



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

SLR-A



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Original Manual

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INOXPA S.A.U.

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hereby declare under our sole responsibility that the

| | |
|----------------|--|
| Machine: | LOBE ROTOR PUMP |
| Model: | SLR-A |
| Type: | SLR-A 3-90 |
| Serial number: | IXXXXXXXXXX to IXXXXXXXXXX XXXXXXXXXXIINXXX to XXXXXXXXXXXXIINXXX |

fulfills all the relevant provisions of the following directive:

Machinery Directive 2006/42/EC

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

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
EN ISO 14159:2008
EN 1672-2:2005+A1:2009
EN 12162:2001+A1:2009
EN IEC 63000:2018**

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



David Reyero Brunet

Technical Office Manager

17th June 2024



Document: 01.505.30.02EN

Revision: (A) 2024/06

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fulfils all the relevant provisions of these regulations:

**Supply of Machinery (Safety) Regulations 2008
The Restriction of the Use of Certain Hazardous Substances in
Electrical and Electronic Equipment Regulations 2012 (as amended)**

and with the following designated standards:

**EN ISO 12100:2010
EN 809:1998+A1:2009/AC:2010
EN 60204-1:2018
EN ISO 14159:2008
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David Reyero Brunet
Technical Office Manager
17th June 2024

**UK
CA**

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1. Safety

1.1. INSTRUCTION MANUAL

This manual contains information regarding the reception, installation, operation, assembling, disassembling and maintenance of the SLR-A pump.

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

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

1.2. INSTRUCTIONS FOR START-UP

This instruction manual contains essential and useful information for properly starting the pump and maintaining it in good operating condition.

Prior to starting the pump, personnel and operators must carefully read the safety instructions detailed in this chapter and must familiarize themselves with the operating characteristics of the pump; also, personnel and operators should strictly follow the instructions provided. It is of vital importance that these instructions be maintained at a fixed location near the installation.

1.3. SAFETY

1.3.1. Warning symbols



Danger for persons in general.



Risk of injury caused by the rotary parts of the equipment.



Electrical hazard.



Danger! Caustic or corrosive agents.



Danger! Suspended loads.



Danger for the proper operation of the machine.



A safe working environment must be ensured at all times.



The use of safety glasses is mandatory.

1.4. GENERAL SAFETY INSTRUCTIONS



Please carefully read this instruction manual prior to installing and starting up the pump. Contact INOXPA in the case of any doubts or questions.

1.4.1. During the installation



You must read and take into account the *Technical specifications* in Chapter 8 at all times.

Do not start the pump until it has been connected to the pipework.

Do not start the pump unless the pump body has been mounted and adjusted and the pump rotors have been fastened.

Ensure that the specifications of the drive are the proper ones; especially if there is a risk of explosion due to the particular operating conditions.



During the installation procedure, electrical work must be carried out by properly authorized personnel.

1.4.2. During operation



Make sure to take into account the *Technical specifications* in Chapter 8 at all times. The specified limit values shall **NEVER 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 has moving parts. Never place your fingers inside the pump during operation.



NEVER operate with the suction and discharge valves closed.

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

1.4.3. During maintenance



The *Technical specifications* in Chapter 8 shall always be observed.

NEVER disassemble the pump until the pipes have been emptied. Remember that liquid will remain inside the pump's body (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 pump prior to carrying out any maintenance. Remove the fuses and disconnect the cables from the motor's terminals.

All the electric work should be carried out by authorised personnel.

1.4.4. Compliance with the instructions

The non-compliance with any of the instructions may impose a hazard for operators, the atmospheric conditions of the room and for the machine; also, it may cause the loss of any right of claiming damages.

These non-compliances may result in the following hazards:

- Important failures of the machine's/plant's operation.
- Non-compliance with specific maintenance and repair procedures.
- Possibility of creating electric, mechanical and chemical hazards.
- The atmospheric conditions in the room may impose a hazard due to the substances that are released.

1.4.5. Warranty

We wish to emphasize that any warranty provided will be void and that we have the right to receive compensation in the case of any civil responsibility claim by products presented by third parties in the following cases:

- The operation and maintenance work has not been carried out in accordance with the corresponding service instructions; the repairs have not been carried out by our personnel or they have been carried out without our written authorization;
- Modifications have been carried out of our products without our prior written authorization;
- The parts or lubricating agents used are not original INOXPA parts/lubricants;
- The material has been improperly used due to errors or negligence or it has not been used according to the indications and for the desired purpose.
- The pump parts have been damaged by high pressure due to not having used a safety or relief valve.

The supplied General Conditions of Delivery also apply.



No modification of the machine is permitted without prior authorization from the manufacturer. For your safety, use only original spare parts and accessories. The usage of other parts will relieve the manufacturer of any liability.

Any change in the operating conditions shall be conducted only with the previous written authorization of INOXPA.

Please contact us in case of any doubt or if you require a more detailed explanation regarding particular data (adjustment, assembly, disassembly, etc.).

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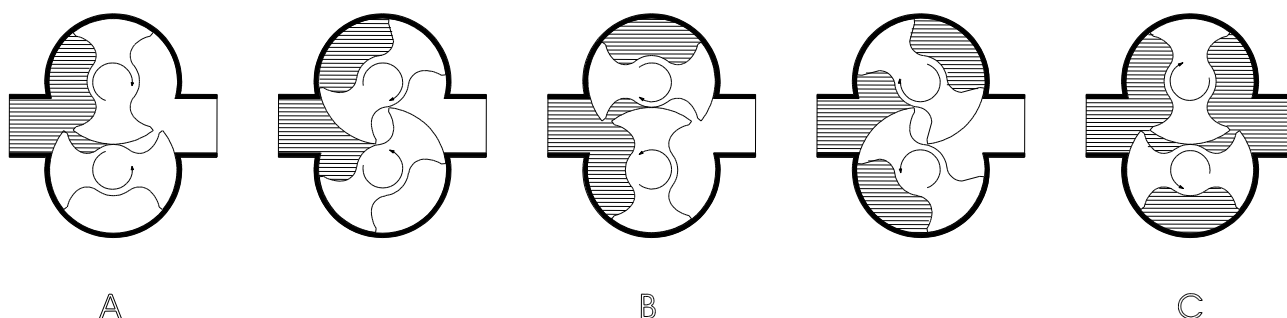
3. General information

3.1. DESCRIPTION

INOXPA's SLR-A lobe pumps are part of our wide range of positive displacement rotary pumps for viscous liquids. Thanks to the wider lobes installed in the SLR-A pump, it has a greater flow, appropriate for pressures of up to 6 bar. The SLR-A model has been developed in order to meet all hygiene requirements of the food industry. Regarding hygiene, reliability and robustness, the complete range of lobe pumps satisfies all the requirements of the aforementioned industry. Thanks to its modular design, there is an optimum interchangeability of parts between the different pumps. This unit is approved for use with food products.

3.2. PRINCIPLE OF OPERATION

The lobe pump is a positive displacement rotary pump. The upper lobe is actuated by the drive shaft. The lower lobe is located on the driven shaft and is driven by a helical gear. Both lobes rotate in sync without touching each other. During the operation of the pump, they displace a fixed volume of liquid. The following figure shows how a lobe pump operates.



A: As the lobes rotate, the space on the suction side increases because one lobe separates from the other, causing a partial vacuum that pushes the liquid into the pumping chamber.

B: Each lobe is filled consecutively as the shafts rotate and the liquid is displaced towards the discharge side. The small clearances that exist between the lobes and between the lobes and walls of the pump body cause the spaces to properly close.

C: The pump body is completely filled and liquid escapes through the meshing of the lobes, pushing against the walls of the spaces, thus completing the pumping action.

NOISE

Lobe pumps are rotary displacement pumps. Owing to the contact between internal parts, pressure variations, etc., these pumps are louder than centrifugal pumps. This noise originating from the operation and installation must be considered.



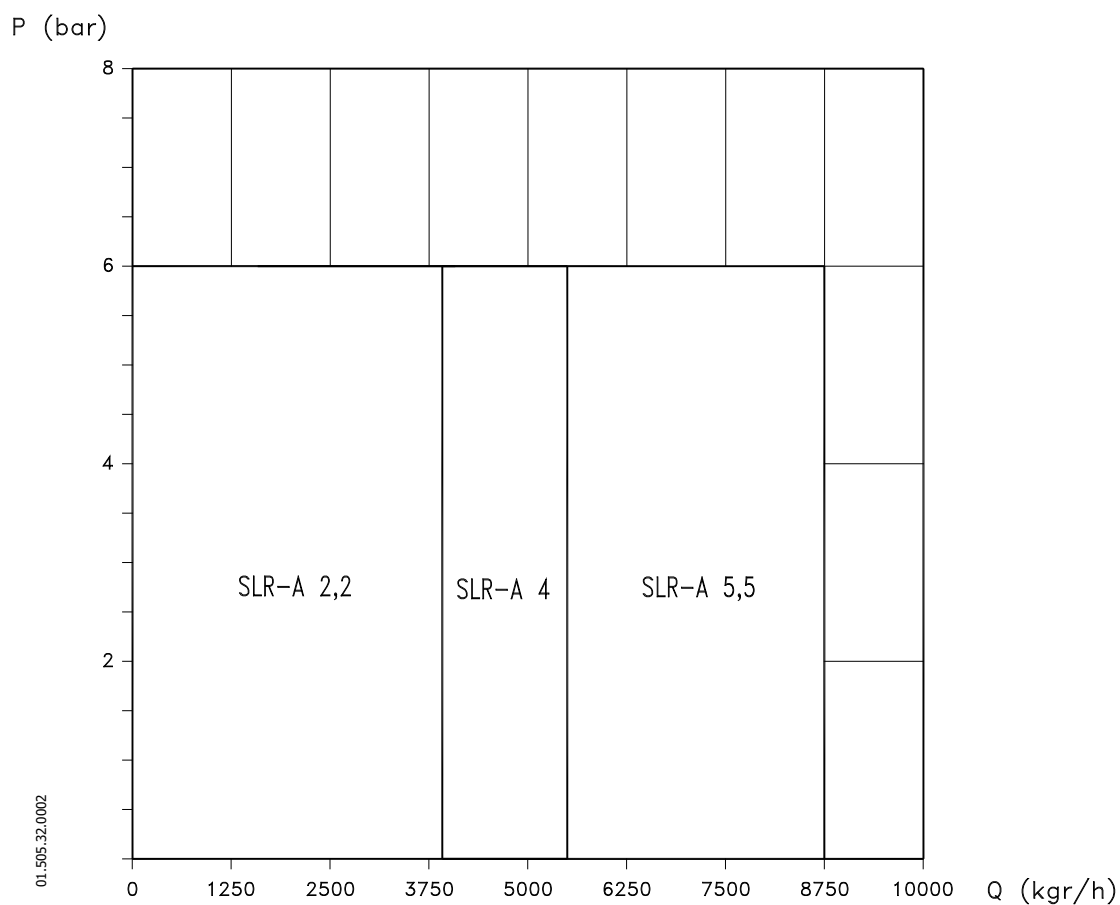
When the noise level in the operating area exceeds 85 dB (A), special protection must be used.

3.3. APPLICATION

The SLR-A lobe pump has been designed for pumping olive paste and olive-mill waste ('alperujo'), and its applications are:

- Decanter feeding with olive paste.
- Decanter feeding with 2-phase olive press 'orujo' waste.
- Short distance transfers:
 - Filling of tanks.
 - Top feeding of 'orujo' into hoppers
 - Feeding of blenders for centrifuging

3.3.1. Field of application



The field of application for each type of pump is limited. Each pump is ordered to meet specific pumping conditions. INOXPA will not be liable for any damage that may occur if the information provided by the buyer is incomplete (specifications of the liquid, RPM, etc.).

4. Installation

4.1. RECEPTION OF THE PUMP

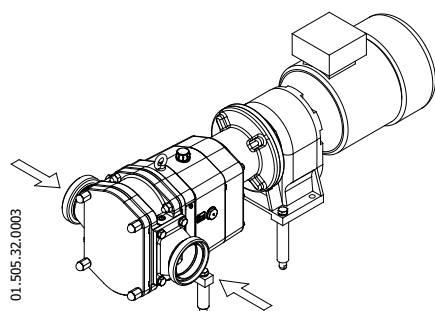


INOXPA is not liable for any deterioration of the material caused by its transport or unpacking. Visually check that the packaging has not been damaged.

The following documentation is included with the pump:

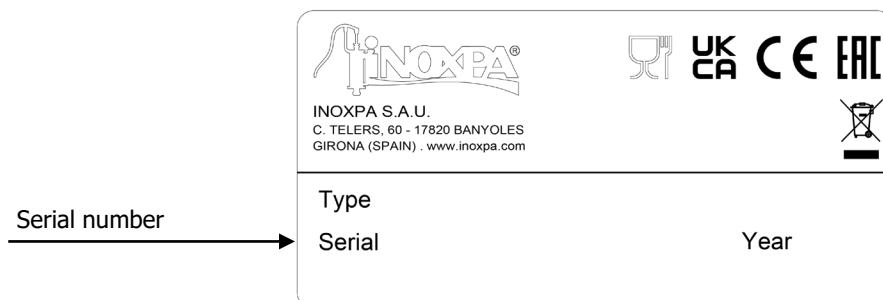
- Shipping documents.
- Instructions and Servicing manual for the pump.
- Instructions and Servicing manual for the geared motor.

Unpack the pump and check the following:



- The pump's suction and discharge connections.
- Removing any packaging material remains.
- 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.

4.1.1. Identification of the pump

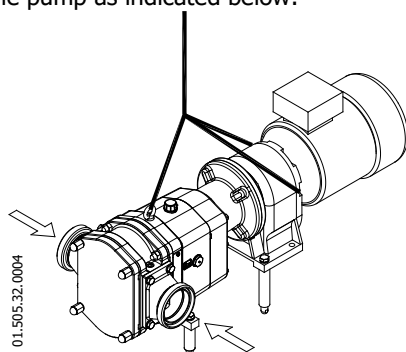


4.2. TRANSPORT AND STORAGE



The SLR-A pumps are usually too heavy to be stored manually. Use an adequate means of transport. Use the points indicated in the diagram for lifting the pump. The pump should only be transported by authorized personnel. Do not work or walk underneath heavy loads.

Lift the pump as indicated below:



- Always use two supporting points located as far away from each other as possible.
- Fasten the points in a manner that prevents them from sliding.
- Refer to Chapter 8 [Technical specifications](#) in order to verify the dimensions and weights.

4.3. LOCATION

- Place the pump as close as possible to the suction tank and if possible, below the liquid level.
- Place the pump in a position that allows enough space around it to provide access to the pump as well as to the motor. (Refer to Chapter 8 *Technical specification* to verify the dimensions and weights).
- Place the pump on a flat and level surface.
- The base must be rigid, horizontal and protected against vibrations.



Install the pump in a manner that provides it with adequate ventilation. If the pump is installed outside, it must be sheltered under a roof. Its location must allow for easy access during any required inspection or maintenance task.

4.4. PIPING

- In general, suction and discharge pipes must be installed in straight sections, with the minimum number of elbows and fittings in order to reduce wherever possible any head losses that may be caused by friction.
- Ensure that the pump ports are properly aligned with respect to the pipes and they are of a similar diameter size as the pipe connections.
- Place the pump as close as possible to the suction tank and whenever possible below the liquid level or even at a lower level with respect to the tank in order to ensure that the gauge height of the static suction is at its maximum point.
- Place the pipe support clamps as close as possible to the pump's suction and discharge ports.

4.4.1. Shutoff valves

The pump may be isolated for maintenance. For this, shutoff valves must be installed and connected to the pump's suction and discharge connections.



These valves must ALWAYS be open when the pump is operating.

4.4.2. Self-priming process

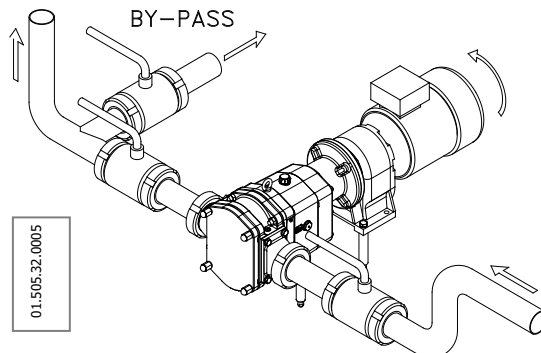
In general terms, if the self-priming process is followed, the pump must contain sufficient liquid to fill all internal recesses and voids, allowing the pump to generate a difference in pressure.

However, if low viscosity fluids are pumped, a foot valve of the same or greater diameter than that of the suction pipe must be installed; as an alternative, a "U" shaped pipe may be installed.



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

- To eliminate the air and gases from the suction line, the counter pressure inside the discharge line must be decreased. When the self-priming process is used, the pump must be started by opening and closing the feed line, which allows the air and gases to escape to a lesser counter pressure.
- Another option involves the use of long pipes or the installation of a check valve in the discharge line; it is also possible to install a by-pass with a shut-off valve on the discharge side of the pump. This valve must be opened for priming, which allows air and gases to escape with a minimum counter-pressure.
- The by-pass must not return to the suction port, it should go to the supply tank instead.



4.5. ELECTRICAL INSTALLATION



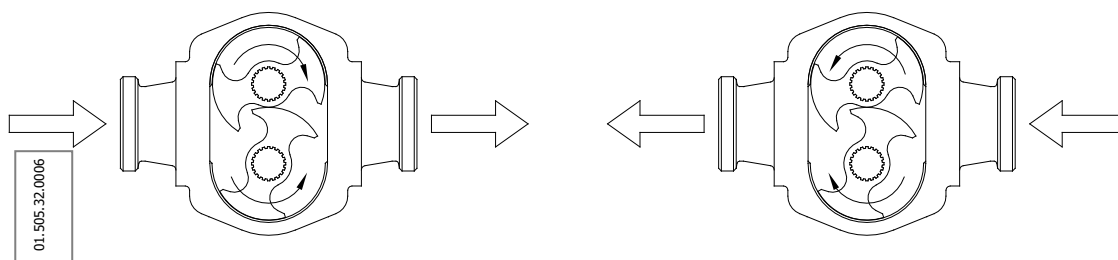
Only allow qualified personnel to connect the electrical motors. Take the necessary steps to prevent any failure of connections and cables.



The electrical equipment as well as the terminals and control system components may remain electrically charged even when they are disconnected. Contacting them may impose a hazard to operators or cause irreparable material damage.

Prior to handling the valve, ensure the motor is stopped.

- Connect the motor in accordance with the instructions supplied by the motor manufacturer.
- Verify the direction of rotation (refer to the label located on the pump).
- Briefly start up the pump motor. Ensure that the pumping direction is correct. Operating the pump in the wrong direction may cause serious damage.



ALWAYS verify the direction of the pump with liquid inside the pump.

5. Start-up



Prior to starting the pump, carefully read and follow the installation instructions given in Chapter 4 [Installation_Recepción_de_la](#)

5.1. START-UP



Carefully read Chapter 8 [Technical specifications](#). INOXPA will not be liable if the equipment is improperly used.



Do not touch the pump or the pipework while high temperature products are being pumped.

5.1.1. Inspections that must be carried out prior to starting the pump

- Completely open the shut-off valves on the suction and discharge lines.
- Check the pump oil level. Add the proper amount of oil as required to maintain the level at the centre of the oil sight glass (when starting up for the first time: the pumps are shipped with oil in the bearing support. However, this check must always be performed).
- If liquid does not flow to the pump, fill it up with the liquid to be pumped.



The pump shall NEVER turn with no fluid inside.

- Check that the electrical power supply coincides with the power rating indicated on the motor plate.
- Check for proper direction of rotation of the motor.
- If the pump has a double mechanical or cooled seal, install the corresponding secondary connection with the values indicated in Chapter 8, [Technical specifications](#).

5.1.2. Inspections that must be carried when starting the pump

- Check that the pump is not making any strange noises.
- Check that the absolute inlet pressure is sufficient to prevent cavitation of the pump. Refer to the curve for the minimum pressure required above the vapour pressure (NPIPr).
- Control the discharge pressure.
- Check that the seals are not leaking.



The shutoff valves must not be used to regulate the flow in the suction line. It must be completely open during operation.



Control the power consumption of the motor to prevent an electrical overload.

If required, decrease the flow and the power consumed by the motor by decreasing the motor speed.

5.2. Safety valve

The opening pressure adjustment of the safety valve is carried out at the INOXPA workshops. However, 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 safety valve.

5.2.1. Safety valve setting

When the pump incorporates a safety valve and the pressure setting of the valve is not indicated, the valve is adjusted to the pump's maximum working pressure. The user must verify this by observing the position of the pressure nut (37). At maximum set pressure, the pressure nut is located at the lower part of its travel.

In order to obtain the proper opening pressure, follow the procedure below:

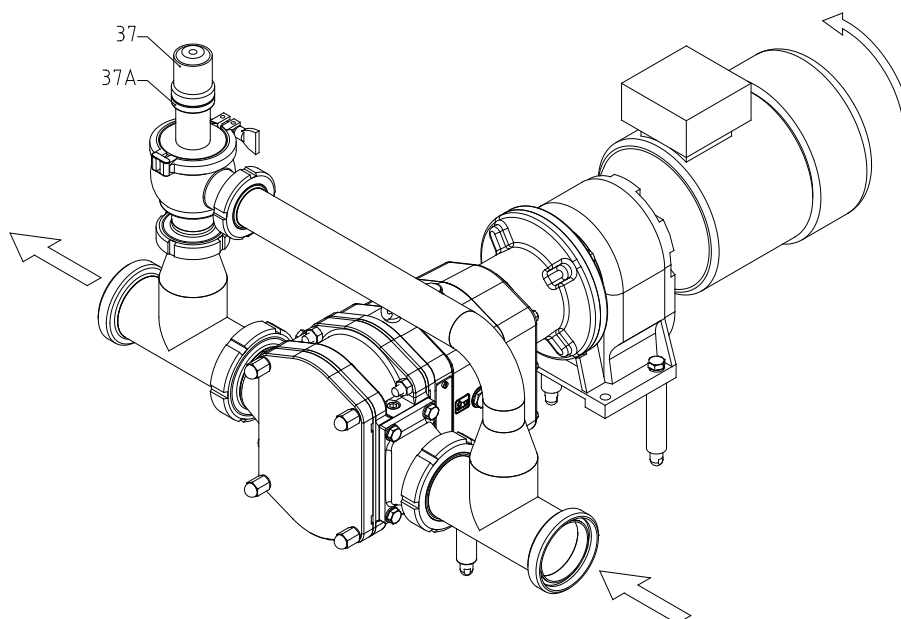
- Loosen the counter nut (37A).
- Use a spanner to turn the pressure nut (37) to the left to reduce the spring tension and obtain the desired opening pressure.
- When the desired opening pressure is obtained, tighten the counter nut (37A).



When checking the safety valve setting you must ensure that the pump pressure NEVER exceeds the set pressure + 2 bars.



When the safety valve is not operating properly, the pump must immediately be placed out of service. The valve must be verified by INOXPA's technical service personnel.



6. Operating problems

The following table provides solutions to problems that may appear during normal pumping operations. It is hereby assumed that the pump has been installed properly and it has been properly selected for the pertinent application. Contact INOXPA if technical assistance is required.

| Operating problem | Probable causes |
|--|--|
| Motor overload. | 8, 9, 12, 16, 20, 21, 22, 23. |
| The pump flow or pressure is insufficient. | 2, 4, 5, 7, 8, 9, 10, 11, 13, 14. |
| No pressure on the discharge side. | 1, 2, 3, 6, 7, 15. |
| Irregular discharge flow rate / pressure. | 2, 4, 5, 6, 9, 12. |
| Noise and vibrations. | 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 16, 19, 20, 21, 22, 23, 24. |
| The pump gets clogged. | 8, 9, 11, 16, 19, 20, 21, 22, 23, 24. |
| Pump overheated. | 7, 8, 9, 11, 12, 16, 20, 21, 22, 23. |
| Abnormal wear. | 4, 5, 11, 16, 19, 23, 24. |
| Leak through the mechanical seal. | 17, 18. |

| Probable causes | Solutions |
|---|--|
| 1 Wrong direction of rotation. | Invert the direction of rotation |
| 2 NPIP insufficient. | Increase the NPIP: <ul style="list-style-type: none"> • Raise the suction tank • Lower the pump • Reduce the speed • Increase the diameter of the suction pipe • Shorten and simplify the suction line. |
| 3 The pump is not purged. | Purge or fill with product. |
| 4 Cavitation. | Increase the suction pressure. (refer to Section 2) |
| 5 The pump sucks air. | Inspect the suction line and all of its connections. |
| 6 Suction pipe obstructed. | Check the suction line and the filter/s if applicable. |
| 7 Incorrect safety valve setting. | Verify the setting of the safety valve. |
| 8 Discharge pressure is too high. | If required, reduce the head loss by increasing the diameter of the discharge pipe. |
| 9 Liquid viscosity is too high. | <ul style="list-style-type: none"> • Reduce the speed of the pump • Reduce the viscosity; for example, by heating the liquid. |
| 10 Liquid viscosity is too low. | <ul style="list-style-type: none"> • Increase the speed of the pump • Increase the viscosity; for example, by cooling the liquid. |
| 11 Liquid temperature is too high. | Reduce the temperature of the liquid. |
| 12 The pump speed is too high. | Reduce the speed of the pump. |
| 13 The lobes are worn. | Replace the lobes. |
| 14 The pump speed is too low. | Increase the speed of the pump. |
| 15 The shutoff valve on the suction side is closed. | Check and open. |
| 16 Bearings are worn. | Replace the bearings, inspect the pump. |
| 17 Seal gaskets are worn or damaged. | Replace the seal gaskets. |
| 18 The gaskets are not adequate for the liquid. | Install the correct gaskets; consult with the supplier. |
| 19 Gears are worn. | Replace and re-adjust the gears. |
| 20 Insufficient lubricating oil level. | Fill with oil. |
| 21 Improper lubricating oil. | Use an appropriate type of oil. |
| 22 Friction in the lobes. | <ul style="list-style-type: none"> • Reduce the speed of the pump • Reduce the feed pressure. • Adjust the play |
| 23 Tension in the pipework. | Connect the pipes to the pump without tension. |
| 24 Foreign objects in the liquid. | Install a filter in the suction line. |



If the problem persists, stop using the pump immediately. Contact the pump manufacturers or representatives.

7. Maintenance

7.1. GENERAL CONSIDERATIONS

Just like any other machine, this pump requires maintenance. The instructions included in this manual cover the identification and replacement of spare parts. These instructions have been prepared by the maintenance personnel and are aimed at those responsible for the supply of spare parts.



Carefully read Chapter 8 *Technical specifications*.

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 prior to starting any maintenance action.



The symbol indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.

7.1.1. Check the seal gaskets.

Periodically check that no leaks are present around the shaft. If the seal gaskets leak, replace the gaskets in accordance with the instructions provided in Section 7.4.5 *Removal of the lip seals*.

7.1.2. Tightening torque

| Material | Tightening torque [Nm] | | | | | | | | |
|----------|------------------------|----|----|-----|-----|-----|-----|-----|-----|
| | M5 | M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 |
| 8.8 | 6 | 10 | 25 | 49 | 86 | 135 | 210 | 290 | 410 |
| A2 | 5 | 9 | 21 | 42 | 74 | 112 | 160 | 210 | 300 |

7.1.3. Lubrication

The bearings are lubricated by immersion in an oil bath.

The pumps are supplied with oil.

- Periodically check the oil level; for example, weekly or every 150 hours of operation.
- The first oil change must be carried out after 150 hours of operation.
- Afterwards, it may be changed every 2,500 hours of operation or at least once a year under normal operating conditions.

When changing the oil: the oil collector must be filled to the half mark on the oil sight glass.



Do not fill the bearing support with oil above that level.

Stop the pump for a moment and then re-check the oil level; if required, add a little oil.

- The oil capacity of the SLR-A pump is 1.5 litres.
- Oils for temperatures between 5 and 50°C: SAE 90 or ISO VG 220.

7.2. STORAGE

Prior to storing, the pump must be completely drained of fluids. Where possible, avoid exposing the parts to excessively humid environments.

7.3. CLEANING

7.3.1. Manual cleaning



The use of aggressive cleaning products such as caustic soda and nitric acid can burn the skin.

Use rubber gloves during the cleaning process.



Always use protective goggles.

7.3.2. Automatic CIP (cleaning-in-place)

If the pump is installed in a system with CIP, dismantling of the pump is not required.

The minimum recommended liquid speed for an effective cleaning process is 1.8 m/s (minimum Reynolds number > 100 000 at 1.0~2,5 bar).

If an automatic cleaning system is not available, disassemble the pump in accordance with the instructions supplied in the section called Assembly and Disassembly of the pump.

Cleaning solutions for CIP processes.

Only use clear water (chlorine free) for mixing with the following cleaning agents:

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

1 kg NaOH + 100 litres of water = cleaning solution
or

2.2 litres NaOH at 33% + 100 litres of water = cleaning solution

b) Acid solution: 0.5% by weight of nitric acid (HNO₃) at 70°C (150°F)

0.7 litres of 53% HNO₃ + 100 litres of water = cleaning solution



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

To remove any residues of cleaning products, ALWAYS perform a final rinse with clean water upon completion of the cleaning process.

7.4. DISASSEMBLY OF THE PUMP

The assembling and disassembling of the pumps must only be carried out by qualified personnel. Ensure that personnel carefully read this instruction manual and, in particular, the instructions relative to the work that is to be carried out.



Improper assembling or disassembling may cause damage that may affect the operation of the pump and result in high repair costs as well as a long period of inactivity. INOXPA will not be liable for accidents or damage caused by non-compliance with the instructions included in this manual.

Preparations

Provide for a clean working environment since some parts, including the mechanical seal, may need to be handled carefully and others have small tolerances.

Check that the parts used have not been damaged during transport. Upon doing this, the adjustment edge, coinciding faces, the tight seal, presence of burrs, etc., must be inspected.

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

Tools

Use the adequate tools for carrying out the assembling and disassembling. Use the tools properly.

Cleaning

Prior to disassembling the pump, clean the exterior and interior of the pump.

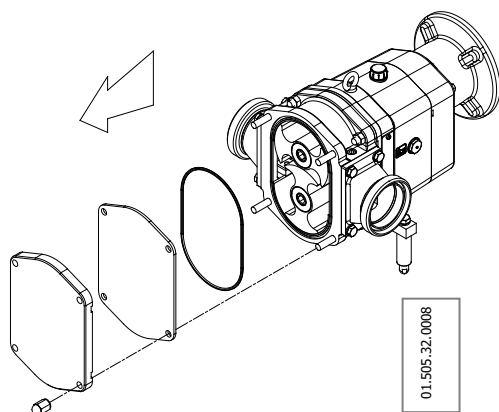


NEVER clean the pump by hand while it is operating

7.4.1. Removing the pump cover and the front wear plate

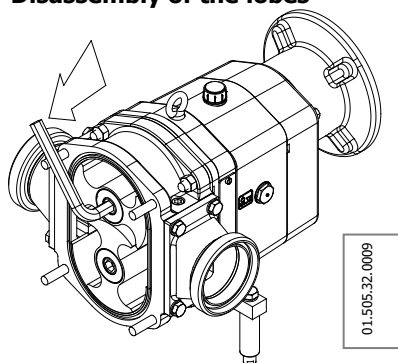


CAUTION! Liquid from the pump body may spill when the pump cover is removed



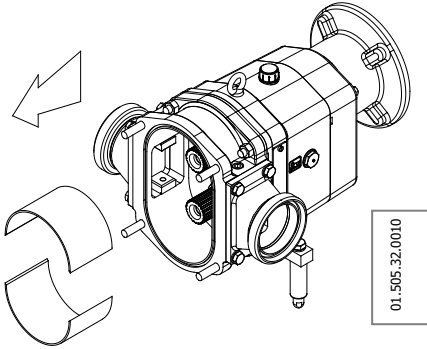
- Close the suction and discharge valves.
- Remove the cap nuts (45). Notches are available at four points around the pump cover (03) to help remove it (using a screwdriver) from the body if required.
- Remove the front wear plate (32A).
- Check that the gasket (80A) is in good material condition.

7.4.2. Disassembly of the lobes



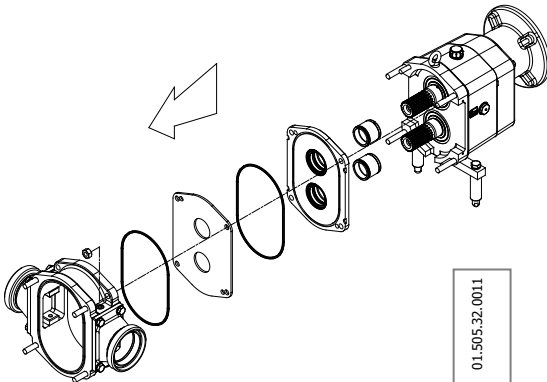
- Use an Allen key 14 to loosen the screws (25).
- Remove the screws (25) and the screw cap (85B) these screws have a right-hand thread. To prevent the lobes from turning simultaneously, a wooden or plastic block may be placed between the lobes.
- Check that the O-rings (80)(80G) are in good material condition.
- Remove both lobes (02). If required, use a tool for this task.

7.4.3. Disassembly of curved wear plates



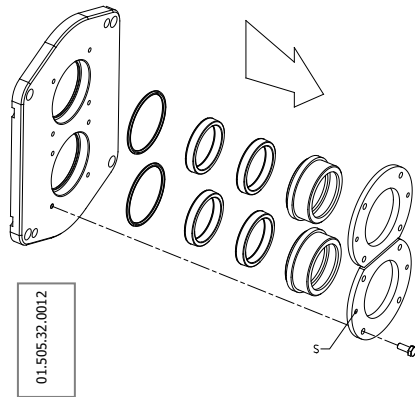
- Loosen the flange screws (51A).
- Remove the curved wear plates (13C).

7.4.4. Disassembly of the body



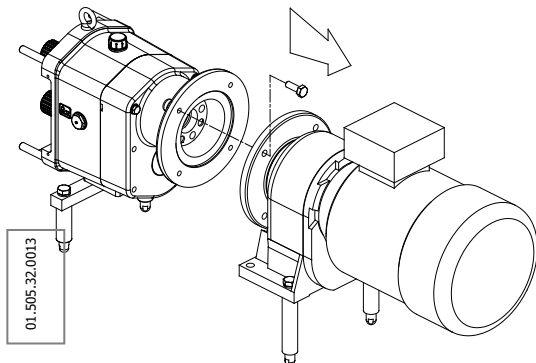
- Loosen and remove the nuts (54A) that fasten the body to the bearing support (06)
- Separate the rear wear plate (32B) and the seal cover (09).
- Check that the gaskets (80A) are in good material condition.
- Remove the sleeve (13) and inspect the sleeve's O-ring (80D).

7.4.5. Removal of the lip seals



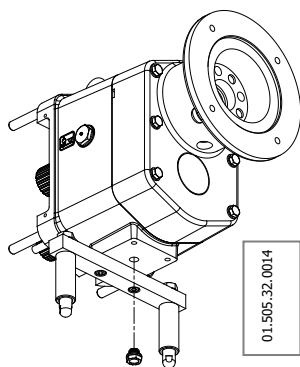
- Loosen and remove the screws (52) that fasten the counter cover (11) to the seal cover (09); the counter cover includes two M6 bores to facilitate its removal (S).
- Remove the lip seal cover (09B) and check the condition of the lip seals (08).
- Check the material condition of the O-ring (80B).

7.4.6. Disassembly of the drive



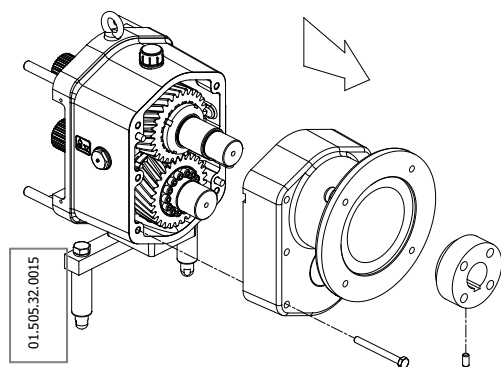
- Loosen and remove the screws (52B) that fasten the drive (93) to the bearing cover (12)
- Remove the drive (93), if required use a tool for this task; with the drive, the coupling flexor (40) will be released.

7.4.7. Draining the lubrication oil



- Place a container below the bearing support (06) to collect the lubricating oil for its disposal.
- Remove the drain cap (87) that is located on the rear side of the bearing support (06).

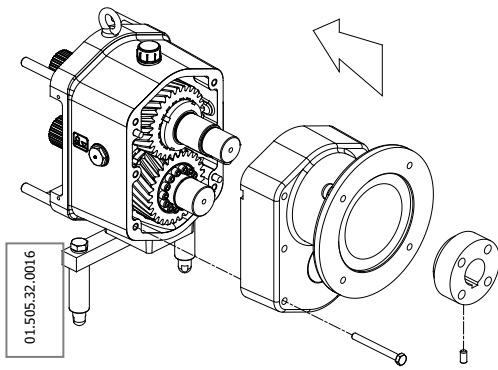
7.4.8. Disassembly of the shaft assembly



- Loosen the threaded stud (55D) through the hole located below the bearing cover (12) and remove coupling (41A).
- Loosen and remove the screws (52E).
- Remove the bearing cover (12) to check the condition of the bearing cover gasket (18). If any defect is found, find a spare prior to assembling the pump.

7.5. ASSEMBLY OF THE PUMP

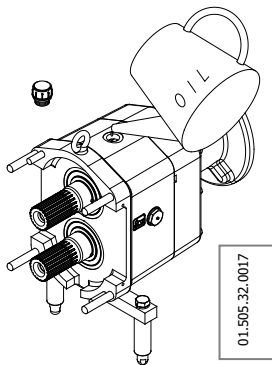
7.5.1. Assembly of the shaft assembly



- Check that the bearing cover gasket (18) is not damaged and mount it in the proper position on the bearing cover (12).
- Place the bearings cover (12) and fasten with screws (52E).
- Install the cotter pin (61A) of the drive shaft (05) and install the drive plate (41A), tighten it with the threaded stud (55D) through the hole on the bottom of the bearing cover (12).

•

7.5.2. Filling with lubricating oil

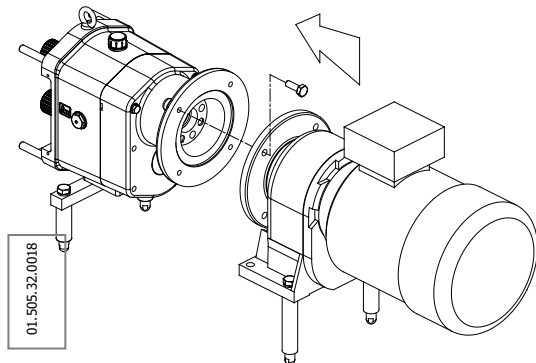


- Remove the oil cap (85) that is located on top of the bearing support (06).
- Fill the bearing support (06) with lubricating oil to mid level of the oil sight glass (86).

Refer to 7.1.3 *Lubrication* to find out what type and the quantity of oil to use.

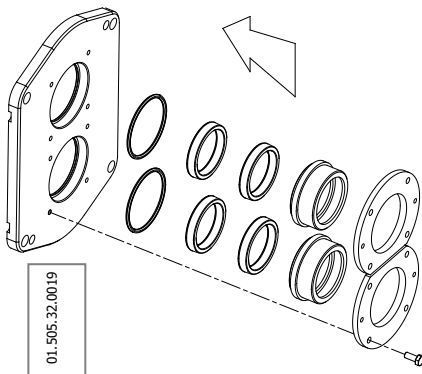
•

7.5.3. Assembly of the drive



- Place the coupling flector (40) and the drive coupling (41A) on the drive shaft (93) and mount it on to the bearing cover (12).
- Tighten the screws (52B) that fasten it to the bearing cover (12).

7.5.4. Installation of the lip seals

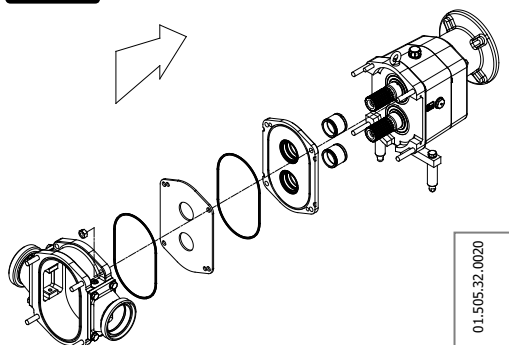


- Place the lip seals (08) on the lip gasket cover (09B), apply food grease between gaskets.
- Place the O-ring (80D) on the lip seal cover (09B) and install on the seal cover (09).
- Install the seal cap (11) and fasten it with the screws (52).

7.5.5. Assembly of the body

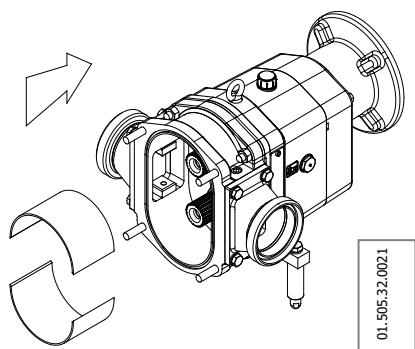


CAUTION! When re-assembling the pump body, make a note of the position of the centring pins.



- Slide the sleeve (13) over the shaft and place the O-ring (80D) on the sleeve.
- Place the seal cover (09) along with the O-rings (80A) and the rear wear plate (32B).
- Install the body (01) and place and tighten the nuts (54A) that fasten the entire assembly.

7.5.6. Assembly of the curved wear plates

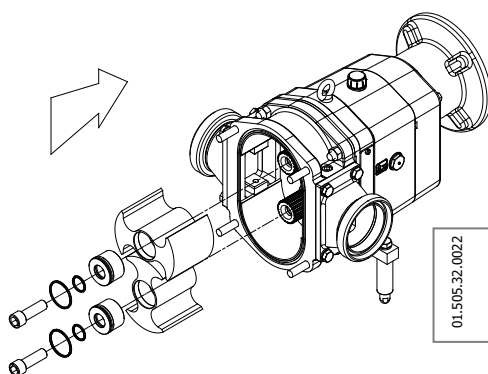


- Slide the curved wear plates (13C) on the upper and lower part of the body ensuring that the degrees of the ends coincide with that of the flanges (15).
- Tighten screws (51A) and ensure they are installed and tightened properly.

7.5.7. Installation of the lobes

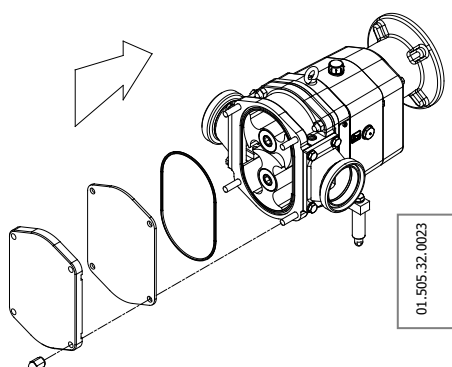


ALWAYS check the clearance between the lobes and between each other and the body before completing the assembly. See 7.6.1 *Play and tolerances*



- Mount new O-rings (80) (80G) on the lobe screws (25) and the screw cap (85B).
- Lubricate the O-rings with soapy water or food grease compatible with the O-ring material.
- Adjust the spacer washers (32) on the shafts (05 and 05A).
- Refer to Chapter 7.6.3 *Adjustment of pump body/lobes using spacer washers*.
- Mount the lobes (02) on the shafts (05 and 05A) at 90 degrees from each other.
- Install the screw cap (85B) and tighten the screws (25) using a size 14 Allen key. Apply sealing cement to the screw thread to fix them. To prevent the lobes from turning simultaneously, a wooden or plastic block may be placed between the lobes.

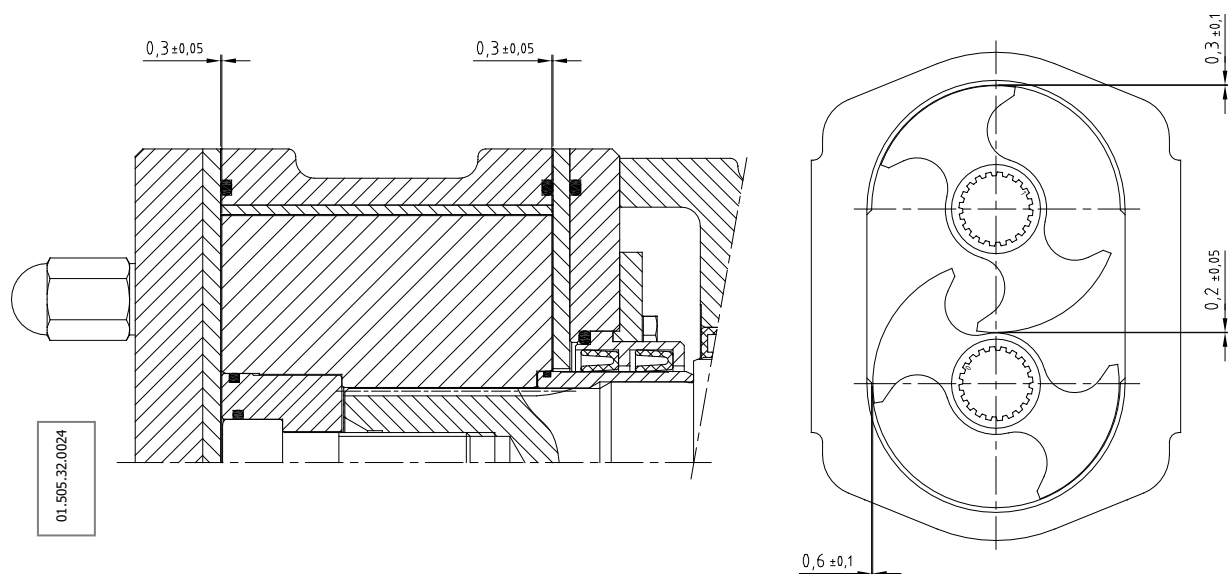
7.5.8. Mounting the cover



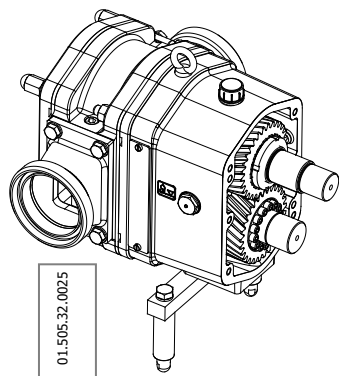
- Check that the gasket (80A) is in good material condition, or if applicable, replace it with a new one.
- Install it on the pump body (01).
- Place the front wear plate (32A) and the pump cover (03) on the body (01) and cross tighten the cap nuts (45).
- Refer to Chapter 5.1.1 *Inspections that must be carried out prior to starting the pump*.

7.6. SETTING AND SYNCHRONIZING THE LOBES

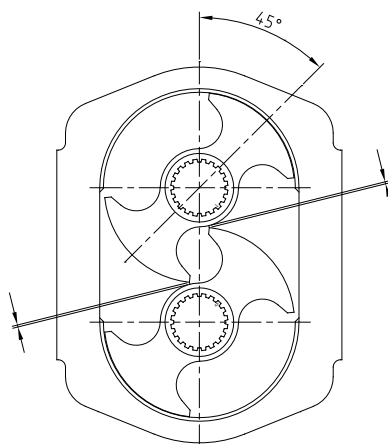
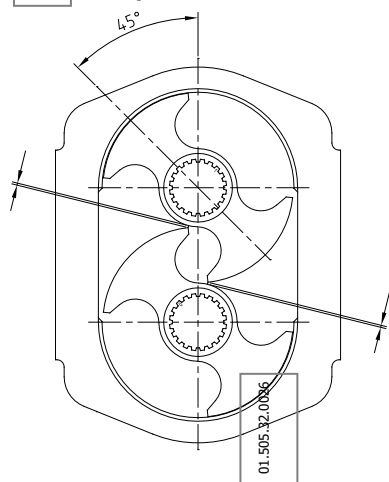
7.6.1. Play and tolerances



7.6.2. Synchronizing the lobes



- In order to allow the lobes to be synchronized, the bearing cover assembly and the pump cover assembly must be removed, the lobes (02) must be installed on the shafts and fastened with the screws (25).
- Loosen the screws on the conical tightening ring (65) of the 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 (05A).
- Fit the lobes (02) on the shafts (05 and 05A) as indicated in 7.5.7 [Installation of the lobes](#)
-



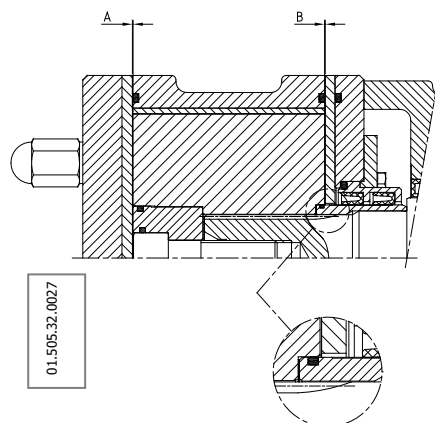
Position 1

Position 2

- Turn the lobes to positions 1 and 2 as shown in the drawing and adjust the indicated distances until the separation is the same in both positions.
- Manually tighten several torque screws on the adjustable fastening mechanism.
- Re-check the distance and, if not correct, the distances must be equalled by slowly turning a lobe while the other one is held firmly.
- Tighten the torque screws of the adjustable fastening mechanism diagonally with 2 or 3 turns using the set torque.
- When tightening the screws on the adjustable fastening mechanism, ensure that gears (19 and 19A) do not turn simultaneously. This can be prevented by placing a wooden wedge between the gears (19 and 19A).

- Re-check the separation between the lobes (02) and turn the drive shaft (05) a few times to check that the lobes (02) do not rub against each other at any point.

7.6.3. Adjustment of lobes/pump body using spacer washers:



- This is the last adjustment to be carried out. The pump must be synchronized and the pump body must be mounted on the support.
- The adjustment will be carried out using spacer washers (32) installed between the sleeve (13) and the lobe (02).
- There are 3 washer thicknesses: 0.1, 0.15 and 0.2 mm.
- Install the lobes (02) and adjust the screws (25) in the way described in 7.5.7 *Installation of the lobes*.
- Check the tolerances between the lobes and the body (A and B). See 7.6.1 *Play and tolerances*. If they are found outside the scale, replace the spacer washers until the proper play is achieved.

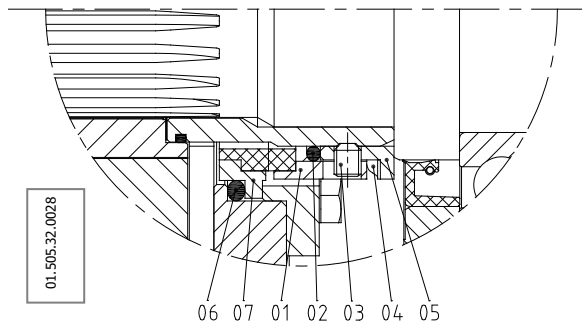
7.7. ASSEMBLY / DISASSEMBLY OF THE MECHANICAL SEAL OPTION

7.7.1. Simple mechanical seal



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.



| Pos. | Description |
|------|------------------------|
| | Simple mechanical seal |
| 01 | Rotating part |
| 02 | O-ring |
| 03 | Retaining stud |
| 04 | Wave spring |
| 05 | Drive bushing |
| 06 | O-ring |
| 07 | Stationary part |

Disassembly



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.

- Disassemble the body as indicated in Section 7.4.4.
- Unscrew the screws (52) from the seal cover (09) and remove the stationary part of the seal (07); check the condition of the O-ring (06).
- Disassemble the rotating part (01) of the sleeve (13) Unscrew the threaded studs (03) and check the condition of the O-ring (02).

Assembly



Remember that if spacer washers are available (32) they must be adjusted on each source shaft.

- When mounting the seal, be careful to fit the parts and the gaskets using soapy water in order to facilitate sliding them; apply to the stationary as well as the rotating parts.
- Install the stationary part (07) and mount the seal counter cover (11) on the seal cover (09).
- Fit the rotating part (01) on the seal sleeve (09) tightening the studs (03) and install the assembly on the shaft (05).
- Assemble the body as indicated in Section 7.4.5.

8. Technical Specifications

8.1. TECHNICAL SPECIFICATIONS

| | |
|---|--------------------------------|
| Displaced volume at 100 RPM | 99 litres |
| Maximum flow rate | 42 m ³ /h (274 GPM) |
| Maximum differential pressure | 7 bar (102 PSI) |
| Maximum working pressure | 10 bar (145 PSI) |
| Maximum temperature | 100 °C (212 °F) |
| Maximum viscosity ⁽¹⁾ (recommended)..... | 100,000 mPa.s |
| Maximum speed..... | 720 rpm. |
| Maximum connections | 80 mm. (3 inches) |
| Suction/discharge connections | DIN 11851 (standard) |
| Internal diameter of the connection | 81 mm. |
| Lobe width | 88 mm. |
| Lobe diameter | 131.5 mm. |
| Maximum torque of the pump support | 400 Nm |

⁽¹⁾ 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 420, AISI 431 |
| Other stainless steel parts | AISI 304 |
| Seals in contact with the product | NBR |
| Surface finish | Ra < 0.8 mm |
| Lip seal double material | FPM |
| Mechanical seal stationary part material..... | Tungsten carbide |
| Mechanical seal rotating part material | Silicon carbide |



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

8.2. WEIGHTS

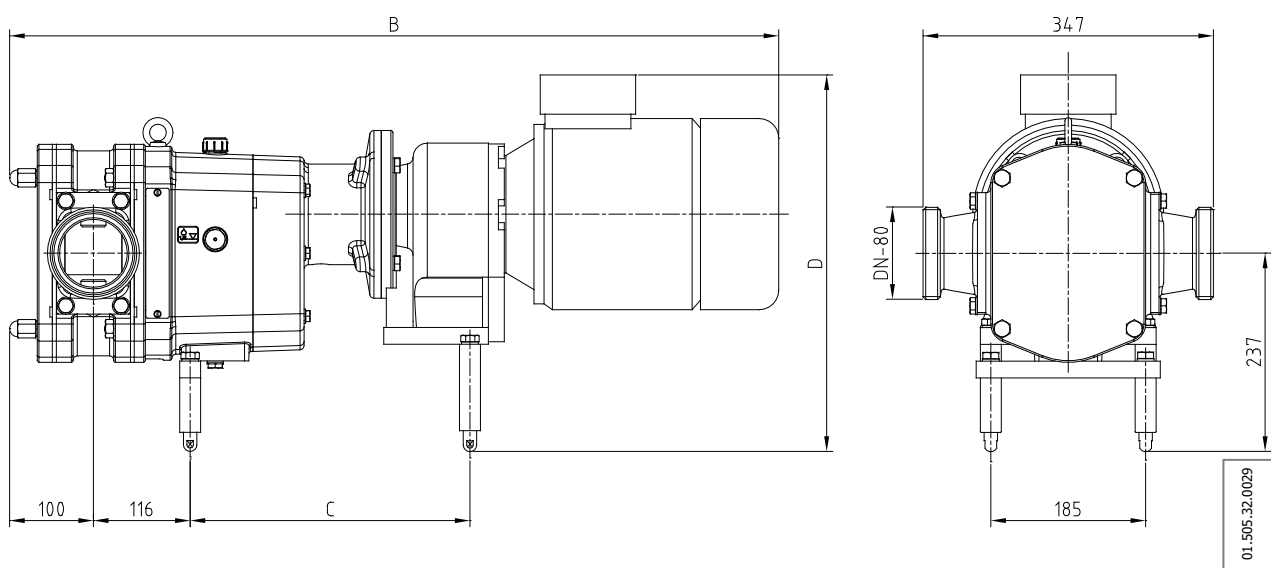
| Size | Power [kW] | Weight ⁽¹⁾ [kg] |
|-------|------------|----------------------------|
| SLR-A | 2,2 | 120 |
| | 4 | 130 |
| | 5,5 | 150 |

⁽¹⁾Weight of the pump with the drive.

8.3. OPTIONS

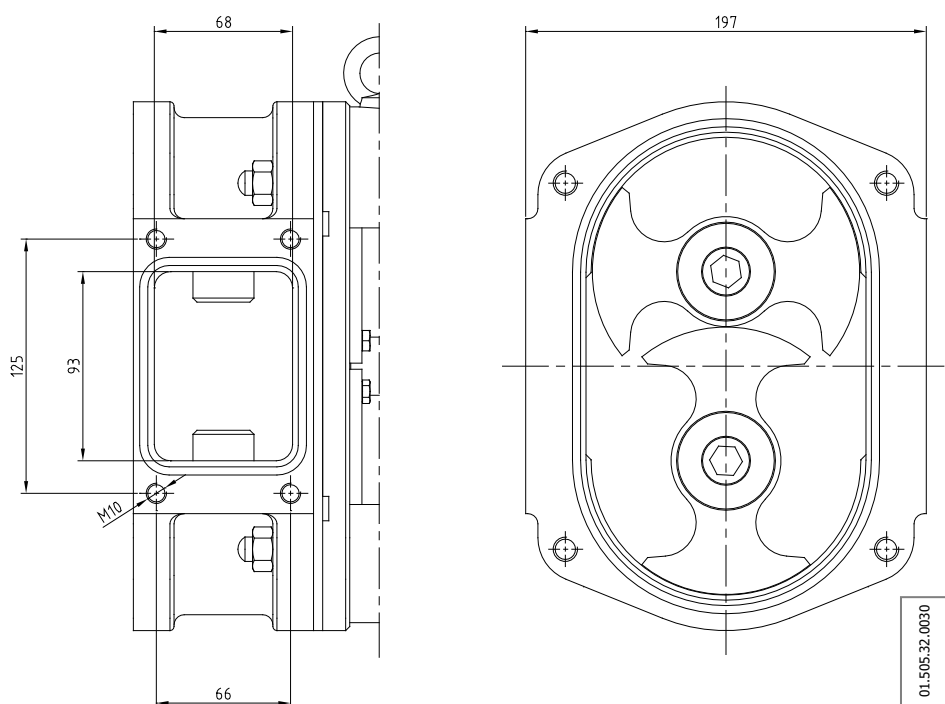
Vertical ports.
Rectangular port.
Simple mechanical seal.

8.4. SLR-A DIMENSIONS



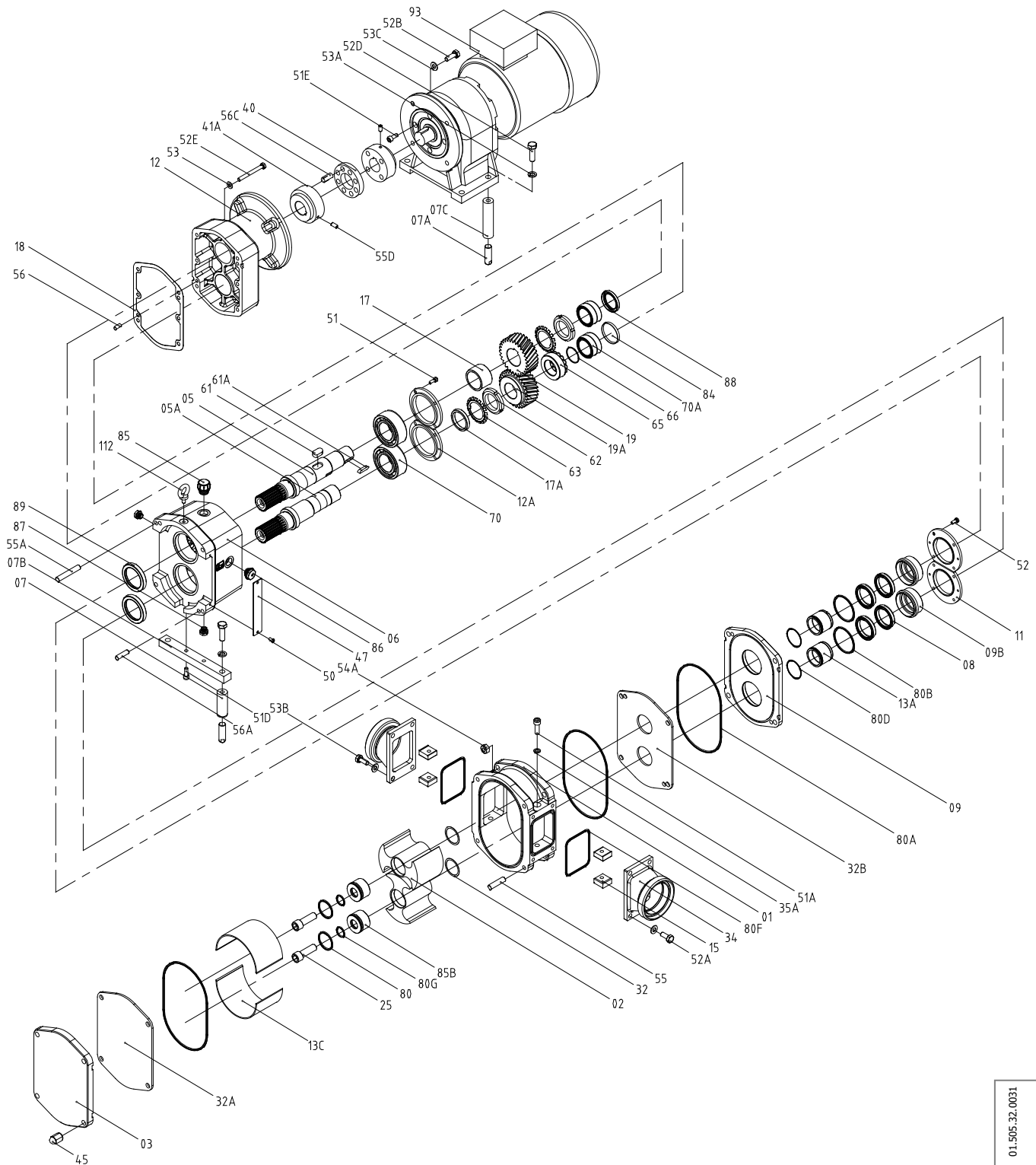
| TYPE | Power [kW] | B | C | D |
|-------|------------|------|-----|-----|
| SLR-A | 2,2 | 900 | 334 | 440 |
| | 4 | 920 | 334 | 450 |
| | 5,5 | 1030 | 402 | 480 |

8.5. RECTANGULAR PORT DIMENSIONS



8.6. SLR-A PARTS BREAKDOWN

8.6.1. Breakdown of the pump



01.505.32.0031

8.6.2. List of parts

| Pos. | Description | Quantity | Material |
|------|-------------------------|----------|------------|
| 01 | Body | 1 | CF 3M |
| 02 | Wedge lobe | 2 | AISI 431 |
| 03 | Pump cover | 1 | AISI 304 |
| 05 | Drive shaft | 1 | AISI 329 |
| 05A | Driven shaft | 1 | AISI 329 |
| 06 | Support | 1 | GG 25 |
| 07 | Foot | 2 | AISI 304 |
| 07A | Adjustable foot | 4 | AISI 304 |
| 07B | Foot | 1 | AISI 304 |
| 07C | Gearbox foot | 2 | AISI 304 |
| 08 | Lip seal | 4 | FPM |
| 09 | Seal cover | 1 | AISI 304 |
| 09B | Lip seal cover | 2 | AISI 316L |
| 11 | Seal counter cover | 2 | AISI 304 |
| 12 | Bearing cover | 1 | GG 25 |
| 12A | Bearing counter cover | 2 | GG -15 |
| 13A | Seal sleeve | 2 | ASI 316L |
| 13C | Curved wear plate | 2 | AISI 420 |
| 15 | Flange | 4 | AISI 316L |
| 17 | Drive shaft bushing | 1 | F 114 |
| 17A | Driven shaft bushing | 1 | ST-52 |
| 18 | Bearing cover seal | 1 | Rivatherms |
| 19 | Drive shaft gear | 1 | F 154 |
| 19A | Driven shaft gear | 1 | F-154 |
| 25 | Screw modification | 2 | A2 |
| 32 | Adjustment sheet | 2 | Stainless |
| 32A | Front wear plate | 1 | AISI 420 |
| 32B | Rear wear plate | 1 | AISI 420 |
| 34 | Port | 2 | AISI 316L |
| 35A | Flange washer | 4 | Brass |
| 40 | Flector | 1 | Plastic |
| 41A | Coupling | 2 | F 114 |
| 45 | Cap nut | 4 | AISI 304 |
| 47 | Support protection | 2 | PETP |
| 50 | Screw | 4 | A2 |
| 51 | Allen screw | 8 | Steel |
| 51A | Allen screw | 4 | A2 |
| 51D | Allen screw | 2 | A2 |
| 51E | Allen screw | 4 | Steel |
| 52 | Screw | 8 | A2 |
| 52A | Screw | 8 | A2 |
| 52B | Screw | 4 | Steel |
| 52D | Screw | 4 | A2 |
| 52E | Screw | 6 | AISI 304 |
| 53 | Washer | 6 | Steel |
| 53A | Washer | 4 | Steel |
| 53B | Washer | 8 | A2 |
| 53C | Washer | 4 | Steel |
| 54A | Nut | 4 | A2 |
| 55 | Threaded stud | 4 | A2 |
| 55A | Threaded stud | 4 | A2 |
| 55D | Threaded stud | 2 | Steel |
| 56 | Pin | 2 | A2 |
| 56A | Pin | 2 | F 522 |
| 56C | Pin | 8 | F 522 |
| 61 | Cotter pin | 1 | Steel |
| 61A | Cotter pin | 1 | Steel |
| 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 | NBR |
| 80A | O-ring | 3 | NBR |
| 80B | O-ring | 2 | NBR |
| 80D | O-ring | 2 | NBR |
| 80F | O-ring | 2 | NBR |
| 80G | O-ring | 2 | NBR |
| 84 | Sealed cap | 1 | PTFE |
| 85 | Oil cap | 1 | Plastic |
| 85B | Cap screw | 2 | AISI 431 |
| 86 | Sight glass | 1 | Plastic |
| 87 | Purge | 2 | Plastic |
| 88 | Retainer | 1 | NBR |
| 89 | Retainer | 2 | NBR |
| 93 | Drive | 1 | - |
| 112 | Eyebolt | 1 | AISI 304 |

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