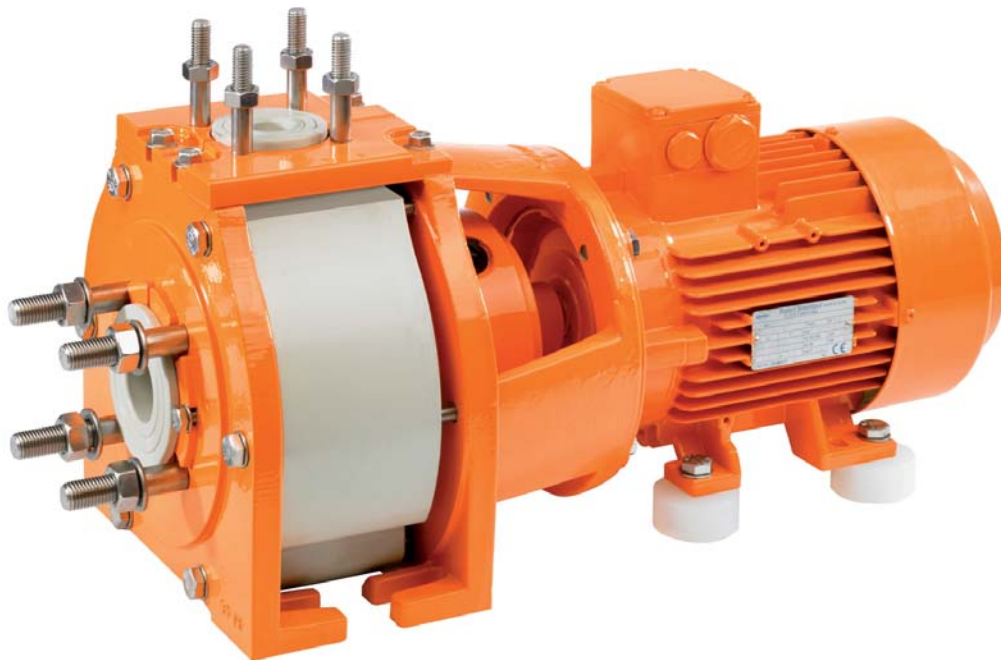


Standard Chemical Pump

Original Operating manual

**NP-B series with
MUNSCH-REA-F mechanical
seal**



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We reserve the right to make technical changes.

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1 About this document

This manual

- Is part of the pump
- Applies to all of the afore-mentioned series
- Describes safe and appropriate operation during all operating phases

1.1 Target groups

Target group	Duty
Operating company	<ul style="list-style-type: none"> ▶ Keep this manual available where the installation is used, including for later use. ▶ Make sure the staff read and follow this manual and the other applicable documents, especially the safety instructions and warnings. ▶ Observe any additional rules and regulations referring to the installation.
Qualified staff, fitter	<ul style="list-style-type: none"> ▶ Read, observe and follow this manual and the other applicable documents, especially the safety instructions and warnings.





Tab. 1 Target groups and their duties

1.2 Other applicable documents



Document	Purpose
ATEX additional instructions	Operation in potentially explosive areas
Order data sheet	Technical specifications, operating conditions
Setup drawing	Setup dimensions, connection dimensions etc.
Technical description	Technical specifications, operating limits
Sectional drawing	Sectional drawing, part numbers, component designations
Supplier documentation	Technical documentation for supplier parts
Spare parts list	Ordering spare parts
Document of compliance	Returning the pump to the manufacturer
Declaration of conformity	Legal confirmation that the pump meets all requirements of the applicable EC directive(s) (→ 9.4 Declaration of conformity according to EC machine directives, Page 42).

Tab. 2 Other applicable documents and their purpose

1.3 Warnings and symbols

Warning	Risk level	Consequences of non-observance
	Immediate acute risk	Fatal or serious injury
	Potential acute risk	Fatal or serious injury
	Potentially hazardous situation	Minor bodily harm
	Potentially hazardous situation	Material damage

Tab. 3 Warnings and consequences of non-observance

Symbol	Meaning
	Safety warning sign ► Observe all information indicated by the safety warning sign to avoid injury or death.
►	Instruction
1. , 2. , ...	Multiple-step instructions
✓	Requirement
→	Cross reference
	Information, note


Tab. 4 Symbols and their meaning

1.4 Technical terms


Term	Meaning
Pump unit	Pump with motor
Quenching medium	Medium for quenching shaft seals
Barrier medium	Pressurised barrier medium for shaft seals
Flushing medium	Medium for flushing the sealing faces in the seal space or plain bearing
Auxiliary operating systems	Devices for operating the pump

Tab. 5 Technical terms and their meaning

2 Safety

 The manufacturer does not accept any liability for damage resulting from non-observance of the entire documentation.

2.1 Intended use


 The intended use of the pump is defined in the technical documents. If the pump is to be used for operating data other than those specified in the order data sheet, the operator should check carefully whether the pump version, the accessories and the materials are suitable for the new operating conditions.

- Adhere to the operating limits (→ order data sheet, technical description).
- Only use the pump to pump the agreed pumped media (→ order data sheet).
- Avoid dry running:
Initial damage such as destruction of mechanical seal and plastic parts within only a few seconds.
 - Make sure the pump is never put into operation or operated without pumped medium.
- Avoid cavitation:
 - Fully open the suction-side fitting; do not use the fitting to adjust the flow rate.
 - Do not open the pressure-side fitting beyond the agreed operating point.
 - Ensure a sufficient $NPSH_{\text{installation}}$.
- Avoid overheating:
 - Do not operate the pump while the pressure-side fitting is closed.
 - Observe the minimum flow rate (→ order data sheet).
- Avoid damage to the motor:
 - Do not open the pressure-side fitting beyond the agreed operating point.
 - Observe the number of permitted motor start-ups per hour (→ manufacturer's specifications).
- Consult the manufacturer about any other use of the pump.

Avoiding common types of misuse (examples)

- The power uptake of the pump increases with increasing density of the pumped medium. To avoid any overloading of the pump and motor, maintain the permissible density (→ order data sheet).
Lower densities are allowed. Adapt the auxiliary systems accordingly.
- Adhere to the limits for solids content and grit size when pumping solids-carrying fluids (→ order data sheet, technical description).
- When using auxiliary operating systems:
 - Make sure the operating medium is compatible with the product medium.
 - Ensure a permanent supply of the respective operating medium.

2.2 General safety instructions

 Take note of the following instructions before carrying out any work.

2.2.1 Product safety

The pump has been constructed according to the latest technology and established technical safety rules. Nevertheless, a potential risk to life and limb of the operator or other persons or damage to the pump and other property cannot be completely excluded.

- Only operate the pump if it is in perfect technical condition; only use it as intended, staying aware of safety and risks and adhering to the instructions in this manual.
- Keep this manual and all other applicable documents complete, legible and accessible to staff at all times.
- Refrain from any procedures that would endanger staff or third parties.
- If a safety-relevant fault occurs, shut down the pump immediately and have the fault eliminated by appropriate staff.
- In addition to the entire documentation, comply with statutory or other safety and accident-prevention regulations as well as with the applicable standards and guidelines in the country where the pump is operated.

2.2.2 Operator's obligations

Safety-conscious operation

- Only operate the pump if it is in perfect technical condition; only use it as intended, staying aware of safety and risks and adhering to the instructions in this manual.
- Ensure the following are observed and monitored:
 - Adherence to intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances
 - Applicable standards and guidelines in the country where the pump is operated
- Make protective equipment available.

Staff qualifications

- Make sure all staff assigned with work on the pump have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before beginning with work.
- Organise responsibilities, areas of competence and the supervision of staff.
- Make sure all work is carried out by specialist technicians only:
 - Fitting, repair and maintenance work
 - Work on the electrical system
- Make sure trainee staff only work on the pump under supervision of specialist technicians.

Safety devices

- Provide the following safety devices and verify their integrity:
 - For hot, cold and moving parts: contact protection of the pump provided by the customer
 - If electrostatic charging is possible: provide appropriate earthing.

Warranty

- Obtain the manufacturer's approval before carrying out any modifications, repairs or alterations during the warranty period.
- Only use original parts or parts that have been approved by the manufacturer.

2.2.3 Duties of staff

- Observe and keep legible all directions given on the pump, e.g. the arrow indicating the direction of rotation and the markings for flushing connections.
- Do not remove the protection against accidental contact with hot, cold and moving parts during operation.
- Use protective equipment if necessary.
- Carry out work on the pump only while the pump is not running.
- Before carrying out any fitting or maintenance work, isolate the motor from its supply voltage and secure it against being switched back on again.
- Reinstall the safety devices according to regulations after any work on the pump.

2.3 Special hazards

2.3.1 Potentially explosive areas

- (→ ATEX additional instructions)

2.3.2 Hazardous pumped media

- Observe the safety regulations for handling hazardous substances when handling hazardous pumped media (e.g. hot, flammable, explosive, poisonous or potentially harmful).
- Use protective equipment when carrying out any work on the pump.

3 Layout and function

3.1 Labels

3.1.1 Type plate

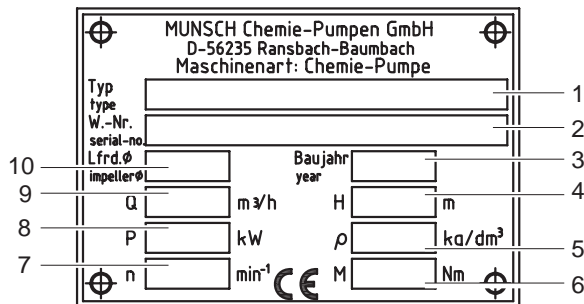


Fig. 1 Type plate (example)

- 1 Pump type
- 2 Serial number
- 3 Year of construction
- 4 Pump head
- 5 Density
- 6 Torque
- 7 Speed
- 8 Power consumption
- 9 Flow rate
- 10 Impeller diameter

3.1.2 ATEX plate

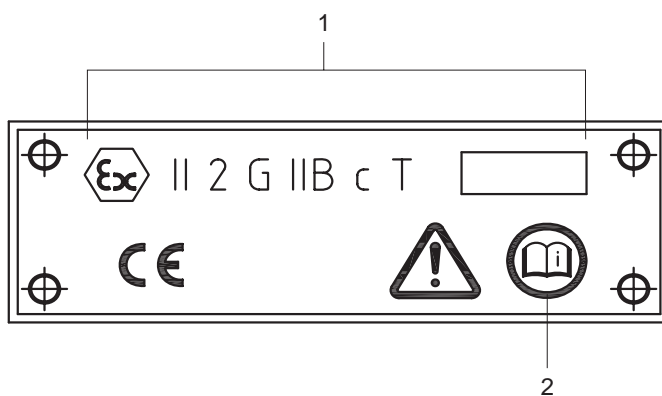


Fig. 2 ATEX plate (example)

- 1 Explosion protection code
- 2 Reference to ATEX additional instructions

3.1.3 Pump type code

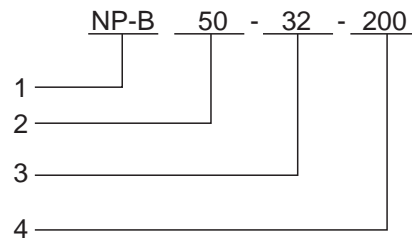


Fig. 3 Pump type code (example)

- 1 Series
- 2 Suction nozzle DN [mm]
- 3 Pressure joint DN [mm]
- 4 Nominal impeller diameter [mm]

3.2 Layout

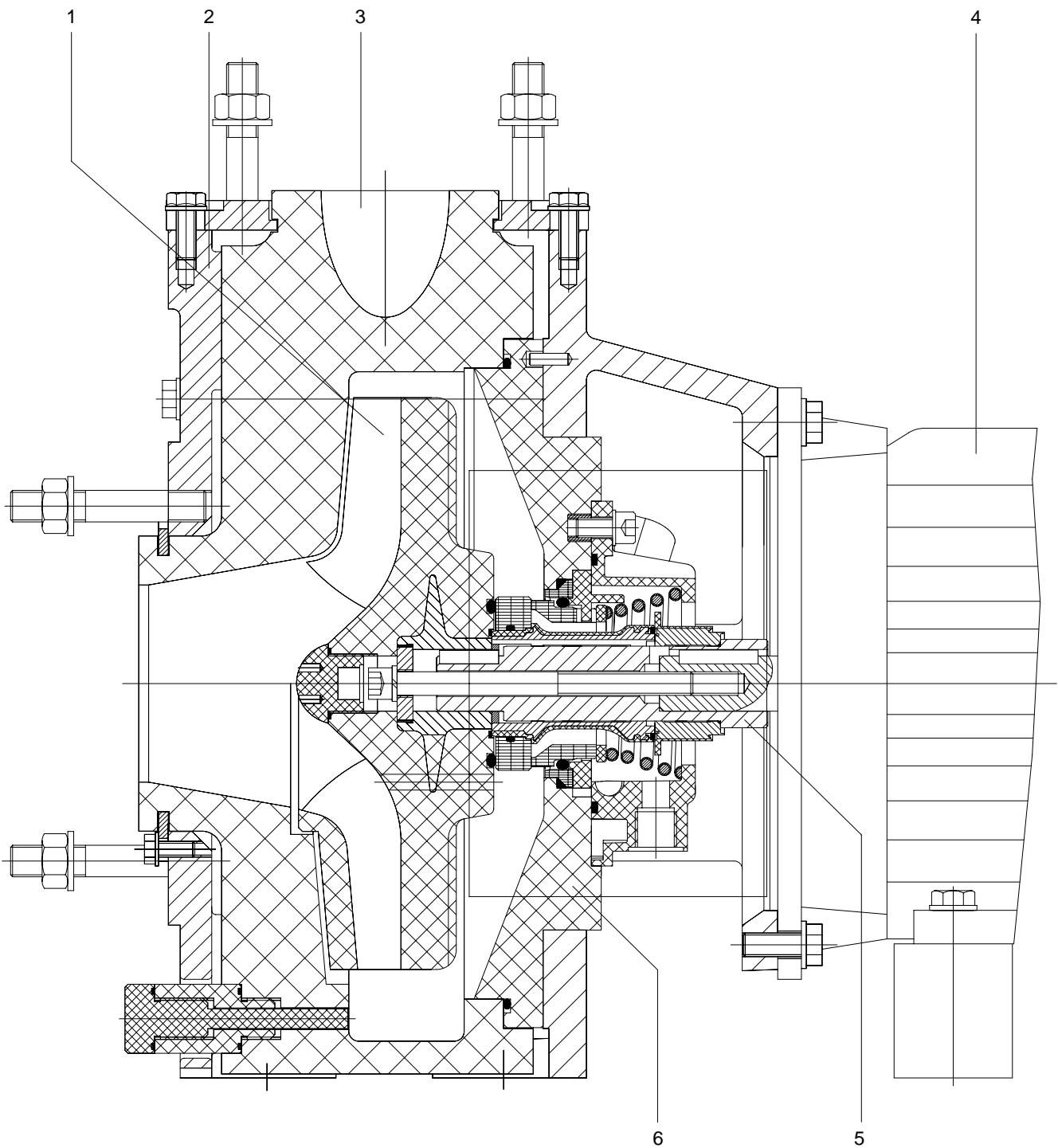




Fig. 4 NP-B layout (with single-action mechanical seal)

- | | | |
|------------------|---------------|----------------|
| 1 Impeller | 3 Pump casing | 5 Pump shaft |
| 2 Suction flange | 4 Motor | 6 Casing cover |

3.3 Shaft seals

 Only one of the following shaft seals can be used.


3.3.1 Mechanical seals

 Mechanical seals will always show some functional drip leakage.

- Single mechanical seal
- Double mechanical seal with quench (in preparation)
- Double mechanical seal with pressurised barrier medium (in preparation)

3.4 Auxiliary operating systems

3.4.1 Sealing systems (in preparation)

 Only one of the following sealing systems can be used.

Quenching

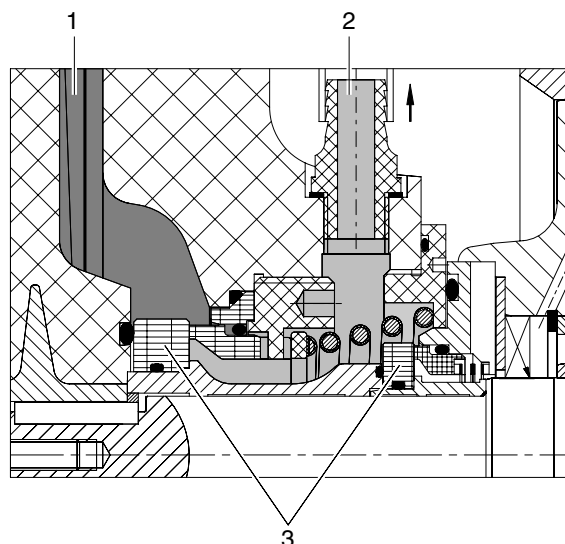


Fig. 5 Double mechanical seal with quench (in preparation) – operating principle

- 1 Pumped medium
- 2 Quenching medium (unpressurised)
- 3 Double mechanical seal

The pressure of the pumped medium on the product-side mechanical seal is higher than the pressure of the quenching medium during quenching. The sealing faces of the product-side seal are lubricated by the pumped medium. The sealing faces of the atmosphere-side seal are lubricated by the quenching medium.

Application examples:

- Pumped media that crystallize in air, causing long-term damage to the seal
- Prevention of odours
- Cooling of seals

Variant	Characteristics of the quenching medium
Open system	<ul style="list-style-type: none"> • Supplied and drained continuously • Unpressurised • Clean fluid
Closed system	<ul style="list-style-type: none"> • Circulated in a closed circuit • Unpressurised

Tab. 6 Quenching (in preparation) – variants and characteristics

Using a pressurised barrier medium

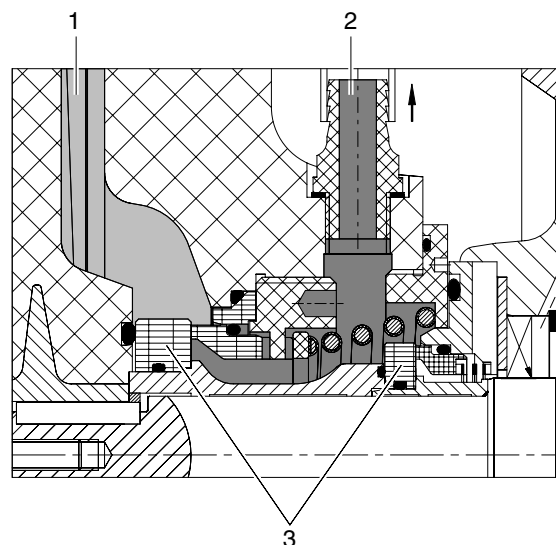


Fig. 6 Double mechanical seal with pressurised barrier medium (in preparation) – operating principle

- 1 Pumped medium
- 2 Barrier medium (pressurised)
- 3 Double mechanical seal

When using a pressurised barrier medium, the pressure of the barrier medium on the product-side mechanical seal is higher than the pressure of the pumped medium. The sealing faces are lubricated by the barrier medium.

Application examples:


- Pumped media that crystallize or carry solids, causing long-term damage to the seal
- Toxic pumped media
- Pumped media presenting an environmental hazard

Variant	Characteristics of the barrier medium
Open system	<ul style="list-style-type: none"> • Supplied and drained continuously • Pressurised • Clean fluid
Closed system	<ul style="list-style-type: none"> • Circulated in a closed circuit • Pressurised

Tab. 7 Using a pressurised barrier medium (in preparation) – variants and characteristics

4 Transport, storage and disposal

4.1 Transport

 Weight specifications (→ individual order documents)

4.1.1 Unpacking and inspection on delivery

1. Unpack the pump unit upon delivery and check it for transport damage.
2. Report any transport damage to the manufacturer without delay.
3. Dispose of packaging material according to local regulations.

4.1.2 Lifting

 **DANGER**

Death or crushed limbs caused by falling loads!

- ▶ Use lifting gear appropriate for the total weight to be transported.
- ▶ Fasten the lifting gear as shown in the illustrations below.
- ▶ Do not stand under suspended loads.

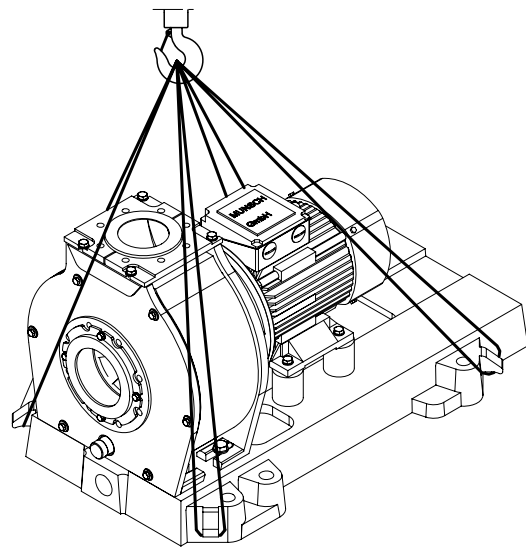


Fig. 7 Fastening the lifting gear to the pump unit with base plate

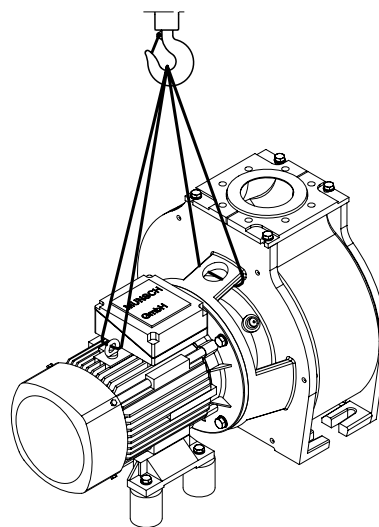



Fig. 8 Fastening the lifting gear to the pump unit without base plate

- ▶ Lift the pump unit properly.

4.2 Preservation

 No preservation required

- ▶ Do not preserve the pump.


4.3 Storage

NOTE

Material damage due to inappropriate storage!

- ▶ Store the pump in an appropriate manner.
-
1. Seal all openings with blank flanges, blind plugs or plastic covers.
 2. Make sure the storage room meets the following conditions:
 - Dry
 - Frost-free
 - Vibration-free
 3. Turn the motor shaft once a month:
 - Remove any transport protection devices which are available.
Keep the transport protection devices for later use.
 - Make sure the shaft and the bearing change their rotational position in the process.

4.4 Disposal


 Plastic parts can be contaminated by poisonous or radioactive pumped media to such an extent that cleaning is insufficient.

WARNING

Risk of poisoning and environmental damage due to the pumped medium or oil!

- ▶ Use protective equipment when carrying out any work on the pump.
 - ▶ Prior to the disposal of the pump:
 - Collect any pumped medium and oil or grease which run out and dispose of them separately according to local regulations.
 - Neutralise residues of pumped medium in the pump.
 - ▶ Remove the plastic parts and dispose of them according to local regulations.
-
- ▶ Dispose of the pump according to local regulations.

5 Setup and connection

 For pumps in potentially explosive areas (→ ATEX additional instructions)

NOTE

Material damage caused by dirt!

- ▶ Do not remove the covers and sealing covers until immediately before connecting the pipes to the pump.

5.1 Preparing the setup


5.1.1 Checking the ambient conditions

- ▶ Make sure the required ambient conditions are met (→ 9.2.1 Ambient conditions, Page 39).

5.1.2 Preparing the setup site

- ▶ Make sure the setup site meets the following conditions:
 - Pump freely accessible from all sides
 - Sufficient space for installation/removal of the pipes and for maintenance and repair work, especially for the removal and installation of the pump and motor
 - Pump not exposed to external vibrations (damage to bearings)
 - Frost protection
 - Sufficient leak protection available according to local regulations

5.1.3 Preparing the foundation and setup surface

-  Setup options:
- With concrete foundation
 - With steel foundation frame
 - Without foundation

- ▶ Make certain that the foundation and setup surface meet the following conditions:
 - Level
 - Clean (no oil, dust or other impurities)
 - Capable of bearing the weight of the pump unit and all operating forces
 - Stability of the pump unit ensured
 - For concrete foundation: Standard concrete of strength class B 25

5.1.4 Preparing the pump


1. Take the following measures after long storage times / downtimes.

Storage time/ downtime	Measure
> 2 years	<ul style="list-style-type: none"> ▶ Replace the motor bearing if necessary (→ operating manual of the motor manufacturer). ▶ Replace the elastomer seals (O-rings, shaft seal rings).

Tab. 8 Measures after long storage times/downtimes

2. Remove any transport protection devices which are present.
Keep the transport protection devices for later use.

5.1.5 Installing the heat insulation

 Only necessary to maintain the temperature of the pumped medium.

NOTE

Material damage caused by overheating!

- ▶ Only install the heat insulation on the volute casing.
- ▶ Install the heat insulation appropriately.

5.2 Setup with foundation

NOTE

Material damage due to base plate distortion!


- Set and fasten the base plate on the foundation as described in the following.

5.2.1 Setting the pump unit on the foundation

✓ Implements, tools and materials:

- Foundation bolts (→ Setup drawing)
- Steel washers
- Mortar grout, non-shrinking
- Spirit level

1. Lift the pump unit (→ 4.1 Transport, Page 14).
2. Working from below, hang the foundation bolts in the fixation holes of the base plate.

 Observe the manufacturer's instruction when using chemical anchors.

3. Setting the pump unit on the foundation When doing this, sink the foundation bolts into the prepared anchoring holes.

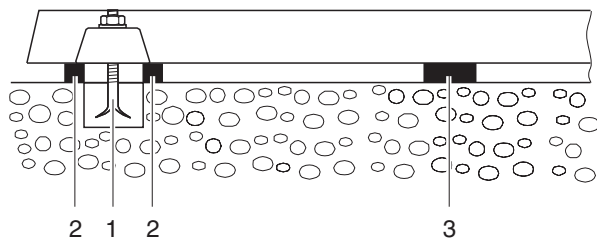



Fig. 9 Setup with foundation

4. Use steel washers to align the pump unit to height and system measures as described in the following:
 - Position 1 steel washer (2) each left and right of next to each foundation bolt (1).
 - If the distance between anchoring holes is > 750 mm, position additional steel washer (3) centrally at each of the base plate.
5. Make certain that the base plate and the steel washers are in full surface contact.
6. Use a machine spirit level to check the permissible height deviation (1 mm/m) lengthwise and crosswise.
7. Repeat procedure until the base plate is correctly aligned.

5.2.2 Fastening the pump unit

 Filling out the base plate with mortar grout will improve the damping behaviour.

1. Fill the anchoring holes with mortar grout.
2. Once the mortar grout has set:
 - Screw the base plate tight at three points with the specified tightening torque (→ 9.2.4 Tightening torques, Page 39).
3. Before tightening the remaining screws, compensate any unevenness of the fixation surface, using metal shims next to every screw.
4. Make sure the base plate is not deformed.

5.3 Setup without foundation

- ✓ Implements, tools and materials:
- Wrench
 - Spirit level

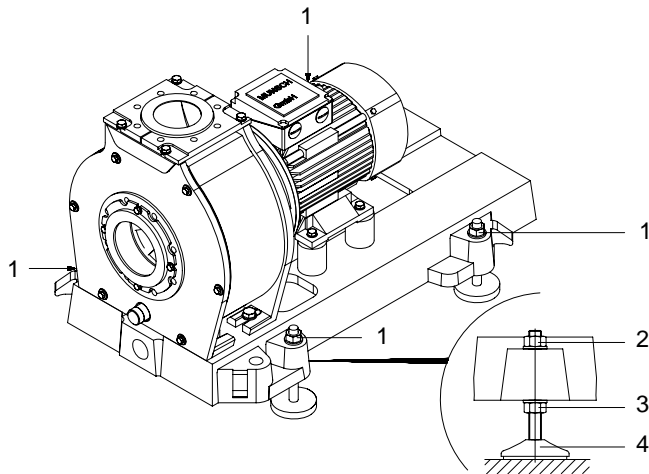


Fig. 10 Setup without foundation

1. Lift the pump unit (→ 4.1.2 Lifting, Page 14).
2. Mount the four levelling feet (1) as shown in the illustration.
3. Set down the pump unit on the setup surface.
4. Adjust the height of the base plate using levelling feet (1) as shown above:
 - Use wrench to hold the hexagon at levelling foot (4).
 - Slacken hexagon nut (2).
 - Adjust height by turning hexagon nut (3).
 - Tighten hexagon nut (2) (→ 9.2.4 Tightening torques, Page 39).
 - Use a machine spirit level to check the permissible height deviation (1 mm/m) lengthwise and crosswise.
 - Repeat procedure until the base plate is correctly aligned.

5.4 Planning pipes

5.4.1 Laying out supports and flange connections


NOTE

Material damage due to excessive forces and torques of the pipes on the pump!

- ▶ Do not exceed permissible limits (→ 9.2.6 Socket loads acc. to ISO 5199, Page 40).

1. Calculate pipe forces taking into account every possible operating condition:
 - Cold/warm
 - Empty/full
 - Unpressurised/pressurised
 - Position shifts of flanges
2. Ensure the pipe can slide freely in the supports and does not seize up due to corrosion.

5.4.2 Specifying nominal diameters

 Keep the flow resistance in the pipes as low as possible.

1. Specify suction pipe nominal width \geq suction nozzle nominal width.
2. Specify pressure pipe nominal width \geq pressure joint nominal width.

5.4.3 Specify pipe lengths

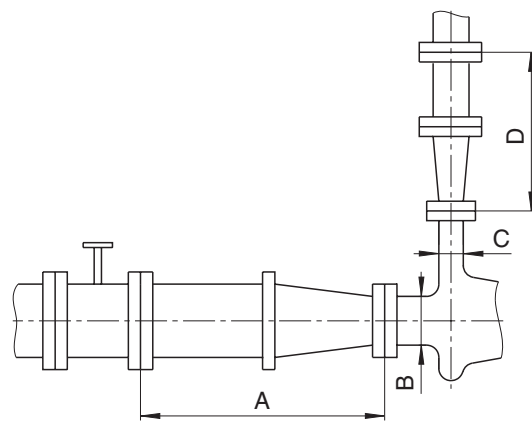



Fig. 11 Straight pipe lengths upstream and downstream of the pump (recommended)

- A > 5x DN_s
- B DN_s
- C DN_d
- D > 5x DN_d

- ▶ Observe recommend minimum values when installing the pump.

 Suction side: Shorter pipes are feasible but can restrict hydraulic performance data.

Pressure side: Shorter pipes are feasible but can lead to increased operating noise.

5.4.4 Optimising changes in cross-section and direction

1. Avoid bends with radii smaller than 1.5 times the pipe diameter.
2. Avoid abrupt changes of cross-sections in the pipes.

5.4.5 Providing safety and monitoring devices (recommended)

Avoid impurities

1. Integrate filter into the suction pipe.
2. To monitor the level of dirt, install a differential manometer with contact manometer.

Avoiding reverse operation

1. Install a non return valve between the pressure joint and stop valve to ensure the medium does not flow back after the pump is switched off.
2. To enable bleeding, provide a bleeding connection between the pressure joint and non return valve.

Make provisions for isolating and shutting off the pipes



For maintenance and repair work.

- ▶ Provide shut-off devices in the suction and pressure pipes.

Enable measurements of the operating conditions

1. Provide manometers for pressure measurements in suction and pressure pipes.
2. Provide for pump temperature measurements.

5.5 Connecting pipes

NOTE

Material damage due to excessive forces and torques of the pipes on the pump!

- ▶ Do not exceed permissible limits (→ 9.2.6 Socket loads acc. to ISO 5199, Page 40).

5.5.1 Avoid impurities in the pipes

NOTE

Material damage due to impurities in the pump!

- ▶ Ensure no impurities enter the pump.

1. Clean all pipe sections and fittings prior to assembly.
2. Ensure no flange gaskets protrude inwards.
3. Remove any blank flanges, plugs, protective films and/or protective paint from the flanges.

5.5.2 Installing auxiliary piping



Observe the manufacturer's specifications for any existing auxiliary operating systems.

1. Install the auxiliary pipes at the auxiliary connections without stress and leaks.
2. To avoid air enclosures: install the pipes so that they ascend to the pump.

5.5.3 Installing the suction pipe

1. Remove the transport and sealing covers from the pump.
2. Install the suction pipe without stress and leaks.
To avoid air enclosures: install the pipes so that they ascend to the pump.
3. Ensure no seals protrude inwards.
4. For suction operation: Install a foot valve in the suction pipe to prevent the pump and suction pipe from running empty during downtimes.

5.5.4 Installing the pressure pipe


1. Remove the transport and sealing covers from the pump.
2. Install the pressure pipe without stress and leaks.
3. Ensure no seals protrude inwards.

5.5.5 Checking that the pipe connection is stress-free

- ✓ Pipe installed and cooled down
1. Disconnect the connection flange of the pipes from the pump.
 2. Check whether the pipe is freely moveable in all directions within the range of expected expansion:
 - Nominal width < 150 mm: by hand
 - Nominal width > 150 mm: with a small lever
 3. Make sure the flange surfaces are parallel.
 4. Reconnect the connection flange of the pipes to the pump.

5.6 Connecting the electrical system

5.6.1 Connecting the motor

 Observe the specifications of the motor manufacturer.


DANGER

Risk of fatal injury due to electric shock!


- ▶ Have all electrical work carried out by qualified electricians only.
- ▶ Isolate the installation from its supply voltage and secure it against being switched back on again prior to any work on the electrical system.

1. Connect the motor according to the circuit diagram.
2. Ensure the electrical power does not pose any risks.
3. Install an EMERGENCY STOP switch.

5.6.2 Checking the direction of rotation

 Only possible when putting the pump into service (→ 6.1 Putting the pump into service for the first time, Page 21).


6 Operation

 For pumps in potentially explosive areas (→ ATEX additional instructions)

6.1 Putting the pump into service for the first time

6.1.1 Identifying the pump version


- ▶ Identify the pump version (→ order data sheet).

 Pump versions vary, for example in the shaft seal, auxiliary operating systems.

6.1.2 Checking the downtime

- ▶ Check the downtime (→ Table 8 Measures after long storage times/downtimes, Page 16).

6.1.3 Preparing auxiliary operating systems (if available)

 The manufacturer assumes no liability for damage caused by installing or using a third-party or non-approved auxiliary operating system.

Sealing systems

1. Make sure the quenching/barrier medium is suitable for mixing with the pumped medium.
2. Identify the sealing system (→ order data sheet) (→ 3.4.1 Sealing systems (in preparation), Page 13).
3. Install the sealing system (→ manufacturer's instructions).
4. Ensure the parameters required for the installed sealing system (→ 9.2.2 Parameters for auxiliary operating systems (optional), Page 39).

6.1.4 Filling and bleeding

- ✓ If available: Auxiliary operating systems are ready for operation

WARNING

Risk of injury and poisoning due to hazardous pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Collect any leaking pumped medium safely and dispose of it according to local regulations.

1. Open the suction-side fitting.
2. Open the pressure-side fitting.
3. Fill the pump and the suction pipe with pumped medium.
4. Open the auxiliary operating systems, if available, and check the flow rate.
5. Make sure all connections are tight.

6.1.5 Checking the direction of rotation

- ✓ Transport protection devices removed

DANGER

Risk of fatal injury due to rotating parts!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Keep a sufficient distance to rotating parts.

NOTE

Material damage caused by dry running!

- ▶ Make sure the pump is filled properly.
1. Switch the motor on and immediately off again.
 2. Check whether the motor's direction of rotation corresponds to the arrow indicating the direction of rotation of the pump.
 3. If the direction of rotation is different:
 - Swap two phases (→ 5.6.1 Connecting the motor, Page 20).

6.1.6 Switching on the pump

- ✓ The pump is correctly set up and connected
- ✓ The motor is correctly set up and connected
- ✓ All connections stress-free and leak-free
- ✓ Any existing auxiliary system are ready for operation
- ✓ All safety devices installed and checked for integrity
- ✓ The pump has been correctly prepared, filled and bled

 **DANGER**
Risk of injury due to running pump!

- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.
- ▶ Allow the pump to cool down completely before starting any work.

 **WARNING**
Risk of injury and poisoning due to hazardous pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Collect any leaking pumped medium safely and dispose of it according to local regulations.

NOTE
Material damage caused by dry running!

- ▶ Make sure the pump is filled properly.

NOTE
Risk of cavitation when throttling the suction flow rate!

- ▶ Fully open the suction-side fitting; do not use the fitting to adjust the flow rate.
- ▶ Do not open the pressure-side fitting beyond the operating point.

NOTE
Material damage caused by overheating!

- ▶ Do not operate the pump while the pressure-side fitting is closed.
- ▶ Observe the minimum flow rate (→ order data sheet).

1. Open the suction-side fitting.
2. Close the pressure-side fitting.
3. Switch on the motor and check whether it is running smoothly.
4. As soon as the motor is running at nominal speed, open the pressure-side fitting slowly until the operating point is reached.
5. With hot pumped media, make sure any temperature changes do not exceed 50 °C/h.

6. After the initial stress caused by pressure and operating temperature, check whether the pump is not leaking.

6.1.7 Switching off the pump

- ✓ Pressure-side fitting closed (recommended)

 **WARNING**
Risk of injury due to hot pump components!

- ▶ Use protective equipment when carrying out any work on the pump.

1. Switch off the motor. If available, maintain the following functions:
 - With double mechanical seals (in preparation): Barrier pressure until pump is unpressurised
2. Check all connecting screws and tighten them if necessary.

6.2 Operating

6.2.1 Making preparations for operation

- ▶ If necessary, perform the following steps:
 - Prepare any auxiliary operating systems (→ 6.1.3 Preparing auxiliary operating systems (if available), Page 21).
 - Fill and bleed the pump (→ 6.1.4 Filling and bleeding, Page 21).

6.2.2 Switching on the pump

- ✓ Pump initially put into service properly
- ✓ Operation prepared properly

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.
- ▶ Allow the pump to cool down completely before starting any work.

WARNING

Risk of injury and poisoning due to hazardous pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Collect any leaking pumped medium safely and dispose of it according to local regulations.

NOTE

Material damage caused by dry running!

- ▶ Make sure the pump is filled properly.

NOTE

Risk of cavitation when throttling the suction flow rate!

- ▶ Fully open the suction-side fitting; do not use the fitting to adjust the flow rate.
- ▶ Do not open the pressure-side fitting beyond the operating point.

NOTE

Material damage caused by overheating!

- ▶ Do not operate the pump while the pressure-side fitting is closed.
- ▶ Observe the minimum flow rate (→ order data sheet).

1. Open the suction-side fitting.
2. Close the pressure-side fitting.
3. Switch on the motor and check whether it is running smoothly.
4. As soon as the motor is running at nominal speed, open the pressure-side fitting slowly until the operating point is reached.
5. Make sure the temperature changes do not exceed 50 °C/h at pumps with hot pumped media.

6.2.3 Switching off the pump

- ✓ Pressure-side fitting closed (recommended)

WARNING

Risk of injury due to hot pump components!

- ▶ Use protective equipment when carrying out any work on the pump.
-
- ▶ Switch off the motor. If available, maintain the following functions:
 - With double mechanical seals (in preparation): Barrier pressure until pump is unpressurised

6.3 Shut-down

WARNING

Risk of injury and poisoning due to hazardous pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Collect any leaking pumped medium safely and dispose of it according to local regulations.

DANGER

Risk of fatal injury due to electric shock!

- ▶ Have all electrical work carried out by qualified electricians only.
- ▶ Isolate the installation from its supply voltage and secure it against being switched back on again prior to any work on the electrical system.

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.
- ▶ Before carrying out any fitting or maintenance work, isolate the motor from its supply voltage and secure it against being switched back on again.

- Take the following measures if operation is interrupted:

Pump is	Measure
...shut down for a prolonged period	<ul style="list-style-type: none"> ► Take measures according to the pumped medium (→ Table 10 Measures to be taken, depending on the pumped medium behaviour, Page 25). ► Isolate the motor from its supply voltage and secure it against being switched back on again.
...emptied	<ul style="list-style-type: none"> ► Close the suction-side and pressure-side fittings.
...dismounted	<ul style="list-style-type: none"> ► Disconnect the electrical connections and secure the motor against being switched back on again
...put into storage	<ul style="list-style-type: none"> ► Follow the storage instructions (→ 4.3 Storage, Page 15).

Tab. 9 Measures to be taken if operation is interrupted

Behaviour of the pumped medium	Duration of the interruption to service (depending on process)	
	Short	Long
Solids sedimenting	<ul style="list-style-type: none"> ► Flush the pump. 	<ul style="list-style-type: none"> ► Flush the pump.
Solidifying/ freezing, non-corrosive	<ul style="list-style-type: none"> ► Heat up or empty the pump and containers. 	<ul style="list-style-type: none"> ► Empty the pump and containers.
Solidifying/ freezing, corrosive	<ul style="list-style-type: none"> ► Heat up or empty the pump and containers. 	<ul style="list-style-type: none"> ► Empty the pump and containers. ► Clean and dry the pump. ► Preserve the containers if necessary.
Remains liquid, non-corrosive	–	–
Remains liquid, corrosive	–	<ul style="list-style-type: none"> ► Empty the pump and containers. ► Clean and dry the pump. ► Preserve the containers if necessary.


Tab. 10 Measures to be taken, depending on the pumped medium behaviour

6.4 Restoring the pump to service

1. Check the downtime (→ Table 8 Measures after long storage times/downtimes, Page 16).
2. Carry out all steps as for the initial start-up (→ 6.1 Putting the pump into service for the first time, Page 21).


6.5 Operating the stand-by pump


- ✓ Stand-by pump filled and bled

 Operate the stand-by pump at least once a week.


1. Fully open the suction-side fitting.
2. Open the pressure-side fitting until the stand-by pump reaches operating temperature and is evenly heated (→ 6.1.6 Switching on the pump, Page 22)..

7 Maintenance

 For pumps in potentially explosive areas (→ ATEX additional instructions)

 Trained service technicians are available for fitting and repair work. Present a pumped material certificate (DIN safety data sheet or document of compliance) upon request.

7.1 Monitoring

 The inspection intervals depend on the load placed on the pump.

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.


WARNING

Risk of injury and poisoning due to hazardous pumped media!


- ▶ Use protective equipment when carrying out any work on the pump.

1. Check at appropriate intervals:
 - Compliance with minimum flow rate
 - Roller bearing temperature < 70 °C
 - Normal operating conditions unchanged
 - Concentration of the quenching/barrier medium in the closed system
2. For trouble-free operation, ensure the following:
 - No dry running
 - No leaks
 - No cavitation
 - Suction-side gate valves open
 - Unobstructed and clean filters
 - Sufficient supply pressure
 - No unusual running noises and vibrations
 - No impermissible leaks at the shaft seal
 - Proper functioning of auxiliary operating systems

7.2 Maintenance

 Service life of the roller bearings for operation within the permissible operating range: > 2 years

Intermittent operation, high temperatures, low viscosities and aggressive ambient and process conditions reduce the service life of roller bearings (→ operating manual of the motor manufacturer).

 Mechanical seals and plain bearings are subject to natural wear, which strongly depends on the actual operating conditions. Therefore, general statements regarding their service life cannot be made.

DANGER

Risk of fatal injury due to electric shock!

- ▶ Have all electrical work carried out by qualified electricians only.
- ▶ Isolate the installation from its supply voltage and secure it against being switched back on again prior to any work on the electrical system.

DANGER

Risk of injury due to running pump!


- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.
- ▶ Before carrying out any fitting or maintenance work, isolate the motor from its supply voltage and secure it against being switched back on again.

WARNING

Risk of injury and poisoning due to hazardous or hot pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Allow the pump to cool down completely before performing any work.
- ▶ Make sure the pump is unpressurised.
- ▶ Empty the pump, safely collect the pumped medium and dispose of it in accordance with environmental rules and requirements.

7.2.1 Mechanical seals

 Mechanical seals will always show some functional drip-leakage (→ manufacturer's instructions).

Double mechanical seals with quench (in preparation): Any dramatic rise of the quench system level indicates a major leak at the product-side mechanical seal.

Double mechanical seals with pressurised barrier medium (in preparation): A dramatic pressure drop in the barrier system (loss of lubricating fluid) indicates a major leak at one of the mechanical seals.

- ▶ If there is a major leak: Replace the mechanical seal with its auxiliary seals and check the functionality of auxiliary operating systems.

7.3 Dismounting the pump

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the running pump.
- ▶ Do not carry out any work on the running pump.
- ▶ Before carrying out any fitting or maintenance work, isolate the motor from its supply voltage and secure it against being switched back on again.

DANGER

Risk of fatal injury due to electric shock!

- ▶ Have all electrical work carried out by qualified electricians only.
- ▶ Isolate the installation from its supply voltage and secure it against being switched back on again prior to any work on the electrical system.

WARNING

Risk of injury and poisoning due to hazardous or hot pumped media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Allow the pump to cool down completely before performing any work.
- ▶ Make sure the pump is unpressurised.
- ▶ Empty the pump, safely collect the pumped medium and dispose of it in accordance with environmental rules and requirements.

7.3.1 Returning the pump to the manufacturer


- ✓ The pump is unpressurised
 - ✓ Pump completely empty
 - ✓ Electrical connections disconnected and motor secured against being switched back on again
 - ✓ Pump cooled down
 - ✓ Auxiliary systems shut down, depressurised and emptied
 - ✓ Manometer lines, manometer and fixtures dismantled
1. Enclose a truthfully completed declaration of compliance when returning pumps or components to the manufacturer. Order a form for the document of compliance from the manufacturer if necessary.
 2. Take the measures required to return the pump to the manufacturer as specified in the following table, depending on the repair work required.

Repairs	Measure for return
At the customer's premises	<ul style="list-style-type: none"> ▶ Return the defective component to the manufacturer.
At the manufacturer's premises	<ul style="list-style-type: none"> ▶ Flush the pump and decontaminate it if it has been used with hazardous pumped media. ▶ Return the entire pump unit (not disassembled) to the manufacturer.
At the manufacturer's premises for warranty repairs	<ul style="list-style-type: none"> ▶ Only in the event of hazardous pumped media: <ul style="list-style-type: none"> – Flush and decontaminate the pump. ▶ Return the entire pump unit (not disassembled) to the manufacturer.

Tab. 11 Measures for return

7.3.2 Preparations for dismantling the pump

- ✓ The pump is unpressurised
- ✓ Pump completely empty, flushed and decontaminated
- ✓ Electrical connections disconnected and motor secured against being switched back on again
- ✓ Pump cooled down
- ✓ Auxiliary systems shut down, depressurised and emptied
- ✓ Manometer lines, manometer and fixtures dismantled

 The pumps are constructed in process architecture as standard. The slide-in unit can be dismantled without removing the volute casing and piping.

1. Observe the following when dismantling the pump:
 - Mark the precise installation orientation and position of all components prior to the disassembly.
 - Dismount the components concentrically without canting.
 - Dismount the pump (→ sectional drawing).
2. Unscrew the fixation bolts between the pump/plug-in unit and base plate.
3. If necessary, undo the pipes.
4. Lift the pump/plug-in unit out of the installation (→ 4.1.2 Lifting, Page 14).

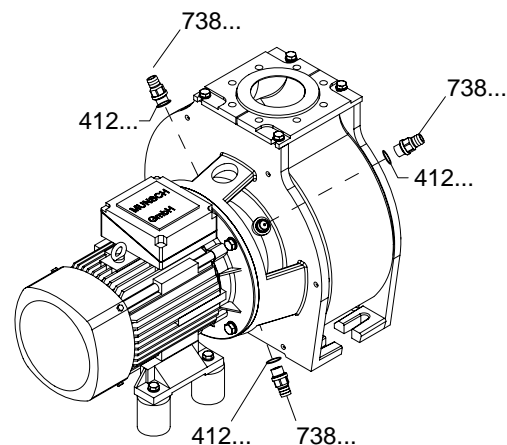
7.3.3 Loosen connectors (if applicable)


Fig. 12 Loosening the connectors

1. Loosen and unscrew existing fittings **738...**
2. Remove and replace O-rings **412...**

7.3.4 Dismounting the pump casing

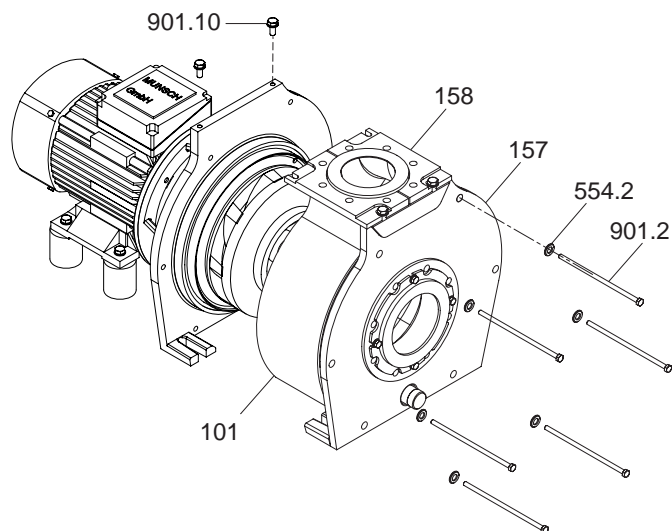


Fig. 13 Dismounting the pump casing

1. Loosen hexagon head bolts **901.10** at intermediate lantern **146**.
2. Undo the hexagon head screws **901.2**.
3. Slide off pump casing **101** with suction flange **157** and pressure flange **158**.

7.3.5 Removing the impeller and front shaft sleeve

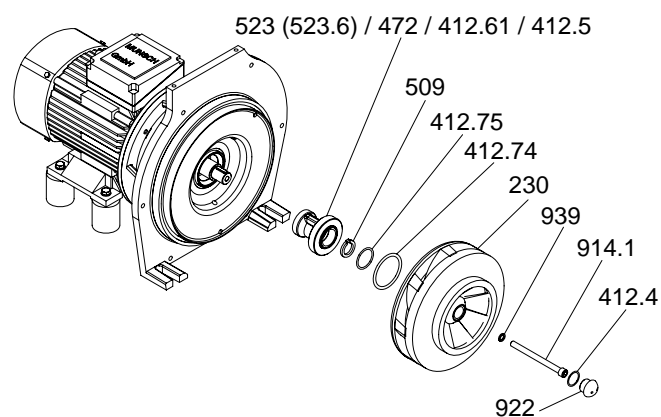


Fig. 14 Removing the impeller and front shaft sleeve

1. Undo the impeller screw **922** with circlip pliers and unscrew it.
2. Undo the socket head cap screw **914.1** with SCHNORR spring washer **939**.
3. Extract impeller **230**.
4. Extract intermediate ring **509**.
5. Remove and replace the O-rings **412.4**, **412.74**, **412.75**.
6. Extract the rotating seal ring **472** with shaft sleeve **523 (523.6)** from the pump shaft **211**.

7.3.6 Dismounting the product-side MUNSCHE-REA-F mechanical seal

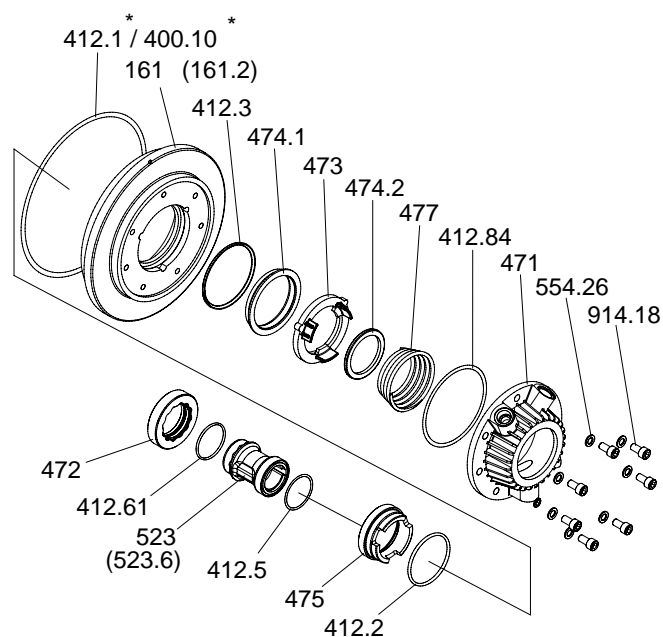


Fig. 15 Dismounting the product-side MUNSCHE-REA-F mechanical seal

1. Undo the rotating seal ring **472** from the shaft sleeve **523 (523.6)**.
2. Take the casing cover **161 (161.2)** out of the intermediate lantern **146** and set it down with the seal cover **471**.
3. Take the O-ring **412.1** or gasket **400.10** off the casing cover **161 (161.2)** and replace it if necessary.
4. Extract stationary seal ring **475**.
5. Turn the casing cover upside down.
6. Undo the socket head cap screws **914.18** and remove the washers **554.26**.
7. Remove the seal cover (**471**).
8. Remove spring **477** and thrust ring **474.2**.
9. Remove stationary seal ring holder **473**.
10. Remove thrust ring **474.1**.
11. Take out the O-rings **412.61**, **412.5**, **412.2**, **412.84**, **412.3** and replace them.

7.3.7 Dismounting the rear shaft sleeve

- ▶ Pull the rear shaft sleeve **523.1 (523.5)** off the pump shaft **211**.

7.3.8 Dismounting the pump shaft

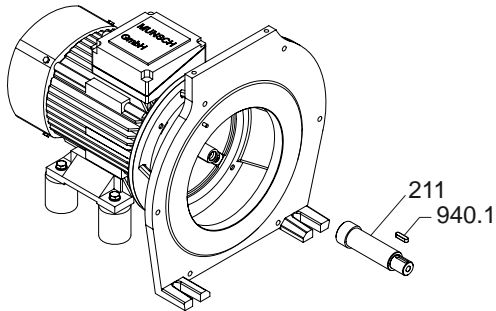



Fig. 16 Dismounting the pump shaft

- ▶ Pull the pump shaft **211** off the motor shaft.

7.4 Installing the pump

7.4.1 Preparing the installation

1. Observe the following for the installation:
 - Replace worn out parts with original spare parts.
 - Replace the seals, inserting them in such a way that they cannot rotate.
 - Tighten the screws/nuts crosswise with a torque key in an appropriate manner.
Observe any tightening torques which deviate from standard (→ 9.2.4 Tightening torques, Page 39).
 - Reinstall the components concentrically without canting according to the applied marks.
2. Clean all components (→ 9.2.5 Cleaning agents, Page 40), but do not remove the applied marks.
3. Install the pump (→ sectional drawing).

 The pump is installed in the reverse order of its disassembly. The following sections show particular aspects to be observed when installing the pump.

7.4.2 Fitting the casing cover

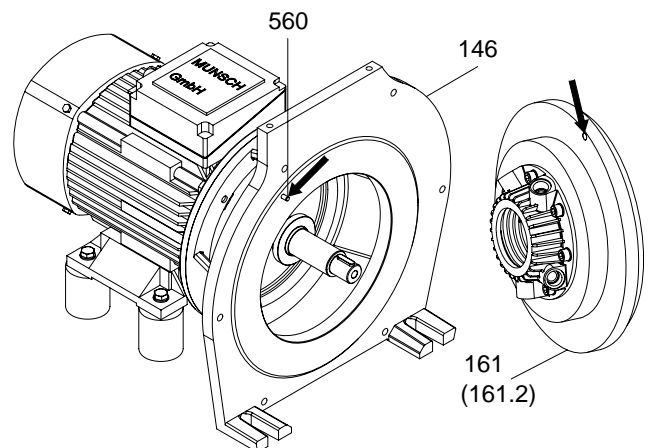



Fig. 17 Fitting the casing cover

1. Fit casing cover **161** into intermediate lantern **146**.
2. Make sure the pin **560** is in the bore hole of the casing cover **161 (161.2)**.

7.4.3 Installing the pump in the installation

- ▶ (→ 5 Setup and connection, Page 16).

7.5 Ordering spare parts

 For trouble-free replacement in the event of damage, we recommend keeping entire plug-in units or spare pumps available on site.

The application guidelines according to DIN 24296 recommend keeping a supply for two years of continuous use (→ 9.3 Spare parts for two years of continuous operation according to DIN 24296, Page 41).

- ▶ Have the following information ready to hand when ordering spare parts (→ type plate):
 - Short designation of the pump
 - Serial number
 - Year of construction
 - Part number
 - Designation
 - Quantity

8 Troubleshooting

If faults occur which are not specified in the following table or cannot be traced back to the specified causes, please consult the manufacturer.

Possible faults are assigned a number in the table below. Use this number to find the cause and remedy in the troubleshooting table.

Fault	Number
Pump not pumping	1
Pumping rate insufficient	2
Pumping rate too high	3
Pumping pressure too low	4
Pumping pressure too high	5
Pump running roughly	6
Roller bearing temperature too high	7
Pump leaking	8
Excessive motor power uptake	9

Tab. 12 Fault/number assignment

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
X	-	-	-	-	-	-	-	-	Supply/Suction pipe and/or pressure pipe closed by fitting	▶ Open the fitting.
-	X	-	X	-	-	-	-	-	Supply/Suction pipe not fully opened	▶ Open the fitting.
X	X	-	X	-	X	-	-	-	Supply/Suction pipe, pump or suction strainer blocked or encrusted	▶ Clean the supply/suction pipe, pump or suction strainer.
-	X	-	X	-	X	-	-	-	Supply/Suction pipe cross-section too narrow	▶ Increase the cross-section. ▶ Remove encrustations from the suction pipe. ▶ Open the fitting completely.
X	-	-	-	-	-	-	-	-	Transport sealing cover not removed	▶ Remove the transport sealing cover. ▶ Dismount the pump and check for dry-running damage.
-	X	-	X	-	X	-	-	-	Suction head too large: $NPSH_{\text{pump}}$ larger than $NPSH_{\text{installation}}$	▶ Increase the supply pressure. ▶ Consult the manufacturer.
X	-	-	-	-	X	-	-	-	Supply/Suction pipe and pump not bled properly or not filled up completely	▶ Fill the pump and/or pipes completely and bleed them.
X	-	-	-	-	X	-	-	-	Supply/Suction pipe contains air pockets	▶ Install a fitting for bleeding. ▶ Correct the pipe installation.
X	X	-	X	-	X	-	-	-	Air is sucked in	▶ Seal the source of malfunction.
X	X	-	X	-	X	-	-	-	Excessive amount of gas: pump cavitating	▶ Consult the manufacturer.
-	X	-	X	-	X	-	-	-	Temperature of pumped medium too high: pump cavitating	▶ Increase the supply pressure. ▶ Lower the temperature. ▶ Consult the manufacturer.

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
-	X	-	X	-	-	-	-	X	Viscosity or density of the pumped medium outside the specified range for the pump	▶ Consult the manufacturer.
-	X	-	X	-	-	-	-	-	Geodetic pump head and/or pipe flow resistance too high	▶ Remove sediments from the pump and/or pressure pipe. ▶ Install a larger impeller and consult the manufacturer.
-	X	-	-	X	X	-	-	-	Pressure-side fitting not opened wide enough	▶ Open the pressure-side fitting.
X	X	-	-	X	X	-	-	-	Pressure pipe blocked	▶ Clean the pressure pipe.
X	X	-	X	-	X	-	-	-	Pump running in wrong direction	▶ Swap any two phases at the motor.
X	X	-	X	-	-	-	-	-	Motor speed too low	▶ Compare the required motor speed with the specification on the pump type plate. Replace the motor if necessary. ▶ Increase the motor speed if speed control is available.
-	X	-	X	-	X	X	-	-	Pump components worn out	▶ Replace any worn-out pump components.
-	-	X	X	-	X	-	-	X	Pressure-side fitting opened too wide	▶ Throttle with pressure-side fitting. ▶ Mill down the impeller. Consult the manufacturer and adjust the impeller diameter.
-	-	X	-	-	X	-	-	X	Geodetic pump head, pipe flow resistances and/or other resistances lower than specified	▶ Throttle the flow rate with the pressure-side fitting. Observe the minimum flow rate. ▶ Mill down the impeller. Consult the manufacturer and adjust the impeller diameter.
-	-	X	-	X	-	-	-	-	Viscosity lower than expected	▶ Mill down the impeller. Consult the manufacturer and adjust the impeller diameter.
-	-	X	-	X	X	X	-	X	Motor speed too high	▶ Compare the required motor speed with the specification on the pump type plate. Replace the motor if necessary. ▶ Reduce the motor speed if speed control is available.
-	-	X	-	X	X	-	-	X	Impeller diameter too large	▶ Throttle the flow rate with the pressure-side fitting. Observe the minimum flow rate. ▶ Mill down the impeller. Consult the manufacturer and adjust the impeller diameter.
X	X	-	X	-	X	-	-	-	Impeller out of balance or clogged up	▶ Dismount the pump and check for dry-running damage. ▶ Clean the impeller.
-	X	-	X	-	X	-	-	-	Hydraulic components of the pump dirty, clotted or encrusted	▶ Dismount the pump. ▶ Clean the components.
-	-	-	-	-	-	X	-	X	Roller bearing in motor defective	▶ Replace the roller bearing.

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
-	-	-	-	-	-	X	-	-	Lubricant: excessive, insufficient or unsuitable	▶ Reduce, top up or replace the lubricant.
-	-	-	-	-	-	-	X	-	Connecting screws not tightened properly	▶ Tighten the connecting screws.
-	-	-	-	-	-	-	X	-	Mechanical seal worn	▶ Replace mechanical seal.
-	-	-	-	-	-	-	X	-	Housing seal defective	▶ Replace the housing seal.
-	-	-	-	-	-	-	X	-	Shaft sleeve is infiltrated	▶ Replace shaft sleeve and/or O-rings.
-	-	-	-	-	X	X	X	X	Pump distorted	▶ Check the pipes and pump fastenings.
-	X	-	X	-	X	-	-	X	Motor running on 2 phases	▶ Check the fuse and replace it if necessary. ▶ Check the cable connections and insulation.

Tab. 13 Troubleshooting table

9 Appendix


9.1 Sectional drawing

9.1.1 Part numbers and designations

Part no.	Designation
101	Pump casing
146	Intermediate lantern
157	Suction flange
158	Pressure flange
161	Casing cover
211	Pump shaft
230	Impeller
412.xxx	O-ring
471.xxx	Seal cover
472.xxx	Rotating seal ring
473.xxx	Stationary seal ring holder
474.xxx	Thrust ring
475.xxx	Stationary seal ring
477.xxx	Spring
509	Intermediate ring
523.xxx	Shaft sleeve
550	Disc
554.xxx	Washer
560.xxx	Pin
738.xxx	Fitting
801	Flange motor
901.1–9	Hexagon head screw
901.10	Hexagon head bolt with washer
902.xxx	Stud
903.xxx	Screwed plug
912.1	Drain plug
914.xxx	Socket head cap screw
920.xxx	Nut
922	Impeller screw
932.8	Circlip
939	SCHNORR spring washer
940.xxx	Fitting key

Tab. 14 Designation of components according to part numbers

9.1.2 Overview sectional drawing

 The position numbers in brackets in the following illustrations only apply to previous versions of the pump.

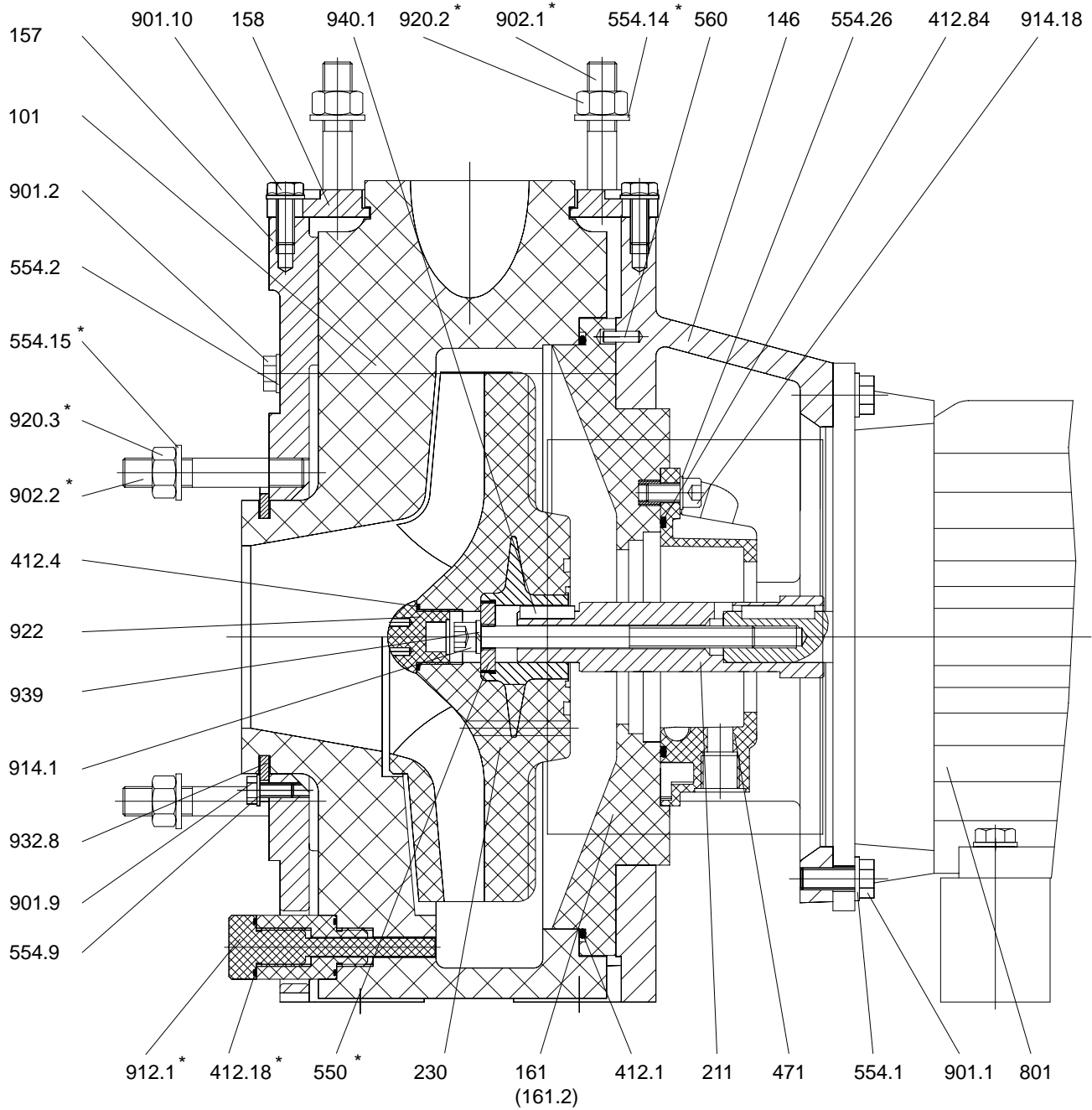



Fig. 18 NP-B with MUNSCH-REA-F mechanical seal – overview sectional drawing

* Optional

9.1.3 Variants

 The position numbers in brackets in the following illustrations only apply to previous versions of the pump.

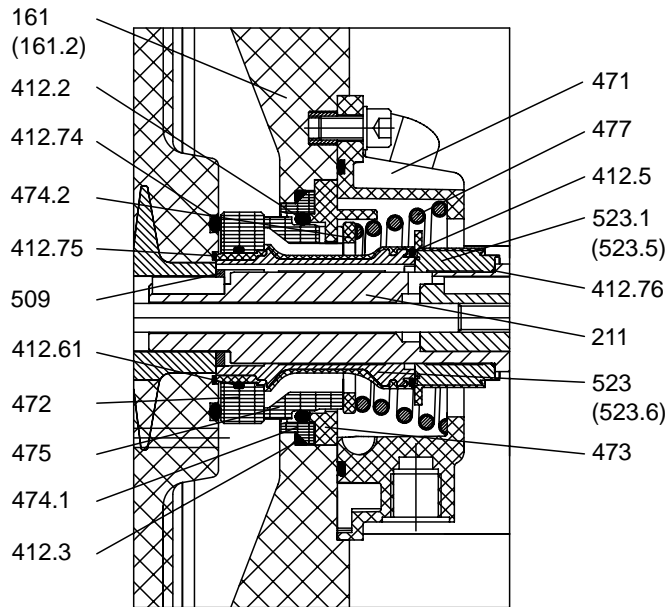


Fig. 19 MUNSCH-REA-F single mechanical seal

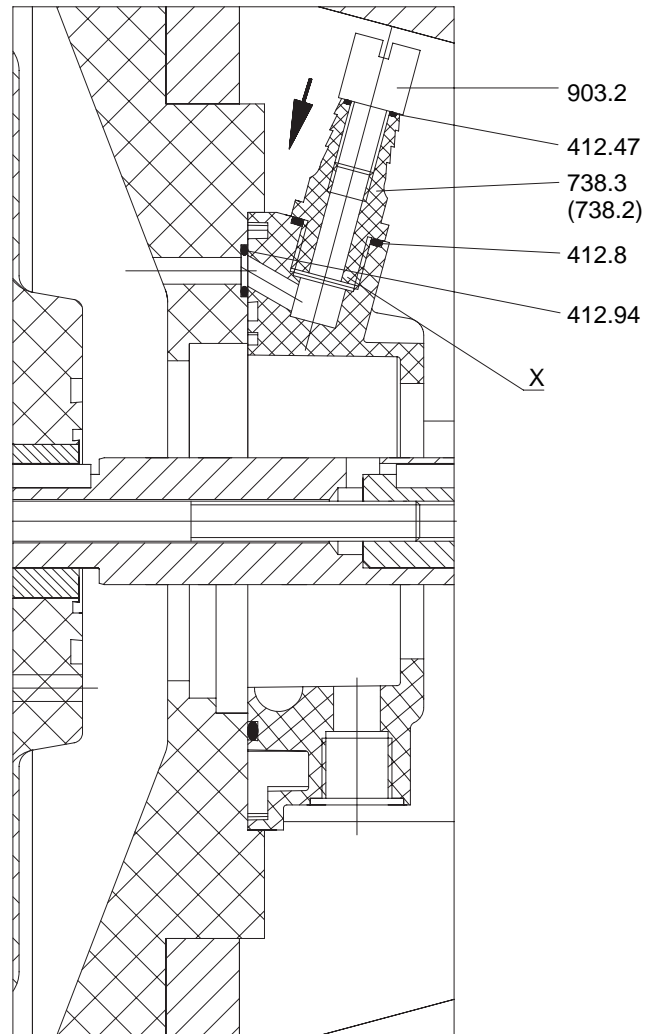


Fig. 20 Stationary flushing (supply connection)
x drawn staggered

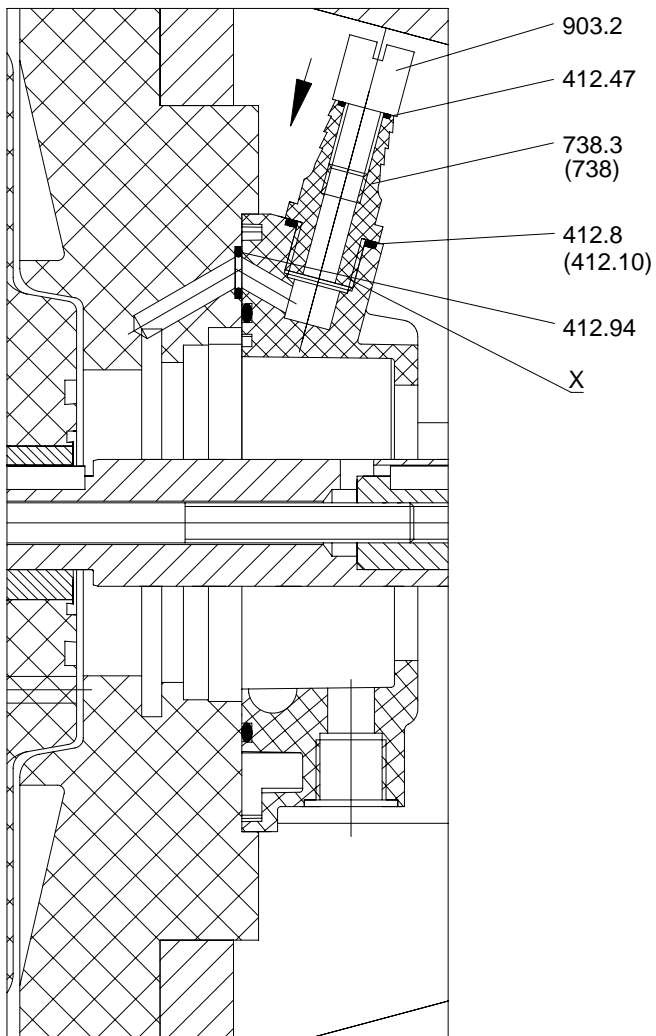


Fig. 21 Permanent flushing (supply connection)
 x drawn staggered

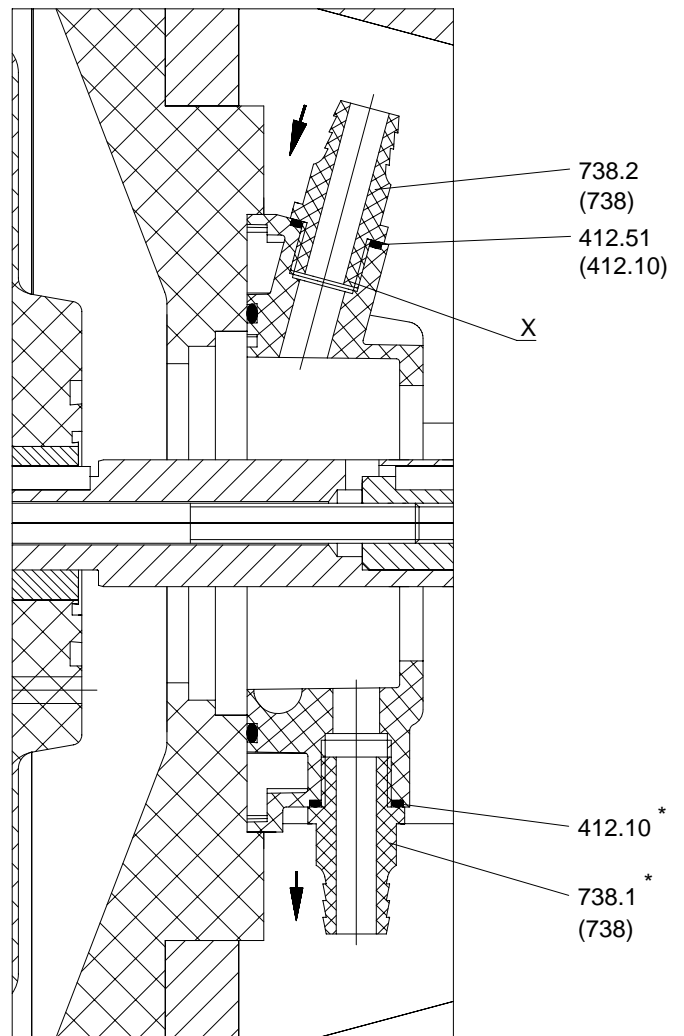




Fig. 22 Spring chamber flushing (supply connections)
 * Optional
 x Drawn staggered

9.2 Technical specifications

 Further technical specifications (→ order data sheet)

9.2.1 Ambient conditions

 Consult the manufacturer about operation under other ambient conditions.

Temperature [°C]	Relative humidity [%]		Setup level above sea level [m]
	Long-term	Short-term	
-20 to +40	≤ 85	≤ 100	≤ 1000

Tab. 15 Ambient conditions

9.2.2 Parameters for auxiliary operating systems (optional)

Quenching/barrier medium in open system

 In preparation

Medium	Volume flow [l/h]	Pressure
Quenching medium	30	Unpressurised
Barrier medium	30	► (→ diagram below).

Tab. 16 Operating parameters for quenching/barrier medium in open system (in preparation)

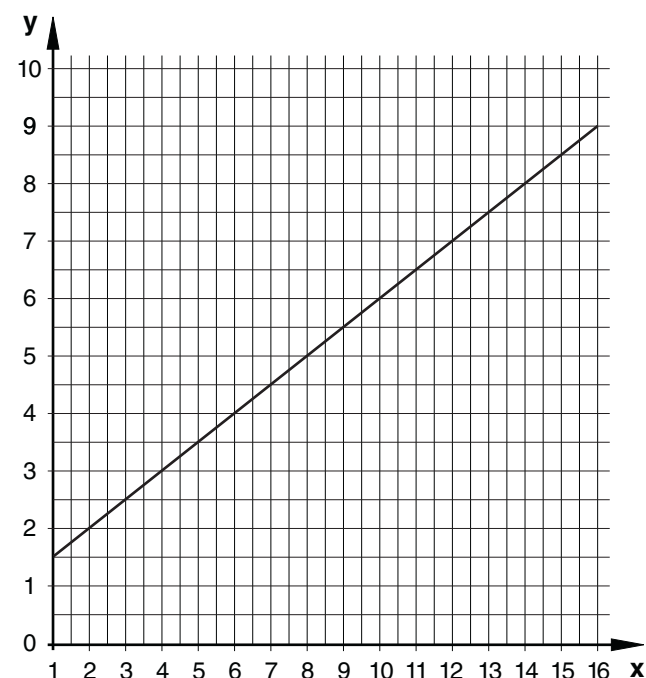


Fig. 23 Using a pressurised barrier medium (in preparation) – pressure of barrier medium

x Pressure at pressure socket [bar]

y Required pressure for using a pressurised barrier medium [bar]

9.2.3 Noise pressure levels

Measuring conditions:


- Distance to pump: 1 m
- Operation: cavitation-free
- Motor: IEC standard motor
- Tolerance ±3 dB

Lower-noise motor versions are available if the expected noise values exceed the permissible limits.

Nominal motor power PM [kW]	Noise pressure level [dB] for pump with motor at speed [min ⁻¹]			
	1450	1750	2900	3500
1.5	58	58.5	63	64
2.2	60	60.5	66	67
3.0	62	62.5	68	69
4.0	63	63.5	69	70
5.5	65	65.5	71	72
7.5	66	66.5	72	73
11.0	68	68.5	74	75

Tab. 17 Noise pressure levels

9.2.4 Tightening torques

 Tighten the screws/nuts with torques properly in accordance with the general technical rules. Deviating torques are dealt with in the following.

The following figures apply to new screws and nuts.


The following values only apply to the assembly procedure.

Thread size	Tightening torque [Nm]
	Casing bolts
M 8	–
M 10	15
M 12	30
M 16	45
M 20	75

Tab. 18 Hexagon head bolt **901.2** – steel/cast iron pairings

Thread size	Tightening torque [Nm]
M 8	25
M 10	45
M 12	55

Tab. 19 Socket head cap screw **914.1** – steel/steel pairings

 Tighten hand-tight for plastic/plastic pairings, e.g. impeller screw **922**.

9.2.5 Cleaning agents

Application area	Cleaning agents
Foodstuff and drinking water sector	E.g. spirit, Ritzol 155, strong alkaline soap suds, steam blast (for individual components only)
Other	Benzine, wax solvents, diesel, petrol, alkaline cleaners

Tab. 20 Cleaning agents

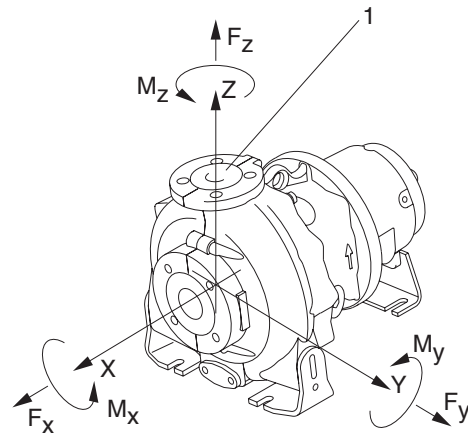
9.2.6 Socket loads acc. to ISO 5199


Fig. 24 Socket loads at the pump

1 Pressure socket

Nominal diameter DN [mm]	Fx [N]		Fy [N]	Fz [N]		Σ F [N]
	Pull	Push		Pull	Push	
25	600	300	500	700	350	1100
32	800	400	700	900	450	1500
40	1100	550	900	1200	600	2000
50	1500	750	1300	1600	800	2500
65	1900	950	1600	2000	1000	3500
80	2400	1200	2100	2600	1300	4500
100	3000	1500	2600	3300	1650	5500
125	3600	1800	3200	4000	2000	6500

Tab. 21 Socket load – forces

Nominal diameter DN [mm]	Mx [Nm]	My [Nm]	Mz [Nm]	Σ M [Nm]
25	900	600	800	1550
32	1200	800	700	1700
40	1300	900	1000	1850
50	1400	1000	1100	2000
65	1500	1100	1200	2150
80	1600	1200	1300	2300
100	1800	1300	1500	2600
125	2100	1500	1700	3000

Tab. 22 Socket load – torque

9.3 Spare parts for two years of continuous operation according to DIN 24296

9.3.1 Commissioning

Part no.	Part designation	Number of identical pumps (including spare pumps)							
		1	2	3	4	5	6 or 7	8 or 9	10 or more
		Set/Quantity of spare parts							
–	Gasket set	1	1	1	2	2	2	3	25 %
412.1	O-ring (casing)	1	2	3	4	5	100 %	100 %	100 %
523 (523.6)	Shaft sleeve	1	1	1	2	2	2	3	25 %
523.1 (523.5)	Shaft sleeve	1	1	1	2	2	2	3	25 %


Tab. 23 Replacement parts for 2 years' continuous operation – commissioning

9.3.2 Maintenance

Part no.	Part designation	Number of identical pumps (including spare pumps)							
		1	2	3	4	5	6 or 7	8 or 9	10 or more
		Set/Quantity of spare parts							
–	Gasket set	1	1	1	2	2	2	3	25 %
161	Casing cover	1	1	1	1	2	2	2	20 %
211	Pump shaft	1	1	1	1	2	2	2	20 %
230	Impeller	1	1	1	1	2	2	2	20 %
412.1	O-ring (casing)	1	2	3	4	5	100 %	100 %	100 %
523 (523.6)	Shaft sleeve	1	1	1	2	2	2	3	25 %
523.1 (523.5)	Shaft sleeve	1	1	1	2	2	2	3	25 %

Tab. 24 Replacement parts for 2 years' continuous operation – maintenance

9.4 Declaration of conformity according to EC machine directives


MUNSCH

EG-Konformitätserklärung des Herstellers
nach der EG-Maschinenrichtlinie 2006/42/EG Anhang II, Nr. 1 A
EC Declaration of Conformity by the Manufacturer
as defined by machinery directive 2006/42/EC, Annex II, No. 1 A

CE

MUNSCH Chemie-Pumpen GmbH
Im Staudchen
56235 Ransbach-Baumbach
Germany

Mr Johann Dausenau,
MUNSCH Chemie-Pumpen GmbH,
is authorised to compile the technical documentation.

We hereby declare that the pump units

Machine Type:	Standardized Chemical Pump	Chemical Pump in Close-Coupled Design	Chemical Pump in Close-Coupled Design	Chemical Pump in Close-Coupled Design
	With Mechanical Seal			With Magnetic Drive
Design Designation:	NP	NP-B SP-K	MNP-B	MSP-K

are in accordance with all relevant provisions of the EC Machinery Directive.


The following harmonised standards (or parts of these standards) were applied:

<input checked="" type="checkbox"/> <u>DIN EN ISO 12100-1: 2004</u> <input checked="" type="checkbox"/> <u>DIN EN ISO 12100-2: 2004</u> <input checked="" type="checkbox"/> <u>EN 809: 1998</u> <input type="checkbox"/> _____ <input type="checkbox"/> _____	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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The product complies with the aforesaid standards insofar as it is used at the contractually agreed conditions.
The operator is responsible for this.

In the event of any structural change or use not as intended, this declaration becomes invalid unless the manufacturer's prior written approval has expressly been given.

Ransbach-Baumbach, 29.12.2009


Dipl.-Ing. Stefan Munsch
Managing Director

MUNSCH Chemie-Pumpen GmbH

December 2009