following harmonized standards and/or regulations:

**EN ISO 12100:2010
EN 809:1998+A1:2009/AC:2010
EN 60204-1:2018**

The technical file has been prepared by the signer of this document.

A handwritten signature in black ink, appearing to read 'DRB', enclosed in a light grey rectangular box.

David Reyero Brunet
Technical Office Manager
25th October 2021



Document: 01.500.30.06EN

Revision: (0) 2021/10

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INOXPA S.A.U.

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Serial number: **IXXXXXXXXXX to IXXXXXXXXXX
XXXXXXXXXXIINXXX to XXXXXXXXXXXIINXXX**

fulfils all the relevant provisions of these regulations:

Supply of Machinery (Safety) Regulations 2008

and with the following designated standards:

**EN ISO 12100:2010
EN 809:1998+A1:2009/AC:2010
EN 60204-1:2018**

The technical file has been prepared by the signer of this document.

A handwritten signature in black ink, appearing to read "Dr. Reyero Brunet".

David Reyero Brunet
Technical Office Manager
25th October 2021



Document: 01.500.30.07EN

Revision: (0) 2021/10

1. Table of contents

1. Table of contents	
2. Generalities	
2.1. Instructions manual	6
2.2. Compliance with the instructions	6
2.3. Warranty.....	6
3. Safety	
3.1. Warning symbols.....	7
3.2. General safety instructions	7
4. General Information	
4.1. Description	9
4.2. Principle of operation	9
4.3. Application.....	9
5. Installation	
5.1. Reception of the pump.....	10
5.2. Identification of the pump.....	10
5.3. Transport and storage.....	11
5.4. Location.....	11
5.5. Coupling.....	12
5.6. Pipes	13
5.7. Secondary piping	14
5.8. Relief valve (pressure bypass).....	15
5.9. Electrical installation	15
6. Start-up	
6.1. Checks before starting the pump	17
6.2. Checks when starting the pump.....	17
6.3. Relief valve (pressure bypass).....	17
7. Troubleshooting	
8. Maintenance	
8.1. General considerations	20
8.2. Check the mechanical seal	20
8.3. Maintenance of the seals	20
8.4. Oiling	21
8.5. Storage.....	21
8.6. Cleaning.....	21
8.7. Disassembly of the pump.....	23
8.8. Assembly of the pump	26
8.9. Adjusting and synchronising the lobes	28
8.10.Assembly / disassembly of the mechanical seal	30
9. Technical Specifications	
9.1. Tightening torque	40
9.2. Particle size.....	41
9.3. Weights	41
9.4. Dimensions	42

9.5. SLR 0-20 / 0-25.....	44
9.6. SLR 1-25 / 1-40.....	46
9.7. SLR 2-40 / 2-50.....	48
9.8. SLR 3-50 / 3-80.....	50
9.9. SLR 4-100 / 4-150.....	52
9.10.SLR 5-125 / 5-150	54
9.11.Relief valve	56
9.12.Front heating jacket	57

2. Generalities

2.1. INSTRUCTIONS MANUAL

This manual contains information regarding the reception, installation, operation, assembly, disassembly and maintenance of the SLR pump.

Carefully read the instruction prior to starting the pump, familiarize yourself with the installation, operation and correct use of the filter and strictly follow the instructions. These instructions should be kept in a safe location near the installation area.

The information published in the instruction manual is based on updated data.

INOXPA reserves the right to modify this instruction manual without prior notice.

2.2. COMPLIANCE WITH THE INSTRUCTIONS

Not following the instructions may impose a risk for the operators, the environment and the machine, and may result in the loss of the right to claim damages.

This non-compliance may result in the following risks:

- failure of important machine/plant functions,
- failure of specific maintenance and repair procedures,
- possible electrical, mechanical and chemical hazards,
- risk to the environment due to the type of substances released.

2.3. WARRANTY

Any warranty will be void immediately and lawfully and, additionally, INOXPA will be compensated for any civil liability claims submitted by third parties, in the following cases:

- the service and maintenance work have not been carried out in accordance with the service instructions, the repairs have not been carried out by our personnel or have been carried out without our written authorisation,
- modifications have been carried out on our material or equipment without written authorisation,
- the parts or lubricants used are not original INOXPA parts and products,
- the material or equipment has been improperly used, has been used negligently, or has not been used according to the instructions and their intended.
- The pump parts are damaged because they have been subjected to high pressure due to not having used a safety valve.

The General Conditions of Delivery already in your possession are also applicable.



The machine may not undergo any modification without prior approval from the manufacturer.

For your safety, only use original spare parts and accessories.

The usage of other parts will relieve the manufacturer of any liability.

Changing the service conditions can only be carried out with prior written authorization from INOXPA.

Please do not hesitate to contact us in case of doubts or if further explanations are required regarding specific data (adjustments, assembly, disassembly, etc.).

3. Safety

3.1. WARNING SYMBOLS



Safety hazard for people in general and/or for equipment



Electric hazard

ATTENTION

Important instruction for the protection of the equipment and its functions

3.2. GENERAL SAFETY INSTRUCTIONS



Read the instruction manual carefully before installing and starting the pump. Contact INOXPA in case of doubt.

3.2.1. During the installation



The [Technical specifications of chapter 9](#) should always be observed.

Never start the pump before connecting it to the lines.

Do not operate the pump if the pump casing and lantern protections are not fitted.

Check for proper specifications of the motors, especially if its working conditions create an explosions hazard.



During the installations, all the electric work should be carried out by authorized personnel.

3.2.2. During operation



The [Technical specifications of chapter 9](#) should always be observed. Under no circumstances can the specified limit values be exceeded.

NEVER touch the pump or the pipework during operation if the pump is being used for transferring hot liquids or during cleaning.

The pump contains moving parts. Never place your fingers inside the pump during operation.

NEVER operate with the suction and discharge valves closed.

NEVER spray water directly on the electrical motor. The standard motor protection is IP-55: protection against dust and water spray.

3.2.3. During maintenance



The [Technical specifications of chapter 9](#) shall always be observed.

NEVER disassemble the pump until the pipes have been emptied. Remember that liquid will remain inside the pump's pump casing (if does not have a purge). Bear in mind that the pumped liquid may be hazardous or extremely hot. Consult the regulations in effect in each country for these cases.

Do not leave loose parts on the floor.



ALWAYS disconnect the electrical power to the pumps prior to carrying out any maintenance.
Remove the fuses and disconnect the cable from the motor's terminals.
All electrical work must be carried out by authorized personnel.

4. General Information

4.1. DESCRIPTION

The SLR lobe pumps by INOXPA are part of our wide range of positive displacement rotary pumps for viscous liquids.

The following models exist in the lobe pump range:

- The SLR pump normal flow rate suitable for pressures of up to 12 bar.
- The SLR pump with wider lobes, delivers a higher flow rate, and is suitable for pressure of up to 7 bar.

The Hyclean model has been specially developed to respond to all hygienic requirements in the food industry.

As regards hygiene, reliability and sturdiness, the complete range of lobe pumps satisfies all requirements set by the aforesaid industry.

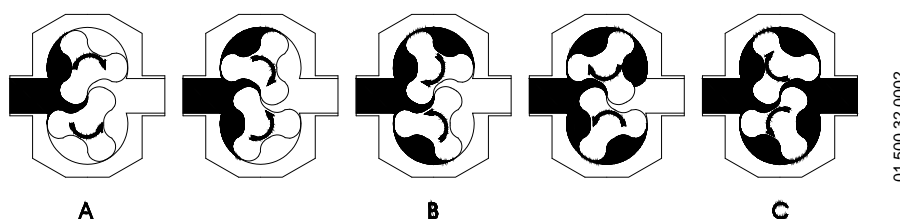
Its modular design enables optimal part interchange between the different pumps.

The lobe pumps are rotary displacement pumps. Owing to the contact between the internal parts, the pressure variations, etc. they make a louder noise than centrifugal pumps. This noise must be taken into consideration when installing these pumps.

This equipment is suitable for his use in food process.

4.2. PRINCIPLE OF OPERATION

The lobe pump is a positive displacement rotary pump. The top lobe is driven by the driving shaft. The lower lobe is located on the driven shaft, and is driven via a helical gear. Both lobes rotate in synchronism without one touching the other. When the pump is running they displace a set volume of liquid. The following figure shows how a lobe pump operates.



A: When the lobes rotate, the space on the suction side increases because one lobe moves away from the other, thus causing a partial vacuum that draws the liquid into the pumping chamber.

B: Each lobe void is filled consecutively as the shafts rotate and the liquid is displaced towards the discharge side. The small clearances between the lobes and between the lobes and the walls of the pump body duly cause the spaces to be rather well closed.

C: The pump body is completely full and the liquid leaks through the meshing of the lobes, knocking against the space walls so as to thus complete the pumping action.

4.3. APPLICATION

The main advantage of the INOXPA lobe pump is its capacity to pump a great variety of viscous liquids, from 1 mPa.s up to 100.000 mPa.s.

Furthermore, it is capable of pumping liquid products that require very careful handling and liquids that contain soft solids with only a minimum degradation of same.

ATTENTION



The range of application for each type of pump is limited. The pump was selected for a given set of pumping conditions when the order was placed. INOXPA shall not be liable for any damage resulting from the incompleteness of the information provided by the purchaser (nature of the fluid, rpm, etc.).

5. Installation

5.1. RECEPTION OF THE PUMP



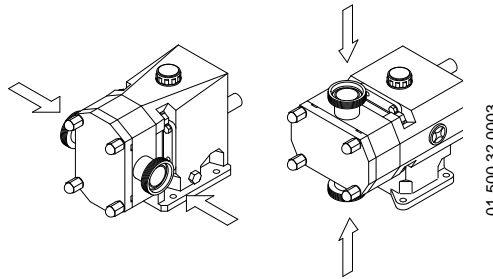
INOXPA will not be liable for any deterioration of the material due to transport or unpacking. Visually check that the packaging has not been damaged.

The following documentation is included with the pump:

- shipping documents,
- installation, service and maintenance instructions manual,
- instructions and servicing manual for the motor¹.

Unpack the pump and check the following:


- The suction and discharge connections on the pump, removing any remaining packaging material.



- Check that the pump and motor have not suffered any damage.
- If not in good material condition and/or if not all the parts are included, the shipping carrier should submit a report as soon as possible.

5.2. IDENTIFICATION OF THE PUMP

Each pump has a nameplate with the basic data required to identify the model.



CE EAC

INOXPA S.A.U.
C. TELERS. 60 - 17820 BANYOLES
GRONA (SPAIN) , www.inoxpa.com

Serial number →

Type	SLR 2-50	
No	I123456 / 1	Year 2018
D7023 / 01234567INO		

01.500.32.0004

¹ If the pump has been supplied with a motor from INOXPA

5.3. TRANSPORT AND STORAGE

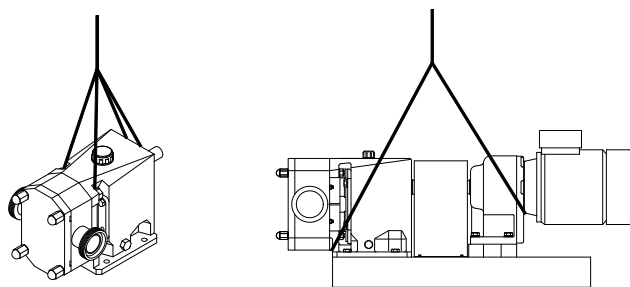
ATTENTION



- The SLR pumps are often too heavy to be transported or lifted manually.
- Use an adequate means of transport.
- Use the points which are indicated in the drawing for lifting the pump.
- Only authorized personnel should transport the pump.
- Do not work or walk under the heavy loads.

Lift the pump as indicated below:

- Always use two support points placed as far apart as possible.



- Secure the support so that they will not move.
- See chapter 9. [Technical specifications](#) to consult dimensions and weights.

ATTENTION



During the transport, disassembly or assembly of the pump, there is a risk of loss of stability and that the pump could fall down and cause damages to the operators. Make sure that the pump is properly supported.

5.4. LOCATION

- Place the pump as close as possible to the suction tank and it is possible below the level of the liquid.
- Leave sufficient space around the pump to provide access to both pump and motor. See chapter 9. [Technical specifications](#) to consult dimensions and weight.
- Place the pump on a flat and level surface.
- The foundation must be hard, level, flat and vibration free.

5.4.1. Foundation

Install the pump base so that the drive and pump are level and well supported. Therefore, the pump unit should be installed on a base plate – according to DIN 24259 – or on a frame, both placed exactly level on the foundation. The foundation must be hard, level, flat, vibration free, etc. to prevent base distortion (to keep the alignment pump –drive guaranteed while commissioning).

To install the pump unit on the foundation proceed as follows:

- Make holes in the foundation to fit foundation bolts. This is unnecessary when expanding screws are used instead of foundation bolts.
- Place base plate or frame with the aid of shims horizontally on the foundation.
- Grout.
- When the grout has entirely hardened the pump unit can be placed on the baseplate or the frame. Tighten the nuts on the foundation bolts carefully.

For other foundations consult INOXPA.

5.4.2. Excessive temperatures

Depending on the fluid to be pumped, high temperatures can be reached inside and around the pump.



Over 68°C the operator should take protective measures and place warning notices advising of the danger which exists if the pump is touched.

The type of protection selected should not isolate the pump entirely. It should allow for the bearings to be cooled more efficiently and for the bearings to be lubricated.

5.5. COUPLING

For the selection and fitting of the couplings, please refer to the supplier's manual. In some cases, the starting torque of positive-displacement pumps can be quite high. Therefore, the chosen coupling should be 1,5 to 2 times the recommended torque.

5.5.1. Alignment

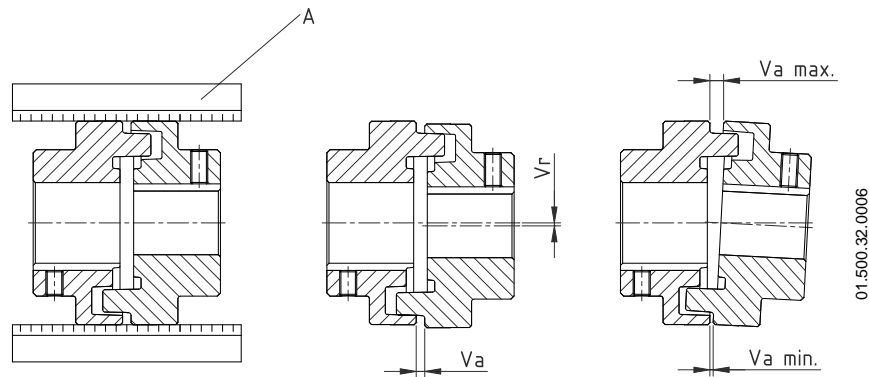
The shaft of the pump and the motor of the pumping assembly were properly aligned at factory.

ATTENTION



Align the shaft of the pump and the motor again after install the pumping assembly.

- Check the alignment of the pumping assembly after installation. If is necessary, realign.
- In the case of applications dealing with high temperatures the pump can be operated temporarily at its working temperature. Then recheck alignment pump-piping.
- Place a straight-edge (A) on top of the coupling: the straight should make contact with both halves of the coupling over their entire length. See the follow figure.
- Repeat the check, but this time on both sides of the coupling near the shaft.



Maximum alignment deviations:

Outside diameter of the coupling [mm]	Va [mm]	Va max. - Va min. [mm]	Vr [mm]
69	3	1,2	0,20
87	4	1,5	0,25
96	4	1,7	0,25
129	5	2,2	0,30
140	5	2,4	0,35
182	5	3	0,40
200	5	3,4	0,45
224	6	3,9	0,50

The coupling have to be adequately protected during the operating the pump to avoid possible accidental accesses.



Do not operate the pump if the protectors are not installed adequately.

5.6. PIPES

- As a general rule, install the suction and discharge lines in straight sections, with the minimum possible number of elbows and fittings in order to reduce any pressure losses that may be caused by friction.
- Make sure that the pump's ports are properly aligned with the pipework and have a diameter similar to that of the pump connections.
- Place the pump as close as possible to the suction tank and whenever possible below the liquid level, or even below the tank level in order to achieve the largest possible static head for suction.
- Install support brackets for the lines as close as possible to the pump's suction and discharge ports in order to avoid vibrations and stress on the pump.

5.6.1. Shut-off valves

The pump may be isolated for maintenance. To accomplish this, shut-off valves must be installed and connected to the pump's suction and discharge connections.



ATTENTION

These valves must ALWAYS be open during operation of the pump.

5.6.2. Self-priming process

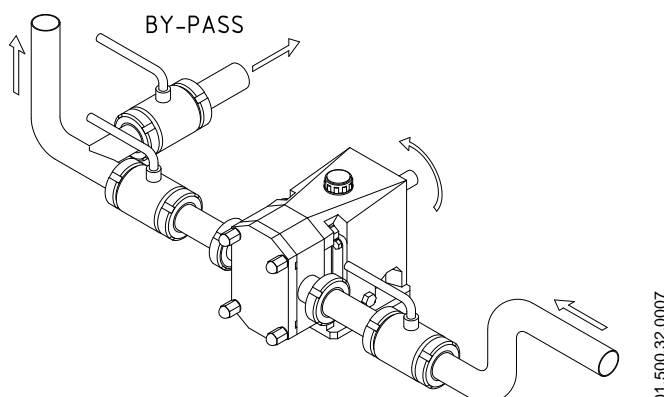
In general terms, if the self-priming process is followed, should contain sufficient liquid to fill the internal recesses and the void spaces thus enabling the pump to create a pressure difference.

However, if low viscosity fluids are to be pumped, a foot valve of the same or greater diameter as that of the suction pipe should be installed. Alternatively, the pump can be installed with a "U" shaped piping.



The use of a foot valve is not recommended for pumping viscous liquids.

- In order to eliminate air and gases from the suction pipe, the counter-pressure on the discharge pipe should be reduced. When the self-priming process is used, the pump's start-up should be done by opening and emptying the discharge pipe which allows the air and gases to escape at a low counter-pressure.
- Another possibility involves long pipes or when a check valve is installed in the discharge pipe; it is also possible to install a by-pass with a shut-off valve on the discharge side of the pump. This valve shall be opened in the case of priming and will allow air and gases to escape at minimum counter-pressure.
- The by-pass should not lead back to the intake orifice but to the supply tank instead..



5.6.3. Pressurization tank

Since the double mechanical seal of the pump SLR has a balanced design allow to work with external liquid at low pressure (buffer fluid) and with external liquid at high pressure (barrier fluid). In the even that it is necessary to work at high pressure and a closed pressurization system be install, the assembly must be done following the instructions manual of the pressure tank's manufacturer.

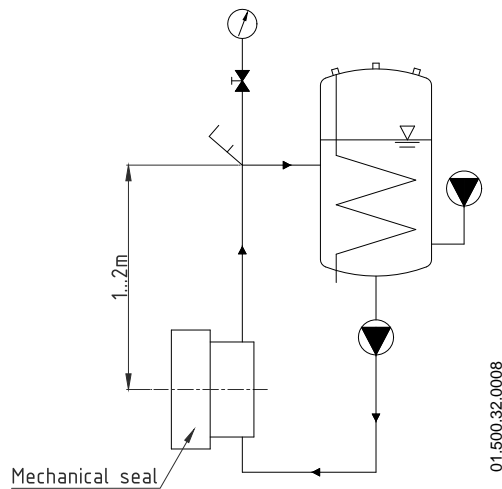
The pressurization tank is only required if the pumped liquid's safety rules demands it.

ATTENTION



ALWAYS install the pressurization tank at a height of between 1 and 2 meters with respect to the pump shaft.

ALWAYS connect the coolant inlet to the bottom connection on the seal chamber. The coolant will then exit through the top connection on the chamber. See the follow figure.



Installation drawing of the pressurization tank

For more information on the pressurization tank (installation, performance, maintenance, etc.), refer to the instruction manual supplied by the manufacturer.

5.7. SECONDARY PIPING

The entrance of the auxiliary liquid must be at the bottom part and the exit at the upper part. This will ensure that the auxiliary liquid fills completely the chamber where the secondary seal is housed.

5.7.1. Flushed mechanical seal / Quench

If the mechanical seal requires flush media, is not the responsibility of INOXPA the media supply and the purchase and installation of piping.

ATTENTION



Should be given to the compatibility of the handled liquid with the flush media. Choose the sealing liquid so that unwanted chemical reactions are avoid. Also check the compatibility of the flush media with seal elastomers.

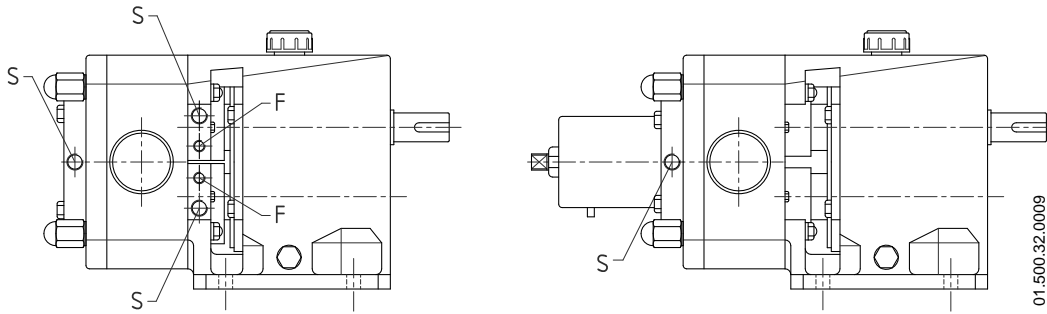
The SLR pumps' mechanical seal have female threaded inlet and outlet connection and are dependent upon frame of the pump and type of quench system employed.

5.7.2. Double mechanical seal: liquid flush media

Use and filtered auxiliary liquid and free from impurities to obtain maximum service life of the seal. The auxiliary liquid used must be chemically compatible with the pumped product to avoid the unwanted reactions in case of the accidental mix. The choice of the auxiliary liquid is the customer's responsibility.

Connect the quench so that the inlet is at the bottom and outlet is at the top (F). This will make a better evacuation of air or gases possible.

5.7.3. Heating / cooling jackets



Heating / cooling jackets (S) are available on the front cover.

5.8. RELIEF VALVE (PRESSURE BYPASS)

ATTENTION



The positive displacement lobe pumps must be protected from excess pressure when they are operating. Consequently, all the SLR pumps can be fitted with a stainless steel pressure relief valve or a pressure by-pass.

5.8.1. Protection

This valve protects the pumps and prevents excessively high pressure arising in the circuit. It reduces the differential pressure (Δp) between suction and discharge, but not the maximum pressure within the plant.

ATTENTION



Do not use the pressure relief valve to protect the system from excess pressure. It is designed to protect the pump only as it is not a safety outlet

5.8.2. Operating principle

The pressure by-pass valve is located in the rotor case and prevents excess pressure arising inside the pump. For example, when the pump's discharge port is clogged and the liquid cannot be pumped out, too high a pressure can cause serious damage to some of the pump's parts. The pressure relief valve opens a passage from the pump's discharge side to its suction side: an escape route, redirecting the flow again to the suction side whenever specifically high pressure levels are reached. The by-pass is effective in both directions of rotation (only front cover assembly).

ATTENTION



If the relief valve operates, this will mean that the equipment is not working properly. The pump should be disconnected immediately. Identify and solve the problem before re-starting the pump.

ATTENTION



Remember that the pressure relief valve is not able to be used to regulate the flow rate.

5.9. ELECTRICAL INSTALLATION



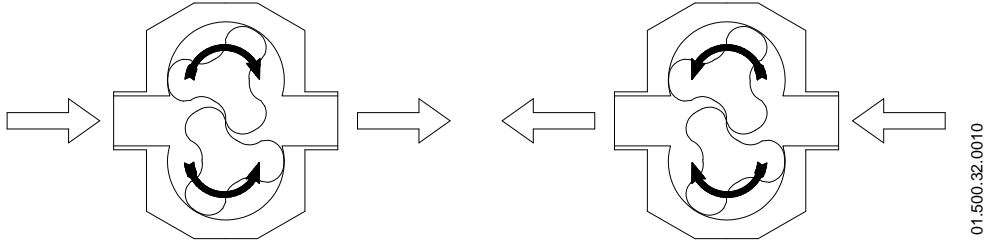
Only qualified personnel can connect the electric motors.
Take the necessary measures to prevent damage to cables and connections.



Electrical equipment, terminals and components of the control systems may still carry current when they are disconnected. Contacting them may impose a hazard to operators or cause irreparable material damage.

Before handling the pump, make sure that the motor is stopped.

- Connect the motor in accordance with the instructions supplied by the motor manufacturer.
- Check the direction of rotation (see the signalling label on the pump).
- Start and stop the pump motor momentarily. Make sure that the direction of rotation is correct. If the pump rotates in the wrong direction it could cause serious damage.



ATTENTION



ALWAYS check the direction of rotation of the motor with liquid inside the pump.

For models with a seal chamber, ALWAYS ensure that it is full of liquid prior to checking the direction of rotation.

6. Start-up



Prior to starting the pump, carefully read the instructions in section [5. Installation](#).

Carefully read section [9. Technical specifications](#). INOXPA will not be liable for improper use of the equipment.



NEVER touch the pump or the lines if hot liquids are being pumped.

6.1. CHECKS BEFORE STARTING THE PUMP

- Completely open the shut-off valves on the suction and discharge lines.
- Check oil level of the pump. Add correct grade of oil as necessary to maintain level in the center of oil sight glass (in the case of first start-up: pumps are shipped with oil in the gearbox, nevertheless this check may be skipped).
- If liquid does not flow towards the pump, fill it with the liquid to be pumped.



ATTENTION

The pump must never turn dry.

- Check that the power supply matches the rating indicated on the motor plate.
- Check that the direction of rotation of motors is the right one.
- If the pump has a single or double mechanical seal with buffer or barrier fluid, mount the auxiliary connection corresponding to the values indicated in chapter [9. Technical specifications](#).

6.2. CHECKS WHEN STARTING THE PUMP

- Check that the pump is not making any strange noises.
- Check if the absolute inlet pressure is sufficient to prevent cavitation in the pump. Check the curve to obtain the minimum required pressure above the vapour pressure (NPIP_r).
- Control the discharge pressure.
- Check for leaks in the sealing areas.



ATTENTION

Shut-off valves on the suction pipe must not be used to regulate the flow. All shut-off valves must be fully open during operation.



Control the motor consumption to prevent an electrical overload.

If is necessary, reduce flow and motor power consumption by reducing motor speed.

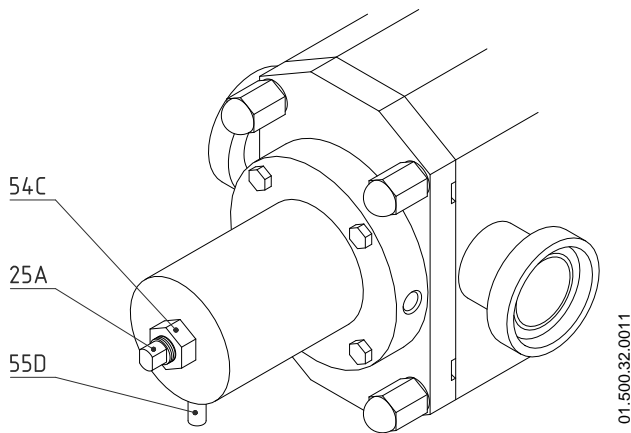
6.3. RELIEF VALVE (PRESSURE BYPASS)

The pressure at which the valve opens depends on the fluid to be pumped, the viscosity, the rpm, etc., which means that prior to starting the pump, the user must set the opening pressure of the relief valve.

When the pump incorporates a relief valve, the valve is set to the pump's maximum working pressure. The user must verify this by checking the position of the pin (55D). At the maximum set pressure, the pin has moved out all the way toward the pump cover.

In order to set the correct opening pressure, proceed as follows:

- Loosen the nut (54C).
- Use a spanner to turn the adjustment screw (25A) to the right to reduce the spring tension and get the desired opening pressure. While carrying out this operation, we can see how the pin (55D) moves away from the pump cover.
- When the desired opening pressure has been set, tighten the nut (54C).



ATTENTION



If the relief valve is not working properly, the pump must be put out of service immediately. The valve must be checked by INOXPA's technical service personnel.

Tamaño	2-5 bar	2-7 bar	5-8 bar	7-12 bar
SLR 0-10		X		X
SLR 1-25		X		X
SLR 1-40		X		
SLR 2-40		X		X
SLR 2-50		X		
SLR 3-50		X		X
SLR 3-80		X		
SLR 4-100		X	X	
SLR 4-150	X			
SLR 5-125		X	X	
SLR 5-150	X			

Types of springs that can be mounted depending on the set pressure

7. Troubleshooting

The attached table lists solutions to problems that may arise while operating the pump. It is assumed that the pump has been properly installed and that it has been selected correctly for the specific application. Contact INOXPA if technical assistance is required.

Motor overload						
↓	The pump flow or pressure is insufficient					
↓	↓	There is no pressure on the discharge side				
↓	↓	↓	Irregular discharge flow rate/pressure			
↓	↓	↓	Noise and vibrations			
↓	↓	↓	The pump gets clogged			
↓	↓	↓	Pump overheated			
↓	↓	↓	Abnormal wear			
↓	↓	↓	Leak through the mechanical seal			
↓	↓	↓	PROBABLE CAUSES		SOLUTIONS	
↓	↓	↓	Wrong rotation direction		Invert the rotation direction	
↓	↓	↓	Insufficient NPIP		Rise the suction tank Lower the pump Reduce the speed Increase the diameter of the suction pipe Shorten and simplify the suction piping	
↓	↓	↓	Pump not purged		Purge or fill	
↓	↓	↓	Cavitation		Increase suction pressure	
↓	↓	↓	The pump sucks in air		Check suction pipe and all its connections	
↓	↓	↓	Suction pipe clogged		Check the suction pipe and filter(s), if any	
↓	↓	↓	Wrong setting of the bypass valve		Check the bypass valve's setting	
↓	↓	↓	Discharge pressure too high		If is necessary, reduce the loss of head by increasing the diameter of the discharge pipe	
↓	↓	↓	Viscosity of the liquid is too high		Reduce the viscosity, for example, by heating the liquid Reduce the pump speed	
↓	↓	↓	Viscosity of liquid too low		Increase the viscosity, for example, by cooling the liquid Increase the pump speed	
↓	↓	↓	Temperature of liquid too high		Reduce the temperature by cooling the liquid	
↓	↓	↓	Pump speed too high		Reduce the pump speed	
↓	↓	↓	The lobes are worn		Replace the lobes	
↓	↓	↓	Pump speed too low		Increase the pump speed. Check the motor power is sufficient.	
↓	↓	↓	Product very abrasive		Fit hardened lobe hubs	
↓	↓	↓	Worn bearings		Replace the bearings, check the pump	
↓	↓	↓	Worn or damaged mechanical seal		Replace the seal	
↓	↓	↓	O-rings not the right ones for the liquid		Fit the proper O-rings. Check with the supplier	
↓	↓	↓	Worn gears		Replace and readjust the gears	
↓	↓	↓	Insufficient lubricating oil level		Fill up with oil. See chapter 8.4. Oiling	
↓	↓	↓	Insufficient lubricating oil level		Use an appropriate oil	
↓	↓	↓	The lobes rub		Reduce the speed Reduce the discharge pressure Adjust the play	
↓	↓	↓	Coupling misalignment		Align the coupling, see chapter 5.5 Coupling	
↓	↓	↓	Tension on the pipelines		Connect the pipelines free of tensions to the pump	
↓	↓	↓	Foreign bodies in the liquid		Insert a filter in the suction pipe	
↓	↓	↓	Mechanical seal spring tension too low		Adjust as indicated in this manual	
↓	↓	↓	Pump and/or electric motor not fixed on foundation		Tighten, check that the piping has been connected stress-free and align the coupling	

8. Maintenance

8.1. GENERAL CONSIDERATIONS

This pump, just like any other machine, requires maintenance. The instructions contained in this manual cover the identification and replacement of spare parts. The instructions are aimed at maintenance personnel and those responsible for the supply of spare parts.



Carefully read chapter [9. Technical Specifications](#).

Maintenance work can only be carried out by qualified personnel that are trained and equipped with the necessary resources to carrying out this work.

All parts or materials that are replaced must be properly disposed of/recycled in accordance with the current directives applicable in each area.



ALWAYS disconnect the pump before beginning any maintenance work.

Tightening torque:

Size	Nm	lbf-ft
M6	10	7
M8	21	16
M10	42	31
M12	74	55
M16	112	83

8.2. CHECK THE MECHANICAL SEAL

Periodically check that there are no leaks around the shaft. If leakage is detected through the mechanical seal, replace it following the instructions in the section [8.7. Disassembly of the pump](#) and [8.8. Assembly of the pump](#).

8.3. MAINTENANCE OF THE SEALS

SEALS REPLACEMENT	
Preventive maintenance	Replace after twelve (12) months. We also recommend replacing the gaskets during seal or pump shaft replacement.
Maintenance after a leak	Replace at the end of the process. If the impeller nut gasket fails, the threaded hole on the impeller nut and the threads on the end shaft have to be cleaned. Follow the instructions given in 8.6. Cleaning .
Scheduled maintenance	Regularly check that there are no leaks and that the pump is operating correctly. Keep a record of the pump. Use statistics to plan inspections.
Lubrication	During assembly, use soapy water when fitting the different gaskets to allow them to slide better.

8.4. OILING

The bearings are oiled by immersion in an oil bath.

The pumps are supplied with oil suitable for food industries registered as NSF H1 and comply with FDA, with ISO 21469, kosher and halal certification. This oil is an oil PAO (polyalphaolefin) and is miscible with other synthetic PAO oil or other mineral oil.

Example of recommended oil types:

Brand	Type
Total	Nevastane XSH-220
Klüber	Klüberoil 4 UH1-220N

- Regularly check the oil level, for example, weekly or every 150 operating hours.
- The first oil change must be carried out after 150 hours of operation.
- Afterwards, it can be changed every 2500 operating hours or at least once a year when operating under normal conditions.



Do not fill with oil the bearing support above the level

Leave the pump switched off for a while and then re-check the oil level. If necessary, add a little oil.
Oil for environmental temperatures from 5°C to 50°C: SAE 90 or ISO VG 220

Pump size	Quantity of oil in the support (l)	
	Horizontal connections (standard)	Vertical connections
SLR 0	0,30	0,25
SLR 1	0,50	0,40
SLR 2	0,75	0,50
SLR 3	1,75	1,40
SLR 4	4,50	3,40
SLR 5	15,0	11,5

8.5. STORAGE

Before being stored the pump must be completely emptied of liquids. Avoid, as far as possible, the exposure of the parts to excessively damp atmospheres.

8.6. CLEANING

Although three methods of cleaning are described, the recommended method for the pump design is COP.



- The use of aggressive cleaning products such as caustic soda and nitric acid may give raise to skin burns.
- Use rubber gloves during the cleaning process.
- Always use protective during the cleaning process.

8.6.1. COP (clean-out-of-place) cleaning

1. Dismantle all parts.

2. Pre-rinse with warm water (110°F) until the rinsed surface look clean.
3. Submerge and soak all parts for 5 minutes in COP tank with 2% caustic wash (120°F to 145°F).
4. Brush-clean the threads to the lobe screws, O-ring housings, shafts spline, and threaded hole of the shaft.
5. Rinse with clear water.
6. Swab test the inside of the tapped hole to determine cleanliness.
7. Should the swab test fail, repeat steps 2 to 6 above until the swab test is passed.
8. Should swab testing continue to fail, or time is on the essence, install a new (spare) air shaft.
9. Immerse items in sanitizer before reassembling and/or brush-sanitize connections.

If the drive screw gasket (80) or sleeve seal gasket (80B) is damaged, the threads of the shafts (05 and 05A) and the screws (25) must be cleaned. It is recommended:

1. Remove the screws (25), washers (35) and lobes (02) according to the instructions given in section [8.7.2. Disassembly the lobes](#).
2. Remove damaged gaskets.
3. Pre-rinse all the parts with warm water (45°C / 110°F) until the rinsed surface look clean.
4. Submerge and soak the all the parts for 5 minutes in COP tank with 2% caustic wash (50°C to 65°C / 120°F to 145°F).
5. Brush-clean the tapped hole of the shaft (05 and 05A) and the threading of the lobe screw (25).
6. Rinse with clear water and dry with clean air.
7. Swab test the threading of the impeller nut and shaft to determine cleanliness.
8. Should the swab test fail, repeat steps 1 to 5 above until the swab test is passed.
9. Should swab testing continue to fail, or time is on the essence, install a new spare parts.

8.6.2. SIP (sterilization-in-place) automatic

The process of sterilization with steam is applied to all the equipment including the pump.

Do NOT start the pump during the process of sterilization with steam.

The parts/materials suffer no damage if the indications specified in this manual are observed.

No cold liquid can enter the pump till the temperature of the pump is lower than 60°C (140°F).

A flow by-pass is recommended to be used in order to assure the flow of sterile product after the pump.



Maximum conditions during the SIP process with steam or overheated water:

- | | |
|-------------------------|--|
| a) Maximum temperature: | 140°C / 284°F |
| b) Maximum time: | 30 min |
| c) Cooling: | sterile air or inert gas |
| d) Materials: | EPDM/PTFE (recommended)
FPM/NBR (not recommended) |

8.6.3. Automatic CIP (clean-in-place)

If the pump is installed in a system with a CIP process, it is not necessary to disassemble the pump.

If the automatic cleaning process is not provided, proceed to disassemble the pump as indicated in the chapter [8.7. Disassembly and assembly of the pump](#).

Cleaning solutions for CIP processes:

Only use clear water (chlorine-free) to mix the cleaning agents:

- a. Alkaline solution: 1 kg by weight of caustic soda (NaOH) at 70°C (150°F)

1 kg NaOH + 100 l H₂O = cleaning solution

or

2,2 l NaOH at 33% + 100 l H₂O = cleaning solution
- b. Acid solution: 0,5% by weight of nitric acide (HNO₃) at 70°C (150°F)

0,7 l HNO₃ at 53% + 100 l H₂O = cleaning solution

ATTENTION

Check the concentration of the cleaning solutions. Incorrect concentrations may lead to the deterioration of the pump seals.

To remove any traces of cleaning products ALWAYS perform a final rinse with clean water at the end of the cleaning process.

8.7. DISASSEMBLY OF THE PUMP

The assembly and disassembly of the pumps should be done by qualified personnel. Make sure that the personnel read carefully this instruction manual and, in particular, those instructions which refer to the work they will perform.

ATTENTION

Incorrect assembly or disassembly may cause damage in the pump's operation and lead to high repair costs and a long period of down time.

INOXPA is not responsible for accidents or damages cause by a failure to comply with the instructions in this manual.

Preparation

Provide for a clean working environment so some parts, including the mechanical seal, require very careful handling and others have close tolerances.

Check that the parts which are used are not damaged during transport. When doing this, you need to inspect the adjustment edge, the butted faces, the tight fit, burrs, etc.

After each disassembly, carefully clean the parts and check for any damage. Replace all damaged parts.

Tools

Use the proper tools for assembly and disassembly operations. Use them correctly.

Cleaning

Before disassembling the pump, clean it on the outside on the inside.



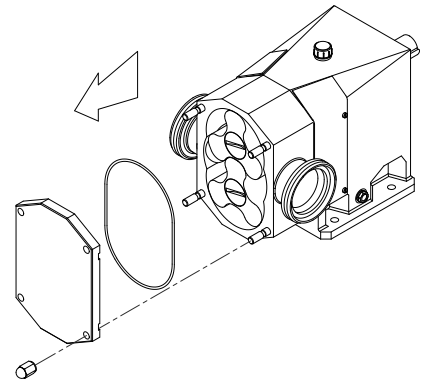
NEVER clean the pump by hand when it is running.

8.7.1. Disassembly pump cover



¡ATTENTION! The liquid can spill out when the pump housing is removed.

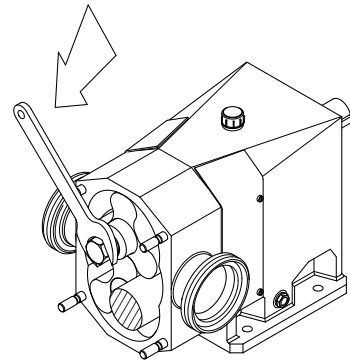
- Close the suction and discharge valves.
- Remove the wing nuts (45). Grooves are provided on 4 places along the circumference to permit removing the pump cover with the aid of, say, a screwdriver, if need be.
- Check to see that the O-ring (80A) is in good condition.



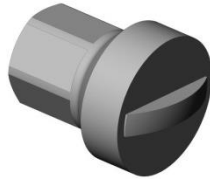
01.500.32.0012

8.7.2. Disassembly the lobes

- Unscrew the lobe screws (25) using a wrench (see the fig.: 01.500.32.0059). This wrench can be ordered from INOXPA.
- These screws are threaded to the right. Wooden or nylon blocks can be placed between the lobes to stop them from rotation.
- Check to see that the O-ring (80) is in good conditions.
- Remove both lobes (02). If is necessary, use a suitable tool.



01.500.32.0013



01.500.32.0059

8.7.3. Disassembly cover seal / mechanical seals

SLR 0, 1:

Due to the pump's design, in these models is necessary remove the pump housing (01) for assembly / disassembly the mechanical seals.

SLR 2, 3, 4, 5:

Due to the pump's design, in these models is not necessary remove the pump housing (01) for assembly / disassembly the mechanical seals.

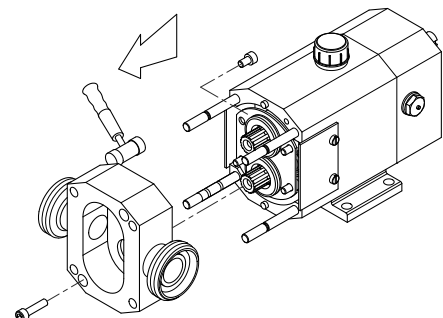
The rotating part of the mechanical seal is assemblies over shaft sleeve (13-13C) directly. The stationary part of the mechanical seal is assemblies on the cover seal (09).

According to the instructions given in section [8.10. Assembly / disassembly of the mechanical seal](#).

8.7.4. Disassembly the pump housing

SLR 0:

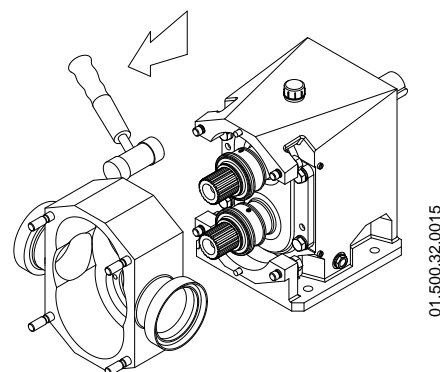
- Unscrew and remove the Allen screws (51B) which sure the housing (01) to the bearing bracket (06).
- Remove the housing (01) with a plastic hammer if is necessary.



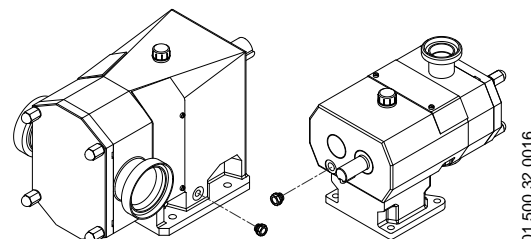
01.500.32.0014

SLR 1, 2, 3, 4, 5:

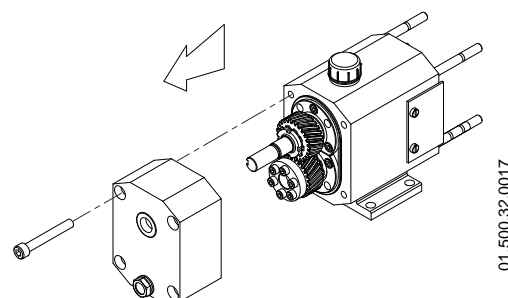
- Unscrew and remove the nuts (54A) which secure the housing (01) to the bearing bracket (06).
- Remove the housing (01) with a plastic hammer if necessary.

**8.7.5. Draining the lubrication oil**

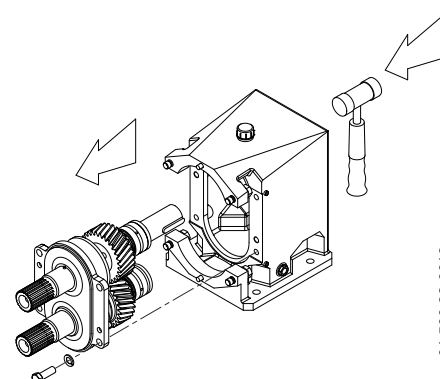
- Place a container below the bearing bracket (06) to collect the lubricating oil for recycling.
- Remove the oil plug (87) situated on the back side to the bearing bracket.

**8.7.6. Disassembly of the shaft assembly**SLR 0:

- Remove the cotter (61A) of the shaft drive (05).
- Remove the screws (51D) and disassemble the cover (12B) while checking that the O-ring (80E) does not stick on both sides.

SLR 1, 2, 3, 4, 5:

- Identify the drive shaft (05), if it is upper or lower position – right or left on the vertical support.
- Remove the screws (52) – screws (51D) for the size pump 1 – and washers (53A) which fix the bearing cover (12) with the bearing bracket (06).
- Remove the cotter (61A) of the shaft drive (05).
- Remove the shaft assembly of the bearing bracket. Due to tight fit to the bearing cover (12) it is necessary to use a nylon hammer. Hit slightly the back of the drive shaft (05).
- Check the klingerit seal (18A) –or O-ring (80E) on the support of size 4– after that the shaft assembly has been removed. If there is any defect, look for a spare seal before assembly of the pump.

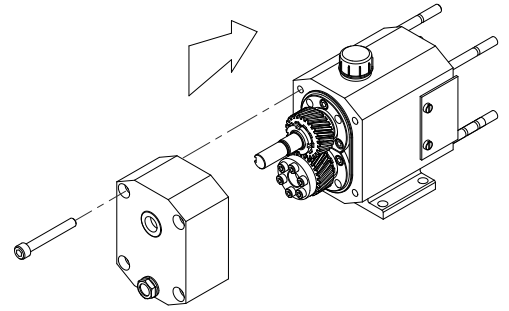


8.8. ASSEMBLY OF THE PUMP

8.8.1. Assembly of the shaft assembly

SLR 0:

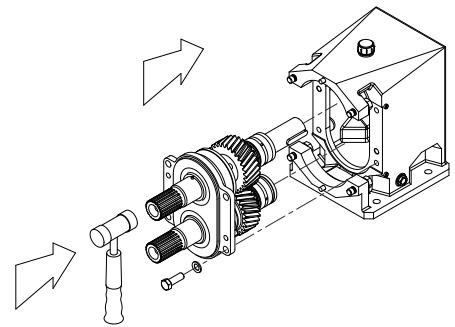
- Check O-ring (80E) is not damaged and mount it, with a grease or lubrication oil, in the proper position on the rear cover (12B).
- Place the rear cover and fasten with screws (51D).
- Place the drive shaft's (05) cotter (61A).



01.500.32.0019

SLR 1, 2, 3, 4, 5:

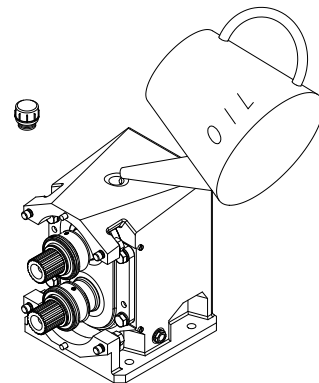
- Check the klingerit seal (18A) – or O-ring (80E) on the support of size 4 – is in good conditions. If is necessary replace it and mount it on the support (06).
- Make sure to reassemble the pump with a drive shaft (05) in the upper or lower position –right or left in the vertical support–, as it was before disassembly.
- Introduce the shaft assembly inside the support (06) giving attention to slide the drive shaft (05) by the retainer ring (88)..
- Use a nylon hammer and hit slightly the shafts (05 and 05A) until the bearing cover (12) is fixed to the support.
- Fix the bearing cover (12) on the support (06) with the washers and screws (53A and 52) –screws (51D) for support 1.
- Place the drive shaft's (05) cotter (61A).



01.500.32.0020

8.8.2. Filling with lubricating oil

- Remove the oil plug (85) located on top side of the bearing bracket (06).
- Fill the bearing bracket (06) with lubricating oil to the half mark on the sight glass (86).



01.500.32.0021

See chapter [8.4. Oiling](#) for the type and quantity of oil to be used.

8.8.3. Assembly of the body / seal cover

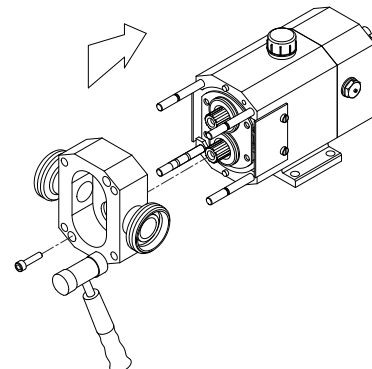
ATTENTION



¡CAUTION! When re-assembling the pump body, make a note of the position of the centered pins. Before the assembly of the body and the seal covers see chapter [8.10. Assembly / disassembly of the mechanical seal](#).

SLR 0:

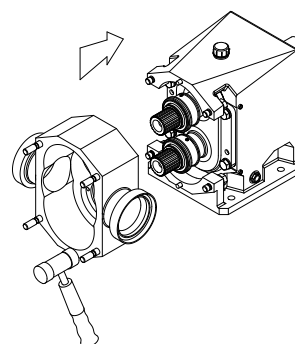
- Assemble the body (01) on the bearing bracket (06). Due to tight to the centered pins is necessary use to a nylon hammer. Hit slightly the housing until to adjust to bearing bracket.
- Tighten the Allen screws (51B).
- Tighten the screws with appropriate tightening torque.



01.500.32.0022

SLR 1, 2. 3. 4. 5:

- Assembly the body (01) on the bearing bracket (06). Due to tight to the centered pins is necessary use to a nylon hammer. Hit slightly the housing until it is tight to bearing brackets.
- Fix the nuts (54A) with the washers (53) in the pins.
- Tighten the screws with appropriate tightening torque.



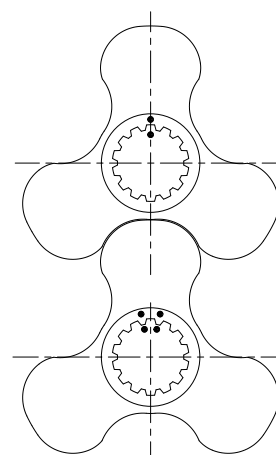
01.500.32.0023

8.8.4. Installation of the lobes

ATTENTION

ALWAYS check the clearance between the lobes and the body before completing the assembly. See chapter [8.9.1. Play and tolerances](#).

- Install new O-rings (80) on the lobe screws (25).
- Lubricate the O-rings with a soapy water or food grade oil compatible with the O-ring material.
- Adjust the spacer washers (32) on the shafts (05 and 05A).
- See the chapter [8.9.4. Adjustment of the lobes / pump body using spacer washers](#).
- Install the lobes (02) on the shafts (05 y 05A), making sure that the markings of the lobes and the shafts match.
- Tighten the screws (25) with a key. To prevent the lobes from turning simultaneously, the extraction tool handle can be used (this tool can be ordered from INOXPA).
- The assembly is exactly the same for the all types of lobes.



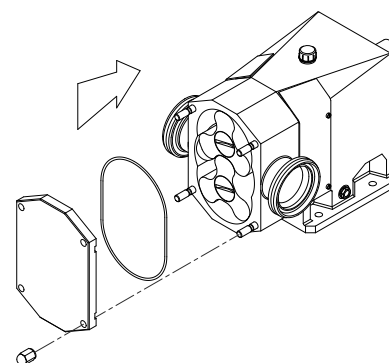
01.500.32.0024

ATTENTION

When installing the different parts and seals, use soapy water to allow them to slide better.

8.8.5. Mounting the cover

- Check that the seal (80A) is in good condition or replace it with a new one, if is necessary.
- Place it on the pump body (01), making sure there is no dirt or residue of any product in the seal or in the body.
- If is necessary lubricate the seal for make easier. Use soapy water or installation oil compatible with the seal material.
- Place the cover of the pump (03) on the body (01) and tight the cap nuts (45).
- See the chapter [6.1. Checks before starting the pump](#).



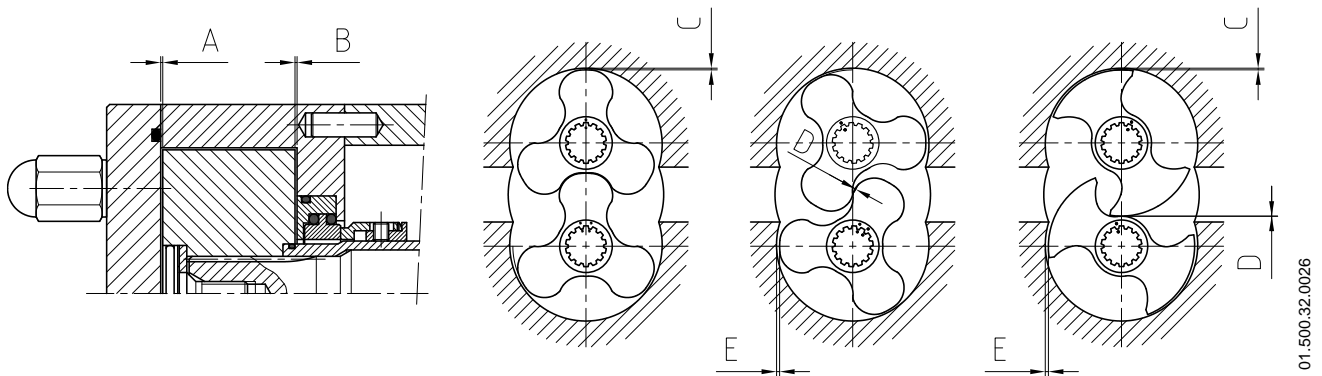
01.500.32.0025

ATTENTION

When installing the different parts and seals, use soapy water to allow them to slide better.

8.9. ADJUSTING AND SYNCHRONISING THE LOBES

8.9.1. Play and tolerances



01.500.32.0026

(mm)	A	B	C	D	E
SLR 0-10	0,10 ±0,05	0,06 ±0,03	0,15 ±0,05	0,15 ±0,05	0,35 ±0,05
SLR 0-20	0,12 ±0,05	0,07 ±0,03	0,15 ±0,05	0,15 ±0,05	0,35 ±0,05
SLR 0-25	0,15 ±0,05	0,08 ±0,03	0,2 ±0,05	0,15 ±0,05	0,4 ±0,05
SLR 1-25	0,15 ±0,05	0,1 ±0,05	0,15 ±0,05	0,15 ±0,05	0,35 ±0,05
SLR 1-40	0,15 ±0,05	0,1 ±0,05	0,2 ±0,05	0,15 ±0,05	0,4 ±0,05
SLR 2-40	0,2 ±0,05	0,15 ±0,05	0,15 ±0,05	0,15 ±0,05	0,35 ±0,05
SLR 2-50	0,2 ±0,05	0,15 ±0,05	0,2 ±0,05	0,15 ±0,05	0,4 ±0,05
SLR 3-50	0,25 ±0,05	0,2 ±0,05	0,2 ±0,05	0,2 ±0,05	0,4 ±0,1
SLR 3-80	0,3 ±0,05	0,2 ±0,05	0,3 ±0,1	0,2 ±0,05	0,5 ±0,1
SLR 4-100	0,35 ±0,05	0,35 ±0,05	0,4 ±0,1	0,3 ±0,05	0,85 ±0,1
SLR 4-150	0,5 ±0,05	0,35 ±0,05	0,6 ±0,1	0,3 ±0,05	1,05 ±0,1
SLR 5-125	0,5 ±0,05	0,35 ±0,05	0,5 ±0,1	0,45 ±0,05	1,05 ±0,1
SLR 5-150	0,5 ±0,05	0,35 ±0,05	0,6 ±0,1	0,45 ±0,05	1,05 ±0,1

A = axial play between lobe and cover

B = axial play between lobe and rear side of the body

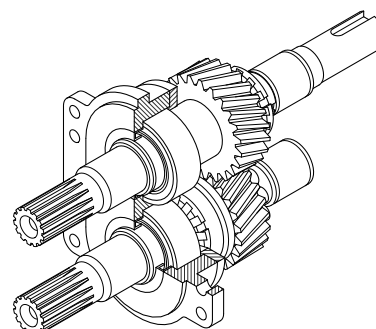
C = axial play between lobe and body

D = radial play between lobes

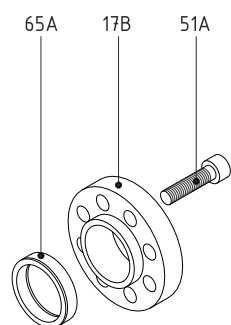
E = radial play between lobe and body in the suction

8.9.3. Synchronising the lobes

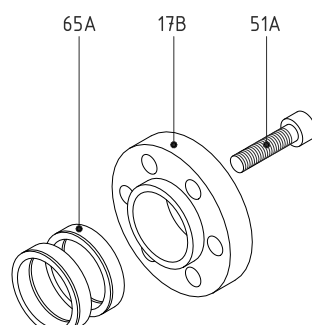
- To be able to synchronise the lobes, is necessary remove the shaft assembly from the bearing bracket (except the size pump 0), and place the lobes (02) in the shafts and fix them with the screws (25).
- Loosen the torque screws in the adjustable locking mechanism from driven shaft gear (19A). In principle, the tensioning unit is of a self-release type. It is now possible to turn the drive shaft (05) while firmly holding the driven shaft (05).



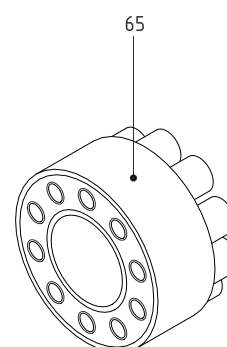
01.500.32.0027



Soporte 0/1



Soporte 2



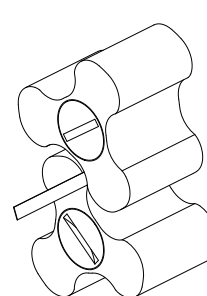
Soporte 3/4/5

01.500.32.0028

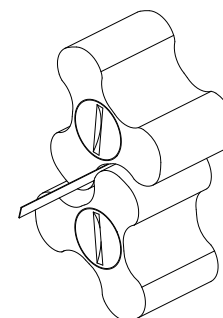
SLR 0, 1 and 2: the adjustable locking mechanism is made for three pieces: allen screw (51A), conical tightening ring (65A) and dragging bushing (17B).

SLR 3, 4 and 5: the adjustable locking mechanism is made by only one piece (65)..

- Fit the lobes (02) on the shafts (05 and 05A) as indicated in [8.8.4. Installation of the lobes](#).
- Turn the lobes to position 1 as shown in the drawing and adjust the distance until the separation is as indicated in [8.9.1. Play and tolerances](#).
- Manually tighten the torque screws on the adjustable locking mechanism.
- Then turn the upper lobe approximately 60° in anti-clockwise direction (position 2). Check that the separation distance in this position is equal to that of position 1. If this is not the case, the separation distances must be adjusted by slowly turning one lobe while the other one is held firmly.
- Tighten the torque screws of the adjustable locking mechanism diagonally with 2 or 3 turns using the set torque.
- When tightening the screws on the adjustable locking mechanism, ensure that the gears (19 and 19A) are not turning at the same time. This can be prevented by placing a wooden wedge between the gears (19 and 19A).
- Re-check the separation distance between the lobes (02) and turn the drive shaft (05) a few times to verify that the lobes (02) are not rubbing against each other at any point.
- Remove the lobes (02) from the shafts (05 and 05A).
- Apply a small amount of lubricant to the drive shaft (05) in the area of the retainer ring (88) once you have completed the assembly process.



Posición 1



Posición 2

01.500.32.0029

8.9.4. Adjustment of the lobes / pump body using spacer washers

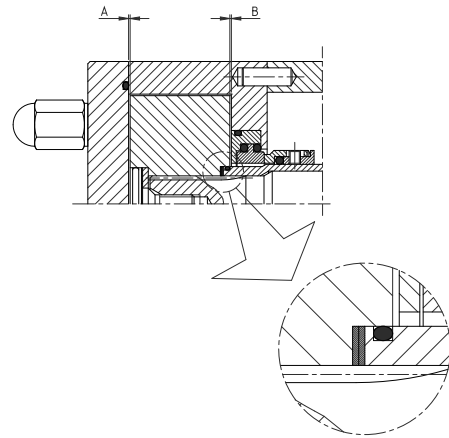
This is the last adjustment to be carried out. The pump needs to be synchronized and the pump body must be mounted on the support.

SLR 0, 5:

- Not use spacer washers.
- The sleeve's length (13-13C) is adjusted for each pump.

SLR 1, 2, 3, 4:

- The adjustment will be carried out using spacer washers (32) installed between the shaft (05 y 05A) and the lobe (02).
- There are 3 washer thicknesses: 0,1 mm , 0,15 mm and 0,2 mm.
- Install the lobes (02) and adjust the screws (25) in the way described in [8.8.4. Installation of the lobes](#).
- Check the tolerances between the lobes and the body (A and B) See [8.9.1. Play and tolerances](#). If they are found outside the scale, replace the spacer washers until the proper play is achieved.



01.500.32.0030

8.10. ASSEMBLY / DISASSEMBLY OF THE MECHANICAL SEAL

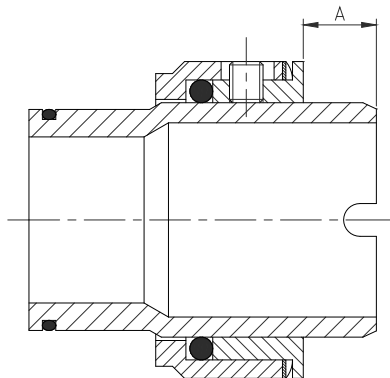
8.10.1. Simple mechanical seal



ATTENTION

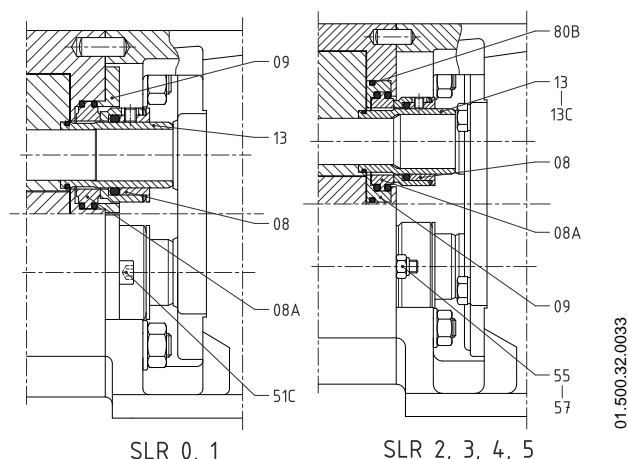
Mechanical seals are fragile parts. Handle them with care. Do not use screwdrivers or similar tools to extract the parts.

- Clean all the mechanical seal components prior to installing them.
- Check that the working surfaces are not damaged. INOXPA recommends replacing all of the mechanical seals if one of the working surfaces is found to have some defect.
- Replace the O-rings during assembly.



01.500.32.0032

Model	A (mm)
SLR 0-20 / 0-25	8
SLR 1-25 / 1-40	9,5
SLR 2-40 / 2-50	11
SLR 3-50 / 3-80	20
SLR 4-100 / 4-150	-
SLR 5-125 / 5-150	-



8.10.1.1. Disassembly

ATTENTION



If available, remove the spacer washers (32) installed on each shaft. If more than one washer is installed on each shaft, don't remove them to prevent them from getting mixed up.

- In **SLR 0, 1** pumps, to disassembly the mechanical seal is necessary remove the body from the pump. See chapter [8.7.4. Disassembly the pump housing](#).
- In **SLR 2, 3, 4, 5** pumps, to disassembly the mechanical seal is not necessary remove the body from the pump (02).
- In **SLR 0, 1** pumps, disassemble the seal cover (09) loosening the screws (51C). After that, you can remove the stationary part of the mechanical seal.
- In **SLR 2, 3, 4, 5** pumps, loosen the nuts (57), but leave them a few pitches on the stud. Put pressure on the nuts (57) so the cover is released (09). After that, you can remove the stationary part of the mechanical seal.
- In **SLR 1, 2, 3, 4** pumps, separate the spacer washers (32) from the sleeve (13, 13C).
- Remove the sleeve (13, 13C) and the rotating part of the mechanical seal will go out with it.
- Loosen the allen studs of the mechanical seal.
- Disassemble the rotating part of the sleeve (13, 13C).

8.10.1.2. Assembly

ATTENTION



Remember that if spacer washers (32) are present, they must be adjusted on the originating shafts.

- When assembling the mechanical seal, use soapy water on the different parts and seals to allow them to slide better. Apply to both the stationary part and the rotating part of seal. Replace the damaged seals.
- Place the rotating part on the sleeve (13, 13C). Respect the measure A of the above table.
- Tighten the allen studs (03) and place the sleeve (13, 13C) in the shaft.
- In **SLR 1, 2, 3, 4** pumps, mount the spacer washers (32) in front of the sleeve (13, 13C).
- In **SLR 0, 1** pumps, mount the stationary part of the mechanical seal in the body (01). In **SLR 2, 3, 4, 5**, mount the stationary part of the mechanical seal in the seal cover (09), trying that it is completely flat.
- Clean with a solvent the working surfaces of the mechanical seal.
- In **SLR 0, 1**, mount the seal cover (09) in the body (01) and tighten the screws (51C).
- In **SLR 2, 3, 4, 5**, mount the seal cover (09) in the body (01) and tighten the nuts (57) in the studs (55).
- Mount the body (01) in the bearing bracket (06). See chapter [8.8.3. Assembly of the body / seal cover](#).
- See chapter [8.9.4. Adjustment of the lobes / pump body using spacer washers](#).

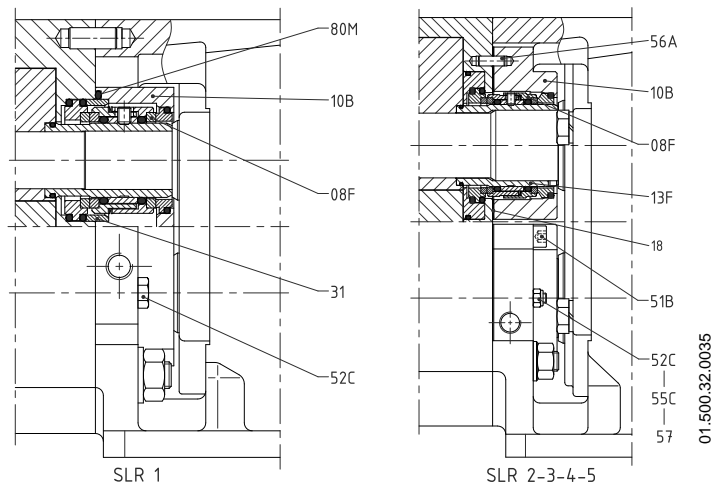
8.10.2. Balanced double mechanical seal

ATTENTION



Mechanical seals are fragile parts. Handle them with care. Do not use screwdrivers or similar tools to extract the parts.

- Clean all the mechanical seal components prior to installing them.
- Check that the working surfaces are not damaged. INOXPA recommends replacing all of the mechanical seals if one of the working surfaces is found to have some defect.
- Replace the O-rings during assembly.



8.10.2.1. Disassembly

ATTENTION



If available, remove the spacer washers (32) installed on each shaft. If more than one washer is installed on each shaft, don't remove them to prevent them from getting mixed up.

The SLR 0 has not a double mechanical seal.

- In **SLR 1**, to disassembly the double mechanical seal is necessary remove the body from the pump (01). See chapter [8.7.4. Disassembly the pump housing](#).
- In **SLR 1**, unscrew the screws (52C) and you can remove the cover double seal (10B).
- Remove the separator (31) from the body (01) and the internal stationary part of the double mechanical seal and its O-rings (02) which are housed in the body (01).
- Separate the cover double seal (10B) from the external stationary part of the double mechanical seal (08).
- Unscrew the Allen studs (11) and you will be able to remove the sleeve (13) from the central rotating part of the double mechanical seal.
- In **SLR 2, 3, 4, 5** the double mechanical seal remove through by part front of the body. Dismount the lobes. See chapter [8.7.2. Disassembly the lobes](#).
- The internal stationary part of the double mechanical seal and its O-rings are house in the cover double seal. Unscrew the nut (57) or screw (52C) and remove the assembly.
- Separate the spacer washers (32) from the sleeve (13, 13F).
- Remove the sleeve (13, 13F) and the central rotating part of the double mechanical seal will go out with it.
- Loosen the Allen studs (11).
- Dismount the rotating part from the sleeve (13, 13F).
- If is necessary, change the external stationary part of the double mechanical seal and its O-ring and dismount the body pump (01). See chapter [8.7.4. Disassembly the pump housing](#).
- Dismount the cover double seal (10B) unscrewing the screws (51B) and carefully, remove the external stationary part of the double mechanical seal and its O-ring (09).

8.10.2.2. Assembly



ATTENTION

Remember that if spacer washers (32) are present, they must be adjusted on the originating shafts.

- When assembling the mechanical seal, use soapy water on the different parts and seals to allow them to slide better. Apply to both the stationary part and the rotating part of seal.
- In the **SLR 1**, mount the external stationary part of the double mechanical seal in the cover double seal (10B) trying that it is completely flat.
- Place the internal stationary part of the double mechanical seal and its O-rings (02) on the body (01) trying that it is completely flat.
- Place the snap ring (31) on the body (01).
- Place the central rotating part of the double mechanical seal in the sleeve (13) and fixed the studs (11).
- Clean with a solvent the working surfaces of the double mechanical seal.
- Place the sleeve's assembly (13) in the body (01) and mount the cover double seal (10B) with the O-ring (80F) fixing it at the body (01) with a screws (52C).
- Mount the body (01) on the bearing bracket (06). See chapter [8.8.3. Assembly of the body / seal cover](#).
- In the **SLR 2, 3, 4, 5**, mount the external stationary part of the double mechanical seal (08) in the cover double seal (10B) trying that it is completely flat.
- Mount the cover double seal (10B) on the body (01) screwing the screws (51B) place the flat gasket (18).
- Mount the body (01) to the bearing bracket. See chapter [8.8.3. Assembly of the body / seal cover](#).
- Mount the central rotating part of the double mechanical seal to the sleeve (13, 13F).
- Clean with a solvent the working surfaces of the double mechanical seal.
- Place the sleeve (13, 13F) in the shaft.
- Place the spacer washers (32) in front of the sleeve (13, 13F).
- Mount the rotating part of the double mechanical seal to the cover double seal (09) trying that it is completely flat.
- Clean with a solvent the working surfaces of the double mechanical seal.
- Mount the cover double seal (09) and tighten the nuts (57) to the studs (55).
- See chapter [8.9.4. Adjustment of the lobes / pump body using spacer washers](#).

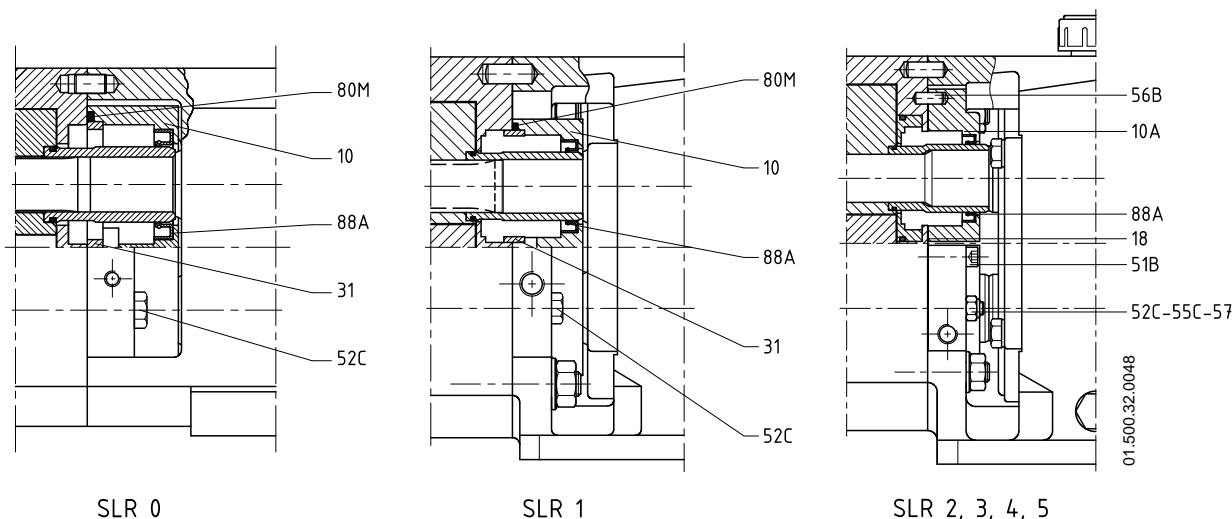
8.10.3. Flushed mechanical seal



ATTENTION

Mechanical seals are fragile parts. Handle them with care. Do not use screwdrivers or similar tools to extract the part

- Clean all the mechanical seal components prior to installing them.
- Check that the working surfaces are not damaged. INOXPA recommends replacing all of the mechanical seals if one of the working surfaces is found to have some defect.
- Replace the O-rings during assembly.



8.10.3.1. Disassembly

ATTENTION



If available, remove the spacer washers (32) installed on each shaft. If more than one washer is installed on each shaft, don't remove them to prevent them from getting mixed up

SLR 0, 1:

- To disassembly the flushed mechanical seal is necessary remove the body from the pump (01). See chapter [8.7.4. Disassembly the pump housing](#). After that, the pump housing will go out with the quench cover (10), the lip seal (88A) and the sleeve (13).
- Remove the screws (52C) to separate the quench cover (10) from the body. The retaining ring will be loose. Then you can remove the stationary part of the flushed mechanical seal.
- Remove the lip seal (88A) from the quench cover (10).
- In **SLR 1** pumps, separate the spacer washers (32) from the sleeve (13).
- Loosen the studs of the flushed mechanical seal to disassembly the rotating part of the sleeve (13).

SLR 2, 3, 4, 5:

- Loose the nuts (57C) but leave them a few pitches on the studs (55). Put pressure on the nuts (57) so the cover is released (09). After that, you can remove the stationary part of the mechanical seal.
- In **SLR 2, 3, 4** pumps, separate the spacer washers (32) from the sleeve (13, 13C).
- Remove the sleeve (13, 13C) and the rotating part of the mechanical seal will go out with it.
- Loosen the studs of the mechanical seal to disassembly the rotating part from the sleeve (13, 13C).
- Remove the set of body pump (01) with the quench cover (10A) and the lip seal (88A).
- Loosen the screws (51B) and the quench cover (10) will go out with the lip seal (88A).
- Remove the lip seal (88A).

8.10.3.2. Assembly

ATTENTION



Remember that if spacer washers (32) are present, they must be adjusted on the originating shafts.

SLR 0, 1:

- When assembling the mechanical seal, use soapy water on the different parts and seals to allow them to slide better. Apply to both the stationary part and the rotating part of seal. Replace the damaged seals.
- Place the rotating part on the sleeve (13). Respect the measure A of the table in chapter [8.10.1. Simple mechanical seal](#).
- Tighten the studs and place the sleeve (13) in the shaft.
- In the **SLR 1** pumps, mount the spacer washers (32) in front of the sleeve (13).
- Mount the stationary part of the flushed mechanical seal in the body (01).
- Place the lip seal (88A) in the quench cover (10).
- Mount the set of quench cover (10) with the lip seal (88A), the O-ring (80M) and the retaining ring (31) with the screws (52C).
- Mount the body (01) of the pump. See chapter [8.8.3. Assembly of the body / seal cover](#).

SLR 2, 3, 4, 5:

- When assembling the mechanical seal, use soapy water on the different parts and seals to allow them to slide better. Apply to both the stationary part and the rotating part of seal. Replaced the damaged seals.
- Place the rotating part on the sleeve (13, 13C). Respect the measure A of the table in chapter [8.10.1. Simple mechanical seal](#).
- Tighten the studs and place the sleeve (13, 13C) in the shaft.
- Place the lip seal (88A) in the quench cover (10).
- Mount the quench cover (10) with the lip seal (88A) with the screws (51B).
- Mount the stationary part of the flushed mechanical seal in the seal cover (09), trying that it is completely flat.

- Mount the set of sleeve (13, 13C) and the rotating part of the flushed mechanical seal in the quench cover (10) with the lip seal (88A).
- Mount the cover seal (09) with the stationary part of the flushed mechanical seal inside the body (01) and fix it with the screws (52C).
- Mount the set of body and flushed mechanical seals taking care fitting the shaft pin into the shaft sleeve notch. See chapter 8.8.3. [Assembly of the body / seal cover](#).

8.10.4. Garlock retainer

ATTENTION



If available, remove the spacer washers (32) installed on each shaft. If more than one washer is installed on each shaft, don't remove them to prevent them from getting mixed up.

Clean all the retainer ring components prior to installing them.

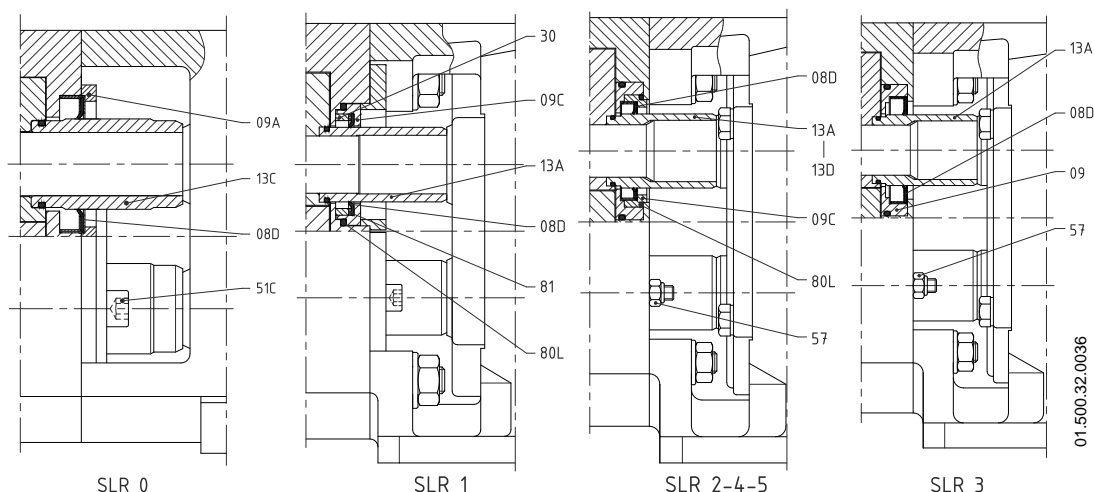
- Check that the working surfaces are not damaged. INOXPA recommends replacing all of the mechanical seals if one of the working surfaces is found to have some defect.
- Replace the O-rings during assembly.

8.10.4.1. Disassembly

- In the **SLR 0, 1** pump, to disassembly the retainer is necessary remove the body from the pump (01). See chapter 8.7.4. [Disassembly the pump housing](#).
- Unscrew the Allen screws (51C) and you can will remove the cover seal (09A) (09).
- Remove the body (01) in the **SLR 0**, the retainer (08D) in the **SLR 1** cover seal assembly (09C) and the seal (80L).
- In the **SLR 1**, remove the cover seal (09C) the lip seal (30), the flat gasket (81) and the seal (08D).
- If the sleeve don't remove with the retainer, remove it (13C) **SLR 0** and (13A) **SLR 1** from the shaft.
- In **SLR 2, 3, 4, 5** the retainer removes through by part front of the body (01). Dismount the lobes. See chapter 8.7.2. [Disassembly the lobes](#).
- Unscrew the safety nut (57) and you will be able to the seal cover assembly (09).
- You will be able to dismount the seal cover (09), in the **SLR 2, 4, 5** the cover seal (09C), the retainer (08D) and the O-rings (80B) (80L), in the **SLR 3** the retainer (08D) and the O-ring (80B).
- If the sleeve doesn't remove with the retainer (09C), remove it (13A) **SLR 2, 3** and (13D) **SLR 4, 5**, the shaft.

8.10.4.2. Assembly

- In **SLR 1** pump place inside the retainer cover (09C) the seal (08D), the flat gasket (81) and the lip seal (30), trying that it is completely flat.
- In **SLR 0** pump place the retainer (08D) on the body (01), in the **SLR 1** place the retainer cover assembly (09C) on the body (01).



- Place the retainer cover (09A) (09C) and fix them at the body (01) with the Allen screws (51C).
- Place the sleeve (13C) or (13A) on the shaft.
- Mount the body (01) on the bearing bracket (06). See chapter [8.8.3. Assembly of the body / seal cover](#).
- In the **SLR 2, 4, 5** pumps, place inside the cover seal (09) the supporting ring (09C) the retainer (08D) and the O-rings (80B) (80L), in the **SLR 3** place inside the cover seal (09) the retainer (08D) and the O-ring (80B).
- Place the sleeve (13A) o (13D) on the shaft.
- Place the cover seal assembly (09) on the body (01).
- Fix them with the safety nut (57) on the body (01).

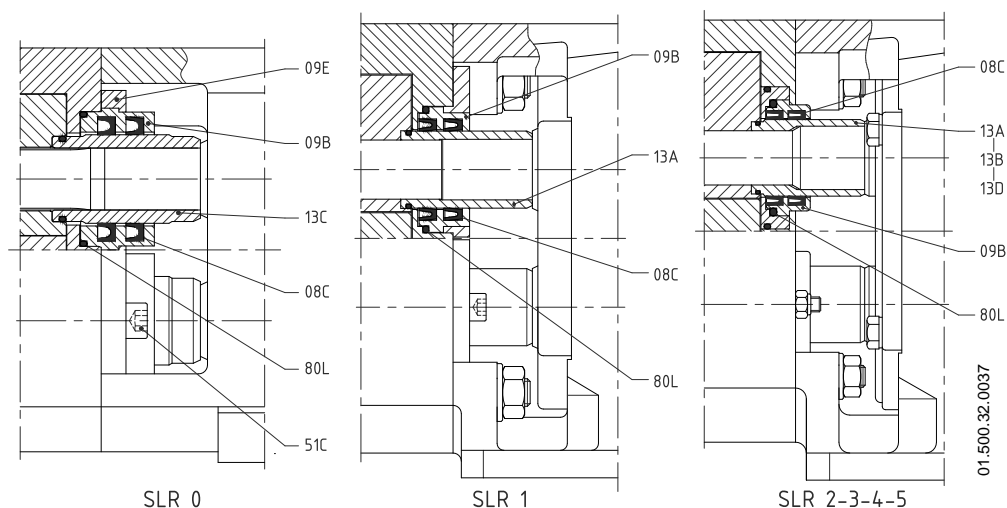
8.10.5. Assembly of the lip seal

ATTENTION



If available, remove the spacer washers (32) installed on each shaft. If more than one washer is installed on each shaft, don't remove them to prevent them from getting mixed up.

- Clean all the lip seal components prior to installing them.
- Check that the working surfaces are not damaged. INOXPA recommends replacing all of the mechanical seals if one of the working surfaces is found to have some defect.
- Replace the O-rings during assembly.



8.10.5.1. Disassembly

- In the **SLR 0, 1** pump, to disassembly de lip seal is necessary remove the body from the pump (01). See chapter [8.7.4. Disassembly the pump housing](#).
- Remove the sleeve (13C) or (13A) from the shaft.
- Unscrew the allen screws (51C) and you can will remove the cover seal assembly (09) (09E) of the pump's body (01).
- Remove the cover lip seal (09B) and the O-ring (80L) of the pump's body (01).
- Remove the lip seals (09B) from the cover lip seal (08C).
- In **SLR 2, 3, 4, 5** the retainer removes through by part front of the body (01). Dismount the lobes. See chapter [8.7.2. Disassembly the lobes](#).
- Unscrew the safety nut (57) and you can remove the cover seal assembly (09).
- You will be able to can dismount the cover seal (09) the cover lip seal (09B) and the O-ring (80L).
- Remove the lip seals (08C) from the cover lip seal (09B).
- Remove the sleeve (13A), (13B) o (13D) from the shaft.

8.10.5.2. Assembly

- Place inside the cover lip seal (09B) the lip seals (08C) and mount the O-ring (80L).
- In the **SLR 0, 1** place the cover lip seal assembly (09B) in the pump's body (01).
- Fix it with cover seal (09) (09E) by an Allen screws (51C) in the pump's body (01).
- Place the sleeve (13C) or (13A) on the shaft.
- Mount the body (01) at bearing bracket (06). See chapter [8.8.3. Assembly of the body / seal cover](#).
- In the **SLR 2, 3, 4, 5** place the cover lip seal assembly (09B) inside the cover seal (09).
- Place the sleeve (13A), (13B) o (13C) on the shaft.
- Place the seal cover assembly (09) facing the studs (55) in the holes of the body (01).
- Fix it with safety nut (57) on the body (01).

9. Technical Specifications

	Short rotor	Large rotor
Flow at 100 rev.	555 litres	662 litres
Maximum flow rate	133 m ³ /h (586 GPM)	160 m ³ /h (700 GPM)
Maximum differential pressure	12 bar (174 PSI)	7 bar (102 PSI)
Maximum working pressure	16 bar (232 PSI)	16 bar (232 PSI)
Maximum temperature ²	121°C (250°F)	121°C (250°F)
Maximum viscosity ³ (recommended)	100.000 mPa.s	100.000 mPa.s
Maximum speed	950 rpm	950 rpm
Maximum connections	125 mm (5 in)	150 mm (6 in)
Suction/discharge connections	DIN 11851 (standard)	DIN 11851 (standard)



Use specific protection if the noise level in the working is exceeds 85 dB (A).

Size	n _{max.} [rpm]	B ₁ [mm]	D ₁ [mm]	V _{s-100} [l]	Q _{th} [m ³ /h]	P _{max.} [bar]	V _u [m/s]	V _i [m/s]
SLR 0-10	1.450	10	47,84	1,0	0,9	12	3,6	3,2
SLR 0-20	950	21	47,84	2,1	1,2	12	2,4	1,2
SLR 0-25	950	29	47,84	3,0	1,7	7	2,4	1,0
SLR 1-25	950	30	69,15	10,0	5,7	12	3,4	3,0
SLR 1-40	950	42	69,15	13,9	7,9	7	3,4	2,0
SLR 2-40	950	42	87,65	23,4	13,3	12	4,4	3,3
SLR 2-50	950	54	87,65	30,1	17,1	7	4,4	2,4
SLR 3-50	720	54	131,50	67,7	29,3	12	5,0	4,1
SLR 3-80	720	76	131,50	95,3	41,2	7	5,0	2,2
SLR 4-100	400	104	169,74	217,2	52,1	8	3,6	1,8
SLR 4-150	400	154	169,74	321,7	77,2	5	3,6	1,2
SLR 5-125	400	129	243,14	554,7	133,1	8	5,1	3,0
SLR 5-150	400	154	243,14	662,2	158,9	5	5,1	2,4

n_{max} maximum speed

B₁ lobe width

D₁ lobe diameter

V_{s-100} flow at 100 rev

Q_{th} maximum flow at n_{max}

P_{max.} maximum working pressure

V_u peripheral speed

V_i maximum speed in suction

² Maximum temperature in continual, EPDM seals and standard settings. If the temperature is higher, consult with INOXPA

³ The maximum allowed viscosity will depend on the type of liquid and the sliding speed of the seal sides. If the viscosity is higher, consult with INOXPA.

Materials

Parts in contact with the product	AISI 316L
Other stainless steel parts	AISI 304
Seals in contact with the product	EPDM
Other materials for the seal	consult with INOXPA
Surface finish	Ra ≤ 0,8 μm

Single mechanical seal

Type of seal	External mechanical seal
Mechanical seal stationary part material	Carbon
Mechanical seal rotating part material	Silicon carbide
Seal material	EPDM

Cooled mechanical seal

Maximum working pressure	0,5 bar
Flow rate	2,5 – 5 l/min

Double mechanical seal

Operating pressure (if the process requires it)	1,5 – 2 bar over the pump's operating pressure
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Garlock retainer

Material	PTFE + AISI 316
Maximum pressure	10 bar

Double lip seals

Material	FPM
Maximum pressure	7 bar

Heating jacket

Maximum temperature	180°C
Maximum pressure	4 bar

Noise

Pump type	Maximum differential pressure and maximum speed		50% maximum differential pressure and 50% maximum speed	
	Sound pressure LpA dB(A)	Sound power LpA dB(A)	Sound pressure LpA dB(A)	Sound power LpA dB(A)
SLR 0-10	59	70	55	66
SLR 0-20	59	70	55	66
SLR 0-25	59	70	55	66
SLR 1-25	65	77	56	68
SLR 1-40	66	78	57	69
SLR 2-40	71	84	63	76
SLR 2-50	72	85	64	77
SLR 3-50	73	87	63	76
SLR 3-80	73	87	63	76
SLR 4-100	78	92	69	83
SLR 4-150	79	93	70	84
SLR 5-125	87	101	71	85
SLR 5-150	88	102	72	86

9.1. TIGHTENING TORQUE

Maximum tightening torque on the pump's shaft.

Size	[Nm]
SLR 0	35
SLR 1	53
SLR 2	108
SLR 3	400
SLR 4	1200
SLR 5	2300

9.2. PARTICLE SIZE



¡ATTENTION! Only soft particles.
 <10% damage when using trilobe geometry.
 <2% damage when using winglobe geometry.

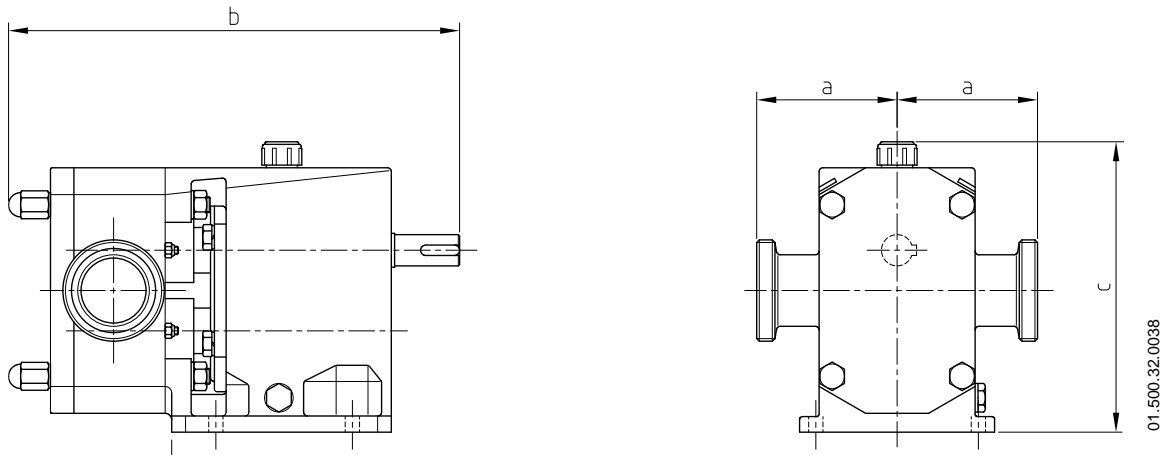
Pump type	Inside diameter of connections [mm]	Maximum nominal sphere size [mm]	Recommended nominal sphere size [mm]
SLR 0-10	9,5	7,5	2,5
SLR 0-20	15,8	7,5	2,5
SLR 0-25	22,4	7,5	2,5
SLR 1-25	22,4	20,6	7
SLR 1-40	35,1	20,6	7
SLR 2-40	35,1	25,6	9
SLR 2-50	47,8	25,6	9
SLR 3-50	47,8	38,5	13
SLR 3-80	72,2	38,5	13
SLR 4-100	97,6	45,6	15
SLR 4-150	150	45,6	15
SLR 5-125	125	71,5	23
SLR 5-150	150	71,5	23

9.3. WEIGHTS

Size	Bare shaft pump [kg]
SLR 0-10	12
SLR 0-20	12
SLR 0-25	13
SLR 1-25	16
SLR 1-40	17
SLR 2-40	26
SLR 2-50	28
SLR 3-50	61
SLR 3-80	65
SLR 4-100	150
SLR 4-150	165
SLR 5-125	375
SLR 5-150	395

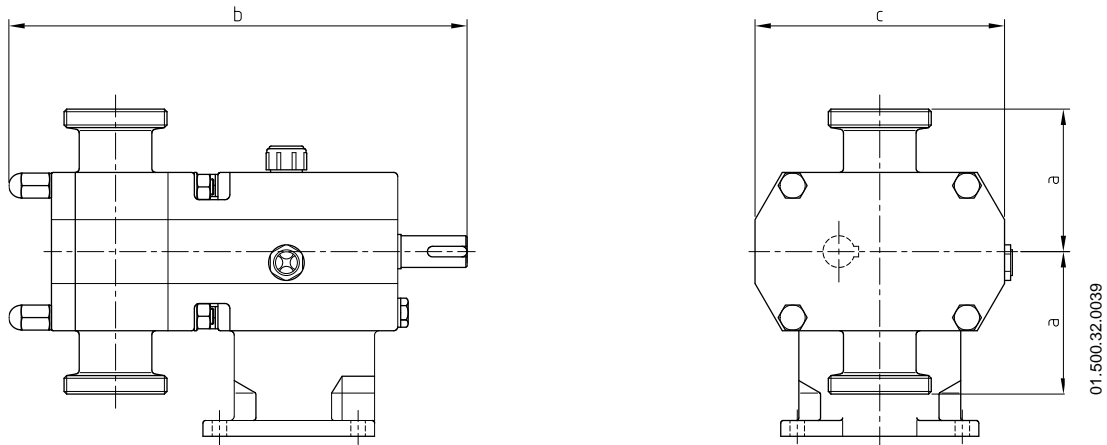
9.4. DIMENSIONS

9.4.1. Standard SLR dimensions



PUMP	DN	a			b	c
		DIN 11851	SMS	CLAMP		
SLR 0-10	10 / ½"	64	-	70	253	138
SLR 0-20	20 / ¾"	67	-	77	261	138
SLR 0-25	25 / 1"	72	62	72	269	138
SLR 1-25	25 / 1"	94,5	91,5	94	280	186
SLR 1-40	40 / 1½"	99,5	100	99	292	186
SLR 2-40	40 / 1½"	107	108	106,5	337	224
SLR 2-50	50 / 2"	108	108	106	349	224
SLR 3-50	50 / 2"	135,5	135	133,5	430	289
SLR 3-80	80 / 3"	137,5	139,5	133,5	452	289
SLR 4-100	100 / 4"	170	170	161,5	627	366
SLR 4-150	150 / 6"	180	-	168	677	366
SLR 5-125	125 / 5"	225	-	218	793	508
SLR 5-150	150 / 6"	230	-	218	818	508

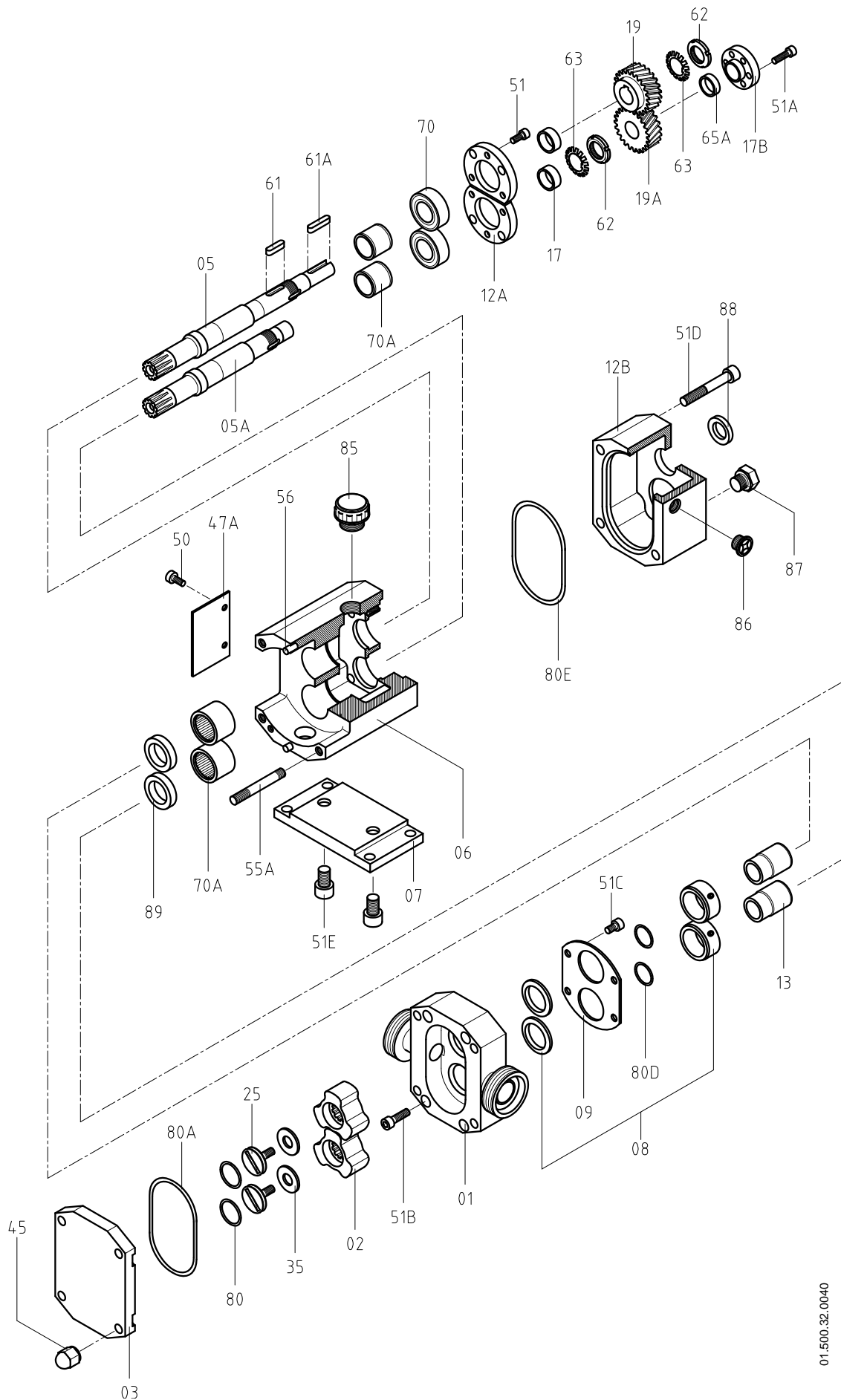
9.4.2. SLR dimensions with vertical support



PUMP	DN	a			b	c
		DIN 11851	SMS	CLAMP		
SLR 0-10	10 / ½"	64	-	70	253	115
SLR 0-20	20 / ¾"	67	-	77	261	115
SLR 0-25	25 / 1"	72	62	72	269	160
SLR 1-25	25 / 1"	94,5	91,5	94	280	160
SLR 1-40	40 / 1½"	99,5	100	99	292	160
SLR 2-40	40 / 1½"	107	108	106,5	337	190
SLR 2-50	50 / 2"	108	108	106	349	190
SLR 3-50	50 / 2"	135,5	135	133,5	430	250
SLR 3-80	80 / 3"	137,5	139,5	133,5	452	250
SLR 4-100	100 / 4"	170	170	161,5	627	345
SLR 4-150	150 / 6"	180	-	168	677	345
SLR 5-125	125 / 5"	225	-	218	793	500
SLR 5-150	150 / 6"	230	-	218	818	500

9.5. SLR 0-20 / 0-25

9.5.1. Exploded drawing



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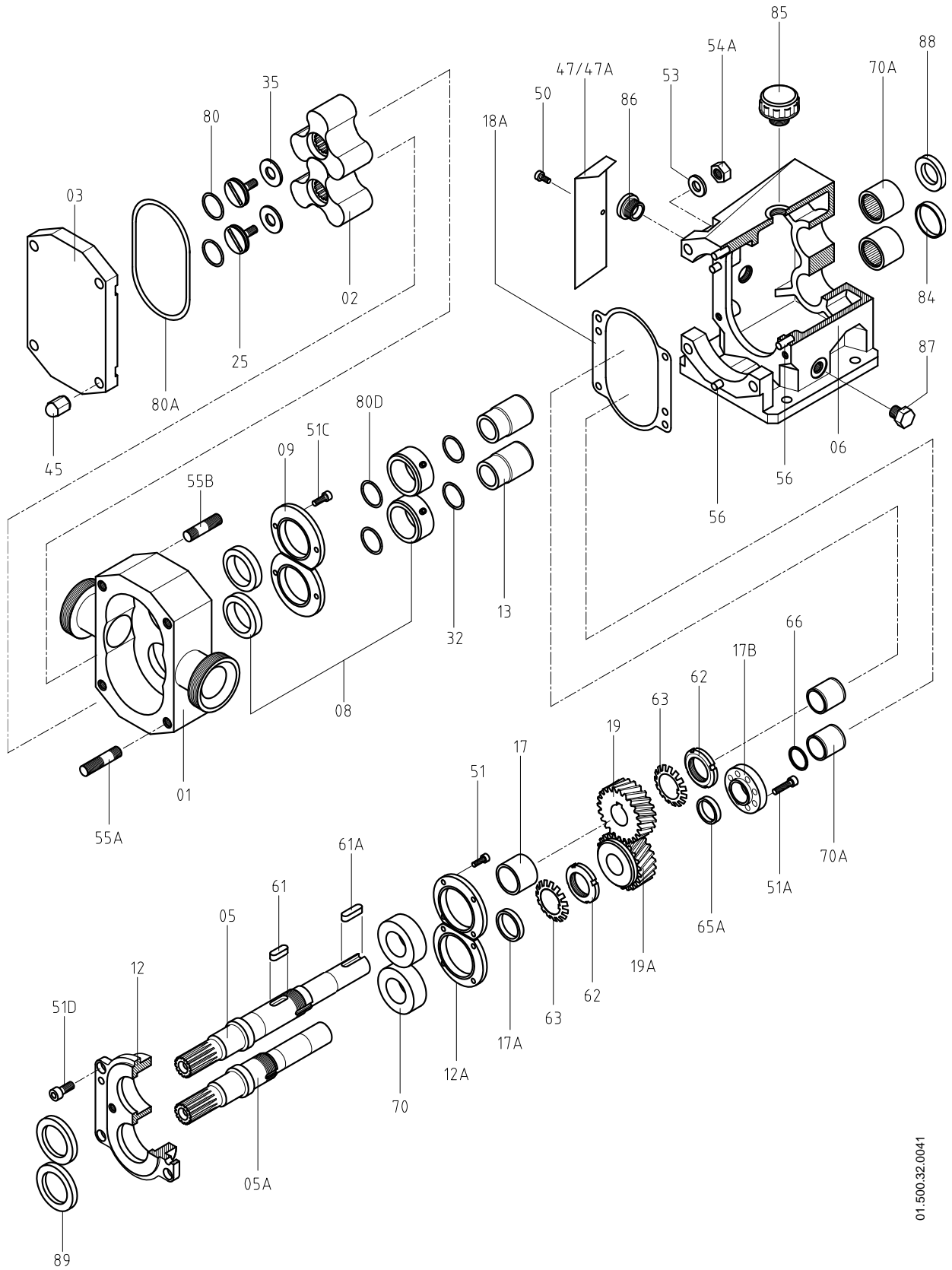
9.5.2. Parts lists

Position	Description	Quantity	Material
01	Pump housing	1	AISI 316L
	SLR 0-10 (reduced)		
	SLR 0-20 (short)		
	SLR 0-25 (large)		
02	Lobe	2	Alloy
	SLR 0-10 (reduced)		AISI 316L
	SLR 0-20 (short)		AISI 316L
	SLR 0-25 (large)		AISI 316L
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI-329
05A	Driven shaft	1	AISI-329
06	Bearing bracket	1	GG-22
07	Leg	1	AISI 304
08	Mechanical seal*	2	-
09	Seal cover	2	AISI 316L
12A	Bearing cover	2	GG-22
12B	Back cover	1	GG-22
13	Sleeve	2	AISI 316L
17	Drive shaft bushing	2	F-114
17B	Dragging bushing	2	F-114
19	Drive shaft gear	1	F-115
19A	Driven shaft gear	1	F-115
25	Lobe screw	2	AISI 316L
	SLR 0-10 (reduced)		
	SLR 0-20 (short)		
	SLR 0-25 (large)		
35	Lobe washer	2	AISI 316L
45	Wing nut	4	AISI 304
47A	Protector	1	Methacrylate
50	Screw	4	A2
51	Allen screw	6	8.8
51A	Allen screw	6	8.8
51B	Allen screw	4	A2
51C	Allen screw	4	A2
51D	Allen screw	4	8.8
55A	Stud	4	A2
56	Pin	2	F-522
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65A	Conical tightening ring	1	Steel
70	Ball bearings	2	Steel
70A	Needle bearings	2	Steel
80	O-ring*	2	EPDM
80A	Seal cover*	1	EPDM
80D	O-ring*	2	EPDM
80E	O-ring*	1	MVQ
85	Oil plug	1	Plastic
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal*	1	NBR
89	Lip seal*	2	NBR

* recommended spare parts

9.6. SLR 1-25 / 1-40

9.6.1. Exploded drawing



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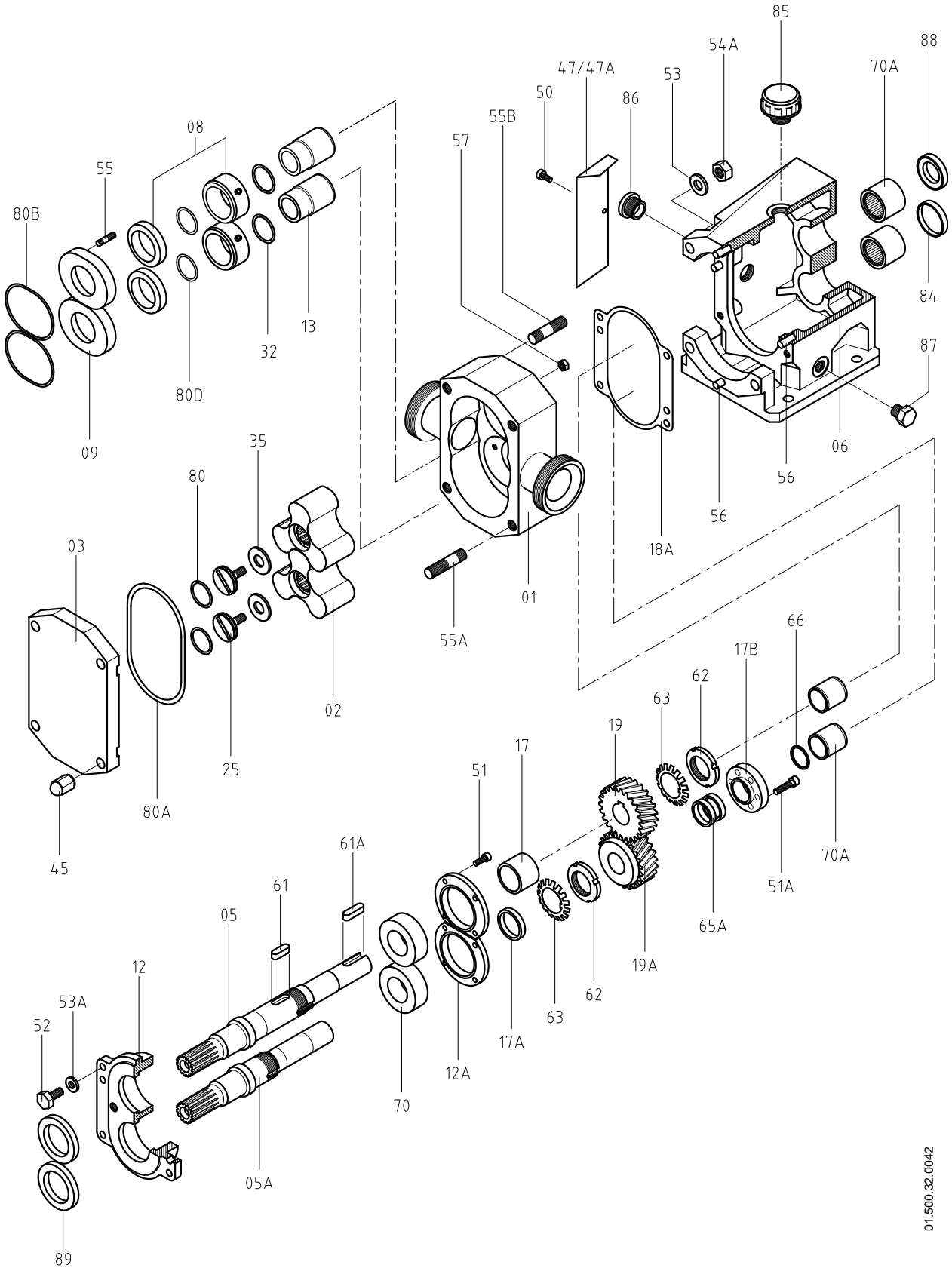
9.6.2. Parts lists

Position	Description	Quantity	Material
01	Pump housing SLR 1-25 (short) SLR 1-40 (large)	1	AISI 316L
02	Lobe SLR 1-25 (short) SLR 1-40 (large)	2	AISI 316L
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI-329
05A	Driven shaft	1	AISI-329
06	Bearing bracket	1	GG-22
08	Mechanical seal*	2	-
09	Seal cover	2	AISI 316L
12	Bearing cover	1	GG-22
12A	Bearing stop flange	2	GG-22
13	Sleeve	2	AISI 316L
17	Drive shaft bushing	1	ST-52
17A	Driven shaft bushing	1	ST-52
17B	Dragging bushing	1	ST-52
18A	Bearing cover gasket	1	Klingerit
19	Drive shaft gear	1	F-154
19A	Driven shaft gear	1	F-154
25	Lobe screw SLR 1-25 (short) SLR 1-40 (large)	2	AISI 316L
32	Spacer washer	2	AISI 304
35	Lobe washer	2	AISI 316L
45	Wing nut	4	AISI 304
47	Protector (right)	1	Methacrylate
47A	Protector (left)	1	Methacrylate
50	Screw	4	A2
51	Allen screw	8	8.8
51A	Allen screw	8	8.8
51D	Allen screw	4	8.8
51C	Allen screw	4	A2
53	Washer	4	A2
54A	Hexagonal nut	4	A2
55A	Stud	4	A2
55B	Stud	4	A2
56	Pin	4	F-522
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65A	Conical tightening ring	1	Steel
66	Elastic ring	1	Steel
70	Ball bearings	2	Steel
70A	Needle bearings	2	Steel
80	O-rings*	2	EPDM
80A	Seal cover*	1	EPDM
80B	O-ring*	2	EPDM
80D	O-ring*	2	EPDM
84	Sealing plug	1	NBR
85	Oil plug	1	Plastic
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal*	1	NBR
89	Lip seal*	2	NBR

* recommended spare parts

9.7. SLR 2-40 / 2-50

9.7.1. Exploded drawing



01.500.32.0042

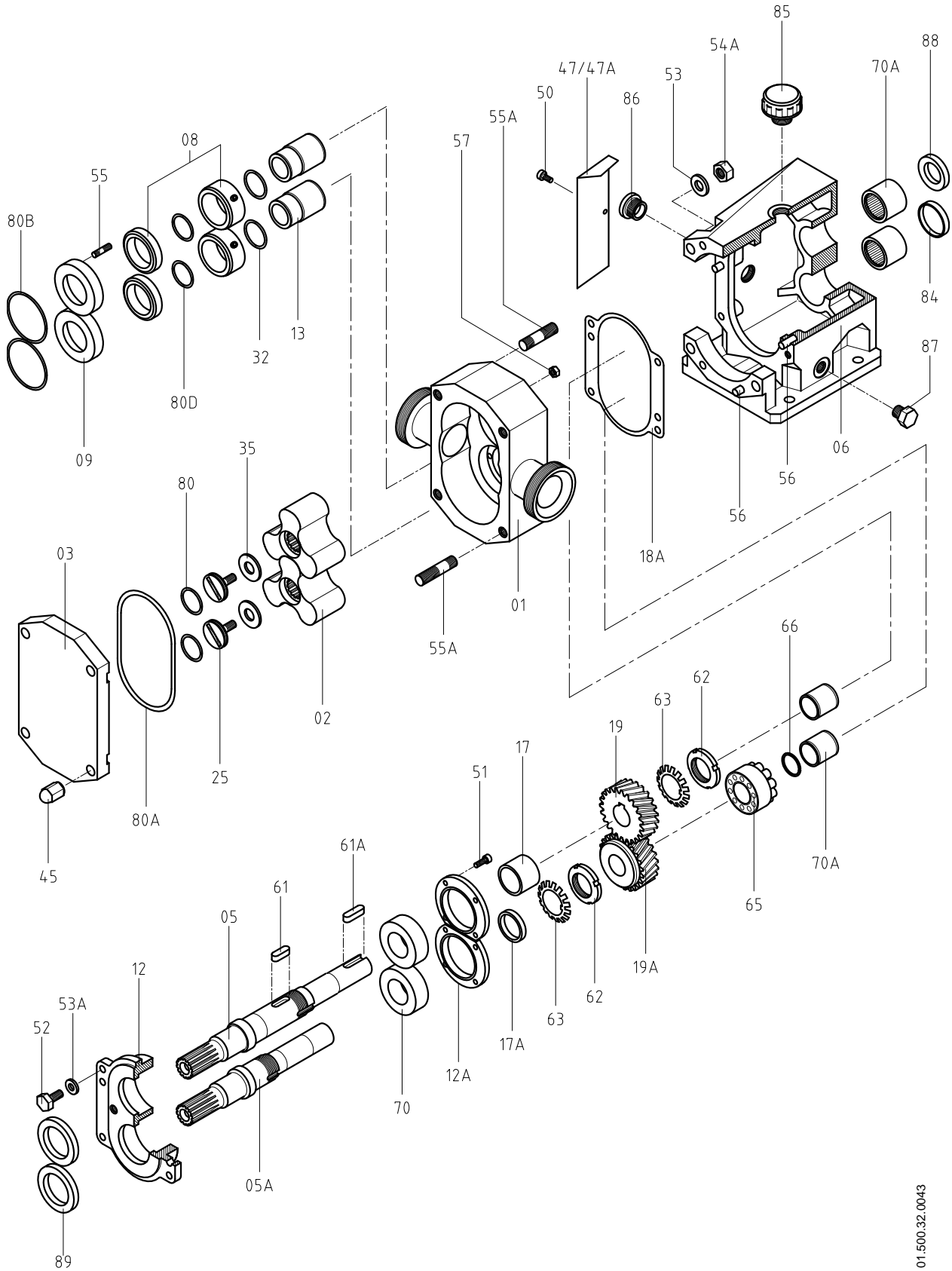
9.7.2. Parts list

Position	Description	Quantity	Material
01	Pump housing SLR 2-40 (short) SLR 2-50 (large)	1	AISI 316L
02	Lobe SLR 2-40 (short) SLR 2-50 (large)	2	AISI 316L
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI 329
05A	Driven shaft	1	AISI 329
06	Bearing bracket	1	GG-22
08	Mechanical seal*	2	-
09	Seal cover	2	AISI 316L
12	Bearing cover	1	GG-22
12A	Bearing stop flange	2	GG-22
13	Sleeve	2	AISI 316L
17	Drive shaft bushing	1	ST-52
17A	Driven shaft bushing	1	ST-52
17B	Dragging bushing	1	ST-52
18A	Bearing cover gasket	1	Klingerit
19	Drive shaft gear	1	F-154
19A	Driven shaft gear	1	F-154
25	Lobe screw SLR 2-40 (short) SLR 2-50 (large)	2	AISI 316L
32	Spacer washer	2	AISI 304
35	Lobe washer	2	AISI 316L
45	Wing nut	4	AISI 304
47	Protector (right)	1	Methacrylate
47A	Protector (left)	1	Methacrylate
50	Screw	4	A2
51	Allen screw	8	8.8
51A	Allen screw	6	8.8
52	Hexagonal screw	4	8.8
53	Flat washer	4	A2
53A	Spring washer	4	Steel
54A	Nut	4	A2
55	Stud	4	A2
55A	Stud	4	A2
55B	Stud	4	A2
56	Pin	4	F-522
57	Self-locking nut	4	A2
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65A	Conical tightening ring	2	Steel
66	Elastic ring	1	Steel
70	Ball bearings	2	Steel
70A	Needle bearings	2	Steel
80	O-ring*	2	EPDM
80A	Seal cover*	1	EPDM
80B	O-ring*	2	EPDM
80D	O-ring*	2	EPDM
84	Blanking plug	1	NBR
85	Oil plug	1	Plastic
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal*	1	NBR
89	Lip seal*	2	NBR

* recommended spare parts

9.8. SLR 3-50 / 3-80

9.8.1. Exploded drawing



01.500.32.0043

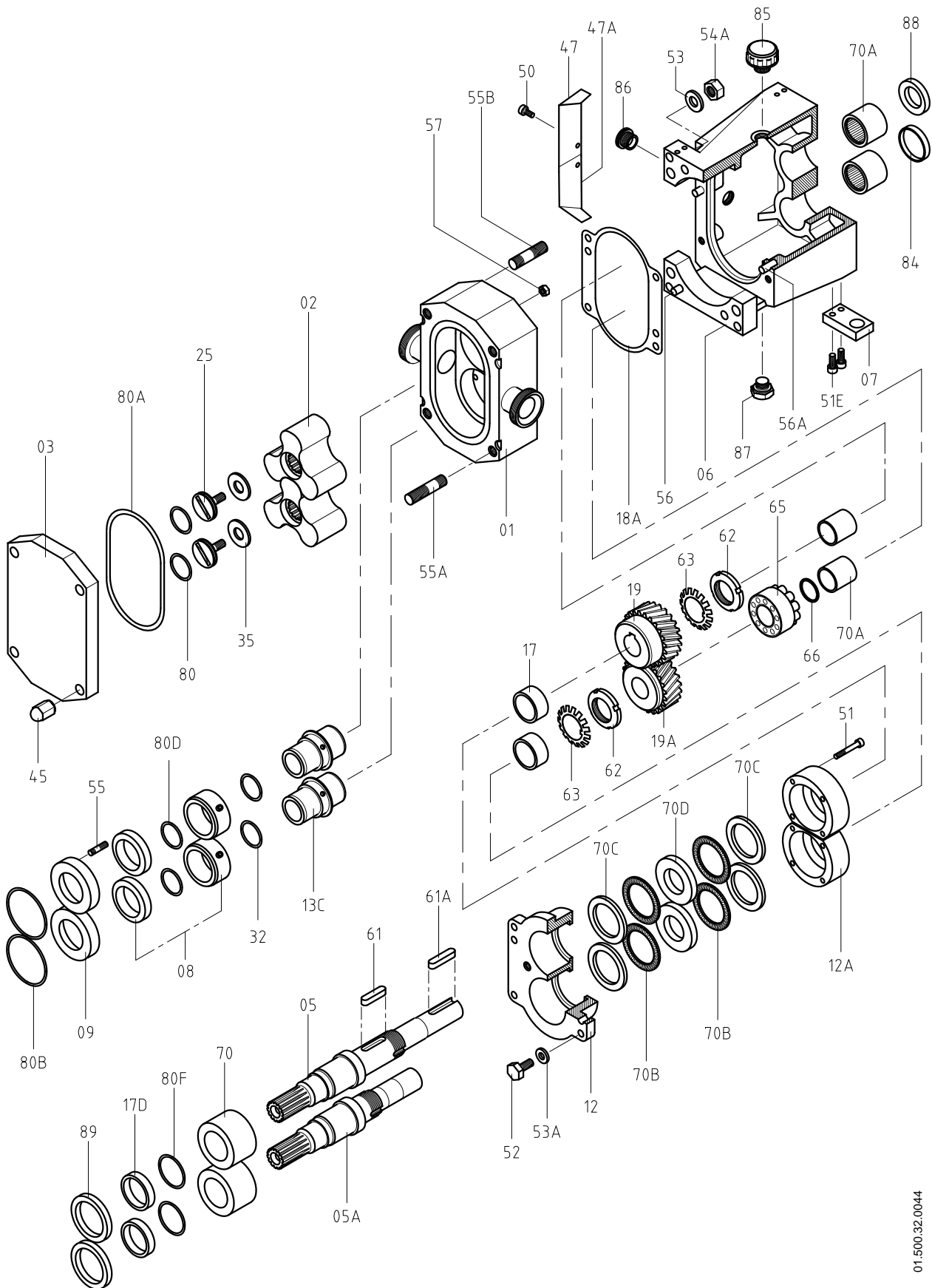
9.8.2. Parts list

Position	Description	Quantity	Material
01	Pump housing SLR 3-50 (short) SLR 3-80 (large)	1	AISI 316L
02	Lobe SLR 3-50 (short) SLR 3-80 (large)	2	AISI 316L
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI 329
05A	Driven shaft	1	AISI 329
06	Bearing bracket	1	GG-22
08	Mechanical seal*	2	-
09	Seal cover	2	AISI 316L
12	Bearing cover	1	GG-22
12A	Bearing stop flange	2	GG-22
13	Sleeve	2	AISI 316L
17	Drive shaft bushing	1	ST-52
17A	Driven shaft bushing	1	ST-52
18A	Dragging bushing	1	Klingerit
19	Drive shaft gear	1	F-154
19A	Driven shaft gear	1	F-154
25	Lobe screw SLR 3-50 (short) SLR 3-80 (large)	2	AISI 316L
32	Spacer washer	2	AISI 304
35	Lobe washer	2	AISI 316L
45	Wing nut	4	AISI 304
47	Protector (right)	1	Methacrylate
47A	Protector (left)	1	Methacrylate
50	Screw	4	A2
51	Allen screw	8	8.8
52	Hexagonal screw	4	A2
53	Flat washer	4	A2
53A	Spring washer	4	Steel
54A	Nut	4	A2
55	Stud	4	A2
55A	Stud	4	A2
56	Pin	6	F-522
57	Self-locking nut	4	A2
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65	Conical tightening ring	1	Steel
66	Elastic ring	1	Steel
70	Ball bearings	2	Steel
70A	Needle bearings	2	Steel
80	O-ring*	2	EPDM
80A	Seal cover*	1	EPDM
80B	O-ring*	2	EPDM
80D	O-ring*	2	EPDM
84	Blanking plug	1	NBR
85	Oil plug	1	Plastic
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal*	1	NBR
89	Lip seal*	2	NBR

* recommended spare parts

9.9. SLR 4-100 / 4-150

9.9.1. Exploded drawing



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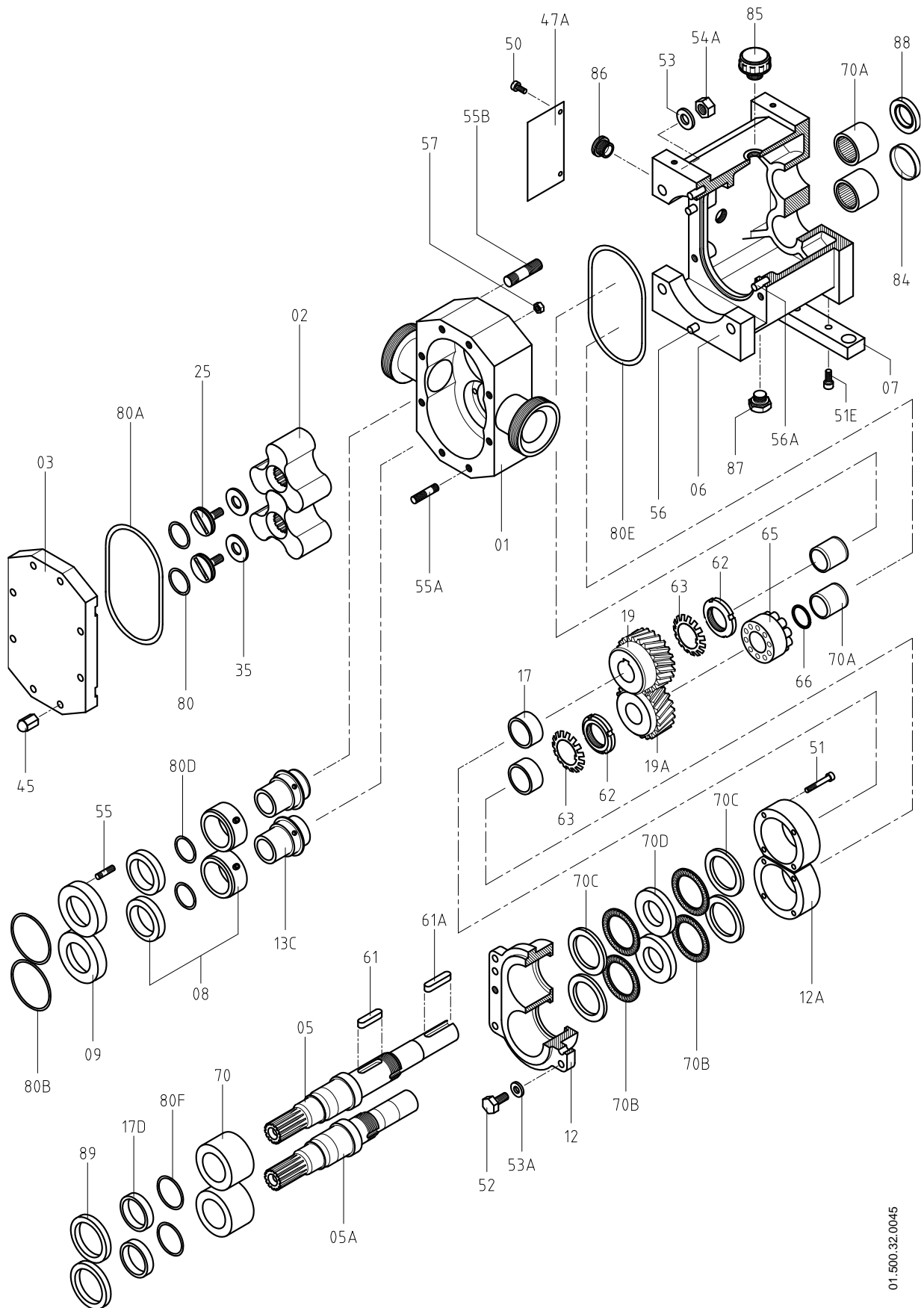
9.9.2. Parts lists

Position	Description	Quantity	Material
01	Pump housing SLR 4-100 (short) SLR 4-150 (large)	1	AISI 316L
02	Lobe SLR 4-100 (short) SLR 4-150 (large)	2	AISI 316L
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI 329
05A	Driven shaft	1	AISI 329
06	Bearing bracket	1	GG-22
07	Feet, horizontal suport	1	AISI 304
08	Mechanical seal*	2	-
09	Seal cover	2	AISI 316L
12	Bearing cover	1	GG-22
12A	Bearing stop flange	2	GG-22
13C	Sleeve	2	AISI 316L
17	Drive shaft bushing	2	ST-52
17D	Driven shaft bushing	2	AISI-304
18A	Dragging bushing	1	Klingerit
19	Drive shaft gear	1	F-115
19A	Driven shaft gear	1	F-115
25	Lobe screw SLR 4-100 (short) SLR 4-150 (large)	2	AISI 316L
32	Spacer washer	2	AISI 304
35	Lobe washer	2	AISI 316L
45	Wing nut	4	AISI 304
47	Protector (right)	2	Methacrylate
47A	Protector (left)	2	Methacrylate
50	Screw	8	A2
51	Allen screw	8	8.8
51E	Allen screw	4	A2
52	Hexagonal screw	4	A2
53	Flat washer	4	A2
53A	Spring washer	4	Steel
54A	Hexagonal nut	4	A2
55	Stud	4	A2
55A	Stud	4	A2
55B	Stud	4	A2
56	Pin	4	F-522
56A	Pin	2	F-522
57	Self-locking nut	4	A2
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65	Conical tightening ring	1	Steel
66	Elastic ring	1	Steel
70	Safety nut	2	Steel
70A	Safety washer	2	Steel
70B	Conical tightening ring	2	Steel
70C	Elastic ring	2	Steel
70D	Safety nut	2	Steel
80	O-ring*	2	EPDM
80A	Seal cover*	1	EPDM
80B	O-ring*	2	EPDM
80D	O-ring*	2	EPDM
80F	O-ring*	2	MVQ
84	Blanking plug	1	NBR
85	Oil plug	1	Plastic
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal	1	NBR
89	Lip seal	2	NBR

* recommended spare parts

9.10. SLR 5-125 / 5-150

9.10.1. Exploded drawing



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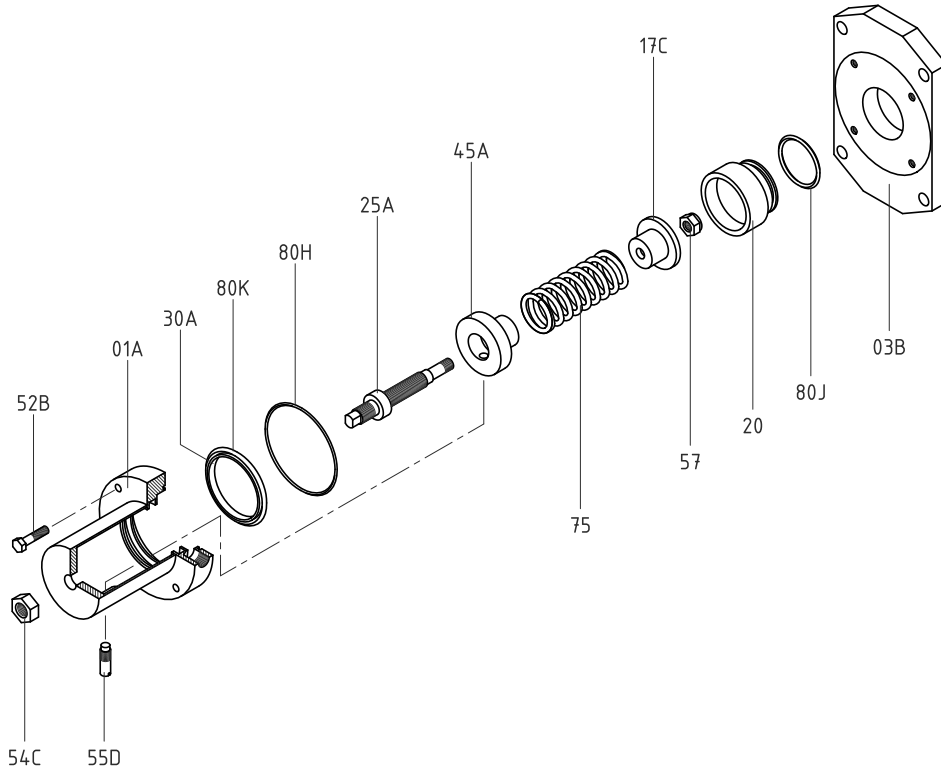
9.10.2. Parts lists

Position	Description	Quantity	Material
01	Pump housing	1	AISI 316L
	SLR 5-125 (short)		
	SLR 5-150 (large)		
02	Lobe	2	AISI 316L
	SLR 5-125 (short)		
	SLR 5-150 (large)		
03	Pump cover	1	AISI 316L
05	Drive shaft	1	AISI 329
05A	Driven shaft	1	AISI 329
06	Bearing bracket	1	GG-22
07	Feet, horizontal support	1	AISI 304
08	Mechanical seal*	2	Si/70 EPDM
09	Seal cover	2	AISI 316L
12	Bearing cover	1	GG-22
12A	Bearing stop flange	2	GG-22
13C	Sleeve	2	AISI 316L
17	Drive shaft bushing	2	ST-52
17D	Driven shaft bushing	2	AISI-304
19	Drive shaft gear	1	F-115
19A	Driven shaft gear	1	F-115
25	Lobe screw	2	AISI 316L
	SLR 5-125 (short)		
	SLR 5-150 (large)		
35	Lobe washer	2	AISI 316L
45	Wing nut	8	AISI 304
47A	Protector	2	Methacrylate
50	Screw	4	A2
51	Allen screw	8	8.8
51E	Allen screw	4	A2
52	Hexagonal screw	4	A2
53	Flat washer	4	A2
53A	Spring washer	4	Steel
54A	Nut	4	A2
55	Stud	4	A2
55A	Stud	8	A2
55B	Stud	4	A2
56	Pin	2	F-522
56A	Pin	2	F-522
57	Self-locking nut	4	A2
61	Key	1	F-114
61A	Key	1	AISI 304
62	Safety nut	2	Steel
63	Safety washer	2	Steel
65	Conical tightening ring	1	Steel
66	Elastic ring	1	Steel
70	Ball bearings	2	Steel
70A	Needle bearings	2	Steel
70B	Axial bearing	2	Steel
70C	Axial disc	2	Steel
70D	Intermediate disc	2	Steel
80	O-ring*	2	EPDM
80A	Seal cover*	1	EPDM
80B	O-ring*	2	EPDM
80D	O-ring*	2	EPDM
80E	O-ring*	1	MVQ
80F	O-ring*	2	MVQ
84	Blanking plug	1	NBR
85	Oil plug	1	Plastic

* recommended spare parts

Position	Description	Quantity	Material
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal*	1	72 NBR
89	Lip seal*	2	72 NBR

9.11. RELIEF VALVE

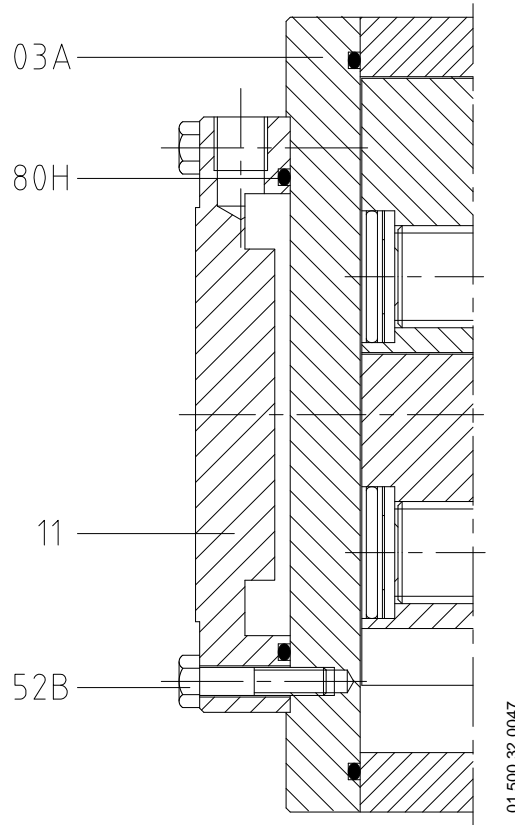


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Position	Description	Quantity	Material
01A	Safety valve body	1	AISI 304
03B	Pump cover for safety valve	1	AISI 316L
17C	Spring plate	1	AISI 304
20	Piston	1	AISI 316L
25A	Adjusting screw	1	AISI 304
30A	Guiding ring	1	PTFE
45A	Spring plate	1	AISI 304
52B	Hexagonal screw	4	A2
54C	Hexagonal nut	1	A2
55D	Locking pin	1	AISI 304
57	Self-locking nut	1	A2
75	Spring	1	AISI 302
80H	O-ring	1	EPDM
80J	O-ring	1	EPDM
80K	O-ring	1	EPDM

* recommended spare parts

9.12. FRONT HEATING JACKET



Position	Description	Quantity	Material
03A	Pump cover for heating jacket	1	AISI 316
11	Heating cover	1	AISI 304
52B	Hexagonal screw	4	A2
80H	O-ring	1	FPM

NOTES



NOTES



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