



## Operating Instructions

### Premiumlobe Rotary Lobe Pump

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## 1 How to consult and keep this documentation

These operating instructions have been established by IPP Pump Products GmbH and refer to the installation, safe utilisation and maintenance of the Premiumlobe rotary lobe pump. In this sense this documentation and the use and maintenance manuals supplied by the manufacturers of the single components is an integral part of the Premiumlobe rotary lobe pump.

The purpose of all the documentation mentioned above is to enable the users of the Premiumlobe rotary lobe pump to operate the pump safely and thus the documentation contains clear rules of use; this documentation must be read carefully and understood by the users.

Please note that the specifications mentioned in any operating and maintenance manuals referring to this pump, have been developed in order to assure the safety and healthiness of the users. For this reason you as well as the operating and maintenance staff have to carefully read and understand these instructions and have to be able to apply the indications / procedures.

The compliance with these indications renders possible the safe utilisation of the pump as well as the execution of appropriate interventions. As indicated above the declaration of conformity as well as all operating and technical maintenance instructions of the Premiumlobe rotary lobe pump have to accompany the pump in case of a resale of the pump. This documentation has to be kept carefully until the final demolition of the pump and must be made available to the personnel appointed to operate the pump.

It is good practice not to damage the manual and keep it properly, Do not tear pages, dirty them or get them greasy, never expose them to sources of heat and always maintain the proper layout. This documentation and annexes must be made available to the personnel authorized to operate the pump in such way that it can be consulted easily; to clear any doubts about its safe operation and / or the execution of use and maintenance procedures.

The content of the technical manual reflects the state of the art at the time of construction of the machine in question. The technical manuals cannot be considered inadequate, as a result of technological improvements of the Premiumlobe rotary lobe pump.

The technical documentation and relative annexes are completely confidential: IPP Pump Products GmbH reserves all rights related to this use and maintenance manual and with the object presented therein. The receiving party recognises these rights to IPP Pump Products GmbH in the person of its legal representative, Mr. Fredrik Jönsson, and undertakes, in the absence of an explicit written consent, no to make it accessible to others, either in whole or in part and, not to use it outside the purpose for which it was created. Any violators will be prosecuted according to law.



### **WARNING**

For an appropriate safety management during the operation and maintenance of the Premiumlobe rotary lobe pump the complete technical documentation must accompany the pump, even in case of re-sale.



### **DANGER**

The technical documentation contains information / procedures referring to the utilization and execution of a safe maintenance of the Premiumlobe rotary lobe pump. It must be kept near to the

|                                                                                   |                                                                                   |                                                                                   |                                                                                            |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  |  | <p>Instruction &amp; Operation Manual</p> <p>Premiumlobe<br/>Rotary Lobe Pump</p> | <p>Date: 20/10/29</p> <p>Page 6 of 75</p> <p>Doc. No. 0076</p> <p>Name: T. Moldenhauer</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|

pump's location, at a place which is easily accessible for the operating staff. The person responsible for the operation and maintenance has to be able to find the documentation and consult it at any time.



All technical documentations regarding the Premiumlobe rotary lobe pump have to be kept at an easily accessible place so that they can be consulted quickly. Furthermore the personnel responsible for the operation and maintenance have to be informed about the place where the documentation is kept.

## 2 Used symbols

Important information about the technical reliability and safe utilization are presented as follows in these operating instructions (these symbols can always be found at the beginning of the text to which they refer).



The DANGER symbol draws the attention to a procedure, practice or similar measure which – if not performed correctly – can result in injury. Do not proceed beyond a DANGER symbol until you have fully understood and satisfied the conditions specified.



The WARNING symbol draws the attention to an operating procedure, practice or other similar measure which is potentially dangerous and which bears the risk of serious injury if the instructions are not followed exactly.



The ATTENTION symbol draws the attention to an operation procedure, practice or similar measure which might damage or even completely destroy the product if it is not executed or followed correctly. Do not proceed beyond an ATTENTION symbol, unless you have read and complied with the conditions specified.



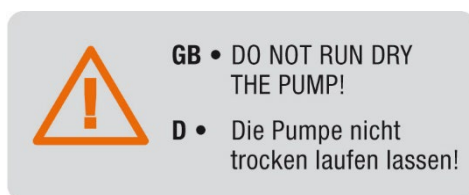
Refers to technical aspects for which the user of the equipment must pay particular attention.

|                                                                                   |                                                                                   |                                                                                   |                                                                                            |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  |  | <p>Instruction &amp; Operation Manual</p> <p>Premiumlobe<br/>Rotary Lobe Pump</p> | <p>Date: 20/10/29</p> <p>Page 7 of 75</p> <p>Doc. No. 0076</p> <p>Name: T. Moldenhauer</p> |
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### 3 Used tags

There are identification plates on the Premiumlobe rotary lobe pump for the different components of the unit. The identification plate at the left side of the pump shows the serial number of the Premiumlobe rotary lobe pump.

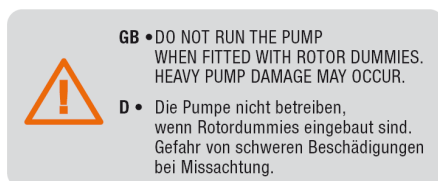
On the surface of the different components of the Premiumlobe rotary lobe pump there are warning tags which prohibit the dry running of the pump (tag A). If the Premiumlobe rotary lobe pump has been designed for liquids over 50°C there is a tag on the pump warning of hot surfaces (tag B).



A



B



C

### NOTE

Please note that the markings / tags at the Premiumlobe rotary pump may not be changed or removed.

### WARNING

It is not allowed to use any IPP Pump Products GmbH item without its identification plate. Should an item be without its identification plate the customer has to contact IPP Pump Products GmbH technical office so that the item can be identified and a new identification plate can be issued.

## 4 Terms and definitions

**Dangerous areas:** any area inside and / or in proximity of a machine in which the presence of an exposed person constitutes a risk for the safety and health of this person.

**Exposed person:** any person who finds himself either entirely or in part in a dangerous area.

**Machine:** Assembly of parts: according to definition in article 2 of the Directive 2006/42/EC of the European Parliament and the council of 17<sup>th</sup> May 2006.

**Manufacturer:** IPP Pump Products GmbH

**Customer:** Physical or legal person on whose behalf the machine is built, upon prior written acceptance of an order confirmation.

**Copyright:** 2012 IPP Pump Products GmbH

**Date of release:** 29.10.2020

**Doc. number:** 0076 – Date 10/2020



### WARNING!

- All work on and with the pump must always be in accordance with all the prevailing standards regarding occupational health and safety as well as machine safety.
- Never let the pump run without pump cover or without being connected to the piping!
- The pump may never be put into operation if the coupling is not provided with a proper coupling protection.
- When performing maintenance work to the pump, ensure that the drive of the pump is shut down and cannot be switched on unintentionally!
- Always wear protective gloves and safety goggles when performing maintenance work to the pump, if the pump conveys liquids which are a health hazard.
- Ensure that the pump is depressurized when it must be disassembled for maintenance purposes! Close any steam or heating water feeding pipes!
- If the pump is provided with a heating jacket and / or conveys hot liquids, let the pump cool down before starting maintenance work.
- When lifting a pump or a pump unit it is not allowed to stand under the hoisted load.
- Never insert your fingers into the pump case or into the connection ports. Even manually rotating of the shaft can cause injuries!
- Ensure that the drive motor cannot be started during works at the pump unit. Also ensure that the rotating parts are completely covered.
- If the pump has already been installed. Ensure that the pump is shut down and make sure that the pump cannot be switched on unintentionally!
- Any works at the electric drive motor may only be carried out by qualified staff!
- A pressure relief valve may ONLY be disassembled if the pump stands still, has cooled down and has been depressurized completely!
- The pump cover may ONLY be disassembled if the pump stands still, has cooled down and has been depressurized completely!



## ATTENTION!

- The piping system must ALWAYS BE CLEANED respectively be FREE OF SOLID MATTERS! After each new installation of the system, after each work at the system and each opening of the system an appropriate cleaning must be carried out!
- If there is the risk of exceeding the maximum operating pressure an appropriate safety device must be fitted to the pump, the motor or to the system!
- Always check the alignment of the coupling between pump and drive motor after hoisting the pump unit to its base plate.
- A pump which is NOT equipped with a QUENCHED or FLUSHED shaft seal may NEVER be installed in a position where it possibly could run DRY!
- The pump may never run if the gearbox is not filled with oil appropriately!
- The pump may never run with a closed pressure valve or blocked pressure pipe.
- When the pressure relief valve is activated the pump may only continue running for a short period in order to avoid the risk of overheating. A pressure relief valve is a safety device, not a flow control!
- Avoid extreme temperature fluctuations of the pumped liquid. This could cause damages to the pump if the pump components expand / shrink.
- The indicated maximum values for operating pressure, the speed and the temperature may never be exceeded!
- When emptying the pump make sure that it does not run dry! Dry running is only permitted if the pump is equipped with a flushed shaft seal.

## 5 Intended use

The Premiumlobe rotary lobe pump manufactured by IPP Pump Products GmbH has been designed and manufactured for the installation in industrial plants of third parties. Its purpose is to pump liquids which comply with the materials used in the construction of the pump.

For an appropriate installation all technical indications of these operating and maintenance instructions must be complied with.

The utilization of the Premiumlobe rotary lobe pump is only permitted within the admissible ranges of pressure and temperature under consideration of chemical and corrosive influences. Any utilization exceeding the indicated operating ranges and specifications is being considered as improper use. Any damages resulting from this will void responsibility of the manufacturer and the user bears the full risk.

Please contact IPP Pump Products GmbH if the pump shall be used for any other application or at any other conditions than those which are part of the agreed specifications according to which the pump had been selected.



## DANGER

Any improper use of the Premiumlobe rotary lobe pump is forbidden without the written permission of IPP Pump Products GmbH.

## 6 Introduction

### 6.1 General information

These operating instructions contain important information about the correct installation, utilization and maintenance of the pump.

Furthermore, this manual provides the necessary information for the installation staff / operating staff in order to avoid injuries and problems during the installation and operation of the pump and in order to guarantee the correct handling of the machine and ensure a perfect functioning of the pump.

This manual represents the most recent information regarding the pump types mentioned in this manual at the time printing. IPP Pump Products GmbH reserves the right to modify the construction of the mentioned pump types as well as the contents of this manual without prior or afterward notification.



### ATTENTION

Read this manual thoroughly before installing, operating respectively repairing this pump. Ensure that operators and technical maintenance staff are familiar with the symbols used and have understood the content. The instructions of this manual must be followed step by step.

### 6.2 Warranty

Warranty is strictly limited to the conditions specified by IPP Pump Products GmbH and will only be granted according to these conditions.

Warranty will only come into force provided that:

- The pump has been installed and put into operation strictly in accordance with the instructions given in this manual;
- Any maintenance and repair works have been executed according to the instructions given in this manual;
- Only original IPP Pump Products GmbH parts or parts provided by IPP Pump Products GmbH have been used for replacement;
- The pump has been used according to the agreed conditions only;
- The construction principle of the pump has not been changed by the buyer;
- The damages in question are not result of work carried out by persons not qualified or appointed.
- The damage has not been caused through force majeure.

### 6.3 Transport and receiving of the goods

Please make sure that the pump has not been damaged during transport. If any damage has occurred, the transport company and IPP Pump Products GmbH must be notified of this immediately.



### ATTENTION

In order to facilitate the transport on your premises and in order to protect the pump as good as possible, please leave the pump on the pallet or in the crate as long as possible until it has reached its final position.

## 6.4 How to identify the pump

The serial number and the model type of the pump can be seen on the identification plate. Please always indicate the relevant serial number and model on any correspondence and order for spare parts.

### Manufacturer

Die Premiumlobe – Rotary lobe pumps are manufactured by

IPP Pump Products GmbH  
Feldmühlenweg 6 - 10  
D- 49593 Bersenbrück  
Phone +49 (0) 5439-80921-0  
Fax. +49 (0) 5439-80921-20  
[info@pump-products.de](mailto:info@pump-products.de)  
[www.pump-products.de](http://www.pump-products.de)

## 7 Safety

### 7.1 General information

This manual provides the necessary information to prevent the installer / operator from injury or discomfort during installation and operation of this pump and to ensure the correct use and reliable performance of the pump.

- Read this manually thoroughly before installing, operating or servicing this pump.
- Make sure that operating and maintenance staffs are familiar with the contents of this manual and with the relevant instructions.
- Make sure that the operating and technical maintenance staffs are familiar with the symbols used.
- Follow the instructions of this manual step by step.
- This manual has to be stored at a place which is known and accessible to any user.

### 7.2 Staff

All personnel in charge of the installation, operation or maintenance of the pump must have received the necessary training and qualification.

### 7.3 Precautions

- When performing maintenance work to the pump ensure that the drive motor is shut down and cannot be switched on unintentionally!
- All work on and with the pump must always be in accordance with all the prevailing standards regarding occupational health and safety as well as machine safety!
- Always wear protective gloves and safety goggles if the pump conveys harmful liquids that may cause injuries!
- Make sure that the pump is depressurized if it has to be disassembled for overhaul!
- Let the pump cool down first if it is fitted with heating jacket and / or if it is conveying hot liquids.

## 8 Risk assessment relating to the use of ipp pump products GmbH Premiumlobe Rotary Lobe Pumps and pump units in potentially explosive atmospheres



### NOTE

For a feature to be suitable for an application, the feature must be fit for its designated purpose and also suitable for the environment where it is to be installed.

| Source of Hazards                  | Potential Hazards                                                                      | Frequency of Hazards | Recommended Measures                                                                                                                             |
|------------------------------------|----------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Unvented cavities                  | Build up of explosive gas                                                              | Very Rare            | Ensure that pump is totally filled. Consider mounting ports vertically.                                                                          |
| Rotorcase / Rotors / Front Cover   | Unintended mechanical contact                                                          | Rare                 | Ensure that operating pressures are not exceeded. Ensure that sufficient NPSH to prevent cavitation. System Design and installation Service plan |
| Pump external surfaces             | Excess temperature. Electrostatic charging                                             | Rare                 | User must ensure temperature limits. Do not overfill gearboxes with lubricant. Provide a ground contact for pump. Service plan                   |
| Cover "O" ring                     | Pump liquid leakage. Build up of explosive gas.                                        | Very Rare            | Check selection of elastomers are suitable for application. Ensure cover retaining nuts are tight. Service plan.                                 |
| Pump casing / cover                | Pump liquid leakage. Build up of explosive gas.                                        | Very Rare            | Stainless steel, Corrosion resistant.                                                                                                            |
| Shaft seals                        | Excess temperature. Unintended mechanical contact. Leakage. Build up of explosive gas. | Rare                 | Selection of seal system must be suitable for application.                                                                                       |
| Auxiliary system for shaft sealing | Pump liquid leakage. Build up of explosive gas.                                        | Rare                 | Selection of auxiliary seal system must be suitable for application.                                                                             |
| Rotation direction test            | Excess temperature                                                                     | Very Rare            | If flushed seals are installed ensure that flush is applied to seal assembly. Only allow pump to run for minimum period – just                   |

|                                                                                                             |                                                                                   |                                                                               |                                                                          |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <br>a <b>DOVER</b> company |  | Instruction & Operation Manual<br><br><b>Premiumlobe<br/>Rotary Lobe Pump</b> | Date: 20/10/29<br>Page 13 of 75<br>Doc. No. 0076<br>Name: T. Moldenhauer |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------|

|                                               |                                                                                       |           |                                                            |
|-----------------------------------------------|---------------------------------------------------------------------------------------|-----------|------------------------------------------------------------|
|                                               |                                                                                       |           | a few seconds.                                             |
| Closed valve condition                        | Excess Temperature.<br>Excess Pressure.<br>Mechanical contact.                        | Rare      | Can cause excessive pressure, heat and mechanical contact. |
| Shaft                                         | Random induced current                                                                | Very Rare | Provide a ground contact for pump                          |
| Mechanical shaft coupling (Torque Protection) | Temperature from friction. Sparks from break up of shear pins. Electrostatic charging | Rare      | Coupling selection must suit application.                  |
| Mechanical shaft coupling (standard)          | Break up of spider. Unintended mechanical contact. Electrostatic charging             | Rare      | Coupling selection must suit application. Service plan.    |

## 8.1 Atex Information Plate

The nameplate of a pump or a pump unit certified for “Explosion protection” contains the following data:

|                                                                                                                                       |                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>II 2 G ck T4</b>                               |                                                                                                                                             |
| <div>SERIAL NUMBER I</div>                                                                                                            |                                                                                                                                             |
|                                                    |  <b>PUMP PRODUCTS<br/>GMBH</b><br>SOLUTIONS & TECHNOLOGY |
| <div>PUMP-SERIES I</div>                                                                                                              |                                                                                                                                             |
| <div>MODEL I</div>                                                                                                                    |                                                                                                                                             |
| <div>SERIAL NUMBER I</div>                                                                                                            |                                                                                                                                             |
| Feldmühlenweg 6-10 · D-49593 Bersenbrück<br>Fon +49 (0) 5439-80921-0 · <a href="http://www.pump-products.de">www.pump-products.de</a> |                                                                                                                                             |

### Pump type code:

example:

PREMIUMLOBE (see the User manual of the pump for the explanation)

**Serial number:** manufacturers' serial number of the pump

**Ex marking:** Ex-symbol followed by ATEX type designation (see examples on next page).

## 8.2 ATEX type designation examples

Example 1:

### Ex II 2G c k T4

**II 2G** marking according to Group II, Category 2,  
Gas (G) protection,  
**c k** marking essential for safe use ignition protection  
(c = constructional safe, k = protection by liquid immersion)  
**T4** temperature class T4

Example 2:

### Ex II 2D c k 240°C

**II 2D** marking according to Group II, Category 2,  
Dust (D) protection,  
**c k** marking essential for safe use ignition protection  
(c = constructional safe, k = protection by liquid immersion)  
**240°C** for a maximum surface temperature of 240°C

The environment temperature must be between -20°C and +40°C, if not, the corresponding environment temperature will be indicated on the nameplate.

### 8.2.1 Equipment Groups & Categories

| Equipment-groups (annex I of the EC-Directive 94/9/EC)                                             |                                                                                                            |                                                                                                                                  |                          |                                                                                                                        |                          |                                                                                                                               |                          |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Group I                                                                                            |                                                                                                            |                                                                                                                                  |                          | Group II                                                                                                               |                          |                                                                                                                               |                          |
| (Mines, mine gas and dust)                                                                         |                                                                                                            |                                                                                                                                  |                          | (other explosive atmospheres gas/dust)                                                                                 |                          |                                                                                                                               |                          |
| Category M                                                                                         |                                                                                                            | Category 1                                                                                                                       |                          | Category 2                                                                                                             |                          | Category 3                                                                                                                    |                          |
| 1                                                                                                  | 2                                                                                                          | G<br>(gas)<br>(Zone 0)                                                                                                           | D<br>(dust)<br>(Zone 20) | G<br>(gas)<br>(Zone 1)                                                                                                 | D<br>(dust)<br>(Zone 21) | G<br>(gas)<br>(Zone 2)                                                                                                        | D<br>(dust)<br>(Zone 22) |
| For equipment providing a very high level of protection when endangered by an explosive atmosphere | For equipment providing a high level of protection when likely to be endangered by an explosive atmosphere | For equipment providing a very high level of protection when used in areas where an explosive atmosphere is very likely to occur |                          | For equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur |                          | For equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur |                          |

### 8.3 Remark on EX type plate concerning CE-marking

A single pump without drive, according to the EC-Machine Directive, is not considered to be a machine and does not have to be CE-marked: a II-B Manufacturers Declaration will suffice. However the CE-marking is prescribed by the ATEX regulations, and therefore is compulsory.

### 8.4 Temperature classes and allowable temperatures

During normal operation the highest temperature on the surface of the pump will either correspond to the temperature of the pumped liquid, increased with a safety margin for a possible local temperature rise on the mechanical seal, or to the temperature of the gearbox oil or to the heating medium, in case the pump is heated by jackets. The maximum permissible temperature depends on the temperature class (T4) or on  $T_{max}$  to be complied with. The complete pump surface must be freely exposed to the atmosphere to allow proper cooling. The ATEX type designation is related to ambient temperatures of maximum 40°C. If the ambient temperature is over 40°C, corrections must be made according to the difference. Refer to your local Ipp Pump Products GmbH supplier.

### 8.5 Responsibility

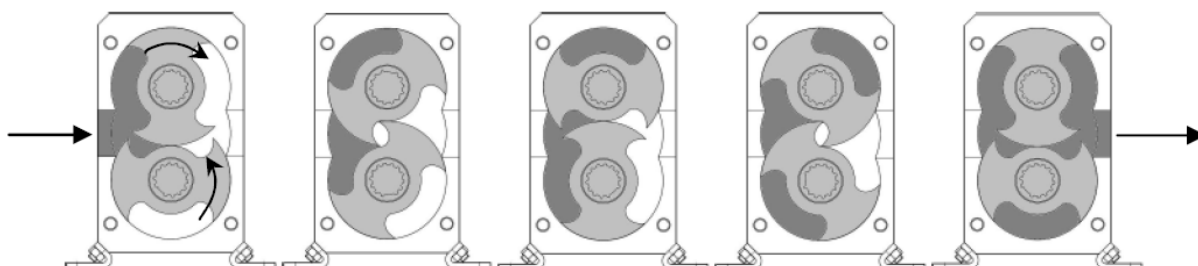
It is the responsibility of the operator to ensure specified product temperatures are not exceeded and to ensure regular inspections and maintenance for proper functioning of the shaft seal, the bearings and the internal pump parts. If this cannot be ensured by the operator, suitable monitoring facilities must be provided.

## 9 General Information

### 9.1 Pumping Principle

A lobe pump is a rotary positive displacement pump. The operating principle is based on the counter-rotation of 2 rotors in a rotor case. Both rotors are fixed on shafts. The shafts are supported by a bearing house, which is directly mounted on the rotor case. One shaft is driving the other is driven synchronously by timing gears. The rotors do run without contact in the rotor case. The chamber between rotors and rotor case rotate from inlet to outlet. When passing the inlet, the atmospheric pressure pushes liquid in the chamber, which is transported to the outlet and finally displaced. The pumped product seals the clearances between the rotors and the clearances between the rotors and the rotor case.

Depending on the pumped liquid properties and the operation conditions, a Rotary Lobe Pump runs with slip.



### 9.2 Range of products

#### 9.2.1 Connections

The scope of supply comprises pump types with connections DN20, DN25, DN40, DN 50, DN65, DN80, DN100, DN125 and DN150. The ports can either be in horizontal or in vertical position.

### 9.2.2 Shaft Seals

The following options of shaft seals are available:

- Single Mechanical Seal
- Double Mechanical Seal for Flush (pressurized or non-pressurized)
- Lip seal

### 9.2.3 Models

| Type    | Capacity [L/rev.] | max. differential pressure[bar] | max. no. of rotations [min <sup>-1</sup> ] | Nominal connection width | Weight [kg] |
|---------|-------------------|---------------------------------|--------------------------------------------|--------------------------|-------------|
| L55sxx  | 0,01              | 15                              | 1400                                       | DN15                     | 10,5        |
| L55sx   | 0,03              | 15                              | 1400                                       | DN15                     | 10          |
| L55s    | 0,039             | 15                              | 1400                                       | DN15                     | 10,5        |
| L55i    | 0,056             | 15                              | 1400                                       | DN25                     | 11,0        |
| L55l    | 0,094             | 9*                              | 1400                                       | DN32                     | 12,0        |
| L63sxx  | 0,049             | 50                              | 1200                                       | DN20                     | 35          |
| L63i    | 0,11              | 15                              | 1200                                       | DN40                     | 17          |
| L63l    | 0,17              | 15                              | 1200                                       | DN50                     | 19          |
| L85sxx  | 0,10              | 80                              | 1100                                       | DN15                     | 35          |
| L85sx   | 0,167             | 30                              | 1100                                       | DN32                     | 33          |
| L85s    | 0,21              | 20                              | 1100                                       | DN40                     | 35          |
| L85i    | 0,28              | 15                              | 1100                                       | DN50                     | 38          |
| L85l    | 0,35              | 15*                             | 1100                                       | DN65                     | 40          |
| L115sxx | 0,3               | 80                              | 950                                        | DN32                     | 100         |
| L115sx  | 0,40              | 30                              | 950                                        | DN40                     | 90          |
| L115s   | 0,55              | 20                              | 950                                        | DN50                     | 95          |
| L115si  | 0,75              | 20                              | 950                                        | DN65                     | 98          |
| L115i   | 0,95              | 15                              | 950                                        | DN80                     | 101         |
| L115l   | 1,23              | 15*                             | 950                                        | DN100                    | 110         |
| L130sx  | 1,23              | 40                              | 850                                        | DN65                     | 170         |
| L130s   | 1,6               | 22                              | 850                                        | DN80                     | 181         |
| L130i   | 1,97              | 15                              | 850                                        | DN100                    | 192         |
| L130l   | 2,34              | 9                               | 850                                        | DN100                    | 202         |
| L160sxx | 1,02              | 80                              | 800                                        | DN32                     | 245         |
| L160sx  | 1,29              | 50                              | 800                                        | DN50                     | 255         |
| L160sx  | 1,29              | 40                              | 800                                        | DN50                     | 220         |
| L160s   | 1,60              | 30                              | 800                                        | DN80                     | 245         |
| L160i   | 2,40              | 20                              | 800                                        | DN100                    | 270         |
| L160l   | 3,41              | 15*                             | 800                                        | DN150                    | 320         |

\*) Depends on the clearances.

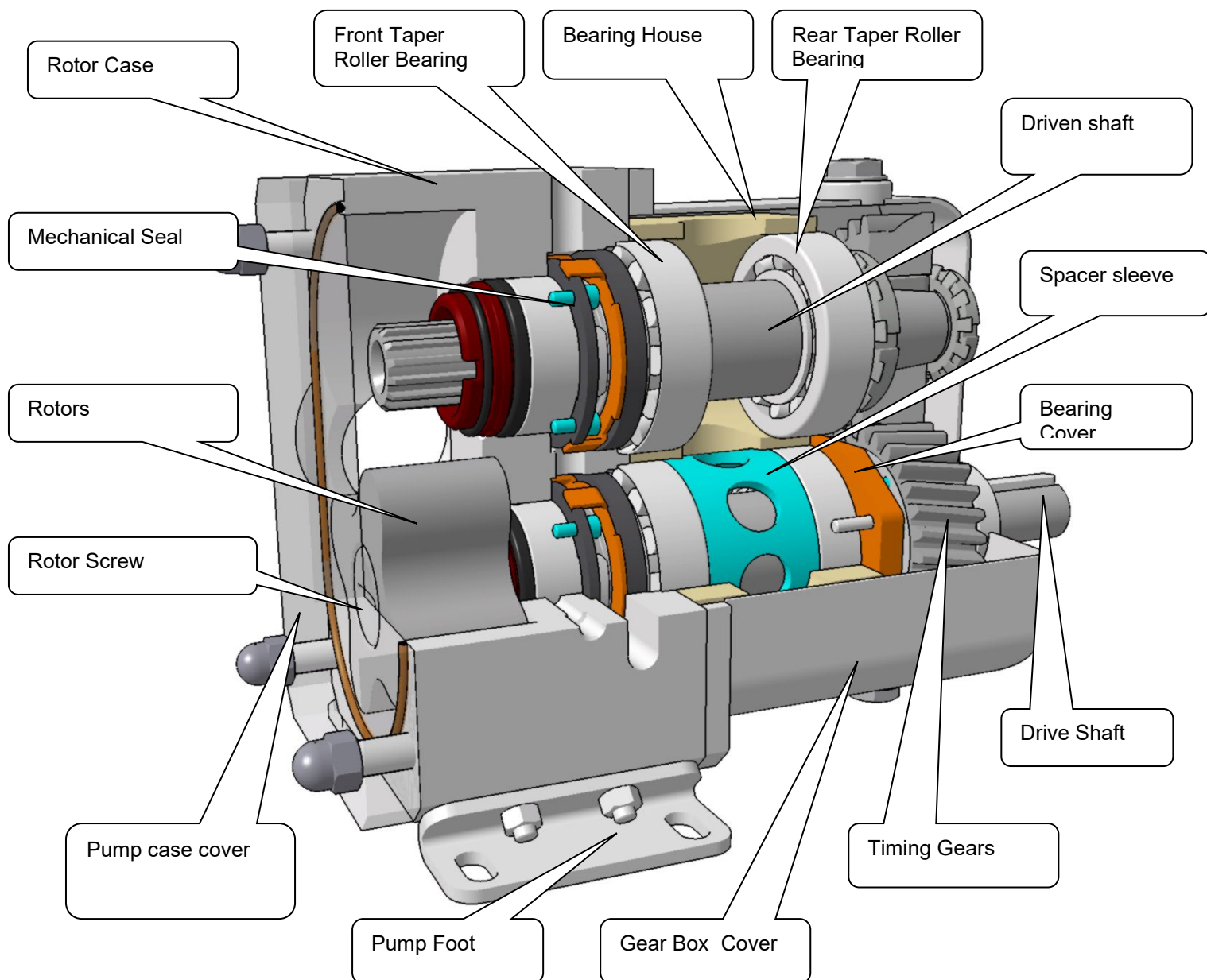


### NOTE

The given Data are maximum limits. Depending on the individual duty conditions, the limits can vary.

## 10 Main Components

The pump with its main components:



## 11 Installation

### 11.1 General Information

- The foundation must be solid, flat and even.
- The area, in which the pump is placed, must be well vented. Too high temperature or air humidity, or a dusty atmosphere, may have negative effects on the performance of an electric motor.
- The area around the pump-unit must be sufficient for the pump to be operated, cleaned or repaired.
- To ensure an unobstructed air supply to an electric motor there must be a free space behind the fan cover, equal to 1/4 of its diameter.



#### **DANGER**

All work on and with the pump must always be in accordance with all the prevailing standards regarding occupational health and safety as well as machine safety.

### 11.2 Transport



#### **ATTENTION**

In case the pump or the pump-unit is delivered on a pallet, leave it on the pallet as long as possible. This will facilitate the internal transport.

### 11.3 Storage Conditions

If the pump is not installed immediately following storage instructions have to be obeyed for a future troublefree operation.

Store the pump at a temperature of ca. 20°C. Protect it against wetness, dust as well as against mechanical influences and UV radiation.

If you plan to store the pump for more than one year, you should oil the coupling and fill the gearbox completely with oil. Please note that before the pump is put into operation the oil filling level of the gearbox has to be reduced to the operation level (see chapter 11.16). To avoid potential damage caused by foreign objects in the pump, close the connections of the pump with the included sealing caps.

In case the pump as already been in operation, clean it thoroughly both internally and externally. If the pump is equipped with a flush tank, the flush tank and its connecting pipelines have to be completely emptied and also cleaned thoroughly.

When the pump is stored with an engine, make sure the engine is protected against cold, dust and especially wetness, even by air humidity. Furthermore, the instructions for storage and transport of the manufacturer of the engine have to be obeyed.

To avoid potential damage on the gearbox and the mechanical seals, the shafts have to be checked for ease of movement before putting into operation.

## 11.4 Lifting

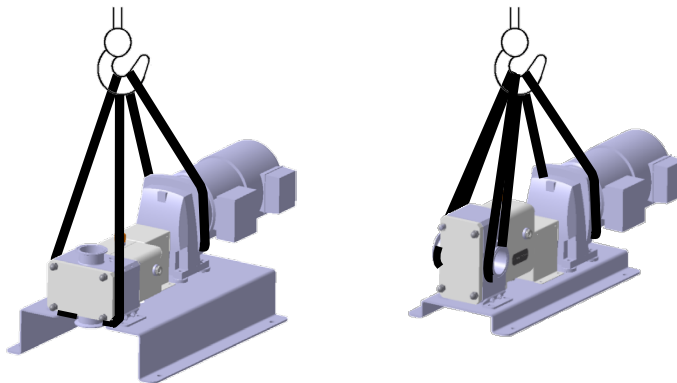
If there is a proper hoisting device available, use this to move the pump (-unit).



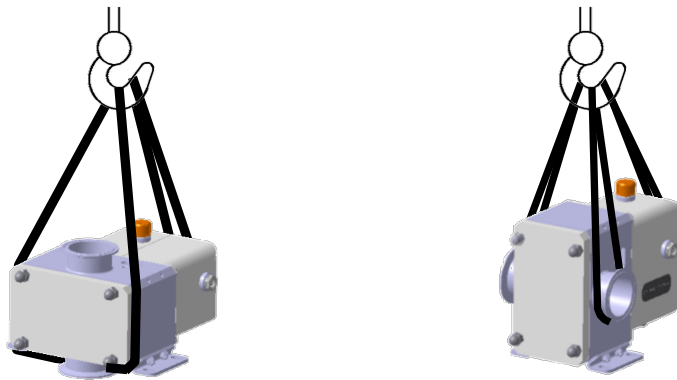
### DANGER

It is not allowed to stand under suspended loads!

In case the pump is assembled with a motor on a base plate, the pump-unit must always be hoisted with the straps fixed as shown in the following figure:



In case a bare shaft pump must be hoisted, fix the straps as follows:



### DANGER

Never insert fingers into the rotor case or into the connection ports. Even manually rotating the shaft can cause injury!



### ATTENTION

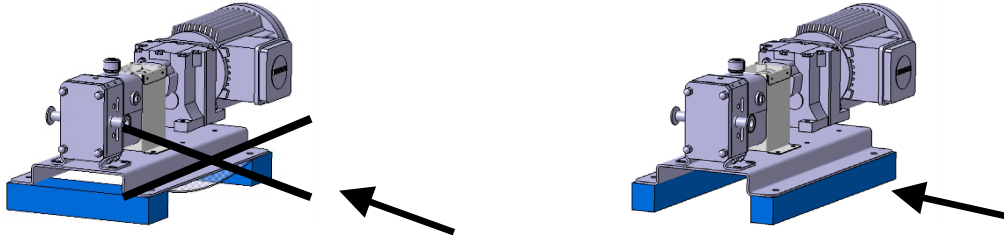
If the risk exists of exceeding the maximum working pressure a safety device must be fitted to the pump, the drive or the system!

## 11.5 Foundation

The foundation must be solid, flat and level.

Take into consideration the need for draining facilities.

The entire weight of the base plate should rest level on the foundation. The base plate may not bend!



## 11.6 Installation Dimensions

The correct installation dimensions of the pump are part of the unit drawing which has been supplied separately or which can be obtained at IPP Pump Products GmbH.

For details regarding the most important dimensions of the bare shaft pump, please refer to chapter 16.5 of this manual.

## 11.7 Piping System

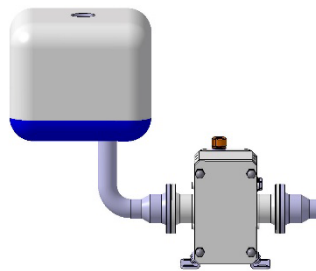
The piping must meet the following requirements:

### 11.7.1 General Information

- Ensure the piping is sufficiently supported, especially besides the inlet and outlet ports. The piping should be fully supported independently from the pump.
- The connections must be fitted square to the pump.
- The lines must be fitted and connected stress-free.
- Piping which is fitted obliquely, insufficiently supported or exerting force to the pump may cause serious damage to the pump!
- Check if the piping shows any visible leakage.

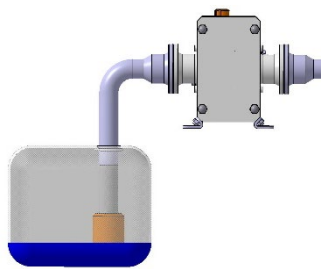
### 11.7.2 Inlet Piping

It is recommended to place the pump below the supply liquid level. A flooded suction reduces the presence of air in the system.

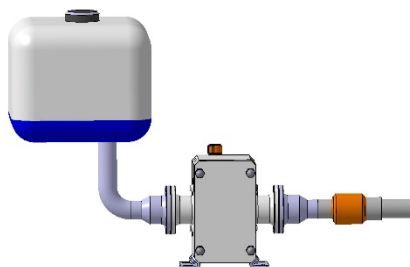


## 11.8 Non-Return Valves

In case the pump is installed **above** the supply liquid level fit a non-return valve to the foot of the suction line to keep it filled with liquid. This applies especially when low-viscous liquids are conveyed.



For systems that convey liquid under vacuum, a non-return valve in the delivery line is recommended. This prevents backflow of air or liquid.



## 11.9 Pump with pressure relief valve

If the pump is provided with a safety valve to the pump cover, it is compulsory to install a **pressure gauge** at pressure side and a **shut-off valve** directly after the pressure gauge! The pressure gauge and the shut-off valve are needed to adjust the set pressure. The pressure gauge must have a measuring range of at least 0-25 bar.

## 11.10 Assembly of the pump unit

In case the pump is supplied as a single pump, it needs to be assembled to a drive and a base plate.

This is done as follows:

- Place the pump onto the base plate and fit it with retaining bolts.
- Fit a coupling half to the pump shaft.
- Fit the other half to the drive shaft of the drive.
- Fit the drive to the base plate. Leave a 3 mm gap between both coupling halves.
- Place copper shims under the feet of the drive to bring it on a level with the pump. Fix the drive.
- Align the coupling according to the following instructions.

### 11.10.1 Alignment of the coupling

After the assembly and set-up of the pump-unit the alignment of the coupling needs to be checked.

Always check the alignment after hoisting the pump-unit up to its base plate!



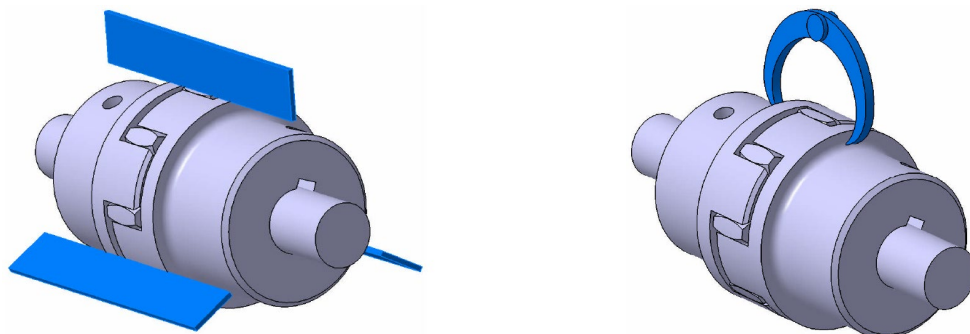
### NOTE

Misalignment can lead to excessive wear, increased motor temperature and noise level.

Check the alignment using special alignment equipment, or do the following:

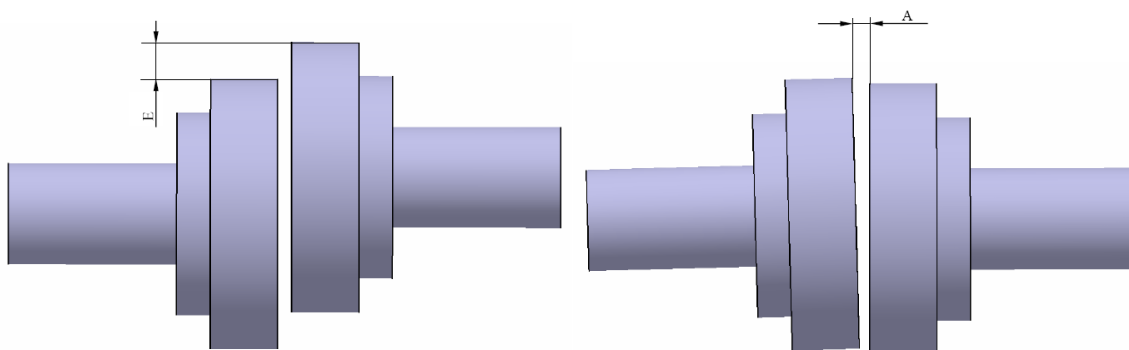
- Place a ruler on the coupling. It must be adjacent to the entire width of the coupling halves, see figure.
- Repeat this check at 3 different positions around the coupling.
- Check the alignment with a pair of outside callipers at 2 diametrically opposite positions of the coupling sides, see figure.
- If the measured values are outside the tolerance limits slightly loosen the retaining bolts of the drive and move the drive until the values are within their tolerance limits. Fix the retaining bolts again.

- When the coupling is well aligned mount the coupling guard.



### 11.10.2 Alignment Tolerances

The following table with its corresponding figure shows the tolerance limits for aligning the coupling.



| Outer Diameter<br>Coupling [mm] | A must be<br>between [mm] | Max. difference<br>between $A_{\max}$ and<br>$A_{\min}$ [mm] | E must be<br>between [mm] |
|---------------------------------|---------------------------|--------------------------------------------------------------|---------------------------|
| 81-95                           | 2 – 4                     | 0.15                                                         | 0 – 0.15                  |
| 96-110                          | 2 – 4                     | 0.18                                                         | 0 – 0.18                  |
| 111-130                         | 2 – 4                     | 0.21                                                         | 0 – 0.21                  |
| 131-140                         | 2 – 4                     | 0.24                                                         | 0 – 0.24                  |
| 141-160                         | 2 – 6                     | 0.27                                                         | 0 – 0.27                  |
| 161-180                         | 2 – 6                     | 0.30                                                         | 0 – 0.30                  |
| 181-200                         | 2 – 6                     | 0.34                                                         | 0 – 0.34                  |
| 201-225                         | 2 – 6                     | 0.38                                                         | 0 – 0.38                  |

### 11.11 Connection of the pipes



#### **DANGER**

Ensure the engine can not be started when work is performed to the pump-unit and the rotating parts are not completely covered!



#### **ATTENTION**

Ensure that the whole system is thoroughly flushed and cleaned. The whole system must be free from debris and particles, because they could get into the pump and cause serious damage to rotors and rotor case!



#### **ATTENTION**

A pump which is NOT equipped with a QUENCHED shaft seal, may NEVER be installed in a position where it possibly could run DRY!

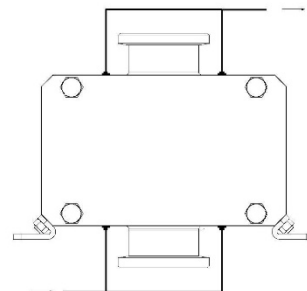
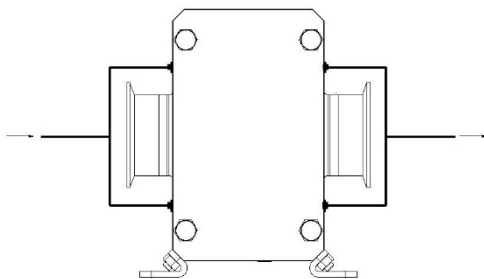
### 11.12 Flushing of the shaft seals

When equipped with double mechanical shaft seal connect the flush pipes to the shaft seal chamber, through the openings in the rotor case. The standard connections are threaded G1/8" or DIN ISO DN08 BBS connections.

If a low pressure flush or quench are used, the flush system must have a capacity of 2.5 l / min. at 0.2 bar max. In case of a vertical position of the connection ports, connect the flush pipes feeding at the bottom part!

If a pressurized flush is used the flushing system must have a capacity of 2.5 l/min at a pressure of 2 bars higher than the system pressure.

In case of a vertical position of the connection ports, connect the flush pipes feeding at the bottom part!



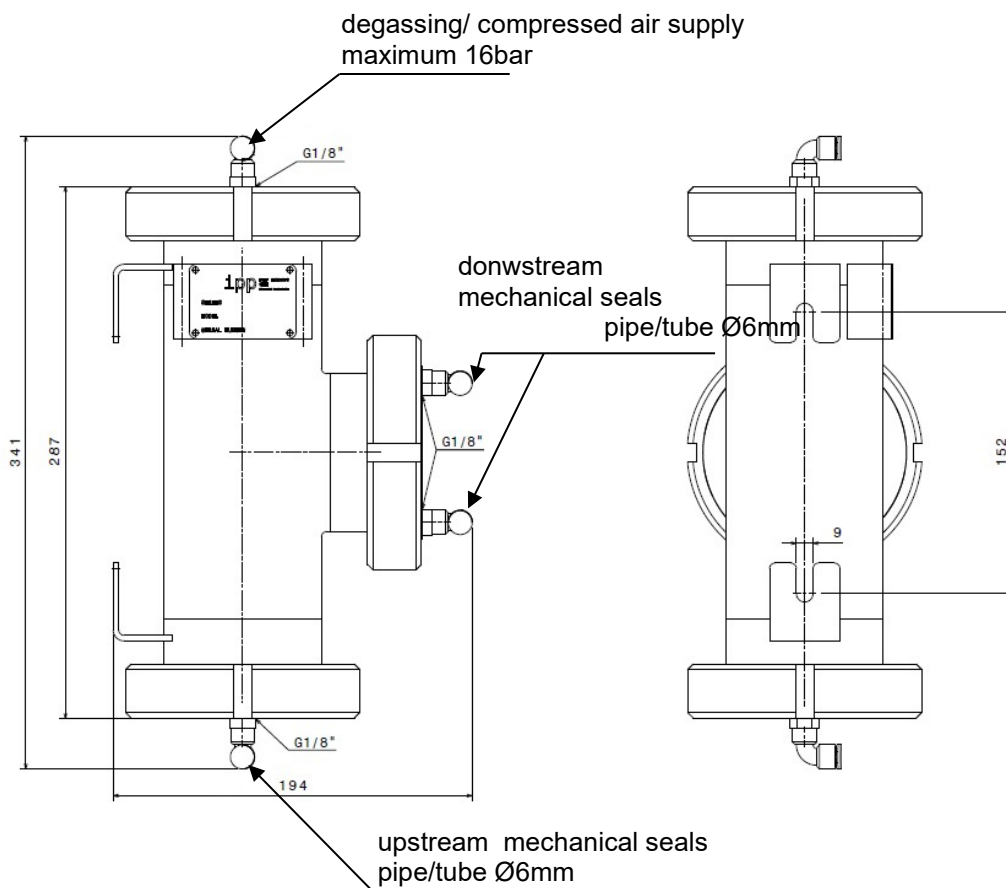
### 11.13 Barrier pressure tank / Barrier fluid tank

The barrier pressure tank is delivered from the factory without barrier fluid. To avoid damages to the mechanical seals the barrier pressure tank must be filled with a suitable liquid before start-up of the pump.

The barrier pressure tank can be operated depressurized or under pressure. When operating under pressure the sealing pressure must be app. 2 bar higher than the operating pressure of the pump to be sealed. The sealing pressure must not exceed the admissible pressure of 16 bar.

If the barrier pressure tank is operated depressurized, it serves as quench tank and consequently the liquid is a flush fluid.

#### 11.13.1 Overview barrier pressure tank

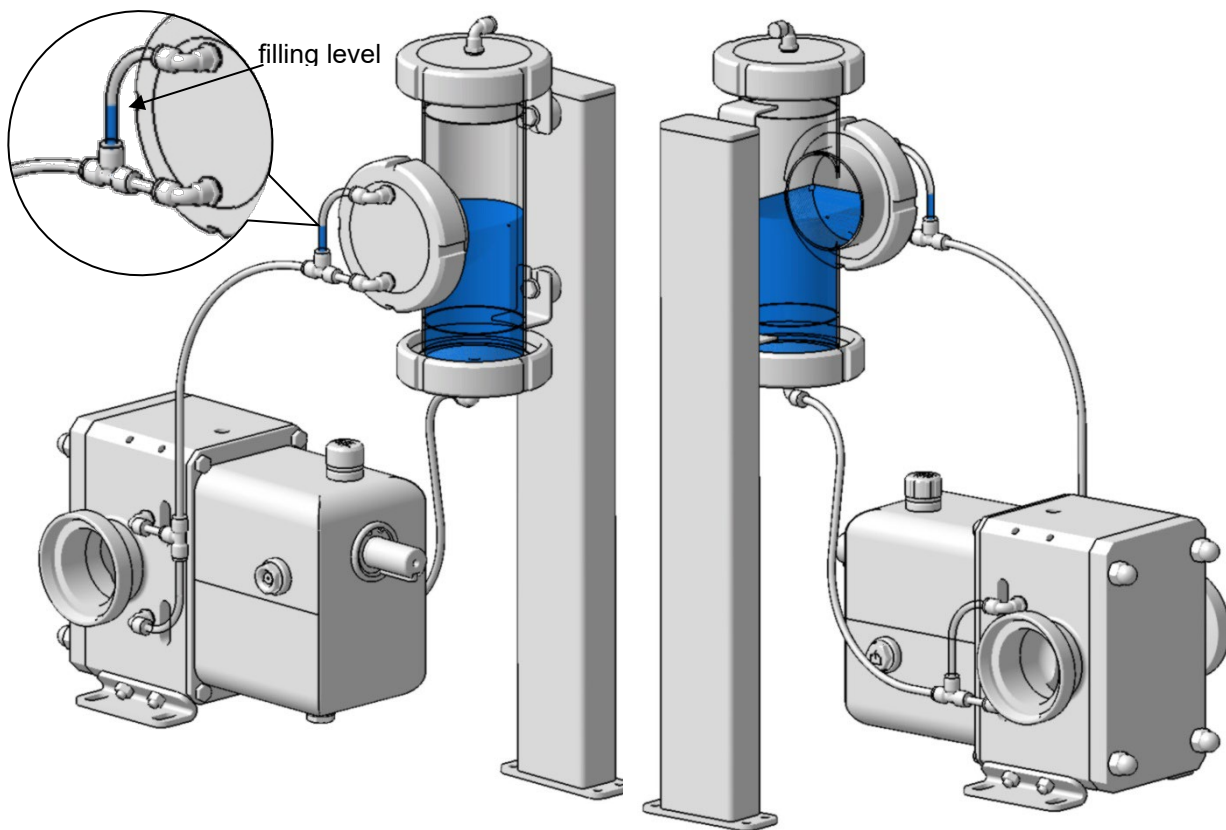


### 11.13.2 Assembly and connection of the tank

In general the barrier pressure tank is delivered connected to the pump with hoses and fixed onto the base plate. In special cases it might be possible that the barrier pressure tank is not delivered assembled and must be installed by the customer on site. In case of a later assembly the following points must be observed:

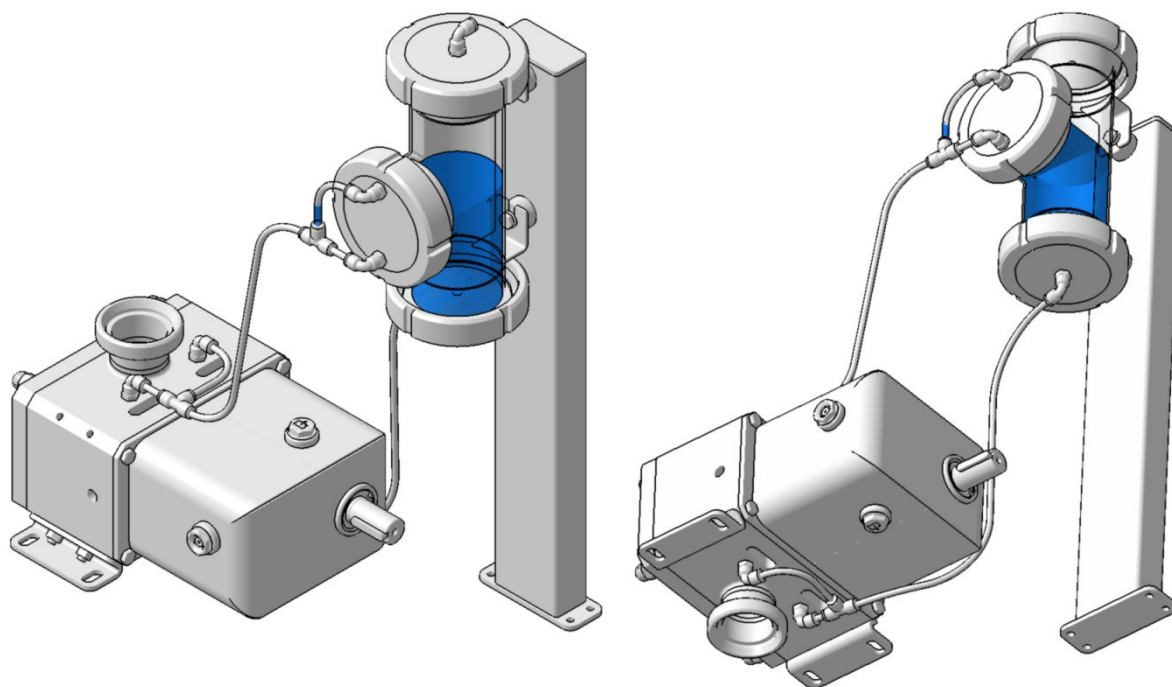
As this barrier pressure unit is a buffer system with thermosiphon circuit the barrier pressure tank must be arranged in a way that the pipes leading to the mechanical seal are continuously declining and the pipes from the mechanical seals to the barrier pressure tank are continuously rising.

In case of a horizontal position of the connection ports the pipes can either be connected serially or in parallel. If the mechanical seals should be flushed in parallel it must be observed that the T-piece of the flow pipe is not positioned above the bottom flush connection. The T-piece of the return pipe should be installed at least on the same height as the top flush connection. When laying the pipes respectively hoses it must always be made sure to prevent a later formation of lumps in order to guarantee the perfect circulation of the barrier liquid.



Parallel flushing mechanical seals

If the pump position is vertical the flush pipes can only be connected in parallel. The feed must be at the bottom part and the return at the top part of the pump.



Flushing of mechanical seal vertical

The ports can be connected with hoses or pipes. The selection of the material depends on the application field and on the barrier liquid and must be done by the customer himself.

### 11.13.3 Selection of barrier fluid

The barrier fluid must be compatible to the pumped fluid to be sealed, it must have suitable lubricating characteristics and sufficient heating capacity. In case of ATEX-execution it must further be observed that the barrier fluid is electrically conductive.

The barrier fluid should be soluble in the pumped fluid in order to guarantee a mixing of both fluids and a complete and thorough flushing of the mechanical seals.

When selecting the O-rings and seals which get in contact with the flushing fluid these must be checked for compatibility with the selected barrier fluid.

#### 11.13.4 Filling and emptying the tank



### **DANGER**

Never open a barrier pressure tank under pressure. Before opening the barrier pressure system must always be completely depressurized. To avoid scalding by escaping barrier fluid let the barrier pressure system cool down before opening.

For filling the barrier pressure tank must be opened by screwing off the upper locknut with a suitable tool (e.g. hook wrench for locknut DN80). The system is being filled until the filling level has reached the middle of the hose between T-piece and upper entry of the barrier fluid tank (see 11.13.2).

At special executions with sight glass the filling level should be app. in the middle of the sight glass. If a filling level monitoring system is installed the operating manual of the system must be observed.



### **ATTENTION**

On any variation of barrier pressure tanks the circulation system must always be closed.

Then the barrier fluid tank is closed with the locknut and can be put into operation.

The change of the barrier fluid should be done in suitable intervals. For this purpose the feed pipe is loosened at the lowest point and the barrier fluid tank and the drain pipe are emptied. To remove residual liquid in the mechanical seals the detached feed pipe is closed and an air pressure pipe is connected to the upper connection port of the tank. Then the open circuit is pressurized. Afterwards the system can be cleaned and the barrier pressure tank can be refilled.

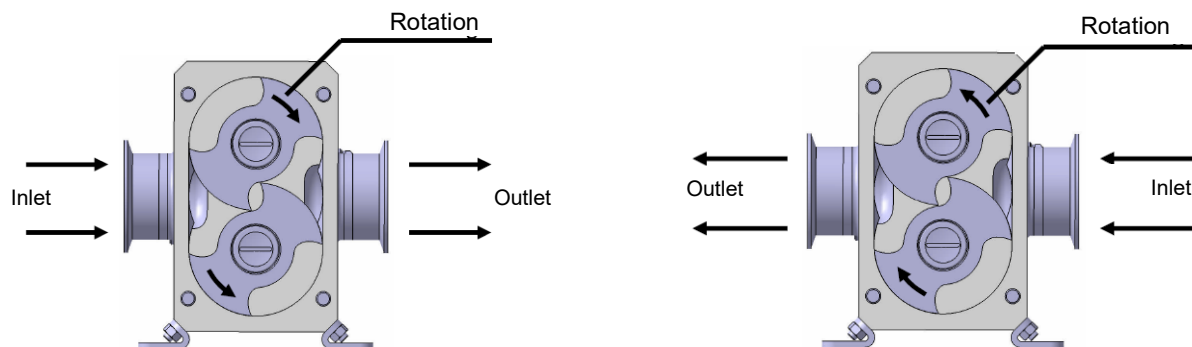
## 11.14 Direction of Rotation



### ATTENTION

Never operate the pump without front cover or without being connected to the piping!!

Before connecting the drive to the power supply, the correct direction of rotation of the drive shaft must be established. The pump operates in both directions. At the same time the drive shaft can have different positions. See following figure to establish the correct direction of rotation of the drive shaft.



## 11.15 Connecting the drive



### DANGER

The pump may never be put into operation if the coupling is not provided with a proper fitting guard!

When driven by an electric drive:



### DANGER

An electric drive may only be connected to the electric power supply by a qualified electrician! Consult the locally prevailing regulations of the electricity company first, before connecting an electric drive!

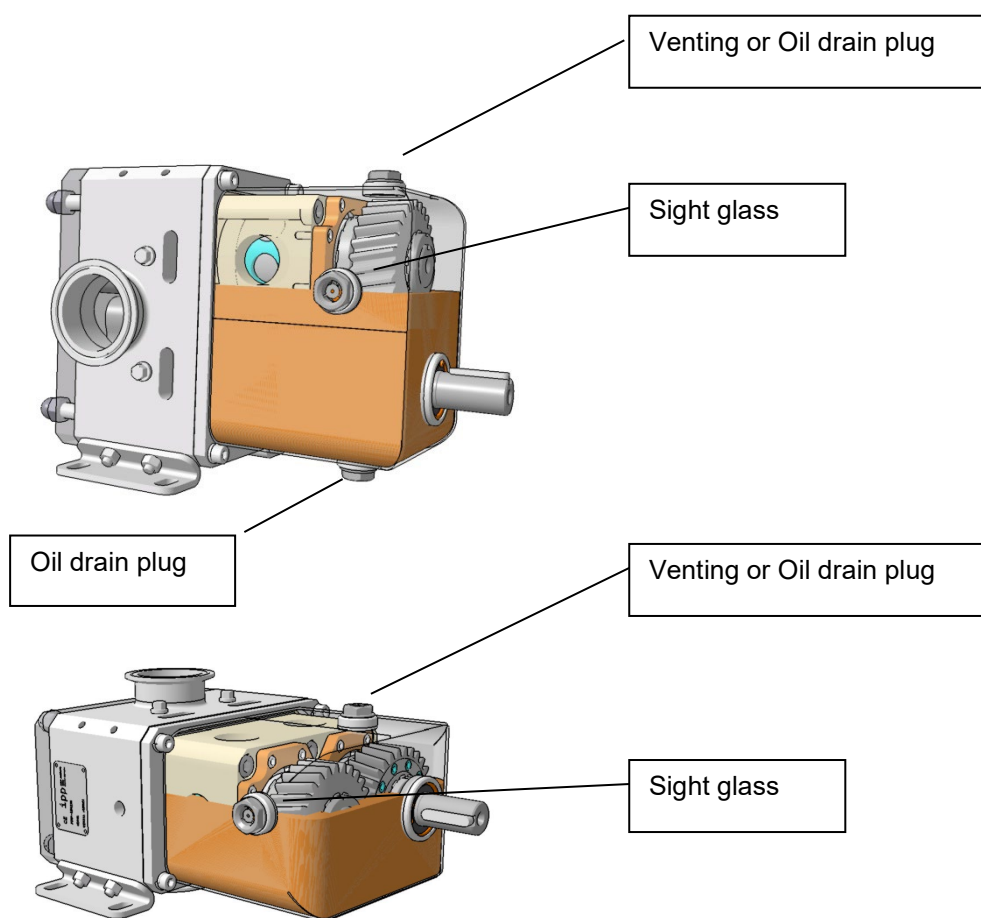
- Fit an automatic circuit breaker to protect the drive against electrical overload.
- If possible, mount a working switch close to the pump.
- If possible, mount an earth switch.

### 11.16 Oil Filling

The gearbox is originally filled with oil!

Unscrew the venting plug on top of the gearbox.

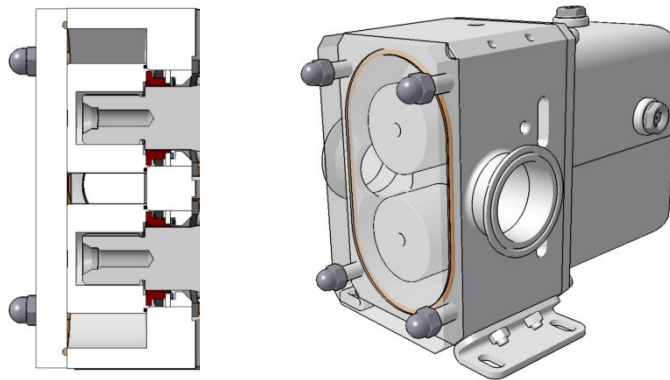
Fill the gearbox with oil until the oil level reaches the centre of the sight glass. See Chapter 16.1.  
Fit the oil plug to the gear box.



## 12 Commissioning

### 12.1 Cleaning of the System

Please check that all piping and associated equipment are clean and free from debris. Hard solids going through the pump can cause severe damage. On new equipment often hard particles from welding, grinding or other mechanical work are still in the system. During commissioning this debris is flushed into the pump and can cause severe damage. For initial cleaning of the system, rotor dummies can be used which allow those particles / debris to pass the pump without damage. Rotor dummies are available at ipp Pump Products GmbH.



For assembly and disassembly of the rotors, please proceed in accordance with the instructions given in chapter 14.7.1 and 14.8.



### WARNING

**Hand-tightening of the Rotor Dummies is good enough. The pump shall not rotate, when it is equipped with Rotor Dummies!**



**GB** • DO NOT RUN THE PUMP  
WHEN FITTED WITH ROTOR DUMMIES.  
HEAVY PUMP DAMAGE MAY OCCUR.

**D** • Die Pumpe nicht betreiben,  
wenn Rotordummies eingebaut sind.  
Gefahr von schweren Beschädigungen  
bei Missachtung.

Rotor Dummies are available at ipp Pump Products GmbH.

### 12.2 Checks

Ensure lubrication is provided for both pump and drive. The oil should be filled to the level of the oil sight glass that must be installed in the upper tapped hole of the gear box cover.



### WARNING

Only operate the pump with correctly filled oil level

If a low pressure flush or quench are used, the flush system must have a capacity of 2.5 l / min. at 0.2 bar max. In case of a vertical position of the connection ports, connect the flush pipes feeding at the bottom part!

If a pressurized flush is used the flushing system must have a capacity of 2.5 l/min at a pressure of 2 bars higher than the system pressure.

In case of a vertical position of the connection ports, connect the flush pipes feeding at the bottom part!

If selected – check that the heating jacket is connected correctly and check the correct heating temperature.

### 12.3 Start-up

- Ensure that discharge and suction valves are fully open and the pipes are free from obstructions. Rotary Lobe Pumps are Positive Displacement Pumps and should therefore never be operated against a closed valve as this would result in pressure overload, resulting in damage to the pump and possibly to the system.
- Open the valves on pump inlet and outlet as well on the seal flush connection and heating.
- Ensure that product is available in the tank before starting the pump. This is very important for pumps installed with un-flushed product seals, as these sealing arrangements must never be allowed to run dry.
- Start the pump.

### 12.4 During Operation



#### ATTENTION

Do not operate the pump against closed valves or when the discharge piping is blocked.

If the pressure relief valves opens, please bear in mind that the relatively small capacity circulating in the pump, may cause excessive heat after a while. The pressure relief is a safety device and not designed for continuous operation.



#### NOTE

Avoid strong temperature changes of the pumped liquid and of the pump. Excessive heat expansion could cause damage of the pump components. Always stay within the given limits of pressure, speed and temperature.

### 12.5 Shutdown Procedure

When stopping the pump it must be paid attention to the fact that the pump must not run dry! This is only admissible for pumps which are fitted with a flushed shaft seal.

- Stop the pump by switching off the drive
- If the system stays pressurized existing shut-down valves of the flushing pipes must stay OPEN
- If the pumped liquid solidifies at low temperatures, and if the pump is fitted with heating jackets any existing shut-down valves of the heating system must stay OPEN.

## 13 Maintenance

### 13.1 General Instruction

The following points subject to routine inspection:

- Proper pump performance. **Appearance of noises** could be a result from worn bearings, worn timing gears, galling rotors or cavitation.
- Check leakage.
- If installed, check correct pressure and capacity of the seal flush system.
- If installed – Check correct temperature of the heating/cooling system.
- Check oil levels regularly.
- Check correct pressure on inlet and outlet.
- Check parts regarding corrosion.

### 13.2 Oil Change

Change the oil every 12 months or 3000 operating hours whichever is sooner. For lubricant capacities and grades refer to section 16.1 and 16.2.

## 14 Disassembly / Assembly

### 14.1 Procurement of Spare Parts

When ordering spare parts please provide your dealer with the following information

- The **serial number**. This is printed on the name plate of the pump.
- The **model designation**. This is also printed on the name plate
- The item number and description of the requested spare – if identified.

Section 16.3 shows a cross-sectional drawing with all items. **Rotors und timing gears should always be ordered as a pair.**

## 14.2 Precautions



### **DANGER**

Never allow the pump to run without pump cover or without being connected to the piping!



### **DANGER**

Never allow the pump to run without pump cover or without being connected to the piping!



### **DANGER**

When performing maintenance work to the pump always wear protective gloves and safety goggles if the pump conveys liquids which are a health hazard!



### **DANGER**

Ensure that the pump is depressurized, when it has to be disassembled for overhaul! When provided with heating jackets ensure the steam supply is shut down and the heating jackets have cooled down!

## 14.3 Special Tools

### 14.3.1 Rotor retainer tool

| Type | Rotor Retainer Tool |
|------|---------------------|
| L55  | 110.1003.00-000     |
| L63  | 210.1003.00F000     |
| L85  | 120.1003.00-000     |
| L115 | 130.1003.00-000     |
| L130 | 130.1003.00F000     |
| L160 | 140.1003.00-000     |

### 14.3.2 Rotor Retainer Assembly Plate

| Typ  | Rotor Retainer Assembly plate |
|------|-------------------------------|
| L55  | 110.1006.00-000               |
| L63  | 150.1006.00C000               |
| L85  | 120.1006.00-000               |
| L130 | 170.1006.00C000               |
| L115 | 130.1006.00-000               |
| L160 | 140.1006.00-000               |

## 14.4 Pump Drainage

- Close the valves on inlet and outlet of the pump. If not installed, make sure that the liquid level has fallen down below the pump level.
- Locate a catch basin below the front cover / pump head.
- Slightly unscrew the cap nuts of the front cover.
- Pull off the front cover by applying a screw driver or another appropriate tool, which fits in the recesses of the front cover.
- Catch the liquid with the catch basin underneath the pump.

- When completely drained, close the pump by screwing tight the cap nuts.

### 14.5 Oil Drainage

- Locate an oil catch basin underneath the gear box.
- Unscrew the oil vent plug on top the pump
- Remove the oil drain plug on bottom of the pump.
- Catch the oil with the catch basin
- After complete drainage, put the oil vent plug and the oil drain plugs in the original positions.



#### NOTE

*Ensure that no oil leakage is contaminating the environment!*

### 14.6 Dismantling of the Pump

- Remove the coupling guard.
- Disengage the part of coupling, which is fitted on the pump shaft. Push it backwards.
- If installed- remove the flush connections from the pump
- If installed- remove the air supply of the pressure relief and other auxiliaries.
- If installed- remove steam or heating connections from the heating devices



#### DANGER

When provided with heating jackets ensure the steam supply is shut down and the heating jackets have completely cooled down!

- Disengage the connections of the inlet and outlet. **Ensure the piping are well-supported.**
- Unscrew the bolts and remove the pump from the base. **The pump types L85, L115 und L160 are too heavy to lift it by hand, the use of an appropriate lifting device is strongly recommended.** Please refer to section 11.4.

### 14.7 Disassembly of the Pump

The location of all parts and components of the pump is shown on the cross-sectional drawing section 16.3.

*Use a bench, which is suitable to carry the pump weight.*



#### NOTE

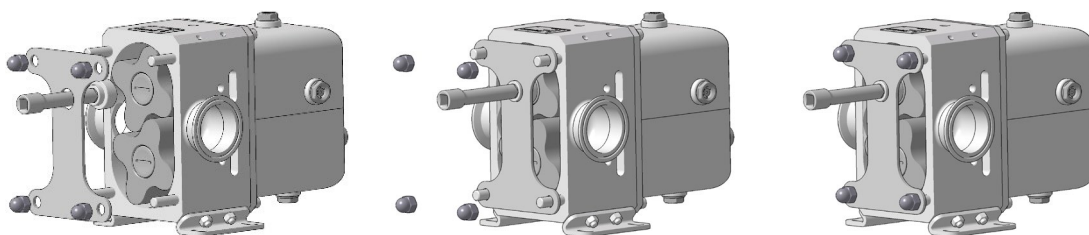
In order to catch residual oil and product it is recommended to put the pump in a large basin.

#### 14.7.1 Rotor Disassembly

Remove the cap nuts and pull off the front cover together with the O-Ring or gasket.

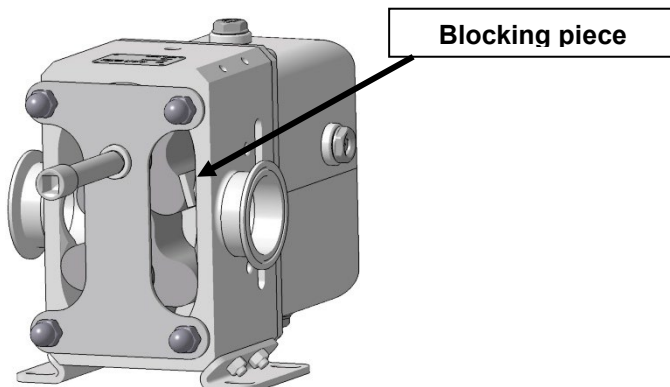
Unscrew the rotor retainer screw and its O-ring by applying the rotor retainer tool in accordance to below procedure.

The use of the rotor retainer plate is recommended. Risk of damage of the slot of the rotor retainer screw is minimised. Fix the rotor retainer plate on the pump as shown in the figures below. Just pull it hand-tight.



Put a soft plastic block between the rotor and the rotor case.

Remove the rotors from the shafts.



#### 14.7.2 Disassembly of Shafts Seals

##### 14.7.2.1 Mechanical Seals

The rotating seal face fits in the rotor already disassembled. Remove the seal face by carefully applying a screw driver or *another* appropriate tool.

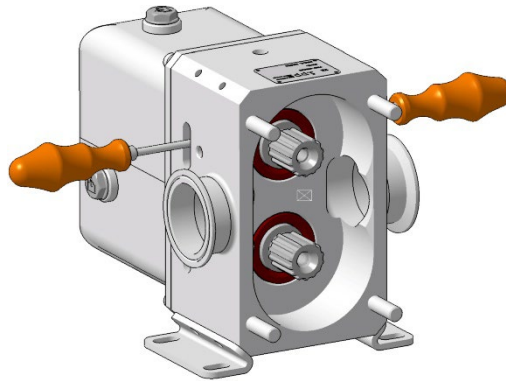




## ATTENTION

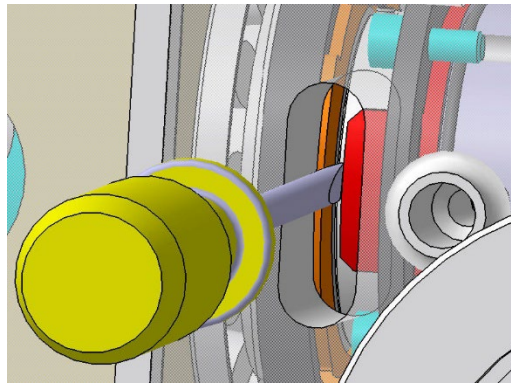
Handle with greatest care during seal extraction. Any violence may result in damage.

Continue with the seal disassembly as following

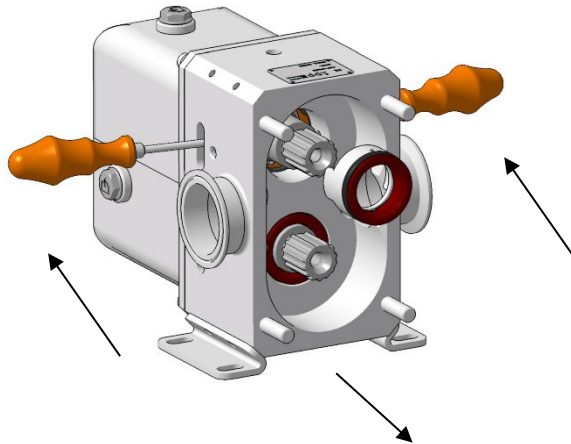


Put a screw driver or another appropriate tool in the leakage slots on the sides of the pump.

Locate the extraction tool as shown in the figures (place them behind the visible edges of the seal housing).



Remove the seal housing together with the stationary seal out of the casing.



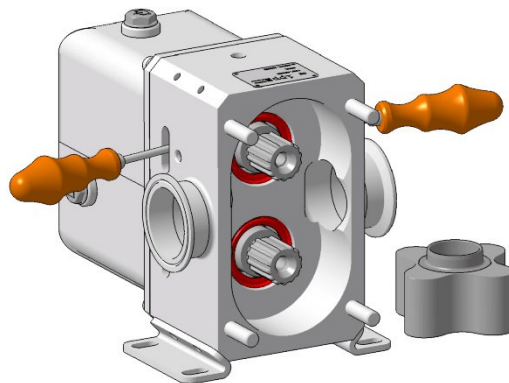
Extract the seal of the other shaft seal in the same way  
If the seals are being reused, ensure that the seal faces remain matched.

#### 14.7.2.2 Lip Seals

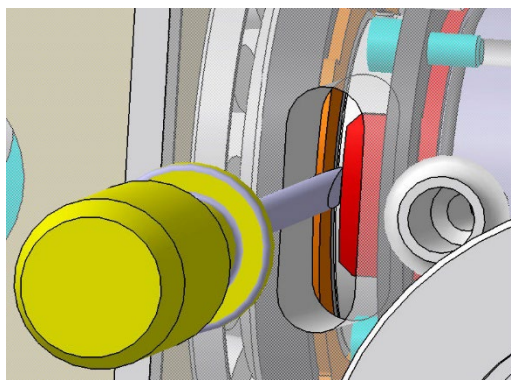
Disassemble the rotors. Therefore please refer to chapter 14.7.1.

The other parts of the lip seal are disassembled as follows:

Put a screwdriver at both sides of the shaft into the leakage slots which are located on both sides of the pump case.



Place the screwdriver behind the visible edges of the seal housing.



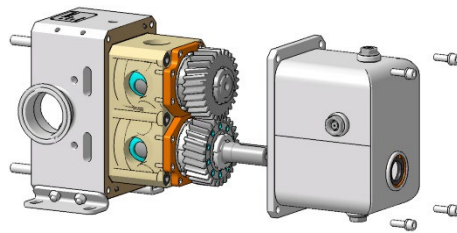
Now carefully pull the seal housing with the shaft seal (using both screwdrivers at the same time) to the front out of the pump case. Remove the seal housing with the shaft seal from the front of the shaft. Remove the other shaft seal in the same way.

### 14.7.3 Disassembly of the Gearbox

Please continue as following:

Pay attention that the gear oil has been drained before removing the gearbox cover (see chapter 14.5). Remove the key, which fits in the drive shaft.

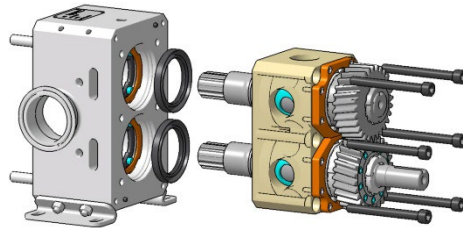
Unscrew the screws of the gear box and pull off the gear box cover from the pump housing.



Remove the gasket.

Unscrew the screws of the bearing house and pull off the bearing-unit together with the shafts.

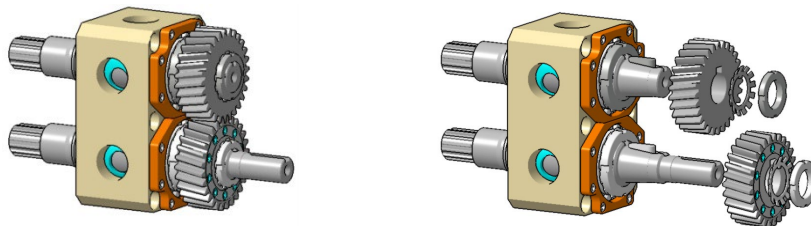
Remove the oil seals.



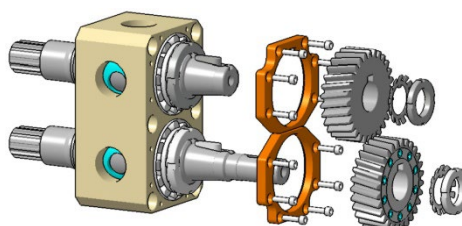
Remove locknut and tab washer.

Pull off the timing gears from the shafts. A puller or a lever may be a helpful tool.

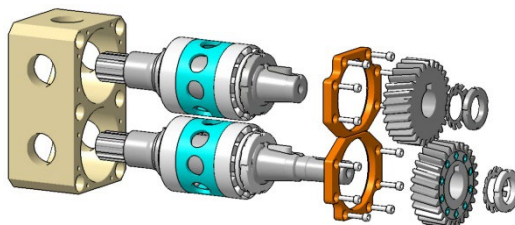
Remove the keys.



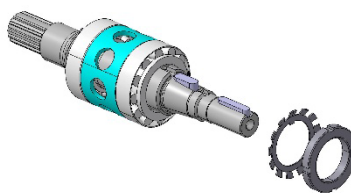
Remove the bearing covers.



Press the shaft units off the bearing housing by applying a press.



Remove the locknuts and the tab washers.



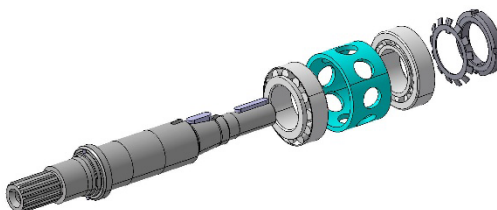
Remove the keys.

Pull off the bearings and the bearing cones by applying a press.

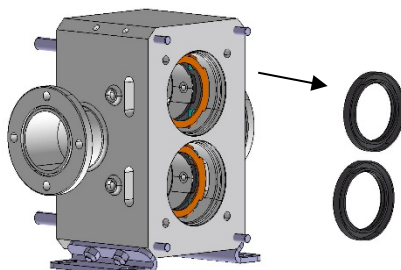


## NOTE

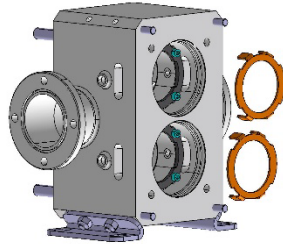
Do not damage the seal-surfaces of the shafts.



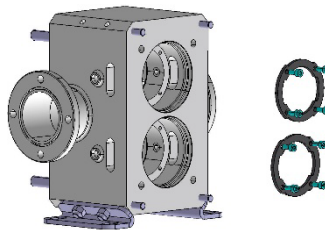
Remove the oil lipseals of the gear box. Do not damage the bore in the rotor case of the lips of the lipseals.



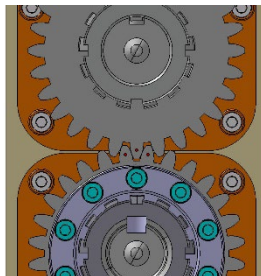
Remove the Spacer.



Unscrew the seal covers and remove them.



Unscrew and remove the clamping ring from the sprocket.



#### **14.7.4 Inspection of Parts**

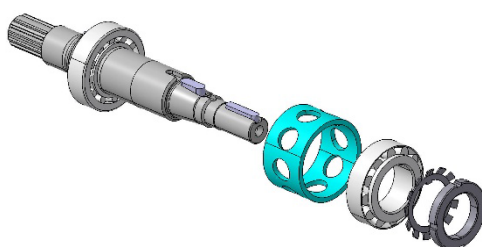
- Replace defective parts always by using original - ipp Pump Products GmbH – spare parts.
- Check all oil seals for possible leakages and damages.
- Check all non-defective parts for scratches, burrs, debris or excessive wear.
- If the gearbox has been disassembled: Ensure that the sealing face between rotor case and gearbox cover is clean and free from gasket residues.
- Clean all parts with a non picking cloth.

## 14.8 Pump Assembly

The location of all parts and components of the pump is shown on the cross-sectional drawing section 16.3.

If installed with quattrolobe rotors the synchronization must be checked and if necessary re-timed. Ensure that all parts are clean and ready for reuse. A clean environment is helpful for successful reassembling.

Heat cones of the front bearing to 120°C and install onto shafts.



### DANGER

We recommend to heat the bearing to app. 100 – 150°C. CAUTION: Heat can cause severe injury.



### DANGER

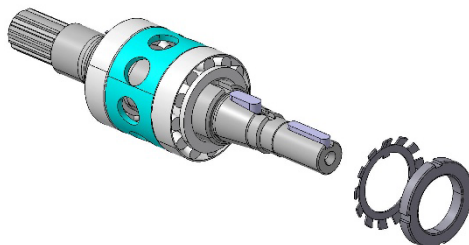
Install the spacer sleeve and the rear bearing cone, which is also heated to app. 100 – 150°C. (Caution: Heat can cause severe injury.)



### NOTE

Work rapidly in order to prevent early cool down.

Install the tab washer and the locknut.

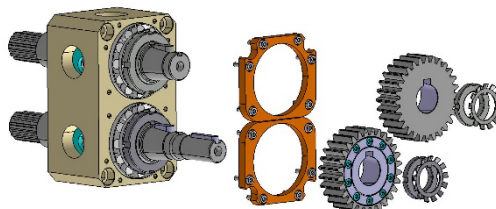


Tighten the locknut and adjust to achieve the rolling torque, refer to below table. To measure the rolling torque, place assembled shaft in the bearing housing and screw a bolt in the tapped hole of the splined end of the shaft.

Rotate the shaft by means of the bolt using a torque meter. If the rolling torque does not correspond to the required setting, adjust lock nut. Ask ipp Pump Products GmbH for a suitable torque meter.

| Type | Rolling Torque |
|------|----------------|
| L55  | 1,5 – 1,8 Nm   |
| L63  | 1,8 – 2,0 Nm   |
| L85  | 2,0 – 2,5 Nm   |
| L115 | 3,5 – 4,0 Nm   |
| L130 | 5,0 – 5,5 Nm   |
| L160 | 5,5 – 6,0 Nm   |

Install the keys onto the shafts.  
Install the shafts into the bearing house.

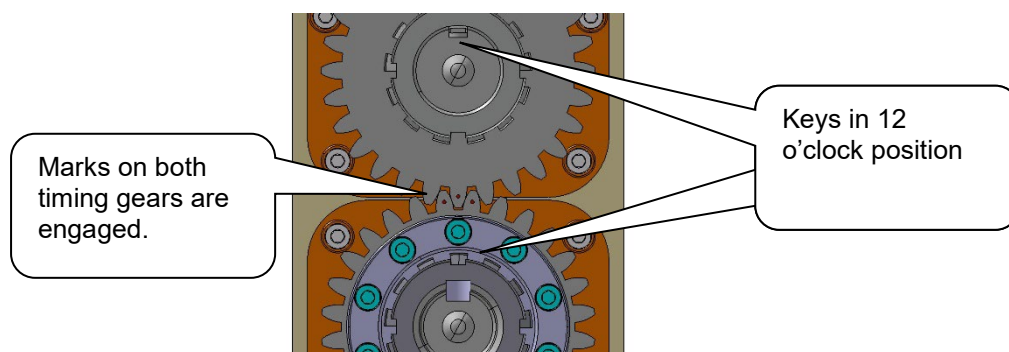


Install the bearing covers. Just pull hand-tight at this stage.

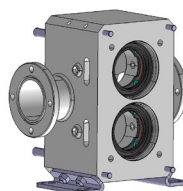
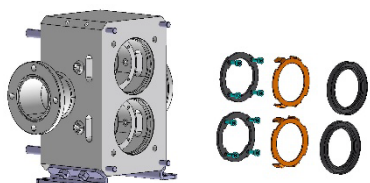
Install the timing gears.

Pull tight the locknut and secure the tab washer.

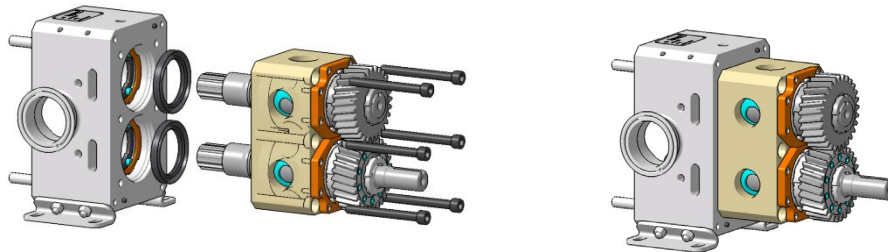
It is important that the shafts are positioned in the 12 o'clock position and that the marks on the both are engaged. Install the fixing ring and the screws. Just pull hand-tight in order adjust the final timing later.



Prepare the rotor case by installing the seal covers, the lipseals and the spacer. Avoid damage of the lip seal. Ensure that the bore is clean and free of any scratches and damages.



Fit the bearing house to the rotor case. Ensure the shaft shoulders do not damage the lipseals during assembly. Ipp Pump Products GmbH offer special tools in order to support easy assembly.

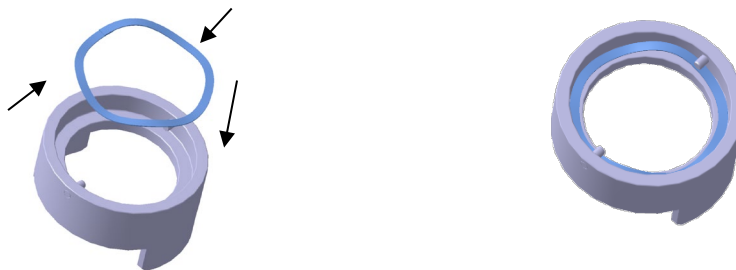


Tighten the bearing house. Tighten the bearing covers.

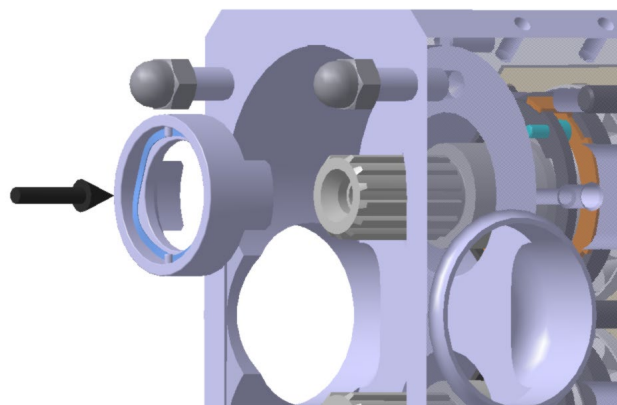
### 14.8.1 Mechanical seals

#### 14.8.1.1 Single mechanical seal

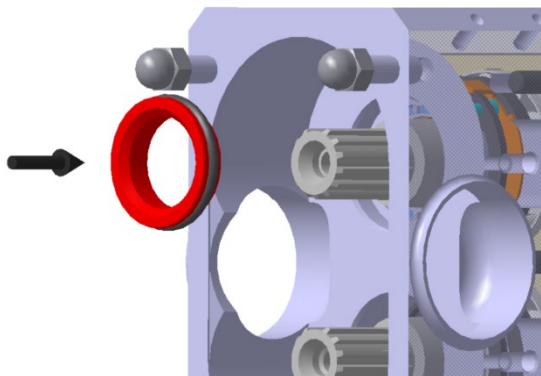
Insert the wave spring into the mechanical seal housing



Push the seal housing into the bore of the rotor case. Ensure that the anti-rotation is provided. The seal housing must be engaged with the slots of the seal cover, which is in-line with the leakage holes.



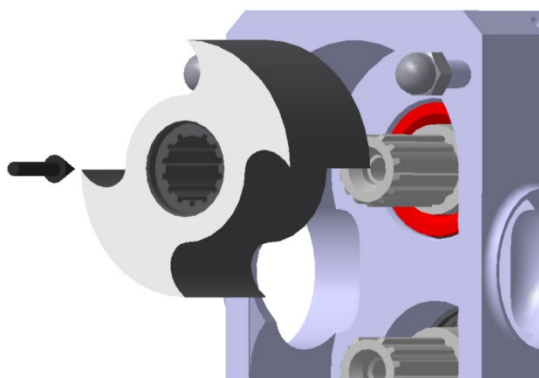
Put the O-ring on the stationary seal face. It is recommended to use a sufficient lubricant. Push the seal face into the bore of the rotor case. Ensure that the pins on the seal housing are engaged with the slots of the seal face.



Put the O-ring on the rotary seal face. It is recommended to use a sufficient lubricant. Push the seal face into the bore of the rotor. Ensure that the pins on the rotor are engaged with the slots of the seals face.



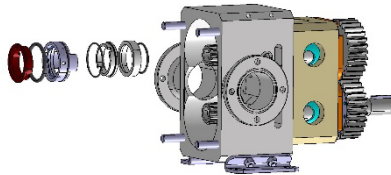
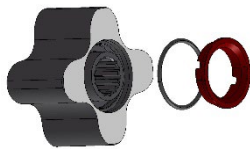
Before final assembly check that the seal faces absolutely clean, use a soft tissue and a suitable solvent cleaner for best results.  
Fit the rotors on the shafts.





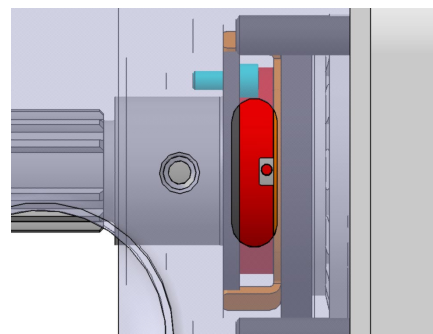
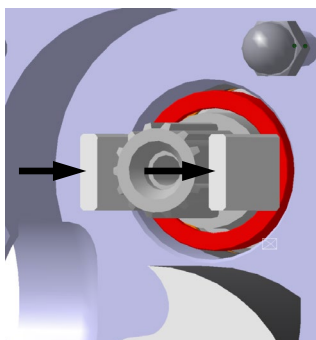
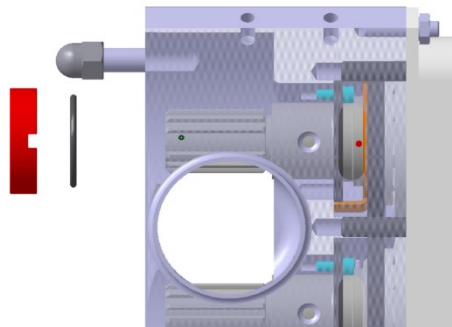
## ATTENTION

Extreme care should be taken when carrying out these procedures to ensure that the seal faces are not damaged. No excessive force is necessary to install the seals correctly. Check the wave spring when rotors are being installed.



### 14.8.1.2 Double mechanical seal

Put the rotating seal face of the atmosphere seal on the shaft. It is recommended to put the O-Ring in the seal face first. Use a sufficient lubricant on the O-Ring. Turn the shaft into 3 o'clock position. The anti-rotation pins on the shafts are in-line with the leakage holes. Put the seal face into position by using two off plastic blocks, which are supplied with the pump. Ensure that the slots in seal face are engaged with the anti-rotation pins of the shaft, see figures.



Install the seal housing. First install the wave spring into the seal housing and then the O-ring of the stationary atmospheric seal face. Ensure that the wave spring is located between the two rows of anti-rotation pins. Use a sufficient lubricant on the O-ring. The slots of the seal must be engaged with the pins of the seal housing.

Install the static O-Ring on the outer diameter of the seal housing. Use a sufficient lubricant on the O-ring. Do not stretch the O-ring excessively.

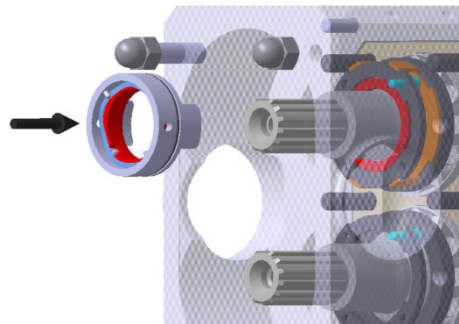


Push the seal housing into the bore of the rotor case.

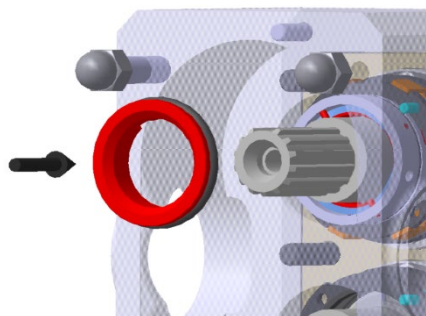


## NOTE

Both seal faces must be cleaned with a soft tissue and a sufficient solvent cleaner. Ensure that the anti-rotation is provided. The seal housing must be engaged with the slots of the seal cover, which is in-line with the leakage holes.



Insert the stationary seal face together with the o-ring. It is recommended to first put the o-ring onto the seal face. Ensure that the pins on the seal housing are engaged with the slots of the seal face. Use sufficient lubricant.



Now put the o-ring on the rotary seal face. It is recommended to use sufficient lubricant. Push the seal face into the bore of the rotor. Ensure that the pins on the rotor are engaged with the slots of the seals face.



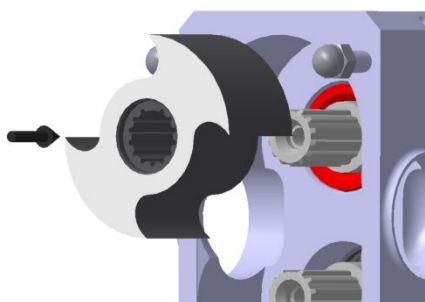
## NOTE

The o-rings should be greased slightly with suitable lubricant.



Before final assembly check that the seal faces absolutely clean, use a soft tissue and a suitable solvent cleaner for best results.

Fit the rotors on the shafts.



## ATTENTION

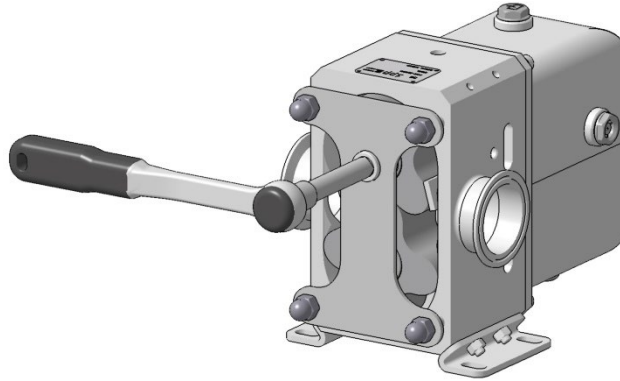
**Extreme care should be taken when carrying out these procedures to ensure that the seal faces are not damaged. No excessive force is necessary to install the seals correctly. Check the wave spring when rotors are being installed.**

Install the rotors. Some rotors are stamped and should be kept with their respective shafts. Check the wave spring function again by pushing the rotors against the seat. The wave spring should be able to push back the loose rotor on a distance of a few millimetres. Now insert the slightly greased o-rings and the rotor screws.



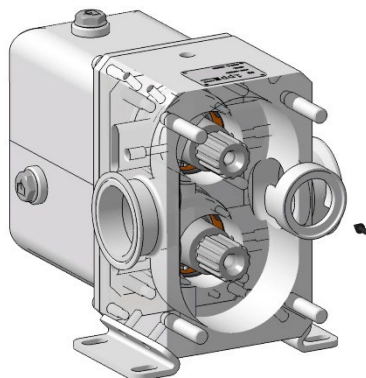
## ATTENTION

Install the O-Rings of the rotor screws. Ensure that these are sufficiently lubricated. It is recommended to use a rotor retainer assembly tool in order to prevent damage of the rotor screw. For torques, see chapter 14.9.

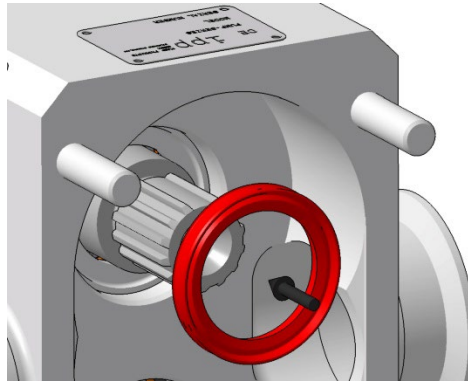


### 14.8.1.3 Lip seal

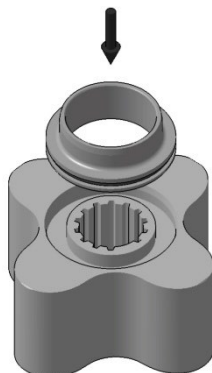
Insert the ejection sleeve into the pump case. Ensure that the pins are engaged with their slots. The slots are in one line with the leakage slots.



Insert the shaft seal into the pump case. Pay attention to the correct alignment. The lip should be directed to the product (see chapter 16.7.3).



Press the shaft protection sleeve together with the o-ring into the rotor groove.



Insert the rotors.



#### ATTENTION

Grease the shaft protection sleeves slightly with a suitable lubricant. Install the rotors. Insert the slightly greased o-rings and the rotor screws.



#### ATTENTION

We recommend using the assembly tool in order to avoid slipping and damage to the rotor screws even with high torques.

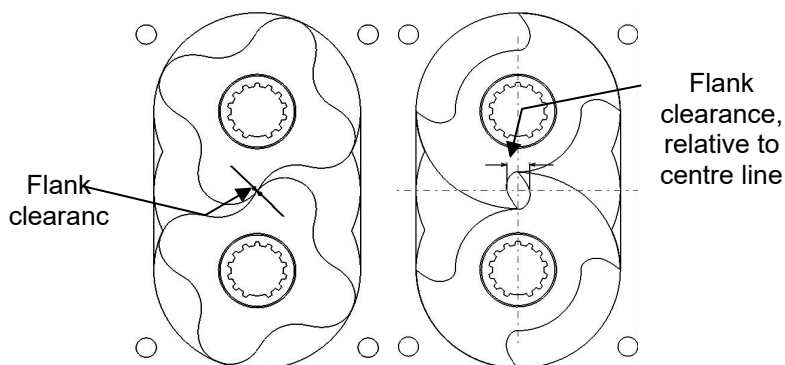
### 14.9 Torque settings:

| Type | Torque |
|------|--------|
| L55  | 36 Nm  |
| L63  | 50 Nm  |
| L85  | 70 Nm  |
| L115 | 150 Nm |
| L130 | 300 Nm |
| L160 | 300 Nm |

Block each rotor, which has to be tightened. Note that the timing gears are not tightened in this stage. Pull tight by using a torque wrench.

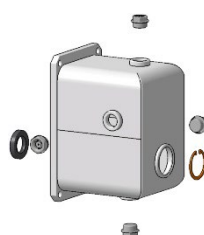
Adjust the synchronisation of the rotors. Fix the timing gear in the required position of non-contacting action of the rotors. A feeler gauge and a slide gauge are required.

| Type | Quattrolobe Rotors<br>Flank clearance | Biwing Rotors<br>Flank clearance |
|------|---------------------------------------|----------------------------------|
| L55  | 0,09 -0,16 mm                         | 7,4 -8,0 mm                      |
| L63  | 0,16 – 0,20 mm                        | 11,5 – 12,5 mm                   |
| L85  | 0,12 -0,18 mm                         | 14,5 -15,5 mm                    |
| L115 | 0,15 -0,25 mm                         | 22,0 -23,4 mm                    |
| L130 | 0,22 – 0,35 mm                        | 27,7 – 29,3 mm                   |
| L160 | 0,27 -0,38 mm                         | 29 -31 mm                        |



Put the gasket on the rotor case. Ensure clean and even surfaces without residue.

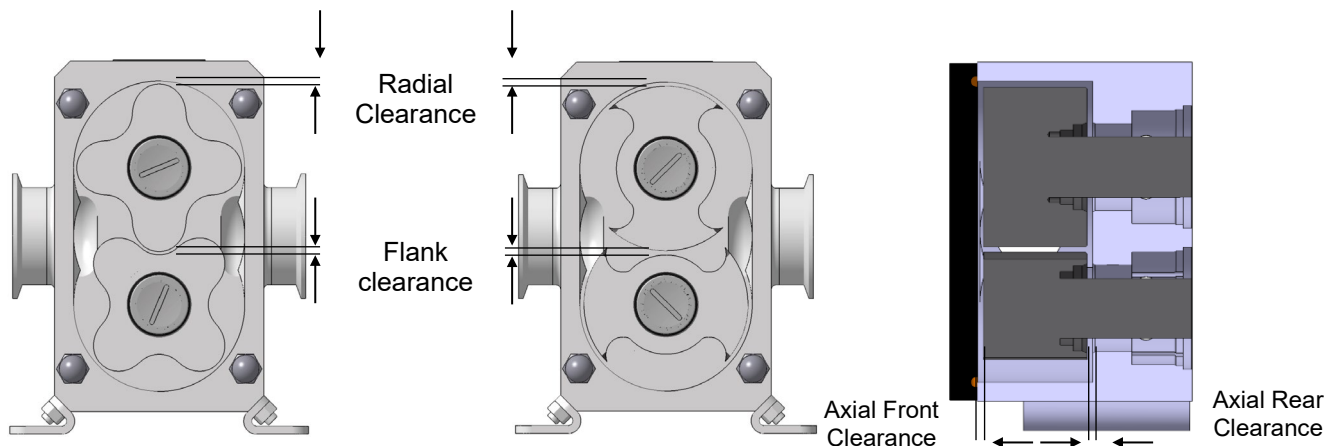
Fix the gear box on the rotor case. Ensure that the lip seal is not damaged by the shaft shoulder of the key way. Lubrication on the lip seal is recommended.



Before tightening, ensure that the lip seal is exactly aligned with the shaft.

Fill in the oil in accordance to section 16.1 and 16.2.

Before installing the front cover execute a final check of the pump clearances. A feeler gauge and depth gauge are required.



The standard clearances are as follows:

|                     |      | L55   | L63   | L85   | L115  | L130 | L160sxx<br>/ L160sx | L160s /<br>i / I |
|---------------------|------|-------|-------|-------|-------|------|---------------------|------------------|
| Radial max          | [mm] | 0.14  | 0.165 | 0.165 | 0.225 | 0.30 | 0.24                | 0.34             |
| Radial min          | [mm] | 0.11  | 0.135 | 0.135 | 0.195 | 0.27 | 0.21                | 0.31             |
| Axial front max     | [mm] | 0.113 | 0.16  | 0.16  | 0.186 | 0.27 | 0.152               | 0.3              |
| Axial front min     | [mm] | 0.09  | 0.14  | 0.135 | 0.165 | 0.24 | 0.122               | 0.27             |
| Axial rear max      | [mm] | 0.13  | 0.16  | 0.185 | 0.215 | 0.27 | 0.178               | 0.34             |
| Axial rear min      | [mm] | 0.107 | 0.14  | 0.16  | 0.194 | 0.24 | 0.148               | 0.31             |
| Flank clearance max | [mm] | 0.16  | 0.2   | 0.18  | 0.25  | 0.35 | 0.25                | 0.38             |
| Flank clearance min | [mm] | 0.09  | 0.15  | 0.12  | 0.15  | 0.22 | 0.2                 | 0.27             |
| Flank clearance max | [mm] | 8.0   | 12.5  | 15.5  | 23.4  | 29.3 | 31                  | 31               |
| Flank clearance min | [mm] | 7.4   | 11.5  | 14.5  | 22    | 27.7 | 29                  | 29               |

**Special Clearances can be executed on pumps with electro polishing or for particular applications.**

Install the front cover.



## ATTENTION

Never overstretch the O-Ring or seal ring in order to maintain good fit to the groove. Replace if necessary.

## 15 Decommissioning

### 15.1 Dismantling

See paragraph 14.6 for dismantling instructions.

### 15.2 Storage

See paragraph 11.3 Storage Conditions.

### 15.3 Disposal

If the pump is to be disposed of, take care of the following points:

- Clean the rotor case internally, it may still contain residual product.
- Drain the oil from the gearbox.
- Dispose of the pump using a company specialized in metal scrapping.

## 16 Technical Data

### 16.1 Oil Types

Recommended oil types for the gearbox are:

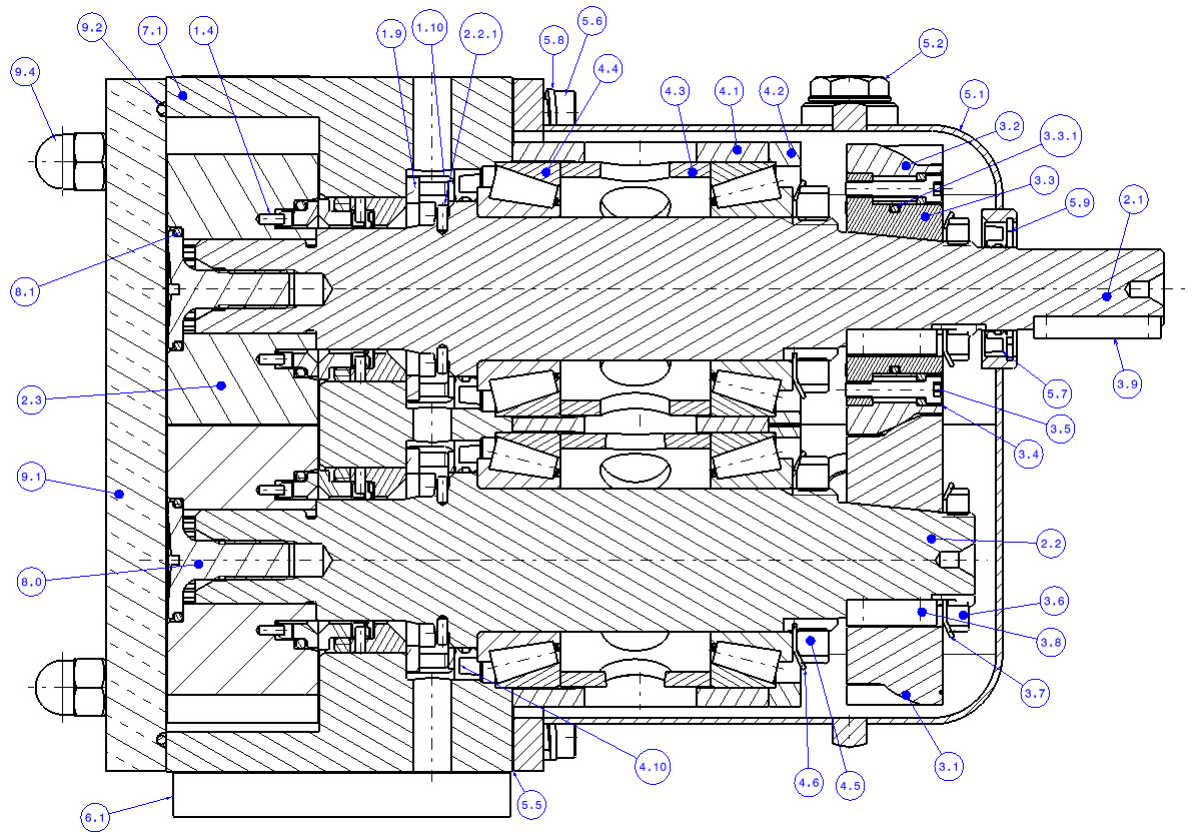
| Examples of recommended oil types |                                     |
|-----------------------------------|-------------------------------------|
| Brand                             | Type                                |
| Petro-Canada                      | Purity_FG_EP_GEAR-FLU10_220, NSF-H1 |
| Klüber                            | 4 UH1-220N, NSF-H1 (synthetic)      |

| Recommended Characteristics |           |
|-----------------------------|-----------|
| Ambient Temperature         | Viscosity |
| -18 °C to 0 °C              | VG 150    |
| 0 °C to 30 °C               | VG 220    |
| 30 °C to 150 °C             | VG 460    |

### 16.2 Oil Filling Capacities

|      | Horizontal Ports | Vertical Ports |
|------|------------------|----------------|
| L55  | 0.4 Ltr.         | 0.4 Ltr.       |
| L63  | 0.4 Ltr.         | 0.4 Ltr.       |
| L85  | 1.1 Ltr.         | 0.9 Ltr.       |
| L115 | 3.2 Ltr.         | 3.0 Ltr.       |
| L130 | 3,65 Liter       | 3,6 Liter      |
| L160 | 6.0 Ltr.         | 7.0 Ltr.       |

## 16.3 Cross-Sectional Drawing



Detailed cross-sectional drawings and part lists of the different shaft seals see chapter 16.7.

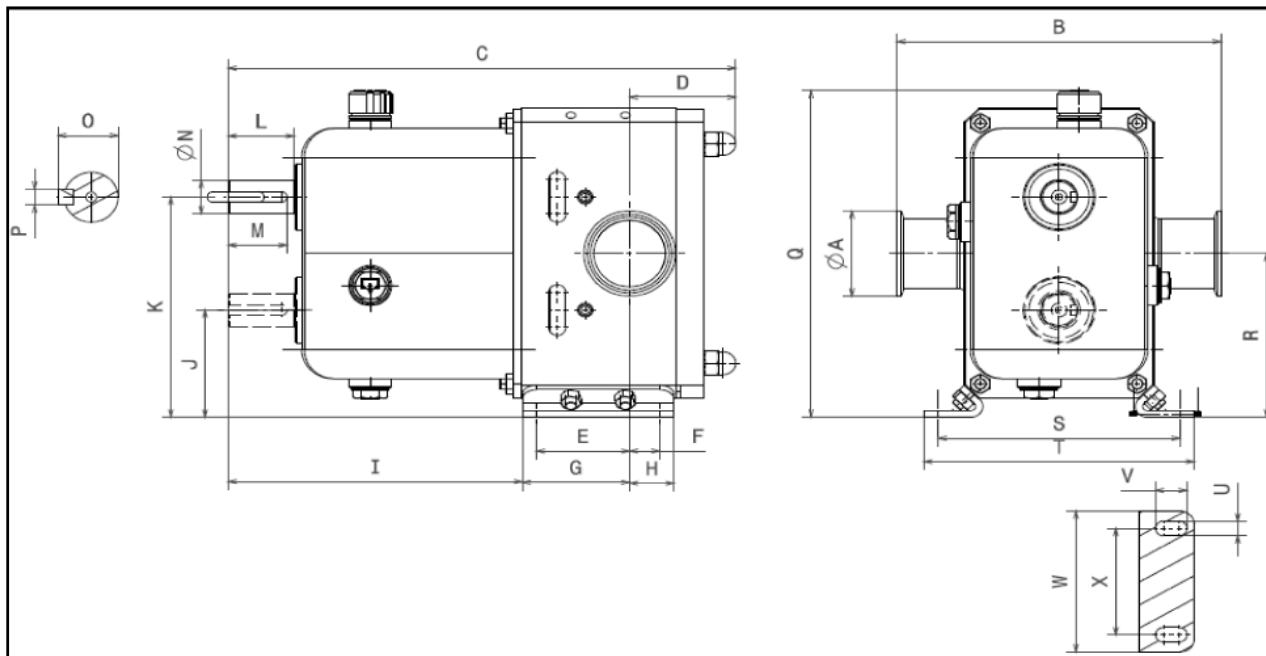
## 16.4 Part List

| Item  | Description                             | Qty. |
|-------|-----------------------------------------|------|
| 1.4   | Anti-Rotation Pins Rotor                | 4    |
| 1.9   | Seal Cover                              | 2    |
| 1.10  | Spacer Oil Seal                         | 2    |
| 2.1   | Drive Shaft                             | 1    |
| 2.2   | Driven shaft                            | 1    |
| 2.2.1 | Shaft pins                              | 4    |
| 2.3   | Rotor                                   | 2    |
| 3.1   | Timing Gear Driven shaft                | 1    |
| 3.2   | Timing Gear Drive Shaft                 | 1    |
| 3.3   | Centre sleeve                           | 1    |
| 3.3.1 | O-ring centre sleeve                    | 1    |
| 3.4   | Fastener                                | 1    |
| 3.5   | Allen Screw                             | 10   |
| 3.6   | Locknut                                 | 2    |
| 3.7   | Tab Washer                              | 2    |
| 3.8   | Key                                     | 2    |
| 3.9   | Key drive journal                       | 1    |
| 4.1   | Bearing House                           | 1    |
| 4.2   | Bearing Cover                           | 2    |
| 4.3   | Spacer sleeve                           | 2    |
| 4.4   | Taper Roller Bearing                    | 4    |
| 4.5   | Locknut                                 | 2    |
| 4.6   | Tab Washer                              | 2    |
| 4.8   | Allen Screw Bearing Cover (w/o fig.)    | 12   |
| 4.9   | Allen Screw Bearing House(w/o fig.)     | 6    |
| 4.10  | Front radial shaft seal                 | 2    |
| 5.1   | Gearbox Cover                           | 1    |
| 5.2   | Oil Drain Plug                          | 23   |
| 5.3   | Oil Sight Glass (w/o fig.)              | 1    |
| 5.5   | Gasket Gearbox Cover                    | 1    |
| 5.6   | Screw Gear Box Cover                    | 4    |
| 5.7   | Rear radial shaft seal                  | 1    |
| 5.8   | Spring washer                           | 4    |
| 5.9   | Locking ring                            | 1    |
| 5.10  | Cylindric pins gearbox cover (w/o fig.) | 2    |
| 6.1   | Pump foot                               | 2    |
| 6.2   | Stud(w/o fig.)                          | 4    |
| 6.3   | Nut (w/o fig.)                          | 4    |
| 7.1   | Rotor Case                              | 1    |
| 8.0   | Rotor Screw                             | 2    |
| 8.1   | O-Ring Rotor Screw                      | 2    |
| 9.1   | Pump cover                              | 1    |
| 9.2   | O-Ring pump cover                       | 1    |
| 9.3   | Stud(w/o fig.)                          | 4    |
| 9.4   | Cap nut                                 | 4    |

Detailed cross-sectional drawings and part lists of the different shaft seals see chapter 16.7.

## 16.5 Dimensions

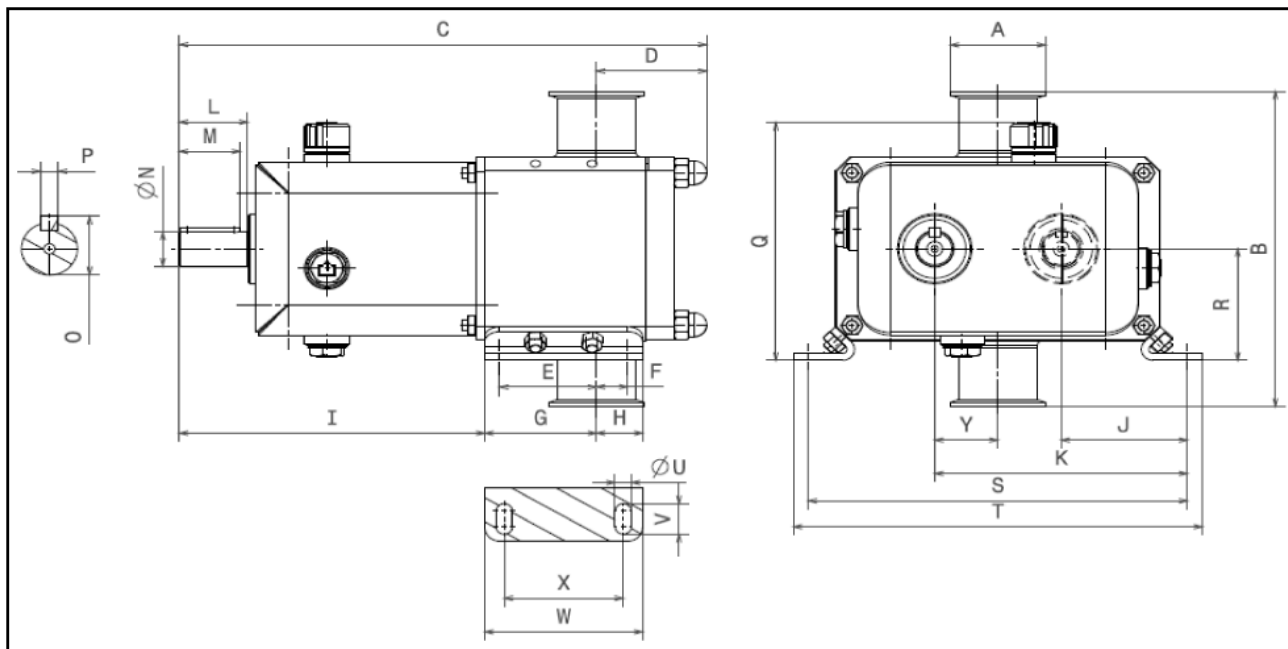
### 16.5.1 Horizontal Port Position



| Typ                                             | Pos   | L55   |       |       |      | L63  |      |       |       | L85   |       |       |       | L115  |       |       |       | L130  |       |       |       | L160  |       |       |       |
|-------------------------------------------------|-------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                 |       | sxx   | s     | i     | l    | sxx  | s    | i     | l     | sxx   | s     | i     | l     | sxx   | s     | i     | l     | sxx   | s     | i     | l     | sxx   | s     | i     | l     |
| Pumps with connection ports according DIN 11851 |       |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| A                                               | DN15  | DN15  | DN25  | DN40  | DN20 | DN40 | DN50 | DN32  | DN40  | DN50  | DN65  | DN32  | DN40  | DN50  | DN80  | DN100 | DN65  | DN80  | DN100 | DN100 | DN32  | DN50  | DN80  | DN100 | DN150 |
| B*                                              | 142   | 142   | 158   | 166   | 172  | 184  | 188  | 206   | 208   | 212   | 222   | 286   | 258   | 262   | 282   | 300   | 327   | 337   | 355   | 355   | 364   | 370   | 390   | 408   | 400   |
| Pumps with connection ports according DIN 32676 |       |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| A                                               | DN15  | DN15  | DN25  | DN40  | DN20 | DN40 | DN50 | DN32  | DN40  | DN50  | DN65  | DN32  | DN40  | DN50  | DN80  | DN100 | DN32  | DN50  | DN80  | DN100 | DN32  | DN50  | DN80  | DN100 | DN150 |
| B*                                              | 136   | 136   | 143   | 143   | 160  | 161  | 161  | 185   | 185   | 185   | 198   | 265   | 235   | 235   | 248   | 303   | 303   | 303   | 303   | 343   | 343   | 356   | 356   | 356   |       |
| Further connection types available upon request |       |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| C                                               | 214   | 220   | 226   | 245   | 266  | 267  | 284  | 333,5 | 343   | 354,5 | 365,5 | 468   | 456   | 469   | 498   | 519   | 517   | 539   | 561   | 583   | 640   | 610,5 | 622,5 | 658,5 | 692,5 |
| D                                               | 40,5  | 40,5  | 44    | 51,5  | 63   | 58   | 67   | 62    | 65    | 74    | 79,5  | 100   | 80,5  | 91    | 105   | 115   | 95    | 104,5 | 115,5 | 126,5 | 130,5 | 100   | 117   | 131   | 152   |
| E                                               | 36,5  | 41,5  | 45    | 56,5  | 45   | 51   | 58,5 | 54    | 59,5  | 62    | 67,5  | 63,5  | 70    | 59,5  | 75,5  | 87    | 89    | 101,5 | 112,5 | 123,5 | 84    | 84,5  | 79,5  | 93,5  | 106,5 |
| F                                               | 13,5  | 8,5   | 5     | -6,5  | 5    | -1   | -8,5 | 26    | 20,5  | 18    | 12,5  | 42,5  | 36    | 46,5  | 30,5  | 19    | 21    | 8,5   | -2,5  | -13,5 | 14    | 13,5  | 50,5  | 36,5  | 23,5  |
| G                                               | 47,5  | 52,5  | 56    | 67,5  | 56   | 62   | 69,5 | 67    | 72,5  | 75    | 80,5  | 79,5  | 86    | 75,5  | 91,5  | 103   | 105   | 117,5 | 128,5 | 139,5 | 101   | 101,5 | 104,5 | 118,5 | 131,5 |
| H                                               | 24,5  | 19,5  | 16    | 4,5   | 16   | 10   | 2,5  | 39    | 33,5  | 31    | 25,5  | 58,5  | 52    | 62,5  | 46,5  | 35    | 37    | 24,5  | 13,5  | 2,5   | 31    | 30,5  | 75,5  | 51,5  | 48,5  |
| I                                               | 126   | 126   | 126   | 126   | 147  | 147  | 147  | 204,5 | 204,5 | 204,5 | 204,5 | 289   | 289   | 302   | 302   | 317   | 317   | 317   | 317   | 317   | 409   | 409   | 409   | 409   | 409   |
| J                                               | 57    | 57    | 57    | 57    | 66   | 66   | 66   | 80,5  | 80,5  | 80,5  | 80,5  | 106,5 | 106,5 | 106,5 | 106,5 | 106,5 | 117,5 | 117,5 | 117,5 | 117,5 | 149   | 149   | 149   | 149   | 149   |
| K                                               | 112   | 112   | 112   | 112   | 129  | 129  | 129  | 165,5 | 165,5 | 165,5 | 165,5 | 221,5 | 221,5 | 221,5 | 221,5 | 221,5 | 247,5 | 247,5 | 247,5 | 247,5 | 309   | 309   | 309   | 309   | 309   |
| L                                               | 28    | 28    | 28    | 28    | 45   | 45   | 45   | 46    | 46    | 46    | 46    | 70    | 70    | 70    | 70    | 70    | 75    | 75    | 75    | 75    | 98    | 98    | 98    | 98    | 98    |
| M                                               | 25    | 25    | 25    | 25    | 36   | 36   | 36   | 40    | 40    | 40    | 40    | 63    | 63    | 63    | 63    | 63    | 70    | 70    | 70    | 70    | 90    | 90    | 90    | 90    | 90    |
| N                                               | 15    | 15    | 15    | 15    | 20   | 20   | 20   | 25    | 25    | 25    | 25    | 40    | 40    | 40    | 40    | 40    | 45    | 45    | 45    | 45    | 55    | 55    | 55    | 55    | 55    |
| O                                               | 17    | 17    | 17    | 17    | 22,5 | 22,5 | 22,5 | 28    | 28    | 28    | 28    | 43    | 43    | 43    | 43    | 43    | 48,5  | 48,5  | 48,5  | 48,5  | 59    | 59    | 59    | 59    | 59    |
| P                                               | 5     | 5     | 5     | 5     | 6    | 6    | 6    | 8     | 8     | 8     | 8     | 12    | 12    | 12    | 12    | 12    | 14    | 14    | 14    | 14    | 16    | 16    | 16    | 16    | 16    |
| Q                                               | 178   | 178   | 178   | 178   | 184  | 184  | 184  | 245,5 | 245,5 | 245,5 | 245,5 | 326,5 | 326,5 | 326,5 | 326,5 | 326,5 | 362   | 362   | 362   | 362   | 441   | 441   | 441   | 441   | 441   |
| R                                               | 84,5  | 84,5  | 84,5  | 84,5  | 97,5 | 97,5 | 97,5 | 123   | 123   | 123   | 123   | 164   | 164   | 164   | 164   | 164   | 182,5 | 182,5 | 182,5 | 182,5 | 229   | 229   | 229   | 229   | 229   |
| S                                               | 115   | 115   | 115   | 115   | 131  | 131  | 131  | 157   | 157   | 157   | 157   | 247   | 247   | 247   | 247   | 247   | 293   | 293   | 293   | 293   | 333   | 333   | 333   | 333   | 333   |
| T                                               | 136,7 | 136,7 | 136,7 | 136,7 | 153  | 153  | 153  | 188,5 | 188,5 | 188,5 | 188,5 | 280   | 280   | 280   | 280   | 280   | 325   | 325   | 325   | 325   | 368   | 368   | 368   | 368   | 368   |
| U                                               | 9     | 9     | 9     | 9     | 9    | 9    | 9    | 11    | 11    | 11    | 11    | 13    | 13    | 13    | 13    | 13    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    |
| V                                               | 16    | 16    | 16    | 16    | 16   | 16   | 16   | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    | 22    |
| W                                               | 72    | 72    | 72    | 72    | 72   | 72   | 72   | 106   | 106   | 106   | 106   | 138   | 138   | 138   | 138   | 138   | 142   | 142   | 142   | 142   | 132   | 132   | 180   | 180   | 180   |
| X                                               | 50    | 50    | 50    | 50    | 50   | 50   | 50   | 80    | 80    | 80    | 80    | 106   | 106   | 106   | 106   | 106   | 110   | 110   | 110   | 110   | 98    | 98    | 130   | 130   | 130   |

\* demsion B can be varied upon request

### 16.5.2 Vertical Port Position



| Typ<br>Pos                                         | sx    | L55   |       |       |      | L63  |       |       | L85   |       |       |      | L115 |      |      |       |       | L130  |       |       |       | L160  |       |       |       |   |
|----------------------------------------------------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
|                                                    |       | sxx   | s     | i     | l    | sxx  | i     | l     | sx    | s     | i     | l    | sxx  | sx   | s    | i     | l     | sx    | s     | i     | l     | sxx   | sx    | s     | i     | l |
| Pumps with connection ports according to DIN 11851 |       |       |       |       |      |      |       |       |       |       |       |      |      |      |      |       |       |       |       |       |       |       |       |       |       |   |
| A                                                  | DN15  | DN15  | DN25  | DN40  | DN40 | DN40 | DN50  | DN32  | DN40  | DN50  | DN65  | DN32 | DN40 | DN50 | DN80 | DN100 | DN65  | DN80  | DN100 | DN100 | DN32  | DN50  | DN80  | DN100 | DN150 |   |
| B*                                                 | 142   | 142   | 158   | 166   | 172  | 184  | 188   | 206   | 208   | 212   | 222   | 286  | 258  | 262  | 282  | 300   | 327   | 337   | 355   | 355   | 364   | 370   | 390   | 408   | 400   |   |
| Pumps with connection ports according to DIN 32676 |       |       |       |       |      |      |       |       |       |       |       |      |      |      |      |       |       |       |       |       |       |       |       |       |       |   |
| A                                                  | DN15  | DN15  | DN25  | DN40  | DN40 | DN40 | DN50  | DN32  | DN40  | DN50  | DN65  | DN32 | DN40 | DN50 | DN80 | DN100 | DN65  | DN80  | DN100 | D100  | DN32  | DN50  | DN80  | DN100 | DN150 |   |
| B*                                                 | 136   | 136   | 143   | 143   | 160  | 161  | 161   | 185   | 185   | 185   | 198   | 265  | 235  | 235  | 248  | 248   | 303   | 303   | 303   | 303   | 343   | 343   | 356   | 356   | 356   |   |
| Further connection types available upon request    |       |       |       |       |      |      |       |       |       |       |       |      |      |      |      |       |       |       |       |       |       |       |       |       |       |   |
| C                                                  | 214   | 220   | 226   | 245   | 266  | 267  | 283,5 | 333,5 | 343   | 354,5 | 365,5 | 468  | 456  | 469  | 498  | 519   | 517   | 539   | 561   | 583   | 640   | 610,5 | 622,5 | 658,5 | 692,5 |   |
| D                                                  | 40,5  | 40,5  | 44    | 51,5  | 63   | 58   | 67    | 62    | 65    | 74    | 79,5  | 100  | 80,5 | 91   | 105  | 115   | 95    | 104,5 | 115,5 | 126,5 | 130,5 | 100   | 117   | 131   | 152   |   |
| E                                                  | 36,5  | 41,5  | 45    | 56,5  | 45   | 51   | 58,5  | 54    | 59,5  | 62    | 67,5  | 63,5 | 70   | 59,5 | 75,5 | 87    | 89    | 101,5 | 112,5 | 123,5 | 84    | 84,5  | 79,5  | 93,5  | 106,5 |   |
| F                                                  | 13,5  | 8,5   | 5     | 6,5   | 5    | -1   | -8,5  | 26    | 20,5  | 18    | 12,5  | 42,5 | 36   | 46,5 | 30,5 | 19    | 21    | 8,5   | -2,5  | -13,5 | 14    | 13,5  | 50,5  | 36,5  | 23,5  |   |
| G                                                  | 47,5  | 52,5  | 56    | 67,5  | 56   | 62   | 69,5  | 67    | 72,5  | 75    | 80,5  | 79,5 | 86   | 75,5 | 91,5 | 103   | 105   | 117,5 | 128,5 | 139,5 | 101   | 101,5 | 104,5 | 118,5 | 131,5 |   |
| H                                                  | 24,5  | 19,5  | 16    | 4,5   | 16   | 10   | 2,5   | 39    | 33,5  | 31    | 25,5  | 58,5 | 52   | 62,5 | 46,5 | 35    | 37    | 24,5  | 13,5  | 2,5   | 31    | 30,5  | 75,5  | 61,5  | 48,5  |   |
| I                                                  | 126   | 126   | 126   | 126   | 147  | 147  | 147   | 204,5 | 204,5 | 204,5 | 289   | 289  | 302  | 302  | 302  | 317   | 317   | 317   | 317   | 317   | 409   | 409   | 409   | 409   | 409   |   |
| J                                                  | 56,5  | 56,5  | 56,5  | 56,5  | 66   | 66   | 66    | 79    | 79    | 79    | 79    | 108  | 108  | 108  | 108  | 108   | 129,5 | 129,5 | 129,5 | 129,5 | 153,5 | 153,5 | 153,5 | 153,5 |       |   |
| K                                                  | 111,5 | 111,5 | 111,5 | 111,5 | 129  | 129  | 129   | 164   | 164   | 164   | 164   | 223  | 223  | 223  | 223  | 223   | 259,5 | 259,5 | 259,5 | 259,5 | 313,5 | 313,5 | 313,5 | 313,5 |       |   |
| L                                                  | 28    | 28    | 28    | 28    | 45   | 45   | 45    | 46    | 46    | 46    | 46    | 70   | 70   | 70   | 70   | 70    | 75    | 75    | 75    | 75    | 98    | 98    | 98    | 98    |       |   |
| M                                                  | 25    | 25    | 25    | 25    | 36   | 36   | 36    | 40    | 40    | 40    | 40    | 63   | 63   | 63   | 63   | 63    | 70    | 70    | 70    | 70    | 90    | 90    | 90    | 90    |       |   |
| N                                                  | 15    | 15    | 15    | 15    | 20   | 20   | 20    | 25    | 25    | 25    | 25    | 40   | 40   | 40   | 40   | 40    | 45    | 45    | 45    | 45    | 55    | 55    | 55    | 55    |       |   |
| O                                                  | 17    | 17    | 17    | 17    | 22,5 | 22,5 | 22,5  | 28    | 28    | 28    | 28    | 43   | 43   | 43   | 43   | 43    | 48,5  | 48,5  | 48,5  | 48,5  | 59    | 59    | 59    | 59    |       |   |
| P                                                  | 5     | 5     | 5     | 5     | 6    | 6    | 6     | 8     | 8     | 8     | 8     | 12   | 12   | 12   | 12   | 12    | 14    | 14    | 14    | 14    | 16    | 16    | 16    | 16    |       |   |
| Q                                                  | 124,5 | 124,5 | 124,5 | 124,5 | 129  | 129  | 129   | 171   | 171   | 171   | 171   | 230  | 215  | 215  | 215  | 215   | 254   | 254   | 254   | 254   | 298,5 | 298,5 | 298,5 | 298,5 |       |   |
| R                                                  | 57,5  | 57,5  | 57,5  | 57,5  | 65,5 | 65,5 | 65,5  | 80    | 80    | 80    | 80    | 122  | 107  | 107  | 107  | 107   | 134,5 | 134,5 | 134,5 | 134,5 | 162   | 162   | 162   | 162   |       |   |
| S                                                  | 168   | 168   | 168   | 168   | 195  | 195  | 195   | 242,5 | 242,5 | 242,5 | 242,5 | 331  | 331  | 331  | 331  | 331   | 389   | 389   | 389   | 389   | 467   | 467   | 467   | 467   |       |   |
| T                                                  | 191   | 191   | 191   | 191   | 217  | 217  | 217   | 275   | 275   | 275   | 275   | 363  | 363  | 363  | 363  | 363   | 421   | 421   | 421   | 421   | 502   | 502   | 502   | 502   |       |   |
| U                                                  | 9     | 9     | 9     | 9     | 9    | 9    | 9     | 11    | 11    | 11    | 11    | 13   | 13   | 13   | 13   | 13    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    |       |   |
| V                                                  | 16    | 16    | 16    | 16    | 16   | 16   | 16    | 22    | 22    | 22    | 22    | 22   | 22   | 22   | 22   | 22    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    |       |   |
| W                                                  | 72    | 72    | 72    | 72    | 72   | 72   | 72    | 106   | 106   | 106   | 106   | 138  | 138  | 138  | 138  | 138   | 142   | 142   | 142   | 142   | 132   | 132   | 132   | 132   |       |   |
| X                                                  | 50    | 50    | 50    | 50    | 50   | 50   | 50    | 80    | 80    | 80    | 80    | 106  | 106  | 106  | 106  | 106   | 110   | 110   | 110   | 110   | 98    | 98    | 98    | 98    |       |   |
| Y                                                  | 27,5  | 27,5  | 27,5  | 27,5  | 31,5 | 31,5 | 31,5  | 42,5  | 42,5  | 42,5  | 42,5  | 57,5 | 57,5 | 57,5 | 57,5 | 57,5  | 65    | 65    | 65    | 65    | 80    | 80    | 80    | 80    |       |   |
| * Dimension B can be varied upon request           |       |       |       |       |      |      |       |       |       |       |       |      |      |      |      |       |       |       |       |       |       |       |       |       |       |   |

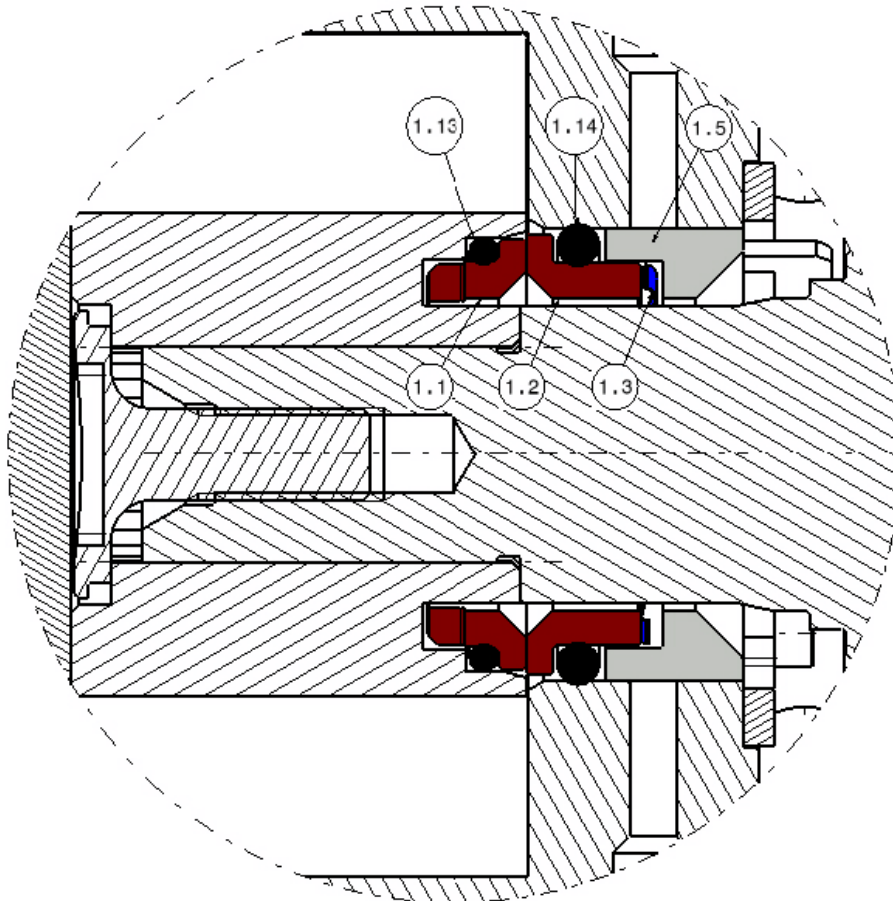
\* Dimension B can be varied upon request

## 16.6 Material Specification

| Item No. | Description              | Materials          | Material Code   |
|----------|--------------------------|--------------------|-----------------|
| 9.1      | Front Cover              | Stainless Steel    | 1.4404 / 1.4435 |
| 8.0      | Rotor Screw              | Stainless Steel    | 1.4404 / 1.4435 |
| 4.1      | Bearing House            | ST52               | 1.0570          |
| 3.2      | Timing Gear Driven shaft | 34CrNiMo6          | 1.6582          |
| 3.1      | Timing Gear Drive Shaft  | 42CrMo4            | 1.7225          |
| 2.1      | Drive Shaft              | X-2 CrNiMoN 22-5-3 | 1.4462          |
| 2.2      | Driven Shaft             |                    |                 |
| 7.1      | Pump Case                | Stainless Steel    | 1.4404 / 1.4435 |
| 2.3      | Rotor                    | Stainless Steel    | 1.4404 / 1.4435 |

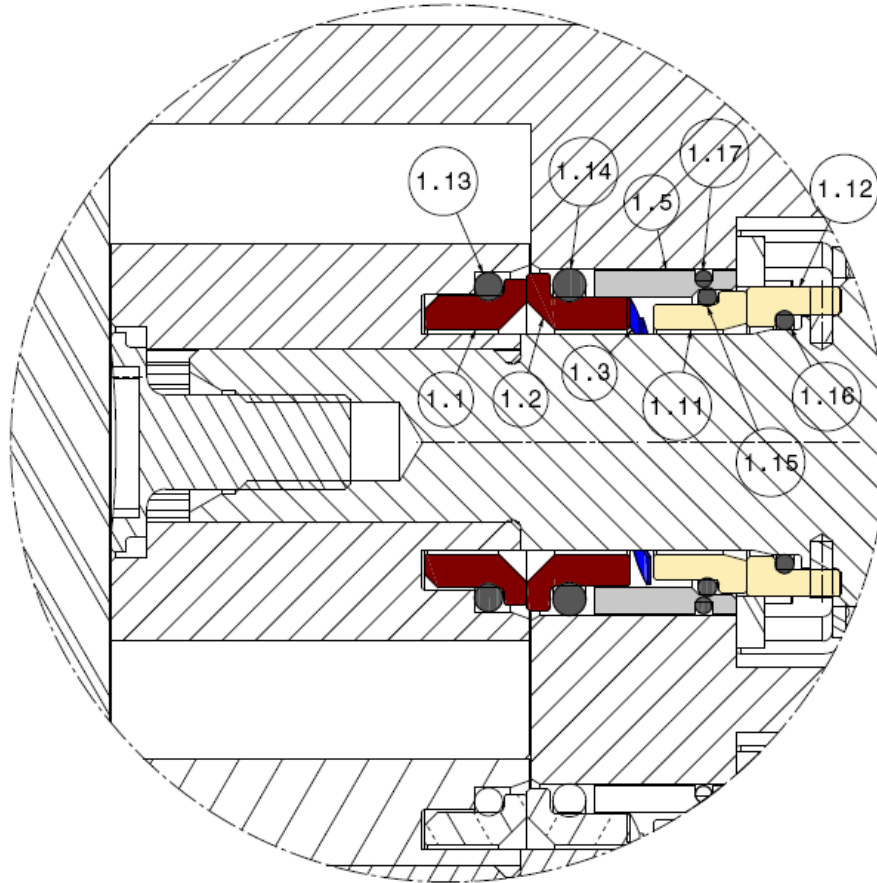
## 16.7 Shaft Seals

### 16.7.1 Single Mechanical Seal



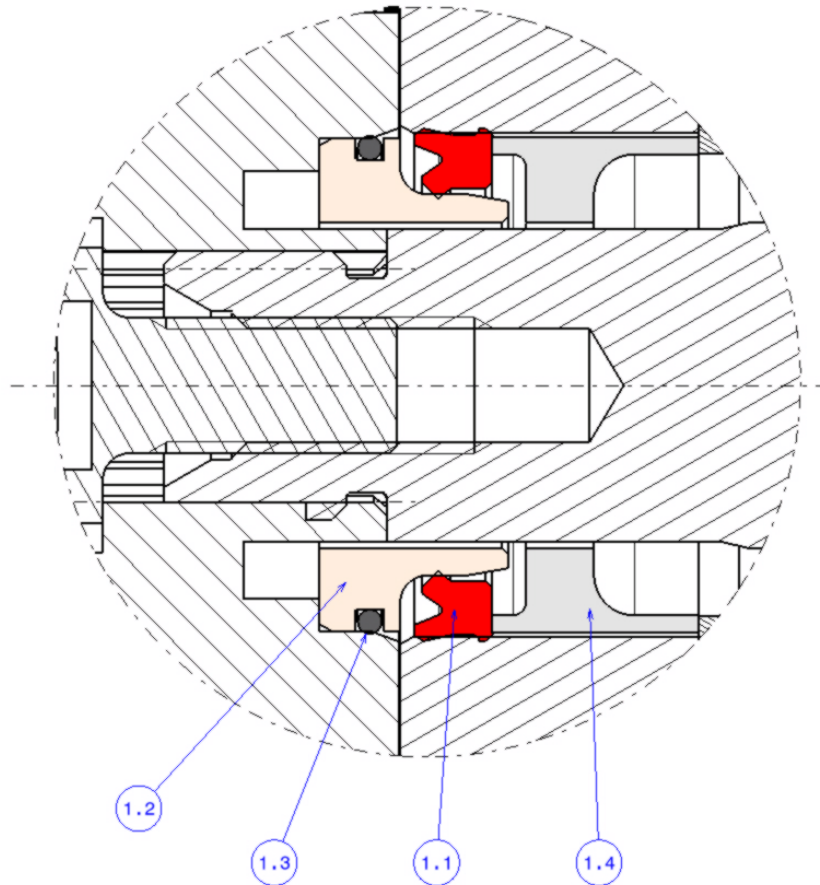
| ITEM | DESCRIPTION                                      | QTY. |
|------|--------------------------------------------------|------|
| 1.1  | <i>Rotary Seal Face, Product Seal</i>            | 2    |
| 1.2  | <i>Stationary Seal Face, Product Seal</i>        | 2    |
| 1.3  | <i>Wave Spring</i>                               | 2    |
| 1.5  | <i>Seal Housing Single Mechanical Seal</i>       | 2    |
| 1.6  | <i>Anti-Rotation Pins (w/o fig.)</i>             | 4    |
| 1.13 | <i>O-Ring Rotary Seal Face, Product Seal</i>     | 2    |
| 1.14 | <i>O-Ring Stationary Seal Face, Product Seal</i> | 2    |

### 16.7.2 Double Mechanical Seal



| ITEM | DESCRIPTION                                  | QTY. |
|------|----------------------------------------------|------|
| 1.1  | Rotary Seal Face, Product Seal               | 2    |
| 1.2  | Stationary Seal Face, Product Seal           | 2    |
| 1.3  | Wave Spring                                  | 2    |
| 1.5  | Seal Housing Double Mechanical Seal          | 2    |
| 1.6  | Anti-Rotation Pins (w/o fig.)                | 8    |
| 1.11 | Stationary Seal Face, Atmosphere Seal        | 2    |
| 1.12 | Rotary Seal Face, Atmosphere Seal            | 2    |
| 1.13 | O-Ring Rotary Seal Face, Product Seal        | 2    |
| 1.14 | O-Ring Stationary Seal Face, Product Seal    | 2    |
| 1.15 | O-Ring Stationary Seal Face, Atmosphere Seal | 2    |
| 1.16 | O-Ring Rotary Seal Face, Atmosphere Seal     | 2    |
| 1.17 | O-Ring Seal Housing                          | 2    |

### 16.7.3 Lip Seal



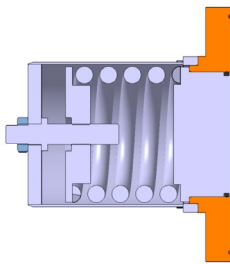
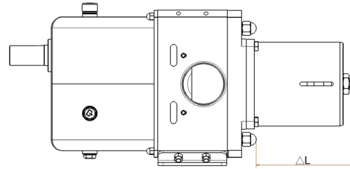
| ITEM | DESCRIPTION             | QTY. |
|------|-------------------------|------|
| 1.1  | Radial shaft seal       | 2    |
| 1.2  | Shaft protection sleeve | 2    |
| 1.3  | O-ring                  | 2    |
| 1.4  | Ejection sleeve         | 2    |

## 17 Pressure relief valves

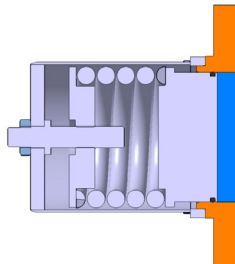
### 17.1 Mode of functioning, purpose and suitability for hygienic use

In order to protect the pump and assembly there are pressure relief valves available which are integrated into the pump cover. These are either spring-loaded or air-loaded. At a defined pressure in the pump these pressure relief valves react and form a short circuit between inlet and outlet part of the pump. Thus the rotary lobe pump as displacement pump is protected against over pressure. The pressure relief valves are suitable for the hygienic use, too, as the load relieving space which is the short circuit between inlet and outlet part of the pump, is re-closed completely.

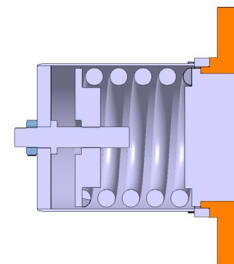
### 17.2 Pressure relief valve integrated into the pump cover, spring-loaded



closed

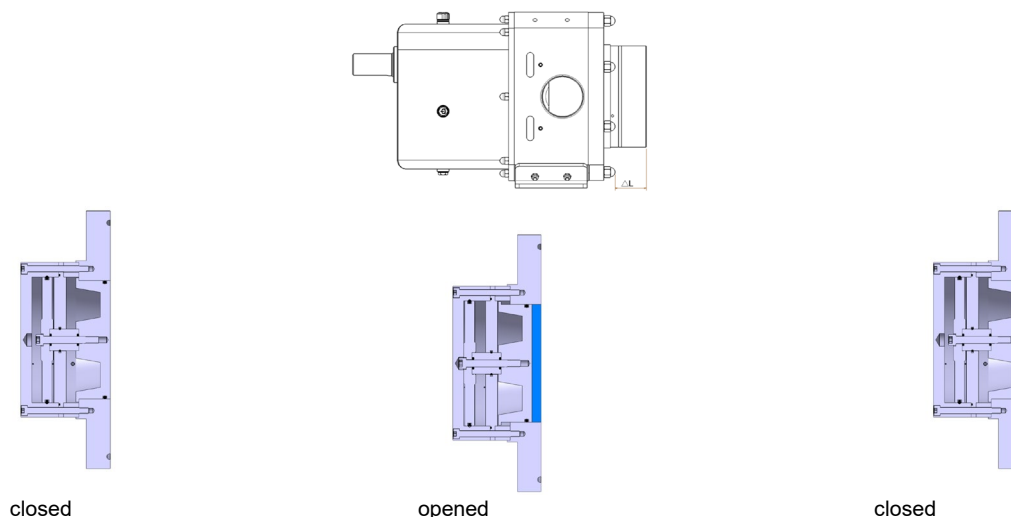


opened



closed

### 17.3 Pressure relief valve integrated into the pump cover, air-loaded and air-operated



### 17.4 Adjustment

The hydraulic loaded space of the pressure relief valve corresponds to app. 1/3 of the valve piston space when the pump is running. When the pump is stopped the total space is loaded. The reaction pressure of the valve is not pre-adjustable. The adjusted pressure depends on the individual product characteristics as well as on the different operating conditions.

For an adjustment, please proceed as follows:

Install a pressure gauge if possible directly at the outlet socket of the pump. If possible, run the pump unloaded resp. without considerable resistance in the assembly, for example by slowly closing a lock valve and observe the pressure gauge. Adjust the desired reaction pressure by loading the pressure relief valve step by step and close the lock valve. The reaction pressure has been reached when the pressure gauge stops rising with a fully closed lock valve.

**The spring-loaded pressure relief valve is preloaded by turning the valve shaft counter clockwise.**

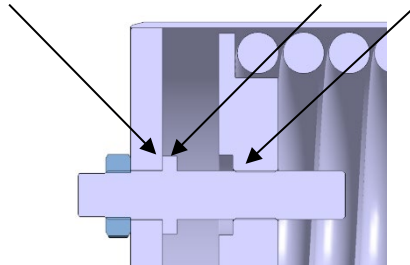
**The air-loaded pressure relief valve is preloaded for example by a pressure reducer.**

### 17.5 State on delivery

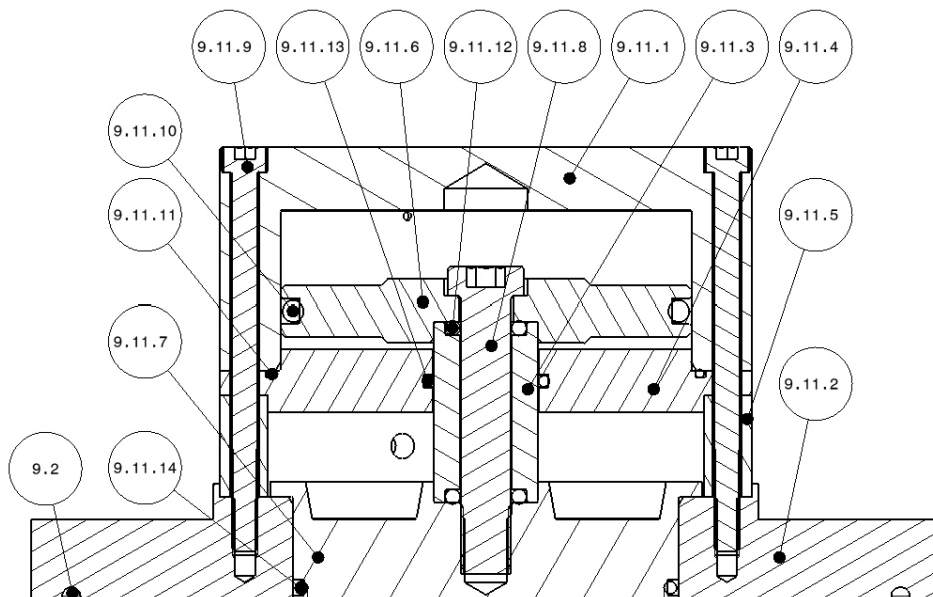
On delivery the pressure relief valves are always unloaded.

## 17.6 Maintenance and lubrication

The points of lubrication at the spring-loaded pressure relief valve are located at the valve spindle on the contact surface to the valve housing and at the thread.



At the air-loaded pressure relief valve all dynamic o-ring seals have to be lubricated using appropriate grease. This comprises position 9.11.10, 9.11.13 and 9.11.14.



## 17.7 Pressure relief valve with built-in temperature sensor

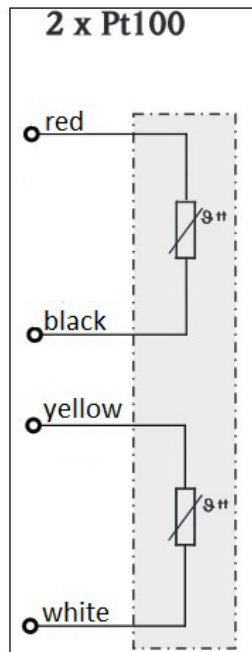
Generally, positive displacement pumps must be protected against excessive overpressure.

Excessively high overpressure might be caused by an obstruction in the discharge line, by solidifying or cooling of the pumped fluid, by modification of the pumped fluid or by wrong pre-setting of the speed.

A protection against overpressure must be provided either on site by an external pressure relief valve, e.g. with tank return system or by a pressure relief valve built into the pump cover. Pressure relief valves built into the pump cover must be adjusted to the response pressure values which have to be fixed by the customer. After reaction, correctly adjusted pressure relief valves release the pump internal return flow from the discharge side to the suction side. The fluid displaced by the pump elements, circulates in the pump so that the major part of the frictional heat is not being discharged anymore thus causing an uncontrolled increase of temperature in the pump. The temperature sensor integrated to the pump cover is used for a safety-related shutdown of the pump.

The shutdown temperature must be fixed by the user of the pump. We recommend a shutdown temperature of 10 – 20 K above the maximum operating temperature.

The built-in temperature sensor is a resistance temperature detector with two PT 100 measuring resistors in a 2-wire configuration.



As the sensor is a resistance sensor, for the evaluation an electronic temperature transmitter is required which supplies power to the sensor and measures and evaluates the variable voltage drop.

By using two independent measuring resistors both mechanically and chemically caused temperature variations of a sensor element can be recognized and reported by the transmitter. For this purpose the temperature transmitter must record the independent measured values of both measuring resistances, evaluate and compare them.



Instruction & Operation Manual

## Premiumlobe Rotary Lobe Pump

Date: 20/10/29

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Doc. No. 0076

Name: T. Moldenhauer

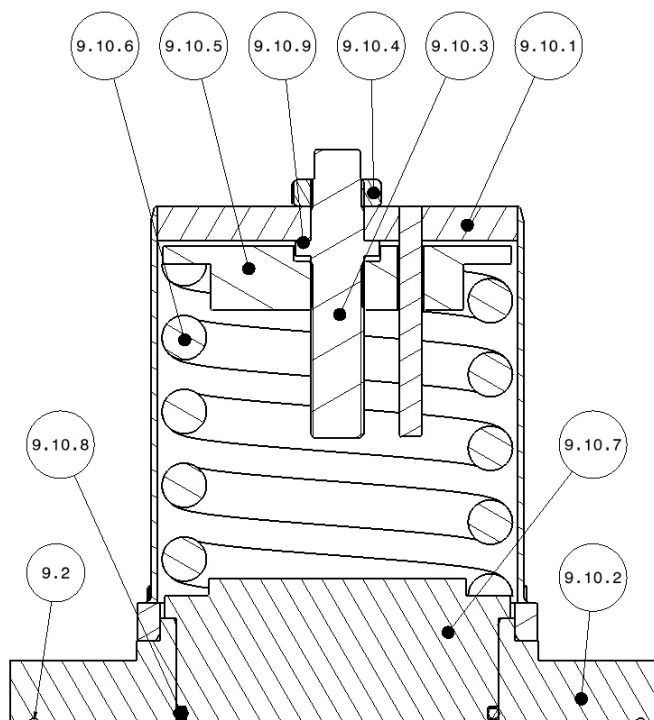
The recognition of changes of sensor measured values caused by an error is of particular importance for a later SIL consideration. The corresponding performance level respectively SIL results from the risk analysis (risk graph), which must be issued respectively stipulated by the user of the pump.

The integration and calibration of the temperature sensor is explicitly done by the customer. Also the correct setting of the pressure relief valve is done by the customer.

The maximum operating pressure values for the setting of the pressure relief valve and the maximum operating temperatures can be looked up in the commercial documents.

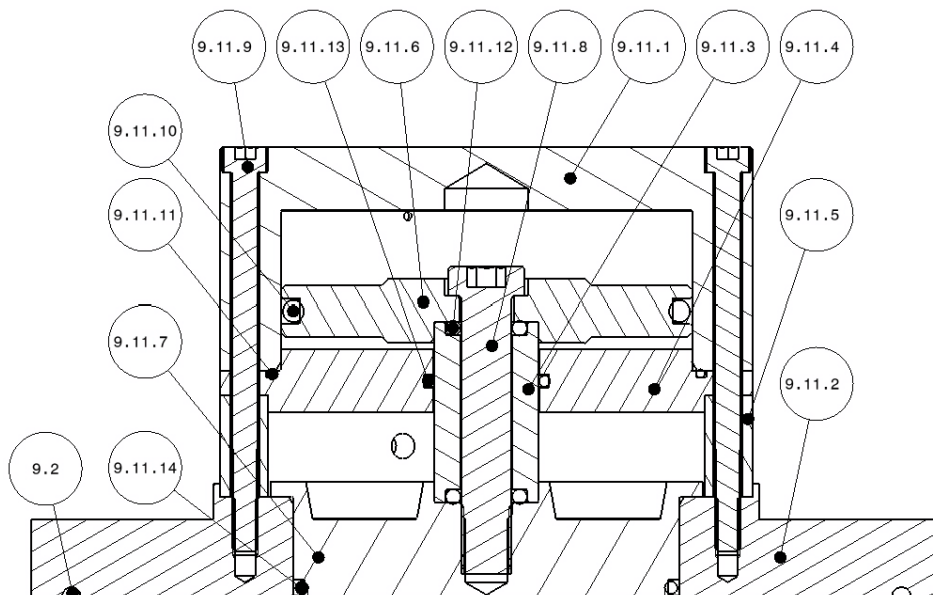
## 17.8 Parts list

### 17.8.1 Spring-loaded pressure relief valve



| POS.    | DESCRIPTION                                  | QUANTITY |
|---------|----------------------------------------------|----------|
| 9.2     | O-Ring seal for pump case cover              | 1        |
| 9.10.1  | Valve housing                                | 1        |
| 9.10.2  | Pump housing cover for pressure relief valve | 1        |
| 9.10.3  | Valve spindle                                | 1        |
| 9.10.4  | Counter nut                                  | 1        |
| 9.10.5  | Pressure plate                               | 1        |
| 9.10.6  | Valve spring                                 | 1        |
| 9.10.7  | Valve piston                                 | 1        |
| 9.10.8  | O-Ring seal for Valve piston                 | 1        |
| 9.10.9  | POM-Washer                                   | 1        |
| 9.10.10 | Hexagonal screw (w/o fig.)                   | 4        |
| 9.10.11 | Washer (w/o fig.)                            | 4        |

### 17.8.2 Air-loaded and air-operated pressure relief valve

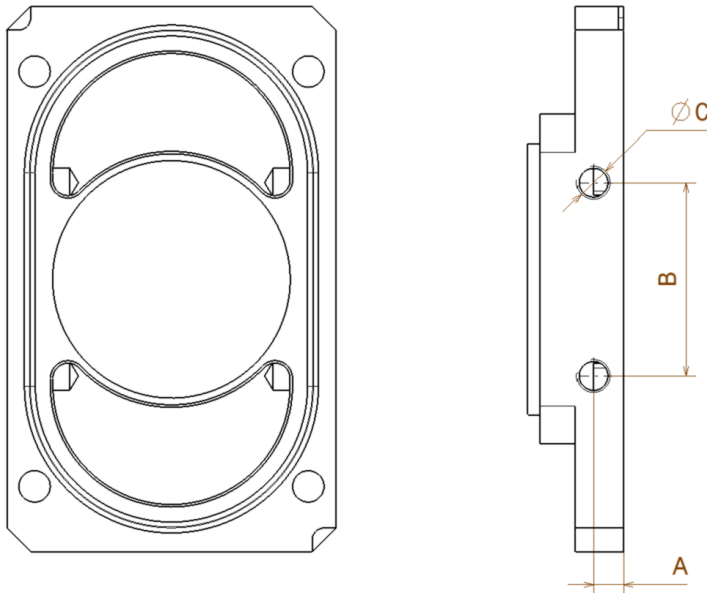


| OS.    | DESCRIPTION                                  | QUANTITY |
|--------|----------------------------------------------|----------|
| 9.2    | O-Ring seal for pump case cover              | 1        |
| 9.11.1 | Valve cover                                  | 1        |
| 9.11.2 | Pump housing cover for pressure relief valve | 1        |
| 9.11.3 | Guiding, valve piston                        | 1        |
| 9.11.4 | Control plate                                | 1        |
| 9.11.5 | Distance washer                              | 1        |

|         |                                                      |   |
|---------|------------------------------------------------------|---|
| 9.11.6  | Control plate                                        | 1 |
| 9.11.7  | Valve piston                                         | 1 |
| 9.11.8  | Allen screw                                          | 1 |
| 9.11.9  | Allen screw                                          | 6 |
| 9.11.10 | O-Ring seal for control plate                        | 1 |
| 9.11.11 | O-Ring seal for control housing                      | 1 |
| 9.11.12 | O-Ring seal for guiding for valve piston             | 2 |
| 9.11.13 | O-Ring seal for guiding valve piston / control plate | 1 |
| 9.11.14 | O-Ring seal for valve piston                         | 1 |

## 17.9 Heatable pressure relief valves

The pressure relief valves are available with heating facility according to the principle below. The heating or cooling can be done by different heat transfer media. The maximum pressure is 3.5 bar gauge.



The direction of flow of the heating transfer medium is variable.

## 18 Heating / Heat exchange

### 18.1 Principle

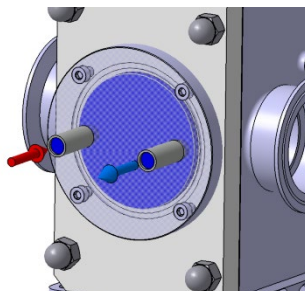
The Premiumlobe series can be fitted with heatable pump cover or heatable pressure relief valve and with heatable pump housing.

The heat exchange faces also permit a cooling of the pump.

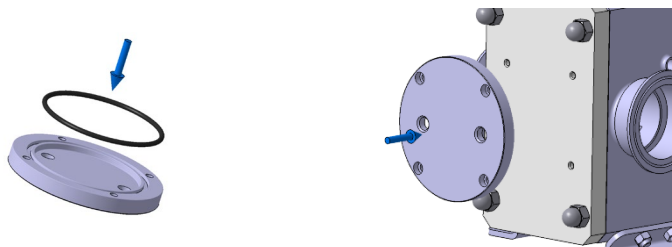
Thus the surface temperatures in the pump can be adjusted. The heat exchange faces are not dimensioned for a cooling or a heating of the system.

#### 18.1.1 Heatable pump cover executed as heating pocket

The heating can be done by means of different heating transfer media. The maximum pressure is 3.5 bar gauge pressure.



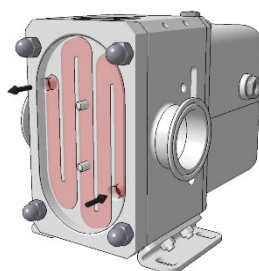
The flow direction of the heating transfer medium is reversible.



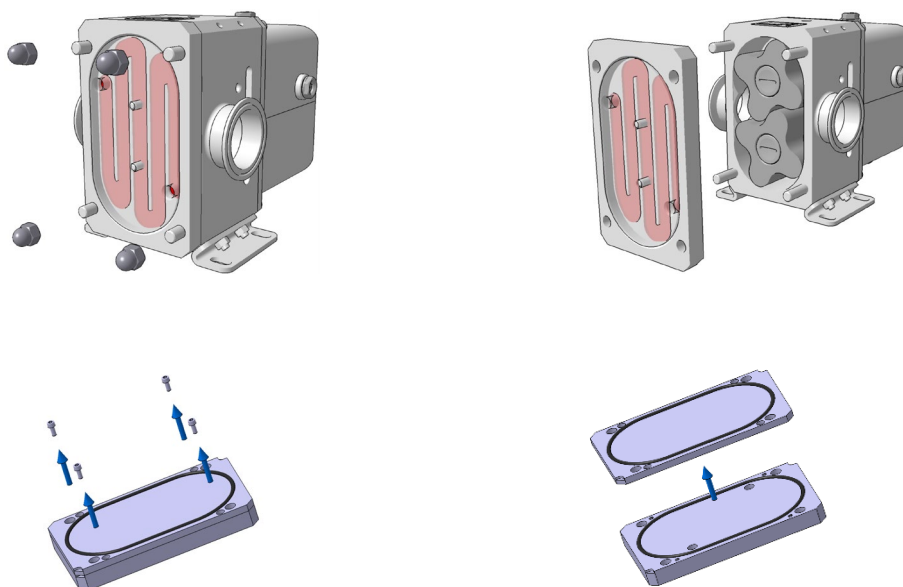
This option can be re-fitted.

### 18.1.2 Heatable pump cover with integrated heating coil IHCh FC

In order to reach a better heat transfer any Premiumlobe rotary lobe pump can be fitted with a pump cover with integrated heating coil. This can also be re-fitted. The heating can be done by means of different heating transfer media. The maximum pressure is 3.5 bar gauge pressure.

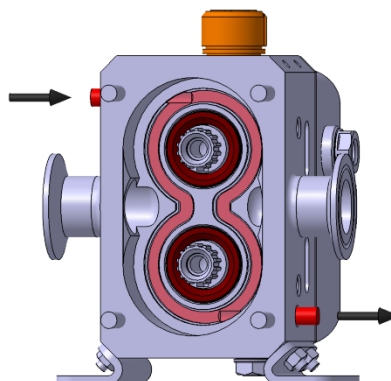


The flow direction of the heating transfer medium is reversible.



### 18.1.3 Heatable pump housing with integrated heating channels IHCh RC

In order to reach a better heating transfer any Premiumlobe rotary lobe pump can be fitted with a pump housing with integrated heating channels. These cannot be re-fitted. The heating can be done by means of different heating transfer media. The maximum pressure is 3.5 bar gauge pressure.



The flow direction of the heating transfer medium is reversible.

## 19 Troubleshooting

A malfunction in a pump system may have various causes. The malfunction is not always necessarily in the pump itself, but can also be caused by a malfunction in the piping system or in another appendage in the system. If the operating conditions deviate too greatly from the specifications by which the pump was purchased this can also cause malfunctioning.

Therefore always check first:

Has the pump been installed correctly?

Are the operating conditions still in accordance to the original specifications?

Are the further appendages in the pipe system functioning correctly?

1. Pump gives no liquid
2. Pump gives irregular liquid flow
3. Capacity too low
4. Pump overheats
5. Motor overheats
6. Excessive rotor wear
7. Excessive wear of shaft sealing
8. Pump vibrates excessively or makes too much noise
9. Pump stops
10. Pump comes to a stop at start-up

The table on the next page gives a possible cause and solution for the malfunctions mentioned above.

| Fault |   |   |   |   |   |   |   |   |    | Cause                                  | Action                                                                                                                  |
|-------|---|---|---|---|---|---|---|---|----|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                        |                                                                                                                         |
| *     |   |   |   |   |   |   |   |   |    | wrong direction of rotation            | reverse direction of rotation of drive                                                                                  |
| *     |   |   |   |   |   |   |   |   |    | pump is not filled with liquid         | vent suction line and rotor case and prime rotor case with liquid                                                       |
| *     | * | * |   |   |   |   | * |   |    | insufficient NPSHA                     | Enlarge diameter of suction line, or simplify suction line and make it shorter, or reduce speed and product temperature |
|       |   | * | * |   |   |   |   | * |    | creation of vapour in suction line     |                                                                                                                         |
|       | * | * |   |   |   |   | * |   |    | air entering the suction line          | check the connections                                                                                                   |
| *     | * | * |   |   |   |   | * |   |    | gas in the suction line                | vent suction line / pump casing                                                                                         |
|       | * | * |   |   |   |   | * |   |    | insufficient static head               | increase liquid level to enlarge static head                                                                            |
|       |   |   | * | * |   |   | * |   | *  | product viscosity is too high          | lower the speed / increase the product temperature                                                                      |
|       |   | * |   |   |   |   |   |   |    | product viscosity is too low           | increase the speed / lower the product temperature                                                                      |
|       |   | * | * |   | * |   | * |   | *  | product temperature is too high        | cool the product / pump casing                                                                                          |
|       |   |   |   | * |   |   |   |   | *  | product temperature is too low         | heat the product/rotor case                                                                                             |
|       |   |   |   |   | * | * | * | * |    | foreign particles in the product       | clean the system/ place a filter at suction side                                                                        |
|       |   | * | * | * | * |   | * | * | *  | pressure at pump discharge is too high | check piping for obstructions / simplify the discharge line                                                             |
|       |   |   | * | * | * |   | * | * |    | rotor case distorted by piping         | check alignment / support the piping                                                                                    |
|       |   |   |   | * |   |   | * |   |    | speed too high                         | lower the speed                                                                                                         |
|       |   | * |   |   |   |   |   |   |    | speed too low                          | increase the speed                                                                                                      |
|       |   |   | * | * | * | * | * | * |    | insufficient flushing                  | increase flushing pressure / - capacity                                                                                 |
|       |   |   | * | * | * | * | * | * | *  | worn bearings / timing gears           | Replace                                                                                                                 |
| *     |   |   |   |   |   |   |   |   |    | pressure relief valve in charge        | Check the discharge for any obstructions, closed valves or further reasons for resistance                               |

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