



EcoPump VPS

Pneumatic Vertical Piston Scoop Pump

Operation manual

MPU00024EN, V02

N24270003, N24270004, N24270005




Information about the document

This document describes the correct handling of the product.

- Read the document prior to every activity.
- Prepare the document for the application.
- Pass on the product only together with the complete documentation.
- Always follow safety instructions, handling instructions and specifications of every kind.
- Illustrations can deviate from the technical construction.

Validity range of the document

This document describes the following product:

N24270003 EcoPump VPS 210 360 SST PU	
N24270004 EcoPump VPS 210 360 SSt PE	
N24270005 EcoPump VPS 210 360 SST PE/PU	

Hotline and Contact

If you have queries or would like technical information, please contact your dealer or sales partner.

TABLE OF CONTENTS

1	Product overview	4	9.3.1	Replace sealing gland.....	16
	1.1 Overview.....	4	9.3.2	Disassemble fluid part and connecting rods.....	18
	1.2 Short description.....	4	9.3.3	Dismantle fluid part.....	19
2	Safety	4	9.3.4	Assemble fluid part.....	24
	2.1 Presentation of Notes.....	4	9.3.5	Assemble fluid part and connecting rods.....	26
	2.2 Intended Use.....	4	10	Faults	27
	2.3 Residual risks.....	5	10.1	Defects table.....	27
	2.4 Property damage.....	5	10.2	Troubleshooting.....	28
	2.5 Conduct in the event of a hazardous situation.....	5	10.2.1	Replace control unit.....	28
	2.6 Staff qualification.....	5	10.2.2	Replace switchover valve.....	29
	2.7 Personal protective equipment.....	6	10.2.3	Replace piston seals.....	31
3	Design and Function	6	11	Disassembly and Disposal	32
	3.1 Control Unit.....	6	11.1	Safety recommendations.....	32
	3.2 Motor.....	7	11.2	Disassembly.....	33
	3.3 Fluid part.....	7	11.3	Disposal	34
4	Transport, scope of supply and storage	8	12	Technical data	35
	4.1 Transport.....	8	12.1	Dimensions and weight.....	35
	4.2 Scope of delivery.....	8	12.2	Connections.....	35
	4.3 Handling of packaging material.....	9	12.3	Operating conditions.....	35
	4.4 Storage.....	9	12.4	Emissions.....	35
5	Assembly	9	12.5	Operating values.....	36
	5.1 Requirements for the Installation point.....	9	12.6	Compressed air quality.....	36
	5.2 Assembly.....	9	12.7	Type plate.....	36
	5.3 Connecting.....	10	12.8	Materials used.....	36
6	Commissioning	10	12.9	Operating and auxiliary materials.....	37
	6.1 Safety recommendations.....	10	12.10	Material specification.....	37
	6.2 Commissioning.....	11	13	Replacement parts, tools and accessories	38
	6.3 Setting operating parameters	12	13.1	Replacement parts.....	38
7	Operation	12	13.1.1	Fluid part.....	38
	7.1 Safety recommendations.....	12	13.1.2	Repair kits.....	43
	7.2 General notes.....	12	13.1.3	Seal sets.....	46
	7.3 Rinsing.....	13	13.2	Tools.....	47
	7.3.1 Safety recommendations.....	13	13.3	Accessories.....	47
	7.3.2 Flush the pump.....	13	13.4	Order.....	48
	7.4 Life cycle of seals.....	13	14	Index	49
8	Cleaning	13			
	8.1 Safety recommendations	13			
	8.2 Cleaning.....	15			
9	Maintenance	15			
	9.1 Safety notes.....	15			
	9.2 Maintenance schedule.....	16			
	9.3 Dismantle and assemble.....	16			

1 Product overview

1.1 Overview

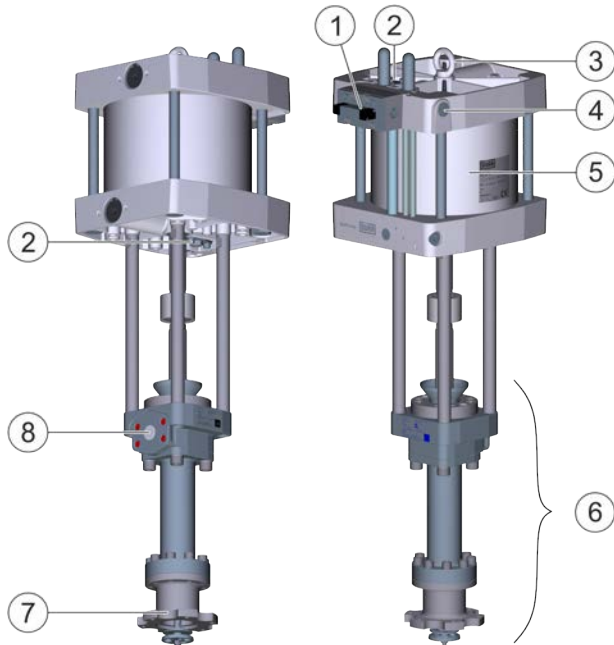


Fig. 1: Assemblies

- 1 Control unit
- 2 Switchover valve
- 3 Transport ring bolt
- 4 Compressed air connection
- 5 Motor
- 6 Fluid part
- 7 Material inlet
- 8 Material outlet

1.2 Short description

The high-pressure piston pump **EcoPump VPS** (in the following “pump”) is a double-acting piston pump. The pump delivers highly viscous, non-flammable, fluid application materials.

2 Safety

2.1 Presentation of Notes

The following notes can appear in this instruction:

⚠ DANGER!

High risk situation that can lead to serious injuries or death.

⚠ WARNING!

Medium risk situation that can lead to serious injuries or death.

⚠ CAUTION!

Low risk situations that can lead to minor injuries.

! NOTICE!

Situations that can lead to material damage.

🌿 ENVIRONMENT!

Situations that can lead to environmental damage.



Additional information and recommendations.

2.2 Intended Use

The pump is a pneumatically operated vertical piston pump.

The pump is intended for delivering highly viscous, non-flammable, fluid application materials.

The pump is intended for integration with a material supply system. To prevent from exceeding the maximum control air pressure of 5 bar, one of the following components is recommended:

- Maintenance unit with regulator element, ensuring the setting of the maximum input pressure.
- Overpressure valve, preventing the motor from being supplied with increased air pressure.

Media-conducting components, which are connected to the pump, must be designed for the maximum operating pressure of the pump. Alternatively, a pneumatic safety valve must be installed.

Operate the pump only in the industrial area and within the approved technical data ↪ 12 “Technical data”.

Misuse

Not using as intended entails danger to life.

Examples of wrong use are:

- Use outdoors
- Installation without mechanical ventilation
- Use of unapproved materials, see safety data sheets
- Use in explosive areas
- Operating an ungrounded pump
- Making conversions or changes on your own
- Use of unsuitable components
- Use of components unapproved by Dürr Systems

2.3 Residual risks

Escaping material

Material leaking under high pressure can penetrate the body. Even if the injury looks like a harmless cut wound, the penetrating material leads to amputation, serious injuries can cause death.

- Do not try to seal leakages using body parts, gloves or towels.
- If there are injuries, seek medical attention immediately.

Before working on the product:

- Purge the system, in which the product is installed.
- Disconnect the system, in which the product is installed, from compressed air and material supply.
- Depressurize the lines.
- Secure the system against being switched on again.

Moving parts:

Serious injuries can result.

Before carrying out any work:

- Disconnect the system with the product from compressed air and material supply and secure the system against being switched on again.

Compressed air

Hoses under pressure can tear or burst. Escaping compressed air can cause serious injury.

- Protect compressed air hoses from heat and sharp edges.
- Wear specified protective equipment.

If hoses under pressure come off loose, the hoses can lash around and cause injuries.

- Check that the hose connections are seated tightly.
- Check compressed air hoses for damage.
- Disconnect the compressed air hoses from the compressed air supply after end of work.
- Depressurize compressed air hoses before carrying out any work.

Noise

Disconnecting pressurized pneumatic lines creates loud noises. This might damage the hearing.

Before carrying out any work:

- Depressurize pneumatic lines. Secure against reconnection.

Danger from harmful or irritant substances

Coming in contact with hazardous substances can result in serious injury or death.

- Follow safety data sheets.
- Wear specified protective equipment.

2.4 Property damage

Replacement Parts

Replacement parts that are not approved by Dürr Systems may not withstand the full operational loads. It can result in property damage and production disruption.

- Use exclusively original replacement parts.

2.5 Conduct in the event of a hazardous situation

Conduct in case of danger depends on the operator's installation situation.

Perform the following activities:

- Close lines.
- Secure against reconnection.
- Depressurize lines.

2.6 Staff qualification



WARNING!

Inadequate qualification

Wrong estimation of dangers can cause serious injury or death.

- Only sufficiently qualified persons may execute all work.
- Some work requires additional qualification. Additional qualifications of specialized personnel are marked with a "+".

This document is intended for qualified personnel in industry and craftsmanship.

Cleaning staff

The cleaning staff receives regular instructions from the operator about the following contents:

- Using the product
- Handling cleaning tools
- Handling cleaning agents
- Technical Measures for occupational safety and health

Electrician

Electricians assemble, install, service and repair electrical systems in a professional manner.

Furthermore, electrical engineers have the following knowledge:

- Guidelines, Standards and Rules of Engineering
- Local conditions
- Electrical Systems and Their Loading Limits
- Technical Measures for occupational safety and health

Mechanic

The mechanic is trained specifically for the field of work in which he works.

Furthermore, he has the following knowledge:

- Guidelines, Standards and Rules of Engineering
- Local conditions
- Technical Measures for occupational safety and health

The mechanic is responsible for the following activities on equipment and components:

- Assembly
- Waiting
- Maintenance
- Disassembly

+ Additional qualification high pressure

In addition, the mechanic has knowledge of regulations and safety measures for high pressure systems > 20 bar.

+ additional qualification explosion protection

In addition to the knowledge of the various specialist fields, the mechanic has knowledge of regulations and safety measures when working in potentially explosive areas.

Dürr Systems offers special product training for ↗ "Hotline and Contact".

2.7 Personal protective equipment

Wear the required personal protective equipment when working. Provide the following personal protective equipment:



Anti-Static Safety Boots

Protect feet from crushing, falling items and slipping on slippery ground.

Moreover, anti-static safety boots reduce electrostatic charge by discharging the electrostatic charges.



Face protection

Protect the face from dust, paint drops and particles flying around, such as chips and slivers.



Protective gloves

Protect the hands from:

- mechanical forces
- Thermal forces
- Chemical effects



Protective workwear

Tight fitting workwear with low tear strength, tight sleeves and no hanging parts.



Respirator mask

Protects from hazardous gases, vapors, dust and similar materials and media.



Safety boots

Protect feet from crushing, falling items and slipping.



Use ear protection

Protects from auditory damage due to noise.

3 Design and Function

3.1 Control Unit



Fig. 2: Control Unit operation

Air reaches into the distributor block of the control unit (1) via the compressed air connection (3). A valve in the distributor block controls the air intake to the motor.

The air outlet is through the two sound mufflers (2).

3.2 Motor

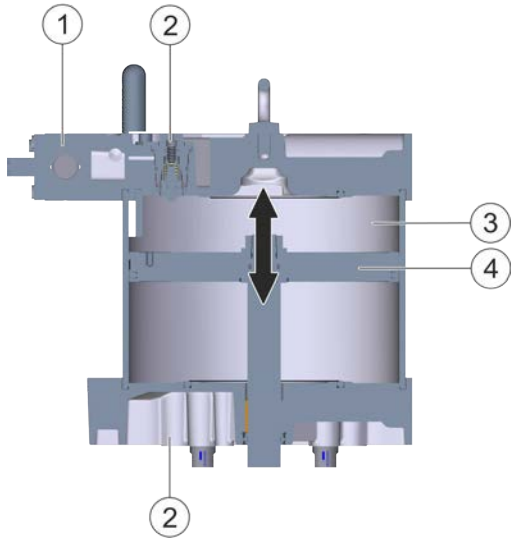


Fig. 3: Motor operation

The pneumatically operated motor drives the pump. The piston (4) of the motor divides the cylinder (3) into two air chambers. Compressed air moves the piston (4) to and fro in the cylinder (3). When the piston reaches one end of the cylinder, the piston switches the switchover valve (2). The switchover valve (2) causes the control unit (1) to change the supply of motor air from one side of the piston to the other. The piston moves in the opposite direction.

3.3 Fluid part

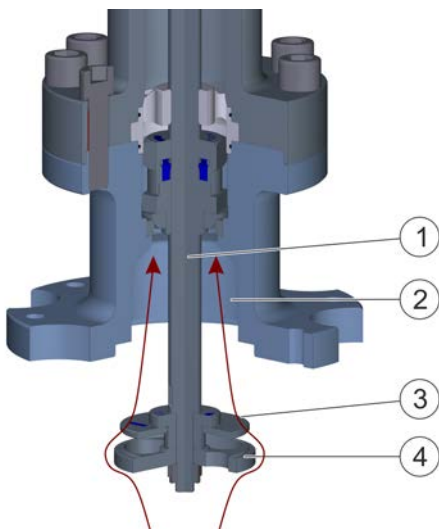


Fig. 4: Plate valve downward stroke

The motor presses the piston rod (1) down. The perforated piston disc (4) dips into the material and opens the valve disc (3). The material flows into the piston chamber (2).

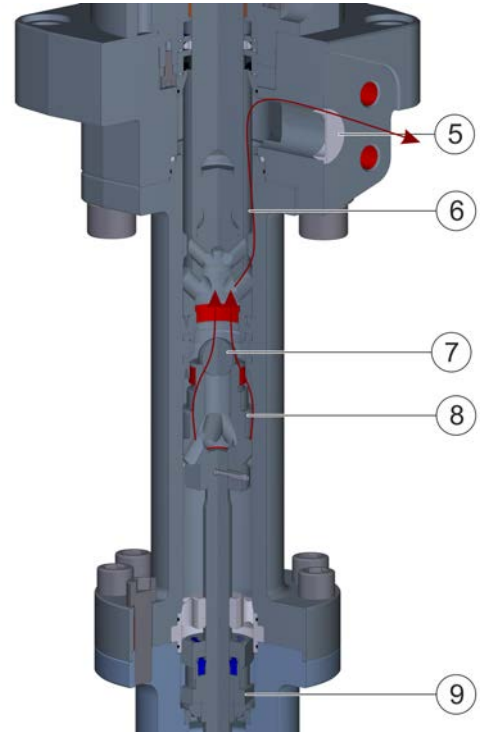


Fig. 5: Ball valve upward stroke

The poppet valve (9) closes. The lower ram $\varnothing 45$ (8) pushes the material upwards through the ball valve (7). Due to the larger piston rod (6), the upper piston chamber has less volume than the lower piston chamber. The superfluous material is therefore pushed through the material outlet (5) into the line.

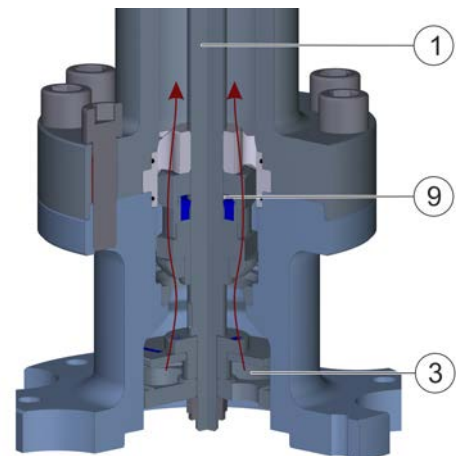


Fig. 6: Plate valve upward stroke

During the upward stroke of the piston rod (1), the valve disc (3) closes and the plate-shaped valve pushes the material through the open poppet valve (9) in the lower piston chamber.

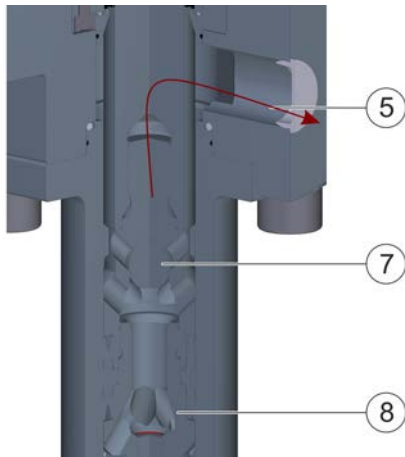


Fig. 7: Ball valve upward stroke

The lower ram \varnothing 45 (8) pushes the material out of the upper piston chamber. The ball valve (7) is closed during this step. The superfluous material flows through the material outlet (5) into the line.

4 Transport, scope of supply and storage

4.1 Transport

WARNING!

Raising heavy loads

Raising heavy loads without suitable hoist and stopper material can cause major injuries.

- Transport heavy loads only by using suitable hoists and stoppers.

WARNING!

Hovering load

Hovering loads can fall down and cause serious injuries or death.

- Do not enter the area below hovering loads.
- Wear specified protective equipment.
- Only use approved hoists and stoppers.
- Ensure that the hoists and stoppers have adequate bearing capacity.

! NOTICE!

Incorrect Transport

Improper transportation of the pump may cause the agitator the pump to fall and suffer damage.

- Protect Pump from moisture.
- Protect Pump from vibrations.
- Use transport locks (e. g. against slipping).

i Permissible ambient temperature during the transportation for a few hours:
-30°C to 60°C

Requirements:

- Pump has been disassembled ↪ 11.2 “Disassembly”.

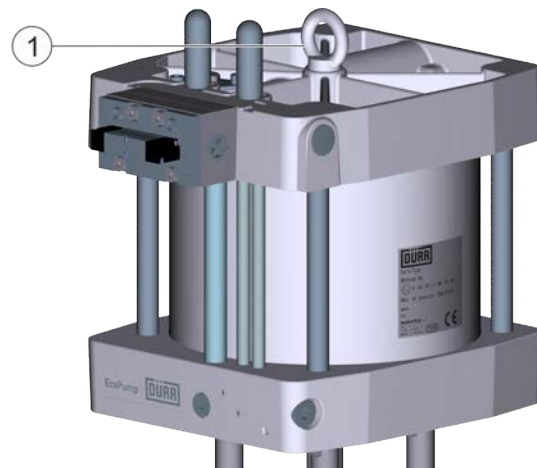


Fig. 8: Transport ring bolt

1. Fix stoppers on the eye bolts (1).
2. Transport pump using a hoist.

4.2 Scope of delivery

The scope of supply only includes the pump.

Personnel:

- Mechanic

Protective equipment:

- Protective gloves
- Protective workwear
- Anti-Static Safety Boots

1. Check the pump for integrity on receiving it.
2. Report defects immediately ↪ “Hotline and Contact”.

4.3 Handling of packaging material

ENVIRONMENT!

Incorrect disposal

Incorrectly disposed packaging material can damage environment.

- Dispose of material no longer required in an environment-friendly manner.
- Observe local disposal specifications.

4.4 Storage

Requirements for the warehouse:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose to aggressive media.
- Protect from solar radiation.
- Avoid mechanical vibrations.
- Close all openings when storing after disassembly.
- Temperature: 10°C to 40°C
- Relative humidity: 35% to 90%

5 Assembly

5.1 Requirements for the Installation point.

- Control air supply and the material feed must be paused and secured against reconnection.
- Lines, seals and screw connections must be designed to conform to the requirements of the pump ↪ 12.5 “Operating values”.
- The pump must be protected from atmospheric influences at the installation point.
- The integration of the pump with a material supply system requires the maintenance unit to be equipped with a regulator element or an overpressure valve.
- The pump must be integrated into a closed process.
- The pump must be installed in an area with forced ventilation.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

5.2 Assembly

Assembling the pump

Personnel:

- Mechanic

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves

- Safety boots

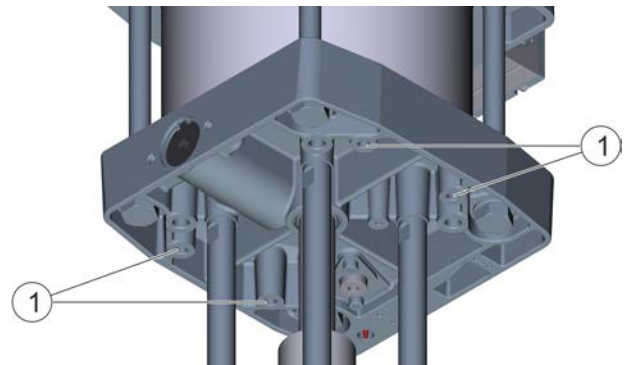


Fig. 9: Assembling the Pump

1. Mount pump on a suitable stand. Use bores (1) for fastening. Ensure a stable and low-vibration installation.

Install compressed air connection

The pump is supplied with disassembled compressed air connection.

Personnel:

- Mechanic

Protective equipment:

- Protective workwear
- Protective gloves
- Safety boots

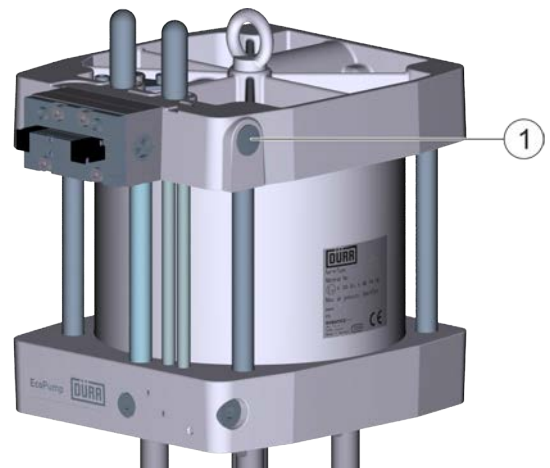


Fig. 10: Install compressed air connection

1. Screw compressed air connection (1) into the control unit and tighten by hand.

5.3 Connecting

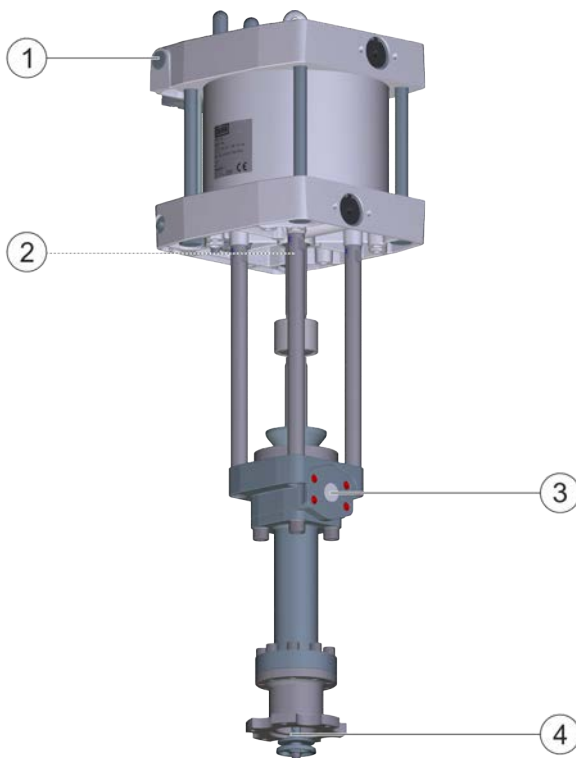


Fig. 11: Connecting the Pump

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

1. Grease all O-rings and threads of the pipelines.
2. Connect material inlet (4).
3. Screw high pressure hose onto the material outlet (3) using fitting SAE flange layout and four screws.
4. Connect control air hose to the compressed air connection (1).

Grounding the Pump

Movement of the piston and of the flowing material create the charge. The charge can only flow if the piston pump is grounded with all components. Connection of the suction pipe and pressure pipe are not sufficient for grounding.

Personnel:

- Electrician
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

1. Connect the grounding cable to the grounding hole (2).
2. Connect the other end of the grounding cable to a secure current conductor.
3. Measure volume resistivity.

6 Commissioning

6.1 Safety recommendations

⚠ WARNING!

Risk of injury due to noise

The sound pressure level during commissioning may cause severe hearing damage.

- Wear ear protection.
- Put the pump only with assembled sound muffler into operation.

⚠ WARNING!

Material escaping under pressure

Material leaking under high pressure can penetrate the body. Even if the injury looks like a harmless cut wound, the penetrating material leads to amputation, serious injuries can cause death.

- Do not try to seal leakages using body parts, gloves or towels.
- If there are injuries, seek medical attention immediately.

Before working on the product:

- Disconnect the system, in which the product is installed, from compressed air and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

 **WARNING!**
Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Pump Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

 **WARNING!**
Risk of injury from whipping hoses

If hoses under pressure come off loose, the hoses can lash around and cause injuries.

- Check that the hose connections are seated tightly.
- Check hoses for damage.

 **WARNING!**
Danger due to escaping compressed air

Compressed air escaping from the sound muffler can contain solid or liquid particles. Particles under pressure can injure the eyes or the skin.

- Wear specified protective equipment.

 **WARNING!**
Moving parts

The components on the material inlet and material outlet are moving. It may cause injuries of fingers, hands or arms.

- Keep fingers, hands and arms away from the material inlet and material outlet.

 **WARNING!**
Hot surfaces


The pump may become extremely hot during operation. Touching the surfaces shortly after operation may cause injuries.

- Wear protective hand gloves.
- Do not touch the pump during operation.
- Switch off the pump prior to maintenance and cleaning work. Let the pump cool down to room temperature.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

 **WARNING!**
Frostbite

The pneumatic drive unit can cool down significantly. Contact with it can result in frostbite.

- Wear protective hand gloves.
- Before conducting any maintenance and cleaning work, ensure that the pneumatic drive unit has room temperature.

 The operator must ensure that connected pipe-lines or hose lines are tested according to the specifications in force (e.g. pressure test).

6.2 Commissioning**Checks Before Commissioning**

- Pump is grounded.
- The pump is assembled ↪ 5 “Assembly”.

Put pump into operation


Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

1. Purge pump before the initial commissioning ↪ 7.3 “Rinsing”.

 Residues of the testing media might still be in the pump.

2. Ensure that there is no air in the pump.
 - Let the pump run with the minimum cycle rate.
3. During this time, check the tightness of the pump, connections and lines.
4. Watch out for unusual noises. Carry out checks if there are unusual noises ↪ 7.2 “General notes”.

6.3 Setting operating parameters

Personnel:

- Mechanic

Protective equipment:

- Protective workwear
- Protective gloves
- Safety boots

1. Set the operating parameters on the higher level control.
2. Check operating parameters ↪ 12.5 “Operating values”.

7 Operation

7.1 Safety recommendations

WARNING!

Risk of injury due to noise

The sound pressure level during normal operation may cause severe hearing damage.

- Wear ear protection.
- Do not spend more time than necessary in the work area.

WARNING!

Crushing hazard due to coupling sleeve

The piston rod moves. It may cause injuries of fingers, hands or arms.

When working on the pump unit:

- Wear protective gloves when moving the piston rod.
- Keep fingers, hands and arms away from the piston rod.
- Do not reach in between the opened coupling.

WARNING!

Moving parts

The components on the material inlet and material outlet are moving. It may cause injuries of fingers, hands or arms.

- Keep fingers, hands and arms away from the material inlet and material outlet.

WARNING!

Hot surfaces

The pump may become extremely hot during operation. Touching the surfaces shortly after operation may cause injuries.

- Wear protective hand gloves.
- Do not touch the pump during operation.
- Switch off the pump prior to maintenance and cleaning work. Let the pump cool down to room temperature.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

WARNING!

Frostbite

The pneumatic drive unit can cool down significantly. Contact with it can result in frostbite.

- Wear protective hand gloves.
- Before conducting any maintenance and cleaning work, ensure that the pneumatic drive unit has room temperature.

7.2 General notes

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Use ear protection
- Protective gloves
- Protective workwear
- Safety boots

Check for unusual noises during operation. Perform visual inspections:

- Check tightness of the connections.
- If there are conspicuous noises, carry out further checks during down times.
- Check for steady delivery pressure.
- In the event of clogging or other faults, switch off the pump. Remedy the malfunction.
- Depressurize the pump during longer breaks in operation.
- Operate the pump only if a load (e.g. application unit) is connected.

If the pump is not in operating mode, the number of cycle of the pump can drop down to the minimum flow velocity of the medium.

- This reduces pump wear and operating costs.

7.3 Rinsing

7.3.1 Safety recommendations

! NOTICE!

Material damage due to unsuitable rinsing agent

If the rinsing agent reacts chemically with the components or the material, components get damaged.

- Use only the rinsing agents that are compatible with the components and the material.
- Refer to safety data sheet of material manufacturer.

7.3.2 Flush the pump.

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Use ear protection
- Protective workwear
- Protective gloves
- Safety boots

Complete the following steps if the pump is not in operation for a longish period:

- Purge pump with a suitable detergent ↪ 12.9 “Operating and auxiliary materials”.
- Disconnect compressed air supply to pump.

7.4 Life cycle of seals

The pump is equipped with seals. The life cycle of the seals depends on the following parameters:

- Conveyed medium
- Wear properties
- Process parameters:
 - Media temperature and pressure
 - Operating mode
 - Environmental influences
- Depending on use case

Adhesions

If during operation the medium is conveyed via the pump, adhesions may occur. The adhesions occur above the sealing gland on the piston rod.

The adhesions are caused by the type of the adhesives used. Adhesions are not a leakage.

The function of the pump is not impaired as the funnel captures the adhesions.

Adhesions develop to a lesser extent during continuous operation than during operation with frequent breaks.

Leakage

Adhesions may become more intense due to sealing wear. A leakage is present if the funnel fills within a few days of operation. Dürr Systems recommends replacing the sealing gland ↪ 9.3.1 “Replace sealing gland”. Maintenance can be conducted at a point in time that can be scheduled and is suitable ↪ 9.2 “Maintenance schedule”.

8 Cleaning

8.1 Safety recommendations

WARNING!

Danger of fire and explosion

Flammable coating materials and their detergents and cleaning agents can cause a fire or an explosion.

- Ensure that the flashpoint of the fluid is at least 15K above the ambient temperature.
- Only electrically conductive containers may be used for the cleaning fluid. Containers must be grounded.
- Note explosion group of the fluid.
- Follow the safety data sheet.
- Ensure that forced ventilation and fire protection equipment are in operation.
- Do not use sources of ignition and open light.
- Do not smoke.
- Ground Pump.

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Pump Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Material escaping under pressure

Material leaking under high pressure can penetrate the body. Even if the injury looks like a harmless cut wound, the penetrating material leads to amputation, serious injuries can cause death.

- Do not try to seal leakages using body parts, gloves or towels.
- If there are injuries, seek medical attention immediately.

Before working on the product:

- Disconnect the system, in which the product is installed, from compressed air and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

WARNING!

Hot surfaces

The pump may become extremely hot during operation. Touching the surfaces shortly after operation may cause injuries.

- Wear protective hand gloves.
- Do not touch the pump during operation.
- Switch off the pump prior to maintenance and cleaning work. Let the pump cool down to room temperature.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

WARNING!

Frostbite

The pneumatic drive unit can cool down significantly. Contact with it can result in frostbite.

- Wear protective hand gloves.
- Before conducting any maintenance and cleaning work, ensure that the pneumatic drive unit has room temperature.

NOTICE!

Unsuitable cleaning agents

Unsuitable detergents can cause material damage.

- Only use cleaning agents approved by the material manufacturer.
- Follow safety data sheets.

NOTICE!

Damage to the hoses and electrical cables

Hoses and electrical cables may become damaged during longer exposure times. It can result in property damage and production disruptions.

Ensure that no cleaning agent has entered the protective sleeves of the hoses and electrical cables. This applies as well to hoses and cables marked as "solvent resistant".

NOTICE!

Unsuitable Cleaning Tools

Unsuitable cleaning tools can cause damage.

- Only use cloths, soft brushes and paintbrushes.
- Do not use abrasive cleaning tools.
- Do not use compressed air for cleaning.
- Do not use any thinner spray guns.
- Do not use high pressure for cleaning agents.

8.2 Cleaning

Make sure that the Pump is completely free of media residues and other contamination.

Personnel:

- Cleaning staff
- + Additional qualification high pressure

Protective equipment:

- Protective gloves
- Safety boots
- Protective workwear
- Face protection
- Respirator mask

1. Clean pump carefully. Dry with a soft cloth.

9 Maintenance

9.1 Safety notes

WARNING!

Unsuitable replacement parts

Replacement parts of third-party suppliers may possibly not be able to hold the loads. Serious injury and death could be the consequence.

- Use exclusively original replacement parts.

WARNING!

Material escaping under pressure

Material leaking under high pressure can penetrate the body. Even if the injury looks like a harmless cut wound, the penetrating material leads to amputation, serious injuries can cause death.

- Do not try to seal leakages using body parts, gloves or towels.
- If there are injuries, seek medical attention immediately.

Before working on the product:

- Disconnect the system, in which the product is installed, from compressed air and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Pump Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Crushing hazard due to coupling sleeve

The piston rod moves. It may cause injuries of fingers, hands or arms.

When working on the pump unit:

- Wear protective gloves when moving the piston rod.
- Keep fingers, hands and arms away from the piston rod.
- Do not reach in between the opened coupling.

WARNING!

Hot surfaces

The pump may become extremely hot during operation. Touching the surfaces shortly after operation may cause injuries.

- Wear protective hand gloves.
- Do not touch the pump during operation.
- Switch off the pump prior to maintenance and cleaning work. Let the pump cool down to room temperature.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

WARNING!

Frostbite

The pneumatic drive unit can cool down significantly. Contact with it can result in frostbite.

- Wear protective hand gloves.
- Before conducting any maintenance and cleaning work, ensure that the pneumatic drive unit has room temperature.

9.2 Maintenance schedule

If a maintenance assistant is used in the system visualizer, the maintenance intervals of the maintenance assistant are valid.

The life cycle and the associated maintenance intervals depend heavily on the abrasiveness and temperature of the material to be pumped as well as the pumping pressure and twice the number of strokes of the pump. The present details are guide values and must be suitably adjusted according to the application.

Interval	Maintenance work
daily	Test the tightness and condition of the connections, hoses and lines.
	Check tightness and state of the pump.
	Check tightness and state of the sealing gland ↪ 7.4 “Life cycle of seals”. If necessary, replace ↪ 9.3.1 “Replace sealing gland”.
weekly	Check noise generation in the pump.
	Check for steady delivery pressure.
annually or after 10 mil. cycles	Check ball valve. Replace worn out parts: <ul style="list-style-type: none"> ↪ 9.3.3 “Dismantle fluid part.” ↪ 9.3.4 “Assemble fluid part.”
	Check cylinder. Replace worn out parts: <ul style="list-style-type: none"> ↪ 9.3.3 “Dismantle fluid part.” ↪ 9.3.4 “Assemble fluid part.”
	Check piston rod. Replace worn out parts: <ul style="list-style-type: none"> ↪ 9.3.3 “Dismantle fluid part.” ↪ 9.3.4 “Assemble fluid part.”

9.3 Dismantle and assemble

9.3.1 Replace sealing gland

WARNING!

Unexpected motor start

If the pump is connected to the compressed air supply, the motor may start unexpectedly. This may cause a crushing hazard when reaching between piston rods as well as injuries due to parts flying around.

- Move motor piston to the uppermost position. Disconnect pump from the compressed air supply.
- Remove funnel only if the pump has been disconnected from the compressed air supply.

The sealing gland can be replaced without completely disassembling the pump.

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The pump is connected to the compressed air supply.

WARNING!

Crushing hazard when reaching between the moving piston rod and the coupling sleeve

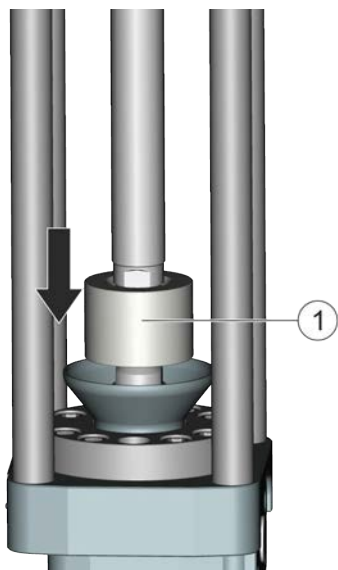


Fig. 12: Pump in lowermost position

1. Move pump in lowermost position.
2. Disassemble coupling (1) ↪ 9.3.2 “Disassemble fluid part and connecting rods.”.

Open control air only impulse by impulse as the motor works without counter pressure.

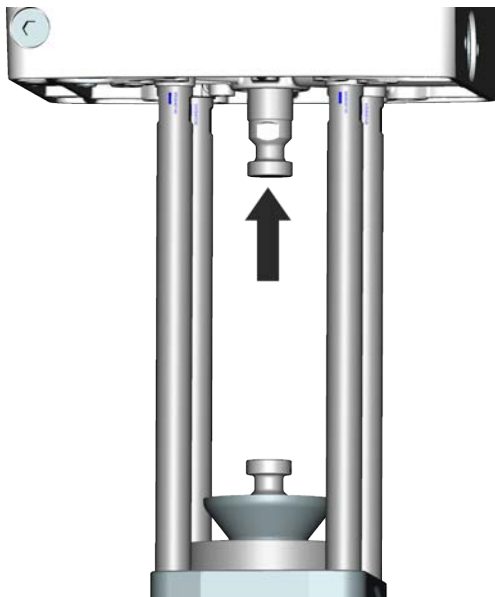


Fig. 13: Motor piston in uppermost position

3. Move motor piston in uppermost position.
4. Disconnect pump from the compressed air supply.

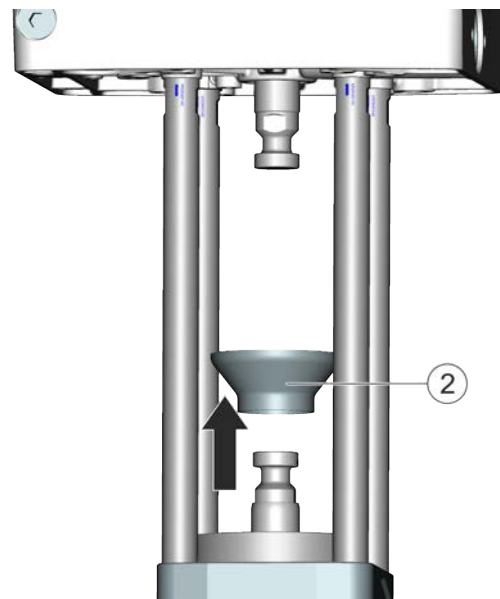


Fig. 14: Remove funnel

5. Pull funnel (2) upwards and remove it.

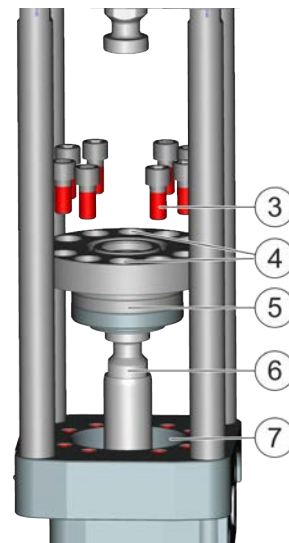


Fig. 15: Removing sealing glands

6. Loosen and remove screws (3).
7. Screw two screws into the pressure test bores (4). Pressure test sealing gland (5) by uniformly tightening it.
8. Push sealing gland (5) upwards from the piston rod (6).

9. Clean drain housing (7).
10. Dismantle sealing gland ↪ 9.3.3 “Dismantle fluid part.”.

The assembly of the sealing gland is in reverse order of disassembly.

9.3.2 Disassemble fluid part and connecting rods.

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The pump is disassembled ↪ 11.2 “Disassembly”.

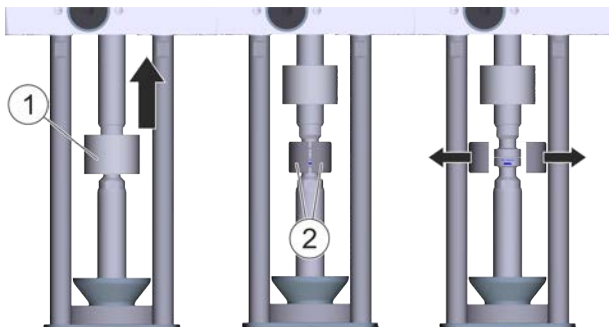


Fig. 16: Disassembling Coupling

1. Push coupling sleeve (1) upwards.
2. Remove half shells (2)
3. Secure fluid part against falling down.

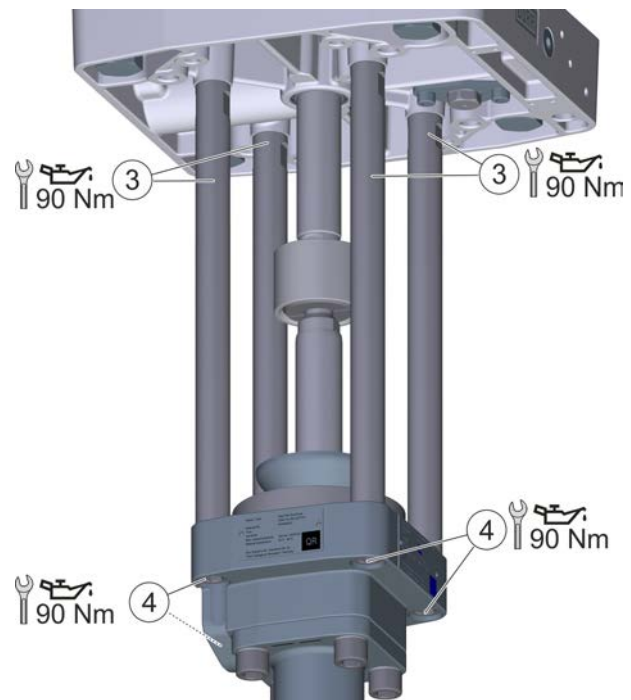


Fig. 17: Disassemble fluid part and connecting rods.

Molykote TP-42 Paste

4. Thread off four screws (4).
⇒ Fluid part is disassembled.
5. Unscrew four connecting rods (3) on key surfaces.

9.3.3 Dismantle fluid part.

Sealing bush

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The coupling is removed. The piston rod is disconnected from the drive and the fluid part ↪ 9.3.2 "Disassemble fluid part and connecting rods."

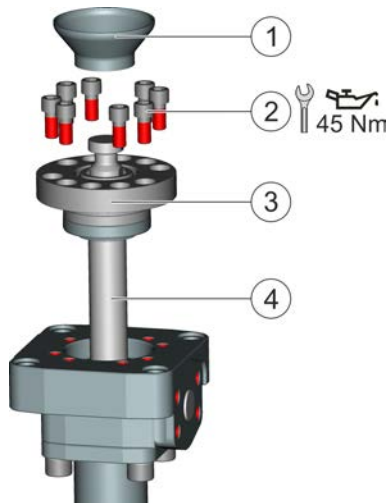


Fig. 18: Disassembly sealing gland

Molykote TP-42

1. Loosen and remove funnel (1).
2. Loosen and remove screws (2).
3. Screw two screws (2) into the pressure test bores. Pressure test sealing gland (3) by uniformly tightening it.
4. Push sealing gland (3) upwards from the piston rod (4).

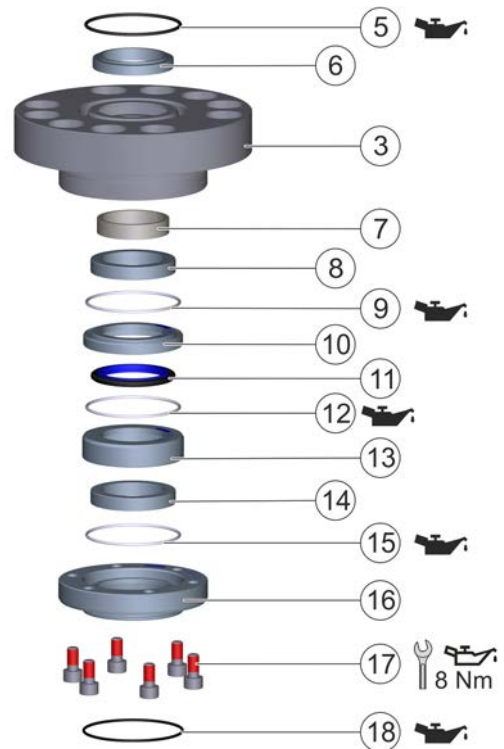


Fig. 19: Dismantle sealing gland N24270003

Molykote TP-42

Klüber Syntheso GLEP 1

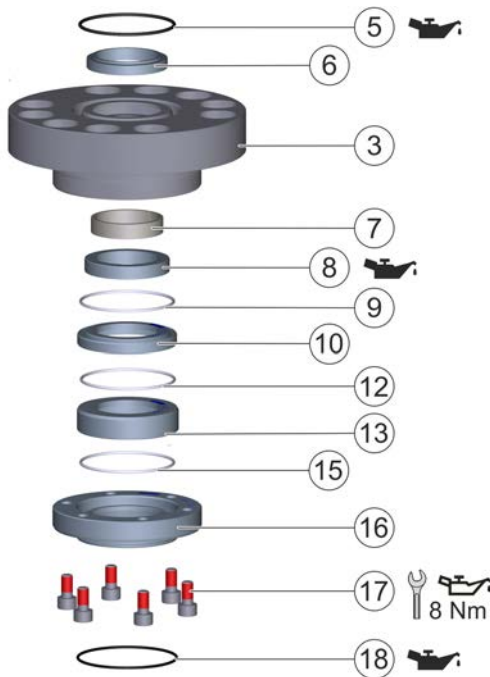


Fig. 20: Dismantle sealing gland N24270004

Molykote TP-42
 Klüber Syntheso GLEP 1

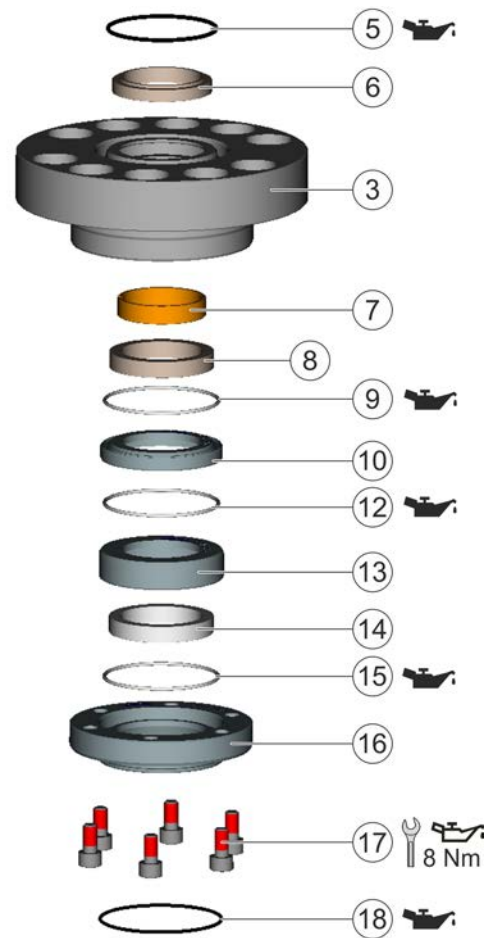


Fig. 21: Dismantle sealing gland N24270005

Molykote TP-42
 Klüber Syntheso GLEP 1

5. Remove O-ring (5) from the sealing gland (3).
6. Remove stripper (6) out of the sealing gland (3).
7. Remove O-ring (7) from the spacer (16).
8. Loosen and remove screws (17).
9. Remove spacer (16) out of the sealing gland (3).
10. Remove O-ring (15) out of the sealing gland (13).
11. Remove gland (13) out of the sealing gland (3).
12. Only N24270003, N24270005: Remove lip seal (14) out of the sealing gland (13).
13. Remove spacer (10) out of the sealing gland (3).
14. Only N24270003: Remove slip ring (11) out of the sealing gland (10).

15. Remove O-rings (9, 12) out of the sealing gland (10).
16. Remove lip seal (8) out of the sealing gland (3).
17. Remove guide belt (7) out of the sealing gland (3).

Inlet housing

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

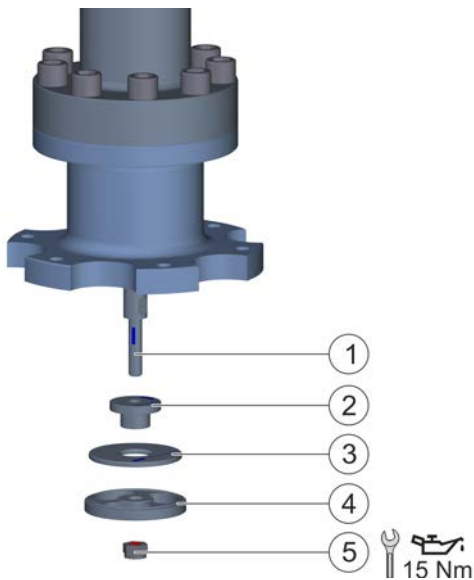


Fig. 22: Dismantle material inlet

1. Unscrew nut (5) from the piston rod (1).
2. Push perforated disc (4) from the piston rod (1).
3. Push cover disk (3) from the guide gland (2).
4. Push guide gland (2) from the piston rod (1).

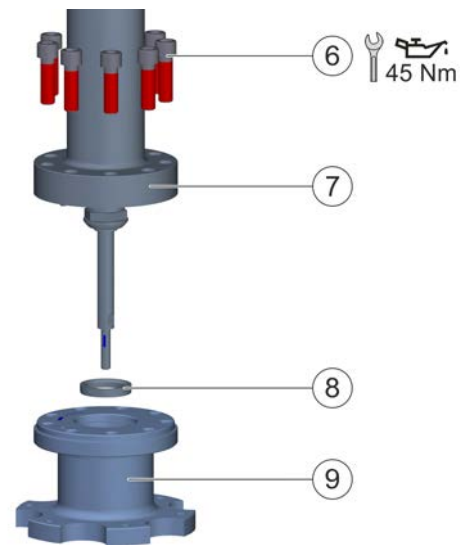


Fig. 23: Disassemble inlet housing

5. Loosen and remove screws (6).
6. Remove inlet housing (9) from the cylinder housing (7).
7. Disassemble the valve seat (8) pressed into the inlet housing (9) by using assembly tools and a hand lever press.

Piston rod

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The inlet housing is disassembled.

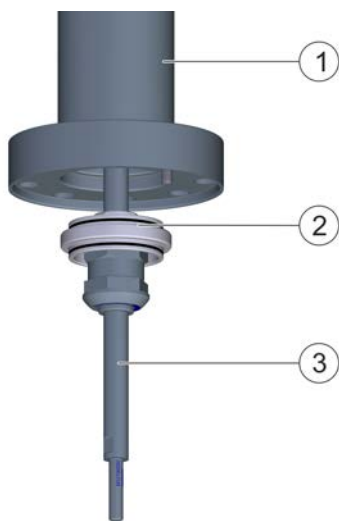


Fig. 24: Disassemble piston rod

1. Pull entire piston rod (3) out of the cylinder housing (1). During this, remove perforated disc (2) from its seat in the cylinder housing (1).

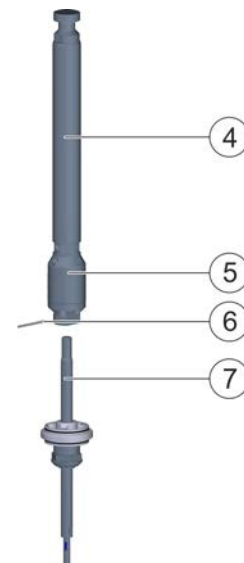


Fig. 25: Unlock piston rod

2. Unlock upper and lower piston rod (4, 7). For this, unbent the ends of the split pin (6). Remove split pin (6).
3. Unscrew lower piston rod (7) from the piston (5).

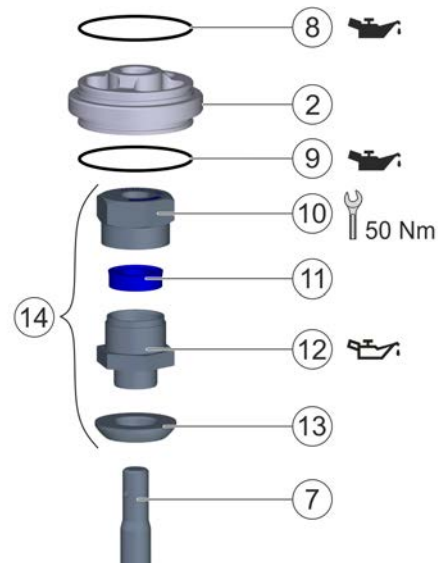


Fig. 26: Dismantle lower piston rod

Molykote TP-42

Klüber Syntheso GLEP 1

4. Push perforated disc (2) from the lower piston rod (7).
5. Push bundle slider (14) from the lower piston rod (7).

6. Remove O-rings (8, 9) out of the perforated disc (2).
7. Push valve disc (13) from the sealing gland (12).
8. Unscrew cap nut (10) from the sealing gland (12).
9. Remove lip seal (11) out of the sealing gland (12).
⇒ The bundle slider (14) is disassembled.

10. Unscrew piston (5) from the piston seal inlet (15).
11. Unwrap guide belt (20) from the guide gland (19).
12. Remove ball (17) from the ball seat of the piston (5).
13. Push guide gland (19) from the piston (5).
14. Only N2427004: Push spacer ring (21) from the piston (5).
15. Push lip seal (22) from the piston (5).
16. Only N2427004: Push spacer ring (18) from the piston seal inlet (15).
17. Push lip seal (16) from the piston seal inlet (15).

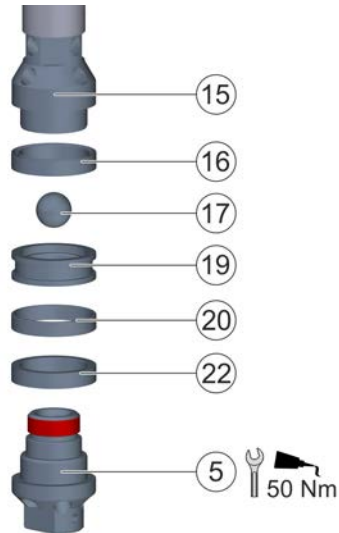


Fig. 27: Dismantle upper piston rod N24270003, N24270005

▲ Loctite 222

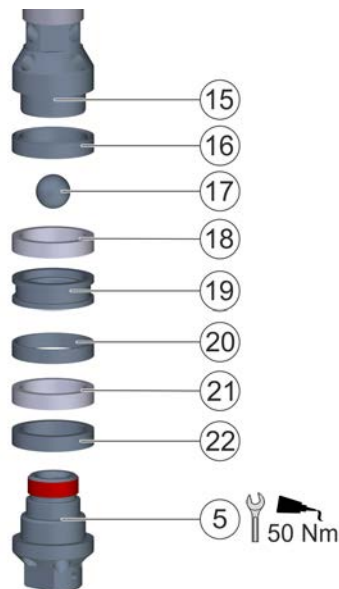


Fig. 28: Dismantle upper piston rod N24270004

▲ Loctite 222

Outlet housing

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

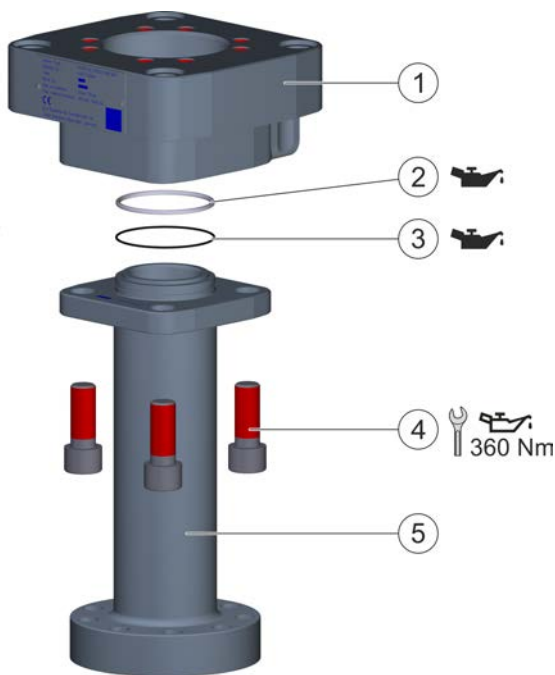


Fig. 29: Disassemble outlet housing

Molykote TP-42

Klüber Syntheso GLEP 1

1. Loosen and remove screws (4).
2. Remove outlet housing (1) from the cylinder housing (5).
3. Remove O-ring (2) from the cylinder housing (5).
4. Remove O-ring (3) from the cylinder housing (5).

9.3.4 Assemble fluid part.

The position numbers relate to the sections in chapter ↪ 9.3.3 “Dismantle fluid part.”.

Outlet housing

Personnel:

- Mechanic

- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The outlet housing is dismantled ↪ 9.3.3 “Dismantle fluid part.”.

1. Lightly grease O-ring (3). Pull onto the cylinder housing (6).
2. Lightly grease O-ring (2). Pull onto the cylinder housing (6).
3. Place outlet housing (1) onto the cylinder housing (6). The bores must coincide.
4. Lightly grease screws (5). Insert with washers (4) into the bores and tighten.
 - Observe tightening torque.

Piston rod

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The outlet housing is assembled.

1. Push lip seal (16) onto the piston seal inlet (15). Ensure correct installation position.
2. Only for N2427004: Push spacer ring (18) onto the piston seal inlet (15).
3. Push lip seal (22) onto the piston (5). Ensure correct installation position.
4. Only for N2427004: Push spacer ring (21) onto the piston (5).
5. Push guide gland (19) onto the piston (5).
6. Place ball (17) into the ball seat of the piston (5).

7. Screw piston (5) to the piston seal inlet (15). Secure with Loctite 222.
 - Observe tightening torque.



Before re-assembly, remove adhesive residues from the threads. Clean surfaces.

8. Insert lip seal (11) into the sealing gland (12).
9. Lightly grease the sealing gland (12). Screw with cap nut (10).
 - Observe tightening torque.
10. Press valve disc (13) onto the sealing gland (12).
 - ⇒ The bundle slider (14) is assembled.
11. Lightly grease O-rings (8, 9). Pull onto the perforated disc (2).
12. Lightly grease upper part of lower piston rod (7) using Klüber Syntheso GLEP 1.
13. Carefully push inlet valve (14) from above to the center onto the lower piston rod (7). Ensure that the thread does not damage the seal.
14. Push perforated disc (2) from above to the center onto the lower piston rod (7).
15. Screw lower piston rod (7) by hand into the piston (5) (approx. 11 turns).
16. Secure piston rods (4, 7) with the split pin (6). For this, bent the ends of the split pin (6).
17. Move assembly tool over the lower piston rod (7). Position above the perforated disk (2).
18. Wrap guide belt (20) around the guide gland (19) and keep tight.
19. Push assembly tool upwards over the guide belt (18).
20. Push the entire piston rod (3) from below into the cylinder housing (1) until the assembly tool is stripped on the cylinder housing.
21. Push assembly tool from the lower piston rod (7).
22. Push the entire piston rod (3) half into the cylinder housing (1).
23. Position the perforated disk (2) in the cylinder housing (1).

Inlet housing

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear

- Protective gloves
- Safety boots

Requirements:

- The piston rod is assembled.
1. Press valve seat (9) into the inlet housing (10) by using assembly tools.
 2. Place inlet housing (10) onto the cylinder housing (8). Note the position of the pin.
 3. Lightly grease screws (6). Insert with washers (7) into the bores and tighten.
 - Observe tightening torque.
 4. Push guide piston (2) onto the piston rod (1).
 5. Push cover disc (3) onto the guide gland (2).
 6. Push perforated disk (4) onto the piston rod (1).
 7. Lightly grease nut (5). Screw onto piston rod (1).
 - Observe tightening torque.

Sealing bush

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- The inlet housing is assembled.
1. Insert guide belt (7) into the sealing gland (3).
 2. Insert lip seal (8) into the sealing gland (3).
 3. Lightly grease O-rings (9, 12). Insert into the spacer (10).
 4. Only 24270003: Insert slip ring (11) into the spacer (10).
 5. Insert spacer (10) into the sealing gland (3).
 6. Only 24270003: Insert lip seal (14) into the gland (13).
 7. Insert gland (13) into the sealing gland (3).
 8. Lightly grease O-ring (15). Insert into the gland (13).
 9. Place disc (16) onto the sealing gland (3). The bores must coincide.

10. Lightly grease screws (17). Insert into the bores and tighten.
 - Observe tightening torque.
11. Lightly grease O-ring (18). Pull onto the disc (16).
12. Insert stripper (6) into the sealing gland (3).
13. Insert O-ring (5) into the sealing gland (3).
14. Push sealing gland (3) from above onto the piston rod (4). The bores must coincide.
15. Lightly grease screws (2). Insert into the bores and tighten.
 - Observe tightening torque.
16. Assemble funnel (1).

9.3.5 Assemble fluid part and connecting rods.

Personnel:

- Mechanic

- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

1. Apply Loctite222 on the threads of the connecting rods.
2. Assemble fluid part and connecting rods in reverse order of disassembly ↪ 9.3.2 “Disassemble fluid part and connecting rods.”.



Observe tightening torques and greases.

10 Faults

10.1 Defects table



If the pump remains static at the top or bottom dead center due to process conditions, the air can audibly escape from the interface of the control unit. This does not have any adverse effect on the pump.

Fault description	Cause	Remedy
Pump does not run.	No or insufficient compressed air supply	Check compressed air supply.
	Switchover valve defective	Replace changeover valve ↪ 10.2.2 "Replace switchover valve".
	Control unit defective	Replace control unit ↪ 10.2.1 "Replace control unit".
	One or more ball valves on suction side or pressure side closed	Open all ball valves.
Pump does not deliver.	Material supply interrupted	Check the connection and operation of the material supply system. Check material viscosity and fluidity.
	Air has penetrated the suction line.	<ul style="list-style-type: none"> ▪ Check seals and pipe connections. ▪ Check material supply line. ▪ Vent the system.
	Piston seals defective	Replace seal kit ↪ 9.3.3 "Dismantle fluid part.".
	Rod seals defective	Replace seal kit.
	Poppet valve not sealing properly.	Check the poppet valve. Replace, if necessary ↪ 9.3.3 "Dismantle fluid part.".
Operating pressure is not reached.	No or insufficient compressed air or material supply	Check air pressure and flow rate of air. Check valves and hoses of the compressed air supply and material supply for kinks, blockages or bottlenecks due to dirt particles or foreign bodies,
	Piston seals defective	Replace seal kit ↪ 9.3.3 "Dismantle fluid part.".
	Switchover valve defective	Replace changeover valve ↪ 10.2.2 "Replace switchover valve".
	Poppet valve not sealing properly.	Check the poppet valve. Replace, if necessary ↪ 9.3.3 "Dismantle fluid part.".
Major material leak on the piston rod.	Rod seal is defective	Replace seal kit.
	Piston rod damaged	Replace piston rod ↪ 9.3.3 "Dismantle fluid part.".
Pump does not come to rest.	Piston seals defective	Replace seal kit ↪ 9.3.3 "Dismantle fluid part.".
	Seal washer or balls soiled or defective	Check the poppet valve. Replace, if necessary ↪ 9.3.3 "Dismantle fluid part.".

Fault description	Cause	Remedy
Motor skips at the top end of the stroke.	Bottom changeover valve defective	Replace changeover valve ↘ 10.2.2 "Replace switchover valve".
Motor skips at the bottom end of the stroke.	Top changeover valve defective	Replace changeover valve ↘ 10.2.2 "Replace switchover valve".
Motor switches over slowly.	Switchover valve defective	Replace changeover valve ↘ 10.2.2 "Replace switchover valve".
	Control unit defective	Replace control unit ↘ 10.2.1 "Replace control unit".
Air streams continuously through the sound muffler.	Diaphragm in the control unit defective	Replace diaphragm.
	Piston seal of the motor defective	Replace piston seal of the motor ↘ 10.2.3 "Replace piston seals.".
Material conveyance during downward stroke too little	Poppet valve in the piston soiled or worn out.	Check the poppet valve. Replace, if necessary ↘ 9.3.3 "Dismantle fluid part.".
	Piston seals worn out	Replace seal kit ↘ 9.3.3 "Dismantle fluid part.".

10.2 Troubleshooting

10.2.1 Replace control unit

Personnel:

- Mechanic
- + additional qualification explosion protection
- + Additional qualification high pressure

Protective equipment:

- Protective workwear
- Protective gloves
- Anti-Static Safety Boots

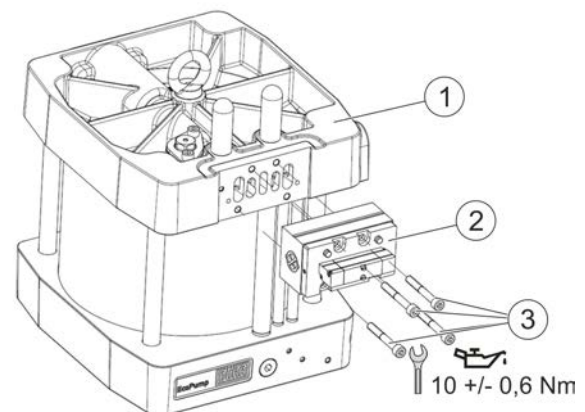


Fig. 30: Replace control unit

Molykote TP-42 Paste

Removal

1. Unscrew four screws (3) from the control unit (2).
2. Remove control unit (2) from the cylinder head (1).

- Remove contamination on control unit (2). Clean sealing surfaces using solvent.

Installing

- Apply Molykote TP-42 paste onto the threads and the screw head.
Observe tightening torques and greases.

Assemble the control unit (2) in reverse order of disassembly.

10.2.2 Replace switchover valve

There is one changeover valve each on both sides of the motor.

Personnel:

- Mechanic
- + additional qualification explosion protection
- + Additional qualification high pressure

Protective equipment:

- Protective workwear
- Protective gloves
- Anti-Static Safety Boots

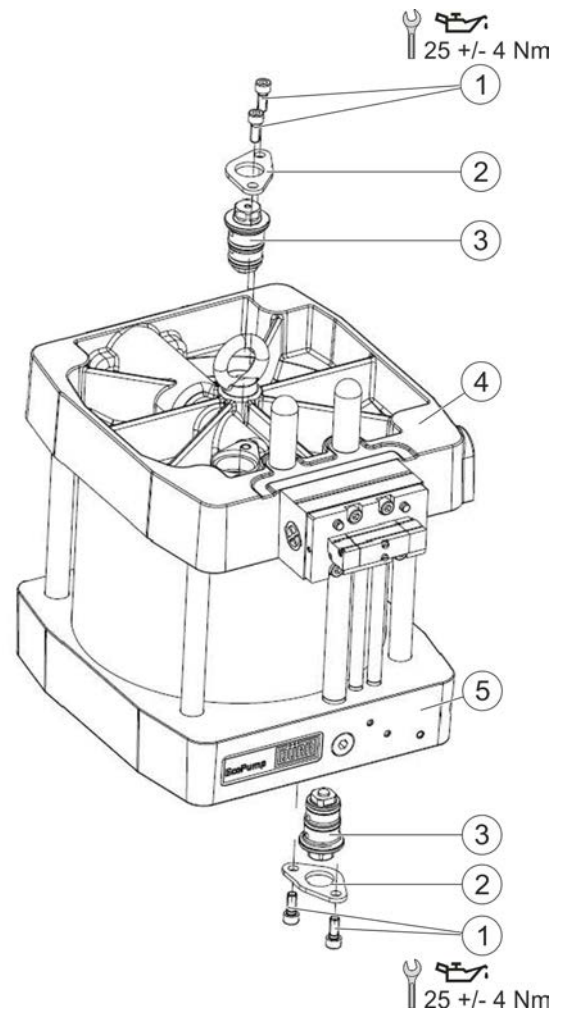


Fig. 31: Replace switchover valve

Molykote TP-42 Paste

Removal

- Unscrew two screws (1).
- Remove fastening clip (2).
- Remove switchover valve (3) out of the cylinder bottom (4, 5).
- Remove any dirt. Clean sealing surfaces using solvent.
- Repeat steps 1 to 4 for the second switchover valve.

Installing

- Insert the new switchover valve (3) into the cylinder bottom (4, 5).
- Place fastening clip (2) onto the switchover valve (3). Align fastening clip (2) to the bores.



Apply Molykote TP-42 paste onto the threads and the screw head.
Observe tightening torques and greases.

8. Insert and tighten two screws (1).
9. Repeat steps 6 to 8 for the second switchover valve.

10.2.3 Replace piston seals.

Personnel:

- Mechanic
- + additional qualification explosion protection
- + Additional qualification high pressure

Protective equipment:

- Protective workwear
- Protective gloves
- Anti-Static Safety Boots

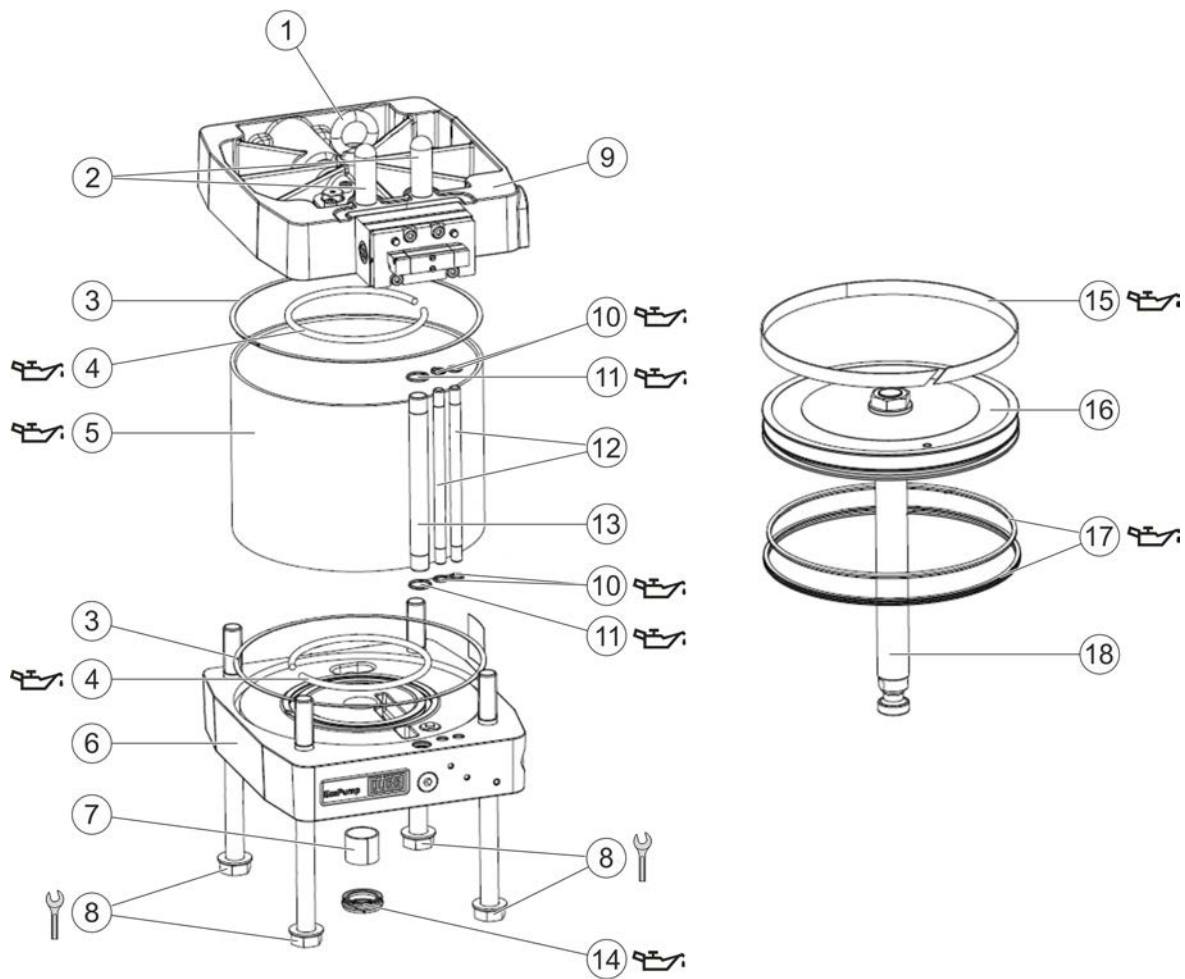


Fig. 32: Replace piston seals

Molykote TP-42 Paste

Requirements:

- Motor is disconnected from the fluid part.

Removal

1. Remove eye bolt (1).
2. Remove two sound mufflers (2).

3. Thread off four screws (8).
4. Remove cylinder bottom (6) and connection pipes (12, 13).
5. Pull piston rod (18) with piston (16) out of the cylinder housing (5).
6. Remove guide belt (15) and two piston seals (17).
7. Remove two O-rings (3) and two flat seals (4).
8. Remove rod seal (14).
9. Remove six O-rings (10, 11).

Do not damage the cylinder bottom (6) when pressing the slide bushing (7) out.

10. Press slide bushing (7) out of the cylinder bottom (6) and remove it.
11. Remove any dirt. Clean sealing surfaces using solvent.

Installing

Apply Molykote TP-42 paste onto the threads and the screw head.
Observe tightening torques and greases.

Do not damage the cylinder bottom (6) when pressing the slide bushing (7) in.

12. Press slide bushing (7) flush into the cylinder bottom (6).
13. Cut approx. 30mm out of the flat seals (4).
14. Insert two flat seals (4), rod seal (14) and six O-rings (10, 11) into the cylinder bottom (6) and the cylinder lid (9).

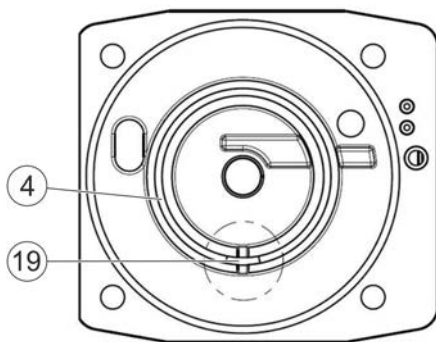


Fig. 33: Align flat seals

15. Align cut-out area of the flat seal (4) to the groove (19) in the cylinder bottom (6) and the cylinder lid (9).

16. Assemble new piston seals (17) and the guide belt (15) on the piston (16).

Do not use any sharp tools for the assembly.

17. Insert piston assembly (16, 18) flush into the cylinder housing (5). Do not tilt the piston seals (17) during the insertion.
18. Move piston assembly (16, 18) in the cylinder housing (5) to and fro.
⇒ Piston seals (17) and the guide belt (15) seat themselves.
19. Place cylinder housing (5) with piston assembly (16, 18) onto the cylinder lid (9).
20. Assemble connection pipes (12, 13) and cylinder bottom (6). Check for correct seat.
21. Screw in four screws (8). Tighten step by step:
 - Step 1: 30Nm
 - Step 2: 100Nm
 - Step 3: 160 ± 25Nm

11 Disassembly and Disposal

11.1 Safety recommendations

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Pump Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

! WARNING!

Material escaping under pressure

Material leaking under high pressure can penetrate the body. Even if the injury looks like a harmless cut wound, the penetrating material leads to amputation, serious injuries can cause death.

- Do not try to seal leakages using body parts, gloves or towels.
- If there are injuries, seek medical attention immediately.

Before working on the product:

- Disconnect the system, in which the product is installed, from compressed air and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

! WARNING!

Raising heavy loads

Raising heavy loads without suitable hoist and stopper material can cause major injuries.

- Transport heavy loads only by using suitable hoists and stoppers.

! WARNING!

Hot surfaces

The pump may become extremely hot during operation. Touching the surfaces shortly after operation may cause injuries.

- Wear protective hand gloves.
- Do not touch the pump during operation.
- Switch off the pump prior to maintenance and cleaning work. Let the pump cool down to room temperature.
- Consider using a stroke sensor with a control system for the automatic interruption of the control air to prevent a dry run.

! WARNING!

Frostbite

The pneumatic drive unit can cool down significantly. Contact with it can result in frostbite.

- Wear protective hand gloves.
- Before conducting any maintenance and cleaning work, ensure that the pneumatic drive unit has room temperature.

11.2 Disassembly

Personnel:

- Mechanic
- + Additional qualification high pressure

Protective equipment:

- Face protection
- Protective workwear
- Protective gloves
- Safety boots

Requirements:

- Pump has been purged ↪ 7.3 “Rinsing”.
- The ball valves are closed.
- The lines are depressurized.
- The collecting vessel is under the pump.

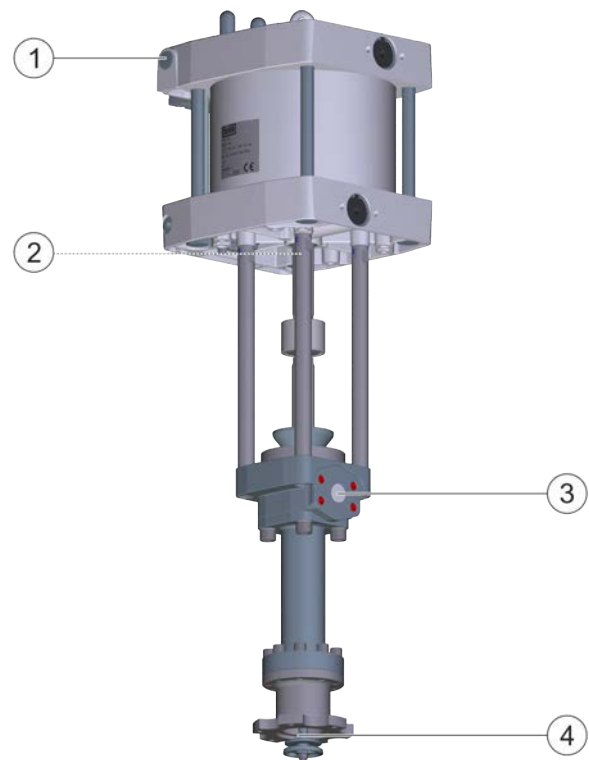


Fig. 34: Disassembling Connections

1. Disconnect compressed air supply to the pump. Secure against reconnection.
2. Relieve the pressure from the compressed air line.
3. Disconnect compressed air hose from the compressed air connection (1).
4. Unscrew and remove material connection line from the material outlet (3).

5. Separate material inlet (4) from the material supply.
6. Collect material residue from pump and the connection lines in collecting vessel.
7. Disconnect grounding cable from the grounding hole (2).

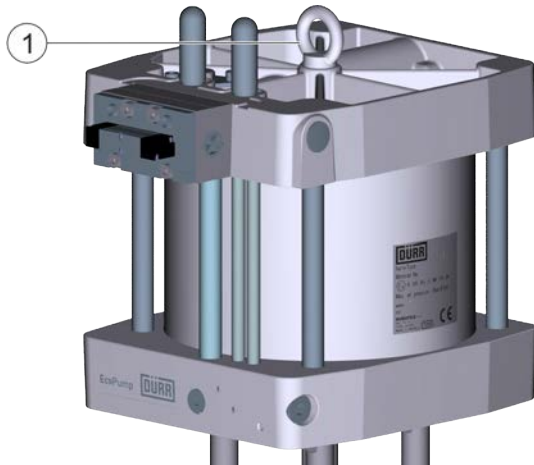


Fig. 35: Eyebolt

8. Fix stoppers on the eye bolts (1).
9. Hinge a sling gear on the hoist.
⇒ The pump is secured against toppling.

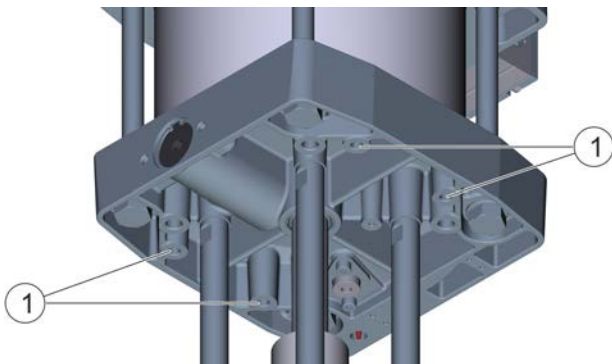


Fig. 36: Disassemble pump

10. Unscrew the screws on the frame from the bores (1).
11. Transport pump using a hoist.

11.3 Disposal

ENVIRONMENT!

Improper waste disposal

Improper waste disposal threatens the environment and prevents re-use and recycling.

- Clean components before their disposal.
- Always dispose of components in accordance with their characteristics.
↳ 12.8 “Materials used”
- Collect leaked out utilities and auxiliaries completely.
- Dispose of work equipment soaked in coating materials or operating substances according to the disposal provisions in force.
- Dispose of utilities and auxiliaries according to the disposal provisions in force.
- In case of doubt, refer to the local disposal authorities.

Requirements:

- Pump has been purged ↳ 7.3 “Rinsing”.
- Pump has been disassembled ↳ 11.2 “Disassembly”.

Personnel:

- Mechanic

Protective equipment:

- Face protection
- Protective gloves
- Safety boots

1. Dispose of material residue from pump professionally.
2. Remove the seals. Ensure professional disposal.
3. Dispose of individual parts of the pump professionally.

12 Technical data

12.1 Dimensions and weight

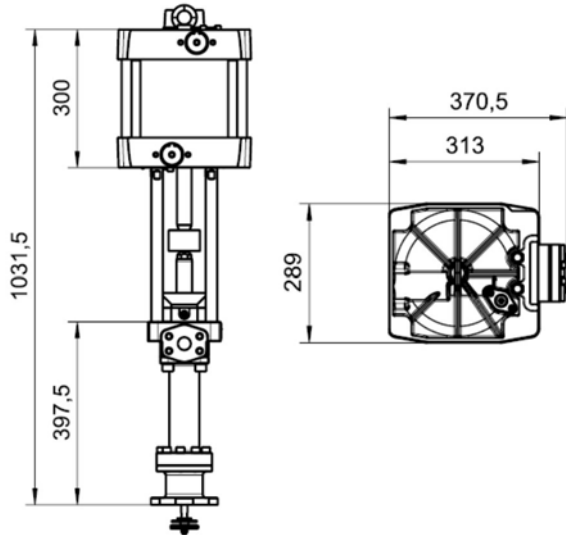


Fig. 37: Dimensions

Detail	Value
Height	1031.5mm
Width	289.0mm
Depth	370.5mm
Weight	51.0kg

12.2 Connections

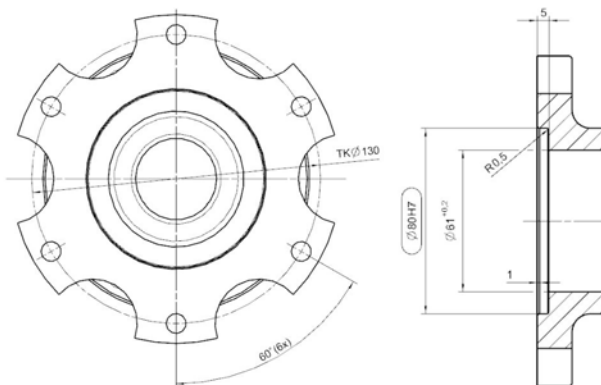


Fig. 38: Material inlet

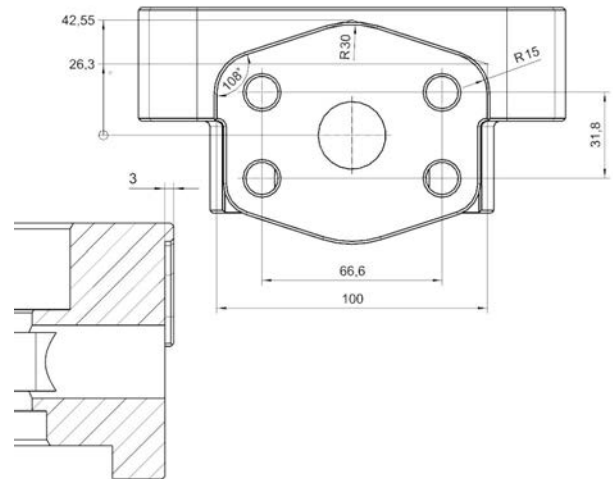


Fig. 39: Material outlet

Detail	Value
Material inlet	Flanged screw connection
Material outlet	SAE flange D25 M14 Sy=31.8 Sx=66.6
Compressed air	G3/4"

12.3 Operating conditions

Detail	Value
Operating temperature, min.	20°C
Operating temperature, max.	80°C
Media temperature, min.	20°C
Media temperature, max.	80°C
Ambient temperature, min.	10 °C
Ambient temperature, max.	50 °C
Relative humidity, min.	35%
Relative humidity, max.	90%

12.4 Emissions

Detail	Value
Sound pressure level, including sound muffler	81dB(A)
Sound pressure level including larger sound muffler (accessories)	71dB(A)
Sound power level	89dB(A)

The sound pressure level was measured during highest load (4 cycles/minute, 3bar).

12.5 Operating values

Displacement volume and flow rate	
Detail	Value
Displacement volume	max. 210cm ³ /cycle*
Recommended number of cycles for continuous running duty	max. 8 cycles/minute = 1.68L/min*
Translation ratio - Upward stroke	72:1
Translation ratio - Downward stroke	72:1

* Depending on the material conveyed

Material pressure and air pressure	
Value	Value
Outlet material pressure, max.	360 bar
Permissible air pressure, max.	5bar
Minimum air pressure	2.5bar

12.6 Compressed air quality

- Purity classes following ISO 8573-1::2010 1:3:1 1:4:1
- Limitations for purity class 4 (pressure dew point max.):
 - ≤ -3°C at 7bar absolute
 - ≤ +1°C at 9bar absolute
 - ≤ +3°C at 11bar absolute

12.7 Type plate

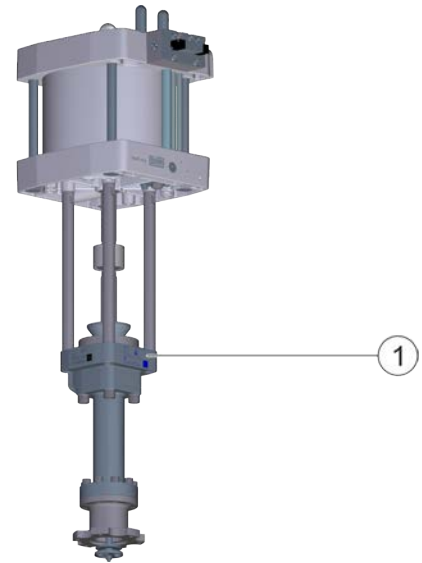


Fig. 40: Position of the Type Plates

The type plate of the pump (1) contains the following details:

- Product name
- Material number
- Year of manufacture
- Serial number
- Maximum air pressure
- Maximum material pressure
- CE labeling
- Manufacturer
- QR Code

12.8 Materials used

Detail	Material
Components in contact with material	Stainless steel, aluminum
Housing	Stainless steel, aluminum
Ball	Stainless steel
Ball seat	Stainless steel
Seals	PU, PE

12.9 Operating and auxiliary materials

Specification	Material	Material number
Klüber Syntheso GLEP 1 1kg	Seal lubricant	W32020009
Molykote TP-42 Paste 1kg	Lubricant for screws	W32020044
Loctite 222	Thread protection	W31010001
Loctite 243		W31010010

Cleaning agents

Only use approved cleaning agent that meet the following conditions:

- Compatible with the materials used

Detergent

Only use approved rinsing agents that meet the following conditions.

- Compatible with the pumped material
- Compatible with the materials used

12.10 Material specification

Detail	Value
Allowable material	Highly viscous, cold application or hot application: e.g. PVC, PU, epoxy, acrylate, rubber
Flashpoint of the material	>100°C
Viscosity, min.	3mPa s
Viscosity, max.	550mPa s
Solids diameter, max.	500µm

13 Replacement parts, tools and accessories

13.1 Replacement parts

13.1.1 Fluid part

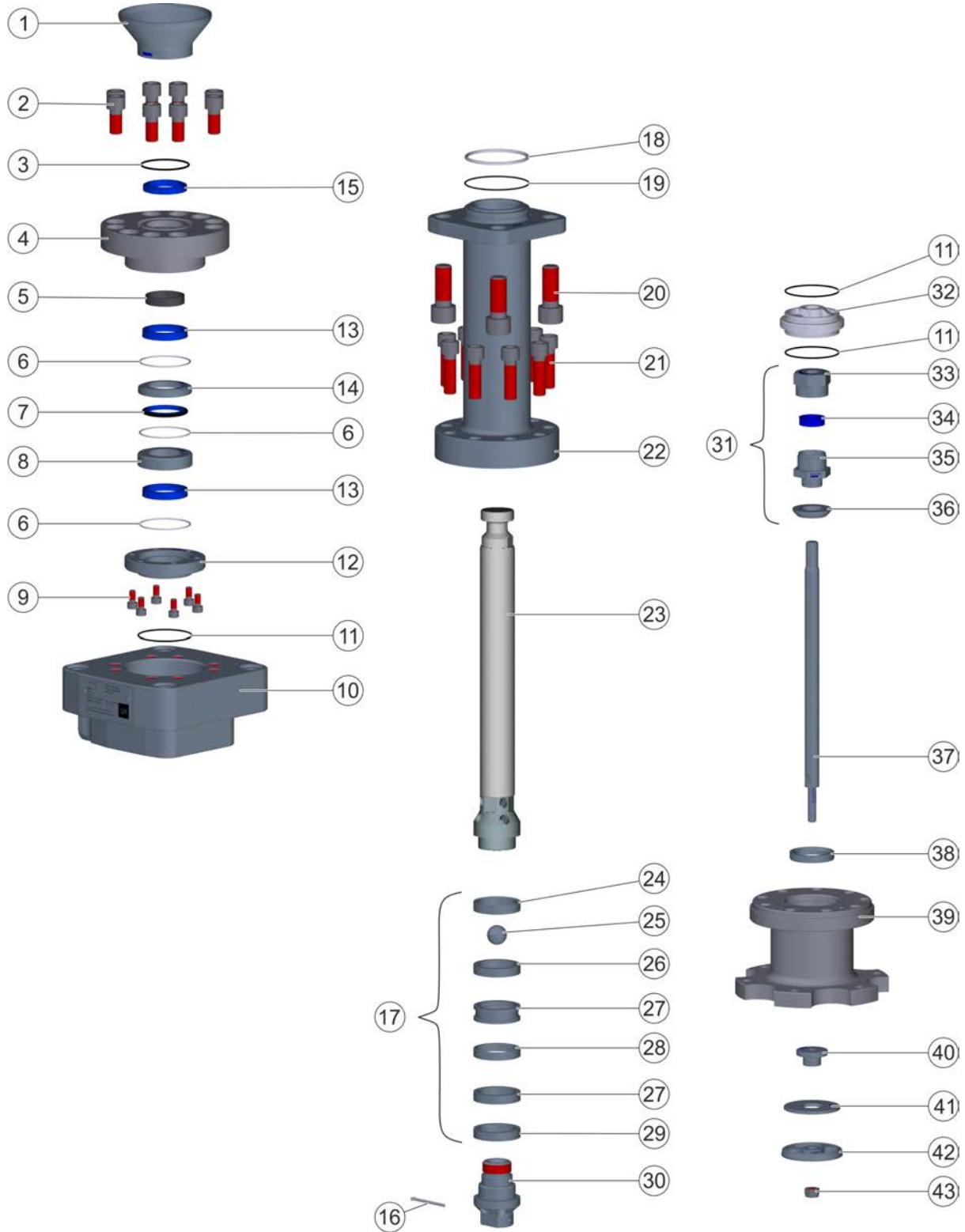


Fig. 41: Fluid part spare parts

N24270003			
Item	Denomination	Quantity	Material number
1	Funnel Ø84 – Ø50 H40	1	M38040037
2	Cheese-head screw M12x25 DIN912 1.4301	8	D09120355
3	O-ring 44.172x1.78	1	M08030654
4	Sealing gland Ø33,7 L40,2 VPS210 EcoPump	1	M08070069
5	Guide belt	1	
6	O-ring 47x1.5 PTFE	3	M08030927 Included in N24960129
7	Slip ring	1	
8	Gland Ø53 Ø33 S12 VA	1	M05010200
9	Cheese-head screw M6x12 DIN912 1.4301	6	D09120187
10	Housing outlet EcoPump VPS 210	1	M16010554 Included in N24960128
11	O-ring 50x1.5 90SH FFKM	3	M08030693 Included in N24960129, N24960130
12	Disc Ø78 Ø39 S12,3 VA	1	M39011083
13	Lip seal	2	
14	Spacer Ø52 Ø33.9 S7,1 VA	1	M39130098
15	Stripper	1	
16	Split pin 3.2x45 DIN94 A2	1	D00940019 Included in N24960127
17	Piston seal set Ø45.4 VPS 210 PU	1	N24960098 Included in N24960130
18	O-ring 56.5x3 PTFE	1	M08030759 Included in N24960130
19	O-ring 60x1.5 EPDM	1	M08030676 Included in N24960130
20	Cheese-head screw M16x40 DIN912 12.9 GEO	4	D09120345
21	Cheese-head screw M12x40 DIN912 1.4301	9	D09120439
22	Housing cylinder VPS 210 EcoPump	1	M16010540 Included in N24960127
23	Piston rod Ø33.7 Ø45	1	M12190079 Included in N24960127
24	Lip seal	1	
25	Ball Ø19.05 EcoPump	1	M66100029 Included in N24960127
26	Spacer ring	2	
27	Guide gland Ø30 EcoPump VPS 210	1	M05150030
28	Guide belt	1	
29	Lip seal	1	N24960161

Item	Denomination	Quantity	Material number
30	Piston Ø45 EcoPump VPS 210	1	M67010117 Included in N24960127
31	Rod seal set Ø33.7 VPS210 PU+	1	N24960161 Included in N24960129
32	Perforated disc Ø62 Ø14 S9,8 POM	1	M39080010
33	Cap nut M28x1 SW32 L22,5 VA	1	M30010358
34	Lip seal 14x24x8 95ShoreA BL PU	1	M35180006 Included in N24960130
35	Guide gland valve EcoPump VPS 210	1	M08070059
36	Valve disc EcoPump VPS 210	1	M08250004
37	Piston rod Ø14 EcoPump VPS 210	1	M12190050 Included in N24960127
38	Valve seat EcoPump VPS 210	1	M08150068 Included in N24960128
39	Housing inlet EcoPump VPS 210	1	M16010541
40	Guide gland Ø8 EcoPump VPS 210	1	M05150029
41	Cover disc Ø54.5 Ø18 S3 VA	1	M39110022
42	Perforated disc Ø59.5 Ø8.2 S7,2 VA	1	M39080011
43	Hexagonal nut M8 DIN985 1.4571	1	D09850004

N24270004

Item	Denomination	Quantity	Material number
1	Funnel Ø84 – Ø50 H40	1	M38040037
2	Cheese-head screw M12x25 DIN912 1.4301	8	D09120355
3	O-ring 44.172x1.78	1	M08030654
4	Sealing gland Ø33,7 L40,2 VPS210 EcoPump	1	M08070069
5	Guide belt	1	
6	O-ring 47x1.5 PTFE	3	M08030927 Included in N24960155
8	Gland Ø53 Ø33 S12 VA	1	M05010200
9	Cheese-head screw M6x12 DIN912 1.4301	6	D09120187
10	Housing outlet EcoPump VPS 210	1	M16010554
11	O-ring 50x1.5 90SH FFKM	3	M08030693 Included in N24960154, N24960155, N24960156
12	Disc Ø78 Ø39 S12,3 VA	1	M39011083
14	Spacer Ø52 Ø33.9 S7,1 VA	1	M39130098
15	Stripper	1	
16	Split pin 3.2x45 DIN94 A2	1	D00940019 Included in N24960127
17	Piston seal set Ø45.4 VPS 210 PE	1	N24960149 Included in N24960156

Item	Denomination	Quantity	Material number
18	O-ring 56.5x3 PTFE	1	M08030759 Included in N24960156
19	O-ring 60x1.5 EPDM	1	M08030676 Included in N24960156
20	Cheese-head screw M16x40 DIN912 12.9 GEO	4	D09120345
21	Cheese-head screw M12x40 DIN912 1.4301	9	D09120439
22	Housing cylinder VPS 210 EcoPump	1	M16010540 Included in N24960127
23	Piston rod Ø33.7 Ø45	1	M12190079 Included in N24960127
24	Lip seal	1	
25	Ball Ø19.05 EcoPump	1	M66100029 Included in N24960127
26	Spacer ring	2	
27	Guide gland Ø30 EcoPump VPS 210	1	M05150030
28	Guide belt	1	
29	Lip seal	1	N24960161
30	Piston Ø45 EcoPump VPS 210	1	M67010117 Included in N24960127
31	Rod seal set Ø33.7 VPS210 PE	1	N24960150 Included in N24960155
32	Perforated disc Ø62 Ø14 S9,8 POM	1	M39080010
33	Cap nut M28x1 SW32 L22,5 VA	1	M30010358
34	Lip seal 14x23.8x4.9 PE	1	M35180014 Included in N24960156
35	Guide gland valve EcoPump VPS 210	1	M08070059
36	Valve disc EcoPump VPS 210	1	M08250004
37	Piston rod Ø14 EcoPump VPS 210	1	M12190050 Included in N24960127
38	Valve seat EcoPump VPS 210	1	M08150068 Included in N24960154
39	Housing inlet EcoPump VPS 210	1	M16010541
40	Guide gland Ø8 EcoPump VPS 210	1	M05150029
41	Cover disc Ø54.5 Ø18 S3 VA	1	M39110022
42	Perforated disc Ø59.5 Ø8.2 S7,2 VA	1	M39080011
43	Hexagonal nut M8 DIN985 1.4571	1	D09850004

N24270005

Item	Denomination	Quantity	Material number
1	Funnel Ø84 – Ø50 H40	1	M38040037
2	Cheese-head screw M12x25 DIN912 1.4301	8	D09120355
3	O-ring 44.172x1.78	1	M08030654

Item	Denomination	Quantity	Material number
4	Sealing gland Ø33,7 L40,2 VPS210 EcoPump	1	M08070069
5	Guide belt	1	
6	O-ring 47x1.5 PTFE	3	M08030927 Included in N24960167
8	Gland Ø53 Ø33 S12 VA	1	M05010200
9	Cheese-head screw M6x12 DIN912 1.4301	6	D09120187
10	Housing outlet EcoPump VPS 210	1	M16010554
11	O-ring 50x1.5 75SH FFKM	3	M08030693 Included in N24960167, N24960128
12	Disc Ø78 Ø39 S12,3 VA	1	M39011083
14	Spacer Ø52 Ø33.9 S7,1 VA	1	M39130098
15	Stripper	1	
16	Split pin 3.2x45 DIN94 A2	1	D00940019 Included in N24960127
17	Piston seal set Ø45.4 VPS 210 PE-PU	1	N24960098 Included in N24960168
18	O-ring 6x1.5 PT PTFE	1	M08030859 Included in N24960168
19	O-ring 60x1.5 EPDM	1	M08030676 Included in N24960168
20	Cheese-head screw M16x40 DIN912 12.9 GEO	4	D09120345
21	Cheese-head screw M12x40 DIN912 1.4301	9	D09120439
22	Housing cylinder VPS 210 EcoPump	1	M16010540 Included in N24960127
23	Piston rod Ø33.7 Ø45	1	M12190079 Included in N24960127
24	Lip seal	1	
25	Ball Ø19.05 EcoPump	1	M66100029 Included in N24960127
26	Spacer ring	2	
27	Guide gland Ø30 EcoPump VPS 210	1	M05150030
28	Guide belt	1	
29	Lip seal	1	N24960161
30	Piston Ø45 EcoPump VPS 210	1	M67010117 Included in N24960127
31	Rod seal set Ø33.7 VPS210 PE-PU	1	N24960163 Included in N24960167
32	Perforated disc Ø62 Ø14 S9,8 POM	1	M39080010
33	Cap nut M28x1 SW32 L22,5 VA	1	M30010358
34	Lip seal 14x24x8 95ShoreA BL PU	1	M35180006 Included in N24960168

Item	Denomination	Quantity	Material number
35	Guide gland valve EcoPump VPS 210	1	M08070059
36	Valve disc EcoPump VPS 210	1	M08250004
37	Piston rod Ø14 EcoPump VPS 210	1	M12190050 Included in N24960127
38	Valve seat EcoPump VPS 210	1	M08150068 Included in N24960128
39	Housing inlet EcoPump VPS 210	1	M16010541
40	Guide gland Ø8 EcoPump VPS 210	1	M05150029
41	Cover disc Ø54.5 Ø18 S3 VA	1	M39110022
42	Perforated disc Ø59.5 Ø8.2 S7,2 VA	1	M39080011
43	Hexagonal nut M8 DIN985 1.4571	1	D09850004

13.1.2 Repair kits

13.1.2.1 Motor

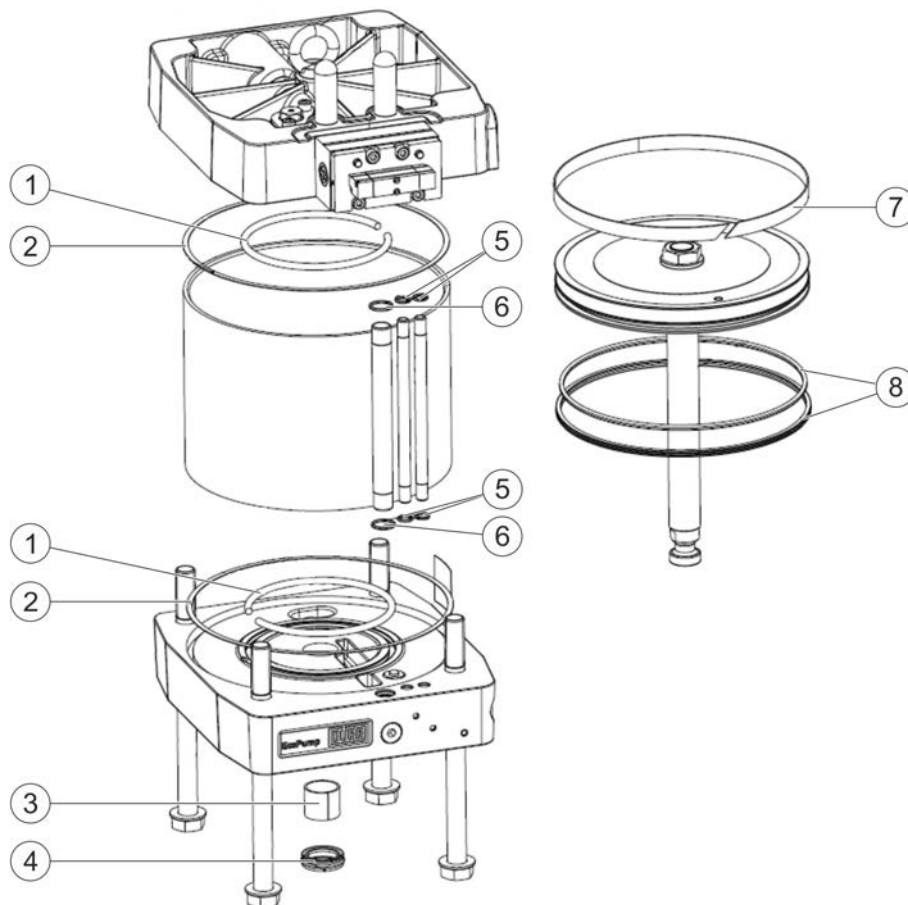


Fig. 42: Piston seals

Repair kit, piston seals N24960139		
Item	Denomination	Quantity
1	Flat seal	2
2	O-ring 158.12 x 6.99	2
3	Slide bushing	1
4	Rod seal	1
5	O-ring 11.3 x 2.4	4
6	O-ring 19.3 x 2.4	2
7	Guide belt	1
8	Piston seal	1
-	Lubricating grease, 20g	1

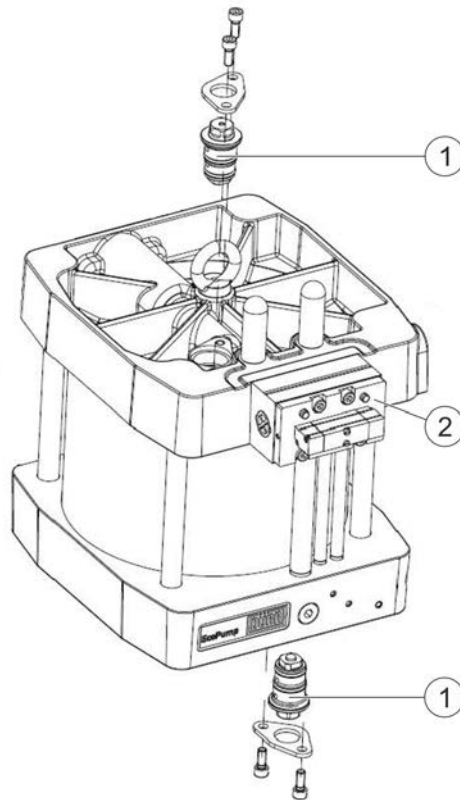


Fig. 43: Switchover valve

Repair kit, switchover valve N24960137

Item	Denomination	Quantity
1	Switchover valve	1
-	Lubricating grease, 20g	1

Repair kit, control unit N24960135

Item	Denomination	Quantity
2	Control unit	1

13.1.2.2 Fluid part

Repair kit VPS fluid part for N24270003, N24270004 and N24270005

N24960127

Designation	Quantity
Piston rod Ø33.7 Ø45	1
Piston rod Ø14 EcoPump VPS 210	1
Piston Ø45 EcoPump VPS 210	1
Housing cylinder VPS 210 EcoPump	1

Designation	Quantity
Ball Ø19.05 EcoPump	1
Split pin 3.2x45 DIN94 A2	1

Repair kit VPS inlet valve PU for N24270003 and N24270005

N24960128	
Designation	Quantity
O-ring 50x1.5 75SH FFKM	2
Valve unit VPS 210 inlet valve PU	1
Valve seat EcoPump VPS 210	1
Pressing rod	1

Repair kit VPS inlet valve PE for N24270004

N24960154	
Designation	Quantity
O-ring 50x1.5 75SH FFKM	2
Valve unit VPS 210 inlet valve PE	1
Valve seat EcoPump VPS 210	1
Pressing rod	1

13.1.3 Seal sets

Rod seal set Ø33.7 PU for N24270003

N24960129	
Designation	Quantity
Rod seal set Ø33.7 VPS210 PU+	1
O-ring 47x1.5 PTFE	3
O-ring 50x1.5 90SH FFKM	1

Rod seal set Ø33.7 PE for N24270004

N24960155	
Designation	Quantity
Rod seal set Ø33.7 VPS210 PE	1
O-ring 47x1.5 PTFE	3
O-ring 50x1.5 90SH FFKM	1

Rod seal set Ø33.7 PE-PU for N24270005

N24960167	
Designation	Quantity
Rod seal set Ø33.7 VPS210 PE-PU	1
O-ring 47x1.5 PTFE	3
O-ring 50x1.5 75SH FFKM	1

Seal set VPS fluid part PU for N24270003

N24960130	
Designation	Quantity
Piston seal set Ø45.4 VPS210 PU	1
Lip seal 14x24x8 95ShoreA BL PU	1
O-ring 60x1.5 EPDM	1
O-ring 56.5x3 PTFE	1
O-ring 50x1.5 90SH FFKM	2
Assembly tool, piston guide belt Ø33.7	1

Seal set VPS fluid part PE for N24270004

N24960156	
Designation	Quantity
Piston seal set Ø45.4 VPS210 PE	1
Lip seal 14x23.8x4.9 PE	1
O-ring 60x1.5 EPDM	1
O-ring 56.5x3 PTFE	1
O-ring 50x1.5 90SH FFKM	2
Assembly tool, piston guide belt Ø33.7	

Seal set VPS fluid part PE-PU for N24270005

N24960168	
Designation	Quantity
Piston seal set Ø45.4 VPS 210 PU	1
Lip seal 14x24x8 95ShoreA BL PU	1
O-ring 60x1.5 EPDM	1
O-ring 6x1.5 PT PTFE	1
O-ring 50x1.5 75SH FFKM	2

13.2 Tools

Tool	Material number	Repair kit
Auxiliary tool	W02850033	Included in N24960127, N24960128
	W02850034	

Detail	Material number
Sealing gland d33,7 PE/PU complete	N24960170

13.3 Accessories

Detail	Material number
Heating jacket	F10400067
Contact protection for heating jacket	M59160043
Sound reducing set	N24970017
Sealing gland d33,7 PE complete	N24960169

13.4 Order

 **WARNING!****Unsuitable replacement parts in explosive areas**

Replacement parts not compliant with the specifications of the ATEX guidelines can cause explosions in an explosive atmosphere. Serious injury and death could be the consequence.

- Use exclusively original replacement parts.

 **WARNING!****Unsuitable replacement parts**

Replacement parts of third-party suppliers may possibly not be able to hold the loads. Serious injury and death could be the consequence.

- Use exclusively original replacement parts.

Ordering replacement parts, tools and accessories as well as information on products that are listed without order number ↪ “Hotline and Contact”.

14 INDEX


A		F	
Accessories	47	Faults	
Advanced training	6	Defects Table	27
assembly	9	Fluid part	
Fluid part	26	assembly	24, 26
Assembly		disassembly	18
Inlet housing	25	dismantling	19
Outlet housing	24	Function	7
Piston rod	24	Repair kit	45
Sealing bush	25	G	
Auxiliary materials	37	Grounding	
C		Pump	10
Clean	15	H	
Cleaning		Hotline	2
Safety notes	13	Humidity	35
Commissioning	12	I	
Compressed air connection	35	Information about the document	2
Connect		Inlet housing	21, 25
Control air supply	10	Inlet valve	46
Material feed	10	Repair kit	46
Pump	10	Installation point	9
Connect the material feed	10	Intended use	4
Connecting Control Air Supply	10	L	
Connecting rods		Life cycle	
disassembly	18	Seals	13
Connections	35	Lubricant	37
Contact	2	M	
Control unit		Maintenance	
Function	6	Safety notes	15
replacement	28	Maintenance schedule	
Replacement parts	45	Motor	16
D		Material number	2
disassembly		Material pressure	36
Pump	33	Material specification	37
Disassembly		Materials	36
Safety notes	32	Misuse	4
dismantling		Motor	7
Sealing bush	16, 19	Control unit	45
Dismantling		Piston seals	43
Inlet housing	21	Replace piston seal	31
Outlet housing	24	Switchover valve	45
Piston rod	22	N	
Disposal	32	Noise emission	35
Handling packaging material	9	Notes	
E		Representation	4
Emissions	35	O	
		Operating materials	37


Operating parameters		Residual risks	5
set	12	Safety notes	
Operating pressure	36	Cleaning	13
Operation		Dismantling and Disposal	32
Life cycle of seals	13	Scope of Supply	8
Order	48	Scope of the document	2
Outlet housing	24	Seal set	
P		Fluid part	47
Packaging		Rod	46
Handling packaging material	9	Sealing bush	25
Personal protective equipment	6	dismantling	19
Piston rod	22, 24	replacement	16
Piston seal		Seals	
replacement	31	Life cycle	13
Replacement parts	43	Serial number	36
Pressure	36	Service	2
Product overview		Short description	4
Short description	4	Solids	
Property damage	5	Diameter	37
Protective equipment	6	Sound pressure level	35
Pump		Storage	9
assembly	9	Switchover valve	
connect	10	replacement	29
disassembly	33	Replacement parts	45
grounding	10	T	
Putting into operation	11	Technical data	
Purging	13	Compressed air quality	36
Q		Depth	35
Qualification	5	Dimensions	35
Qualification of the personnel	5	Emissions	35
R		Height	35
Repair kit		Material specification	37
Inlet valve	46	Materials	36
VPS	45, 46	Operating and auxiliary materials	37
replacement		Operating conditions	35
Control unit	28	Power values	36
Piston seal	31	Weight	35
Switchover valve	29	Width	35
Replacement parts		Technical Data	
Fluid part	38	Connections	35
Representation		Temperature	35
Notes	4	Tools	47
Residual risks	5	Training	6
S		Transport inspection	8
Safety		Transport ring bolt	8
Misuse	4	Transportation	8
Notes	4	Type plate	36
Property damage	5		

U		Y	
Usage	4	Year of manufacture	36
Use	4		
V			
Viscosity	37		



LEADING IN
PRODUCTION
EFFICIENCY

 Dürr Systems AG
Application Technology
Carl-Benz-Str. 34
74321 Bietigheim-Bissingen
Germany

 Phone +49 7142 78-0

 www.durr.com

Translation of the original operation manual
MPU00024EN, V02

The reproduction and distribution of this document, use and communication of its contents are not permitted without express written approval. Offenders will be liable for damages. All rights reserved in the event of the grant of a patent or utility model.

© Dürr Systems AG 2019