

INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

SELF-PRIMING CENTRIFUGAL PUMP

PROLAC HCP SP



01.031.32.0001



Original Instructions

01.031.30.03EN

(A) 2022/01

EC Declaration of Conformity



INOXPA S.A.U.

Telers, 60
17820 - Banyoles (Spain)

hereby declare under our sole responsibility that the

Machine: **SELF-PRIMING CENTRIFUGAL PUMP**

Model: **PROLAC HCP SP**

Type: **PROLAC HCP SP 50-150**
PROLAC HCP SP 50-190
PROLAC HCP SP 65-215

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 "David Reyer Brunet".

David Reyer Brunet
Technical Office Manager
25th October 2021



Document: 01.031.30.04EN

Revision: (A) 2021/10

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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 "DRB".

David Reyer Brunet
Technical Office Manager
25th October 2021



Document: 01.031.30.05EN
Revision: (0) 2021/10

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2. Generalities

2.1. INSTRUCTIONS MANUAL

This manual contains information about the reception, installation, operation, assembly and maintenance of the PROLAC HCP SP pumps.

Carefully read the instruction before starting the pump, familiarize yourself with the installation, operation and correct use of the pump 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 cause the loss of the right to claim damages.

This non-compliance may cause the following risks:

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

2.3. WARRANTY

The conditions of the warranty are specified in the General Sales Condition that have been delivered at the time of placing your order.



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.

The non-compliance of the prescribed indications in this manual means misuse of this gear on the technical side and the personal safety and this, exempt INOXPA of all responsibility in case of accidents and personal injuries and/or property damage. Also, excluded from the warranty all breakdowns caused by improper use of the gear.

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 the equipment



Electric hazard

ATTENTION

Important instruction to prevent damage to the equipment and/or its function

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 installation



Always take into account the [Technical Specifications of chapter 9](#).

Never start the pump before connecting it to the lines.

Do not operate the pump if the pump casing is not fitted.

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



During the installation, 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 IP55: 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 PROLAC HCP SP pump is a closed-coupled centrifugal pump with a hygienic and horizontal design, the single-stage, circular pump casing with axial suction and a tangential discharge.

The main pump components are pump casing, impeller, lantern cover and a shaft which is rigidly coupled to the motor shaft.

The pump casing includes a separator tank and a non-return valve.

The motor is the standard IEC 60034 motor of type IM B35 is protected by a stainless steel shroud and provided with height adjustable stainless steels legs.

4.2. OPERATION PRINCIPLE

The PROLAC HCP SP pump is a self-priming pump that eliminates the need for a vacuum pump or other devices such as foot valves or additional pipes.

The pump needs to be primed with liquid only once before starting up. When the pump is turned on, it sucks the air or gas present in the suction pipe, mixing it with the liquid in the pump body. The centrifugal forces push the mixture of liquid and gas towards the separator tank where it loses speed. Because of gravity, the liquid remains at the bottom of the separator tank and is driven back to the pump body through the return pipe, while the air or gas is released through the discharge pipe. In this way, the air or gas is continuously being removed from the suction pipe until the liquid reaches the pump body and the pump begins to operate as a normal centrifugal pump.

It is very important the sucked air is released through the discharge pipe without any backpressure.

It is not advisable to reduce the hydraulic performance of the pump by resizing the impeller or lowering the speed using a frequency converter since it will have negative repercussions on the pump's suction capacity.

4.3. APPLICATION

Due to the choice of materials and its design, the PROLAC HCP SP pump is suitable for applications requiring a high level of hygiene, gentle handling of the product and resistance to chemical attack.

The PROLAC HCP SP pump is particularly suitable for pumping liquids containing air or gas without losing its pumping capacity. It can be used in the food-processing, pharmaceutical and chemical industries. Its main application is the return of the CIP cleaning system.

For each type of pump, the hydraulic performance is given by the choice of impeller diameters and speeds. The characteristic curves also show the power and NPSH requirements. The intended use of the pump is defined by its characteristic curve and operating limits provided in [chapter 9. Technical Specifications](#).

ATTENTION



The range of applications for each type of pump is limited. The pump was selected for a given set of pumping conditions when the order was placed. Misuse of the pump or its use beyond the operating limits may be dangerous or cause permanent damage to the equipment. 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 cannot be held responsible for the damage sustained by the equipment during transport or unpacking. Please visually check that the packaging is not damaged.

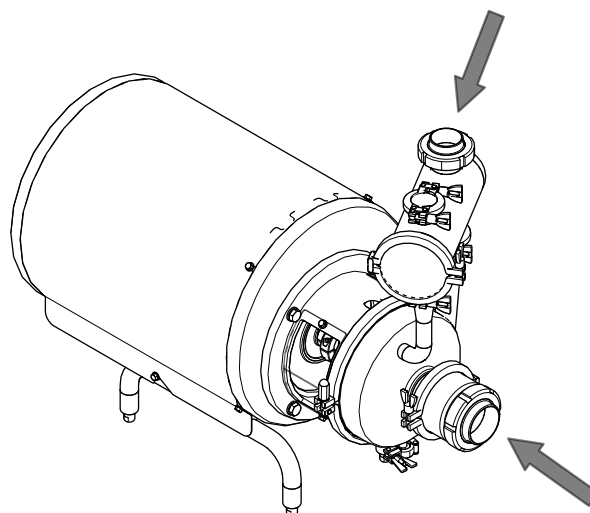
The pump package includes the following documents:

- shipping documents,
- installation, service and maintenance instructions manual,
- instructions and service manual of the motor¹

1) if the pump has been supplied with a motor from INOXPA

Unpack the pump and check the following:

- the suction and discharge connections of the pump, removing any rest of packaging materials,





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- the pump and the motor are not damaged,

If the equipment is not in good condition and/or any part is missing, the carrier should report accordingly as soon as possible.

5.2. IDENTIFICATION OF THE PUMP

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

| | | |
|---|------|---|
|  | |  |
| <small>INOXPA S.A.U. C. TELERS, 60 - 17820 BANYOLES GIRONA (SPAIN) · www.inoxpa.com</small> | | |
| | Type | <input type="text"/> |
| Serial number | No | <input type="text"/> |
| | Year | <input type="text"/> |
| | | <input type="text"/> |

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5.3. TRANSPORT AND STORAGE

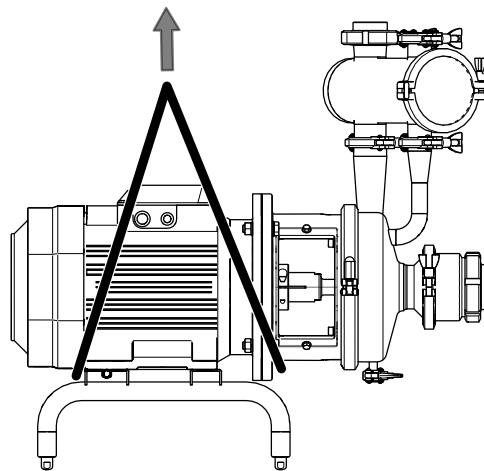
ATTENTION



The PROLAC HCP SP pumps are often too heavy to be stored manually. Use an appropriate 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 heavy loads.

Lift the pump as indicated below:

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



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ATTENTION



Always remove the motor shroud before hoisting

- secure the supports so that they will not move.

See chapter 9. [Technical Specifications](#) to consult the dimensions and weight of the pump.

ATTENTION



During the transport, disassembly or assembly of the pump, there is a risk of loss of stability and that the pump could 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 whenever possible below the liquid and leaving enough space around to can access the pump and the motor. If necessary, consult in chapter 9. [Technical Specifications](#) the dimensions of the pump.

Once a place is chosen, the pump should be mounted on a flat and level surface.

ATTENTION



Install the pump so as to allow proper ventilation. If the pump is installed outdoors, it should be covered by a roof. Its location should allow easy access for inspection or maintenance operations.

5.4.1. Excessive temperatures

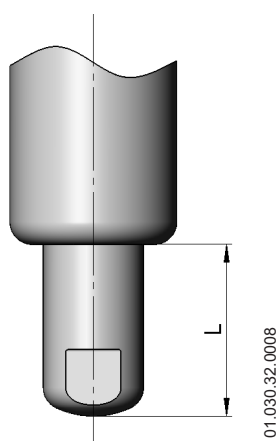
Depending on the fluid to be pumped, high temperatures can be reached inside and around the pump.



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. ADJUSTABLE LEGS

To keep the adjustable legs thread clean these are the permissible L values:



| Motor size | Adjustable leg | L mín (mm) | L màx. (mm) |
|------------|----------------|------------|-------------|
| 71 | M12 | 8 | 23 |
| 80/90 | M12 | 8 | 23 |
| 100/112 | M16 | 10 | 30 |
| 132 | M16 | 10 | 30 |
| 160/180 | M20 | 13 | 40 |
| 200/225 | M20 | 13 | 40 |

5.6. PIPES

About the installation pipes:

- As a general rule, install the suction and discharge lines in straight sections, with the minimum possible number of elbows and fittings 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.
- Install support brackets for the lines as close as possible to the pump's suction and discharge ports to avoid vibrations and stress on the pump.

5.5.1. Shut-off valves

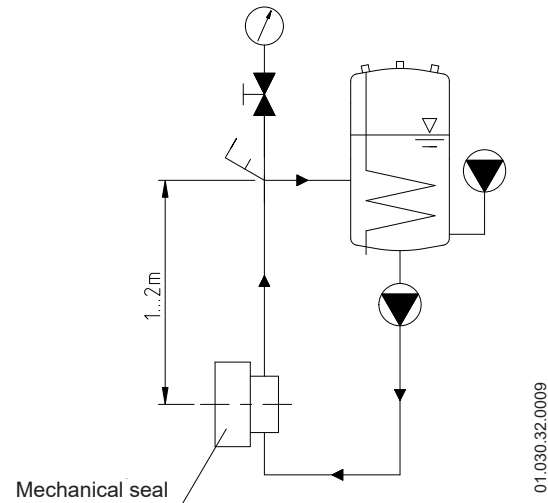
The pump may be isolated for maintenance. To accomplish this, shut-off valves must be installed and connected to the pump's suction and discharge connections.

5.7. PRESSURISATION TANK

For a models with a double mechanical seal, a pressurisation tank needs to be fitted.



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 following figure.



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

5.8. ELECTRICAL INSTALLATION



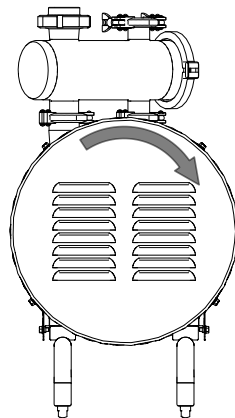
Only qualified personnel can connect the electric motors.
Take the necessary measures to prevent damage to cables and connections.



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.

To do the electrical installation:

- connect the motor in accordance with the instructions supplied by the motor manufacturer, in accordance with the current national legislation and in compliance with EN 60204-1,



- 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



See indicator label on the pump.
ALWAYS check the direction of rotation of the motor with liquid inside the pump.

6. Start-up



Before 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.

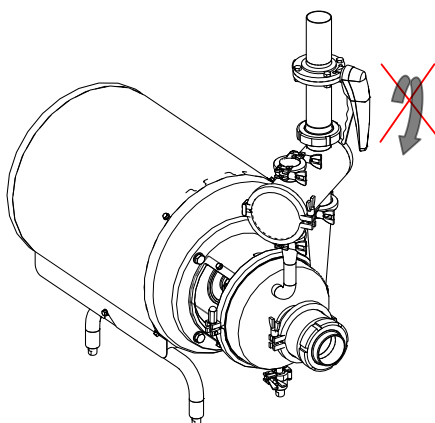


NEVER touch the pump or the lines of hot liquids are being pumped.

6.1. CHECKS BEFORE STARTING THE PUMP

Before starting the pump:

- completely open the shut-off valves on the suction and discharge lines,



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- do an initial filling of liquid since this pump requires it. This can be done through the fill hole located at the top of the separator tank.

| Pump | Priming volume (l) |
|----------------------|--------------------|
| PROLAC HCP SP 50-150 | 3,5 |
| PROLAC HCP SP 50-190 | 3,8 |
| PROLAC HCP SP 65-215 | 7,0 |



ATTENTION

The pump must never turn dry.



ATTENTION

The pump must not be allowed to operate more than 10 minutes without pumping as it heats up and the priming liquid is lost due to evaporation.

- check that the power supply matches the rating indicated on the motor plate,
- check that the motor rotation direction is correct.

6.2. CHECKS WHEN STARTING THE PUMP

When starting the pump check:

- that the pump is not making any strange noises,
- if the absolute inlet pressure is sufficient to prevent cavitation in the pump. See the curve to determine the minimum pressure required above steam pressure (NPSHr).
- the discharge pressure,
- that there are no 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.

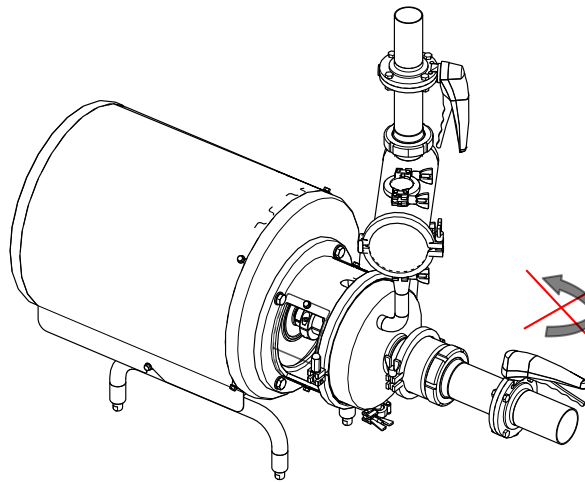
ATTENTION



Control the motor consumption to prevent an electrical overload.

To reduce the flow rate and the electrical power consumed by the motor:

- reduce regulating the pump's discharge flow,
- decrease the motor speed.



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Use special protection when the sound pressure in the operation area exceeds 85 dB(A).

7. Troubleshooting

The following table provides solutions to problems that might arise during the operation of the pump. The pump is assumed to have been properly installed and be suitable for the relevant application. Please contact INOXPA if technical assistance is required.

| Motor overload | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|-----------|-----------------------------|-------------------------------------|-------------------------|---|------------------|------------------------------------|------------|---------------------------------|------------------------------|--|----------------------|---|-----------------------------|--|---------------|--|--------------------------|---|----------------------------|---|---------------------------------|--------------------|----------------------------------|---|----------------------|---|----------------------|---|------------------------------|--|---|--|
| The pump does not provide enough flow or pressure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No pressure on the discharge side | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Uneven delivery flow / pressure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The pump does not suck | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Noise and vibrations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The pump gets clogged | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overheated pump | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excessive wear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The mechanical seal leaks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>PROBABLE CAUSES</th> <th>SOLUTIONS</th> </tr> </thead> <tbody> <tr> <td>Wrong direction of rotation</td> <td>- Reverse the direction of rotation</td> </tr> <tr> <td>NPSH is not high enough</td> <td>- Place the suction tank higher - Place the pump lower - Reduce the vapour pressure - Increase the diameter of the suction pipe - Shorten and simplify the suction pipe</td> </tr> <tr> <td>Pump not drained</td> <td>- Drain or fill the separator tank</td> </tr> <tr> <td>Cavitation</td> <td>- Increase the suction pressure</td> </tr> <tr> <td>Air is sucked in by the pump</td> <td>- Check the suction pipe and all its connections</td> </tr> <tr> <td>Clogged suction tube</td> <td>- Check the suction pipe and the filters if available</td> </tr> <tr> <td>Discharge pressure too high</td> <td>- Fully open the valves in the discharge pipe - If necessary, reduce load losses, e.g. by increasing the diameter of the pipe</td> </tr> <tr> <td>Flow too high</td> <td>- Reduce the flow by means of a diaphragm - Partially shut off the delivery valve - Reduce speed</td> </tr> <tr> <td>Fluid viscosity too high</td> <td>- Decrease the viscosity by injecting liquid or increasing the diameter of the piping</td> </tr> <tr> <td>Fluid temperature too high</td> <td>- Reduce the temperature by cooling the fluid</td> </tr> <tr> <td>Mechanical seal damaged or worn</td> <td>- Replace the seal</td> </tr> <tr> <td>O-rings unsuitable for the fluid</td> <td>- Fit suitable O-rings after checking with the supplier</td> </tr> <tr> <td>The impeller scrapes</td> <td>- Reduce temperature - Reduce suction pressure - Adjust the impeller/cover play</td> </tr> <tr> <td>Tension in the lines</td> <td>- Connect the pipes to the pump without tension</td> </tr> <tr> <td>Foreign matter in the liquid</td> <td>- Install a filter in the suction pipe</td> </tr> <tr> <td>Mechanical seal spring tension is too low</td> <td>- Check the correct position of the shaft and impeller</td> </tr> </tbody> </table> | PROBABLE CAUSES | SOLUTIONS | Wrong direction of rotation | - Reverse the direction of rotation | NPSH is not high enough | - Place the suction tank higher - Place the pump lower - Reduce the vapour pressure - Increase the diameter of the suction pipe - Shorten and simplify the suction pipe | Pump not drained | - Drain or fill the separator tank | Cavitation | - Increase the suction pressure | Air is sucked in by the pump | - Check the suction pipe and all its connections | Clogged suction tube | - Check the suction pipe and the filters if available | Discharge pressure too high | - Fully open the valves in the discharge pipe - If necessary, reduce load losses, e.g. by increasing the diameter of the pipe | Flow too high | - Reduce the flow by means of a diaphragm - Partially shut off the delivery valve - Reduce speed | Fluid viscosity too high | - Decrease the viscosity by injecting liquid or increasing the diameter of the piping | Fluid temperature too high | - Reduce the temperature by cooling the fluid | Mechanical seal damaged or worn | - Replace the seal | O-rings unsuitable for the fluid | - Fit suitable O-rings after checking with the supplier | The impeller scrapes | - Reduce temperature - Reduce suction pressure - Adjust the impeller/cover play | Tension in the lines | - Connect the pipes to the pump without tension | Foreign matter in the liquid | - Install a filter in the suction pipe | Mechanical seal spring tension is too low | - Check the correct position of the shaft and impeller |
| PROBABLE CAUSES | SOLUTIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wrong direction of rotation | - Reverse the direction of rotation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NPSH is not high enough | - Place the suction tank higher - Place the pump lower - Reduce the vapour pressure - Increase the diameter of the suction pipe - Shorten and simplify the suction pipe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pump not drained | - Drain or fill the separator tank | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cavitation | - Increase the suction pressure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air is sucked in by the pump | - Check the suction pipe and all its connections | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clogged suction tube | - Check the suction pipe and the filters if available | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Discharge pressure too high | - Fully open the valves in the discharge pipe - If necessary, reduce load losses, e.g. by increasing the diameter of the pipe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flow too high | - Reduce the flow by means of a diaphragm - Partially shut off the delivery valve - Reduce speed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fluid viscosity too high | - Decrease the viscosity by injecting liquid or increasing the diameter of the piping | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fluid temperature too high | - Reduce the temperature by cooling the fluid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mechanical seal damaged or worn | - Replace the seal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| O-rings unsuitable for the fluid | - Fit suitable O-rings after checking with the supplier | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The impeller scrapes | - Reduce temperature - Reduce suction pressure - Adjust the impeller/cover play | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tension in the lines | - Connect the pipes to the pump without tension | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Foreign matter in the liquid | - Install a filter in the suction pipe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mechanical seal spring tension is too low | - Check the correct position of the shaft and impeller | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 carry 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.

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 chapter 8.7. [Disassembly and 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. |
| Scheduled maintenance | Regularly check that there are no leaks and that the pump is operating correctly. Keep a maintenance record of the pump. Use statistics to plan inspections. |
| Lubrication | During assembly, use soapy water or oil compatible for the food industry when fitting the different gaskets to allow them to slide better. |

The period between each preventive maintenance service will vary depending on the operating condition of the pump: temperatures, flow, number of operating hours, cleaning solutions used, etc.

8.4. TIGHTENING TORQUE

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

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



The use of aggressive cleaning products such as caustic soda and nitric acid may give to skin burns.

Use rubber gloves during cleaning procedures.

Always use protective goggles.

8.6.1. 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](#).

Two types of solutions can be used for CIP processes:

a. alkaline solution: 1% by weight of caustic soda (NaOH) a 70°C (150°F). To make this solution:

1 kg NaOH + 100 l H₂O¹ = cleaning solution

2,2 l NaOH 33% + 100 l H₂O = cleaning solution

b. acid solution: 0,5% by weight of nitric acid (HNO₃) a 70°C (150°F). To make this solution:

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

1) only use chlorine-free water to mix with the cleaning agents

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.

8.6.2. SIP (sterilization-in-place) cleaning

Sterilization with steams is applied to all equipment including the pump.

ATTENTION



Do NOT use the equipment during the steam sterilization process.

The parts and 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).

The pump generates an important pressure drop through the sterilization process. Use a by-pass circuit provided with a discharge valve is recommended for ensuring that the steam or overheated water sterilizes the circuit integrity.

Maximum conditions during 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 (recommended)

FPM (use with caution)

8.7. DISASSEMBLY AND ASSEMBLY 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 to the pump's operation and lead to high repair costs and a long period of downtime. INOXPA is not responsible for accidents or damages caused 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.

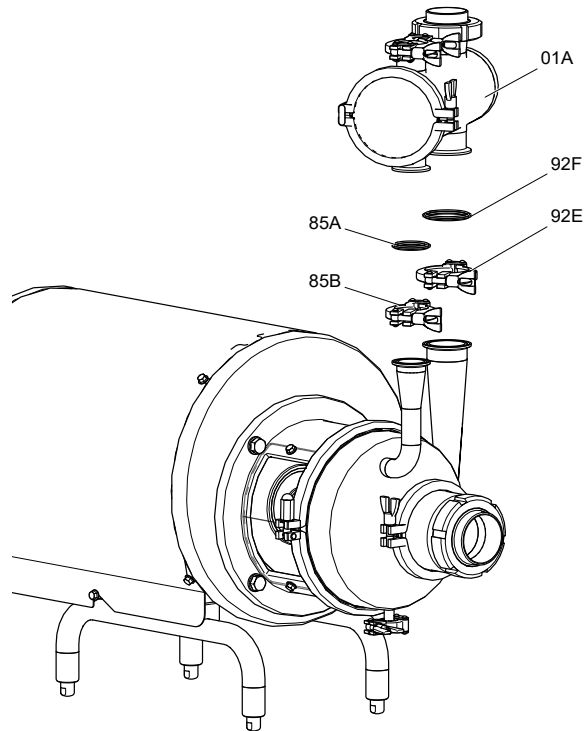
Cleaning

Before disassembling the pump, clean it outside and inside.

8.7.1. Self-priming unit

Disassembly:

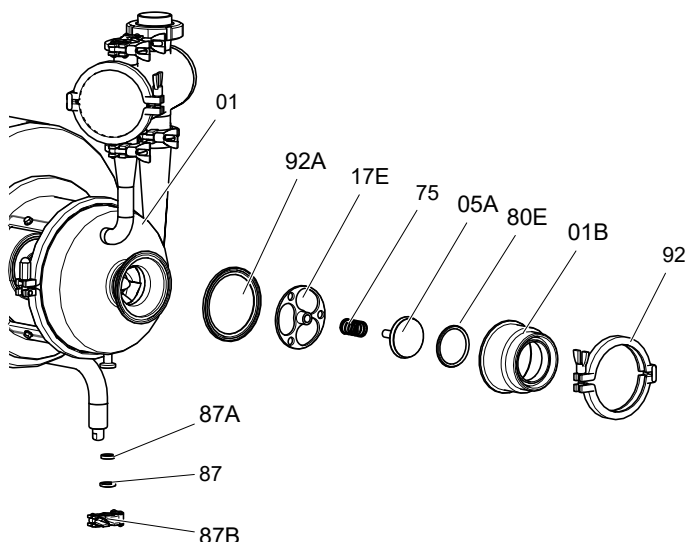
1. Remove the retaining clamps (85B,92E) from the discharge cone and from the return pipe.
2. Remove the separator tank (01A).
3. Remove the clamp seals (85A,92F) from the discharge cone and the return pipe. Check their condition and replace them if damaged.
4. Remove the clamp (92) from the non-return valve of the suction port.
5. Separate the non-return valve body (01B) and remove the seal (92A) from the pump casing (01).
6. Remove the guide bushing (17E), the spring (75), the shaft (05A) and the shaft seal (80E) from the non-return valve.
7. Separate the non-return valve components: the guide bushing (17E), the spring (75) and the shaft (05A).
8. Remove the O-ring (80E) from its seat of the shaft (05A) of the non-return valve.
9. Remove the clamp (87B) from the purge, the blind plug (87) and the seal (87A).



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Assembly:

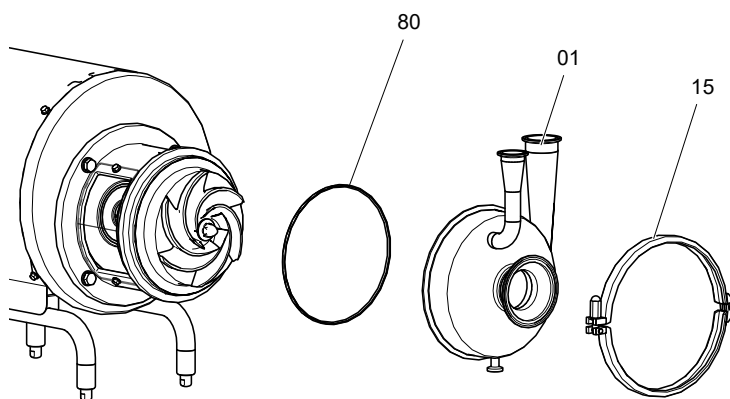
1. Place the seal (87A) and the blind plug (87) on the purge and tighten the clamp (87B).
2. Place the seal (80E) in its seat of the shaft (05A) of the non-return valve. Lubricate the seal with soapy water to facilitate its slide.
3. Fit the spring (75) on the shaft (05A). Join the guide bushing (17E) to the shaft/spring assembly (75,05A).
4. Mount the spring, shaft and guide bushing assembly (75,05A,17E) in the non-return valve body (01B).
5. Place the clamp seal (92A) in the seat of the pump casing (01).
6. Place the whole assembly on the cover of the suction port of the pump casing (01) and tighten the clamp (92).
7. Place the clamp seals (85A,92F) on the discharge cone and the return pipe.
8. Place the separator tank (01A) on the seals (85A,92F).
9. Fit and tighten the two retaining clamps (85B,92E).



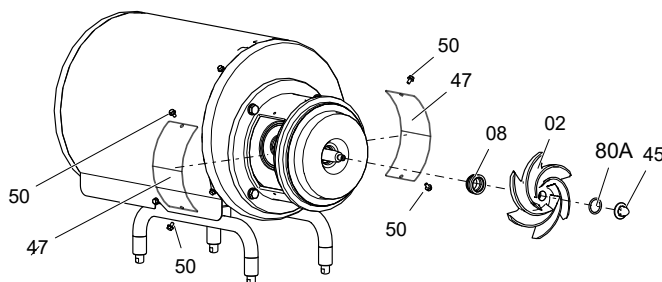
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8.7.2. Pump and single mechanical seal**Disassembly:**

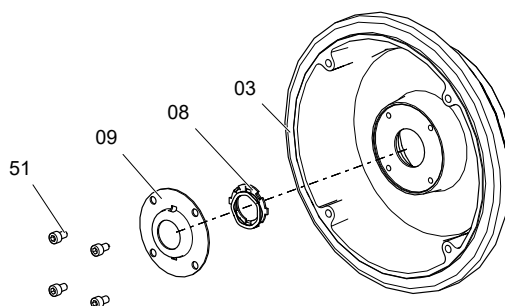
1. Remove the retaining clamp (15) and disassemble the pump casing (01).
2. Check the condition of the O-ring (80) from the pump body and replace it if damaged.
3. Remove the screws (50) and the lantern protections (47).
4. Place an open-end wrench on the flat sides of the shaft to immobilize the shaft.
5. Remove the impeller nut (45) and the O-ring (80A).
6. Disassemble the impeller (02). If necessary, hit it with a plastic mallet to disengage the cone.
7. Remove the rotating part of the seal (08) from the rear side of the impeller (02).
8. Remove manually the stationary part of the seal (08) which is housed in the pump cover (03).
9. If the thrust washer and the seal spring need to be replaced, loosen the allen screws (51A) that secure the pump cover (03) and take it off. Then, loosen the allen screws (51) and remove the seal cover (09).
10. Check the spring and the thrust washer on the mechanical seal (08) and replace if necessary.



01.031.32.0009



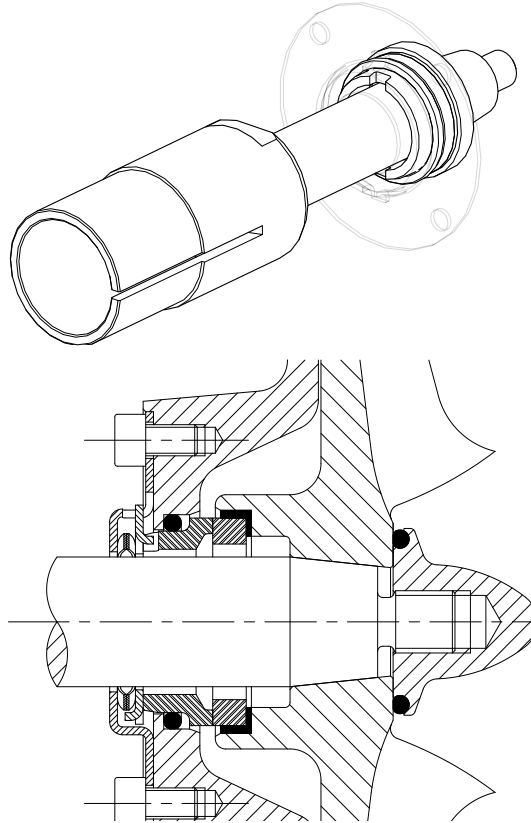
01.031.32.0010



01.031.32.0011

Assembly:

1. Place the thrust washer of the mechanical seal (08) on the pump cover (03). Make sure that the four tabs centring the spring are facing outward.
2. Fit the spring on the thrust washer within the centring tabs. Place the seal cover (09) on the assembly and move it until the seal washer thrust tabs match the slots on the cover (09). Secure it with the allen screws (51).
3. Mount the pump cover (03) on the lantern (04) and secure it with the screws (51A).
4. Fit manually the stationary part of the seal (08) on the pump cover (03). Make sure that the anti-rotation tabs match the slots on the seal.
5. Fit the rotating part of the mechanical seal (08) on the rear side of the impeller (02) and make sure that it is level.
6. Place the O-ring (80A) in the slot of the impeller nut (45).
7. Place an open-end wrench on the flat sides of the shaft to immobilize the shaft (05).
8. Fit the impeller (02) on the pump shaft (05) and secure it with the impeller nut (45).

**ATTENTION**

When installing the new seal, lubricate the pieces and seals with soapy water to allow them to slide better. Apply it to the stationary parts on the cover as well as the rotating parts on the impeller and the double seal ring.

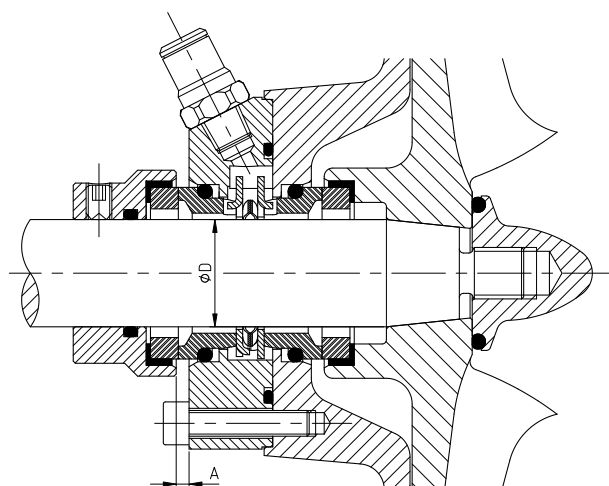
8.7.3. Double mechanical seal**Disassembly:**

1. Remove the main seal following the instructions of the chapter [8.7.2. Pump and single mechanical seal](#) up to point 8.
2. Loosen the allen screws (51A) and remove the pump cover (03) taking care not to damage the stationary part of the secondary seal housed therein.
3. Loosen the allen screws (51B) and remove the double seal cover (10) together with the stationary part of the secondary seal of the pump cover (03). Remove the spring and thrust washers.
4. Remove manually the stationary part of the secondary seal (08) which is housed in the double seal cover (10) as well as the O-ring (80C).
5. Loosen the set screw (55) and remove the double seal ring (30) on the shaft (05) together with the rotating part of the secondary seal.
6. Remove the rotating part of the secondary seal and the O-ring (80D) from the double seal ring.

Assembly:

1. Install the rotating part of the new secondary seal and the O-ring (80) on the double seal ring (30). Slide the assembly over the pump shaft (05).
2. Manually, fit the stationary part of the secondary seal (08) and the O-ring (80C) on the double seal cover (10).
3. Place the thrust washer of the primary seal (08) on the pump cover (03). Make sure that the four tabs centring the spring are facing outward.
4. Fit the spring on the thrust washer within the centring tabs. Place the thrust washer of the secondary seal on the spring. Make sure that the four tabs centring the spring are pointing inward.

5. Place the double seal cover (10) together with the secondary stationary part and the O-ring (80C) on the pump cover (03) and move it until the thrust tabs on the washers of the primary and secondary seals match on the slots on the stationary part of the secondary seal. Secure it with the allen screws (51B).
6. Mount the assembly of the pump cover (03) and the stationary part of the secondary seal to the lantern (04) and fasten it with the screws (51A).
7. Slide the double seal ring (30) onto the shaft (05), checking that the distances between the ring and the double seal cover are as shown below, and tighten the set screw (55).



| ØD | A |
|----|-----|
| 25 | 3 |
| 35 | 3,5 |

01.030.32.0017

8. Install the primary seal following the assembly instructions for the single mechanical seal starting at point 4.

ATTENTION



When installing the new seal, lubricate the pieces and seals with soapy water to allow them to slide better. Apply it to the stationary parts on the cover as well as the rotating parts on the impeller and the double seal ring.

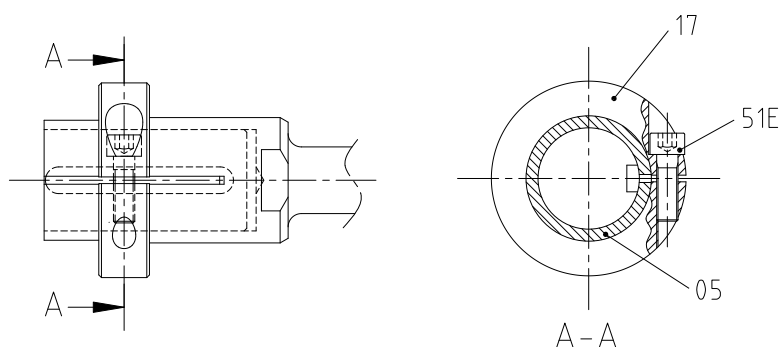
8.7.4. Installation and adjustment of the shaft

Disassembly:

1. Loosen the allen screw (51D) of the retaining ring on the shaft (17).
2. Remove the shaft (05) together with the ring (17).

Assembly:

1. Fit the pump shaft (05) together with the retaining ring (17) on the motor shaft.
2. Tighten the allen screw (51E) on the retaining ring slightly and check that the pump shaft (05) can still turn. Make sure to fit the retaining ring on the shaft (17) as shown in the figure.

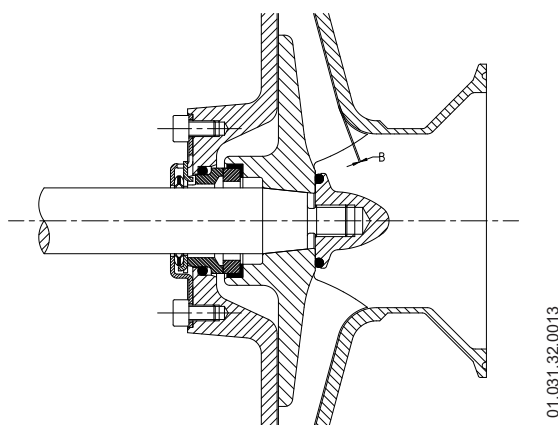


01.030.32.0018

**ATTENTION**

Lubricate the thread and the head of the retaining ring screw.

3. Fit the cover (03), the screws (51A) and tighten them.
4. Install the impeller (02) on the pump shaft and secure it with the lock nut (45). Place an open-end wrench on the flat sides of the shaft to prevent it from rotating.
5. Slide the impeller with the shaft (05) until it reaches the pump cover (03).
6. Install the pump casing (01) and secure it with the clamp (15).
7. With the help of a thickness gauge, move the pump shaft so that the impeller is located at the required distance B from the pump casing (01): 0,4 mm for size pump 50-150 and 0,5 mm for the size pump 50-190 and 65-215.



8. Tighten the allen screw (51D) of the retaining ring (17) of the shaft.
9. Remove the pump casing (01), the impeller (02) and the cover (03) and continue with the assembly of the mechanical seal.

9. Technical Specifications

| | |
|-----------------------------|----------------------|
| Maximum working pressure | 1600 kPa (16 bar) |
| Operating temperature range | -10°C a 120°C (EPDM) |
| Maximum speed | 3000 rpm 3600 rpm |
| Sound level | 72-80 dB(A) |

Materials

| | |
|-----------------------------------|---|
| Parts in contact with the product | 1.4404 (AISI 316L) |
| Other parts in stainless steel | 1.4301 (AISI 304) |
| Seals in contact with the product | EPDM - standard FPM (other materials available upon request) |
| Other materials for the seal | NBR |
| External surface finish | mat |
| Internal surface finish | polished $Ra \leq 0,8 \mu m$ |

Mechanical seal

| | |
|---------------------------------|--|
| Type | internal single or double seal, balanced |
| Material of stationary part | silicon carbide (SiC) - standard |
| Material of rotary part | Graphite (C) - standard Silicon carbide (SiC) |
| Seal material | EPDM - standard FPM |
| Water consumption (double seal) | 0,25 to 0,6 l/min |
| Pressure double seal | from atmospheric to 1000 kPa (10 bar) |

Motor

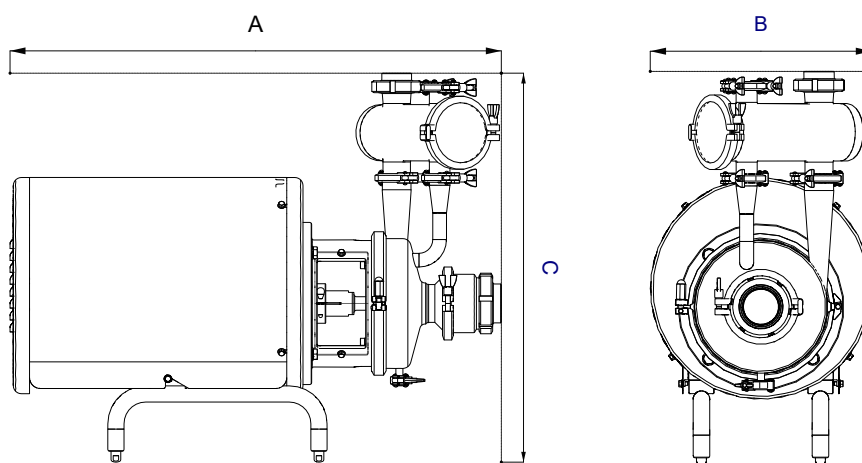
| | |
|-----------------------|--|
| Type | Three-phase asynchronous motor, IEC B35 type, 2 or 4 poles, IP55 protection, class F-insulation |
| Power | 1,5 to 18,5 kW |
| Voltage and frequency | 220-240 V Δ / 380-420 V Y, ≤ 4 kW 380-420 V Δ / 660-690 V Y, $\geq 5,5$ kW |

9.1. NOISE LEVEL

The indicated noise levels correspond to the standard pump, with maximum impeller and shrouded motor, running at approximately 2900 rpm, at the point of the best efficiency and with a motor with sufficient power. These values were taken at a distance of 1 m from the pump and at a height of 1,6 m above the floor level. The measurements were carried out according to the standard EN 12639 / ISO 3746 Grade 3 with a tolerance of ± 3 dB(A).

| Pump | Sound pressure LpA dB(A) | Sound power LwA dB(A) |
|---------------|-----------------------------|--------------------------|
| HCP SP 50-150 | 74 | 87 |
| HCP SP 50-190 | 72 | 85 |
| HCP SP 65-215 | 80 | 94 |

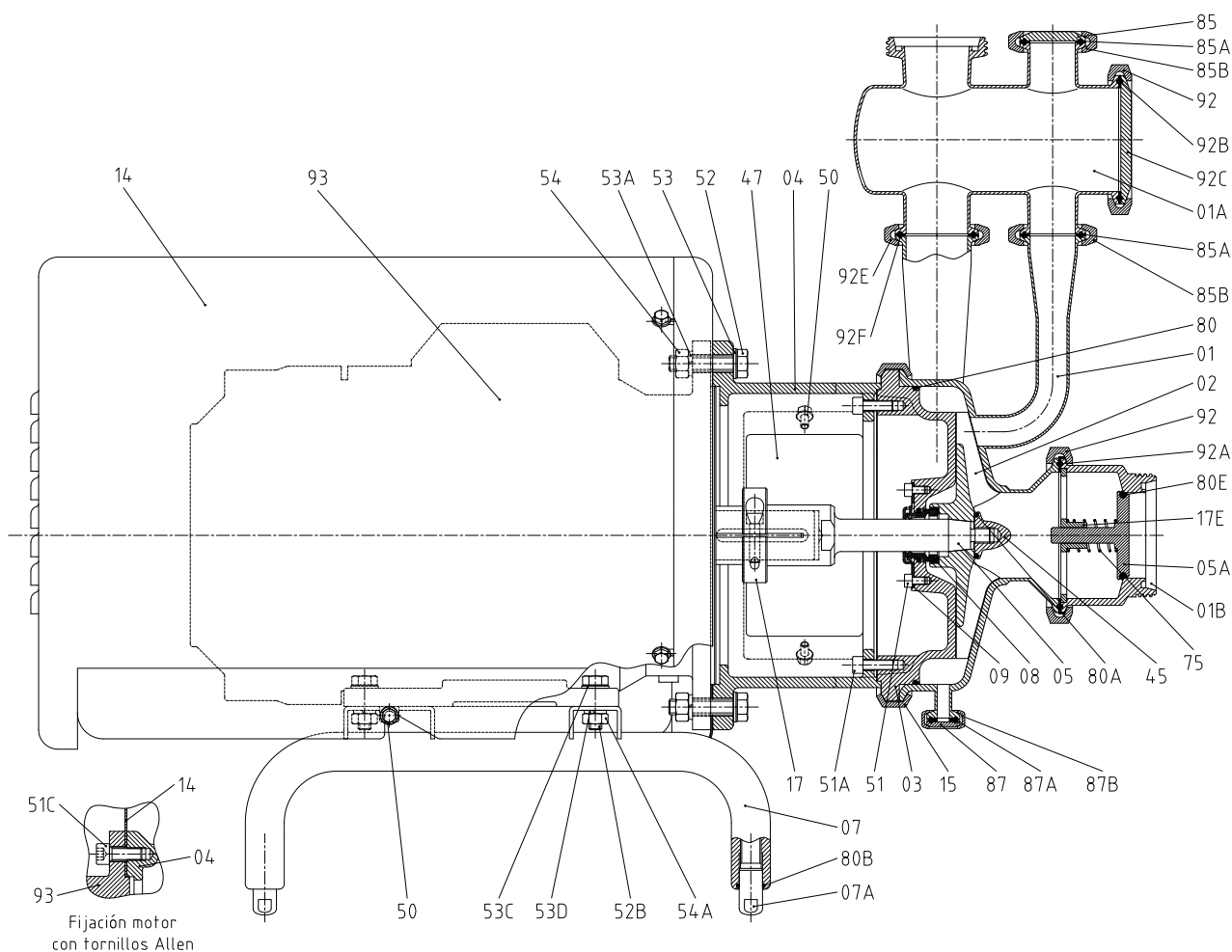
9.2. DIMENSIONS AND WEIGHTS



01.031.32.0015

| Pump | kW | Motor | Dimensions (mm) | | | Weight (kg) | | | |
|---------------|------|-------|-----------------|-----|-----|-------------|-----|-----|-----|
| | | | A | B | C | | | | |
| HCP SP 50-150 | 1,5 | 90 | 658 | 270 | 594 | 40 | | | |
| | 2,2 | | | | | 42 | | | |
| | 3 | 100 | | | | 736 | 330 | 633 | 53 |
| | 4 | 112 | | | | 736 | 330 | 645 | 58 |
| HCP SP 50-190 | 3 | 100 | 730 | 330 | 674 | 58 | | | |
| | 4 | 112 | 730 | 330 | 686 | 63 | | | |
| | 5,5 | 132 | 862 | 380 | 701 | 79 | | | |
| | 7,5 | | | | | 93 | | | |
| 7,5 | 132 | 903 | | | | 380 | 767 | 104 | |
| HCP SP 65-215 | 11 | 160 | | | | 1133 | 465 | 841 | 150 |
| | 15 | | 164 | | | | | | |
| | 18,5 | | 182 | | | | | | |

9.3. TECHNICAL SECTION AND PARTS LIST

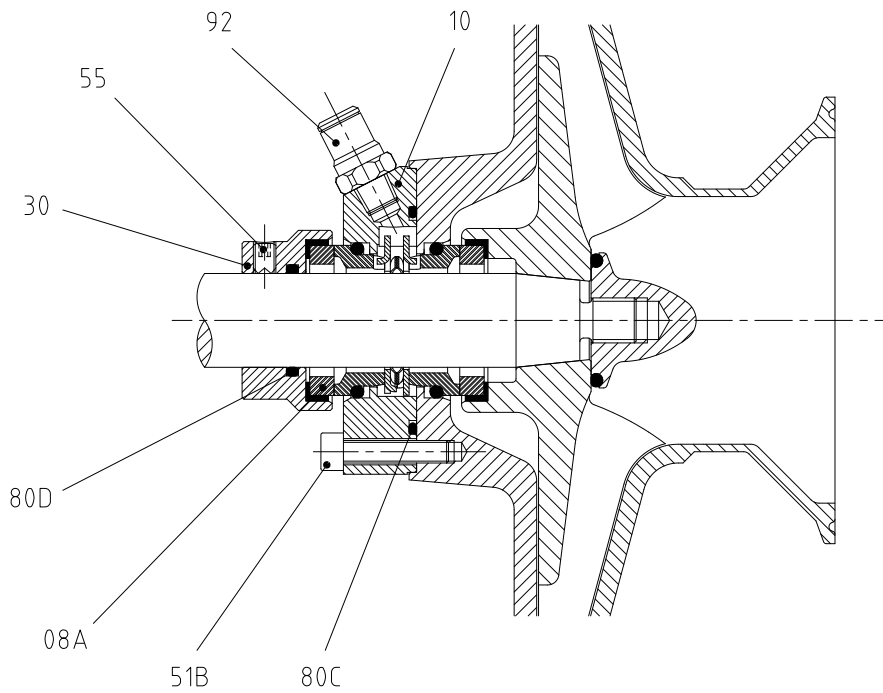


01.031.32.0014

| Position | Description | Quantity | Material |
|----------|------------------------|----------|--------------------|
| 01 | pump casing | 1 | 1.4404 (AISI 316L) |
| 01A | separator tank | 1 | 1.4404 (AISI 316L) |
| 01B | non-return valve body | 1 | 1.4404 (AISI 316L) |
| 02 | impeller | 1 | 1.4404 (AISI 316L) |
| 03 | pump cover | 1 | 1.4404 (AISI 316L) |
| 04 | lantern | 1 | 1.4301 (AISI 304) |
| 05 | shaft | 1 | 1.4404 (AISI 316L) |
| 05A | non-return valve shaft | 1 | 1.4404 (AISI 316L) |
| 07 | motor leg | 2 | 1.4301 (AISI 304) |
| 07A | adjustable leg | 4 | 1.4301 (AISI 304) |
| 08 | mechanical seal | 1 | - |
| 09 | seal cover | 1 | 1.4404 (AISI 316L) |
| 14 | shroud | 1 | 1.4301 (AISI 304) |
| 15 | casing clamp | 1 | 1.4301 (AISI 304) |
| 17 | retaining ring | 1 | 1.4301 (AISI 304) |
| 17E | guide bushing | 1 | 1.4404 (AISI 316L) |
| 45 | impeller nut | 1 | 1.4404 (AISI 316L) |
| 47 | lantern protector | 2 | PETP |
| 50 | screw with washer | 10 | A2 |
| 51 | allen screw | 4 | A2 |

| Position | Description | Quantity | Material |
|----------|-----------------|----------|--------------------|
| 51A | allen screw | 4 | A2 |
| 51C | allen screw | 4 | A2 |
| 52 | hexagonal screw | 4 | A2 |
| 52B | hexagonal screw | 4 | A2 |
| 53 | flat washer | 4 | A2 |
| 53A | grower washer | 4 | A2 |
| 54 | hexagonal nut | 4 | A2 |
| 54A | hexagonal nut | 4 | A2 |
| 75 | spring | 1 | 1.4310 (AISI 302) |
| 80 | O-ring | 1 | EPDM |
| 80A | O-ring | 1 | EPDM |
| 80B | O-ring | 4 | NBR |
| 80E | O-ring | 1 | EPDM |
| 85 | clamp blank cap | 1 | 1.4404 (AISI 316L) |
| 85A | seal clamp | 2 | EPDM |
| 85B | clamp | 2 | 1.4301 (AISI 304) |
| 87 | clamp blank cap | 1 | 1.4404 (AISI 316L) |
| 87A | clamp seal | 1 | EPDM |
| 87B | clamp | 1 | 1.4301 (AISI 304) |
| 92 | clamp | 2 | 1.4301 (AISI 304) |
| 92A | clamp seal | 1 | EPDM |
| 92B | clamp seal | 1 | EPDM |
| 92C | clamp blank cap | 1 | 1.4404 (AISI 316L) |
| 92E | clamp | 1 | 1.4301 (AISI 304) |
| 92F | clamp seal | 1 | EPDM |
| 93 | motor | 1 | - |

9.4. DOUBLE MECHANICAL SEAL



01.031.32.0016

| Position | Description | Quantity | Material |
|----------|----------------------------------|----------|--------------------|
| 08A | double mechanical seal | 1 | - |
| 10 | double seal cover | 1 | 1.4404 (AISI 316L) |
| 30 | double seal ring | 1 | 1.4404 (AISI 316L) |
| 51B | allen screw | 4 | A2 |
| 55 | set screw | 1 | A2 |
| 80C | O-ring | 1 | EPDM |
| 80D | O-ring | 1 | EPDM |
| 92 | straight connector 1/8" BSPT D.8 | 2 | 1.4401 (AISI 316) |

How to contact INOXPA S.A.U.:

Contact details for all countries are continually updated on our website

Please visit www.inoxpa.com to access the information.



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