

# EcoPump HPE

## Electrical Horizontal Piston Pump

### Operation manual

MPU00001EN, V09



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Translation of the original operation manual

MPU00001EN, V09

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### 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 products:

N24260002 <b>EcoPump HPE 400 21 EU</b>	
N24260003 <b>EcoPump HPE 800 21 EU</b>	
N24260014 <b>EcoPump HPE 400 21 UHM PTF KR</b>	
N24260015 <b>EcoPump HPE 800 21 UHM PTF KR</b>	
N24260017 <b>EcoPump HPE 400 21 UHM PTF JP</b>	
N24260018 <b>EcoPump HPE 800 21 UHM PTF JP</b>	

### Hotline and Contact

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

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# 1 Product overview

## 1.1 Overview

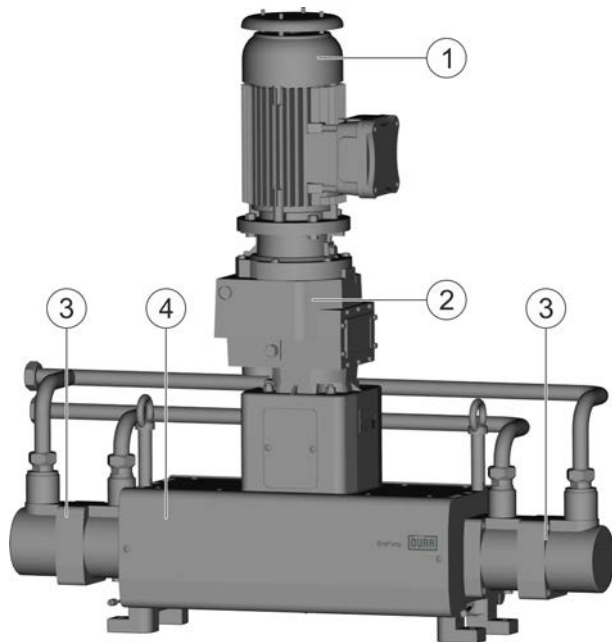


Fig. 1: Assemblies (exemplary)

- 1 Motor
- 2 Gear box
- 3 Fluid part
- 4 Mechanical drive

## 1.2 Short description

The horizontal piston pump (hereafter called "Pump") with electric drive conveys water-based and solvent-based flammable and non-flammable coating materials e.g. in automated paint mixing rooms.

# 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

### Use

The **EcoPump HPE** is a horizontal piston pump with electrical drive. The **EcoPump HPE** may only be used for pumping combustible and water-based or solvent-based non-combustible fluid coating materials and their detergents.

The **EcoPump HPE** may only be installed in a system that securely switches off, if there is overpressure >24.5bar (PLr = b) ↪ 12.5 "Operating values".

An overpressure valve is recommended for mechanically limiting the pressure level (specification ↪ 12 "Technical data").

In addition to the overpressure valve, a circuit breaker (PLr = b) is recommended ↪ 13.3 "Accessories". The circuit breaker is for secure switch-off. It protects the material to be pumped in case there is over-pressure.

The pump is only intended for industrial use.

The pump may only be operated within the approved technical data ↪ 12 "Technical data".

The pump is approved for use in explosive areas of Ex zones 1 and 2.

### Misuse

If used improperly, it can cause serious injuries.

Examples of wrong use are:

- » Use outside a closed process or a remotely controlled and automated process
- » Installation of the pump in an area without forced ventilation
- » Use of unapproved materials, see safety data sheets
- » Making conversions or changes on your own
- » Use of non-conductive fluids ↪ 12.9 “Material specification”
- » Use in explosive areas Ex zone 0
- » Use of components unapproved by Dürr Systems

### Ex labeling

II 2G Ex h IIA T4 Gb X

- II - Device group II: all areas except mining
- 2G - Device category 2 for gaseous atmosphere
- Ex h - Mechanical explosion protection
- IIA - Explosion group IIA
- T4 - Temperature class
- Gb - Device protection level Gb
- X - The pump is configured for operation in an ambient temperature of 15°C to 40°C.

### 2.3 Safety signs

The following signs are placed on the product.

- » Do not remove signs from the product. Replace illegible characters.

Safety Signs	Meaning
	Risk of death due to electrical voltage exists despite switched off mains disconnecting device.

### 2.4 Residual risks

#### Danger of explosion due to sources of ignition in an explosive atmosphere.

Sparks, open flames and hot surfaces can cause explosions in explosive atmospheres. Serious injury and death could be the consequence.

- » Before carrying out any work, make sure that there is no explosive atmosphere.
- » Do not use any sources of ignition and no open light in the work area.
- » Do not smoke.
- » Do not unpack Pump in Ex zone.
- » Dispose of packaging according to regulation outside of Ex zone or store it.
- » Use tools with Ex approval.
- » Ground Pump.
- » Wear suitable protective equipment.

#### Electric current

During the operation, parts of the motor are under dangerous voltage, which can cause serious injuries and death.

Before working on electrical assemblies:

- » Disconnect the power supply and secure it from being switched on again.
- » Ensure that no part of the motor, not even accessory parts are live.

#### Sparks due to electrostatic discharge

If the pump is not properly grounded or the potential equalization fails, components may get charged electrostatically. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- » Ground Pump as specified.
- » Check connection of grounding cable during operation.
- » Measure volume resistivity.

#### Escaping material

Material escaping under pressure can cause serious injuries.

Before working on the product:

- » Disconnect the system with the product from power supply and material supply.
- » Depressurize the lines.
- » Secure the system against being switched on again.

#### 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 equipment.

**Moving parts**

Serious injuries can be the consequence.

Before carrying out any work:

- » Disconnect the system with the product from power supply and material supply and secure the system against reconnection.
- » Ensure the engine is at rest.

**2.5 Conduct in the event of a hazardous situation**

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

Basically:

- » Shut down the power supply. Secure against reconnection.
- » Discharge the residual energy.
- » Verify no current is present.
- » Close media lines. Secure against reconnection.
- » Relieve the 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 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**

When working in explosive areas, the protective clothing, including gloves, must meet the requirements of DIN EN 1149-5. Footwear must meet the requirements of EN ISO 20344 and EN IEC 61340-4-3. The volume resistivity must not exceed 100MΩ.

Wear the specified 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.



**Eye protection**

Protects eyes from dust, paint drops and particles.





**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.

### 3 Design and Function

#### 3.1 Design

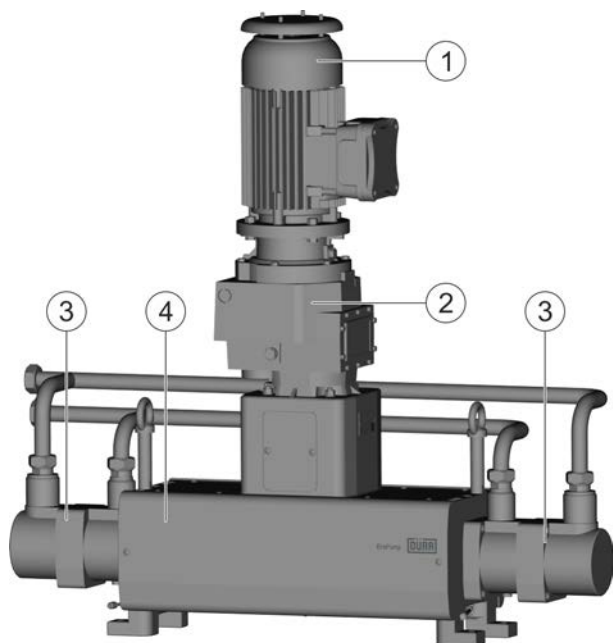


Fig. 2: Assemblies

- 1 Motor (exemplary)
- 2 Gear box
- 3 Fluid parts
- 4 Mechanical drive

A motor (1) with gear box (2) drives the pump. The motor (1) and the gear box (2) together form one unit (hereafter called “gear motor”) with pressure-tight encapsulation.

The mechanical drive (4) transfers the drive energy from the motor (1) to the fluid parts (3).

#### 3.2 Operation

##### Mechanical drive

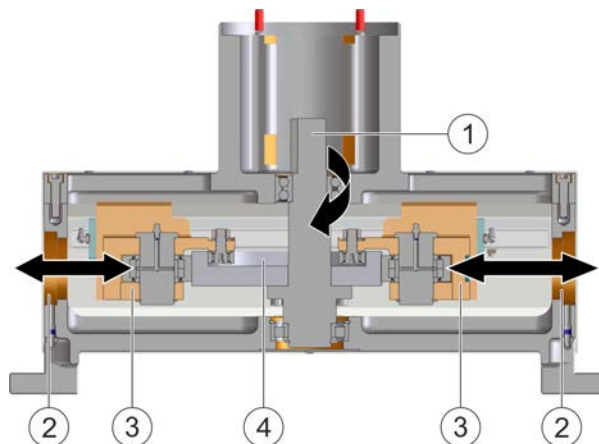


Fig. 3: Functioning of the mechanical drive

- 1 Flanged shaft
- 2 Fluid part connection
- 3 Bearing block
- 4 Control cam

The motor drives the flange shaft (1) via the coupling. The radial cam (4) rotates and moves the bearing blocks (3) to and fro. This moves the piston in the fluid parts to and fro.

##### Fluid part

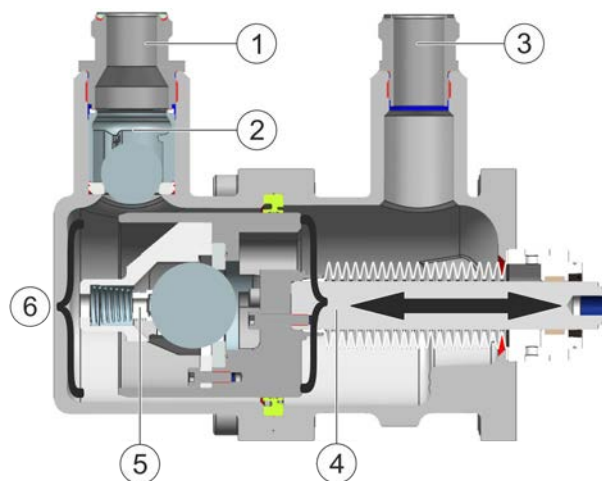


Fig. 4: Fluid part operation

- 1 Pressure line
- 2 Non-return valve in the outlet cylinder
- 3 Suction line
- 4 Piston rod
- 5 Non-return valve in the piston
- 6 Piston

The movement of the piston (6) causes the material to be suctioned through the suction line (3) into a fluid part. At the same time, material is pushed out through the pressure line (1) in the second fluid part. Non-return valves (2) and (5) prevent material from flowing back.

**Recommended accessory**

An overpressure valve is recommended for mechanically maintaining the pressure level. If overpressure occurs, the material to be delivered is circulated until the overpressure is remedied.

In addition to the overpressure valve, a circuit breaker (PLr = b) is recommended ↪ 13.3 “Accessories” and served for secure switching-off. The circuit breaker protects the material to be pumped in the case of overpressure.

**4 Transport, scope of supply and storage**

**4.1 Unpacking**

**EX DANGER!**

**Electrostatically charged plastic films and foils in potentially explosive areas**

The foil and the product can charge electrostatically at the time of the unpacking. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Unpack product outside Ex zones.
- Discharge the product.
- Dispose packaging outside of the Ex zone in accordance with the regulation or store properly for a later return.

**4.2 Transport**

**! WARNING!**

**Risk of injury from tilting pump**

Improper transport of the pump may cause the pump to topple, which might result in serious injuries.

- Use eyebolts only if the path is short.
- Fix pump on the palette.
- Secure pump from toppling.

**! NOTICE!**

**Incorrect Transport**

Incorrect Transport can cause property damage.

- Protect Pump from moisture.
- Protect Pump from vibrations.
- Transport temperature: -30°C to 60°C

Personnel:

- » Mechanic

Protective equipment:

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

Requirements:

- » Pump has been disassembled ↪ 11.2 “Disassembly”.

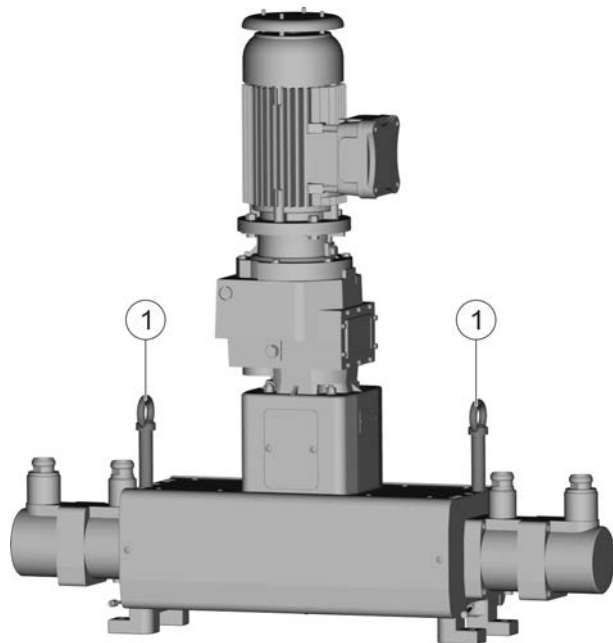


Fig. 5: Eye bolts (motor as example)

1. Fasten load handling equipment to the transport eyebolts (1),
2. Transport pump to the destination location, keeping it close to the ground.

### 4.3 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”.

### 4.4 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.

- » It should be possible to break the circuit on all phases.
- » It should be possible to disconnect the material feed and prevent it from reconnecting.
- » The system in which the pump is installed must switch off if there is overpressure ↪ 12.5 “Operating values”.
- » Lines, seals and screw connections must be designed to conform to the pump requirements ↪ 12.5 “Operating values”.
- » The workplace must have a ventilation.
- » The pump must be protected from atmospheric influences at the installation point.
- » Environmental hindrances must not hamper the motor ventilation. Maintain minimum distances to the motor ↪ 12.5 “Operating values”.
- » The pump is finally connected to the interface (e.g. pipeline). Any docking is not permitted.

#### Circuit breaker

Within the EU, the following applies:

The motor is fitted with a temperature control using PTC thermistors. The temperature control ensures that the limit values of the temperature area are not crossed.

One of the following safety devices must be used:

- » Cut-out conforming to the criteria of the IEC 61508 guideline.
- » Cut-out that can switch over to a safety position if there is a fault (fail-safe).
- » Dual protection circuit

Outside of the EU, the following applies:

Observe the manufacturer’s specifications.

## 5.2 Assembly

### Assembling the pump

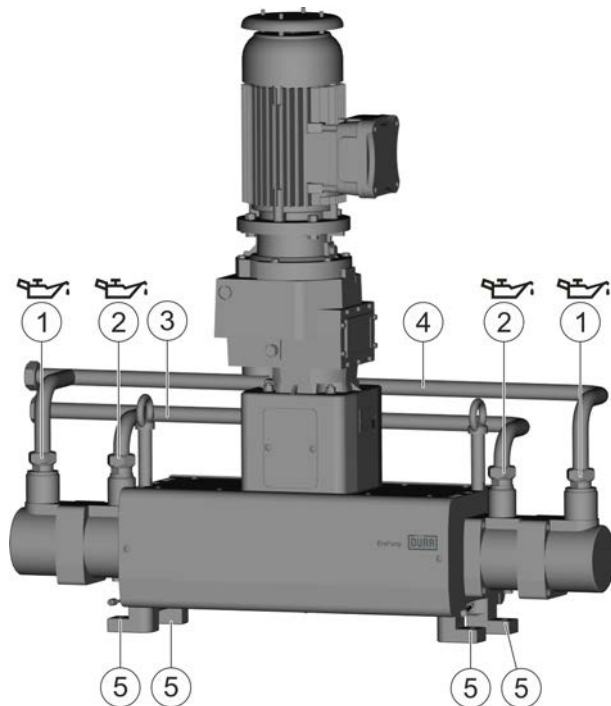


Fig. 6: Assemble pump (motor as example)

Molykote TP-42 Paste

- 1 Pressure line connection
- 2 Suction line connection
- 3 Suction line manifolds
- 4 Pressure line manifolds
- 5 Screw

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
- » Anti-Static Safety Boots

1. Mount pump on suitable surface or stand using the screws on the fastening bores (5).
2. Mount pump such that connections (1) and (2) point upwards.
3. Remove protective caps on the connections on the fluid parts.

Manifolds are available as accessories  
↳ 13.3 "Accessories".

4. Grease threads on the fluid part and on the manifolds.

O-rings are factory-mounted in the connections (1) and (2) on the fluid part.

5. Assemble manifolds on the pump.

## 5.3 Connecting

### Connect material feed

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Grease all O-rings and threads of the pipelines.
2. Screw the tube from material feed into the suction pipe manifold ↳ 5.2 "Assembly".
3. Screw the tube from material discharge into the pressure pipe manifold ↳ 5.2 "Assembly".

### Connect motor

The electric supply of the pump must be equipped with a switch disconnecter with emergency stop function.

Connect and operate motor according to the instructions by the manufacturer. Observe operating instructions by the manufacturer.

Personnel:

- » Electrician
- » + additional qualification explosion protection

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots

1. Make mains connections as specified in the circuit diagrams ↳ 12.2 "Connections".
2. Tighten mains connections and auxiliary connections with special tightening torques ↳ 12.5 "Operating values".

### Connect the pump to ground

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.

The grounding holes are on both sides of the mechanical drive. The grounding holes are mutually opposite.

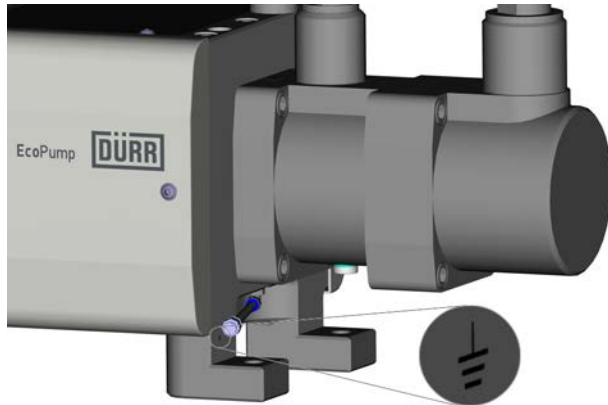


Fig. 7: Connect the pump to ground

Personnel:

- » Electrician
- » + additional qualification explosion protection

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots

1. Connect the grounding cable to one of the two grounding bores.

#### Ground the motor

Personnel:

- » Electrician
- » + additional qualification explosion protection

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots

1. Connect grounding cable to terminal box of the motor.
2. Connect ground cable to the grounding point.
3. Fill in the test log for electric equipment according to EN 60204-1 (e.g. correct conductor cross section and continuity of the earthed conductor system).

## 6 Commissioning

### 6.1 Safety recommendations

#### **WARNING!**

##### **Risk of injury due to escaping material**

Escaping material under pressure can cause serious injuries.

Before commissioning the pump:

- Ensure that the pump is assembled as specified.
- Ensure that all screw connections are tightened according to the specifications of the operation manual. Tightening torque of screws used to tighten the housing parts: 50Nm.
- Consider using a safety valve or another system suitable to prevent overpressure to ensure that the hydrostatic pressure in the pump does not exceed 24.5bar. Stop category 0 and PLr = b

#### **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!**

##### **Sparks due to electrostatic discharge**

If the pump is not grounded, there can be an electrostatic charge on the the pump. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Ground Pump as specified.
- Before carrying out any work, make sure that there is no explosive atmosphere.

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

## 6.2 Commissioning

Re-grease support roller for a period of one month following commissioning ↪ 9.4 “Lubrication”. This must be done after every replacement of the support roller. After that, the specified maintenance interval applies ↪ 9.2 “Maintenance schedule”.

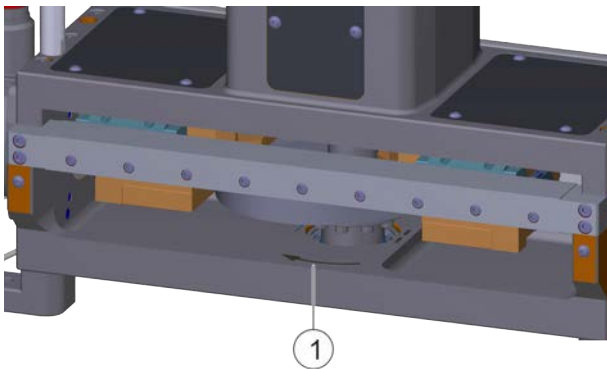


Fig. 8: Direction of the control cam

### Checks before commissioning:

- » Voltage and mains frequency match the details on the type plate of the motor.
- » A network fuse is available against overload or for the power circuits designated for nominal and starting current.
- » The protective circuit of the external power circuit of the motor is executed according to the circuit diagrams ↪ 12.2 “Connections”.
- » The direction of rotation of the control cam is clockwise.  
Observe engraving in the housing floor (1).
- » In the case of inverter operation, the maximum speed of the gear motor is not exceeded.
- » The motor is protected according to the standard.
- » The pump is grounded on the motor and on the mechanical drive.
- » Covers are assembled.
- » The control system of the pump meets the requirement of EN 1037.
- » In case of a fault due to overpressure (>24.5bar), the system switches off: PLr = b, an additional circuit breaker (PLr = b) is recommended.  
An overpressure valve is recommended for mechanically limiting the pressure level.

### Acceptance measurements

#### Personnel:

- » Electrician

#### Protective equipment:

- » Anti-Static Safety Boots

1. Implement the acceptance dimensions valid for the respective country.

### Put the pump into operation

#### Personnel:

- » Mechanic
- » + additional qualification explosion protection

#### Protective equipment:

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

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

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

2. Check oil level in the gear box ↪ 9.3 “Oil level of the gear box.”.

3. **! NOTICE!**

#### Hardening material

If the pump is used to convey hardener components, the hardener component may harden inside of the pump due to getting in contact with air and damage the pump.  
– Bleed pump.

#### Bleed pump.

- » Let the pump run with the minimum cycle rate.
4. During this time, check the tightness of the pump, connections and lines.
  5. Watch out for unusual noises. Carry out checks if there are unusual noises ↪ 7.2 “General notes”.

## 7 Operation

### 7.1 Safety recommendations

**WARNING!**

#### Hot Surface

The surfaces of the motor can heat intensely during operation. Contact can cause burn injuries.  
– Wear safety gloves.

## 7.2 General notes

Personnel:


- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Eye protection
- » Protective gloves
- » Anti-Static 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.
- » Check oil quantity ↪ 9.3 “Oil level of the gear box.”.
- » Make sure there are no dust deposits thicker than 5 mm on the gear box.
- » Make sure the opening in the venting cover is always free from dust.
- » Ensure that the connected pipeline or hose line is tested according to the specifications in force, e.g. by conducting a pressure test.

-  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 General notes

Purge

- » Use fluid to remove inner soiling from components.

Clean

- » Remove outer soiling from parts or components. ↪ 8.2 “Cleaning”

### 7.3.3 Flush the pump.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Eye protection
- » Protective gloves
- » Protective workwear
- » Respirator mask
- » Anti-Static Safety Boots

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

- » Purge pump with a suitable detergent ↪ 12.8 “Operating and auxiliary materials”.

## 8 Cleaning

### 8.1 Safety recommendations

#### WARNING!

#### **Risk of injury when working on electrical assemblies**

During the operation, parts of the motor are under dangerous voltage, which can cause serious injuries and death.

Before working on electrical assemblies

- Disconnect the power supply and secure it from being switched on again.
- Ensure that no part of the motor, not even accessory parts are live.
- Ensure the engine is at rest.

 **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!**

**Risk of injury from hot surfaces and components of the motor.**

Touching the motor during or just after operation can cause injury from the hot surface of the motor.

- Do not touch motor during operation.
- Switch off the motor before maintenance and cleaning work. Let the motor cool down to room temperature.

 **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 due to escaping material**

Escaping compressed material can cause serious injury.

Before working on the product:

- Disconnect the system with the product from power supply and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

 **NOTICE!**

**Unsuitable cleaning agents**

Unsuitable detergents can cause material damage.

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

- » Use alcohols (isopropanol, n-butanol) for non-flammable coating materials.
- » Remove dried paint residue with a thinner approved by the paint manufacturer.

 **NOTICE!**

**Unsuitable Cleaning Tools**

Unsuitable cleaning tools can cause damage.

- Only use cloths, soft brushes and paint-brushes.
- 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

### 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.
  - ↳ 12.7 “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.

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

Make sure there are no dust deposits greater than 5mm on the gear box.

Make sure the opening in the venting cover is always free from dust.

Personnel:

- » Cleaning staff

Protective equipment:

- » Protective gloves
- » Anti-Static Safety Boots
- » Protective workwear
- » Eye protection
- » Respirator mask

1. Clean pump carefully using a moist cloth.

## 9 Maintenance

### 9.1 Safety notes

#### WARNING!

##### Risk of injury when working on electrical assemblies

During the operation, parts of the motor are under dangerous voltage, which can cause serious injuries and death.

Before working on electrical assemblies

- Disconnect the power supply and secure it from being switched on again.
- Ensure that no part of the motor, not even accessory parts are live.
- Ensure the engine is at rest.

#### 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!

##### Risk of injury from hot surfaces and components of the motor.

Touching the motor during or just after operation can cause injury from the hot surface of the motor.

- Do not touch motor during operation.
- Switch off the motor before maintenance and cleaning work. Let the motor cool down to room temperature.

#### 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 due to escaping material**

Escaping compressed material can cause serious injury.

Before working on the product:


- Disconnect the system with the product from power supply and material supply.

- Secure the system against being switched on again.
- Depressurize the lines.

## 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 the number of double strokes of the pump. The indications below are for guidance only. The specifications must be adjusted if necessary.

Interval	Maintenance work
Daily	Check cleanliness of the pump. Check tightness and state of the pump. Test the seal tightness and condition of the connections and lines.
Weekly	Check noise generation in the pump. » ↪ 10.3 “Defects table” Check for steady delivery pressure. » ↪ 10.3 “Defects table”
Semi-annually	Check oil level in the gear box ↪ 9.3 “Oil level of the gear box.”. Check gear box bearing for tightness. » Open maintenance cover ↪ 9.6.1 “Disassemble the gear motor and housing.”. Check the condition of the control cam. » Lubricate the contact surface of the control cam. » Replace worn out parts ↪ 9.6.9 “Disassemble lower shaft bearing.”. Check upper shaft bearing. » Perform visual inspection. » Check noise generation. » Replace worn out parts ↪ 9.6.7 “Disassemble upper shaft bearing.”. Check lower shaft bearing. » Perform visual inspection. » Check noise generation. » Replace worn out parts ↪ 9.6.9 “Disassemble lower shaft bearing.”. Check small cam roller. » Perform visual inspection. » Check noise generation. » Replace worn out parts ↪ 9.6.5 “Dismantle bearing block.”. Check support roller. » Perform visual inspection. » Check noise generation. » Replace worn out parts ↪ 9.6.5 “Dismantle bearing block.”. Lubricate support rollers with the specified grease ↪ 9.4 “Lubrication”.

Interval	Maintenance work
Annually	Check drive housing for chips under the mechanical drive. » Remove maintenance cover ↪ 9.6.9 “Disassemble lower shaft bearing.”. » Replace defective parts.  Check linear carriages and their guides. » Replace worn out parts ↪ 9.6.9 “Disassemble lower shaft bearing.”.  Check linear carriages and their guides. » Replace worn out parts ↪ 9.6.3 “Disassemble bearing block.”.  Lubricate lower shaft bearing with the specified grease ↪ 9.4 “Lubrication”.
After 10 mil. cycles (corresponds to 20 dual strokes/min, for about 1 year)	Replace bellows ↪ 9.5.7 “Dismantling inlet cylinder”. Replace piston seals ↪ 9.5.7 “Dismantling inlet cylinder”. Replace piston guide belt ↪ 9.5.7 “Dismantling inlet cylinder”.
Every 2 years	Lubricate linear carriage with the specified grease ↪ 9.4 “Lubrication”. » Remove extra grease.
Every 5 years	Replace upper shaft bearing ↪ 9.6.7 “Disassemble upper shaft bearing.”. Replace the small cam roller ↪ 9.6.5 “Dismantle bearing block.”. Replace lower shaft bearing ↪ 9.6.9 “Disassemble lower shaft bearing.”. Replace support roller ↪ 9.6.6 “Bearing block assembly.”, ↪ 12.5 “Operating values”. Replace linear carriage ↪ 9.6.9 “Disassemble lower shaft bearing.”. Replace the gear motor ↪ 9.6.1 “Disassemble the gear motor and housing.”. Replace non-return valves ↪ 9.5.3 “Dismantling non-return valve in the outlet cylinder”, ↪ 9.5.5 “Dismantle non-return valve in the piston”.
After 10,000 operating hours	Replace the transmission oil ↪ 9.3 “Oil level of the gear box.”.

### 9.3 Oil level of the gear box.

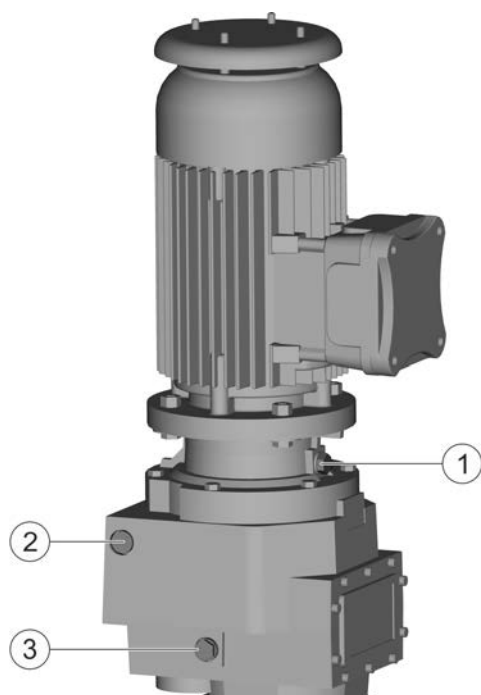


Fig. 9: Check oil level (motor as example)

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
- » Protective workwear

1. Check oil level on the inspection window (2) of the gear box.
  - ⇒ If the oil level reaches midway of the inspection window, the oil level is in order.
2. If the oil level is too low, top up oil through oil inlet screw (1).
  - ↳ 12.8 “Operating and auxiliary materials”
3. If the oil level is too high, discharge oil through oil drain screw (3).

### 9.4 Lubrication

#### Linear carriage

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
- » Protective workwear

1. Disassemble maintenance cover ↳ 9.6.3 “Disassemble bearing block.”.

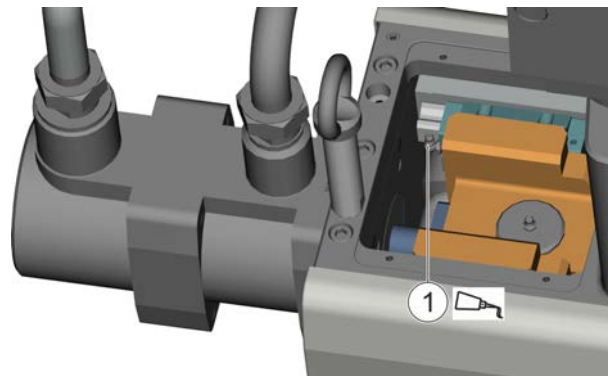


Fig. 10: Lubricating Linear Carriages

↳ Klüberplex BE31-222

2. Lubricate all four linear carriages at the lubricating nipples (1). For this purpose, use 1 stroke of a standard grease gun.

#### Support rollers

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
- » Protective workwear

1. Disassemble maintenance lid on both sides
  - ↳ 9.6.3 “Disassemble bearing block.”.

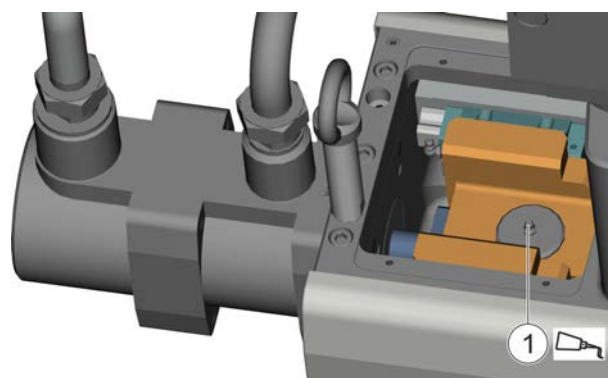


Fig. 11: Lubricate support rollers.

↳ Klüberplex BE31-222

2. Lubricate support rollers on both sides of the pump on the lubricating nipple (1). For this purpose, use 3 to 4 strokes of a standard grease gun per support roller.

### Lower shaft bearing

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
- » Protective workwear

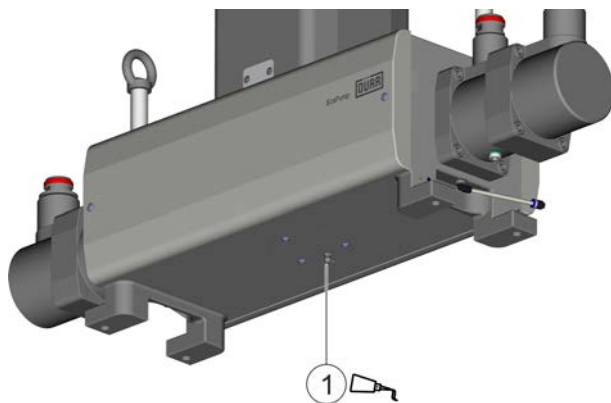


Fig. 12: Lubricating Lower Shaft Bearing

Klüberplex BE31-222

1. Lubricate lower shaft bearing at the lubricating nipples (1). For this purpose, use 3 to 4 strokes of a standard grease gun.

## 9.5 Dismantling and assembling fluid parts.

### 9.5.1 Disassemble fluid part.

#### Disassemble Fluid Part Completely.

#### NOTICE!

##### Hardening material

If the pump is used to convey hardener components, residues of the hardener component may harden inside of the pump due to getting in contact with air and damage the pump.

- Purge pump thoroughly prior to conducting maintenance work or disassembly.
- Clean components in contact with material thoroughly.



##### Use with hardener components

If the pump is used to convey hardener components, replace the bellows as soon as the bellows is in contact with air ↪ 9.5.7 “Dismantling inlet cylinder”.

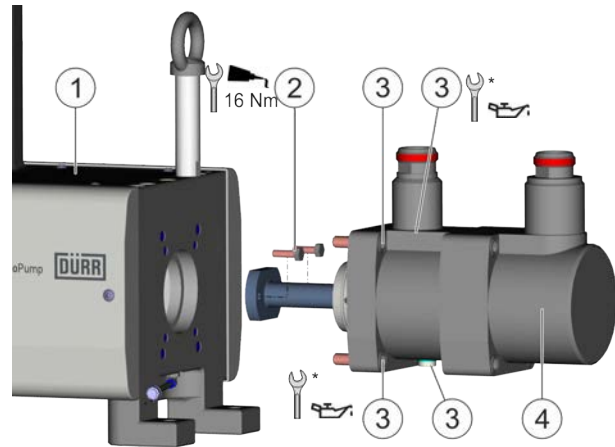


Fig. 13: Disassembling Fluid Part

N24260002, N24260014, N24260017:

1. Stage = 15 Nm, 2. Stage = 35 Nm

N24260003, N24260015, N24260018:

1. Stage = 25 Nm, 2. Stage = 50 Nm

Molykote TP-42 Paste

Loctite 222

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Connections of the suction and the pressure line are disassembled from the manifold ↪ 11.2 “Disassembly”.

1. Remove maintenance cover (1).
2. Disassemble side cover ↪ 9.6.1 “Disassemble the gear motor and housing”.

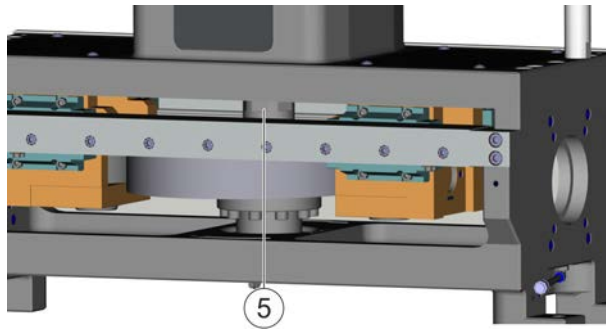



Fig. 14: Rotating the Shaft

3. Rotate shaft on the hexagon (5).  
⇒ Piston rod moves out from the Fluid part.
4.  If the piston rod has reached too deep into the fluid part, you cannot release the screws of the piston rod.  
Release two screws (2) on the piston rod.
5. Remove four screws (3) on inlet cylinder.
6. Pull out complete fluid part (4) carefully from the mechanical drive.

#### Disassemble outlet cylinder.

#### ! NOTICE!

##### Hardening material

If the pump is used to convey hardener components, residues of the hardener component may harden inside of the pump due to getting in contact with air and damage the pump.

- Purge pump thoroughly prior to conducting maintenance work or disassembly.
- Clean components in contact with material thoroughly.

#### Use with hardener components

If the pump is used to convey hardener components, replace the bellows as soon as the bellows is in contact with air ↪ 9.5.7 “Dis-mantling inlet cylinder”.

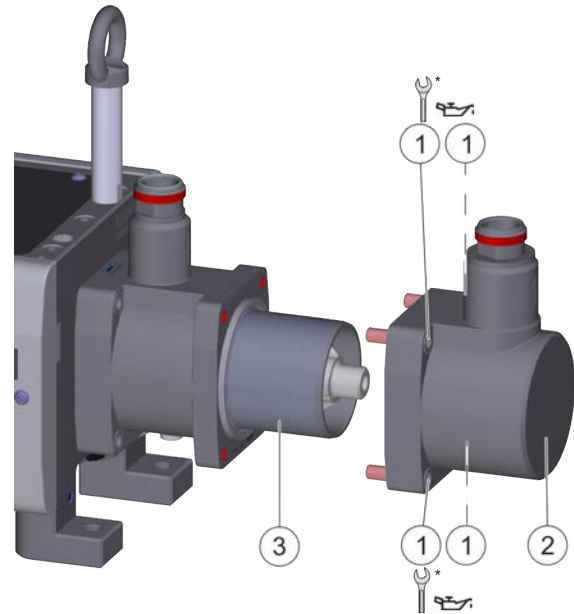





Fig. 15: Disassemble outlet cylinder.

-  N24260002, N24260014, N24260017:  
1. Stage = 15 Nm, 2. Stage = 35 Nm
-  N24260003, N24260015, N24260018:  
1. Stage = 25 Nm, 2. Stage = 50 Nm
-  Molykote TP-42 Paste

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Connection of the pressure line is disassembled from the manifold ↪ 11.2 “Disassembly”.
- 1. Remove four screws (1).
- 2. Pull out housing (2) carefully from the piston (3).

### 9.5.2 Assemble fluid part.

#### Assembling Fluid Part Completely

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Assemble fluid part in reverse order ↪ 9.5.1 “Disassemble fluid part.”. For this purpose, grease screws. Respect tightening torque.

#### Outlet cylinder assembly

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Assemble outlet cylinder in reverse order ↪ “Disassemble outlet cylinder.”. For this purpose, grease screws. Observe tightening torque.
2. Assemble grounding cable ↪ 5.3 “Connecting”.

### 9.5.3 Dismantling non-return valve in the outlet cylinder

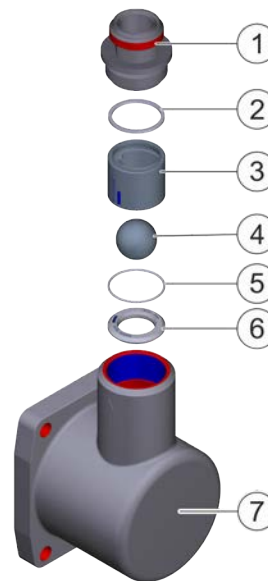


Fig. 16: Dismantling non-return valve in the outlet cylinder

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Outlet cylinder has been disassembled ↪ “Disassemble outlet cylinder.”.
1. Thread off screw-in socket (1).
  2. Remove sealing ring (2).
  3. Remove the valve ball guide (3) from the outlet cylinder housing (7).
  4. Remove ball (4), O-ring (5) and gasket (6) from outlet cylinder housing (7).



9.5.4 Assembling non-return valve in the outlet cylinder.

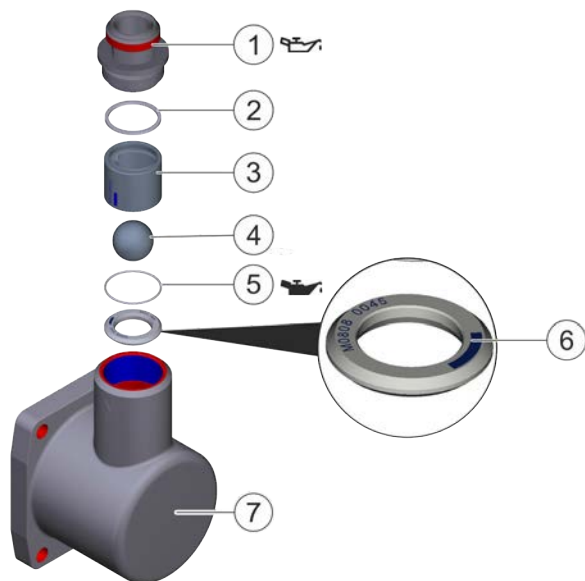


Fig. 17: Assembling non-return valve in the outlet cylinder.

- Klüber Syntheso GLEP 1
- Molykote TP-42 Paste

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Grease O-ring (5) and thread (1).
2. Place seal washer (6) in outlet cylinder housing (7).  
Note orientation of the seal washer:
  - » Engraving "Ball Side" in the direction of the ball
3. Place O-ring (5) in outlet cylinder housing (7).
4. Place ball (4) in the seal cone of the seal washer (6).
5. Insert the valve ball guide (3) into the outlet cylinder housing (7).

6. Place sealing ring (2) in outlet cylinder housing (7).
7. Thread-in the screw-in socket (1) in outlet cylinder housing (7).

9.5.5 Dismantle non-return valve in the piston

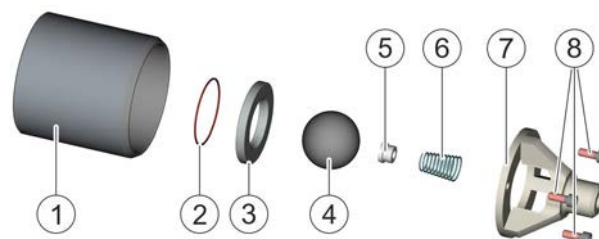


Fig. 18: Dismantle non-return valve in the piston.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Outlet cylinder has been disassembled ↪ "Disassemble outlet cylinder."

1. Remove three screws (8).
2. Pull out the valve ball guide (7) from piston (1).
3. Remove ball (4), compression spring bracket (5) and compression spring (6) from valve ball guide (7).
4. Remove gasket (3).
5. Remove O-Ring (2).

### 9.5.6 Assemble non-return valve in the piston



Fig. 19: Assemble non-return valve in the piston

- N24260002, N24260014, N24260017: 2Nm
- N24260003, N24260015, N24260018: 6Nm
- Klüber Syntheso GLEP 1
- Loctite 222

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Grease O-ring (2).
2. Slide O-ring (2) into piston (1).
3. Slide seal washer (3) into piston (1).  
Note orientation of the seal washer:  
» Engraving "Ball Side" in the direction of the ball
4. Place ball (4) in the seal cone of the seal washer (3).
5. Insert compression spring (6) and compression spring bracket (5) in valve ball guide (7).
6. Coat screws (8) to with Loctite.
7. Screw in and tighten valve ball guide (7) with three screws (8). Respect tightening torque.

### 9.5.7 Dismantling inlet cylinder

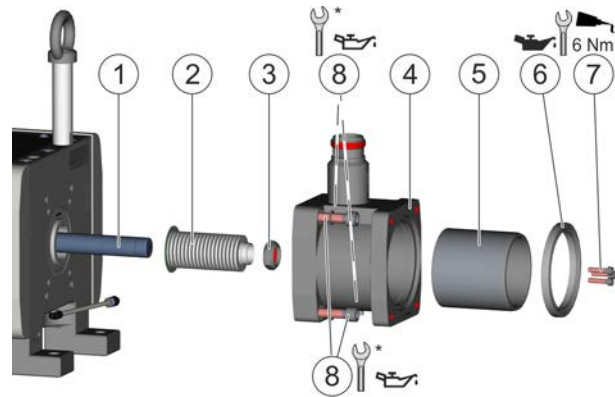


Fig. 20: Dismantling inlet cylinder

- N24260002, N24260014, N24260017: 35 Nm
- N24260003, N24260015, N24260018:  
1. Stage = 25 Nm, 2. Stage = 50 Nm
- Klüber Syntheso GLEP 1
- Molykote TP-42 Paste
- Loctite 222

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Outlet cylinder has been disassembled "Disassemble outlet cylinder."
  - » Non-return valve in the piston is dismantled 9.5.5 "Dismantle non-return valve in the piston".
1. Pull piston seal (6) from the piston (5) and remove.
  2. Remove three screws (7).
  3. Remove piston (5).
  4. Remove four screws (8) on the intake cylinder housing (4).
  5. Remove intake cylinder housing (4).
  6. Hold the bellows (2). Pull off clamping ring (3) from the piston rod (1).
  7. Cut open the bellows (2) on the front collar. Push down bellows (2) from piston rod (1).

### 9.5.8 Inlet cylinder assembly


Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Push in piston rod (1) on the side of which the bellows is mounted as far as it will go.
2. Push in new bellows (2) onto the piston rod (1) until the bellows latch in.
3. Hold the bellows (2). Slide clamping ring (3) onto the bellows (2). Observe direction of the arrow.
4. Carefully slide intake cylinder housing (4) over the bellows (2).
5. Secure intake cylinder housing (4) with four greased screws (8). Do not tighten screws (8) yet.
6. Slide piston (5) onto the piston rod (1).
7. Coat screws (7) to with Loctite. Insert three screws (7) in the piston rod (1).

 When assembling the piston (5), the clamping ring (3) is pushed onto the bellows (2).

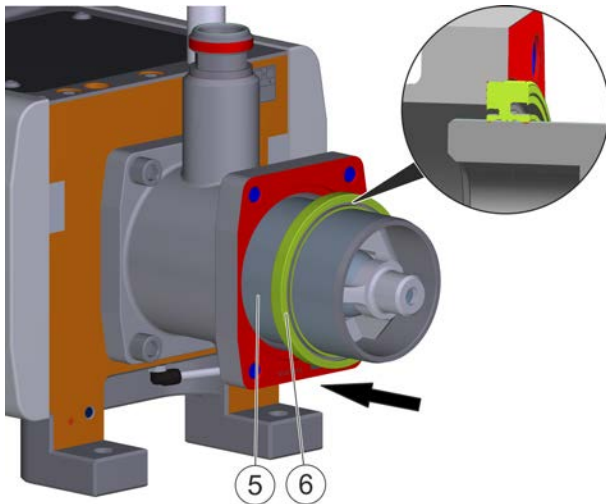


Fig. 21: Alignment of Piston Seal

8. Lightly grease piston (5). Push piston seal (6) on the piston (5).

Note orientation of the piston seal (6):

- » Align small slot of the seal (6) in the direction of the drive.
- » Align large slot of the seal (6) in the direction of the outlet cylinder.

9. Tighten screws (8) in a crosswise sequence. Respect tightening torque.

9.6 Dismantling and assembly of mechanical drive.

9.6.1 Disassemble the gear motor and housing.

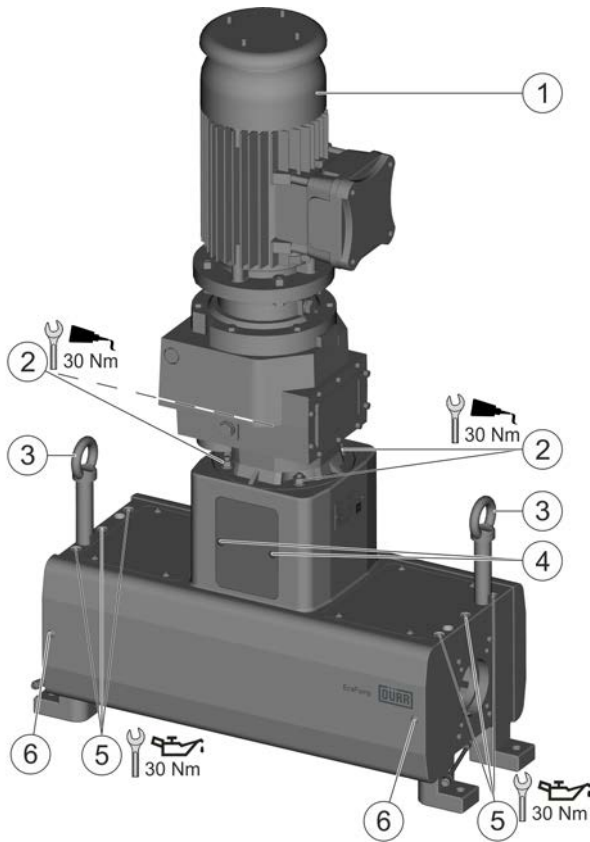


Fig. 22: Disassemble gear motor and housing (motor as example)

- Loctite 222
- Molykote TP-42 Paste

- Personnel:
- » Electrician
  - » + additional qualification explosion protection

- Protective equipment:
- » Protective gloves
  - » Protective workwear
  - » Anti-Static Safety Boots

1. Thread off two screws (4).
2. Remove maintenance cover.
3. Unscrew four nuts with spacers (2).
4. Remove gear motor (1) and coupling.

5. Unscrew two screws (6) on the both parts of the covers.
6. Remove covers on both sides of the pump.
7. Unscrew six screws (5) from the housing lid.

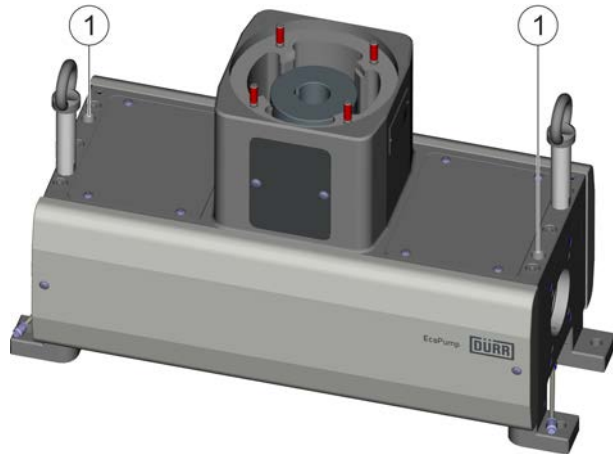


Fig. 23: Jack apart housing lid

8. Lift housing lid on two transport eyelets (3) using a crane and remove them.

Two of the screws (6) can be used as ejector screws for support. For that purpose, bores (1) are provided on the left and right of the housing lid.

The gear motor is a unit with a pressure-proof encapsulation. The gear motor must not be opened.

9.6.2 Disassemble the gear motor and housing.

- Personnel:
- » Electrician
  - » + additional qualification explosion protection

- Protective equipment:
- » Protective gloves
  - » Protective workwear
  - » Anti-Static Safety Boots

1. Assemble gear motor and housing in reverse order ↪ 9.6.1 “Disassemble the gear motor and housing.”.
  - ⇒ Respect tightening torque.

### 9.6.3 Disassemble bearing block.

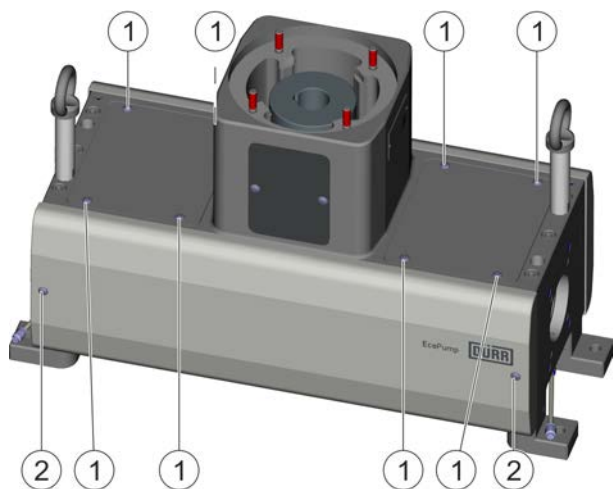


Fig. 24: Disassembling covers

**Personnel:**

- » Mechanic
- » + additional qualification explosion protection

**Protective equipment:**

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

1. Unfasten two screws (2) on both covers.
2. Remove covers on both sides of the pump.
3. Unfasten four screws (1) each.
4. Remove both maintenance covers.

You can also disassemble the housing lid completely ↪ 9.6.1 “Disassemble the gear motor and housing.”.

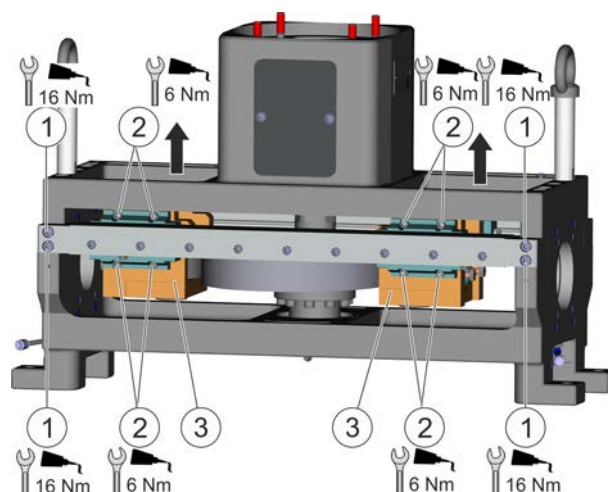


Fig. 25: Disassemble bearing block.

Loctite 222

5. Remove four screws (2) each on the four linear carriages.  
⇒ The bearing blocks are released.
6. Loosen two outer screws (1) each on the two support rails.
7. Remove bearing blocks upwards through the maintenance covers.

### 9.6.4 Assemble bearing block.

**Personnel:**

- » Mechanic
- » + additional qualification explosion protection

**Protective equipment:**

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

1. Assemble bearing block in reverse order ↪ 9.6.3 “Disassemble bearing block.”. For this purpose, grease screws. Observe tightening torque.

9.6.5 Dismantle bearing block.

Detach small cam roller.

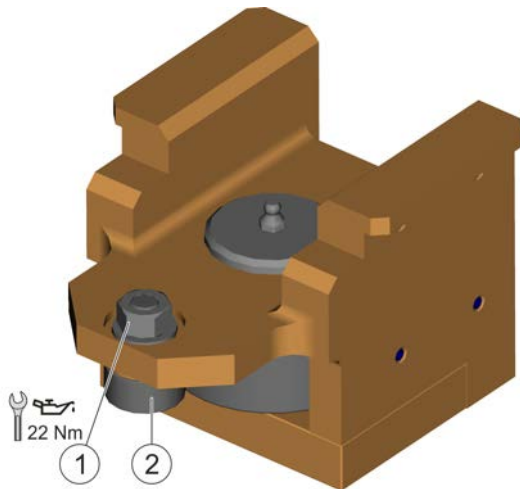


Fig. 26: Detach small cam roller.

Molykote TP-42 Paste

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective gloves
  - » Protective workwear
  - » Anti-Static Safety Boots
- » Removal of bearing block is complete ↪ 9.6.3 "Disassemble bearing block."

1. Remove nut and washer (1).
2. Pull out cam roller (2) from bearing block.

Detaching Support Roller

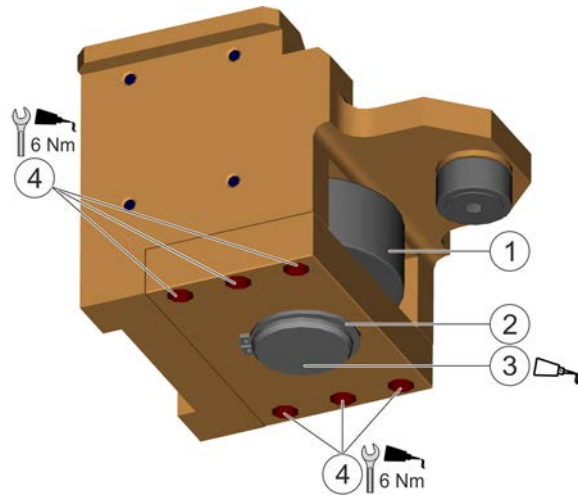


Fig. 27: Detaching Support Roller

Loctite 222

Klüberplex BE31-222

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Removal of bearing block is complete ↪ 9.6.3 "Disassemble bearing block."

1. Loosen six screws (4). Do not unscrew.
2. Remove retainer ring (2) on bearing block.
3. Push out bolt (3) from bearing block.
4. Remove support roller (1).

### 9.6.6 Bearing block assembly.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Install new support roller in reverse order  
↳ 9.6.5 “Dismantle bearing block.”. For this purpose, grease screws. Observe tightening torque.

#### ! NOTICE!

##### Bearing failure

The support roller is pre-lubricated ex-factory. If the new support roller is additionally lubricated when installing, that can cause material damage.

Do not lubricate when installing a new support roller.

Re-grease support roller for a period of one month following commissioning  
↳ 9.4 “Lubrication”. This must be done after every replacement of the support roller.

After that, the specified maintenance interval applies  
↳ 9.2 “Maintenance schedule”.

2. Install new cam roller in reverse order.  
⇒ Observe tightening torque.
3. Lubricate bolt (3).  
⇒ Klüberplex BE31-222

### 9.6.7 Disassemble upper shaft bearing.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Both fluid parts are disassembled  
↳ 9.5.1 “Disassemble fluid part.”.
- » Engine, gear box and housing lid are disassembled  
↳ 9.6.1 “Disassemble the gear motor and housing.”.

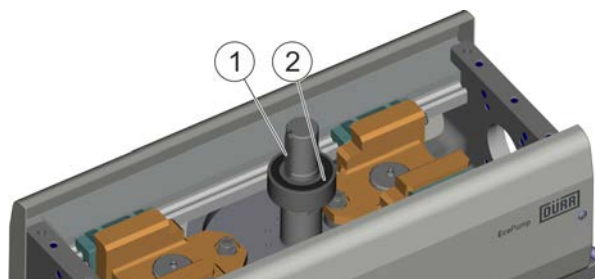


Fig. 28: Disassembling Upper Shaft Bearing.

1. Remove parallel key (1).
2. Pull off shaft bearing (2) from shaft.

### 9.6.8 Assemble upper shaft bearing.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Install new shaft bearing in reverse order of disassembly.

### 9.6.9 Disassemble lower shaft bearing.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

Requirements:

- » Both fluid parts are disassembled ↪ 9.5.1 "Disassemble fluid part."
- » Engine, gear box and housing lid are disassembled ↪ 9.6.1 "Disassemble the gear motor and housing."
- » Detachment of bearing block is complete ↪ 9.6.3 "Disassemble bearing block."

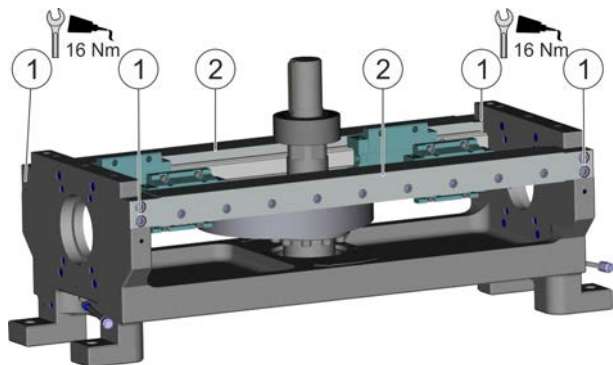


Fig. 29: Disassembling Linear Guides.

Loctite 222

1. Thread off two screws (1) each.
2. Remove both rails with linear carriage (2).
3. Place mechanical drive on the side.

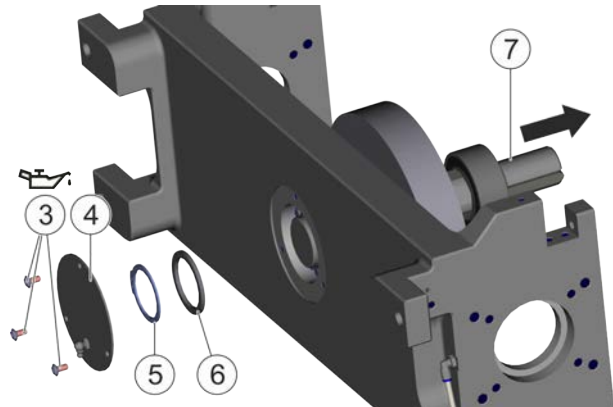


Fig. 30: Disassembling shaft

Molykote TP-42 Paste

4. Remove three screws (3).
5. Remove maintenance cover (4).
6. Remove retainer ring (5).
7. Remove inner bearing ring (6).
8. Pull out shaft (7) with cam disk and upper shaft bearing in the direction of the arrow.

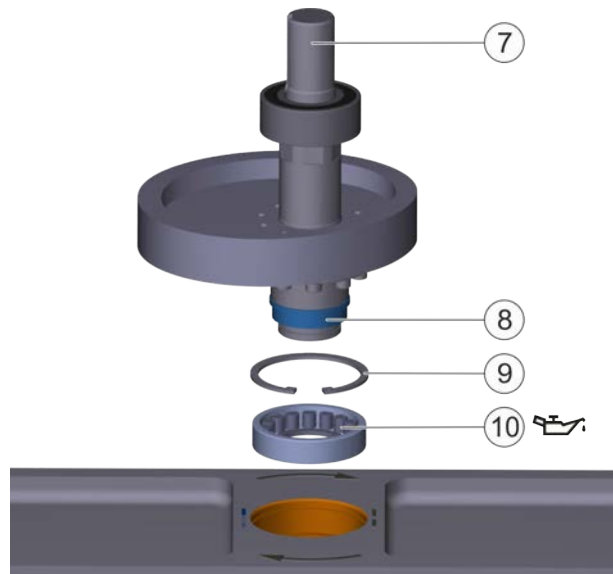


Fig. 31: Disassembling Lower Shaft Bearing

Molykote TP-42 Paste

9. Pull out inner ring (8) from shaft (7).
10. Remove retainer ring (9) from the housing.
11. Remove lower shaft bearing (10) from the housing.



### 9.6.10 Assemble lower shaft bearing.


Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

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

1. Remove inner ring (8) from new lower shaft bearing (10).
2. Assemble inner ring (8) on shaft (7).
3. Insert lower shaft bearing (10) with retainer ring (9) in the pump housing.
4. Push shaft (7) from above into the pump housing.
5. Slide inner bearing ring (6) on the shaft.
6. Secure shaft (7) with a retainer ring (5).
7. Assemble maintenance lid (4) with three greased screws (3).
8. Lubricate lower shaft bearing (10) through the lubricating nipple on the service lid (4). Fill in grease until all the remaining space between bearing and housing is completely filled up. Rollers of the bearing must run fully in the grease.

 Use Molykote TP-42 paste for installing the bearing. To re-lubricate, use Klüberplex BE31-222 ↪ 9.4 "Lubrication".

#### **WARNING!**

##### **Risk of injury due to escaping material and compressed air**

Escaping compressed material can cause serious injury.

Before carrying out any work:

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

#### **WARNING!**

##### **Risk of injury when working on electrical assemblies**

During the operation, parts of the motor are under dangerous voltage, which can cause serious injuries and death.

Before working on electrical assemblies

- Disconnect the power supply and secure it from being switched on again.
- Ensure that no part of the motor, not even accessory parts are live.
- Ensure the engine is at rest.

#### **NOTICE!**

##### **Property damage due to faults**

Faults that hamper safe operation of the product can damage the product.

- Faults must be remedied immediately.
- Operate the product only if it is in perfect condition.

## 10 Faults

### 10.1 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).

### 10.2 Behavior during faults

When faults occur:

- » Shut down the power supply. Secure against reconnection.
- » Verify that no current is present.
- » Switch off material supply system. Secure against reconnection.
- » Relieve the lines.
- » Follow the defects table to correct the fault.

## 10.3 Defects table

<b>Fault description</b>	<b>Cause</b>	<b>Remedy</b>
Motor does not start.	Fuse or motor circuit breaker triggered.	Reset fuse or motor circuit breaker.
	Available power is insufficient.	Align performance data of the motor with the performance data of the control system (frequency converter) ↪ 12.5 "Operating values".
	Connections are not correctly mounted.	Check if the connections match the wiring diagram of the motor.
	Mechanical defect	<ul style="list-style-type: none"> <li>» Check whether motor and mechanical drive can run freely.</li> <li>» Check bearing and lubricant.</li> </ul>
	Rotor defective	Check if the rods of the rings are broken. Replace rotor if necessary.
	One phase is interrupted.	Check connection cable.
	Overload	Reduce load.
	Voltage too low	Ensure that the motor is fed the right voltage ↪ 12.5 "Operating values", ↪ 12.6 "Type plate".
	Frequency converter defective	Check frequency inverter.
Motor does not reach the nominal speed, the acceleration times are too long, consumption too high.	Rotor defective	Check the condition of the rotor cage. Replace rotor if necessary.
Motor shuts off due to trigger by PTC (overheating).	Overload	Reduce load.
	Inverter set incorrectly	Check setting of the inverter. Correct as necessary.
	Radiator and/or fan flap are blocked due to dirt.	Clean ventilation opening. Ensure continuous air streaming in the motor.
	One phase is interrupted.	Check connection cable.
	Operation too heavy or intermittent.	Use motor for the operation stated on the type plate ↪ 12.5 "Operating values", ↪ 12.6 "Type plate".
	Lubricant quantity of the gear box is too low	Top up oil ↪ 9.3 "Oil level of the gear box.".
	Motor defective.	<ul style="list-style-type: none"> <li>» Replace motor.</li> <li>» Send defective motor to Dürr Systems for repairs ↪ "Hotline and Contact".</li> </ul>
	PTC defective	Replace PTC.
Incorrect direction of rotation of the motor or gear box	Wrong phase sequence	Switch two phases.

Fault description	Cause	Remedy
	Inverter set incorrectly	Check setting of the inverter. Correct as necessary.
Motor protection has triggered.	One phase is interrupted.	Check connection cable.
	Inverter set incorrectly	Check setting of the inverter. Correct as necessary.
	Faulty connection	Match connection with circuit diagram of the connections and type plate with the details of the power ↪ 12.5 "Operating values", ↪ 12.6 "Type plate".
	Overload	Reduce load.
Abnormal motor noises	Fan touches the fan flap.	Remove the contact.
	Bearing defective	<ul style="list-style-type: none"> <li>» Replace motor.</li> <li>» Send defective motor to Dürr Systems for repairs ↪ "Hotline and Contact".</li> </ul>
Gear box is losing oil.	Seals defective	Replace gear box.
	Gear vent is blocked.	<ul style="list-style-type: none"> <li>» Remove transport plug.</li> <li>» Clean vent opening.</li> </ul>
Gear box is losing oil through ventilation bore.	Oil level in gear box too high.	Drain oil and fill with specified amount ↪ 9.3 "Oil level of the gear box.".
Roller on cam disk is making noticeable operating noise; roller heats up excessively.	Roller is not sufficiently lubricated.	<ul style="list-style-type: none"> <li>» Lubricate support roller.</li> <li>» Replace damaged roller ↪ 9.6.5 "Dismantle bearing block.".</li> </ul>
	Roller movement heavy due to too much grease, grease oozes out from roller	Replace roller ↪ 9.6.5 "Dismantle bearing block.".
Pumping quantity or operating pressure is not reached. High pressure fluctuations	Material supply interrupted	Check the connection and operation of the material supply system.
	Air has penetrated the suction line.	<ul style="list-style-type: none"> <li>» Check seals and pipe connections.</li> <li>» Check material supply line.</li> <li>» Vent the system.</li> </ul> <p>If hardener components had been conveyed, also ensure the following:</p> <ul style="list-style-type: none"> <li>» Purge the pump thoroughly.</li> <li>» Clean components in contact with material thoroughly.</li> <li>» Replace bellows.</li> </ul>
	Piston seal defective or incorrect installation position	Check the installation location; replace if the piston seal is defective ↪ 9.5.7 "Dismantling inlet cylinder".
	Non-return valves in piston or outlet do not seal properly or are jammed.	Check non-return valves and replace if necessary. <ul style="list-style-type: none"> <li>» ↪ 9.5.3 "Dismantling non-return valve in the outlet cylinder"</li> </ul>

Fault description	Cause	Remedy
	<p>External overpressure device not functioning properly.</p> <p>Setting of the external pressure controller is faulty.</p> <p>Incorrect direction of rotation of the motor or gear box</p>	<p>» ↪ 9.5.5 “Dismantle non-return valve in the piston”</p> <p>Check overpressure device.</p> <p>Check setting of the external pressure controller.</p> <p>Switch two phases. Check setting of the inverter. Correct as necessary.</p>
Paint in the leakage hose or inside the mechanical drive	Bellows on piston rod defective	Replace bellows and guide belt ↪ 9.5.7 “Dismantling inlet cylinder”.
Significant pressure fluctuations during normal operation	<p>Air in material system</p> <p>Piston seal defective or incorrect installation position</p>	<p>» Check tightness of the connections on the suction side.</p> <p>» Vent the system.</p> <p>» Check material supply system.</p> <p>If hardener components had been conveyed, also ensure the following:</p> <p>» Purge the pump thoroughly.</p> <p>» Clean components in contact with material thoroughly.</p> <p>» Replace bellows.</p> <p>Check the installation location; replace if the piston seal is defective ↪ 9.5.7 “Dismantling inlet cylinder”.</p>
Motor remains at rest.	In the case of pressure-controlled operation of the pump, the motor tries to maintain the specified pressure through the rotational speed. If the non-return valves or piston seal are defective, one pipe is clogged or the PTC triggers, the rotational speed can rise, until it causes the motor to shut off.	<p>Check non-return valves and piston seals and replace if necessary.</p> <p>» ↪ 9.5.3 “Dismantling non-return valve in the outlet cylinder”</p> <p>» ↪ 9.5.5 “Dismantle non-return valve in the piston”</p> <p>» ↪ 9.5.7 “Dismantling inlet cylinder”.</p> <p>Check pipes for clogging. Check PTC.</p>

## 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!**

##### **Risk of injury when working on electrical assemblies**

During the operation, parts of the motor are under dangerous voltage, which can cause serious injuries and death.

Before working on electrical assemblies

- Disconnect the power supply and secure it from being switched on again.
- Ensure that no part of the motor, not even accessory parts are live.
- Ensure the engine is at rest.

#### **WARNING!**

##### **Risk of injury due to escaping material**

Escaping compressed material can cause serious injury.

Before working on the product:

- Disconnect the system with the product from power supply and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.



Even if the pump is purged, medium can still come out on loosening the pipe connections.

- Place suitable collecting trays below the pipe connections.

### 11.2 Disassembly

#### **Motor**

Personnel:

- » Electrician

Protective equipment:

- » Protective workwear

1. Disconnect the motor from power supply.

Personnel:

- » Mechanic
- » + additional qualification explosion protection

Protective equipment:

- » Protective workwear
- » Respirator mask
- » Eye protection
- » Protective gloves
- » Anti-Static Safety Boots

Requirements:

- » Pump has been purged ↪ 7.3 “Rinsing”.
- » Ball valves in the pressure line are closed.
- » Ball valves in the suction line are closed.
- » Lines are depressurized.
- » Collection trays are below the outlet openings.

1. Place a collector tray under the pipelines.

#### **NOTICE!**

##### **Hardening material**

If the pump is used to convey hardener components, residues of the hardener component may harden inside of the pump due to getting in contact with air and damage the pump.

- Purge pump thoroughly prior to conducting maintenance work or disassembly.
- Clean components in contact with material thoroughly.

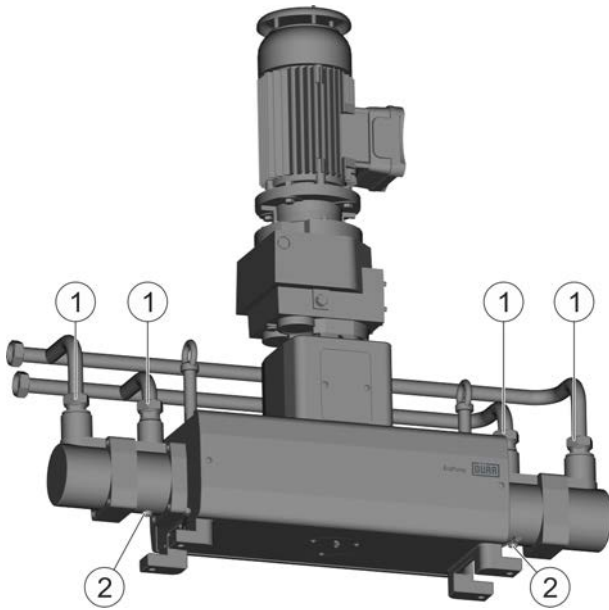


Fig. 32: Disassemble pump (motor as example)

2. Open locking screw (2).  
⇒ Material in the pump flows out.
3. Loosen cap nuts (1) on the manifolds.
4. Separate pipelines from the pump.  
⇒ Material flows out from the pipelines.
5. Separate grounding cable from the grounding hole ↪ 5.3 “Connecting”.
6. Disassemble pump from the wall or the device.
7. Lay down or store the pump as specified.

### 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.  
↪ 12.7 “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 cleaned ↪ 8.2 “Cleaning” and purged ↪ 7.3 “Rinsing”.
- » Pump has been disassembled ↪ 11.2 “Disassembly”.

#### Personnel:

- » Mechanic
- » + additional qualification explosion protection

#### Protective equipment:

- » Protective gloves
- » Eye protection
- » Anti-Static 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

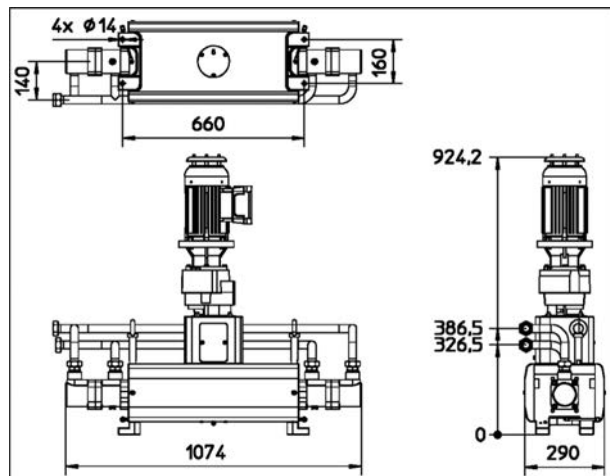


Fig. 33: Dimensions N24260002

N24260002	Value
Height	924mm
Width	1074mm
Depth	290mm
Weight	154kg

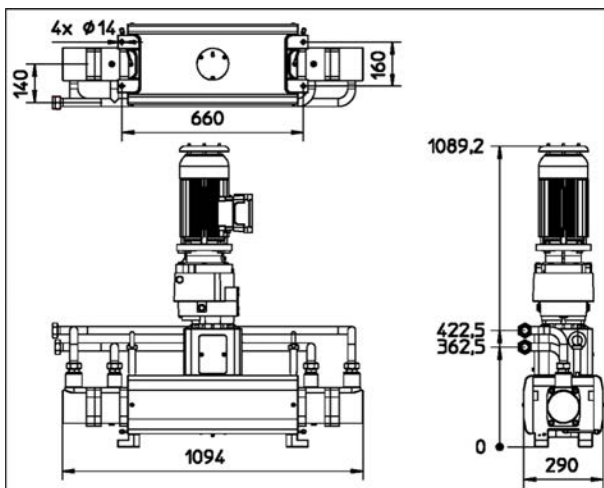


Fig. 34: Dimensions N24260003

N24260003	Value
Height	1089mm
Width	1094mm
Depth	290mm
Weight	180kg

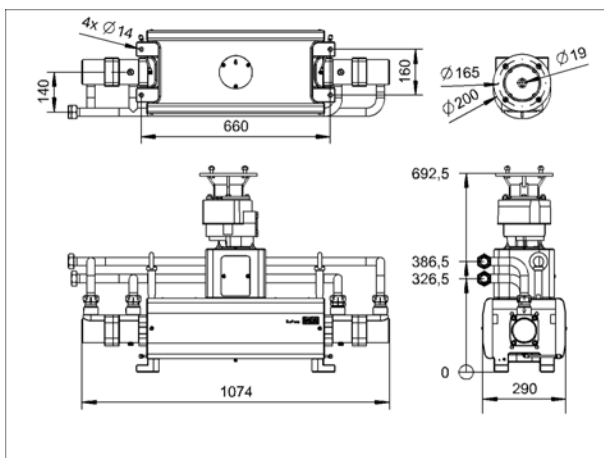


Fig. 35: Dimensions N24260014, N24260017

N24260014, N24260017	Value
Height without motor	693mm
Width	1074mm
Depth	290mm
Weight without motor	126kg
Weight of motor, see the operation manual of the manufacturer	

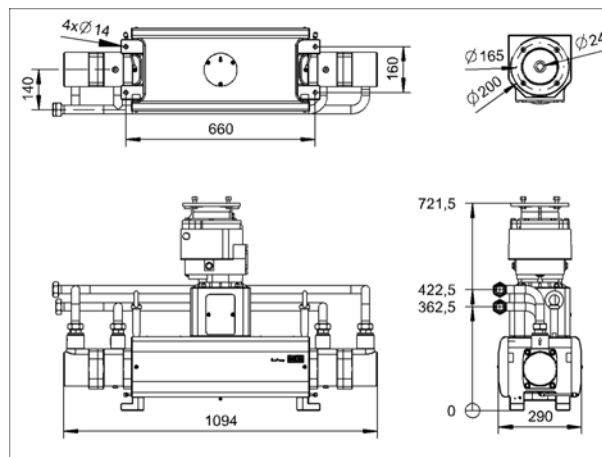


Fig. 36: Dimensions N24260015, N24260018

N24260015, N24260018	Value
Height without motor	722mm
Width	1094mm
Depth	290mm
Weight without motor	147kg
Weight of motor, see the operation manual of the manufacturer	

## 12.2 Connections

Connection	Value
Material outlet connection	EcoTube DN25
Material inlet connection	EcoTube DN25

- i** For the motors of the following pumps, observe the manufacturer's documentation:
- N24260014
  - N24260015
  - N24260017
  - N24260018

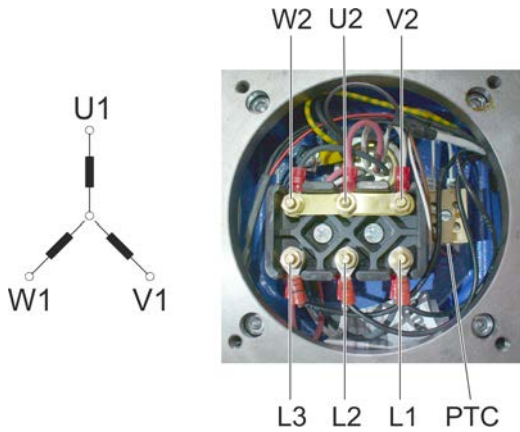


Fig. 37: Motor circuit diagram (N24260002)

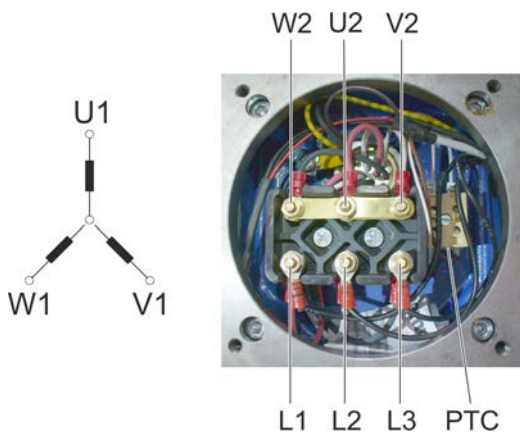


Fig. 38: Motor circuit diagram (N24260003)

### 12.3 Operating conditions

Detail	Value
Operating temperature, min.	10 °C
Operating temperature, max.	50 °C
Media temperature, min.	10°C
Media temperature, max.	50 °C
Ambient temperature, min.	15°C
Ambient temperature, max.	40°C
Relative humidity, min.	35%
Relative humidity, max.	90 %

### 12.4 Emissions

Detail	Value
Sound pressure level	75 dB(A)

The sound pressure level was measured at 40Hz.

### 12.5 Operating values

An increase in wear and, as a result, shorter life cycles of the seals and other pump components are to be expected if the number of cycles is permanently >20 cycles/min. Recommendation: If the number of cycles is >20 cycles/min, use the pump that is next in size.

### Material pressure

Detail	Value
Inlet material pressure, max.	2bar
Outlet material pressure, max.	21bar
Safe switching off of the pump (PLr = b)	24.5bar

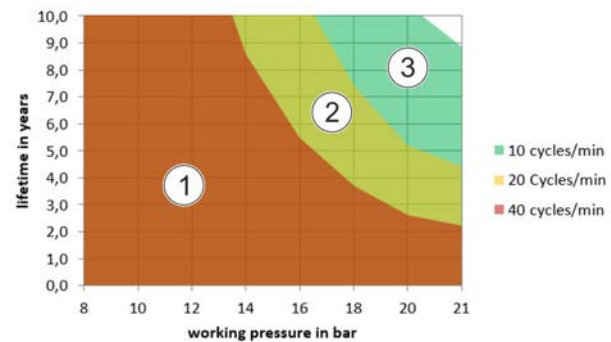


Fig. 39: Characteristic curve of the life cycle of the support rollers

- 1 40 cycles/minute
- 2 20 cycles/minute
- 3 10 cycles/minute

### N24260002, N24260014, N24260017 - Displacement volume and flow rate

Motor frequency (Hz)	Cycles/min.	Flow rate (L/min)
10 - 80	5 - 40	2 - 16

### 12.10 "Characteristic curve of the outflow rate"

Displacement volume: 400cm<sup>3</sup>/cycle



**N24260003, N24260015, N24260018 - Displacement volume and flow rate**

Motor frequency (Hz)	Cycles/min.	Flow rate (L/min)
10 - 80	5 - 40	4 - 32

↳ 12.10 “Characteristic curve of the outflow rate”

Displacement volume: 800cm <sup>3</sup> /cycle
--

**Drive**

Detail	Value
Line voltage, N24260002, N24260003	400V ±5%
Line voltage, N24260014, N24260015, N24260017, N24260018	440V ±5%
Nominal frequency, N24260002, N24260003	10 - 80Hz ±2%
Nominal frequency, N24260014, N24260015	60Hz
Nominal frequency, N24260017, N24260018	50Hz
Power, N24260002, N24260014, N24260017	0.75kW
Power, N24260003, N24260015, N24260018	1.5kW
Motor, N24260002, N24260003	EU
Motor, N24260014, N24260015	KR
Motor, N24260017, N24260018	JP
Minimum distance of the motor to external components	40mm

**Special tightening torques for gear motor**

Screw Size	Tightening torque, max.
M4	2Nm
M5	3.2Nm
M6	2Nm
M8	10Nm
M10	16Nm

Screw Size	Tightening torque, max.
M12	25Nm

**Power cord cross section**

Terminal	Standard value	Peak Value
M5	1.5-2.5-6	10
M6	6-10-16	16
M10	10-16-25-35	70
M12	25-35-50-70	120

The peak values are only valid in connection with special cable lugs.

**12.6 Type plate**

The type plate is on the drive housing of the pump. The type plate shows the following details:

- » Product name
- » Material number
- » Year of manufacture
- » Serial number
- » Mains voltage
- » Maximum material pressure
- » CE labeling
- » ATEX marking
- » Manufacturer
- » QR Code

**12.7 Materials used**

Detail	Material
Components in contact with material	Stainless steel
Housing	Aluminum
Ball	Stainless steel
Ball seat	Hard metal
Piston seal	PTFE

**12.8 Operating and auxiliary materials**

Material	Specification
Seal lubricant	Klüber Syntheso GLEP 1
Lubricant for screws	Molykote TP-42 Paste

Material	Specification
Grease for the lubrication of the rollers	Klüberplex BE31-222
Transmission oil W32030023	AGIP BLASIA S220
Volume of transmission oil N24260002, N24260014, N24260017	2.15L
Volume of transmission oil N24260003, N24260015, N24260018	3.9L
Thread protection	Loctite® 222

**Cleaning agents**

Only use approved cleaning agents with the following properties:

- » Suitable for use in explosive areas.
- » Compatible with the materials used  
↳ 12.9 “Material specification”

**Detergent**

Only use approved detergents with the following properties:

- » Suitable for use in explosive areas.
- » Compatible with the pumped material
- » Compatible with the materials used  
↳ 12.9 “Material specification”

12.9 Material specification

**Requirements for delivered media**

Detail	Value
Viscosity, min.	40mPa s

Detail	Value
Viscosity, max.	250mPa s
Diameter of the solids contained, max.	400µm
Conductivity, min.	1000pS/m

12.10 Characteristic curve of the outflow rate

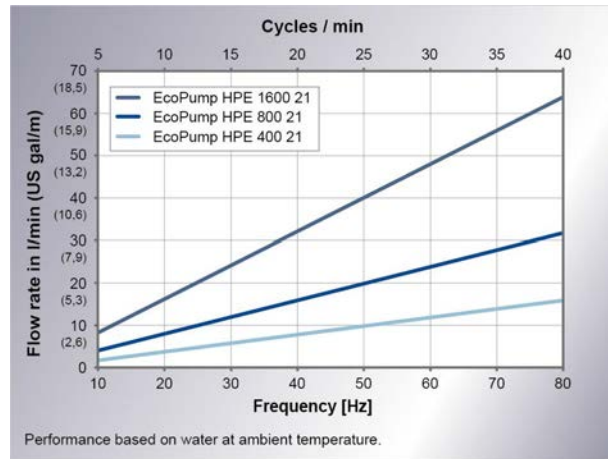


Fig. 40: Characteristic curve of the outflow rate

- EcoPump HPE 400
- EcoPump HPE 800
- EcoPump HPE 1600

### 13 Replacement parts and accessories

#### 13.1 Replacement parts

##### 13.1.1 Fluid part

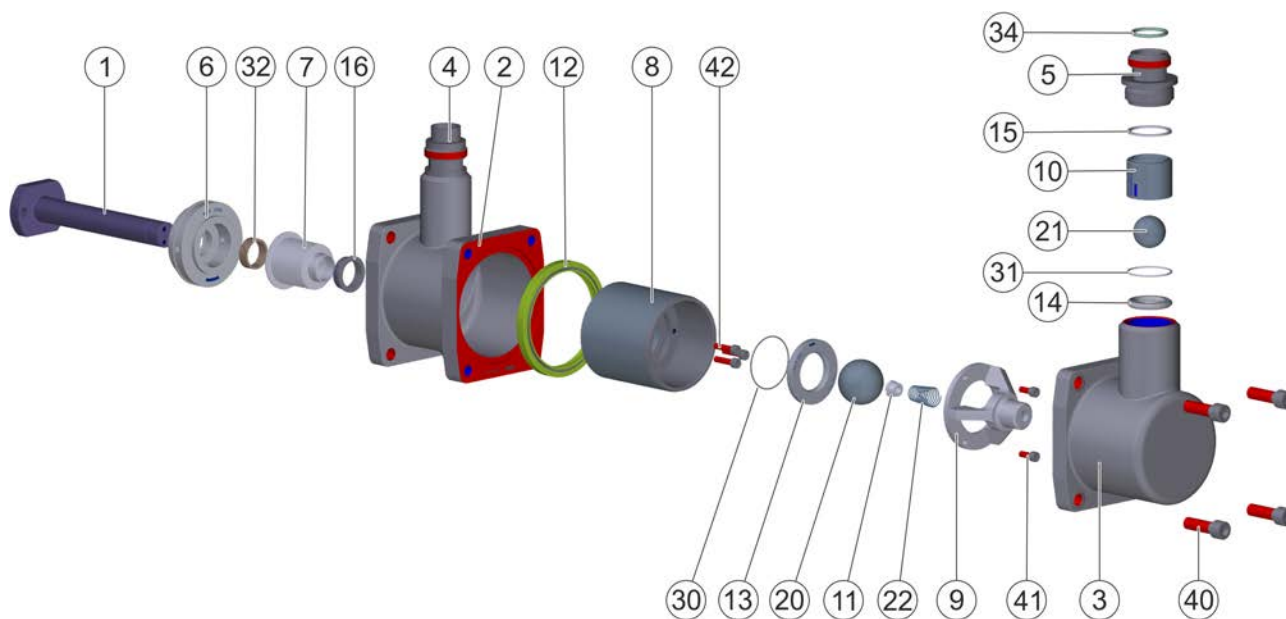


Fig. 41: Fluid part spare parts

**N24260002, N24260014, N24260017**

Position	Denomination	Quantity	Repair kit/ seal set
1	Piston rod	2	
2	Intake cylinder housing	2	
3	Outlet cylinder housing	2	
4	Screw-in socket DN25 G1"	2	
5	Screw-in socket DN25 G1"	2	
6	Seal housing	2	
7	Bellows D25	2	M59040037, included in N24960014
8	Piston	2	
9	Valve ball guide	2	
10	Valve ball guide pressure side G1"	2	
11	Compression spring fix bracket	2	M19023278
12	Piston seal DN65	2	M08050100, included in N24960014
13	Gasket D44.5	2	N24960013
14	Gasket D30.2	2	N24960013

Position	Denomination	Quantity	Repair kit/ seal set
15	Sealing ring D30	2	N24960013, N24960014
16	Clamping ring D36	2	N24960014
20	Ball D31.75	2	N24960013
21	Ball D19.05	2	N24960013
22	Compression spring	2	M68010200
30	O-ring 35 x 1.5	2	N24960013, N24960014
31	O-ring 25 x 2.5	2	N24960013, N24960014
32	Piston guide belt	2	N24960013
34	O-Ring DN25	4	N24960013, N24960014
40	Cylinder screw M10x40 with Safety washer	8 8	
41	Cylinder screw M4x10	6	
42	Cylinder screw M6x25	6	

**N24260003, N24260015, N24260018**

Position	Denomination	Quantity	Repair kit/ seal set
1	Piston rod	2	
2	Intake cylinder housing	2	
3	Outlet cylinder housing	2	
4	Screw-in socket DN25 G1"	2	
5	Screw-in socket DN25 G1 1/2"	2	
6	Seal housing	2	
7	Bellows D25	2	M59040037, included in N24960016
8	Piston	2	
9	Valve ball guide	2	
10	Guide valve ball pressure side G1 1/2"	2	
11	Compression spring fix bracket	2	M19023278
12	Piston seal DN95	2	M08050101, included in N24960016
13	Gasket D64	2	N24960015
14	Gasket D44.5	2	N24960015
15	Sealing ring D44.5	2	N24960015, N24960016
16	Clamping ring D36	2	N24960016
20	Ball D44.45	2	N24960015
21	Ball D31.75	2	N24960015

Position	Denomination	Quantity	Repair kit/ seal set
22	Compression spring	2	M68010200
23	Sealing screw G1/4"	2	
30	O-ring 50 x 1.5	2	N24960015, N24960016
31	O-ring 41 x 1.78	2	N24960015, N24960016
32	Piston guide belt	2	N24960015
33	Sealing ring D18.0	2	N24960016
34	O-Ring DN25	4	N24960015, N24960016
40	Cylinder screw M12x40 with Safety washer	8 8	
41	Cylinder screw M6x16	6	
42	Cylinder screw M6x25	6	

### 13.1.2 Drive

#### Motor and coupling

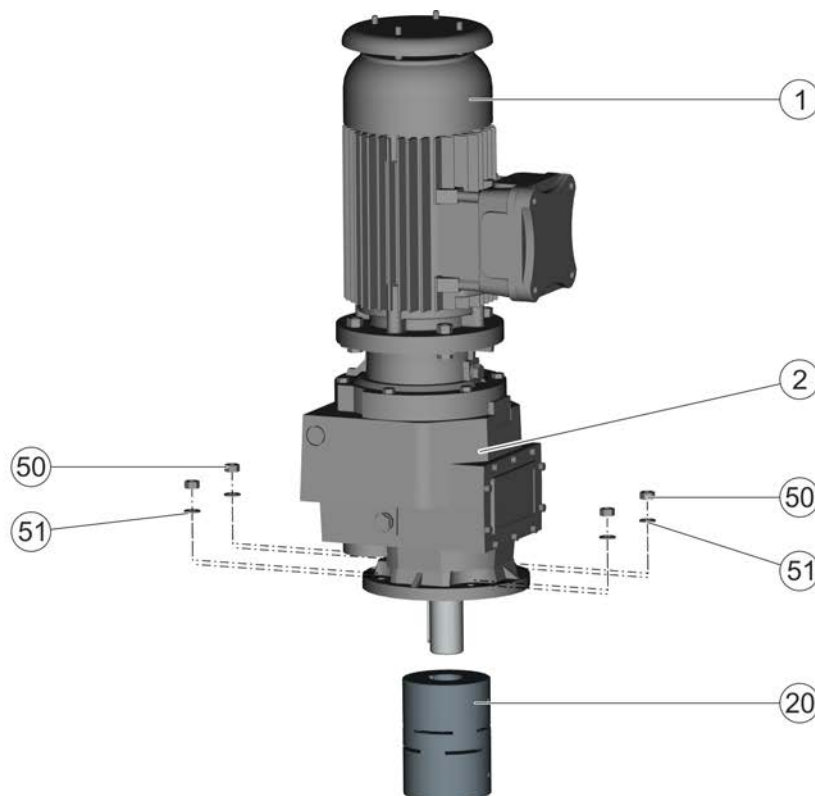


Fig. 42: Spare parts for motor, clutch (motor as example)

Position	Denomination	Quantity	N24260002	N24260003
1	Gear motor	1	N15020347	N15020348
20	Coupling	1	M26070278	M26070279
50	Hexagon nut M10	4		
51	Washer B10.5	4		

Position	Denomination	Quantity	N24260014	N24260015
1	Motor	1	N23030167	N23030168
2	Gear box	1	N15010297	N15010296
20	Coupling	1	M26070278	M26070279
50	Hexagon nut M10	4		
51	Washer B10.5	4		

Position	Denomination	Quantity	N24260017	N24260018
1	Motor	1	N23030172	N23030166
2	Gear box	1	N15010297	N15010296
20	Coupling	1	M26070278	M26070279
50	Hexagon nut M10	4		
51	Washer B10.5	4		

Mechanical drive

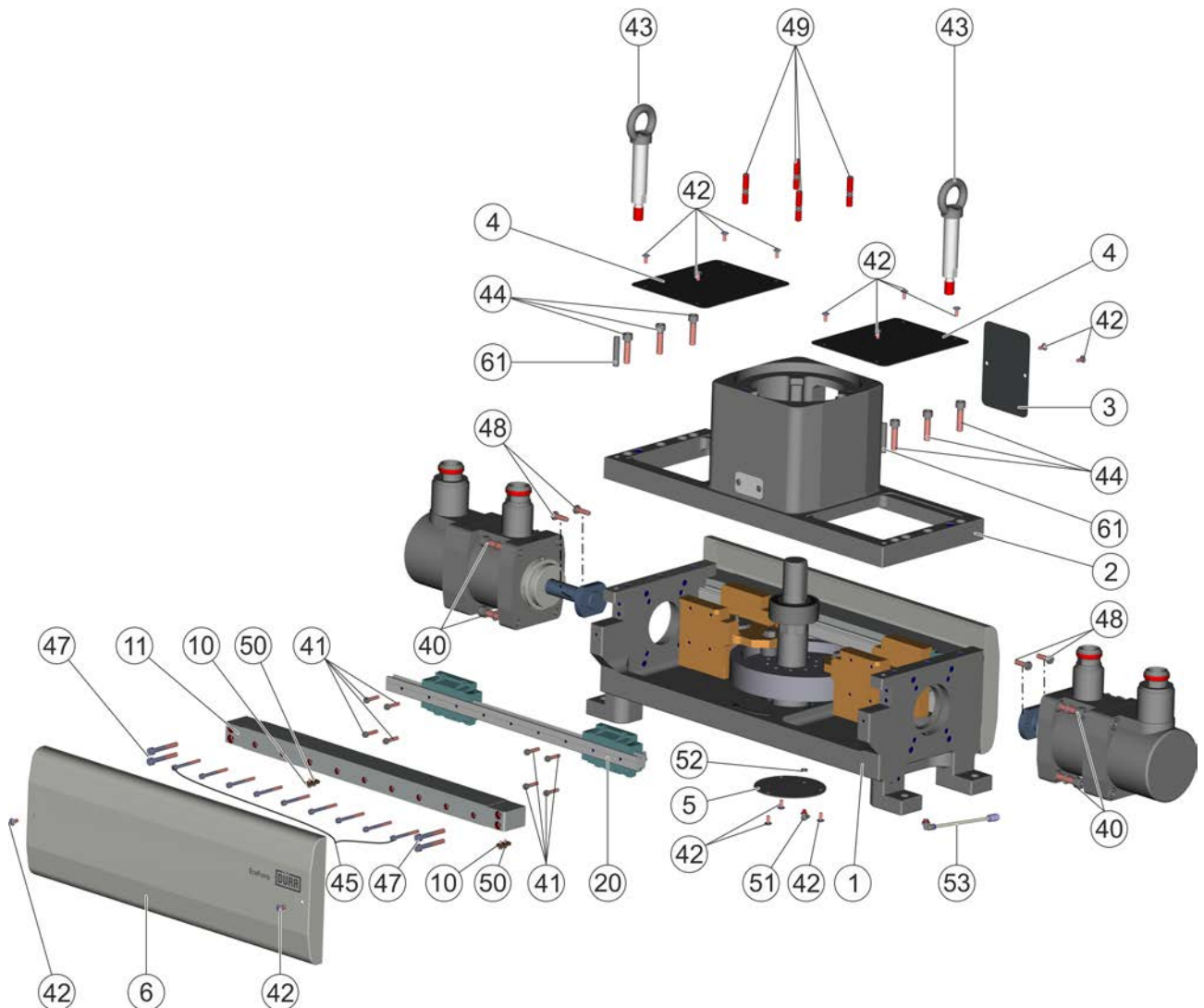


Fig. 43: Replacement parts Mechanical Drive

Position	Denomination	Quantity	Material number
1	Bearing housing	1	
2	Housing cover	1	
3	Maintenance access cover plate	1	
4	Maintenance access cover plate	2	
5	Cover sheet lower shaft bearing maintenance	1	
6	Cover	2	
10	Stop	4	
11	Support rail	2	
20	Linear guide	2	M12030560

Position	Denomination	Quantity	Material number
40	N24260002: Cylinder screw M10x40 with safety washer N24260003, N24260018: Cylinder screw M12x40 with safety washer	8 8	
41	Cylinder screw M6x25	16	
42	Cylindrical flange head screw M6x12	17	
43	Transport ring bolt	2	
44	Cylinder screw M10x40	6	
45	Cylinder screw M6x55	18	
47	Cylinder screw M8x55	8	
48	Hex screw M8x25	4	
49	Stud bolt M10x30.	4	
50	Cylinder screw M4x10	8	
51	Lubricating nipple	1	
52	Hex nut	1	
53	Leakage hose	2	
61	Cylinder pin	2	



Flanged shaft

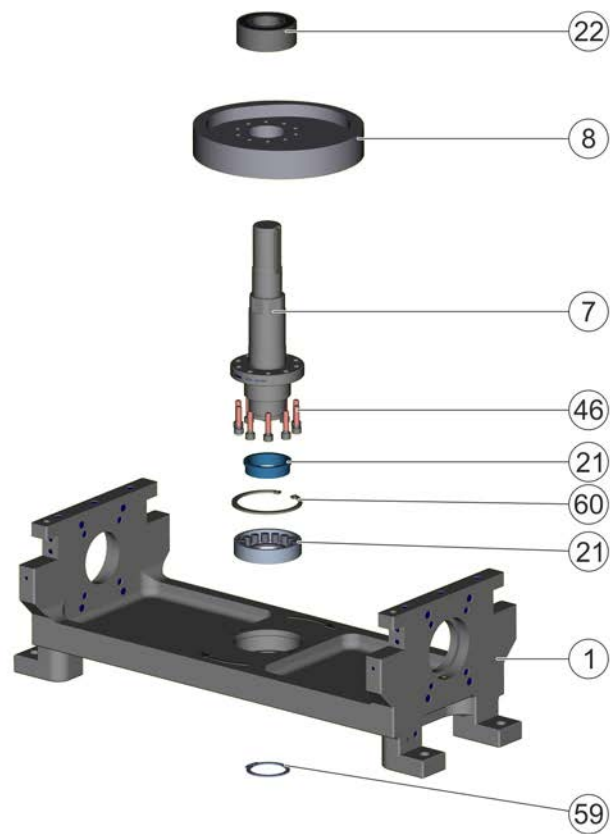


Fig. 44: Replacement parts Flange shaft

Position	Denomination	Quantity	Material number
1	Bearing housing	1	
7	Flanged shaft	1	
8	Control cam	1	
21	Lower shaft bearing	1	M28050004
22	Upper shaft bearing	1	M28090046
46	Cylinder screw M8x30	10	
59	Retainer ring 50 x 2	1	
60	Retainer ring 90 x 3	1	

## Bearing block

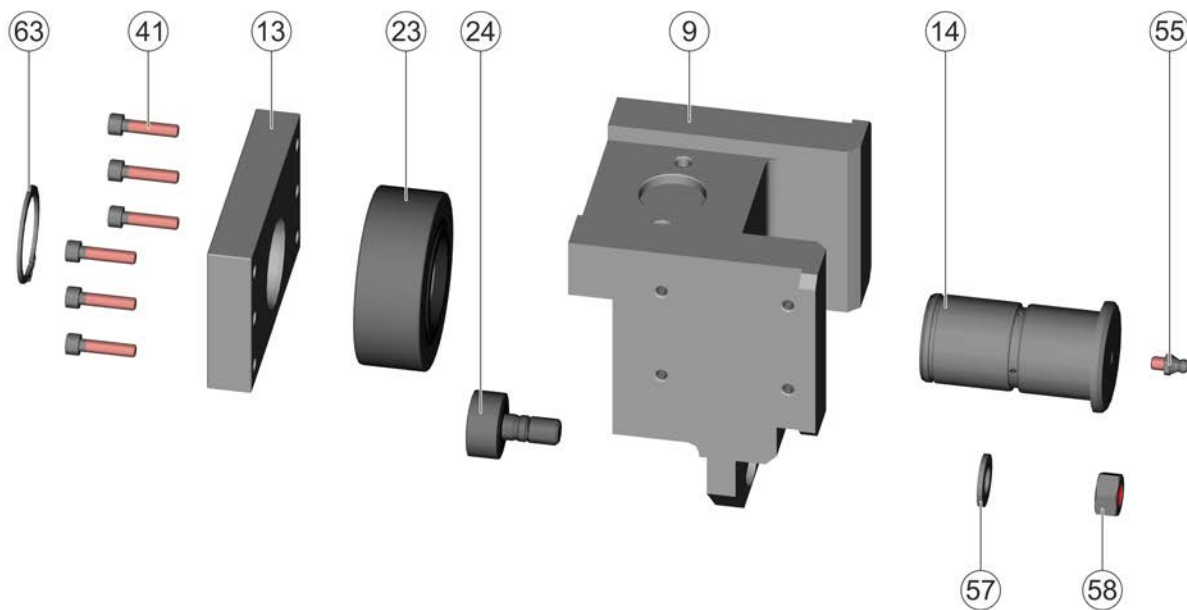


Fig. 45: Replacement parts Bearing Block

Position	Denomination	Quantity	Material number
9	Bearing block	2	
13	Lid Bearing block	2	
14	Bolt Support roller	2	
23	Support roller D80	2	M36030030
24	Cam roller D30	2	M36080003
41	Cylinder screw M6 x 25	12	
55	Lubricating nipple	2	
57	Washer	2	
58	Hex nut	2	
63	Retainer ring 40 x 1.75	2	

## 13.1.3 Repair kits

## Fluid part

N24960013 for N24260002, N24260014, N24260017	Quantity
Gasket D44.5	2
Gasket D30.2	2
Sealing ring D30	2
Ball D31.75	2

N24960013 for N24260002, N24260014, N24260017	Quantity
Ball D19.05	2
O-ring 35 x 1.5	2
O-ring 25 x 2.5	2
Piston guide belt	2
O-Ring DN25	6

<b>N24960015 for N24260003, N24260015, N24260018</b>	<b>Quantity</b>
Gasket D64	2
Gasket D44.5	2
Sealing ring D44.5	2
Ball D44.5	2
Ball D31.75	2
O-ring 50 x 1.5	2
O-ring 41 x 1.78	2
Piston guide belt	2
O-Ring DN25	6

### 13.1.4 Seal sets

#### Fluid part

<b>N24960014 for N24260002, N24260014, N24260017</b>	<b>Quantity</b>
Bellows D25	2
Piston seal DN65	2
Sealing ring D30	2
Sealing ring D18	2
O-ring 35 x 1.5	2

<b>N24960014 for N24260002, N24260014, N24260017</b>	<b>Quantity</b>
O-ring 25 x 2.5	2
O-Ring DN25	6
Clamping ring D36 for bellows	2
Bellows assembly drawing	1

<b>N24960016 for N24260003, N24260015, N24260018</b>	<b>Quantity</b>
Bellows D25	2
Piston seal DN95	2
Sealing ring D44.5	2
Sealing ring D18	2
O-ring 50 x 1.5	2
O-ring 41 x 1.78	2
O-Ring DN25	6
Clamping ring D36 for bellows	2
Bellows assembly drawing	1

### 13.2 Tools

There are no special tools available for this product.

## 13.3 Accessories

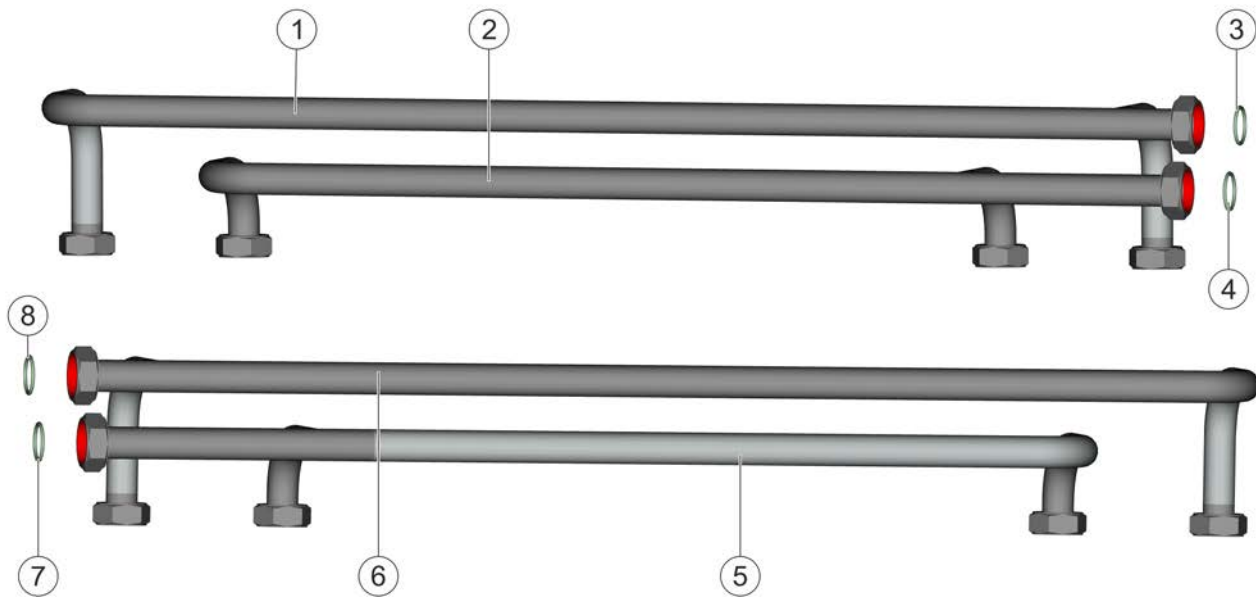
**Manifolds**


Fig. 46: Accessory Manifolds

Position	Denomination	Quantity	Material number
1	Manifold material outlet with female union and cap nuts (variant left)	1	M27050017
2	Manifold material inflow with female union and cap nuts (variant left)	1	M27050016
3	O-Ring DN25	1	Included in M27050017
4	O-Ring DN25	1	Included in M27050016
5	Manifold material inflow with female union and cap nuts (variant right)	1	M27050023
6	Manifold material outlet with female union and cap nuts (variant right)	1	M27050024
7	O-Ring DN25	1	Included in M27050023
8	O-Ring DN25	1	Included in M27050024

**Pressure Relief Valve**

Denomination	Material number
Pressure relief valve 21bar with pressure switch ignition protection category Ex db	N32170009
Pressure relief valve 21bar with pressure switch ignition protection category Ex ia	N32170010


Denomination	Material number
Overpressure valve, 21bar, without pressure switch	N32170011

### Adapter

Denomination	Material number
EcoTube DN25 on G1 1/2" internal threads	M81120014
EcoTube DN25 on G1" internal threads	M81120015
EcoTube DN25 on G3/4" internal threads	M81120016

### Motor

Denomination	Material number
Motor cable, max. 50m	E09130033
PTC cable, max. 50m	E09130024
Power screw connection	E14810037
PTC screw connection	E14810036

-  For the motors of the following pumps, observe the manufacturer's documentation:
- N24260014
  - N24260015
  - N24260017
  - N24260018

## 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".

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