

# Not Binding Operating and Assembly Instruction Progressive Cavity Pump

This operating and assembly instruction is only  
for general information.

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## 1.1 General notes

- Always keep the operating and maintenance instructions close by the machine.
- If problems cannot be solved with reference to the operating and maintenance instructions, please contact the manufacturer.

Observe the following points in addition to these operating and maintenance instructions:

- Prohibition, warning and mandatory signs, warning notes on the machine
- Relevant laws and ordinances
- Statutory provisions on accident prevention
- Corresponding harmonised standards and regulations

## 1.2 Safety and warning notes

- Comply with safety and warning notes for safe and efficient use of the product.

Signal words for specific dangers and (possible) consequences are explained below. These are supplemented by symbols (pictograms) if necessary.

### 1.2.1 Warning notes

<b>NOTICE</b>
<p><b>Caution for machine!</b> Possible danger. Material damage can occur.</p>

	<b>CAUTION</b>
<p><b>Caution for people and machine!</b> Possible danger. Minor injury or damage to property can occur.</p>	

	<b>WARNING</b>
<p><b>Warning for people!</b> Possible danger. Death or serious injury can occur.</p>	

	<b>DANGER</b>
<p><b>Danger for people!</b> Possible danger. Immediate risk of sever or fatal injury.</p>	

### 1.2.2 Danger symbols



Warning:  
Suspended load.



Warning:  
Dangerous electrical  
voltage.

### 1.2.3 Information symbols



Ensure environmental protection.      Wear eye protection.

- Instruction to act/take measures
- List item

### 1.3 Dangers that can be caused by the machine

seepex machines are built in accordance with the state of the art.

Nevertheless, there is a residual risk, because the machine works with:

- Mechanical movements that pose a danger
- Electrical voltages and currents

We have used design measures and applied safety technology to minimise the risk to the health of people posed by this danger.

### 1.4 Qualification of the personnel

This handbook is intended for:

- Owner
- Operators
- Setters
- Maintenance personnel

### 1.5 Authorised people

People authorised to undertake operation, set up and maintenance are instructed and trained specialists employed by the owner/manufactururer.

Detailed technical knowledge is essential for performing any work on the machine.



The owner is responsible for:

- Personnel training
- Compliance with safety regulations
- Compliance with operating and maintenance instructions

The operator must:

- Have received instruction
- Read and understood the relevant parts of the operating instructions before starting work
- Know the safety devices and regulations

**1.5.1 Tasks and information for the owner/operators**

- Regularly check and maintain the machine, replacing all parts in good time which no longer guarantee safe operation.
- It is essential to comply with the procedure described in the operating instructions for shutting down the machine.
- On completion of work, attach all safety and protective devices and make sure they are functioning.

**1.5.2 Safety notes for maintenance, inspection and assembly work**

- Do not work on the machine or system unless it is stationary and depressurised.
- Switch off the master switch and pull out the power plug before starting work on live components.
- Comply with the procedure for shutting down the machine as described in the Shut-down chapter.
- Decontaminate (de-toxify) machines that are used for pumping media that can be harmful to health.
- Refer to the Initial start-up chapter before repeated start-up of the machine.

**1.6 Personal protective equipment**

- Wear personal protective equipment and/or additional equipment for your own safety.
- Avoid/limit risks by the use of collective technical protective equipment or by organisational measures at work.

**1.7 Safety and protective devices**

- Prior to start-up, bolt seepex machines onto a concrete foundation so as to ensure stability.
- Starting and stopping devices must be clearly recognisable. Take appropriate measures to avoid defects.
- No protective device is necessary for checking and/or setting the shaft seal.
- Hot surfaces are identified with a danger symbol on the machine.

**1.8 Foreseeable misuse**

Serious personal injury and damage to property can be caused by:

- Incorrect use
- Incorrect installation or operation of the machine
- Impermissible removal of necessary protective equipment

## 1.9 Designated use

- Only use seepex machines if they are in perfect condition and in compliance with the operating and maintenance instructions.
- Do not start up the machine unless the system in which the machine is installed is in accordance with the provisions of the applicable guidelines and statutory regulations.
- Equivalent sustained sound pressure level at workplaces of operating personnel C75 dB (A). Cavitation-free operation of the machine and screwed connection to concrete foundation are essential.
- seepex machines are components that are exclusively intended for pumping media in accordance with the technical data (→ chapter 3). Written approval must be obtained from the manufacturer before other media are pumped.
- Refer to the information on the type plate and the operating instructions for technical data (→ chapter 3), and comply with them.
- The operating instructions are assigned to the seepex machine based on the commission number.



Fig. 1-1 Similar illustration

## 1.10 Warranty

- Warranty in accordance with our terms and conditions of delivery and order confirmation.
- It is a condition of the machine warranty that the machine must correspond to the listed operating instructions in accordance with the type plate/data sheet.
- All wearing parts are excluded from the warranty.
- These operating instructions are subject to copyright. Reproduction is not permitted and will be punished. Contravention will be pursued through the courts.

### 2.1 General description

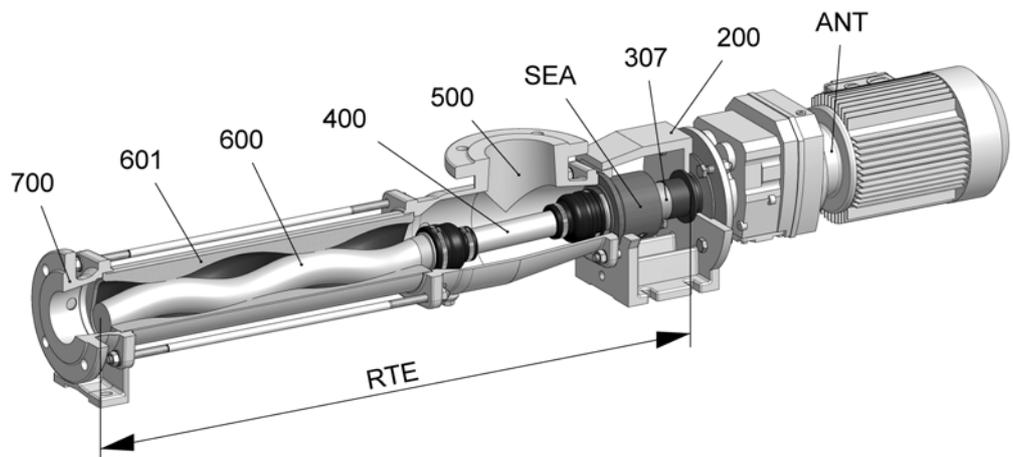
seepex pumps are members of the group of rotating displacement pumps.

- Characteristic features
  - Special configuration/arrangement of the rotor and stator pumping elements.
  - Motion sequence

### 2.2 Mode of action and pumping principle of the seepex pump

- Sealing bands are produced through geometric design/contact of both conveying elements.
- Sealing bands ensure a perfect fit between the suction and pressure side.  
Result:
  - Increased pump suction.
  - Higher pressure build-up independent of speed possible.

### 2.3 Constructive design



No.	Designation
ANT	Drive
200	Lantern
307	Plug-in shaft
400	Coupling rod
SEA	Shaft seal
500	Suction casing
600	Rotor
RTE	Rotating unit
601	Stator
700	Pressure branch



**3.1 Data sheet**

**3.2 Characteristic Curves**

**3.3 Declaration**

- Data sheet, characteristic curves and declarations are commission specific documents and not part of this not binding operating and assembly instruction.



#### 4.1 Safety

<b>CAUTION</b>
<p><b>Damage to property/injuries due to incorrect transport</b> Slight injury or damage to property can occur</p> <ul style="list-style-type: none"> <li>➤ Comply with the safety notes and transport notes on the packaging.</li> <li>➤ Use suitable means of transport, lifting devices and tools.</li> <li>➤ Use protective equipment.</li> </ul>

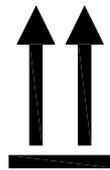
#### 4.2 Transport

##### 4.2.1 Dimensions, weights and center of gravity

- Note the dimensional drawing (→ chapter 5.6).

##### 4.2.2 Symbols

- Meaning of symbol



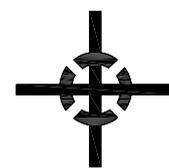
Top



Fragile  
item



Against moisture  
protect



Centre of gravity

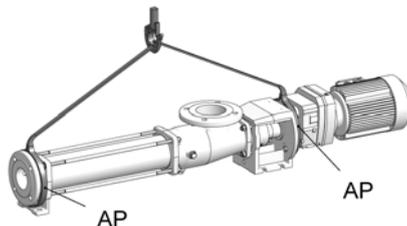


Lashing points

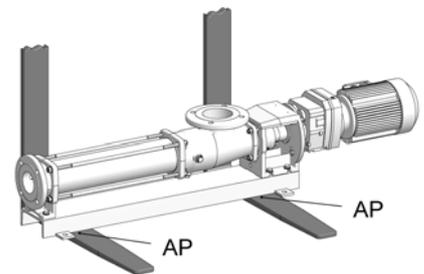
##### 4.2.3 Sling points (AP) for lifting devices

	<b>WARNING</b>
	<p><b>Warning of suspended load.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Use the lashing points <b>(AP)</b> for lifting devices.</li> <li>➤ Note the centre of gravity (→ dimensional drawing, chapter 5.6).</li> </ul>

Lifting machine



Industrial trucks



##### 4.2.4 Unpacking the machine

- Comply with the symbols and notices on the packaging.
- Remove the screwed connection between the machine and packaging.
- Remove the machine with a lifting machine/industrial truck.

#### 4.3 Temporary storage/Corrosion protection

- All seepex machines have corrosion protection applied as standard prior to transport.

<i>NOTICE</i>	
	<p><b>Damage to property if corrosion protection is missing</b> Property damage can occur due to corrosion.</p> <ul style="list-style-type: none"><li>➤ Temporary storage must be in a dry, enclosed, frost-free room in order to provide protection against ambient influences.</li><li>➤ Contact seepex regarding the necessary corrosion protection for temporary storage.</li></ul>

#### 4.4 Disposal

	<i>NOTICE</i>
	<p><b>Environmental protection</b> Material damage can occur.</p> <ul style="list-style-type: none"><li>➤ Drain the pumping medium and dispose of it in accordance with the regulations.</li><li>➤ Dispose of the machine with regard to its composition and existing regulations.</li></ul>

## 5.1 Mounting tools / lifting gear



### CAUTION

#### **Pump falling over.**

Slight injury or damage to property can occur.

- Adhere to the lifting tool's starting point.
- Pay attention to the dimensions, weight and centre of gravity of the pump.
- Use suitable mounting tools/lifting gear.

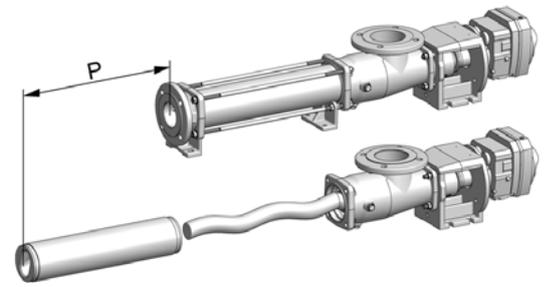
## 5.2 Space requirement

The required space should be determined by considering the following factors:

- Dimensions and weight.
- Requisite transport and lifting equipment.
- Pipe routing – dismantling (dimension for stator replacement).

### 5.2.1 Dimension for stator replacement (P)

- Refer to the dimensional drawing.



## 5.3 Assembly of the complete mounted pump

- Assemble according to technical data (→ chapter 3.).
- Note dimensional drawing.

### **Tension-free mounting of the pump**

- Balance unevenness with suitable supports.
- Applies to mounting on foundations/load-bearing elements.
- Total areas of all pump bearing areas are resting on the surface.

### **Correct position of the drives**

- All drives are set up ready for operation and mounted.
- Correct displacements of the drive during transport/installation of the pump by adjusting/fixing the drive.



### CAUTION

#### **Safety protection equipment.**

Slight injury or damage to property may result.

- Connect safety protection equipment and activate.

## 5.4 Power supply of the seepex pump

	<b>! DANGER</b>
	<p><b>Supply voltage and power frequency.</b> Death or serious injury will result.</p> <ul style="list-style-type: none"><li>➤ Heed type plate on the pump.</li><li>➤ Pay attention to manufacturer's directions (→ chapter 13.).</li><li>➤ Pay attention to safety regulations.</li></ul>

## 5.5 Pipelines

### 5.5.1 Suction and pressure connection

- Refer to the dimensional drawing for the position, nominal width and standard.
- Note direction of rotation/flow direction.

### 5.5.2 Pipeline dimensions

- Adhere to specifications regarding pressure in the pressure respectively suction connection.
- Note technical data (→ chapter 3.).
- Nominal width of suction pipe = nominal width of suction connection of pumps.

### 5.5.3 Residue-free pipelines

<b>NOTICE</b>
<p><b>Damage to property through assembly residue.</b> No claims under guarantee if violated.</p> <ul style="list-style-type: none"><li>➤ Keep all pipe work free of foreign objects.</li><li>➤ Remove weld spatters, screws, steel chips etc.</li></ul>

### 5.5.4 Tension-free assembly

- Assemble pipelines and other components in a tension-free manner on the pump.

**Master Copy**

**6.1 Commissioning report**

Send commissioning report online to  
[www.seepex.com](http://www.seepex.com)

**From:**

**Must be specified with every order!**

**Commission:**

**Model:**

Contact person: .....  
 Tel.: .....  
 Fax: .....  
 E-mail: .....

**Customer Service:**

seepex GmbH  
 Postfach 10 15 64  
 D-46215 Bottrop  
 service@seepex.com

**Germany**

Phone:+49 2041.996-231  
 Fax: +49 2041.996-431

**Rest of Europe**

Phone:+49 2041.996-224  
 Fax: +49 2041.996-424

**Outside Europe**

Phone:+49 2041.996-120  
 Fax: +49 2041.996-432

**Address of plant:**

.....  
 .....  
 .....  
 .....

Delivery date:

Date of installation:

Assembly check carried out on:

Please enter operational data:

Conveying liquid:

Temperature:

Fuse level/motor protection or power consumption

Frequency control

no

yes

If yes:

Supplied by seepex

Supplied by customer

Frequency:

Speed:

Power consumption:

Place, date

Signature / company stamp

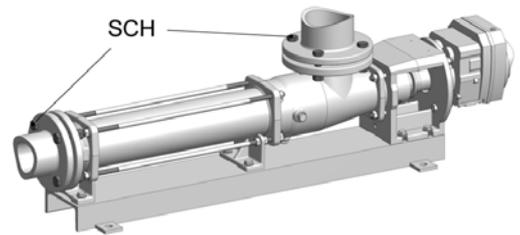


**6.2 Measures before commissioning**

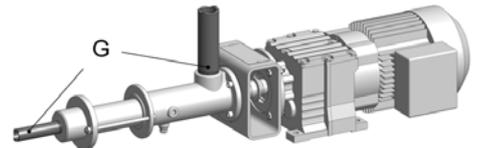
- Note the technical data (→ chapter 3.).

**6.2.1 Checking pipelines**

- Check flange screwed connections (**SCH**).



- Check threaded connections (**G**).



<b>NOTICE</b>
<p><b>Ensure the liquid can flow through without obstruction.</b> Malfunction and/or irreparable damage to the pump.</p> <ul style="list-style-type: none"> <li>➤ Open all shut-off elements before switching on the pump.</li> </ul>

**6.2.2 Protective devices on the pump**

<b>DANGER</b>
<p><b>Missing protective device.</b> Danger of pulling in and crushing.</p> <ul style="list-style-type: none"> <li>➤ Equip the pump with a protective device. Protective devices provided for preventing contact with surfaces or moving parts must be regarded as suitable if contact is not possible in a test involving a test finger, with regard to the penetration possibility, strength and shock resistance.</li> <li>➤ Comply with national protection regulations.</li> <li>➤ In pumps with an open suction flange/feed hopper, attach touch protection. These safety clearances protect those persons who are attempting to reach danger areas without additional help and under the conditions defined for various situations of reaching up, reaching under or reaching through</li> </ul> <p>In shaft seals, touch protection is only necessary if there are components on the rotating shaft.</p>

**6.2.3 Electrical/hydraulic connections**

	<b>DANGER</b>
	<p><b>Dangerous voltage.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Note safety regulations.</li> <li>➤ Disconnect motor from all sources of energy.</li> <li>➤ Secure electrical connections against restarting.</li> </ul>

### 6.2.4 Direction of rotation check

- The pump direction of rotation determines the flow direction of the pumping medium.
- Note the direction of rotation arrow on the type plate.

flow direction



counter clockwise

clockwise

### 6.2.5 Additional devices - optional

- Refer to additional devices (→ chapter 12.1).

### 6.3 Initial commissioning/repeated commissioning

- Start up the pump.

#### NOTICE

##### **Dry running of the pump.**

Malfunction and/or irreparable damage to the pump.

- Fill the suction casing with liquid in order to lubricate the pumping elements.

### 6.3.1 Avoid dry running of the pump

#### NOTICE

##### **High temperature between rotor and stator.**

Stator material burned.

Complete failure of the pump.

- Make sure that the suction-side conveying capacity does not cavitate.
- If this cannot be guaranteed on the machine side, assemble a seepex dry running protection (TSE).

### 6.3.2 Pressure in the suction and pressure connection



#### CAUTION

##### **High pressure.**

Malfunction and/or irreparable damage to the shaft seal or pump.

- Maintain pressure in the suction connection in accordance with the technical data (→ chapter 3.).

#### **Recommendation:**

- Assemble an oil-filled contact pressure gauge to monitor and deactivate the pump.

## 6.4 De-commissioning

Protect the pump and additional devices against the following:

- Frost
- Deposit of solids
- Sedimentation from the liquid
- Corrosion of parts that come into contact with the medium

### 6.4.1 Switching off the pump

	<b>!</b> <b>DANGER</b>
	<b>Dangerous voltage.</b> Death or serious injury can occur. <ul style="list-style-type: none"><li>➤ Note safety regulations.</li><li>➤ Disconnect motor from all sources of energy.</li><li>➤ Secure electrical connections against restarting.</li></ul>

### 6.4.2 Emptying the pump

<b>!</b> <b>CAUTION</b>
<b>Liquid draining out.</b> Minor injury or damage to property can occur. <ul style="list-style-type: none"><li>➤ Wear suitable protective clothing.</li><li>➤ Refer to the technical data (→ chapter 3.) for the corresponding configuration of the pump housing.</li></ul>

To drain the pump:

- If the pump housing has screwed plugs, remove the screwed plugs.
- Drain using a connection branch (suction casing, pressure branch) if the pump housing is coated or the housing does not have screwed plugs.
- Drain the residual liquid from the pump housing.
- Drain the pipelines on the suction and pressure sides, or shut off behind the pump connections.

## 6.4.3 Removing the pump

**WARNING****Risk of pump tipping or falling.**

Death or serious injury can occur.

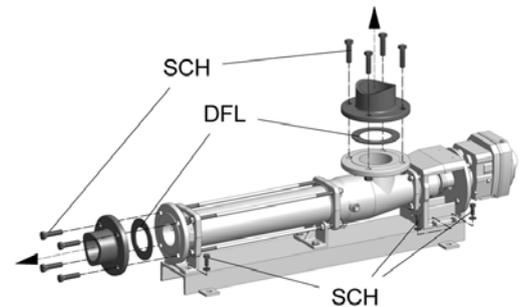
- Support the drive unit to guarantee stability.

**Pipeline dismantling**

- Remove flange bolts (**SCH**) and flange seals (**DFL**).

with/without base plate

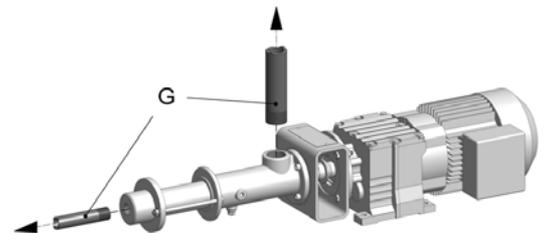
- Remove bolts (**SCH**) from the pump feet.

**Pipeline dismantling**

- Remove threaded connections (**G**).

with/without base plate

- Remove bolts (**SCH**) from the pump feet.



## 6.4.4 Preservation/storage of the pump

**NOTICE****Damage to property due to lack of corrosion protection.**

Property damage can occur due to corrosion.

- Contact seepex to discuss suitable preservation measures.
  - State the commission number of the pump.

7.1 Preventive measures



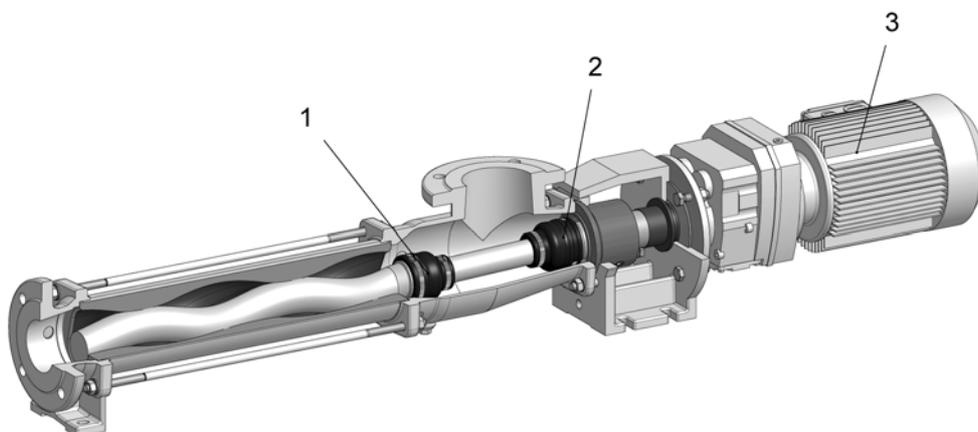
The maintenance personnel must have these operating instructions, follow them and also require corresponding qualifications.

	<b>! DANGER</b>
	<p><b>Dangerous voltage.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Note safety regulations.</li> <li>➤ Disconnect pump from all sources of energy.</li> <li>➤ Secure electrical connections against restarting.</li> </ul>

7.1.1 Pump down-time

<b>NOTICE</b>
<p><b>Pump down-time.</b> Production failure due to wear.</p> <ul style="list-style-type: none"> <li>➤ Acquisition of a set of wearing parts and a set of gaskets.</li> </ul>

7.2 Lubrication



No.	Denomination	Lubricant	Lubricant change in operating hours	Fill volume
1	Pin joint	seepex special grease *	10000 h	*
2	Pin joint	seepex special grease *	10000 h	*
3	Drive	Refer to manufacturer's documentation (chapter 13._)		
	Rotor/stator	Conveying medium	---	---
	Shaft seal	Conveying medium	---	---

\* Type and filling quantities are commission specific information.

## 7.2.1 Joint grease

NOTICE
<p><b>Other grease types.</b> Malfunction and/or irreparable damage to the joints or the pump.</p> <p>➤ Exclusively use seepex special grease.</p>

## 7.3 Inspection

Component	Interval	Action
Joints	Every 10,000 operating hours	Renew joint grease
Stator	Every week	Visual check for leaks
Shaft seal	Every week	Visual check for leaks
Drive unit	Every 3000 operating hours, at least every 6 months	Comply with manufacturer's documentation

## 7.4 Cleaning of CS pumps

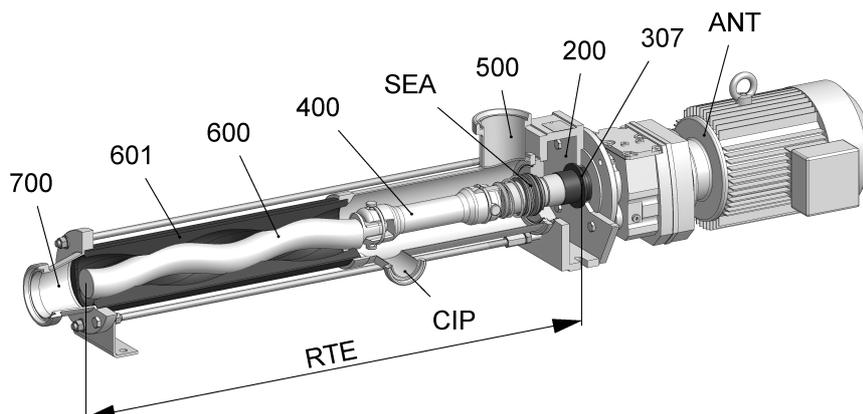
### 7.4.1 Application

- seepex pumps of the CS range can be universally implemented in the food, beverage, pharmaceutical, cosmetic and chemical industries.
- They meet the highest standards in terms of quality, hygienic design, and careful product conveyance.
- The pumps can be cleaned and disinfected in a circular or flow process without having to be dismantled.

### 7.4.2 Observed guidelines

- seepex pumps of the CS range are certified in accordance with 3-A Sanitary Standards (USA) (model designations: BCSO, BTCS, MDC, MDTC) and designed according to the EHEDG guideline.
- In addition to AISI 300 series stainless steels, FDA-compliant non-metallic materials are also used.
- For pumps with closed joints, joint grease with a declaration of conformity in accordance with NSF-H1 is used (NSF = The Public Health and Safety Company, USA).

### 7.4.3 Assembly construction



Item	Denomination	
ANT	Drive	
200	Lantern	
307	Plug-in shaft	
400	Coupling rod	
SEA	Shaft seal	
500	Suction casing	
600	Rotor	
RTE	Rotating unit	
601	Stator	
700	Pressure branch	
CIP	CIP connection	

#### 7.4.4 Designs

##### 7.4.4.1 BCSO, MDC ranges

- Rotating unit (RTE) with open joints.
- Certified in accordance with 3-A Sanitary Standards and designed according to EHEDG guidelines.
- Conveying capacities: BCSO 30 l/h - 130 m<sup>3</sup>/h; MDC range 0.5 l/h - 500 l/h.
- Pressures: up to 24 bar.

##### 7.4.4.2 BSCB range

- Rotating unit (RTE) with closed pin joints.
- Conveying capacities: 30 l/h - 130 m<sup>3</sup>/h.
- Pressures: up to 24 bar.

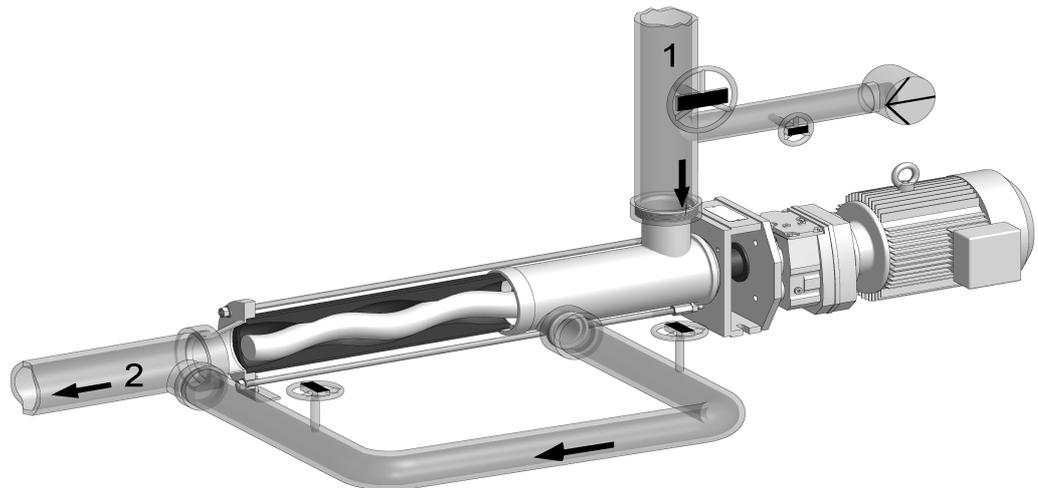
##### 7.4.4.3 BTCS, MDTC ranges

- Feed hopper pump with cylindrical/conical compression zone and a feed screw for conveying highly viscous products with low flowability.
- Rotating unit (RTE) with open joints, optionally with closed joints.
- Certified in accordance with 3-A Sanitary Standards (open joint design) and designed according to EHEDG guidelines.
- Conveying capacities: BTCS range 30 l/h - 130 m<sup>3</sup>/h; MDTC range 0.5 l/h - 500 l/h.
- Pressures: up to 24 bar.

#### 7.4.5 Benefits and properties

- Pump housings which are almost dead space free prevent product deposits.
- High-quality surfaces of inner parts which come into contact with the product allow residue-free cleaning.
- Easy maintenance due to plug-in between rotating unit and drive.
- Mechanical seals, which are adapted to the particular application, ensure a hygienic shaft seal.
- Stator material and secondary seals with FDA approval guarantee high product safety.
- A tangentially aligned flushing connection (optional) enables extensive residual draining of the pump.
- Flushing with high flow speed within the suction casing enables residue-free cleaning.
- Disinfection can be carried out using steam, superheated steam or chemical disinfectant.

## 7.4.6 Cleaning processes (CIP/SIP)



- 1 Suction side
- 2 Pressure side
-  Valve closed (observe flow direction)
-  Valve opened (observe flow direction)
-  Centrifugal pump (CIP pump); customer side
-  Bypass line; customer side
-  Pipeline (suction side); customer side
-  Pipeline (pressure side); customer side

**General**

- Production installations in the food, beverage, pharmaceutical, cosmetic and chemical industries are often equipped with automated cleaning systems.
- CIP stands for "Cleaning in Place"
  - This means that the respective installation equipment does not have to be disassembled or dismantled for cleaning.
  - High flow speed flushing within the casing parts of the pump enables residue-free cleaning.
- SIP stands for "Sterilisation in Place"
  - Thermal or chemical disinfectants, i.e. lowering the total germ level to a very low amount without disassembling or dismantling the pump.
  - Disinfectants, hot water or steam can be used as a medium.

**7.4.6.1 Cleaning recommendations for CIP**

- Flush the pump thoroughly before commissioning it for the first time.
- Clean the pump so that it conforms to the required hygiene regulations.
- Perform customer installation according to the figure in chapter 7.4.6.
- Install the pump so that it can be cleaned residue-free at the application location.
- Flushing processes must be carried out at a sufficient flow speed. Recommended flow speed is at least 1.5 m/s.
- During the individual flushing processes, operate the pump for max. 5 min using a low rotation speed. Then convey the cleaning agent through the bypass line while the pump is switched off.
- Use a suitable cleaning agent.

<i>NOTICE</i>
<p><b>Operating the pump for a longer period (&gt; 5 min./flushing process) during the cleaning process</b> Damage to property can occur.</p> <ul style="list-style-type: none"> <li>➤ Operate the pump for max. 5 minutes using a low rotation speed.</li> <li>➤ Then convey the cleaning agent through the bypass line while the pump is switched off.                             <ul style="list-style-type: none"> <li>– Observe figure in chapter 7.4.6.</li> </ul> </li> </ul>

**7.4.6.2 Recommended cleaning process**

Item	Cleaning process	Cleaning agent	Remarks
1.	Preparation		Extensive draining of the pump before the cleaning process, avoid dry running
2.	Pre-flushing	Fresh water	Removal of loose, adherent dirt components
3.	Alkaline flushing	Sodium hydroxide solution max. 1.5% at 60-80°C	Removing and washing away adherent contamination
4.	Intermediate flushing	Fresh water	Flushing out cleaning agent and residual dirt
5.	Acidic flushing	Nitric acid/peracetic acid max 1% at 50-70%	Disinfection; removing, washing away adherent contamination
6.	Post-flushing	Fresh water	Flushing out residual cleaning agent

<i>NOTICE</i>
<p><b>Application of other cleaning agents</b> Damage to property can occur.</p> <ul style="list-style-type: none"> <li>➤ Consult with seepex</li> </ul>

### 7.4.6.3 Cleaning recommendations for SIP

- Clean the pump so that it conforms to the required hygiene regulations.
- Perform customer installation according to the figure in chapter 7.4.6.
- Install the pump so that it can be cleaned residue-free at the application location.
- For SIP processes with disinfectants or hot water, proceed in the same way as for CIP processes.
  - Cleaning recommendations can be found in chapter 7.4.6.1.
- For SIP processes with steam, the steam should only be conveyed through the bypass line.
  - Do not operate the pump at the same time.

#### Thermal disinfection

 <b>CAUTION</b>	
<b>Disinfection with hot water or steam</b>	
Minor injuries can occur. Burns due to contact with hot surfaces.	
➤ Observe appropriate protective measures.	

<b>NOTICE</b>	
<b>Disinfection with steam</b>	
Damage to property can occur.	
➤ Only convey steam through the bypass line. Do not operate the pump at the same time. <ul style="list-style-type: none"><li>– Observe figure in chapter 7.4.6.</li></ul>	

#### Chemical disinfection

 <b>CAUTION</b>	
<b>Disinfection with chemical agents</b>	
Minor injuries can occur due to contact with cleaning agents.	
➤ Observe notes from the manufacturer.	

<b>NOTICE</b>	
<b>Operating the pump for a longer period (&gt; 5 min./flushing process) during the cleaning process</b>	
Damage to property can occur.	
➤ Operate the pump for max. 5 minutes using a low rotation speed.	
➤ Then convey the cleaning agent through the bypass line while the pump is switched off. <ul style="list-style-type: none"><li>– Observe figure in chapter 7.4.6.</li></ul>	



Refer to technical data (chapter 3.) for application range of the pump.

Malfunction									Causes	Rectification
Pump is not sucking	Pump pumping unevenly	Conveying capacity is not achieved	Pressure head is not reached	Pump does not start up	Pump seized / pump does not pump	Pump is loud when running	Motor gets too hot	Premature stator wear		
			X				X	X	Static friction between stator/rotor too great.	Apply lubricant (liquid soap) between stator and rotor.
X									Incorrect direction of rotation.	Check direction of rotation and swap over motor connections if necessary.
X	X	X			X	X			Suction pipe or shaft seal leaking.	Eliminate leaks.
X	X	X				X			Suction head too great.	Check the suction head, if necessary increase pipe cross section on suction pipe and use a larger filter, open suction-side valve fully.
X	X	X							Viscosity of conveying product too great.	Check/adapt (data sheet).
		X	X				X		Pump rotation speed incorrect.	Correct rotation speed (data sheet).
	X	X								Avoid air bubbles in the conveying product.
		X	X	X	X	X	X	X	Pressure head too great.	Check pressure head with pressure gauge, reduce pressure head by using larger pressure pipe crossed section or shortening the pressure pipe.
X	X	X			X			X	Pump running partially/ completely dry.	Check there is adequate conveying product available on the suction side. Dry running protection DRP.
						X	X		Check coupling.	If necessary, move pump in relation to drive, check wear on coupling gear, re-adjust coupling if necessary.
X		X							Rotation speed too low.	Increase rotation speed for low-viscosity media/large suction volume.

Malfunction									Causes	Rectification	
Pump is not sucking	Pump pumping unevenly	Conveying capacity is not achieved	Pressure head is not reached	Pump does not start up	Pump seized / pump does not pump	Pump is loud when running	Motor gets too hot	Premature stator wear			Shaft seal is leaky
X	X					X				Rotation speed too high.	Reduce rotation speed for high-viscosity media, risk of cavitation.
						X				Joint play too large.	Check mounting of coupling rod bushing.
X		X		X	X			X		Foreign objects in pump.	Dismantle pump, remove foreign bodies, replace defective parts.
X		X	X		X					Stator/rotor worn.	Dismantle pump and renew defective parts.
X		X			X	X				Joint parts worn.	Renew joint parts, use seepex pin joint grease.
X		X			X			X		Suction pipe blocked.	Clean the suction pipe.
X				X	X		X	X		Temperature of pumping liquid too high.	Check temperature, use an undersize rotor.
X		X		X			X		X	Gland packing too firm/worn.	Loosen packing gland or tighten. Renew unusable packing rings.
X				X	X			X		Solid content and/or grain size too great.	Reduce pump speed, install screen with permitted mesh width. Increase liquid proportion.
X				X				X	X	Sedimentation/gumming of solids when pump stationary.	Rinse through and clean the pump immediately.
X				X	X			X	X	Conveying product hardens when the temperature drops below a certain limit.	Heat the pump.
				X	X		X	X		Stator swollen and unable to withstand conveying product.	Select a suitable stator material, use an undersize rotor.
						X			X	Bearings in pump drive housing or drive unit defective.	Renew bearings.
									X	Mechanical seal defective.	Check sliprings and O-rings for wear/resistance, renew if necessary.

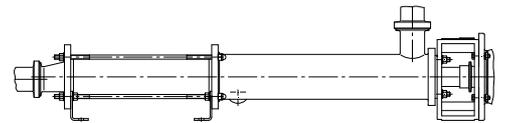
## 9.1 Pump Dismantling/Reassembly

Range: BCSB 2  
Size: 17-24 up to 130-6L

### 9.1.1 Preparing the pump for dismantling

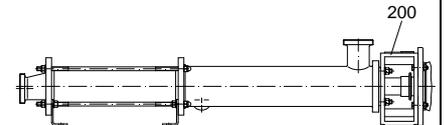
	 <b>DANGER</b>
	<p><b>Dangerous voltage.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Note safety regulations.</li> <li>➤ Disconnect motor from all sources of energy.</li> <li>➤ Secure electrical connections against restarting.</li> </ul>

- Empty pipelines.
- Allow pipelines to cool down.
- Remove pipeline connections (suction side/pressure side).
- Note decommissioning (→ chapter 6.4).



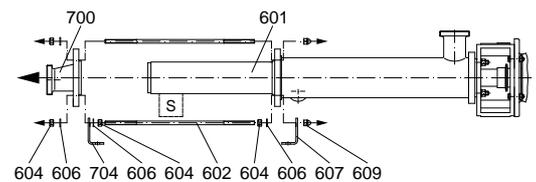
### 9.1.2 Dismantling

 <b>WARNING</b>
<p><b>Risk of pump tipping or falling.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Fasten the lantern (<b>200</b>) to secure the pump.</li> </ul>



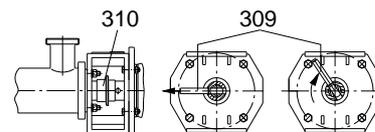
#### 9.1.2.1 Pressure branch (700) - Dismantling

- Prop up the stator (**601**) with the support (**S**).
- Remove screw fitting (**604, 606**) and cap nut (**609**).
- Remove the pressure branch (**700**).
- Remove the tie bolts (**602**).



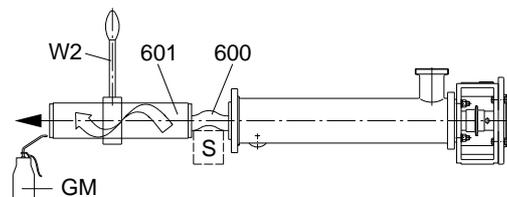
### 9.1.2.2 Stator (601) - Dismantling

- Lift/slide splash ring (310).
- Push out plug-in shaft pin (309) horizontally.
- Turn plug-in shaft pin (309) upwards.



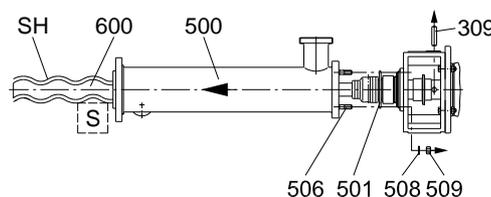
Tool (W2/chain wrench)

- Add lubricant (GM) to the opening on pressure branch side between the rotor (600) and the stator (601).
- Turn the stator (601) in the "left" rotating direction and remove.
  - Use tool (W2).
- Prop up the rotor (600) with support (S).



### 9.1.2.3 Suction casing (500) - Dismantling

- Put a protective cover (SH) on the rotor (600).
- Prop up rotor (600) with a support (S).
- Remove plug-in shaft pin (309).
- Remove screw fitting (506, 508, 509).
- Remove suction casing (500) and casing gasket (501).



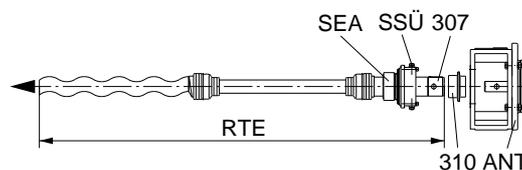
### 9.1.2.4 Rotating unit (RTE) - Dismantling

with flush connection



Tool (W10/dismantling tool)

- Remove the flush connection (SSÜ) on the shaft seal casing (SEA).
- Pull the rotating unit (RTE) with shaft seal (SEA) off from the output shaft of the drive (ANT).
  - Use tool (W10).
- Remove the splash ring (310) from the plug-in shaft (307).
- Pull off the shaft seal (SEA).
  - Note dismantling shaft seal (→ chapter 9.4).

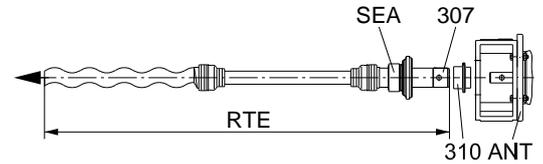


without flush connection



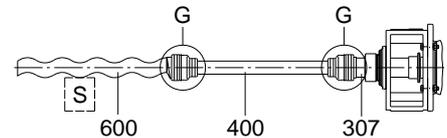
Tool (W10/dismantling tool)

- Pull the rotating unit (RTE) with shaft seal (SEA) off from the output shaft of the drive (ANT).
  - Use tool (W10).
- Remove the splash ring (310) from the plug-in shaft (307).
- Pull off the shaft seal (SEA).
  - Note dismantling shaft seal (→ chapter 9.4).



9.1.2.5 Rotor (600), coupling rod (400), plug-in shaft (307) - Dismantling

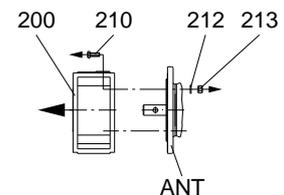
- Joint (G) dismantling note rotating unit - individual parts (→ chapter 9.2).



9.1.2.6 Lantern (200)/drive (ANT) - Dismantling

<b>CAUTION</b>
<p><b>Falling or tilting drive.</b> Slight injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Secure the drive (ANT).</li> </ul>

- Remove the screw fitting (210, 212, 213).
- Remove the drive (ANT).



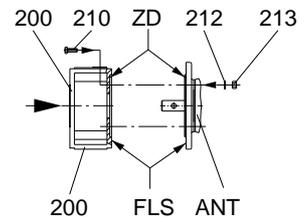
9.1.3 Reassembly

<b>WARNING</b>	
<p><b>Risk of pump tipping or falling.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Fasten the lantern (200) to secure the pump.</li> </ul>	

 <b>CAUTION</b>
<p><b>Risk of fingers being trapped.</b> Minor injuries can occur.</p> <p>➤ Do not reach in between connections.</p>

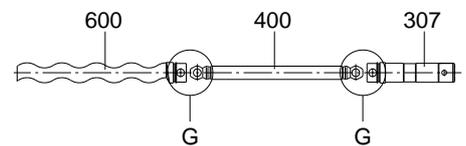
**9.1.3.1 Lantern (200)/drive (ANT) - Reassembly**

- Clean the flange bearing surfaces (**FLS**), bolt circle (**ZD**) and the output shaft of the drive unit (**ANT**).
- Mount the drive (**ANT**) to the lantern (**200**) with screw fittings (**210, 212, 213**).



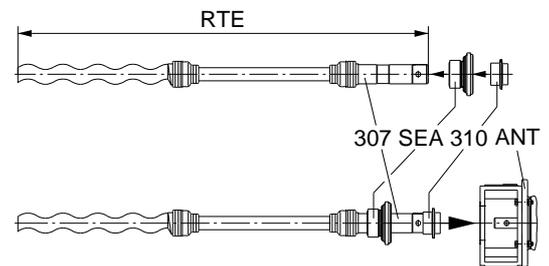
**9.1.3.2 Rotor (600), coupling rod (400), plug-in shaft (307) - Reassembly**

- Joint (**G**) reassembly note rotating unit - individual parts (→ chapter 9.2).



**9.1.3.3 Rotating unit (RTE) - Reassembly**

- Slide on shaft seal casing (**SEA**).
  - Note reassembly shaft seal (→ chapter 9.4).
- Moisten splash ring (**310**) and plug-in shaft (**307**) with antiseize graphite petroleum.
- Slide splash ring (**310**) onto plug-in shaft (**307**).
  - Observe fitting position of splash ring (see lettering).
- Apply antiseize graphite petroleum to the output shaft of drive (**ANT**).
- Slide on rotating unit (**RTE**).

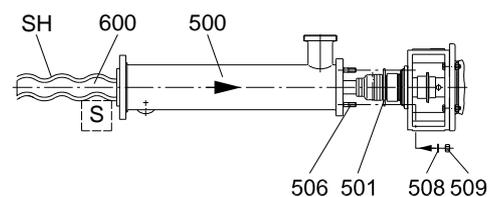


**with flush connection**

- Mount the flush connection (**SSÜ**).

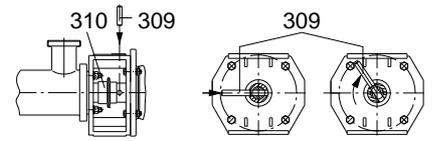
**9.1.3.4 Suction casing (500) - Reassembly**

- Provide rotor (**600**) with protective cover (**SH**).
- Prop up rotor (**600**) with support (**S**).
- Slide on casing gasket (**501**).
- Mount and align the suction casing (**500**) with screw fitting (**506, 508, 509**).
  - Use spirit level (**W**).
- Remove protective cover (**SH**).



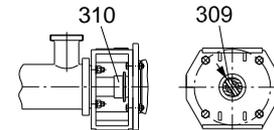
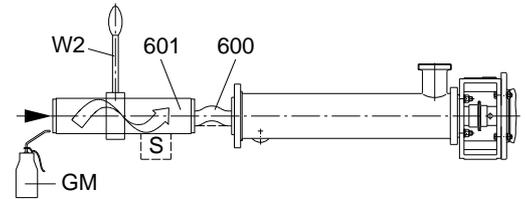
### 9.1.3.5 Stator (601) - Reassembly

- Insert plug-in shaft pin (309).
- Turn plug-in shaft pin (309) upwards.



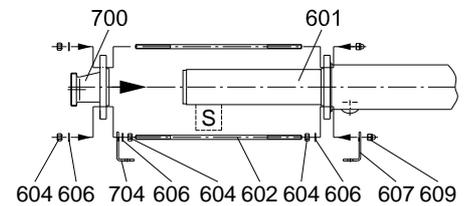
Tool (W2/chain wrench)

- Moisten outer surface of the rotor (600) with lubricant (GM).
- Moisten inner surface of the stator (601) with lubricant (GM).
- Prop up stator (601) with support (S).
- Turn stator (601) in the "right" rotating direction and slide onto rotor (600).
  - Use tool (W2).
- Slide in plug-in shaft pin (309).
- Pay attention to the position of the splash ring (310).
- Insert the splash ring collar at a distance of 0.5 mm from the lantern (200).



### 9.1.3.6 Pressure branch (700) - Reassembly

- Insert tie bolts (602) loosely in the pressure branch (700) and suction casing (500).
- Evenly tighten the tie bolts (602) on the pressure branch (700)/suction casing (500) with screw fitting (604, 606, 609).
- Remove the support (S).





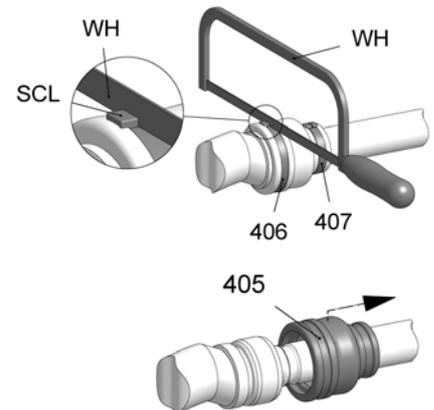
## 9.2 Rotating unit individual parts

### 9.2.1 Dismantling

#### 9.2.1.1 Holding band (406, 407) - dismantling

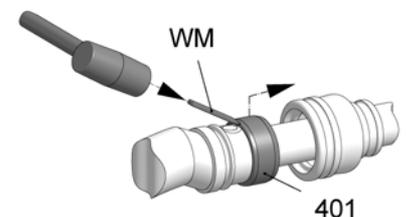
 <b>CAUTION</b>
<p><b>Danger of injury.</b> Parts might be thrown out.</p> <ul style="list-style-type: none"> <li>➤ Wear safety glasses.</li> </ul>

- Detach holding band loop (**SCL**).
  - Use suitable tool (**WH**).
- Push out parts of holding band loop (**SCL**).
- Remove holding band (**406, 407**).
- Pull back universal joint sleeve (**405**).



#### 9.2.1.2 Retaining sleeve (401) - dismantling

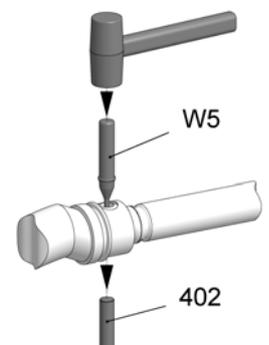
- Knock back retaining sleeve (**401**).
  - Use suitable tool (**WM**).



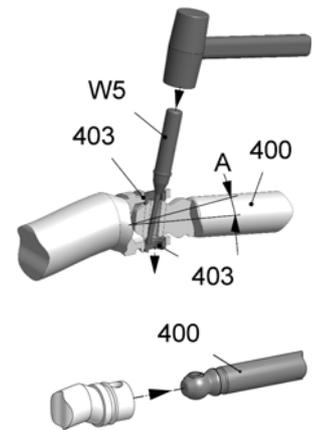
#### 9.2.1.3 Detach joint



- Eject coupling rod pins (**402**).



- Bend (**A**) the coupling rod (**400**). Knock guide bushing (**403**) out with tool (**W5**).

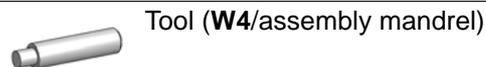


- Remove coupling rod (**400**).

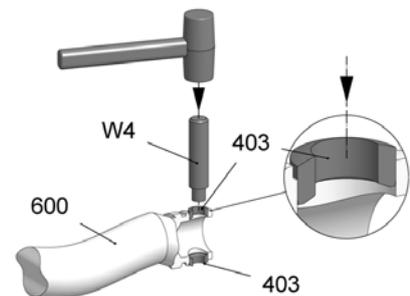
## 9.2.2 Rotating unit (RTE) - prepare individual parts for reassembly

### 9.2.2.1 Rotor (600)

- Remove any damage.
- Clean rotor (**600**).

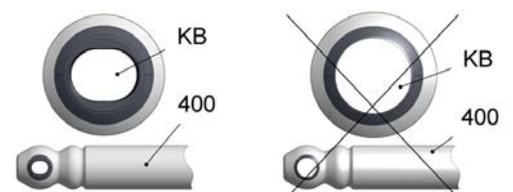


- Press in guide bushings (**403**) (depth = 2/3).
  - Use tool (**W4**).



### 9.2.2.2 Coupling rod (400)

- Clean the coupling rod (**400**).
- Examine bore head for wear.
  - If wearing is detected on the bore head, replace the coupling rod (**400**).



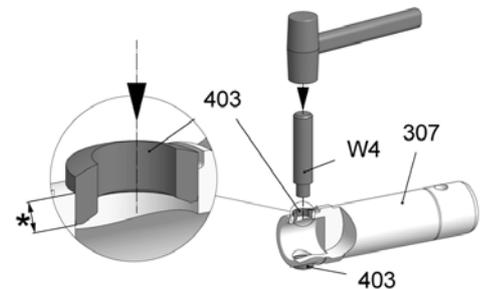
### 9.2.2.3 Plug-in shaft (307)

- Remove any damage.
- Clean rotor (600).



Tool (W4/assembly mandrel)

- Press in guide bushings (403) (depth = 2/3).
  - Use tool (W4).



### 9.2.3 Rotating unit (RTE) - individual parts - reassembly

**NOTICE**

**Malfunction of the joints.**

Malfunction and/or destruction of joints.

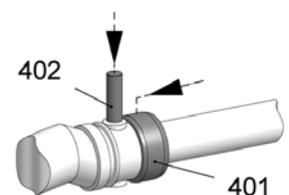
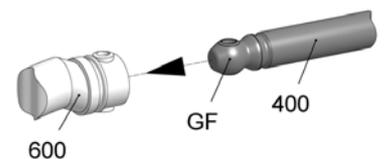
- Replace coupling rod pins (402) and guide bushings (403) jointly.

#### 9.2.3.1 Coupling rod (400) - reassembly

- Slide the universal joint sleeve (405) and holding bands (406, 407) onto coupling rod (400).
- Fit the diameter and width of the holding band of the universal joint sleeve.
- Fill the joint head with seepex joint grease.

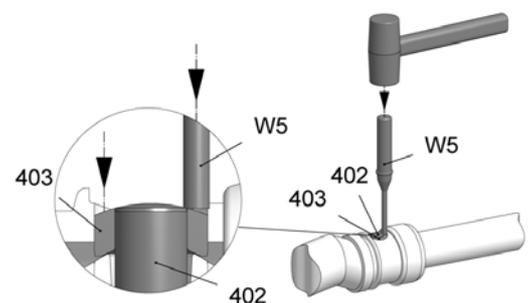
#### Rotor (600)

- Insert coupling rod pins (402).
- Slide on retaining sleeve (401).
- Connect rotor/coupling rod.



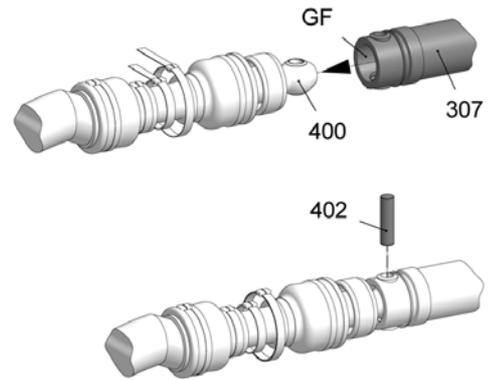
Tool (W5/drift)

- Slide in the coupling rod pins (402).
- Knock the guide bushings (403) in.
  - Use tool (W5).



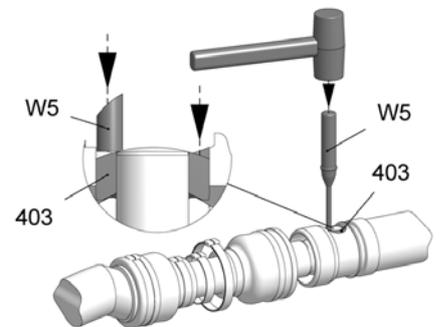
**Plug-in shaft (307)**

- Insert coupling rod pins (402).
- Slide on retaining sleeve (401).
- Connect plug-in shaft/coupling rod.



Tool (W5/drift)

- Slide in the coupling rod pins (402).
- Knock the guide bushings (403) in.
  - Use tool (W5).

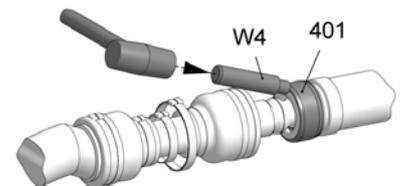


**9.2.3.2 Retaining sleeve (401) - reassembly**



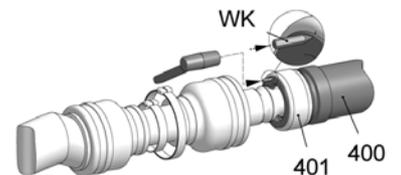
Tool (W4/assembly mandrel)

- Knock back retaining sleeve (401).
  - Use tool (W4).



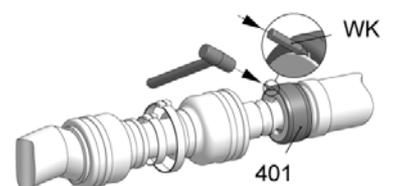
**Rotor (600) unhardened material**

- Secure retaining sleeve (401) in a displaced manner (2x180°).
  - Use suitable tool (WK).



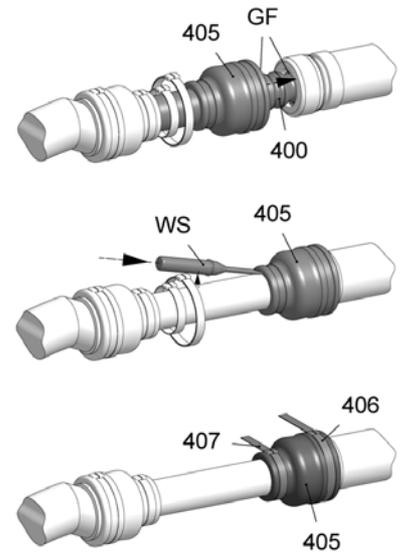
**Rotor (600) hardened material**

- Secure retaining sleeve (401) in a displaced manner (2x180°).
  - Use suitable tool (WK).



**9.2.3.3 Universal joint sleeve (405) - reassembly**

- Moisten the surface of coupling rod (400) / inner surface of universal joint sleeve (405) with joint grease (maintenance → chapter 7.).
- Slide on universal joint sleeve (405).
- Remove air from the inside of the joint.
  - Use suitable tool (WS).
  
- Assemble the holding band.
  - Holding band assembly (→ chapter 9).





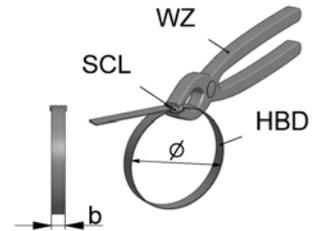
### 9.3 Holding band - assembly

#### 9.3.1 Prepare the holding band

- Only use prefabricated double-band holding bands may.

#### 9.3.2 Check the holding band

- Bent-over holding band (**HBD**) is in contact with holding band loop (**SCL**) to avoid damaging universal joint sleeve.
- Press on holding band (**HBD**) using tool (**WZ**) if necessary.

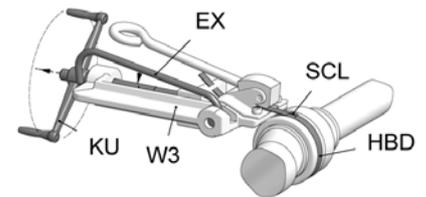


#### 9.3.3 Assemble the holding band



- Use tool (**W3**/mounting tool)

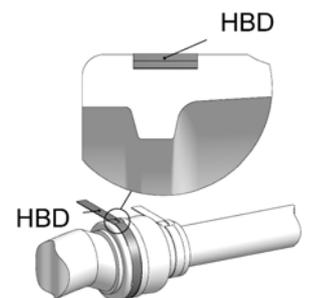
- Feed holding band into tool (**W3**).
- Hold ends of holding band with the eccentric lever (**EX**).
- Turn the crank (**KU**) until the holding band is strained and lies against the holding band loop (**SCL**).
- Carefully pull the holding band together until it is in contact with the circular groove of universal joint sleeve.



#### 9.3.4 Correct tension of holding band (HBD)

##### Correct

The holding band (**HBD**) has drawn in the out shape of the universal joint sleeve and is firmly seated.



##### Incorrect

The holding band (**HBD**) is too loose, can slip off.



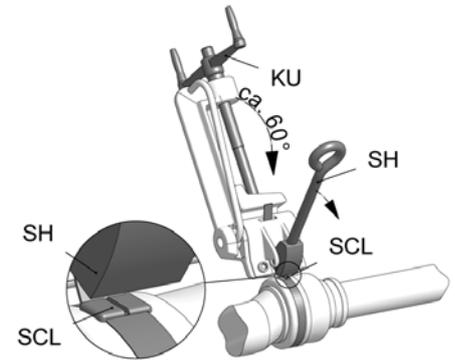
##### Incorrect

The holding band (**HBD**) is too tight, universal joint sleeve will be damaged/sheared off.



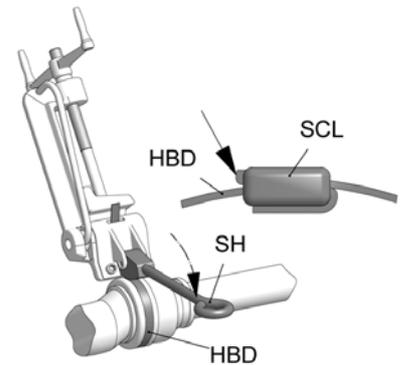
### 9.3.5 Cant up the holding band

- Swivel mounting tool (**W3**) approx. 60° upwards.
- Loosen crank (**KU**) by a half turn.
- Swivel cutting lever (**SH**) forward until the pressure piece is lying behind the holding band loop (**SCL**).



### 9.3.6 Shear the holding band (material: 1.4301; 1.4401)

- Hit the cutting lever (**SH**) with the inside of your hand.
  - Cant up and shear the end of the holding band behind the loop (**SCL**).
  - Carefully straighten up the holding band (**HBD**) if it rises up on the sheared side.



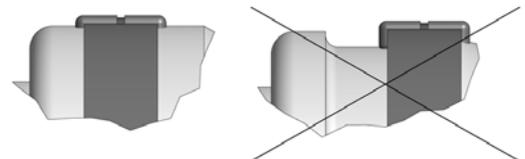
#### NOTICE

**Universal joint seal damage.**  
Pin joint grease can emerge.

- Avoid hammering or striking.

### 9.3.7 Check the holding band after assembly

- The holding band must lie in the groove of the universal joint sleeve.
- Replace the holding band if the holding band slips back through the loop.



## 9.4 / 9.5 Shaft sealing

### 9.4.1 Safety

 <b>WARNING</b>	
<b>Shaft seal is leaky.</b> Leakage may escape into the atmosphere.	
<ul style="list-style-type: none"><li>➤ Take safety measures to protect persons and the environment.</li><li>➤ Wear suitable protective clothing.</li><li>➤ Dispose of leakage appropriately.</li><li>➤ Note applicable regulations when handling hazardous substances.</li></ul>	

### 9.4.2 Operating conditions and material combination

- Adjust to the relevant application
  - Design variants you will find at <http://www.seepex.com/en/service/downloads/>.



10.1 Spare parts list



10.1 Order template for spare parts

Spare parts can be ordered online or requested from  
[www.seepex.com](http://www.seepex.com)

Type: **BCSB 17-24 to 130-6L**

Request                       Order

**Must be included in every order or enquiry!**

Commission: \_\_\_\_\_ Type: \_\_\_\_\_

Sender: \_\_\_\_\_

Contact: .....

Tel.: .....

Fax: .....

E-mail: .....

<b>Customer service:</b> seepex GmbH Postfach 10 15 64 D-46215 Bottrop service@seepex.com	Germany	Tel +492041.996-231 Fax +492041.996-431	<b>Delivery address:</b> ..... ..... ..... .....
	Europe outside Germany	Tel +492041.996-224 Fax +492041.996-424	
	Intercontinental outside Germany	Tel +492041.996-120 Fax +492041.996-432	

No.	Quantity	Component	Material	Comment
<b>Minor set of wearing parts</b> <input type="checkbox"/>				
601	1	Stator		
<b>Major set of wearing parts</b> <input type="checkbox"/>				
307	1	Plug-in shaft		
310	1	Splash ring		
400	1	Coupling rod with coupling rod bushings		
402	2	Coupling rod pin		
403	4	Guide bushing		
405	2	Universal joint sleeve		
406	2	Holding band, large		
407	2	Holding band, small		
600	1	Rotor		
601	1	Stator		
<b>Set of gaskets</b> <input type="checkbox"/>				
310	1	Splash ring		according to data sheet (chapter 3.1)
330	1	Mechanical seal		
501	1	Casing gasket		

\_\_\_\_\_  
Place, date

\_\_\_\_\_  
Signature / company stamp

10.1 Order template for spare parts

No.	Quantity	Component	Material	Comment
<b>Plug-in shaft &amp; shaft seal</b>			<input type="checkbox"/>	
307		Plug-in shaft		
309		Plug-in shaft pin		
310		Splash ring		
<b>Coupling rod &amp; joint parts</b>			<input type="checkbox"/>	
400		Coupling rod with coupling rod bushings		
401		Retaining sleeve		
402		Coupling rod pin		
403		Guide bushing		
405		Universal joint sleeve		
406		Holding band, large		
407		Holding band, small		
401-407		Complete set of joint parts		
<b>Pumping elements</b>			<input type="checkbox"/>	
600		Rotor		
601		Stator		
No.	Quantity	Component	Material	Comment
<b>Miscellaneous parts</b>			<input type="checkbox"/>	
501		Casing gasket		
098		Pin joint grease		1 cartridge = 300 g (approx. 315 cm <sup>3</sup> ) Grease quantity according to maintenance (chapter 7.0)

\_\_\_\_\_  
Place, date

\_\_\_\_\_  
Signature / company stamp

**Version for copying**

Spare parts can be ordered online or requested from  
[www.seepex.com](http://www.seepex.com)

**Must be specified with every order!**

Commission: \_\_\_\_\_

Mark tool!

X

Sender:

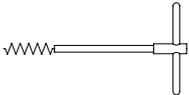
Contact: .....

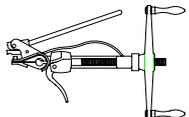
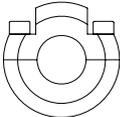
Tel.: .....

Fax: .....

E-mail: .....

<b>Customer service:</b> seepex GmbH Postfach 10 15 64 D-46215 Bottrop service@seepex.com	<b>Germany</b> Tel +492041.996-231 Fax +492041.996-431	<b>Delivery address:</b> ..... ..... ..... .....
	<b>Rest of Europe</b> Tel +492041.996-224 Fax +492041.996-424	
	<b>Outside Europe</b> Tel +492041.996-120 Fax +492041.996-432	

For installation of:	Packing gland	Stator		
Tool no.	W1 <input type="checkbox"/>	W2 <input type="checkbox"/>		
Denomination:	Packing puller	Chain wrench plus spare chain		
Order no.	PKZ	KRZ		
				

For installation of:	Rotating unit			
	Holding band	Plug-in shaft		
Tool no.	W3 <input type="checkbox"/>	W10 <input type="checkbox"/>		
Denomination:	Mounting tool	Dismantling tool		
Order no.	MHB	AZV		
				



### 12.1 Accessories/Technical information

- Accessories and technical information are commission specific documents not part of this not binding operating and assembly instruction.



### 13.1 Manufacturer's and supplier's documents

- Manufacturer's and supplier's documents are commission specific documents and not part of this not binding operating and assembly instruction.





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