PaintCare ePCS-20

Advanced Maintenance Installation

II2G Ex h IIB T6 Gb X

Equipment references 151700520-151700620

Manual 582201110

2021-05-03

Index A

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Subject	Revision	Date
PaintCare ePCS-20	**A**	**01 29 2021**
PaintCare ePCS-20	**B**	**09 08 2021**

Dear customer, you have just acquired your new equipment and we thank you for it.

We have taken the greatest care, from design to manufacturing, to ensure that this equipment gives you complete satisfaction.

For a good use and an optimal availability, we invite you to read this instruction manual carefully before putting your equipment into service.

Manufacture:

Timmer GmbH

Dieselstraße 37

48485 Neuenkirchen

Germany

Warranty

SAMES KREMLIN grants a contractual warranty for a period of twelve (12) months from the date of availability to the Customer provided that the conditions of use indicated in this technical manual are complied with.

In order to be implemented, the warranty claim must define precisely, in writing the malfunction in question, must be accompanied by the defective Material and/or component, and must be informed of the conditions of acquisition by the Customer of the Material from **SAMES KREMLIN**.

SAMES KREMLIN will only accept or refuse the implementation of the warranty after analysis of the "defective" Material. The warranty granted by **SAMES KREMLIN** is limited to the replacement of the Material in its entirety or to the partial replacement of the defective component.

SAMES KREMLIN will only bear the cost of the parts necessary to replace the defective Material.

No guarantee will be granted by **SAMES KREMLIN**:

- For defects and deteriorations resulting from abnormal conditions of storage and/or conservation at the Customer's premises or for maintenance or use of the Equipment not conforming to the rules of art or not respecting the prescriptions of the present technical manual given to the Customer by **SAMES KREMLIN**,

- For defects and damage resulting from replacement parts not approved by **SAMES KREMLIN** or which the Customer, has modified,

- For all damages resulting from negligence or lack of supervision

On behalf of the Customer,

- In the event of normal wear and tear of the Equipment and/or its components or in the event of

Deterioration or accident resulting from faulty and/or abnormal use thereof.

Meanings of pictograms

 Danger : general signal (user)	 Danger: high pressure	 Explosive materials	 Danger: Electricity
 Toxic materials	 Corrosive materials	 Harmful or irritating materials	 Danger : pinching, crushing
 Risk of media emanation	 Danger: hot rooms or surfaces	 Danger: automatic start, moving parts	 Danger: risk of flammability
 General Obligation	 Grounding	 Refer to manual/instruction leaflet	 Gloves must be worn
 Protective helmet	 Hearing protection	 Mandatory respiratory protection	 Safety footwear
 Protective clothing	 Protective visor	 Wearing of glasses is mandatory	 Material recycling

1 General description

This section provides information about the Installation and Service Manual as well as general safety notices for handling the Piston pump.

1.1 About this Installation and Operating Manual

These operating instructions are strictly confidential. Only the manufacturer or authorized service partner are allowed to carry out the work described in this document.

The notices, data and instructions contained in the Installation and Service Manual must be complied with.

This Installation and Service Manual applies only to the media specified on the cover sheet.

1.2 Use of the Installation and Service Manual

This Installation and Service Manual is only valid in conjunction with the operating manual for the Piston pump. The notes, data and instructions contained in the operating manual for the Piston pump must be complied with.

The Installation and Service Manual must be supplemented with instructions on the basis of existing national regulations on accident prevention and environmental protection.

The Installation and Service Manual must be read and applied by any person instructed to carry out one of the tasks described in this Installation and Service Manual.

In addition to the Installation and Service Manual and the binding regulations on accident prevention that are in force in the country of use and at the implementation site, the accepted technical rules for safe and proper work must also be complied with.

1.3 Structure of the Installation and Service Manual

Safety-relevant notices are indicated by appropriate symbols and **bold typeface.**

Listings

Listings of characteristics in arbitrary, not necessarily mandatory sequence are indicated by a dot. For example:

- Characteristic A
- Characteristic B
    - Secondary characteristics to characteristic B

Sequences

Work steps that must be completed in the specified sequence are numbered and the result of each step is shown in italics.

For example:

1. Step 1

   Result of Step 1

2. Step 2

   2.1 Sub-step of Step 2 to be carried out

Note: Mounting is usually carried out in the reverse order of dismounting. If this is not possible (e.g. screws are tightened in a special order with a special torque), the sequence of the assembly process will be described.

1.4 Requirements imposed on personnel

All personnel assigned to work on the Piston pump described in this Installation and Service Manual are obligated before starting work:

- To comply with the general regulations regarding occupational health and safety and accident prevention.
- To read the safety instructions and warnings in this Installation and Service Manual and to confirm with their signature that they have understood them.
- To wear personal / workstation-related protective clothing and equipment that ensures occupational health and safety, or to use these items, to the extent required for safety.
- To comply with the defined competencies.
- To have been trained or instructed and their responsibilities for operation, set-up, maintenance and repair must have been clearly defined.

For example, only a qualified specialist or instructed persons under the supervision of such a qualified specialist are allowed to perform tasks on the electrical equipment of the Piston pump and only in accordance with the applicable technical rules.

Unauthorized access is prohibited.

All persons working on the piston pump must at least meet the following points:

- Physically, sensory and mentally capable of carrying out the work,
- instructed in the residual risks
- of full age (at least 18 years),
- qualified and authorized specialists in the fields of mechanics, hydraulics electrical engineering, explosion proof and pumps technologies.

1.5 Directional and position indications

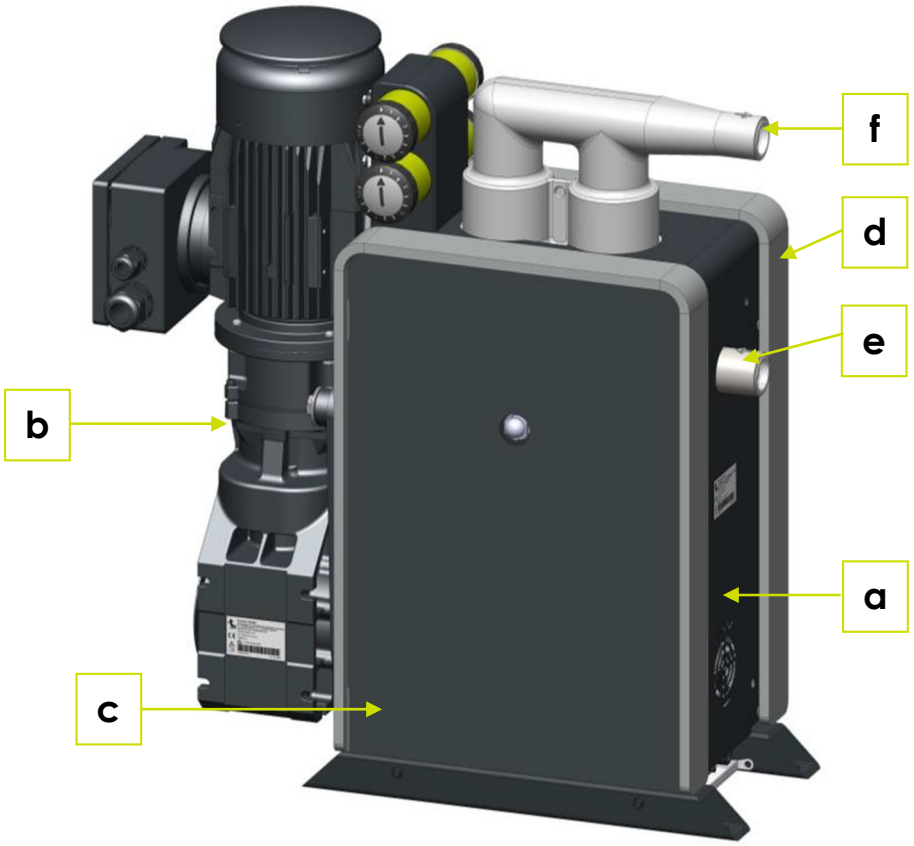


Figure 1 Directional and positional indications

Item	Description	Item	Description
a	Front	b	Rear
c	Right side	d	Left side
e	Inlet opening/supply connection	f	Outlet opening/consumer connection

2 Safety notices

2.1 Safety symbols in this Installation and Service Manual

Danger

indicates an imminent danger that will result in severe or fatal bodily injury.

Warning

indicates a potentially dangerous situation that can result in severe or fatal bodily injury.

Caution

Indicates a potentially dangerous situation that can result in minor injuries.

Note

indicates a potentially dangerous situation that can result in material damage or environmental damage.

This signal word is also used for application instructions and other useful information.

2.2 General safety notices

Danger for personnel and the machine

- Comply with all safety and hazard notices on the Piston pump and keep safety and hazard notices in a complete and legible condition.
- Note the intended use and the possible types of misuse cited in the operating manual for the piston pump.
- Comply with all general and specific safety notices in this Installation and Service Manual, the operating manual for the Piston pump and the manuals of the third-party manufacturers.
- Refrain from any unsafe working method.
- Keep the Installation and Service Manual on hand at all times.
- Comply with the applicable occupational health and safety regulations (DGUV regulations).
- Comply with the technical rules for hazardous substances (TRGS), in particular technical rules of the 700 and 800 series (protection against fire and explosion).
- Comply with the technical rules for operational safety (TRBS).
- Comply with the relevant occupational health regulations.
- Comply with country-specific regulations.
- Comply with the manufacturer's information (safety data sheets) for operating materials and auxiliary materials.

Risk of explosion in potentially explosive atmospheres

- Comply with the safety data sheets for the pumped media.
- Careful handling of highly flammable media.
- Comply with the operating instructions issued by the owner.

- Fire, naked light and smoking are prohibited in potentially explosive atmospheres.
- Keep ignition sources away.

- In the entire potentially explosive atmosphere, activities are prohibited that can result in heating, electrostatic charging, electrical or mechanical sparks or development of fire.

Risk of injury due to unavailability of protective equipment

- Wear the protective equipment specified by the company for all tasks on the Piston pump.
- Wear personal protective clothing.
- Comply with the information in the safety data sheets concerning the pumped media.
- Wear ESD-compliant clothing.
- Wear ESD-compliant safety shoes.

2.3 Safety instructions concerning installation and service tasks

Danger to personnel and the machine

- Only qualified personnel are allowed to perform the tasks described in this Installation and Service Manual.
- Comply with the safety instructions in this Installation and Service Manual, in the operating manual for the Piston pump and in the operating manuals of third-party manufacturers before carrying out maintenance and repair tasks.
- Cordon off the area, ensuring ample space that may be required for the tasks.
- Before starting the tasks, switch off the Piston pump and prevent it from being switched on unexpectedly.
- Execute tasks only when the equipment is de-pressurised and de-energised.
- Execute tasks, for which safety devices must be rendered inoperable and/or cover elements must be removed, with the utmost caution. Clearly define responsibilities and work areas.
- Reattach all removed safety devices and / or cover elements immediately after concluding the tasks.
- Be careful and alert in the entire work area of the Piston pump.
- Comply with and implement the maintenance intervals and maintenance tasks that must be executed as described in the operating manual for the Piston pump.
- The instructions in the operating manual for initial commissioning must be observed and complied with.

Risk of explosion due to improperly performed tasks

- Only qualified personnel are allowed to perform the tasks described in this Installation and Service Manual.
- Only qualified personnel are allowed to perform repair tasks.
- A qualified electrician must carry out all tasks on the electrical equipment of the Piston pump, as well as its installation, commissioning, maintenance and repair in accordance with the circuit diagram and with particular consideration of the applicable regulations for potentially explosive atmospheres.
- Before starting the tasks, switch off the Piston pump and prevent it from being switched on unexpectedly.
- Execute tasks only when the equipment is de-pressurised and de-energised.
- Comply with the operating instructions and processes of the owner, for example, procedures such as permits for working with sources of ignition in areas with a potentially explosive atmosphere.
- Carry out the tasks described in this Installation and Service Manual outside of the potentially explosive atmosphere.
- Use only original spare parts.
- Do not modify the Piston pump without authorisation.
- Before reinstalling the Piston pump in the potentially explosive area, ensure that an explosive atmosphere is not present in the area.
- Only have a specialist with explosion protection expertise perform electrical installations; electrical installations must be executed in accordance with the circuit diagram.
- After the tasks, remove tools and other objects from the Piston pump.
- Ensure that the system components are properly supported to avoid weight load of the pump parts.
- Do not use the Piston pump as a support for the piping system.
- Use suitable hose clamps to attach intake hose and delivery hose.
- The direction of flow is indicated by arrows on the pump housing. Pay strict attention to these arrows; do not remove them, keep them in faultless, recognisable condition.
- Carry out a function test (leak tightness, running behaviour, etc.) before recommissioning with non-hazardous media and under exclusion of explosive atmospheres.

Risk of explosion due to static discharge

- Remove the connection for potential equalisation only when the bottom fastening screws for fixing the Piston pump are removed and the Piston pump must be transported out of the explosive atmosphere for the tasks.
- Before re-commissioning, properly integrate the Piston pump in the local equipotential bonding via a protective conductor on the connection provided for this purpose.
- If the conductive cover is removed from the pump, the pump loses its contact with earth. To prevent electrostatic charges, ESD safety footwear must be worn in the potentially explosive atmosphere and the cover must be placed only on the conductive floor.
- Floors in potentially explosive atmospheres where people are present must be designed in such a manner that people do not become dangerously charged when wearing conductive footwear.
- Do not wear metallic objects, such as watches or jewellery that may pose a hazard of electrostatic discharge.
- Wear ESD safety footwear.

Danger for personnel due to electric shock

- Only qualified personnel are allowed maintain and repair the Piston pump; maintenance and repair must be executed in accordance with the circuit diagram.
- Only have a specialist perform electrical installations; electrical installations must be executed in accordance with the circuit diagram.
- After tasks, close the control cabinet and all terminal boxes and connection boxes.
- Do not touch live parts.
- Before any intervention in the electric wiring or opening the control cabinet, switch off the Piston pump and prevent the main switch from being switched on without authorisation.
- Execute tasks in de-energised status.
- De-energise the affected electrical component.
- Use only voltage-insulated tools.
- Regularly inspect and test the electrical equipment of the Piston pump. Eliminate loose connections, cables with damaged insulation or other defects immediately.

Damage to the Piston Pump and flammable liquids escaping due to incorrect torque applied to the cylinder cover screws

The prescribed tightening torque for the screws of the cylinder cover is 40 Nm. To prevent damage to and leaks of the Piston pump, do not exceed this value.

- Tighten the cylinder screws of the cylinder cover to 40 Nm.
- Use a calibrated torque spanner.

Risk of injury when working on fluid-conveying parts of the Piston pump

Media escaping under high pressure develop unexpectedly high forces and can cause severe injuries.

- Only an authorised specialist is allowed to perform tasks on fluid-conveying parts of the Piston pump.
- Switch off the Piston pump for set-up and service tasks, for maintenance and fault rectification and prevent it from being switched on unexpectedly.
- Depressurise fluid-conveying parts before performing tasks.
- Lay out and mount fluid-conveying parts properly.
- Avoid skin contact. Wear personal protective equipment.
- Seek immediate medical attention for injuries caused by fluids escaping under high pressure. The most severe infections or bodily reactions can be the result, if medical help is not provided immediately.

Danger due to hot surfaces

- Do not touch the hot motor.
- Allow motor to cool down before starting maintenance tasks.

> **Note**
>
> **Use flexible connections (e.g., hose connections) for intake and discharge. The flexible connections prevent transmission of vibration to the piping system.**

Environmental pollution

- Dispose of operating materials and auxiliary materials in a manner that is safe and eco-friendly.
- Comply with manufacturer's instructions.

Health hazard due to emission of harmful media when performing tasks on wetted components of the Piston pump

- Pumped media and media residues in the pump can be harmful.
- Comply with the instructions of the safety data sheet for the pumped product.
- Carefully flush the pump before performing tasks.
- Wear personal protective equipment.
- Ensure adequate ventilation.

3 Drive of the piston pump

3.1 Dismounting the drive

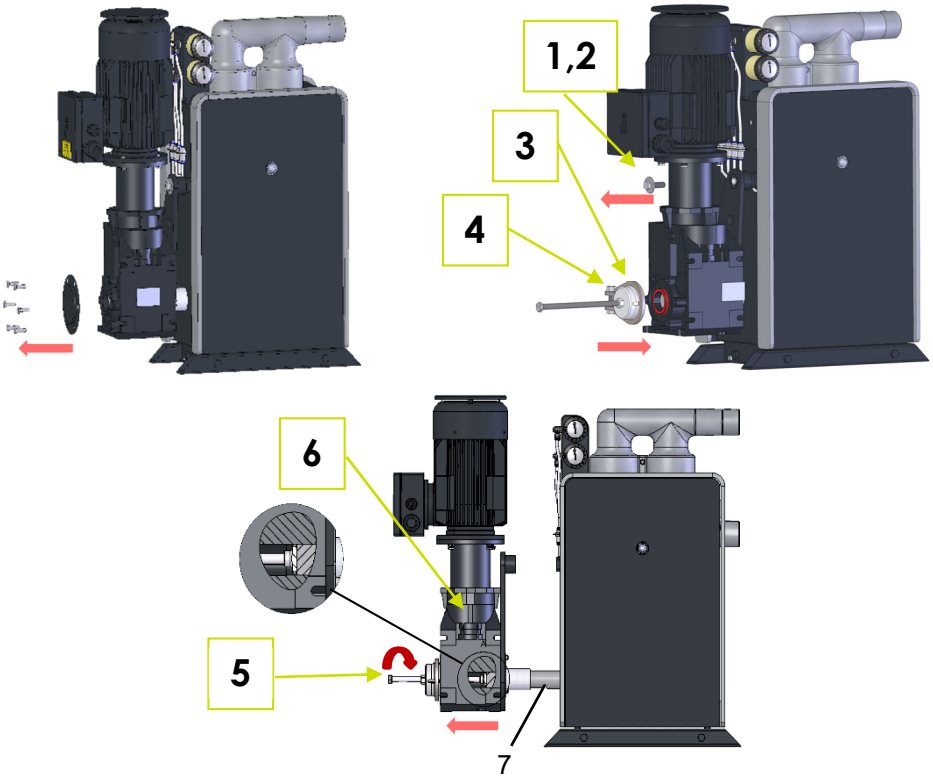


Figure 2 Drive -dismounting

Prerequisites:

- Lines on the suction and pressure connections of the piston pump must be dismounted
- Piston pump must be removed from the Ex zone.
- The pump must be de-energised and must be prevented from being restarted.

Work steps:

1. Remove the protective cover of the gearbox according to the manufacturer's instructions.
2. Place the appropriate dismantling tool (3) on the flange of the gearbox (red) and secure it by tightening the screw (3). For information on the dismantling tool, see section 3.1.1 Mounting the dismantling tool.
3. Unscrew the M12 machine screw (1) with the washer U12 (2) from the torque transducer at the rear of the piston pump and remove it.
4. Push the drive (6) in the direction of the arrow by turning the screw (5) off the drive shaft (7).

Note

Drive unit is heavy, pulling it off may require two persons.

The drive is dismounted.

3.1.1 Mounting Disassembly Tool

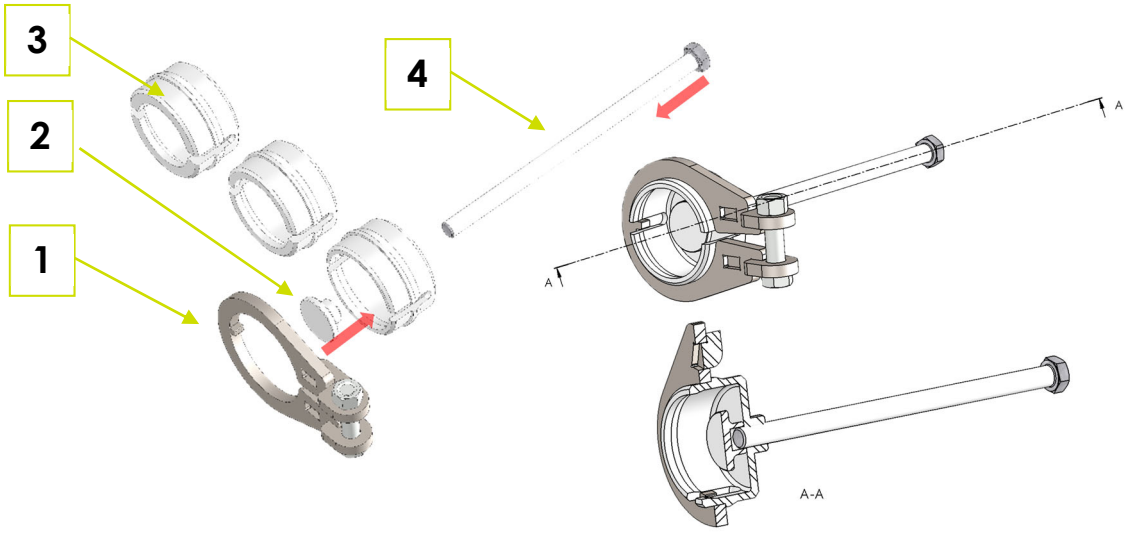


Fig. 3-1: Assembly Disassembly Tool

Work steps:

1. Select the appropriate adapter (3) depending on the gearbox flange diameter.
2. Screw the screw (4) into the adapter (3).
3. Screw the tappet (2) onto the screw (4). (see section A-A)
4. Push the clamping ring onto the adapter.
5. Tool ready for use.

3.2 Mounting the drive

Note

The drive is mounted in the reverse order described in section 3.1 Dismounting the drive

Clean the drive shaft and apply Klüberpaste 46MR401 thinly and uniformly

Tighten the M12 machine screw (1) with 55 Nm

If the protective cover (item no.: 53601680) was removed or all or parts of the drive unit were changed, the drive unit of the parts must be replaced.

Ensure that the feather key (6) is seated in its position (Fig. 8-5: Exploded-view drawing – drive train).

The drive is mounted.

4 Cover of the Piston pump

4.1 Dismounting the side cover

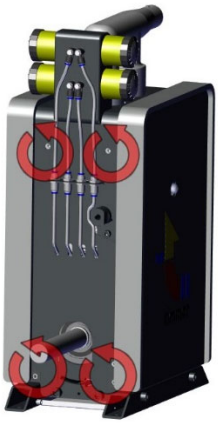


Fig. 4-1: Front

Fig. 4-2: Rear

Prerequisites:

- The drive must be dismounted (section 3.1: Dismounting the drive)
- The pump must be de-energised and must be prevented from being restarted.

Work steps:

1. On the front (Fig. 4-1: Front) of the Piston pump unscrew the two hexagon socket screws M8x40 5 turns with using a 5 mm Allen key ( ).
2. On the rear (Fig. 4-2: Rear) of the Piston pump unscrew the two hexagon socket screws M8x40 5 turns with using a 5 mm Allen key ( ).
3. Take off the side cover elements (1) in the direction of the arrow (Fig. 4-3: Dismounting the side cover).

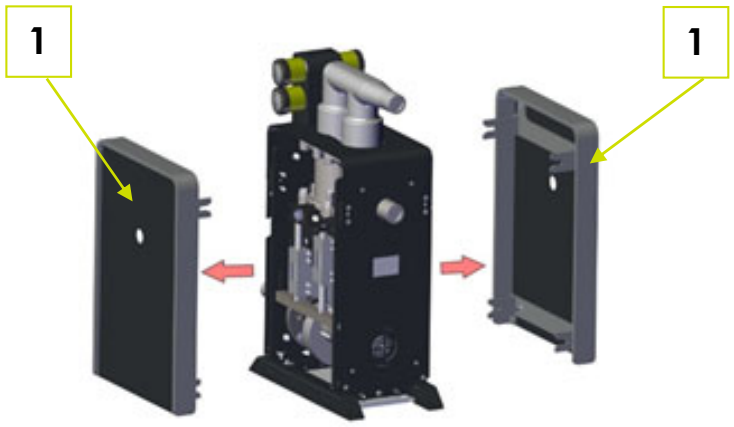


Fig. 4-3: Dismounting the side cover

The side cover elements are dismounted

4.2 Mounting the side cover

> **Note**
>
> **The side cover elements are installed in the reverse order described in section 4.1 "Dismounting the side cover" (tightening torque 16 Nm).**

The side cladding elements are mounted.

4.3 Dismounting the top cover

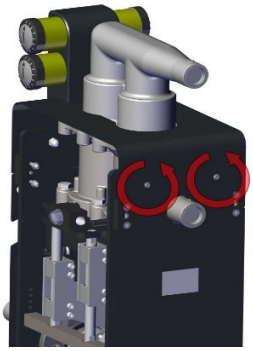


Fig. 4-4: Front

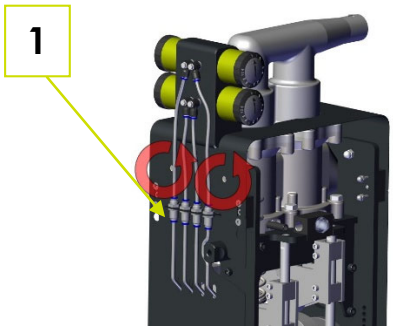


Fig. 4-5: Rear

Prerequisites:

- Side cover elements must be dismounted (see section 4.1 "Dismounting the side cover")

Work steps:

1. On the front of the Piston pump (Fig. 4-4: Front) unscrew the two hexagon socket screws M6x50 5 turns using a 4 mm Allen key ( ).
2. On the rear of the Piston pump (Fig. 4-5: Rear) unscrew the two hexagon socket screws M6x50, 5 turns using a 4 mm Allen key ( ).
3. Turn off permanent lubricator
4. Disconnect the lubrication lines (Fig. 4-5: Rear) from the push-in fittings (1).

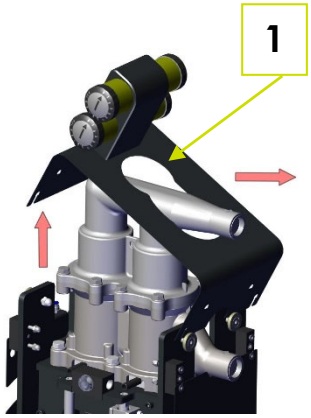


Fig. 4-6: Dismounting the top cover

5. Dismount the top cover (1) in the direction of the arrow (Fig. 4-6: Dismounting the top cover).

Note

Lubricants leak out at the separation points after the lubricant lines have been loosened!

- Switch off the permanent lubricator

- Collect any lubricants that run out.

- Clean the affected components.

The top cover is dismounted.

4.4 Mounting the top cover

Note

The top cover is mounted in the reverse order described in section 4.3 "Dismounting the top cover" (tightening torque 10 Nm).

Activate permanent lubricator

The top cover is mounted.

4.5 Removing the connection cover

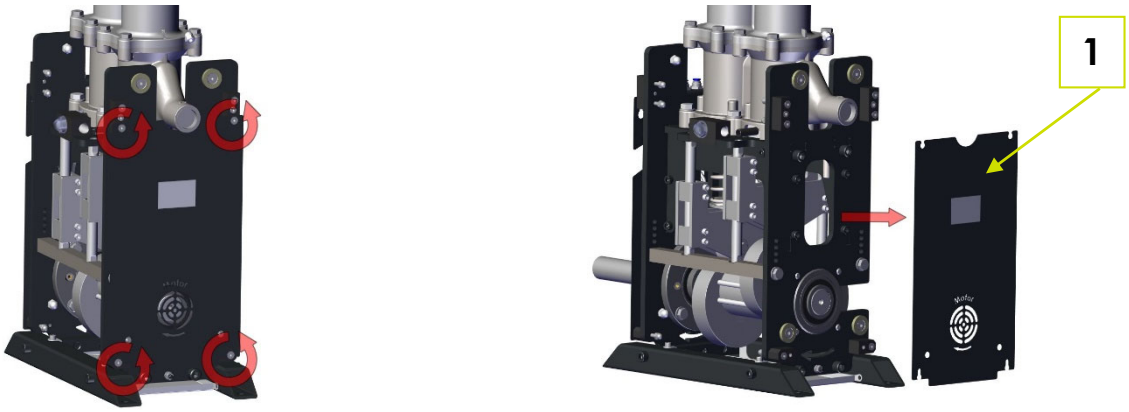


Fig. 4-7: Removing the connection cover

Prerequisites:

- Side cover elements must be dismounted (see section 4.1 "Dismounting the side cover").

Work steps:

1. On the front (Fig. 4-7: Removing the connection cover) of the Piston pump unscrew the two upper hexagon socket screws M6x50, 5 turns using a 4 mm Allen key ( ).
2. On the front (Fig. 4-7: Removing the connection cover) of the Piston pump completely unscrew the two lower hexagon socket screws M6x50 using a 4 mm Allen key ( ).
3. Remove the connection cover (1) in the direction of the arrow (Fig. 4-7: Removing the connection cover).

The connection cover is dismounted.

4.6 Assembly of the connection cover

> **Note**
>
> **The connection cover is mounted in the reverse order described in section 4.5 "Removing the connection cover" (tightening torque 10 Nm).**

The connection cover is mounted.

4.7 Dismounting the drive cover

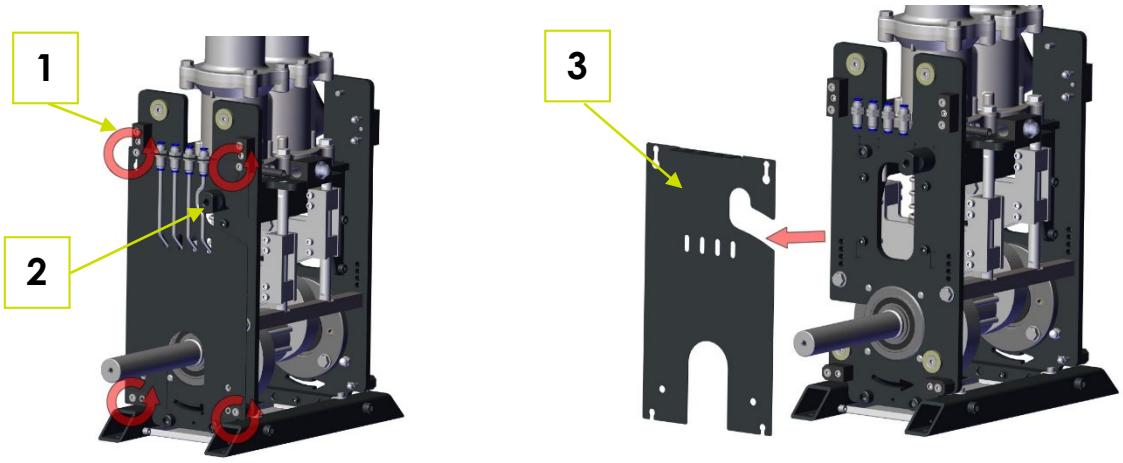


Fig. 4-8: Dismounting the drive cover

Prerequisites:

- Side cover elements must be dismounted (see section 4.1 "Dismounting the side cover").
- The drive unit must be dismounted (see section 3.1 "Dismounting the drive")

Work steps:

1. On the rear of the Piston pump (Fig. 4-8: Dismounting the drive cover) unscrew the four hexagon socket screws M6x50 (1) 5 turns using a 4 mm Allen key ( ).
2. Disconnect the grease lines (2) from the push-in fittings.
3. Pull off the drive cover (3) in the direction of the arrow (Fig. 4-8: Dismounting the drive cover).

The connection cover is dismounted.

4.8 Mounting the drive cover

> **Note**
>
> **The drive cover is mounted in the reverse order described in section 4.7 "Dismounting the drive cover" (tightening torque 10 Nm).**

The connection cover is mounted.

5 Replacing the piston seal

5.1 Dismounting the leakage indicator

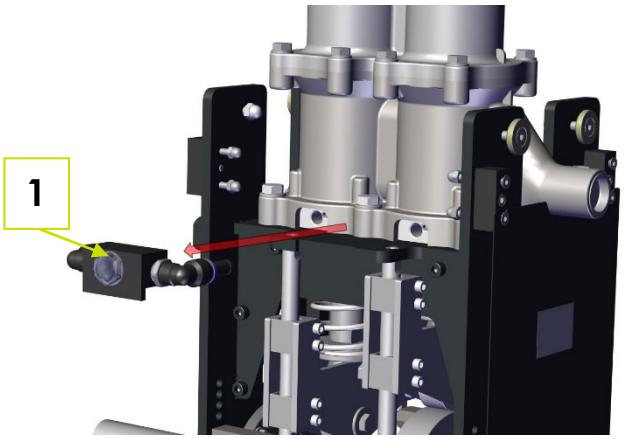


Fig. 5-1: Dismounting the leakage indicator

Prerequisites:

- Cover elements must be dismounted (see section 4.1 "Dismounting the side cover").

Work steps:

Danger due to escaping product

- Collect any escaping product.
- Clean affected components.

1. Pull off the leakage indicator (1) in the arrow direction (Fig. 5-1: Dismounting the leakage indicator).

Note

If product escapes when dismounting the leakage indicator, this suggests a defective bellows (see section 9 "Replacing the bellows"). The leakage indicator is dismounted.

5.2 Mounting the leakage indicator

Note

The leakage indicator is installed in the reverse order described in section 5.1 "Dismounting the leakage indicator".

The leakage indicator is mounted.

5.3 Dismounting the cylinder cover

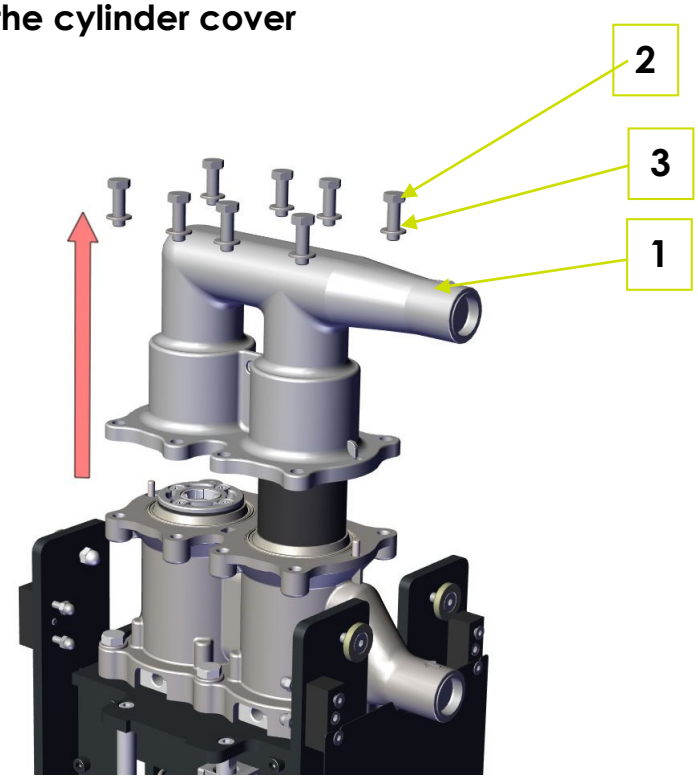


Fig. 5-2: Dismounting the cylinder cover

Prerequisites:

- Piston pump must be de-energised and depressurised.
- Lines on the suction and pressure connections of the Piston pump must be dismounted.
- Piston pump must be removed from the Ex zone.

Danger due to escaping product

- Collect any escaping product.
- Clean affected components.

Work steps:

1. Unscrew all hexagon screws M10x30 (2) with a 17 mm ring spanner.
2. Take off the cylinder cover (1) upward in the direction of the arrow (Fig. 5-2: Dismounting the cylinder cover).

The cylinder cover is dismounted.

5.4 Mounting the cylinder cover

Prerequisites:

- Cylinder cover of the Piston pump must be dismounted (see section 5.3 "Dismounting the of the cylinder cover").
- Piston pump must be removed from the Ex zone.

Work steps:

1. Clean the cylinder cover (1) and fit it back on the cylinder block (Fig. 5-3: Mounting the cylinder cover).
2. Hand-tighten all eight M10x30 hexagon screws (2) greased with assembly grease (Renolit Unitemp 2), with the washers A10.5 (3).
3. Tighten all eight hexagon screws M10x30 (2) to a torque of 40 Nm in the sequence 2-7-3-8-1-6-9-4 (Fig. 5-4: Numbering of the fillister head screws).

The cylinder cover is mounted.

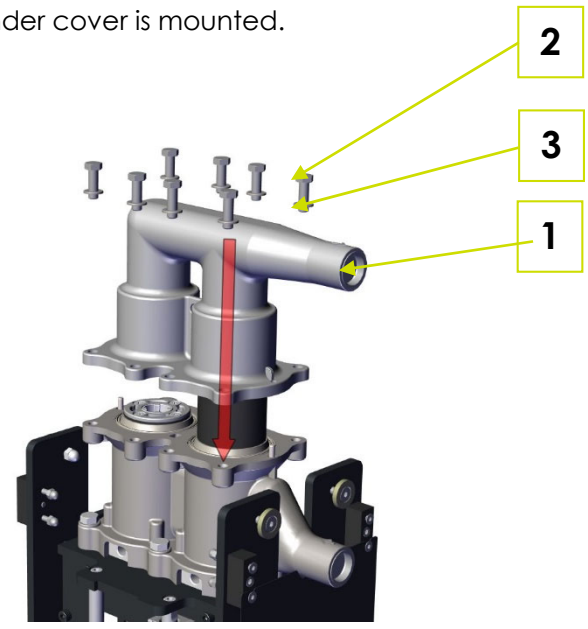


Fig. 5-3: Mounting the cylinder cover

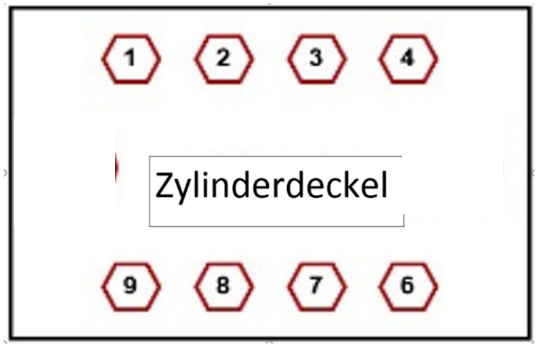


Fig. 5-4: Numbering of the fillister head screws

5.5 Replacing the piston seals

Prerequisites:

- The cylinder cover must be dismounted (see section 5.3 "Dismounting the of the cylinder cover").

Work steps:

1. Use an O-ring hook or a similar tool to remove both composite piston seals (1).
2. Clean the support surfaces of the composite piston seals.
3. Place clamping supports (3) in the seal body (4) (this assembly becomes the composite pist on seal)

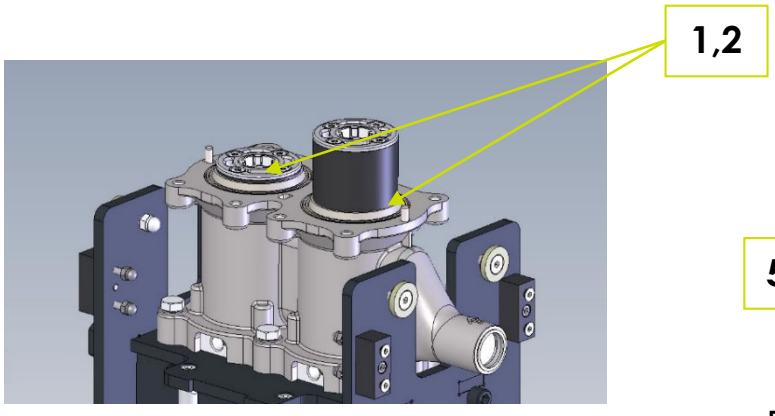


Fig. 5-5: Replacement of the composite piston seal

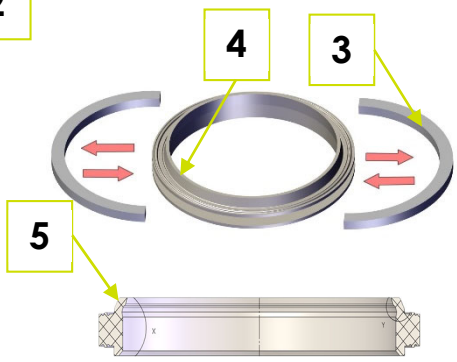


Fig. 5-6: Structure of the composite piston seal

4. Press the composite piston seals (1,2) into their position above the pistons. In installed status the sealing lip (5) points upward
5. Clean the surface of the cylinder block.

Note The new piston seals are slightly pre-tensioned and can only be mounted with a light expenditure of force.

Incorrectly fitted seals lead to a reduced delivery rate.

The composite piston seals are replaced.

6 Replacing the media valves

6.1 Dismounting the media valves in the cylinder block

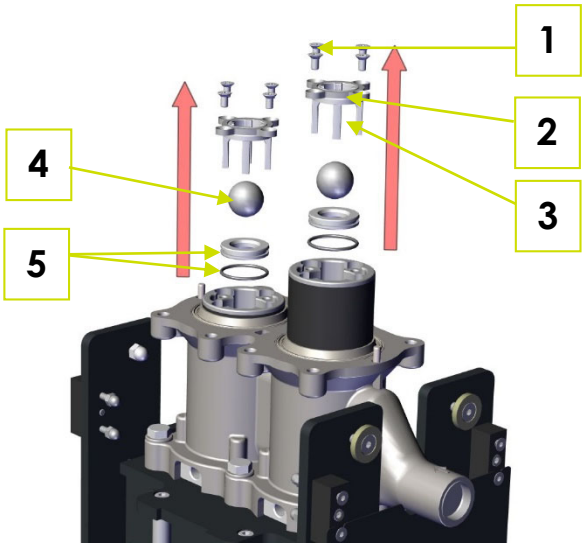


Fig. 6-1: Dismounting the media valves in the cylinder block

Prerequisites:

- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- Leakage indicator must be dismounted (see section 5.1 "Dismounting the leakage indicator").
- Cylinder cover must be dismounted (see section 5.3 "Dismounting the cylinder cover").

Work steps:

1. Unscrew all eight countersunk head screws M6x12 (1) with a T30 Torx spanner (Fig. 6-1: Dismounting the media valves in the cylinder block).
2. Take out both retaining stars (2).
3. Take out both cages (3) and balls (4).
4. Take out both valve seats (5) with the O-rings.

The media valves are dismantled.

> **Note**
>
> **The O-rings must not be reused; they must be replaced with new ones at assembly.**

6.2 Assembly of the media valves in the cylinder block

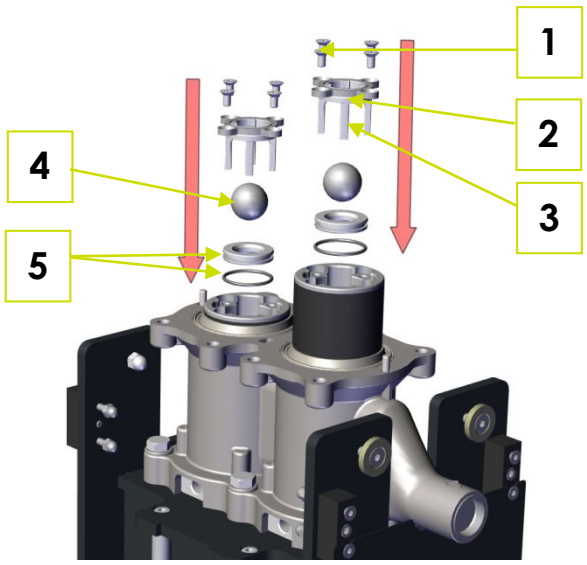


Fig. 6-2: Assembly of the media valves in the cylinder block

Prerequisites:

- Cylinder cover must be dismounted (see section 5.3 "Dismounting the cylinder cover").
- Media valves must be dismantled (see section 6.1 "Dismounting the media valves in the cylinder block").

Work steps:

1. Insert new valve seats (5), greased with Renolit Unitemp 2 with new O-rings (Fig. 6-2: Assembly of the media valves in the cylinder block).
2. Insert both new balls (4) and cages (3).
3. Insert both retaining stars (2).
4. Clean all eight countersunk head screws M6x12 (1) and grease them with Renolit Unitemp 2.
5. Loosely screw in countersunk head screws M6x12 until they rest in the counter bores.

   Note

   Avoid tilting the cages (3) when mounting.
6. Tighten countersunk head screws M6x12 crosswise in 20° increments with a T30 Torx torque spanner until the torque of 10 Nm is reached.

The media valves are mounted.

6.3 Removing the media valves in the cylinder cover

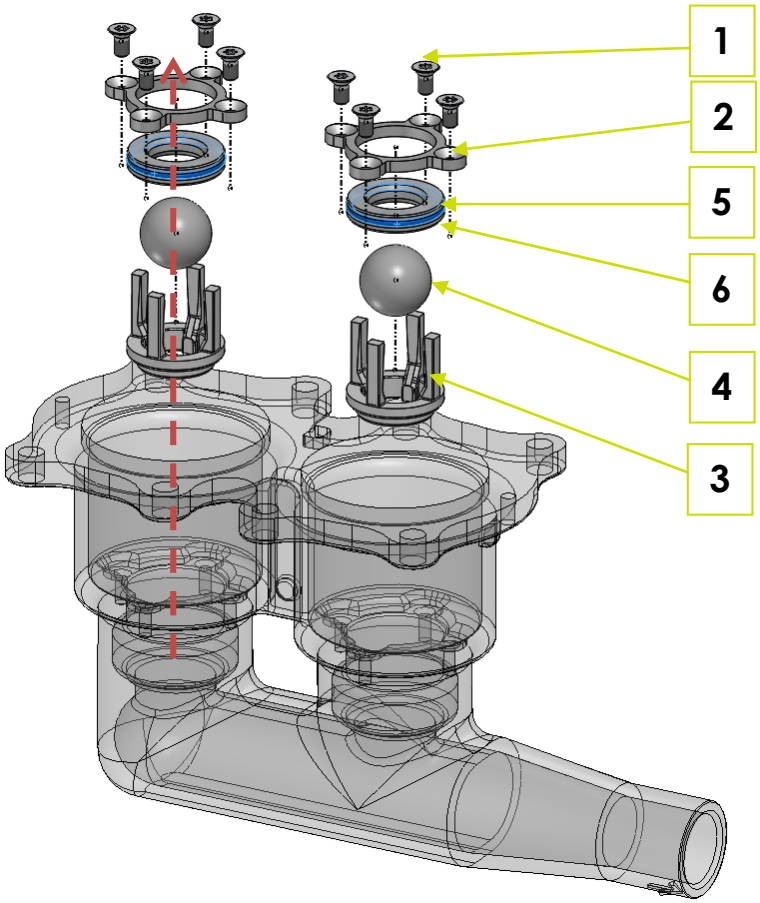


Fig. 6-3: Removing the media valves in the cylinder cover

Prerequisites:

- Cylinder cover must be dismounted (see section 5.3 "Removing the media valves in the cylinder cover").

Work steps:

1. Unscrew all eight countersunk head screws M6x12 (1) with a T30 Torx spanner (Fig. 6-3: Removing the media valves in the cylinder cover).
2. Take out both retaining stars (2).
3. Take out both valve seats (5) with the O-rings (6).
4. Take out both cages (3) and balls (4).

The media valves are dismantled.

> **Note**
>
> **The O-rings must not be reused; they must be replaced with new ones at assembly.**

6.4 Assembly of the media valves in the pump head

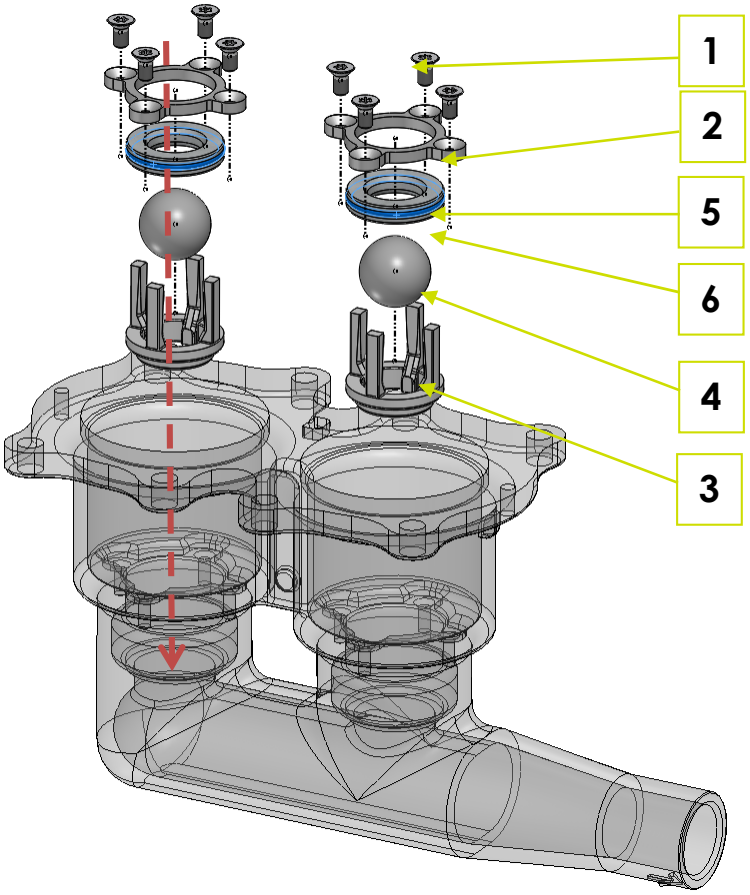


Fig. 6-4: Assembly of the media valves in the pump head

Prerequisites:

- Media valves must be dismantled (see section 6.3 "Removing the media valves in the cylinder cover").

Work steps:

1. Insert both new balls (4) and cages (3).
2. Insert new valve seats (5), greased with Renolit Unitemp 2, with new O-rings (Fig. 6-4: Assembly of the media valves in the pump head).
3. Insert both retaining stars (2).
4. Clean all eight countersunk head screws M6x12 (1) and grease them with Renolit Unitemp 2.
5. Loosely screw in countersunk head screws M6x12 until they rest in the counter bores.

   Note

   Avoid tilting the cages (3) when mounting..
6. Tighten countersunk head screws M6x12 crosswise in 20° increments with a T30 torque spanner until the torque of 10 Nm is reached.

The media valves are mounted.

7 Dismounting the guide unit

7.1 Dismounting the pump unit

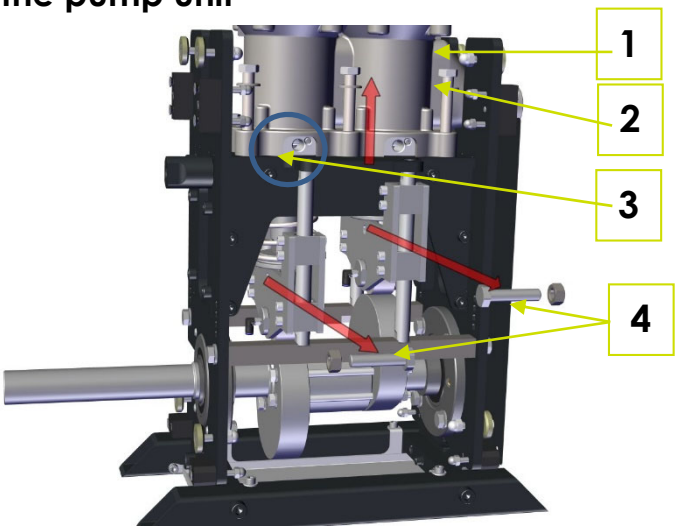


Fig. 7-1: Dismounting the pump unit

Prerequisites:

- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- Leakage indicator must be dismounted (see section 5.1 "Dismounting the leakage indicator").

Work steps:

1. Unscrew all eight hexagon screws M12x90 (1) and washers (2) with a 19 mm ring spanner (Fig. 7-1: Dismounting the pump unit).
2. Unscrew all four threaded pins M6x30 (3) two turns with a 4 mm Allen key.
3. Unscrew both connection screws of the pump unit/guide unit M10x45 (4) (Fig. 7-1: Dismounting the pump unit).
4. Take the pump unit upward and out

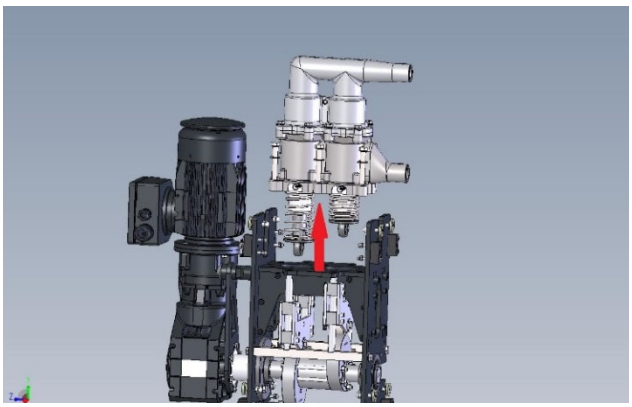


Fig. 7-1: Taking out the pump unit

The pump unit is detached.

7.2 Mounting the pump unit assembly

Prerequisites:

- Pump unit must be detached (see section 7.1 "Dismounting the pump unit")

Work steps:

> **Note**
>
> **The pump unit is mounted in the reverse order described in section 7.1 "Dismounting the pump unit"**
>
> **Tightening torque of M12x90 screws (1) 55 Nm, M6x30 screws (3) 6 Nm, M10x45 screws (4) 32 Nm (Fig. 7-1: Dismounting the pump unit).**

The pump unit is mounted.

7.3 Dismounting the guide unit assembly

Prerequisites:

- Pump unit must be detached (see section 7.1 "Dismounting the pump unit").

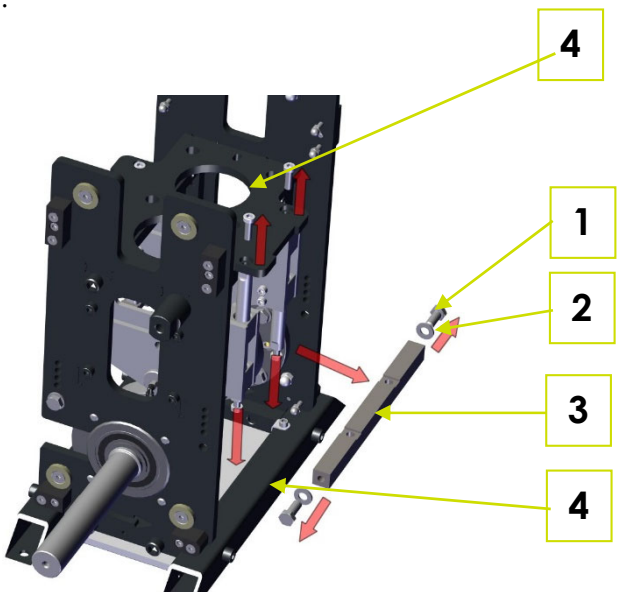


Fig. 7-3: Dismounting the guide unit assembly

Work steps:

1. Unscrew both M10x25 hexagon screws (2) with washers (1) (Fig. 7-3: Dismounting the guide unit assembly)
2. Unscrew four M8x25 fillister head screws (4) and pull the shear bar (3) forward and out (Fig. 7-3: Dismounting the guide unit assembly)
3. Repeat steps 1 and 2 on the left side
4. Disconnect the grease lines from the angled fittings (5) (Fig. 7-3: Dismounting the guide unit assembly)
5. Take out guide units (6) (Fig. 7-4: Dismounting the guide unit 2)

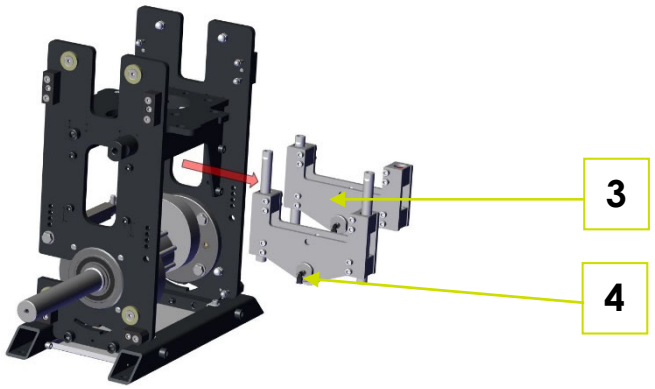


Fig. 7-4: Dismounting the guide unit 2

The guide unit must be dismounted.

7.4 Mounting the guide unit assembly

Prerequisites:

- The pump unit assembly must be dismounted (see section 7.1 "Dismounting the pump unit")
- The pump unit assembly must be dismounted (see section 7.3 "Dismounting the pump unit")

Work steps:

> **Note**
>
> **The drive unit is mounted in the reverse order described in section 7.3 "Dismounting the guide unit assembly**
>
> **Mount guide unit (6) (Fig. *7-4*: Dismounting the guide unit 2) and shear bar (3) (Fig. 7-3: Dismounting the guide unit assembly) and hand tighten with the screws.**
>
> **Tightening torque for M8x30 (4) 16 Nm with additional Weicon AN305-42 thread lock, M10x25 (2) 32 Nm (Fig. 7-3: Dismounting the guide unit assembly)**
>
> **At first mounting, all M6x16 fillister head screws are tightened to 6.6 Nm**
>
> **Move the guide unit upward and downward to check whether it runs easily.**

The guide unit is mounted.

7.5 Dismounting the guide units

Prerequisites:

- Pump unit (section 7.1:"Dismounting the pump unit") guide unit assembly (section 7.3:"Dismounting the guide unit assembly") must be dismounted.

Work steps:

- Dismantling the guide unit in accordance with the exploded-view drawing (in section 7.6.1:"Exploded-view drawing of the guide unit".

The guide units are dismounted.

7.6 Mounting the guide units

Note

The two-joint rockers are installed in the reverse order described in section 7.5 "Dismounting the guide unit".

Prerequisites:

- Guide units are dismounted (see section 7.5 "Dismounting the guide units").
- Check and clean all components of the assembly.
- Replace damaged components.

Mounting work steps:

1. Mount the guide units in the reverse order.
2. The surface of the axle (7) in Fig. 7-5: Exploded-view drawing – guide unit must be wetted with assembly paste (item no.: 70011820)
3. First connect the components with screws tightened hand tight.
4. The final torque of all screws will be applied when the entire assembly is installed in the system.
5. Hexagon socket screw M10x20 (10) must be cleaned with spray cleaner S (item no.: 15073306) and then with Weicon AN 302-43 and bolted to the pump unit and the axle with a tightening torque of 32 Nm.
6. Top up the grease reservoir of the bearing pedestals with 10 cm^3 as shown in the drawing in section 7.6.1 "Exploded-view drawing of the guide unit".

7.6.1 Exploded-view drawing of the guide unit

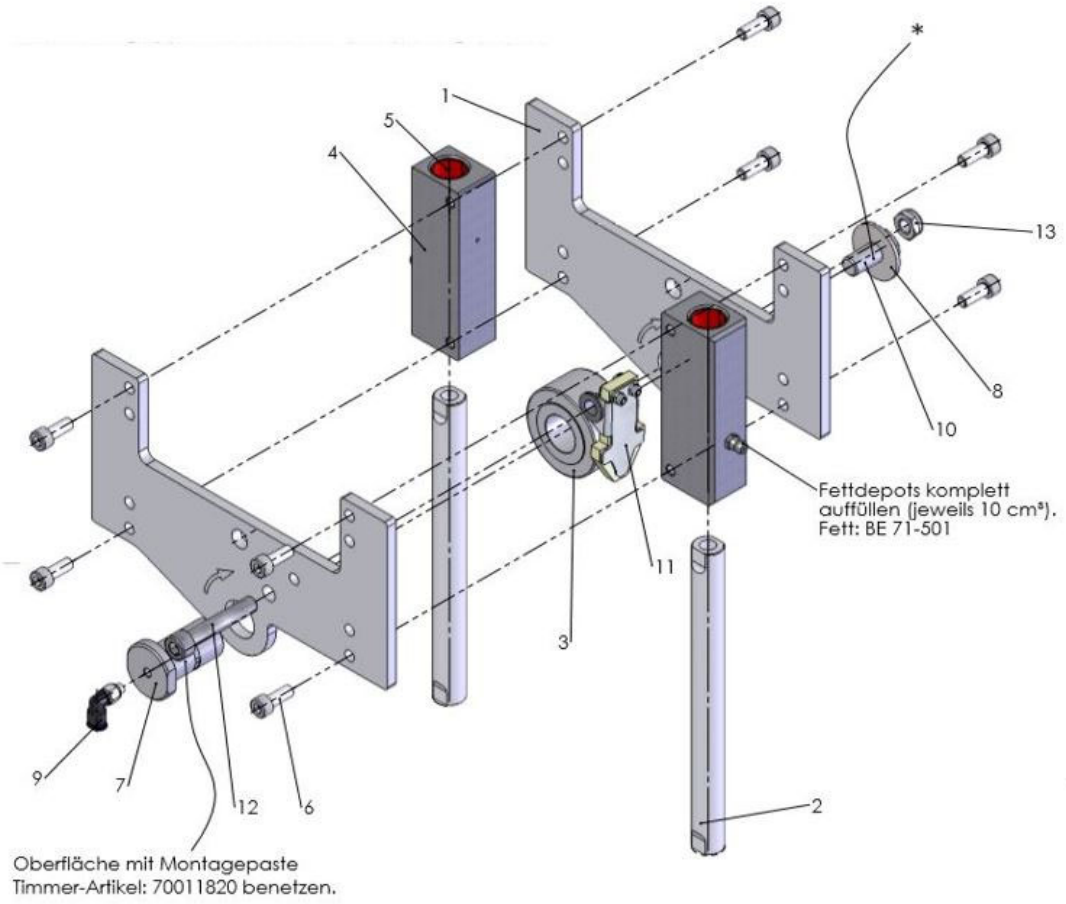


Fig. 7-5: Exploded-view drawing – guide unit

7.6.2 Part numbers for the guide unit

BOM ID	Description	Quantity	Tightening torque in Nm	Secure position with *1
1	Traverse_plate	2		
2	Guide_bar	2		
3	Support_roller	1		
4	Bearing_pedestal	2		
5	DP4B-Bush1625	4		
6	Fillister_head_screw DIN912-M6-16-GALV	8	6.6	
7	Axle	1		A
8	Washer-DIN9021-A10.5-V2A	1		
9	Angled_push-in_fitting WEdM-6-M5-KU	1		
10	Hexagon_socket_screw DIN933-8.8-M10x20-VZ	1		
11	Lubricating rocker	1		
12	Fillister head screw Din912-M8-45-GALV	1	10	
13	Hexagon_nut-DIN985-M8-GALV	1	10	
14	Conical_lubricating nipple-shape A-M6x1-StGALV	2	6	
15	Grease-Klüberlub	10 cm³		

*1 A= product-strength threadlocker

B= high-strength joint connection

8 Replacing the drive train

8.1 Dismounting the contamination collection tray

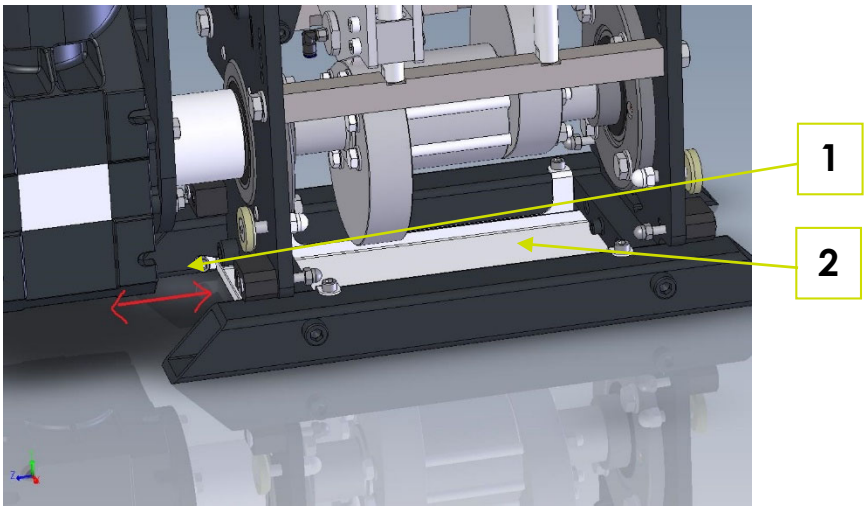


Fig. 8-1: Dismounting the contamination collection tray

Prerequisites:

- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").

Work steps:

1. Unscrew fillister head screw M6x12 (1) (Fig. 8-1: Dismounting the contamination collection tray).
2. Push out the contamination collection tray (2) either forward or back in the in the direction of the arrow.

The contamination collection tray is dismounted.

8.2 Mounting the contamination collection tray

Note

The contamination collection tray is mounted in the reverse order described in section 8.1 "Dismounting the contamination collection tray".

8.3 Dismounting the drive train

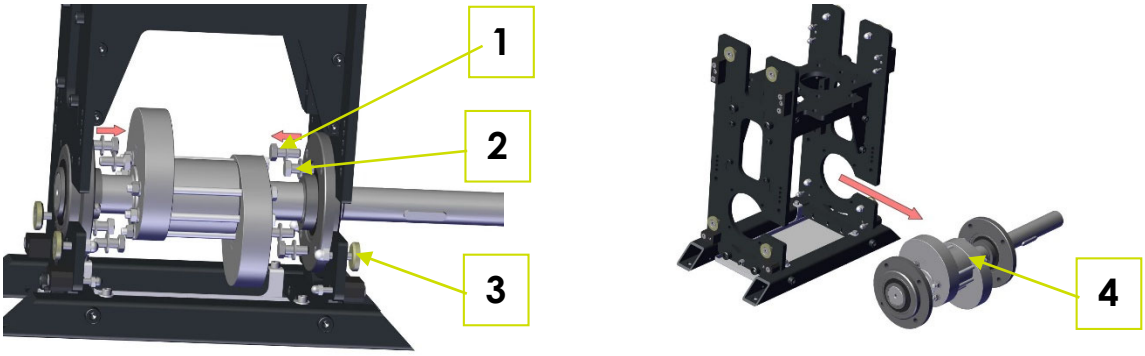


Fig. 8-2: Dismounting the drive train

Prerequisites:

- Drive must be dismounted (see section 3.1 "Dismounting the drive").
- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- Guide unit must be dismounted (see section 7 "Dismounting the guide unit").
- Contamination collection tray must be dismounted (see section 8.1 "Dismounting the contamination collection tray").

Work steps:

1. Disconnect the lubrication lines from the fixed and loose bearings (see Fig. 8-4: Mounting the drive train Lubrication lines on the right side).
2. Dismount and take out eight hexagon screws M10x25 (1), washers (2) and hexagon nuts M10 (3).
3. Remove the castle nut from the fixed bearing (see section 11.5 "Manufacturer's instructions for fixation of the tensioning bearing") and slide the bearing housing to the cam disc.
4. Pull out drive train (4) to the side.

The drive train is dismantled.

8.4 Mounting the drive train

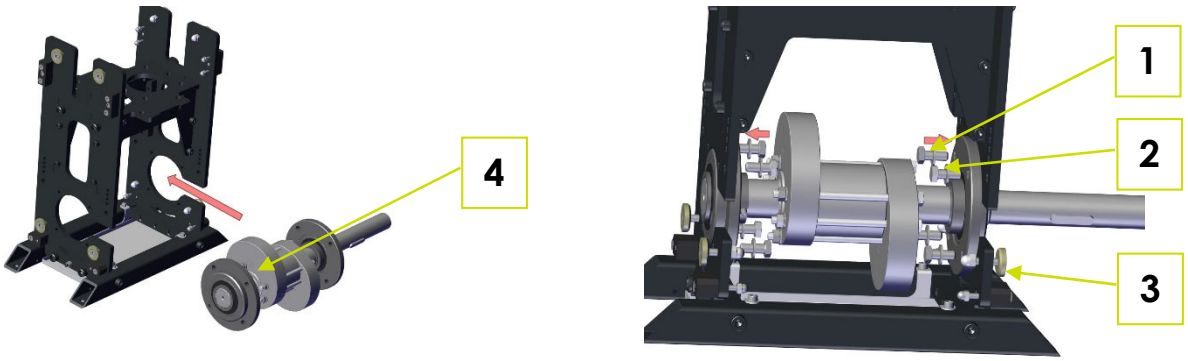


Fig. 8-3: Mounting the drive train

Prerequisites:

- Drive must be dismounted (see section 3.1 "Dismounting the drive").
- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- Guide unit must be dismounted (see section 7 "Dismounting the guide unit").
- Contamination collection tray must be dismounted (see section 8.1 "Dismounting the contamination collection tray").

Work steps:

> **Note**
>
> **When installing, ensure that the connections B (Fig. 8-4: Mounting the drive train Lubrication lines on the right side) of the lubrication lines of the loose bearing and fixed bearing are on the right side of the Piston pump.**

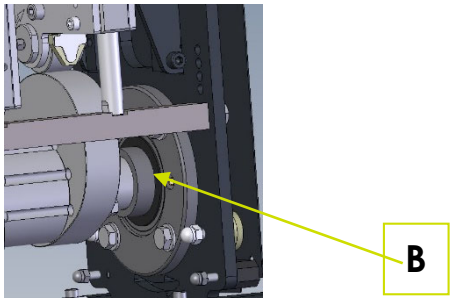


Fig. 8-4: Mounting the drive train Lubrication lines on the right side

1. Introduce drive train (4) into the Piston pump (Fig. 8-3: Mounting the drive train) from the side.
2. Hand-tighten hexagon screws M10x25 (1), with washers (2) and hexagon nuts M10 (3) with washers (2).
3. Tighten hexagon screws M10x25 (2), washers (1) and hexagon nuts M12 (4) to 35 Nm.

4. Mount the lubrication line of the fixed bearing and the loose bearing (Fig. 8-4: Mounting the drive train Lubrication lines on the right side).
5. Unscrew the castle nut from the fixed bearing (see section 11.5 "Manufacturer's instructions for fixation of the tensioning bearing").
6. Lightly grease the running surfaces of the cam disc with Klüberlub BE 71-501.

The drive train is mounted.

8.5 Dismantling the drive train

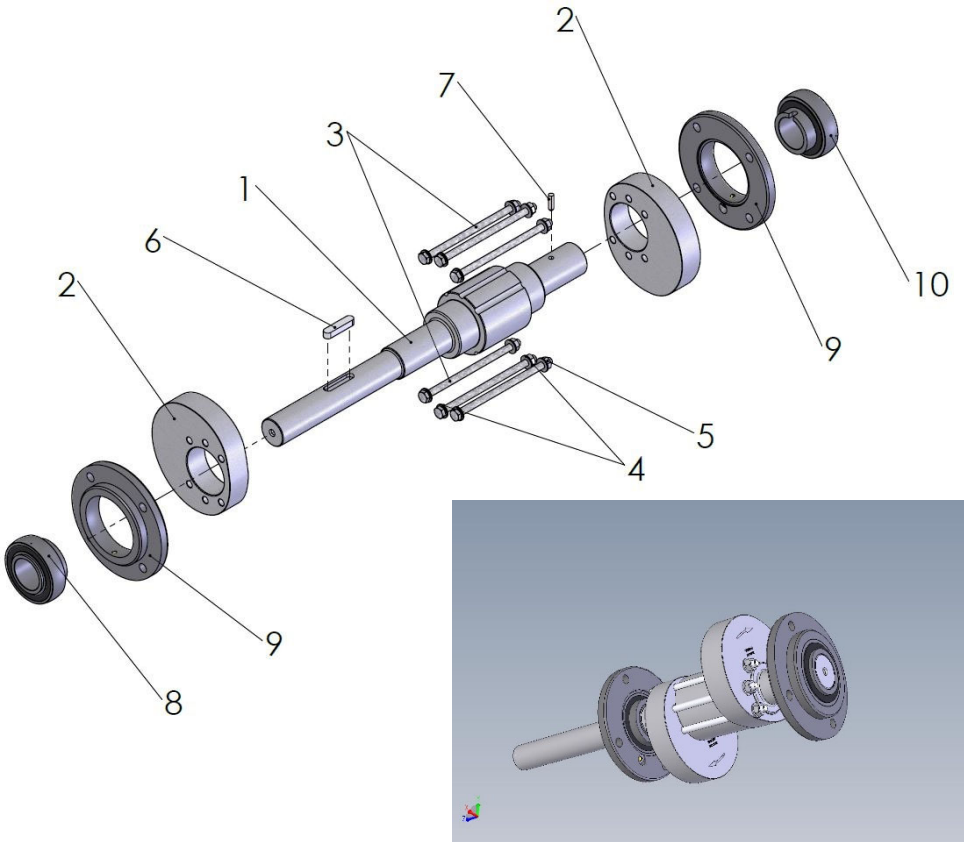


Fig. 8-5: Exploded-view drawing – drive train

Prerequisites:

- The drive train must be removed (see section 8.3 "Dismounting the drive train").

Work steps:

1. Pull off feather key (6).
2. Release the fixed bearing (9) (see section 11.5 "Manufacturer's instructions for fixation of the tensioning bearing").
3. Pull off loose bearing (8) from the drive shaft (1).
4. Remove hexagon nuts (5) and washers (4).
5. Remove hexagon screws (3) and washers (4).
6. Remove cam discs (2).
7. Clean all components.

8.6 Assembling the drive train

Prerequisites:

- All components must be cleaned.
- The item numbers in the work steps refer to Fig. 8-5: Exploded-view drawing – drive train.

Work steps:

1. Apply Weicon Lock AN306-20 to dowel pin (7).
2. Push dowel pin (7) into drive shaft (1).
3. Remove excess adhesive and let harden.
4. Thinly and uniformly apply Klüberpaste 46MR401 on surfaces that are marked with a hash sign (#) in Figure Fig. 8-7: Exploded-view drawing – drive train.
5. Slide the cam discs (2) offset by 180° in the running direction onto the drive shaft.
6. Apply Weicon Lock AN302-43 to thread of hexagon screws (3).
7. Mount cam discs with hexagon screws (3), hexagon nuts (5) and washers (4) and tighten to 25 Nm.
8. Thinly and uniformly apply Klüberpaste 46MR401 to the drive shaft in the area of the fixed bearing.

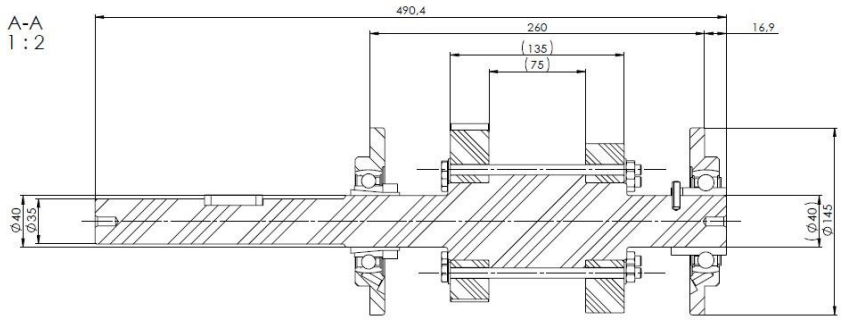


Fig. 8-6: Pre-mounting dimension

9. Slide fixed bearings onto the drive shaft and tighten hand-tight. The definitive tightening torque of the castle nut will be applied at final installation on the pump frame (see section 11.5 "Manufacturer's instructions for fixation of the tensioning bearing").
10. Install feather key with Klüberpaste 46MR401.
11. Thinly and uniformly apply Klüberpaste 46MR401 on the drive shaft in the area ofthe loose bearing.
12. Slide the loose bearing onto the drive shaft.

The drive train is mounted.

8.6.1 Exploded-view drawing of the drive train

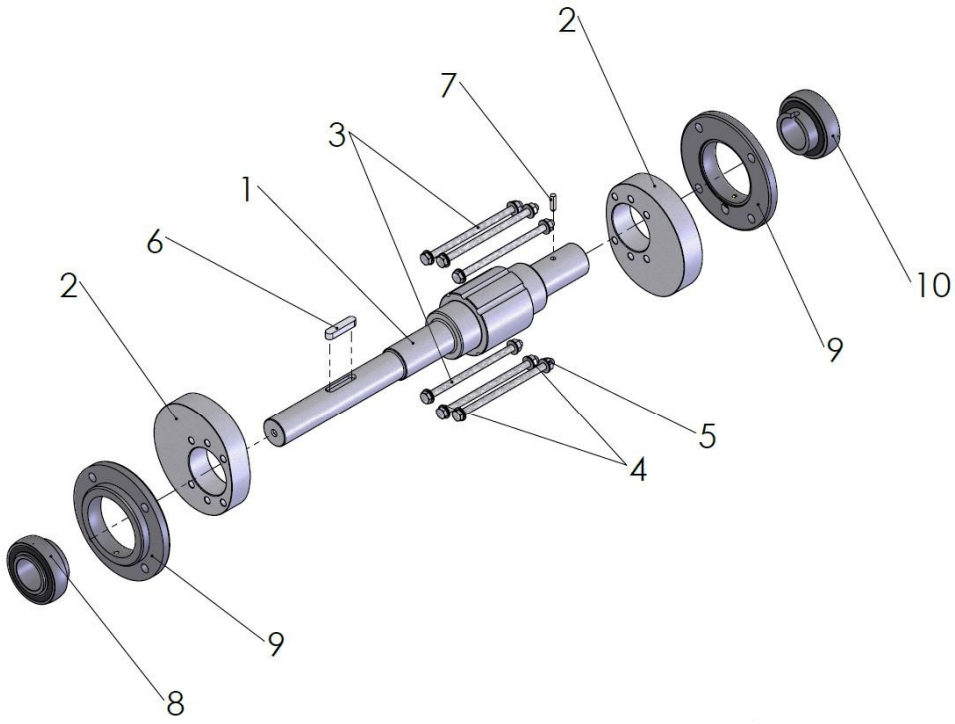


Fig. 8-7: Exploded-view drawing – drive train

8.6.2 Part numbers for the drive train

BOM ID	Description	Quantity	Tightening torque	Secure position with *1
1	Drive shaft	1		
2	Cam disc_stroke_50_mm	2		
3	Hexagon_screws_M8x150-GALV	6		
4	Washer_A8	12		
5	Hexagon_nut_M8	6	25 Nm	A
6	Feather key_high_shape	1		
7	ZKST-ISO8740-Ø6x22	1		B
8	N-ESL-Ø40	1		
9	N-FL-Ø40-Flange_bearing_housing-centring_collar	2		
10	N-ESL-Ø40 loose bearing	1		A

*1 A= product-strength threadlocker

B= high-strength joint connection

9 Replacing the bellows

9.1 Dismounting the pistons

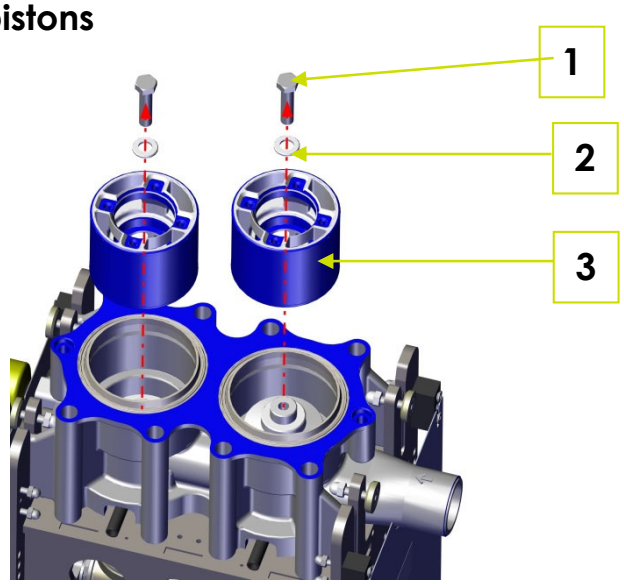


Fig. 9-1: Dismounting the pistons

Prerequisites:

- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- The pump unit must be dismounted (see section 7.1 "Dismounting the pump unit").
- Cylinder cover must be dismounted (see section 5.3 "Dismounting the cylinder cover").
- Media valves must be dismantled (see section 6.1 "Dismounting the media valves in the cylinder block").

Work steps:

> **Note**
>
> **When unscrewing the hexagon screws (1) do not twist the piston rods.**

1. For each piston unscrew the stainless steel hexagon screw M12x50 (1) and washer (2).
2. Pull the pistons (3) upward and out.
3. Clean both stainless steel hexagon screws and grease them with Renolit Unitemp.

The pistons are dismounted.

9.2 Mounting the pistons

Note

The pistons are mounted in the reverse order described in section 9.1 "Dismounting the pistons".

The pistons are mounted.

9.3 Dismounting the bellows

Fig. 9-2: Dismounting the bellows

Prerequisites:

- The pistons must be dismounted (see section 9.1 "Dismounting the pistons").

Work steps:

1. Unscrew all four threaded pins M6x20 (2) approx. 15 mm with a 4 mm Allen key (grease threaded pins with Renolit if it is the first mounting).
2. Pull both bellows (1), lower rings (5) and O-rings (3, 4) upward and out.
3. Unscrew the threaded pins (6) and unscrew the lower rings (5) from the bellows.

The bellows are dismounted.

Note

The O-rings must not be reused; they must be replaced with new ones at assembly.

9.4 Assembly of the bellows

Note

The bellows are mounted in the reverse order described in section: 9.3 "Dismounting the bellows".

- The *pistons are mounted.*

- Dismounting the bellows. The threaded pins (6) are secured with Weicon Lock AN302-43

- The threaded pins M6x20 (2) must only be screwed in to just before the stop. The threaded pins are not fixed in place until after the piston rod has been mounted on the guide unit (section 7.2 "Mounting the pump unit assembly")

The bellows are mounted.

10 Replacing the pump unit

10.1 Dismounting the entire pump unit

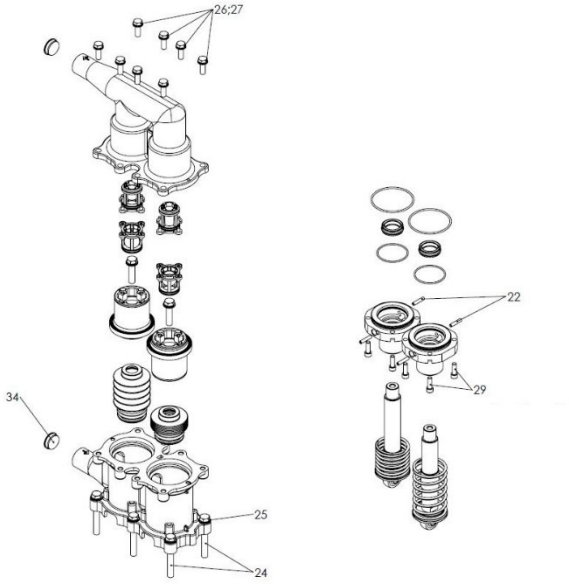


Fig. 10-1: Dismounting the entire pump unit

Prerequisites:

- Piston pump must be de-energised and depressurised.
- Lines on the suction and pressure connections of the Piston pump must be dismounted.
- Piston pump must be removed from the Ex zone.
- Cover elements must be dismounted (see section 4 "Cover of the Piston pump").
- Leakage indicator must be dismounted (see section 5.1 "Dismounting the leakage indicator").

Work steps:

Pump unit

1. Take the entire pump unit upward and out of the Piston pump (see section 7.1 "Dismounting the pump unit").
2. Dismount cylinder cover (see section 5.3 "Dismounting the cylinder cover").
3. Dismantle media valves (see section 6.1 "Dismounting the media valves in the cylinder block").
4. Dismantle media valves in cylinder cover (see section 6.3 "Removing the media valves in the of the cylinder cover").
5. .Dismount the piston (see section 9.1 "Dismounting the pistons").

6. Dismount remaining components according to exploded-view drawing (Fig. 10-1: Dismounting the entire pump unit).

The pump unit is dismounted.

10.2 Mounting the entire pump unit

Note

- The entire pump unit is mounted in the reverse order described in section 10.1 "Dismounting the entire pump unit".

- All stainless steel threaded fittings are greased

-The O-rings must not be reused; they must be replaced with new ones at assembly.

10.2.1 Assembly drawing of the pump unit

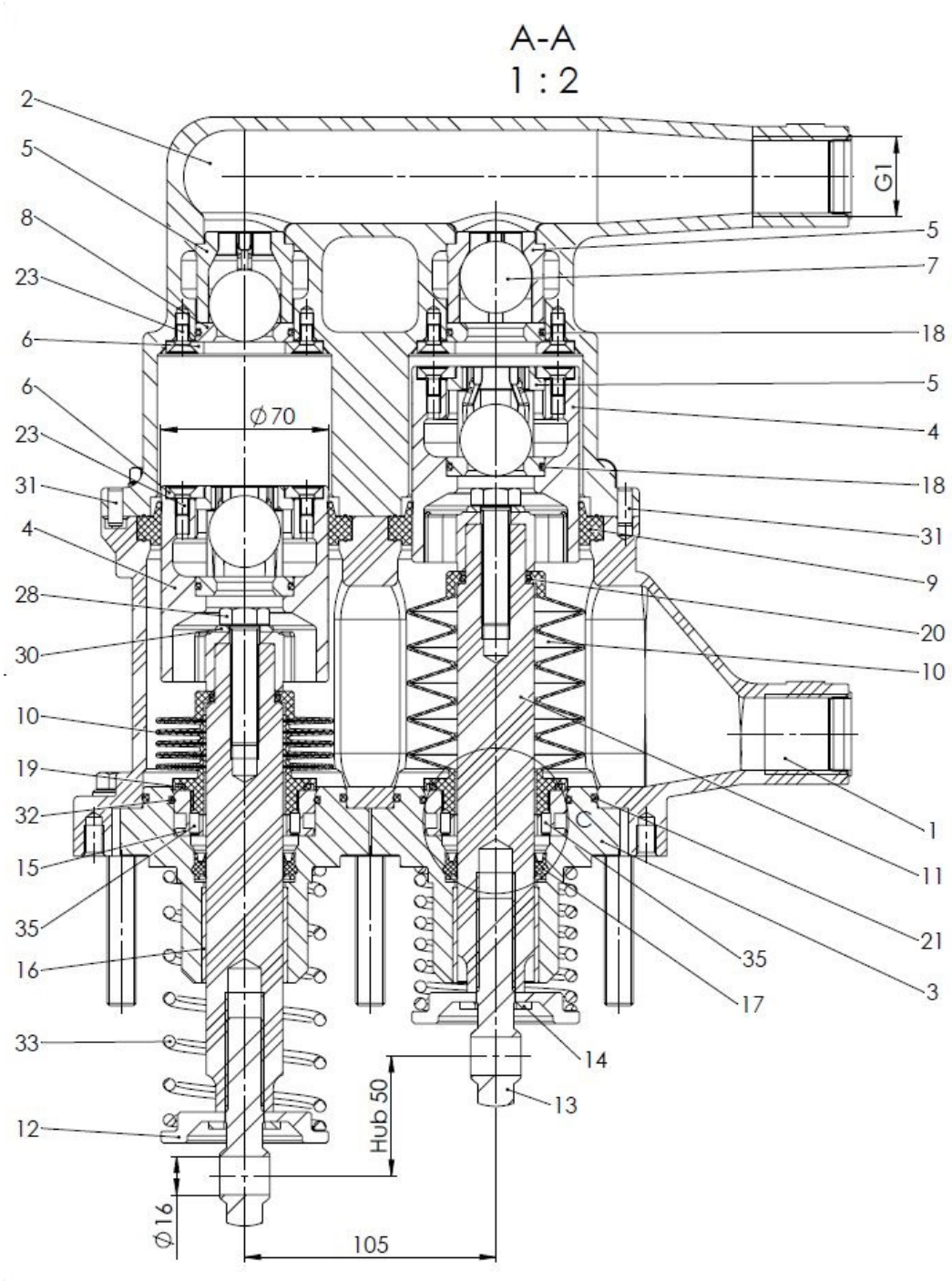


Fig. 10-2 : Sectional drawing/assembly drawing

10.2.2 Part numbers for the pump unit

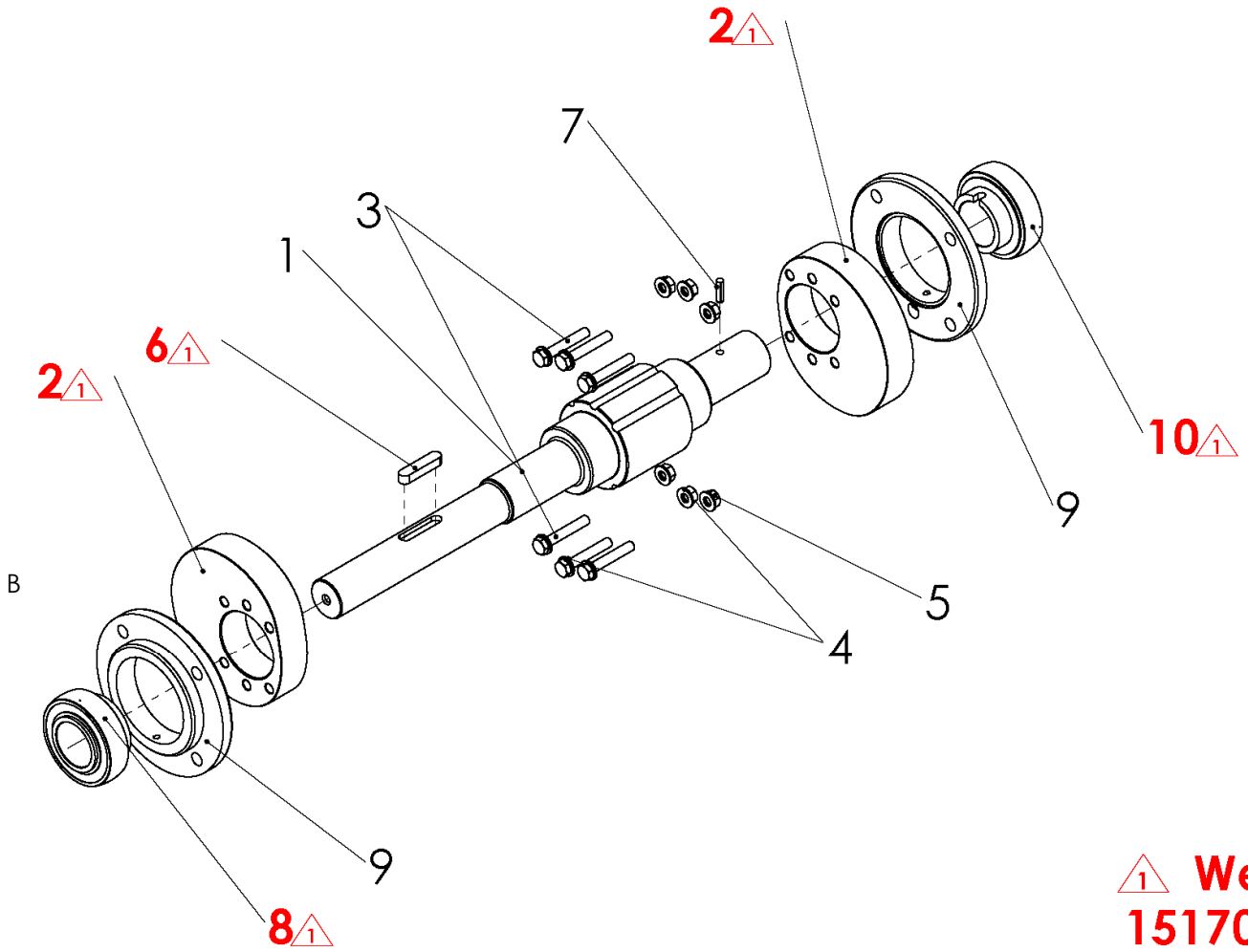
BOM ID	Description	Quantity	Tightening Torque Nm	Secure position with *1
1	Cylinder_block	1		
2	Cylinder_cover	1		
3	Guide_receptacle	2		
4	PistonØ100-coat.	2		
5	Ball_catch	4		
6	Retaining star	4		
7	Ball40-VA-AISI316	4		
8	Valve_seat	4		
9	Piston_seal	2		
10	Bellows	2		
11	Piston_rod	2		
12	Spring_plate	2		
13	Joint eye	2		
14	Washer_DIN125_A17_GALV	2		
15	Lower_ring	2		
16	DP4B-Bush-3240	2		
17	Rod_seal	2		
18	O-ring-36,17x2.62-FEPM	4		
19	O-ring-49.5x3	2		
20	O-ring-25x2.5	2		
201	O-ring-80x3	2		
22	Threaded_pin-M6x30-V2A	4		
23	Countersunk_head_screw-DIN965-M6-12-V4A	16	10	
24	Hex screw-DIN933-M12-90-GALV	6		
25	Washer-A13-A2	8		
26	Washer-DIN125-A10.5-A2	8		
27	Hexagon_screw-DIN931-M10x30-V2A	8		
28	Hexagon_screw-M12-50-V4A	2	60	
29	Fillister_head_screw-M8-25-V2A	8	25	
30	Washer-DIN125-A13-A4	2		

31	Dowel_pin-ISO 2338-Ø6x16-A1	2		
32	O-ring-58x2.5	2		
33	Spring	2		
34	Protective_cap	2		
35	Threaded_pin-M4x10-V2A	4		A

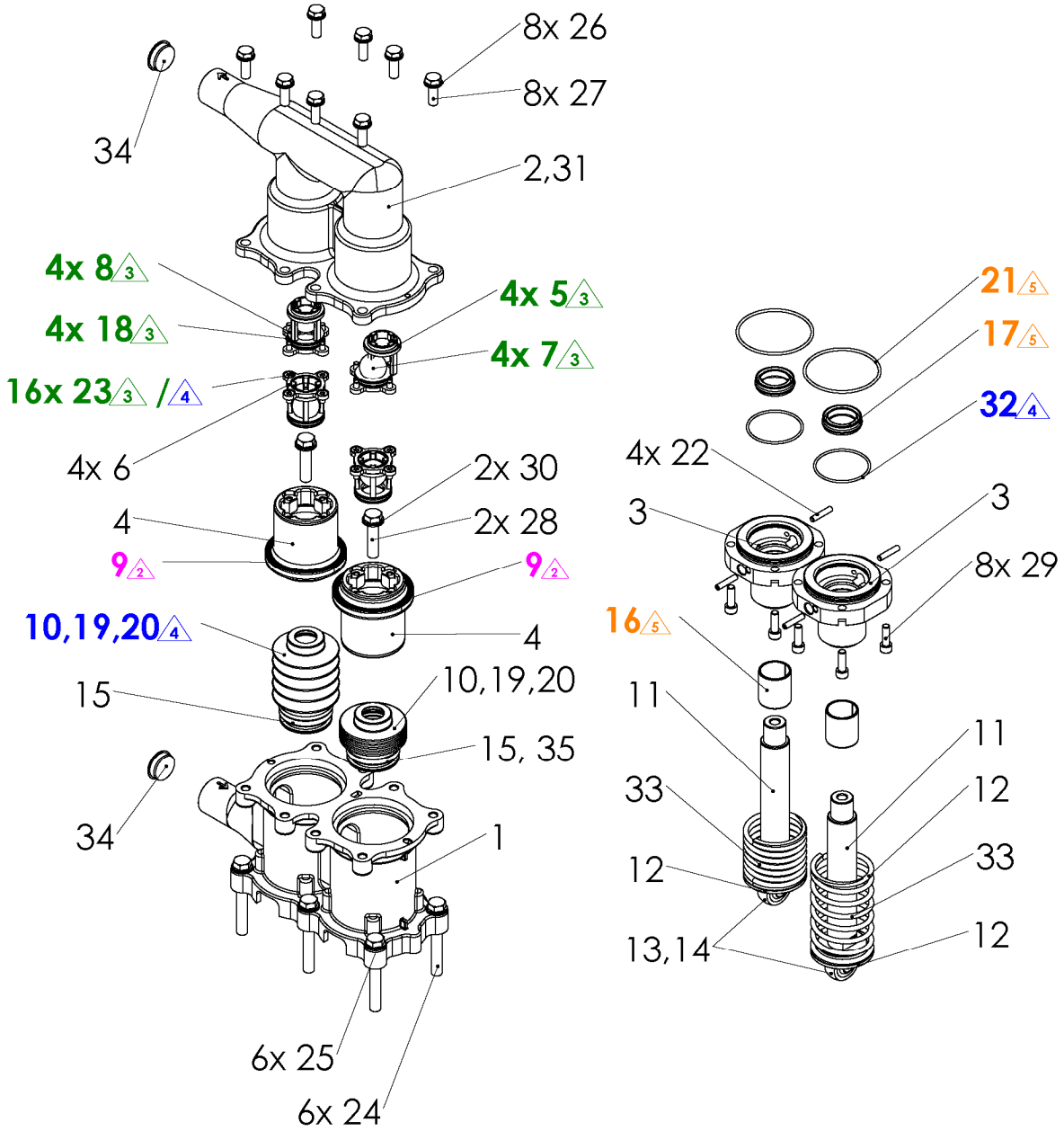
*1 A= product-strength threadlocker

B= high-strength joint connection

11 Spare parts ePCS-20 with and without motor



⚠1 Wear part kit powertrain 151700626

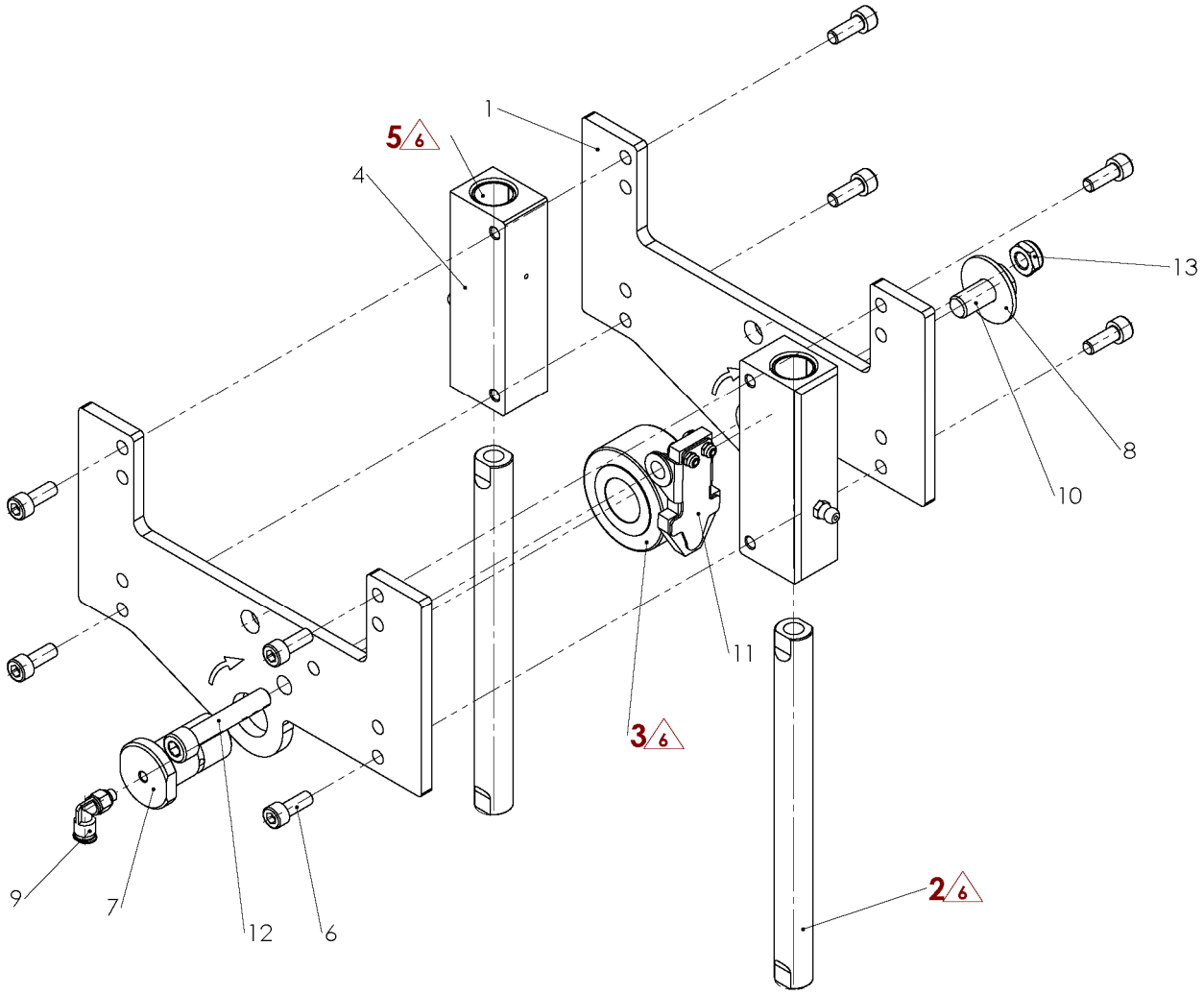


△2 **Wear part kit piston seal**
151700629

△3 **Wear part kit check valves**
151700628

△4 **Wear part kit bellows**
151700627

△5 **Wear part kit pump unit**
151700625
(incl. 151700628 & 151700627)



6 **Wear part guide unit**
151700624

12 Appendix

12.1 Exploded-view drawing – guide unit

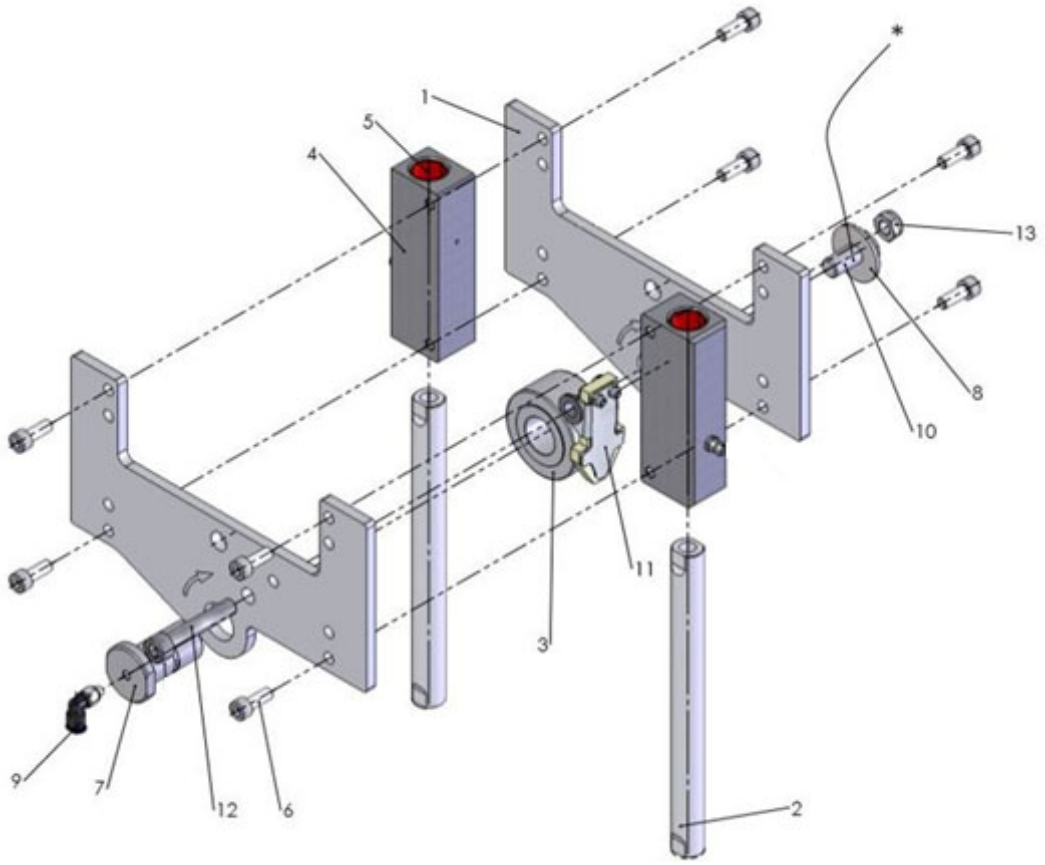


Fig. 12-1: Exploded-view drawing – guide unit

12.2 Exploded-view drawing – drive train

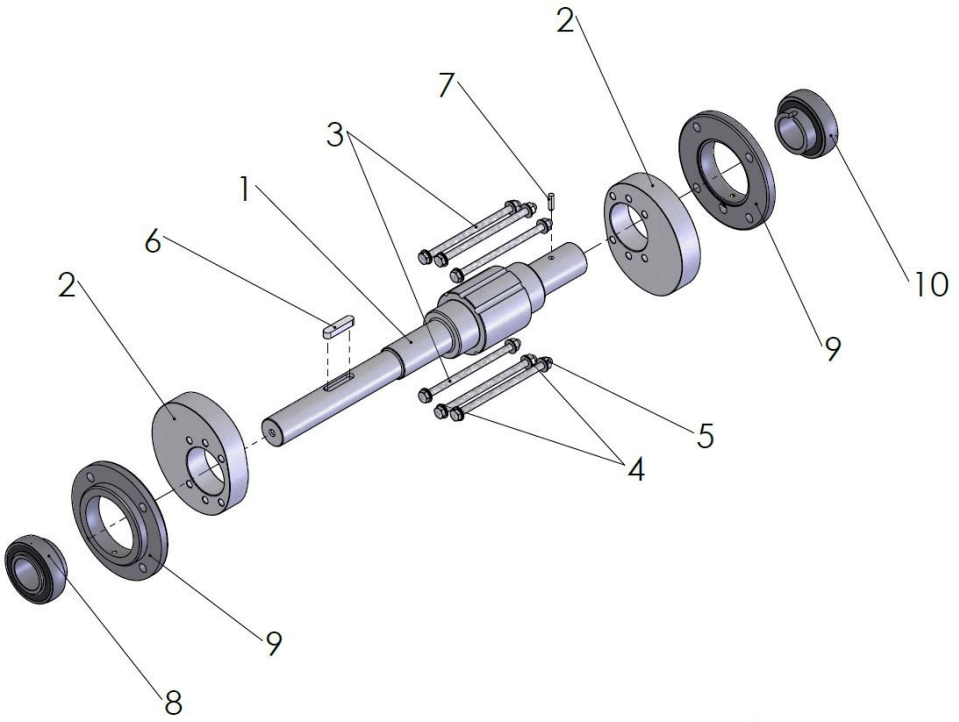


Fig. 12-2: Exploded-view drawing – drive train

12.3 Assembly drawing – pump unit

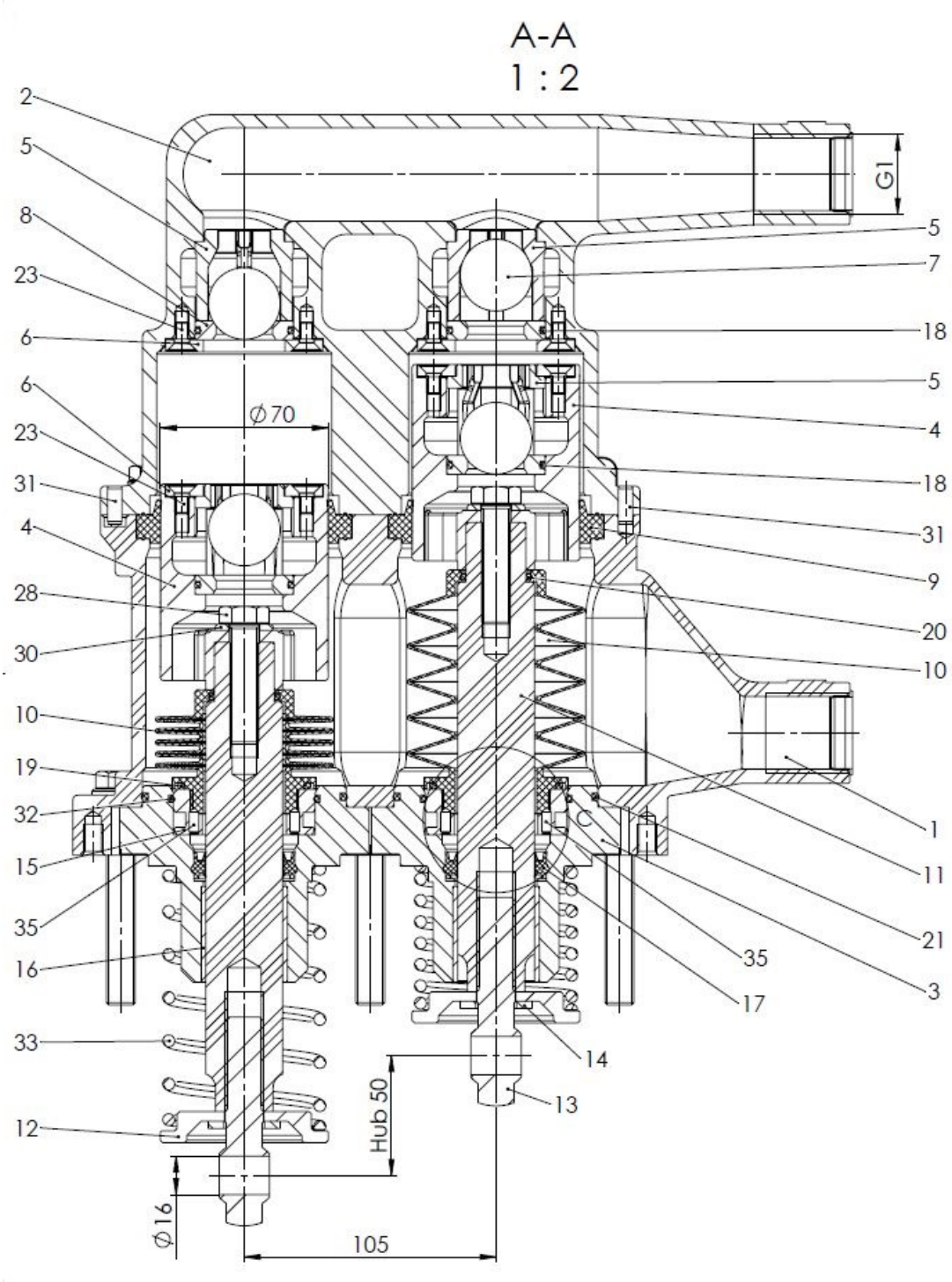


Fig. 12-3: Assembly drawing – pump unit

12.4 Exploded-view drawing – pump unit

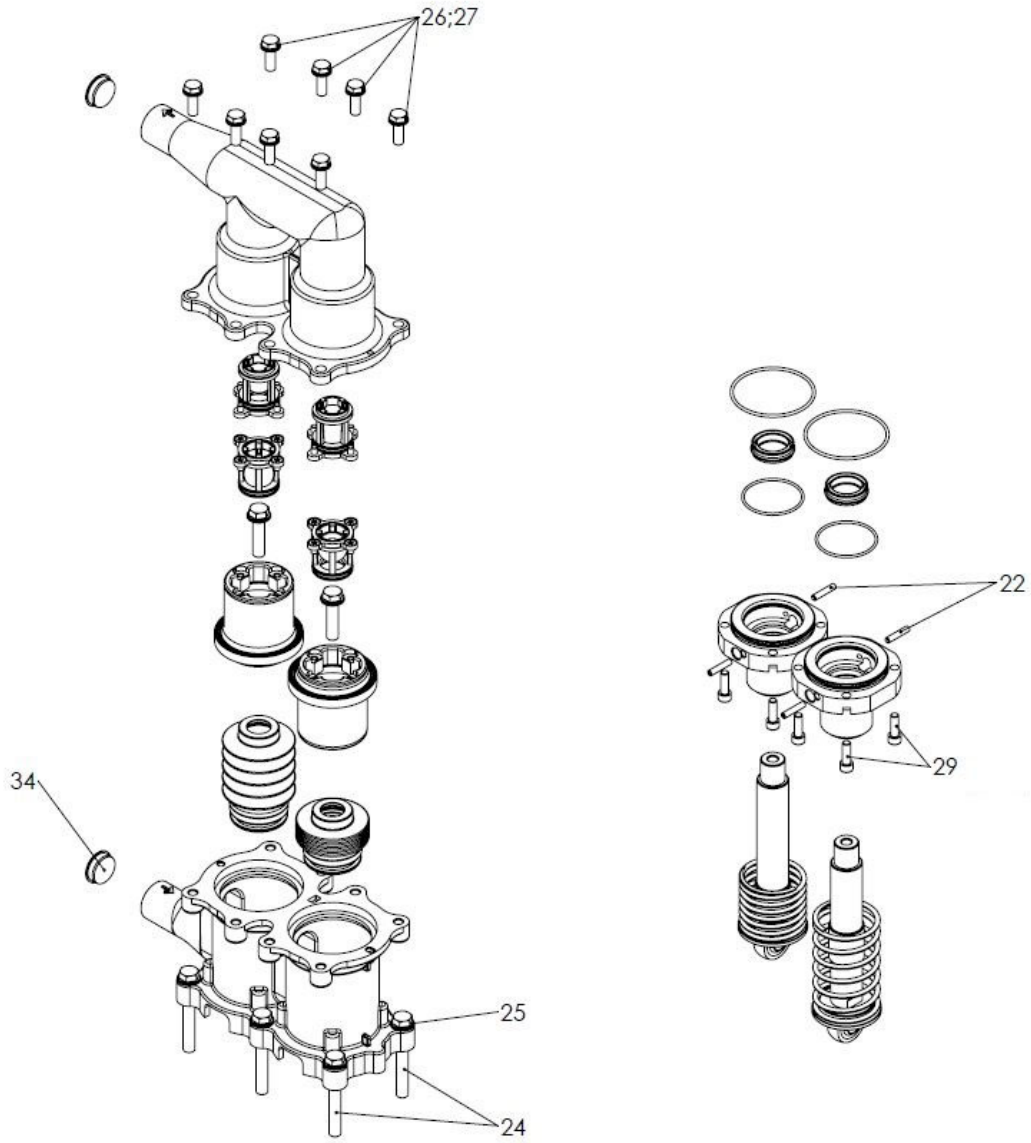
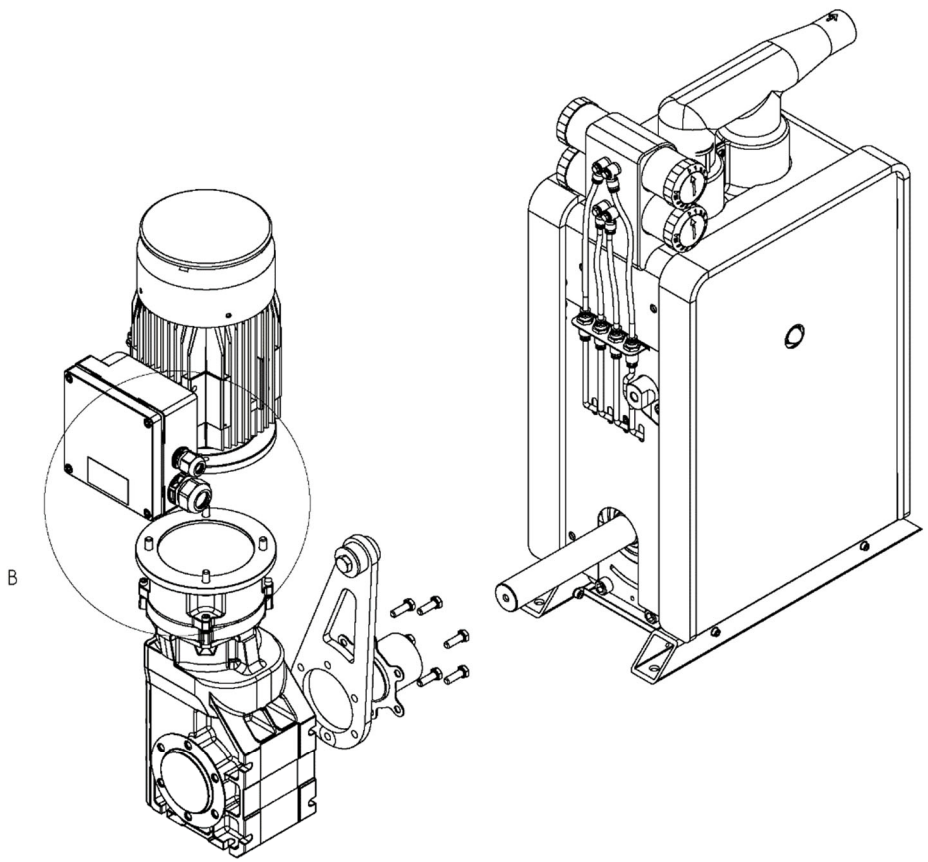
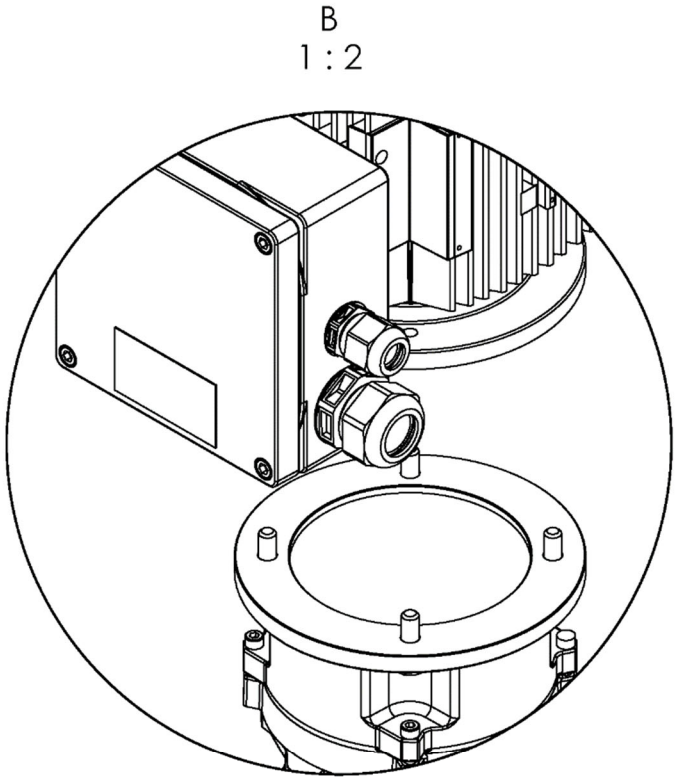


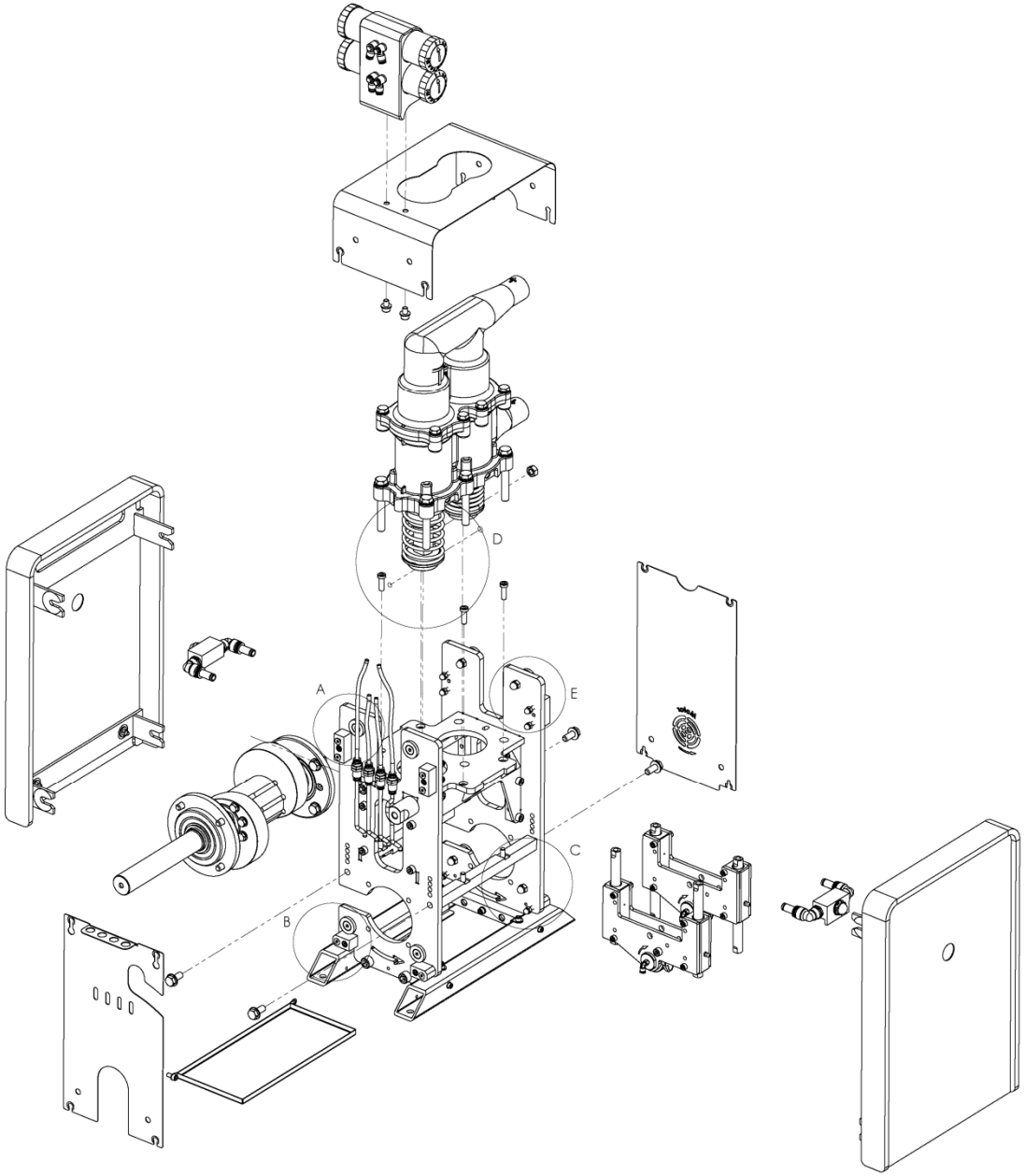
Fig. 12-1: Exploded-view drawing – pump unit

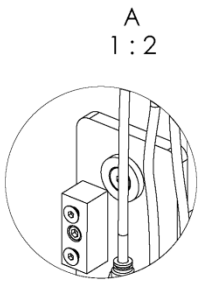
12.5 Exploded-view ColorCare ePCS-20 with motor

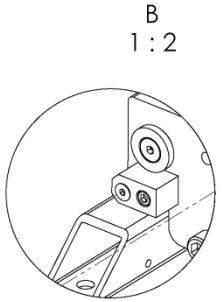


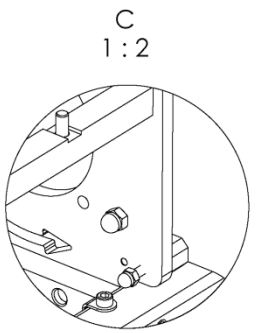


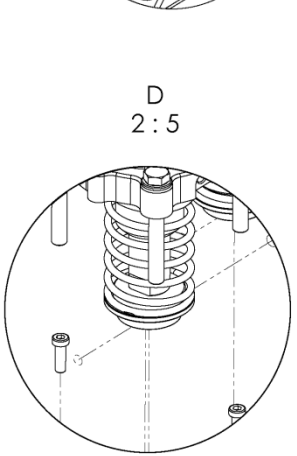
12.6 Exploded-view ColorCare ePCS-20 with& without motor

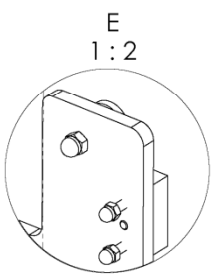












12.7 Manufacturer's instructions for fixation of the tensioning bearing

Tighten the locknut using 2 hook wrenches of type A to DIN 1810; during tightening, the adapter sleeve must be held in place using a second hook wrench, Figure 9. Wrenches for tightening and holding, see table.

! Do not exceed the maximum tightening torque M_A given in the table, otherwise the operating clearance in the bearing will become too small. Driving the locknut up will slightly displace the bearing in an axial direction.

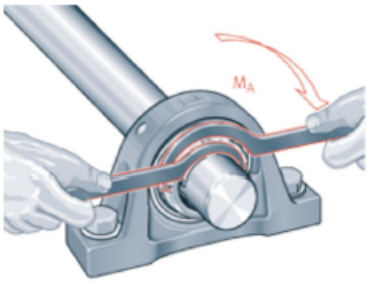


Figure 9
Tightening of locknut

Table 4
Hook wrenches and tightening torques

Shaft diameter	Hook wrench, type A, to DIN 1810		Tightening torque Locknut	
d mm	For tightening locknut	For holding adapter sleeve	$M_{A\ min}$ Nm	$M_{A\ max}$ Nm
20	A 30–32 (HN 4)	A 25–28 (HN 2)	13	17
25	A 40–42 (HN 5)	A 30–32 (HN 3)	22	28
30	A 45–50 (HN 6)	A 34–36 (HN 4)	33	40
35	A 52–55 (HN 7)	A 40–42 (HN 5)	47	56
40	A 58–62 (HN 8)	A 45–50 (HN 6)	70	80
50	A 68–75 (HN 10)	A 52–55 (HN 7)	90	105

Bend the tab on the tab washer into a groove in the locknut to secure the nut against loosening, Figure 10.

! Ensure that the seal in the bearing is not damaged when bending the locking tab over.

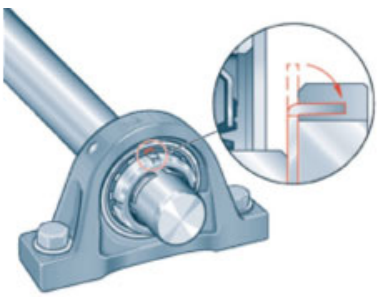


Figure 10
Securing of locknut

Dismantling

Bend back the tab on the tab washer and undo the locknut by a few turns. Place the impact cap in front of the locknut and drive the adapter sleeve off the shaft seat using hammer blows. Unbolt the housing.

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