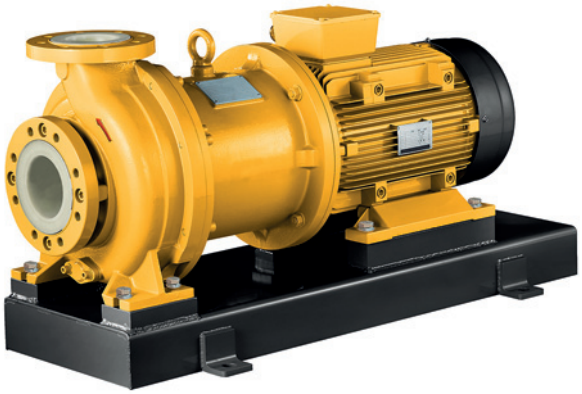
SCHMITT
chemical resistant pumps

NEOChem Core series Magnetically coupled centrifugal pump

Original operating manual



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SCHMITT-Kreiselpumpen GmbH & Co. KG
Einsteinstraße 33
76275 Ettlingen
Germany
Phone: + 49 (0) 7243 / 54 53 - 0
E-Mail: sales@schmitt-pumpen.de
Internet: www.schmitt-pumpen.de

Subject to technical modifications.

Read carefully before use.
Save for future use.

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1 About this document

This manual:

- is an integral part of the pump
- applies to all series referred to
- describes safe and proper operation during all operating phases

1.1 Target groups

Operating company

- Responsibilities:
  - Always keep this manual accessible where the device is used on the system.
  - Ensure that employees read and observe this document, particularly the safety instructions and warnings, and the documents which also apply.
  - Observe any additional country-specific rules and regulations that relate to the system.

Qualified personnel, fitter

- Mechanics qualification:
  - Qualified employees with additional training for fitting the respective pipework
- Electrical qualification:
  - Qualified electrician
- Transport qualification:
  - Qualified transport specialist
- Responsibility:
  - Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

1.2 Other applicable documents

Document/purpose	Where found
The following documents are available online: • ATEX additional instructions • Resistance lists – Resistance of materials used to chemicals • Data sheet – Technical specifications, operating conditions, dimensions • www.schmitt-pumpen.de/en/services/downloads	
Spare parts list • Ordering spare parts	Documentation included
Sectional drawing • Sectional drawing, part numbers, component designations	
Documentation for the drive • Technical documentation for drives	
Declaration of conformity • Conformity with standards • (→ 9.5 Declaration of conformity, Page 36).	

Tab. 1 Other application documents, purpose and where found

1.3 Warnings and symbols

Warning sign	Level of risk	Consequences if disregarded
⚠ DANGER	immediate acute risk	Death, serious bodily harm
⚠ WARNING	potentially acute risk	Death, serious bodily harm
⚠ CAUTION	potentially hazardous situation	Minor injury
NOTE	potentially hazardous situation	Material damage

Tab. 2 Warning signs and consequences if disregarded

Symbol	Meaning
⚠	Safety warning sign ► Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
►	Instruction
1., 2., ...	Multiple-step instructions
✓	Precondition
→	Cross reference
ⓘ	Information, notes

Tab. 3 Symbols and their meaning

2 General safety instructions

The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

2.1 Intended use

- Only use the pump with suitable media. Pump parts in contact with media must be resistant to the media. (→ Order specification).
- Use the pump for flammable or explosive media only if it is intended for use in potentially explosive atmospheres (→ATEX additional instructions).
- Adhere to the operating limits and size-dependent minimum flow rates.
- Avoid dry running:
  Initial damage, such as destruction of plain bearings, seals and plastic parts, will occur within a few seconds.
  – Make sure the pump is only operated only when filled with the conveyed fluid and vented, and never operated when not filled with the pumped liquid.
  – Ensure that there are no excessively high amounts of gas in the pumping medium.
  – Ensure that the pump is operated only within the permissible operating range.
  – Ensure that the use of shut-off valves or filters does not cause the pressure on the inlet side of the pump to be too low.
- Avoid cavitation:
  – Open the suction-side fitting and do not use it to regulate the flow.
  – Do not open the pressure-side fitting beyond the agreed operating point.
- Avoid overheating:
  – Do not operate the pump while the pressure-side fitting is closed.
  – Observe the minimum flow rate (→ 9.3 Technical specifications, Page 31).
- Avoid damage to the motor:
  – Do not open the pressure-side fitting beyond the agreed operating point.
  – Note the maximum permissible number of times the motor can be switched on per hour (→ manufacturer's specifications).
- Consult with the manufacturer regarding any other use of the device.

Prevention of obvious misuse (examples)

- Observe pump limits of use regarding temperature, pressure, flow and speed (→ 9.3 Technical specifications, Page 31).
- The power consumption of the pump increases as the specific gravity of the pumped fluid increases. Adhere to the permissible specific gravity in order to eliminate the possibility that the pump and motor become overloaded (→ 9.3 Technical specifications, Page 31).
  A lower specific gravity is permissible. Adapt the auxiliary systems accordingly.
- When conveying fluids containing solids, observe the limit values for proportions of solid particles and particle size:
  – Particle size Ø ≤ 0.05 mm
  – Proportion of solid particles ≤ 5 % Vol.
  – Hardness within 80 Hs
- If plain bearings of carbon-bonded silicon carbide are fitted, do not pump any liquids containing solids.
- The type of installation should be selected only in accordance with these operating instructions. For example, the following are not allowed:
  – Hanging pumps in the pipe
  – Overhead installation
  – Installation in the immediate vicinity of extreme heat or cold sources
  – Installation too close to a wall
  – Vertical installation

2.2 General safety instructions

Observe the following regulations before carrying out any work.

2.2.1 Product safety

The pump has been built according to state-of-the-art technology and the recognized technical safety regulations. Nevertheless, operation of the pump can still put the life and health of the user or third parties at risk or damage the pump or other property.

- Operate the pump only if it is in perfect technical condition and use it only as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Keep this manual and all other applicable documents complete, legible and accessible to personnel at all times.
- Refrain from any procedures and actions that would pose a risk to personnel or third parties.
- In the event of any safety-relevant faults, shut down the pump immediately and have the fault corrected by appropriate personnel.
- In addition to the entire documentation for the product, comply with statutory or other safety and accident-prevention regulations and the applicable standards and guidelines in the country where the pump is operated.

2.2.2 Obligations of the operating company

Safety-conscious working

- Operate the pump only if it is in perfect technical condition and use it only as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
  - 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
  - Applicable guidelines of the operator
- Make personal protective equipment available.

Qualified personnel

- Make sure all personnel tasked with work on the pump have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- Make sure that trainee personnel only work on the pump under supervision of specialist technicians.
- All activities may be carried out only by specialists who hold the required qualifications:

Actions	Required qualified personnel
Mechanical work (installation, maintenance, servicing)	Skilled mechanic
Electrical work (electrical installation)	Qualified electrician
All further work	Instruction by the user/owner

Safety equipment

- Provide the following safety equipment and verify its functionality:
  - For hot, cold and moving parts: pump safety guarding provided by the customer
  - For pumps without capability to run dry: Dry run protection

Warranty

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

2.2.3 Obligations of personnel

- All directions given on the pump must be followed (and kept legible), e.g. the arrow indicating the sense of rotation and the markings for fluid connections.
- Pump and components:
  - Do not step on them or use as a climbing aid
  - Do not use them to support boards, ramps or beams
  - Do not use them as a fixing point for winches or supports
  - Do not use them for storing paper or similar materials
- Do not remove the safety guarding for hot, cold or moving parts during operation.
- If necessary, use protective equipment for the specific application:
  - Helmet
  - Safety gloves
  - Safety goggles
  - Gloves
  - Further protective equipment depending on the medium being pumped
- Only carry out work on the pump while it is not running.
- Before all installation and maintenance work, disconnect the motor from the mains and secure it against being switched back on again.
- Never reach into the suction or pressure-side flange.
- Following all work on the pump, refit safety devices in accordance with the instructions and bring into service.
- Do not make any modifications to the device.

2.3 Specific hazards

2.3.1 Potentially explosive atmospheres

Observe ATEX additional manual

- Additional instructions for use in explosive atmospheres
- (→ www.schmitt-pumpen.de/sites/default/files/2020-10/ATEX-Zusatzanleitung-en.pdf)

2.3.2 Electric shock

In the event of contact with live parts (e.g. wires in the terminal box of the electric motor), there is a risk of electric shock resulting in serious injury or death.

- All electrical work must be carried out by qualified electricians only.
- Before all work on the electrical system, disconnect the motor from the mains and secure against being switched back on again.

2.3.3 Hazardous pumped media sprayed out

Pumped media can be toxic and hot and can be sprayed out. In the event of contact, there is a risk of burns and skin rashes.

- When handling hazardous fluids (e.g. hot, flammable, explosive, toxic, hazardous to health or the environment), observe the safety regulations for the handling of hazardous substances.
- Allow the pump to cool completely before commencing any work and then depressurize it.
- Use protective equipment for any work on the pump.
- Empty the pump during maintenance and repair work.
- Safely collect the fluid and dispose of it in accordance with environmental regulations.

2.3.4 Moving parts

Moving parts (e.g. shaft, impeller, coupling) present a risk of fatal injury due to being dragged in, crushed or trapped.

- Do not touch the pump when it is running.
- Do not carry out any work on the pump when it is running.
- Maintain an adequate distance from moving parts.
- When performing installation and maintenance work, disconnect the motor from the mains and secure it against being switched back on again.
- (If present) ensure contact guard is fitted after work on the pump.

2.3.5 Hot surfaces

During operation, high temperatures are generated on the surfaces of the housing. Even after switching off, the surfaces of the housing can still be hot and can cool down only slowly. There is a risk of burns when touching hot surfaces.

- Do not touch the pump when it is running.
- Allow the pump to cool completely before commencing any work.
- Wear protective gloves.

2.3.6 Magnetic field

The magnetic field of the magnetic coupling can destroy products and devices that are sensitive to magnets. These include electronic implants (such as pacemakers), digital watches, calculators, hard drives, credit cards and ID cards. For persons with electronic implants there is a danger to life.

- Do not allow persons with electronic implants to work on the pump or on magnetic parts.
- Secure the work place and if necessary cordon off:
  - Ensure that persons with electronic implants maintain a safe distance > 1 m
  - Make sure that no magnetizable metal parts are attracted by the pump's magnetic coupling.
  - Make sure that parts of the magnetic coupling are not attracted by the magnetizable metal parts
- Keep magnetizable objects a safe distance > of 150 mm away from the magnetic coupling.

3 Layout and Function

3.1 Marking

3.1.1 Name plate

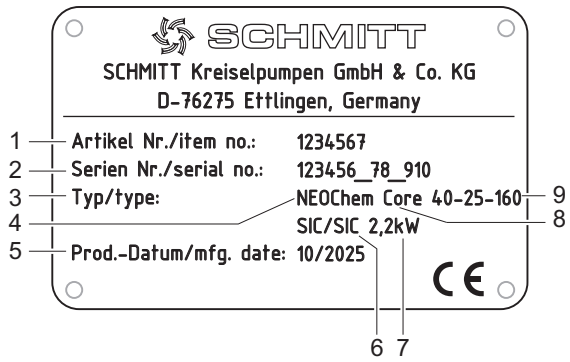


Fig. 1 Name plate (example)

1 Article numbers
2 Serial number
3 Type
4 Pump series
5 Year of manufacture (month/year)
6 Plain bearing material
7 Rated power of motor
8 „Core“ version
9 Size

3.1.2 ATEX type plate

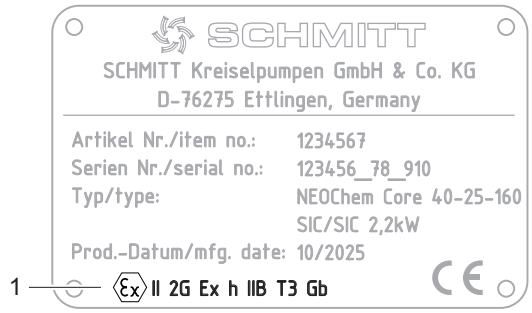


Fig. 2 ATEX type plate (example)

1 Explosion protection label

3.2 Description

Non self-priming and magnetically coupled centrifugal pump in modular design:

- Media-lubricated plain bearings
- Horizontal installation
- Direction of conveying
  - Axial suction flange
  - Vertical pressure flange

3.3 Assembly

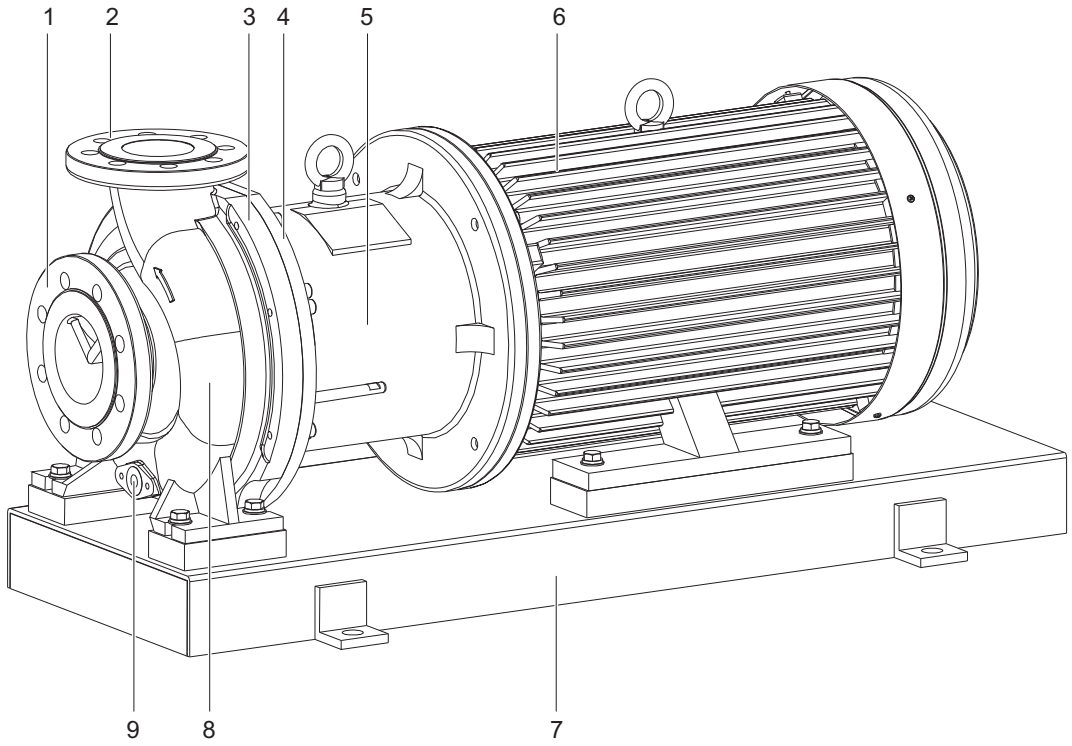


Fig. 3 Assembly

1 Suction flange
2 Pressure flange
3 Carrier plate
4 Motor flange
5 Magnetic coupling (hidden)
6 Motor
7 Base plate
8 Housing assembly
9 Drain cover

3.4 Magnetic coupling

Pumps with magnetic couplings are hermetically sealed and leaktight. Power transmission from the motor is non-contact through an enclosed and hermetically sealed rear cover on the impeller.

4 Transport, Storage and Disposal

4.1 Transport

The user/owner is responsible for the transport of the pump.

Weight specification (→ 9.3 Technical specifications, Page 31).

4.1.1 Unpacking and inspection on delivery

1. Unpack the pump/machine drive on delivery, and inspect it for transport damage.
2. Check completeness and accuracy of delivery.
3. Ensure that the information on the name plate agrees with the order/design data.
4. Report any transportation damage to the manufacturer immediately.
5. Dispose of packaging material according to local regulations.

4.1.2 Lifting

⚠ DANGER

Death or limbs crushed as a result transported items falling over!

- ► Use lifting gear appropriate for the total weight to be transported.
- ► Attach lifting gear in accordance with the following diagram.
- ► Do not stand under suspended loads.

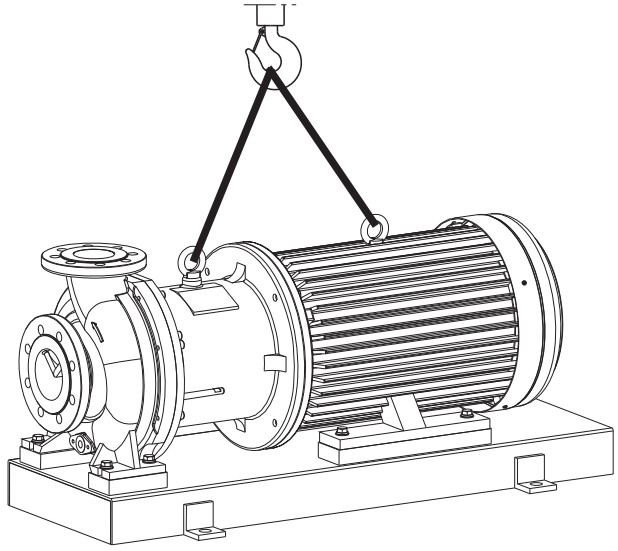


Fig. 4 Attach the lifting gear to the modular pump (illustration of general principle)

1. Attach lifting gear in accordance with the above diagram.
2. Lift the modular pump appropriately.

4.2 Storage

NOTE

Material damage due to inappropriate storage!

- ► Store the pump properly.

1. Rinse and empty the pump if necessary.
2. Seal all openings with blind plugs or plastic covers.
3. Make sure the storage room meets the following conditions:
   - Dry
   - Frost-free
   - Vibration-free
   - UV protected
4. Rotate the pump shaft once a month.
5. Make sure the shaft and bearing change their rotational position in the process.

4.3 Disposal

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

⚠ WARNING

Risk of poisoning and environmental damage by the pumped liquid!

- ► Use personal protective equipment when carrying out any work on the pump.
- ► Prior to the disposal of the pump:
  - Collect and damage any escaping pumped liquid in accordance with local regulations.
  - Neutralize residues of pumped liquid in the pump.
- ► Remove plastic parts and damage them in accordance with local regulations.

- ► Dispose of the pump in accordance with local regulations.

5 Installation and connection

For pumps in potentially explosive atmospheres (→ ATEX additional manual).

NOTE

Material damage caused by dirt!

- ▶ Do not remove the transport seals until immediately before installing the pump.
- ▶ Do not remove any covers or transport and sealing covers until immediately before connecting the pipes to the pump.

5.1 Preparing for installation

5.1.1 Check operating conditions

- ▶ Ensure the required operating conditions are met:
  - Resistance of body and seal material to the medium (→ resistance lists).
  - Required ambient conditions (→ 9.3.1 Ambient conditions, Page 31).

5.1.2 Preparing the installation site

- ▶ Ensure the installation site meets the following conditions:
  - Pump is freely accessible from all sides
  - Sufficient space for the installation/removal of the pipes and for maintenance and repair work, especially for the removal and installation of the pump
  - Pump not exposed to external vibration (damage to bearings)
  - Pump not exposed to external corrosive influences
  - Frost protection
  - The head of the pump is not exceeded.

5.1.3 Surface preparation

✓ Aids, tools, materials:
- Spirit level

- ▶ Make sure the surface meets the following conditions:
  - Level and horizontal
  - Clean (no oil, dust or other impurities)
  - Capable of bearing the weight of the machine drive and all operating forces
  - Ensures the stability of the machine drive

5.2 Setting up

1. Lift up the machine drive (→ 4.1 Transport, Page 12).
2. Put down the machine drive at the place of installation.
3. Screw in and tighten the fixing screws on the base plate.

5.3 Planning pipelines

Note the installation example (→ 9.2 Installation example, Page 30).

Water hammer may damage the pump or the system. Plan the pipes and fittings as far as possible to prevent water hammer occurring.

5.3.1 Designing pipelines

- ▶ Plan pipes safely:
  - No pulling or thrusting forces
  - No bending moments
  - Adjust for changes in length due to temperature changes (compensators, expansion shanks)
  - Avoid bends close to the pressure-side flange

5.3.2 Arranging the supports and connections

NOTE

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

- ▶ Ensure pipe connection without stress.
- ▶ Do not exceed the max. permissible tightening torque for the flange bolts (→ 9.3.4 Tightening torques, Page 31).

1. Support pipes in front of the pump.
2. Ensure the pipe supports will always allow expansion and contraction of the pipes.

5.3.3 Specifying nominal widths

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

1. Make sure the nominal suction line width is equal to the nominal suction flange width.
2. Make sure the nominal pressure line width is not smaller than the nominal discharge flange width.

5.3.4 Determine the pipe lengths and installation parameters

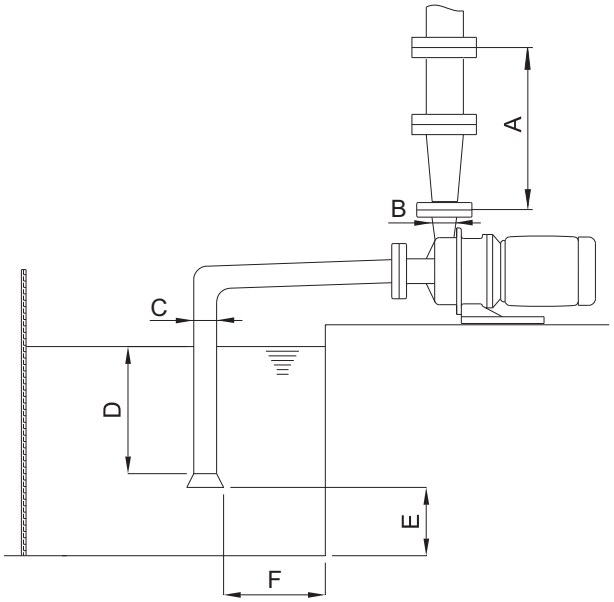


Fig. 5 Pipe lengths and installation parameters

A > 5 x DNd
B DNd
C DNs
D > 0.5 m or > 2 x DNs
E > 1.5 x DNs
F > 1.5 x DNs

1. Observe recommended minimum values when installing the pump. Note the installation example (→ 9.2 Installation example, Page 30).

Pressure side: Shorter lengths are possible, but may result in increased noise development.

2. Note the normal-priming design of the pump (not self-priming).
3. Fill the pump and suction line completely with pumped liquid, and vent them before each start-up.
4. Maintain the required NPSH value of the pump (NPSHr) at all times under the given system conditions.

5.3.5 Overview of installation conditions for pipelines

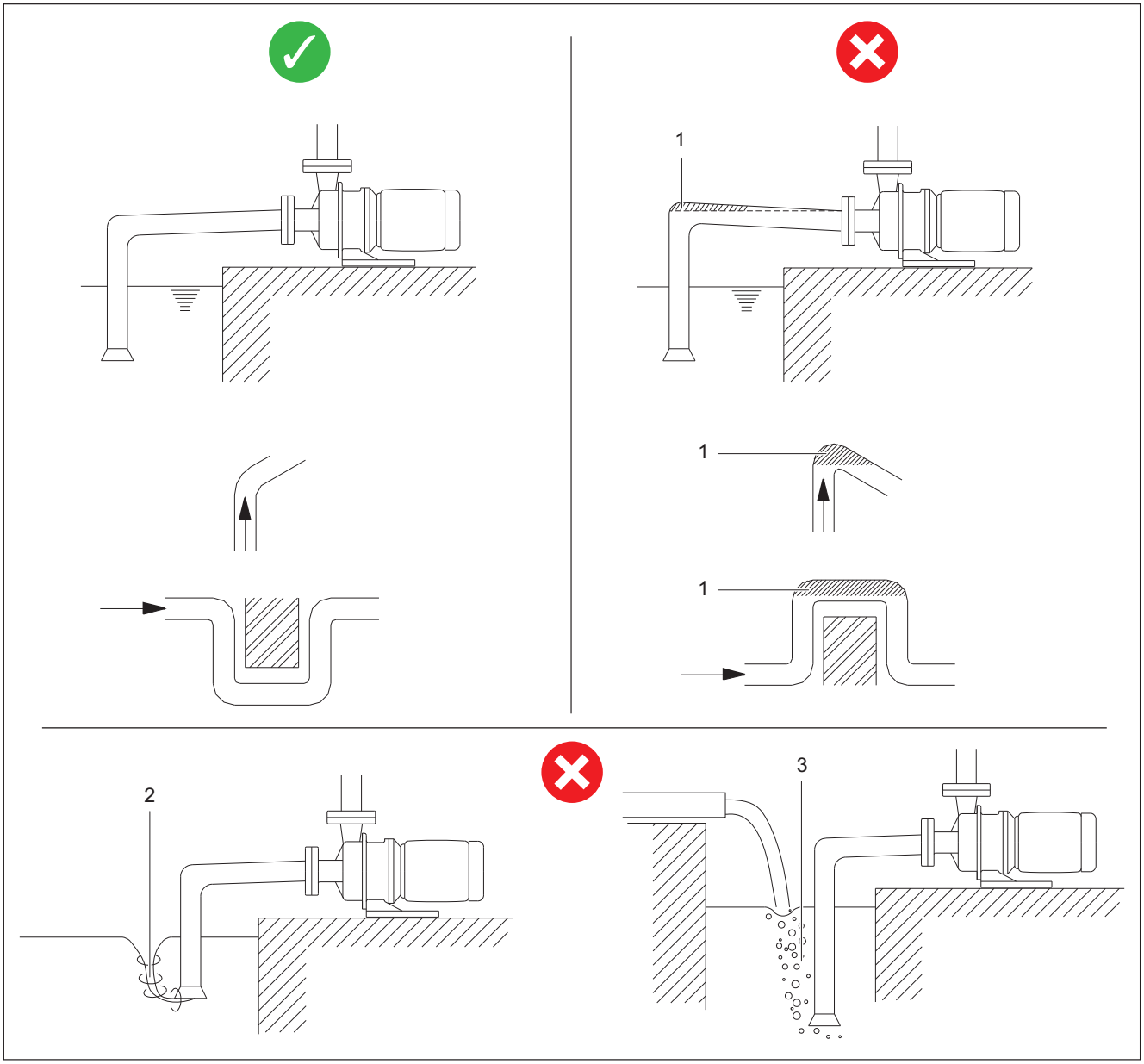


Fig. 6 Permissible (✓) and impermissible(**X**) installation conditions

1 Air pocket formation in the suction line
2 Vortex in the pumped medium
3 Air bubbles in the pumped medium

1. Comply with the installation conditions of the pipelines.
2. Note the normal-priming design of the pump (not self-priming).
3. Fill the pump and suction line completely with pumped liquid, and vent them before each start-up.
4. Maintain the required NPSH value of the pump (NPSHr) at all times under the given system conditions.

5.3.6 Optimizing changes of cross section and direction

1. Avoid radii of curvature of less than 1.5 times the nominal pipe diameter.
2. Avoid abrupt changes of cross-section along the piping.

5.3.7 Providing safety and control devices (recommended)

Avoid contamination

► Install a dirt strainer with mesh size <3 mm at the inlet of the suction pipe.

Avoid reverse running

1. Install a foot valve or check valve between the pressure-side flange and shut-off valve to ensure that the medium does not flow back after the pump is switched off.
2. In order to enable venting, include vent connection between the pressure-side flange and foot valve or check valve.

Make provisions for isolating and shutting off the pipes

For maintenance and repair work.

► Provide shut-off valves in the suction pipe and pressure line.

Dry run protection by measuring the operating conditions

► Provide monitoring sensors for both pressure and flow rate, to protect the pump against dry running and consequential damage

5.4 Connecting the pipes

NOTE

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

► Ensure pipe connection without stress.

5.4.1 Keeping the piping clean

NOTE

Material damage due to impurities in the pump!

► Make sure no impurities can enter the pump.

► Clean all piping parts and fittings prior to assembly.

5.4.2 Installing suction pipe

1. Remove the transport and sealing covers from the pump.
2. Fit suction pipe stress-free and sealed.
3. Avoid gas cavities:
   – Always lay the suction pipe rising.
   – Install bends with an angle < 90°.
   – Do not install the suction pipe near whirlpools or supply lines.

5.4.3 Installing the pressure pipe

1. Remove the transport and sealing covers from the pump.
2. Align the pressure-side flange upwards to allow the pump head to be vented.
3. Fit the pressure line stress-free and sealed.
4. Install the foot valve under the following operating conditions:
   – Suction flow upwards
   – Negative pressure

5.4.4 Inspection for stress-free pipe connections

✓ Piping installed and cooled down
1. Disconnect the pipe connections from the pump.
2. Check whether the pipes can be moved freely in all directions within the expected range of expansion.
3. Make sure that the connections are parallel.
4. Reconnect the pipe connections to the pump.

5.5 Electrical connection

DANGER

Risk of electrocution!

► All electrical work must be carried out by qualified electricians only.

► Before all work on the electrical system, disconnect the motor from the mains and secure against being switched back on again.

5.5.1 Connecting the motor

Follow the instructions of the motor manufacturer.

1. Connect the motor according to the connection diagram.
2. Make sure no danger arises due to electric power.
3. Install an EMERGENCY STOP switch.

6 Operation

For pumps in potentially explosive atmospheres (→ ATEX additional manual).

6.1 Preparing for commissioning

6.1.1 Check downtimes

► Before starting up the pump, check the downtime and perform the following actions:
  – Check the fill level.
  – If the hydraulic parts are dirty, clean them.
  – Check that the impeller runs freely.

6.1.2 Filling and bleeding

1. Open the suction-side fitting.
2. Open the pressure-side fitting.
3. Fill pump and suction pipe with fluid.
4. Verify that no pipe connections are leaking.

6.1.3 Check direction of rotation

NOTE

Material damage as a result of dry running!

► Make sure the pump is filled properly.

1. Switch on motor for max. 2 seconds and switch it off again immediately.
2. Visually check the direction of rotation of the motor fan impeller and make sure that the direction of rotation of the motor matches the direction arrow on the pump casing.
3. If the sense of rotation is different: Change over the two phases (→ 5.5 Electrical connection, Page 16).

6.2 Commissioning

6.2.1 Switching on

✓ Pump set up and connected properly
✓ Motor set up and connected properly
✓ All connections stress-free and sealed
✓ All safety equipment installed and tested for functionality
✓ Pump prepared, filled and vented correctly
✓ Tank fill sufficient

NOTE

Risk of cavitation if suction flow is restricted!

► Open the suction-side fitting and do not use it to regulate the flow, if installed.
► Do not open the pressure-side fitting beyond the operating point.

NOTE

Material damage due to overheating!

► Do not operate the pump for long periods with the pressure-side fitting closed.
► Observe the minimum flow rate (→ 9.3.8 Minimum volume flow, Page 34).

NOTE

Material damage as a result of dry running!

► Make sure the pump is filled properly.

1. Open the suction-side fitting, if installed.
2. Close the pressure-side fitting.
3. Open the exhaust line fitting.
4. Switch on the motor and check it for smooth running.
5. Make sure that the suction pipe and pump are vented fully. Check the vacuum gauge.

   Gas escapes through the exhaust line.
6. Once as the suction line is vented, close the vent line and slowly open the pressure-side valve.
7. Make sure temperature change is smaller than 5 K/min for pumps with hot fluids.
8. After the initial stress due to the pressure and operating temperature, check that the pump is not leaking.
9. If leaks are present at the housing seals or flanges, proceed as follows:
   – Switch off motor.
   – Close the control valves.
   – Remedy the leaks.

6.2.2 Switching off

✓ Pressure-side fitting closed (recommended)
1. Switch off motor.
2. Check all connecting screws and tighten them to the specified torque (→ 9.3.4 Tightening torques, Page 31).

6.3 Shutting down the pump

▶ Take the following measures whenever the pump is shut down:

Pump is	Measure
shut down	▶ Take measures appropriate for the fluid (→ Tab. 5 Measures depending on the behavior of the pumped liquid, Page 18).
…emptied	▶ Close suction and pressure-side fitting.
…dismounted	▶ Isolate the motor from its power supply and secure it against unauthorized switch-on.
…put into storage	▶ Note measures for storage (→ 4.2 Storage, Page 12).

Tab. 4 Measures to be taken if the pump is shut down

Behavior of the pumped liquid	Duration of shutdown (depending on process)	
	Short	Long
Crystallized or polymerized, solids sedimenting	▶ Flush the pump.	▶ Flush the pump.
Solidifying/ freezing, non-corrosive	▶ Heat up or empty the pump and containers.	▶ Empty the pump and containers.
Solidifying/ freezing, corrosive	▶ Heat up or empty the pump and containers.	▶ Empty the pump and containers.
Remains liquid, non-corrosive	–	–
Remains liquid, corrosive	–	▶ Empty the pump and containers.

Tab. 5 Measures depending on the behavior of the pumped liquid

6.4 Restoring the pump to service

▶ Complete all steps as for commissioning (→ 6.2 Commissioning, Page 17).

6.5 Operating the stand-by pump

✓ Stand-by pump filled and bled

✓ Suction pipe not vented

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

1. Fully open the suction-side fitting, if installed.
2. Open pressure-side fitting far enough so that the stand-by pump operating temperature is achieved and heating is even (→ 6.2.1 Switching on, Page 17).

7 Maintenance

Opening the pump casing invalidates the warranty.

When used for the intended purpose the bearings and seals are virtually free of wear and will not require replacement during the warranty period.

Maintenance and repair work should be undertaken in consultation with Schmitt Kreiselpumpen. The chapter describes maintenance not within the warranty period.

For pumps in potentially explosive atmospheres (→ ATEX additional manual).

Maintenance during the warranty period will be performed by Schmitt Kreiselpumpen. Submit evidence of conveyed medium on request (DIN safety data sheet or confirmation of decontamination).

7.1 Inspections

The inspection intervals depend on the operational strain on the pump.

1. Check at appropriate intervals:
   – Adherence to the minimum flow rate
   – Normal operating conditions unchanged
   – Tank fill level
2. For trouble-free operation, always ensure the following:
   – No dry running
   – No leaks
   – No cavitation
   – Shut-off valve open on the suction side, if installed
   – Free and clean filters
   – Sufficient pump inlet pressure
   – No unusual running noises or vibrations
   – No parting of magnetic coupling

7.2 Servicing

Plain bearings are subject to natural wear and tear which is heavily dependent on the respective operating conditions. It is therefore not possible to make general statements about the operating life.

Inspection and replacement of the plain bearings is performed when the pump is disassembled (→ 7.3.2 Disassembling and checking the pump, Page 20).

7.2.1 Maintenance in accordance with maintenance schedule

► Perform maintenance work in accordance with the maintenance schedule (→ 9.4 Maintenance schedule, Page 35).

7.2.2 Cleaning the pump

NOTE

High water pressure or spray water can cause material damage!

► Do not direct water jets or steam jets into the opening of the flange.

► Regularly clean the pump to remove heavy dirt.

7.3 Dismounting

⚠ WARNING

Risk of injury due to heavy components!

► Pay attention to the component weight. Lift and transport heavy components using suitable lifting gear.

► Set down components safely and secure them against overturning or rolling away.

⚠ WARNING

Risk of injury during disassembly!

► Secure the pressure-side shut-off valve against accidental opening.

► Wear protective gloves, components can become very sharp-edged due to wear or damage.

► Observe the manufacturer's specifications (e.g. for the motor).

NOTE

Material damage due to incorrect dismounting/installation of the pump!

► Only specialist mechanics should complete dismounting/installation work.

7.3.1 Preparations for dismounting

✓ Pump is depressurized

✓ Pump completely empty, flushed and decontaminated

✓ Electrical connections disconnected and motor secured against switch-on

✓ Pump cooled down

✓ Pressure gauge lines, pressure gauge and fixtures dismounted

1. Dismantle the pipes on the suction and pressure side.
2. Remove pump from the system.
3. When dismounting, observe the following:
   – Mark the precise orientation and position of all components before dismounting them.
   – Dismount components concentrically without canting.

7.3.2 Disassembling and checking the pump

Following the drawings for disassembly (→ 9.1.2 Drawings , Page 28).

Request spare parts from the manufacturer (→ 7.4 Replacement parts and return, Page 21).

During disassembly, stressed parts are checked for damage and replaced if necessary:

- Bearing rings, bearings, thrust ring
- Impeller
- Shaft
- Seal and O-ring

The plain bearings consist of the following parts:

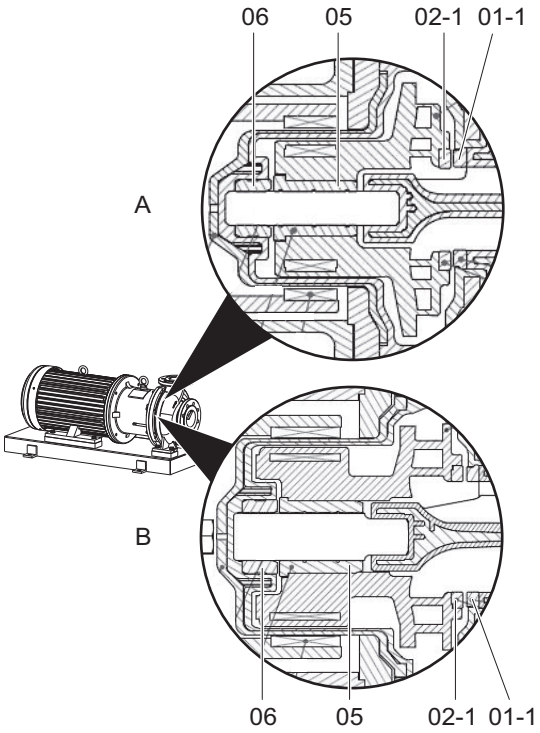


Fig. 7 Components of the plain bearings

A Sizes 40...65
B Sizes 80 and 100
01-1 Race (housing)
02-1 Wear ring (impeller)
05 Bearing
06 Rear thrust collar

✓ Prepared for disassembly.

NOTE

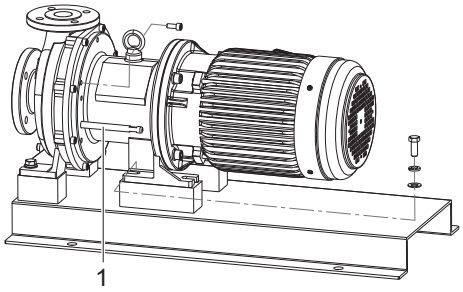
Material damage, fragile components!

The plain bearings can be damaged.

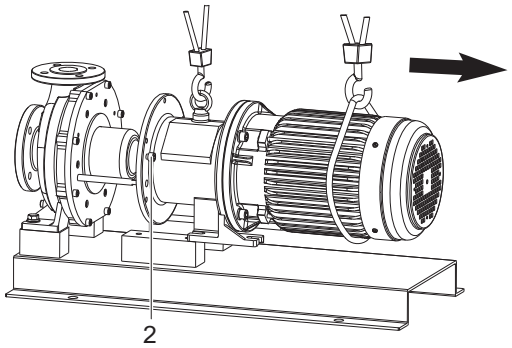
► Perform disassembly carefully, and do not strike or knock the fragile parts of the plain bearing.

Disassembling and checking stressed parts

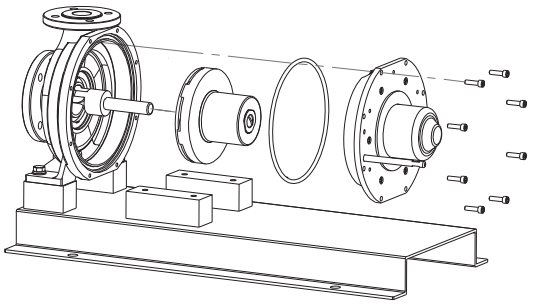
The illustrations show sizes 40...65. The procedure for sizes 80 and 100 is identical unless otherwise described.



1. Unscrew the hexagon socket screws from the support plate (03).
2. Unscrew the hexagon head screws with washers from the base plate (12):
   – For sizes 40...65 on the housing assembly (01).
   – For sizes 80 and 100 on the motor.
3. Fit a guide rod (1) on both ends.



4. Attach the motor flange (07) and motor to a hoist.
5. Screw a hexagon socket screw (2) into the tapped hole on the motor flange (07) on both sides in order to push the motor flange (07) with motor away from the support plate (03).
6. Pull off the motor flange (07) with motor in the direction of the arrow and put it aside in a safe place.



7. Unscrew the hexagon socket screws from the carrier plate (03).
8. Remove the carrier plate (03) with the containment shel (11).
9. Remove the O-ring (09).
10. Carefully remove the impeller assembly (02) from the shaft (04).
11. Check the stressed parts for damage and replace them if necessary:
    – Plain bearing
    – Impeller
    – Shaft
12. Check stressed parts for wear. Replace parts if they exceed the wear limits (→ 9.3.5 Wear limits, Page 32).
13. If no further disassembly is required, assemble the pump (→ 7.5 Installing, Page 22).

Dismount the pump

14. Remove the carrier plate (03) from the rear housing and containment shell (11).
15. Remove the containment shell (11) from the rear housing.
16. Unscrew the hexagon head screws with washers from the housing assembly (01) and base plate (12).
17. Remove the housing assembly (01) from the base plate (12).
18. Unscrew the hexagon socket screws from the suction flange and housing assembly (01).
19. Remove the suction flange from the housing assembly (01).
20. Remove the shaft (04) from the suction flange.
21. Remove the O-ring and seal from the suction flange.
22. Unscrew the drain cover (08) from the housing assembly (01).
23. Unscrew the hexagon head screws with washers from the motor flange (07) and motor.
24. Remove the motor flange (07) from the motor.
25. Loosen the grub screw on the magnetic capsule (10).
26. Unscrew the hexagon head screw with washer from the magnet capsule (10) and motor shaft.
27. Remove the magnetic capsule (10) from the motor shaft.
28. Remove the feather key.
29. Check that the through holes and relief holes are not blocked - if they are, clean them.

7.4 Replacement parts and return

1. Have the following information as shown on the name plate ready to hand when ordering spare parts (→ 3.1 Marking, Page 10).
   – Article numbers
   – Type
   – Year of manufacture
2. Please complete and enclose the confirmation of decontamination for returns
   (→ www.schmitt-pumpen.de/sites/default/files/2020-10/Dekontaminationsnachweis_en.pdf).
3. Use only spare parts from SCHMITT
   (E-Mail: sales@schmitt-pumpen.de).

7.5 Installing

Install components concentrically and without tilting in accordance with the markings applied.

⚠ WARNING

Risk of injury due to heavy components!

- ▶ Pay attention to the component weight. Lift and transport heavy components using suitable lifting gear.
- ▶ Set down components safely and secure them against overturning or rolling away.

⚠ WARNING

Risk of injury during assembly!

- ▶ Observe the manufacturer's specifications (e.g. for the motor).

NOTE

Material damage due to incorrect dismounting/installation of the pump!

- ▶ Only specialist mechanics should complete dismounting/ installation work.

NOTE

Material damage due to unsuitable components!

- ▶ Always replace lost or damaged screws with screws of the same strength where required.
- ▶ Only replace seals with seals of the same material.

NOTE

Material damage, fragile components!

- ▶ Install ceramic parts of the plain bearing and magnets of the magnetic coupling with care, do not strike them or knock them.

7.5.1 Preparations for installation

- ▶ When installing please observe:
  - Replace worn parts with genuine spare parts.
  - Replace the seals and insert them so that they cannot twist.
  - Do not apply synthetic or mineral oil, grease or cleaning agents to elastomer components.
  - Install components concentrically and without tilting in accordance with the markings applied.

7.5.2 Assembly of the pump

Following the drawings for assembly (→ 9.1.2 Drawings , Page 28).

If only stressed parts have been disassembled and tested, the steps in the section „Assembling the pump“ can be omitted.

✓ Prepared for installation

Installing the pump

1. Align the magnet capsule (10) with the tapped hole to the feather key and slide it on to the motor shaft. Align the magnetic capsule parallel to the shaft end.
2. Screw in the grub screw and fix the magnetic capsule (10). Observe the correct torque
3. Screw the hexagon head screw with washer into the motor shaft. Observe the correct torque
4. Align the motor flange (07) correctly:
   - For sizes 40...65 with the base/opening facing downwards.
   - For sizes 80 and 100 with the opening towards the motor base.
5. Screw the motor flange (07) to the motor using the hexagon head screws, washers and nuts. Tighten the hexagon head screws crosswise and observe the correct torque (→ 9.3.4 Tightening torques, Page 31).
6. Tighten the drain cover (08) on the housing assembly (01).
7. Fit the O-ring and seal into the suction flange.
8. Mount the shaft (04) into the suction flange.
9. Mount the suction flange into the housing assembly (01) and secure it with the hexagon socket screws.
10. Place the housing assembly (01) on the base plate (12) and screw tight with the hexagon head screws.
11. Fit the containment shell (11) on to the rear housing.
12. Mount the support plate (03) on the rear housing with containment shell (11).
13. Ensure that both hexagon socket screws are removed from the tapped holes in the carrier plate (03).

Installing stressed parts

14. Carefully slide the impeller assembly (02) on to the shaft (04).
15. Fit the O-ring (09) into the housing assembly (01).
16. Fit the support plate (03), rear housing and containment shell (11) to the housing assembly (01) and screw tight with the hexagon socket screws.
17. Attach the motor flange (07) and motor to a hoist.
18. Mount the motor flange (07) with motor on the support plate (03) and place it on the base plate (12).
19. Screw the motor flange (07) to the support plate (03) using the hexagon socket screws.
20. Screw the hexagon head screws with washers into the base plate (12):
    - For sizes 40...65 on the motor flange (07).
    - For sizes 80 and 100 on the motor base.
21. Remove the guide rods.
22. Remove the hoist.

7.5.3 Install the pump into the system

▶ Install the pump in the system.(→ 5 Disposal, Page 13).

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 identified by a fault number in the table below. This number identifies the respective cause and remedy in the troubleshooting list.

Fault	Number
Pump not pumping	1
Pumping rate insufficient	2
Pumping rate excessive	3
Pumping pressure insufficient	4
Pumping pressure excessive	5
Pump running roughly / loud noises / vibration	6
Pump leaks	7
Excessive motor power uptake	8
Housing temperature too high	9

Tab. 6 Fault/number assignment

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
X	–	–	–	–	–	–	–	–	Suction pipe and/or pressure line closed by fitting	▶ Open the fitting.
X	–	–	–	–	–	–	–	–	Transport and sealing cover still in place	▶ Remove the transport and sealing cover. ▶ Dismount the pump and inspect it for dry-running damage.
X	X	–	–	–	–	–	–	–	Suction pipe too long	▶ Shorten suction pipe.
X	X	–	–	–	–	–	–	–	Pump flange deformed or damaged	▶ Change the pump flange.
X	X	–	X	–	–	–	–	–	Motor speed too low	▶ Compare the required motor speed with the specifications on the pump type plate. Replace the motor if necessary. ▶ Increase the motor speed if speed control is available.
X	X	–	X	–	–	–	–	–	Magnetic coupling has parted	▶ Switch off pump and switch on again.
X	X	–	X	–	X	–	–	–	Intake / suction pipe, pump or suction strainer blocked or encrusted	▶ Clean intake/suction pipe, pump or suction strainer.
X	X	–	X	–	X	–	–	–	Air is sucked in	▶ Seal source of problem.
X	X	–	X	–	X	–	–	–	Proportion of gas too high: pump is cavitating	▶ Consult the manufacturer.
X	X	–	X	–	X	–	–	–	Pump running in the wrong direction	▶ Change over any two phases in the motor.
X	X	–	X	–	X	–	–	–	Impeller out of balance or blocked	▶ Dismount the pump and inspect it for dry-running damage. ▶ Clean the impeller.
X	X	–	–	X	X	–	–	–	Pressure pipe blocked	▶ Clean the pressure pipe.

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
X	–	–	–	–	X	–	–	–	Suction pipe and pump not correctly vented or not completely filled	▶ Completely fill and vent pump and/or pipe.
X	–	–	–	–	–	–	–	X	Standstill, plain bearing stuck	▶ Disassemble the pump and carefully free the plain bearing rings.
–	X	–	X	–	X	–	–	–	Cross section of suction pipe too narrow	▶ Increase cross section. ▶ Clean encrustation from suction pipe. ▶ Fully open the fitting, if installed.
–	X	–	X	–	X	–	–	–	Hydraulic parts of the pump dirty, clotted or encrusted	▶ Dismount the pump. ▶ Clean the parts.
–	X	–	X	–	X	–	–	–	Suction head too large: $NPSH_{pump}$ is larger than $NPSH_{system}$	▶ Increase pump inlet pressure. ▶ Consult the manufacturer.
–	X	–	X	–	X	–	–	–	Back pressure of the system is too high, pump selected is too small.	▶ Consult the manufacturer.
–	X	–	X	–	X	–	–	–	Pump parts worn	▶ Replace the worn pump parts.
–	X	–	X	–	X	–	–	–	Pump jammed	▶ Consult the manufacturer.
–	X	–	X	–	X	–	X	–	Motor running on 2 phases	▶ Check the fuse and replace it if necessary. ▶ Check the cable connections and insulation.
–	X	–	X	–	X	–	–	X	Temperature of fluid is too high: pump is cavitating	▶ Increase pump inlet pressure. ▶ Lower temperature. ▶ Contact the manufacturer.
–	X	–	X	–	–	–	X	X	Viscosity or specific gravity of the pumped liquid outside the range specified for the pump	▶ Consult the manufacturer.
–	X	–	X	–	–	–	–	X	Geodetic differential head and/or pipe flow resistances too high	▶ Remove sediments from the pump and/or pressure pipe. ▶ Install a larger impeller and consult the manufacturer. ▶ Reduce the system pressure.
–	X	–	–	X	X	–	–	–	Pressure-side fitting not opened wide enough	▶ Open the pressure-side fitting.
–	–	X	X	–	X	–	X	–	Pressure-side fitting opened too wide	▶ Throttle down at the pressure-side fitting. ▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.
–	–	X	–	X	–	–	–	–	Viscosity lower than expected	▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.
–	–	X	–	X	X	–	X	–	Motor speed too high	▶ Compare the required motor speed with the specifications on the pump type plate. Replace the motor if necessary. ▶ Reduce the motor speed if speed control is available.

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
–	–	X	–	X	X	–	X	–	Impeller diameter too large	▶ Throttle down the flow rate at the pressure-side fitting. Observe the minimum flow rate. ▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.
–	–	X	–	–	X	–	X	–	Geodetic differential head, pipe flow resistances and/or other resistances lower than specified	▶ Throttle down the flow rate at the pressure-side fitting. Observe the minimum flow rate. ▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.
–	–	–	–	–	X	X	X	–	Pump distorted	▶ Check the pipe connections and pump attachment.
–	–	–	–	–	X	–	–	–	Pipes and fittings blocked	▶ Disassemble and clean the pipes and fittings.
–	–	–	–	–	X	–	X	–	Plain bearing faulty	▶ Change the plain bearing (→ 7.3.2 Disassembling and checking the pump, Page 20).
–	–	–	–	–	–	X	–	–	Connecting bolts not correctly tightened	▶ Check all connecting screws and tighten them to the specified torque (→ 9.3.4 Tightening torques, Page 31).
–	–	–	–	–	–	X	–	–	Faulty housing seal	▶ Replace the housing seal.

Tab. 7 Troubleshooting list

9 Appendix

9.1 Parts

9.1.1 Part numbers and designations

Part no.	Designation
01	Housing assembly
02	Impeller assembly
03	Carrier plate
04	Shaft
05	Bearing
06	Rear thrust collar
07	Motor flange
08	Drain cover
09	O-ring
10	Magnetic capsule
11	Rear cover
12	Base plate

Tab. 8 Designation of components according to part numbers

9.1.2 Drawings

Sectional drawing

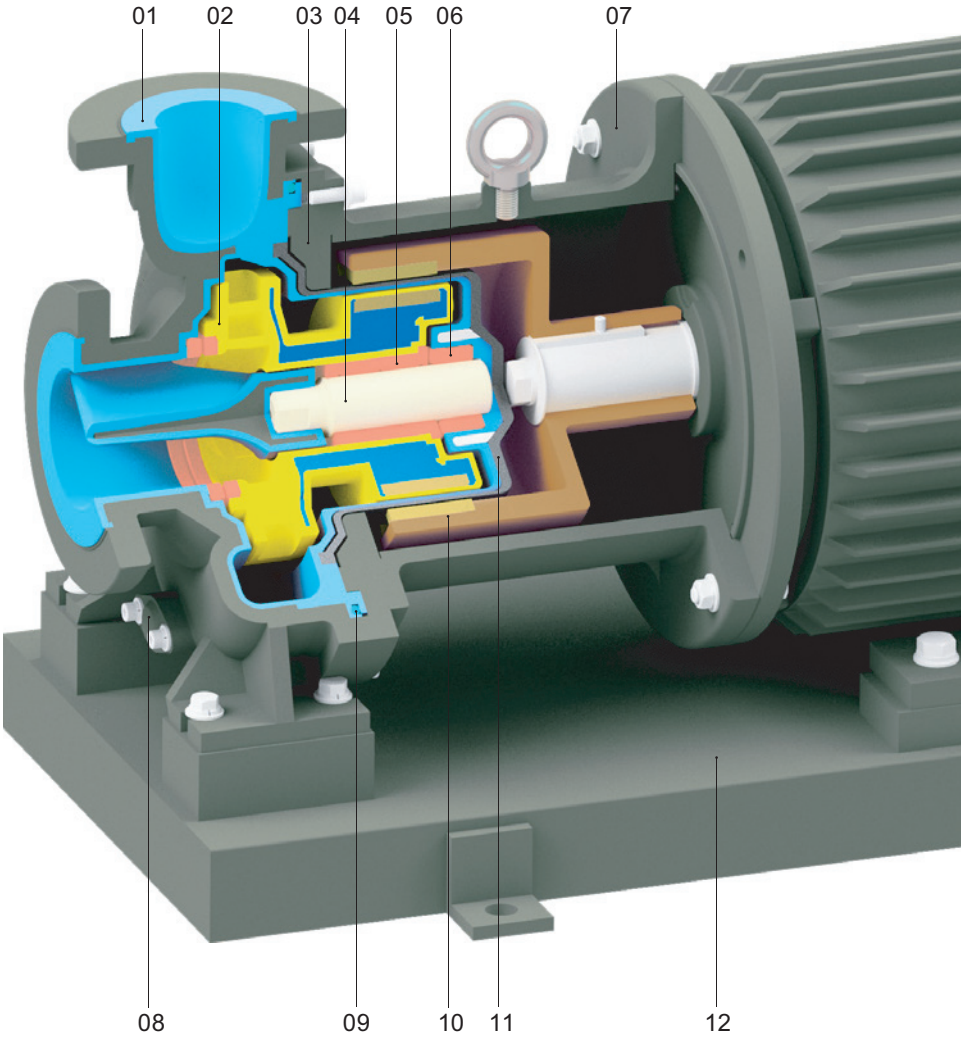


Fig. 8 Parts (sectional drawing)

Exploded drawings

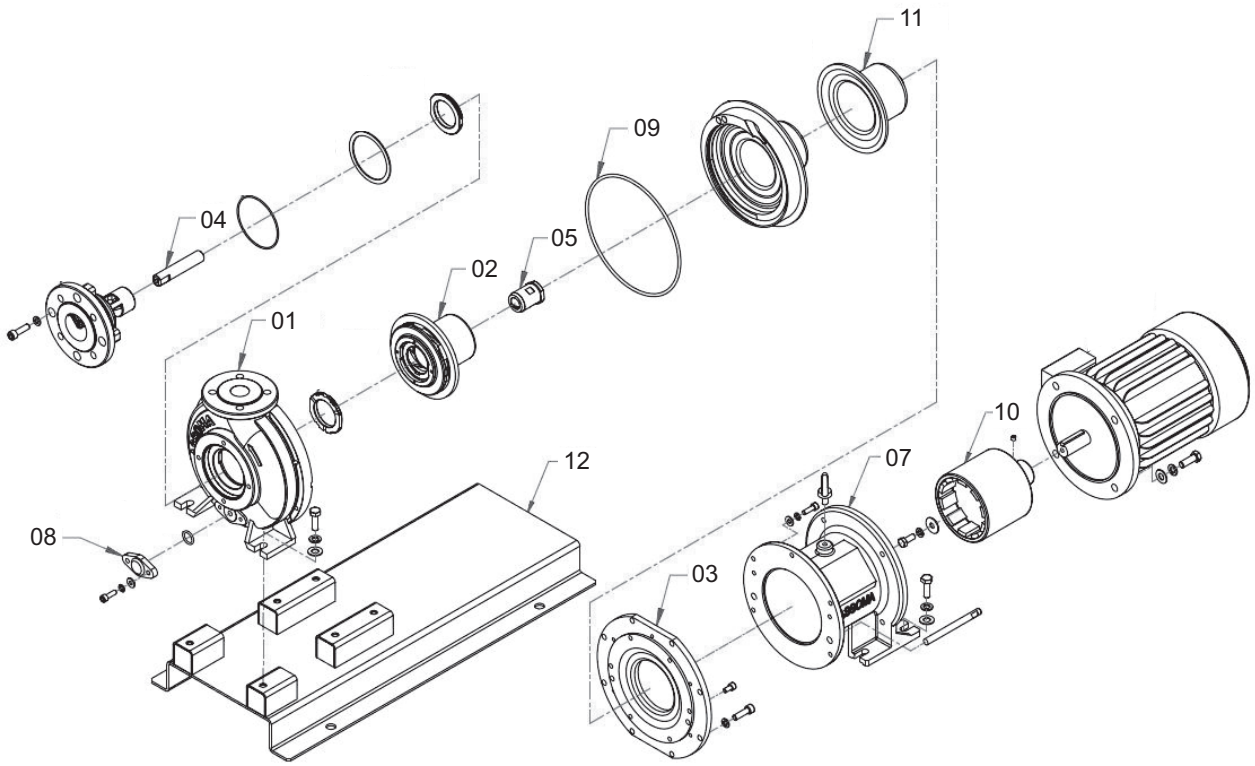


Fig. 9 Parts (exploded view), sizes 40...65

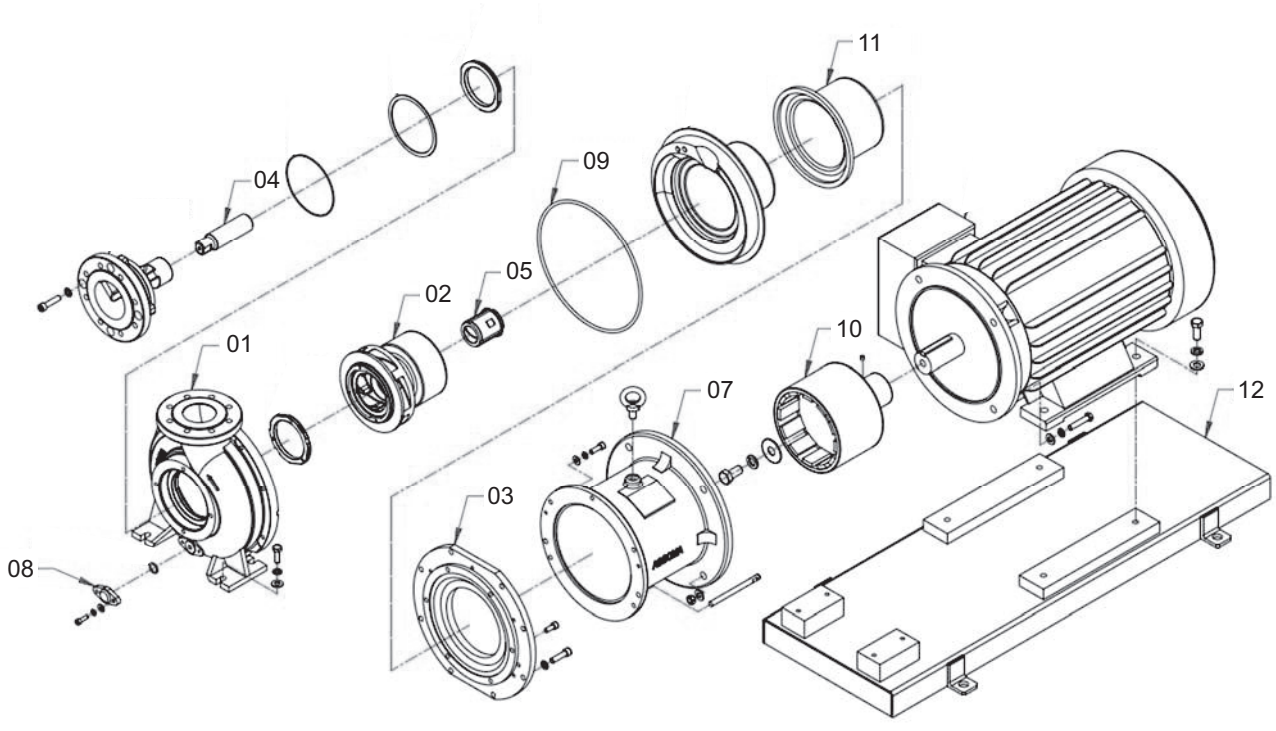


Fig. 10 Parts (exploded view), sizes 80 and 100

9.2 Installation example

The following example pipe schematic shows the main components of a pump installation.

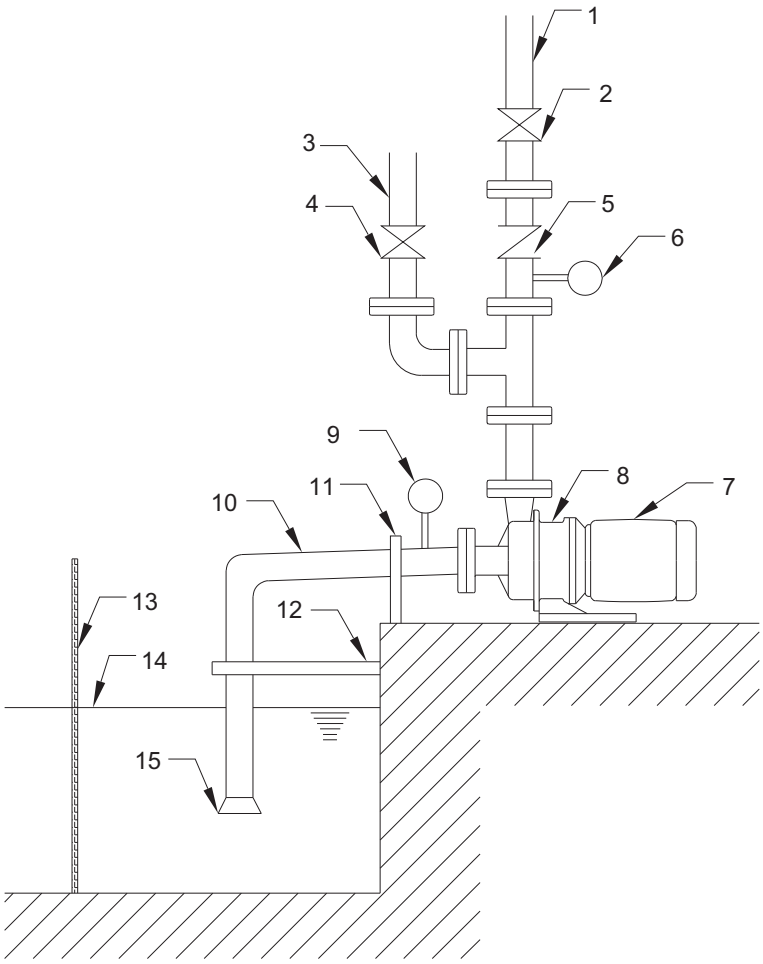


Fig. 11 Installation example

1 Pressure line
2 Pressure line shut-off valve
3 Filling line
4 Filling line shut-off valve
5 Non-return valve
6 Pressure side pressure gauge
7 Motor
8 Pump
9 Suction side pressure gauge
10 Suction pipe
11 Suction line bracket
12 Vibration damper
13 Filter
14 Tank
15 Foot valve

9.3 Technical specifications

9.3.1 Ambient conditions

Operation under any other ambient conditions should be agreed with the manufacturer.

Temperature [°C]	Relative humidity [%]		Installation height above sea level [m]
	Long-term	Short-term	
5 to +40 [1)]	≤ 85	≤ 100	≤ 1000

Tab. 9 Ambient conditions

1) material-dependent

9.3.2 Total pressure

Total pressure = system pressure + pressure build-up in the pump

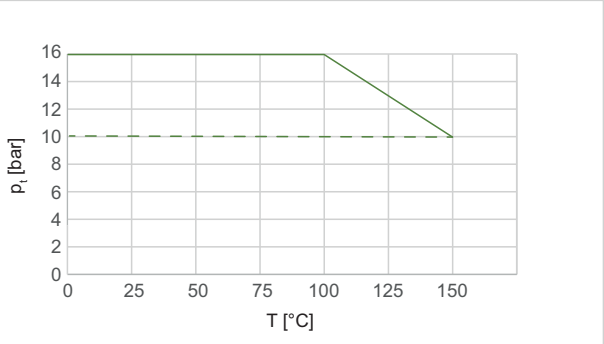


Fig. 12 Total pressure

9.3.3 Sound pressure level

Motor power rating [kW]	Sound pressure level [dB(A)]
1.5...2.2	76
2.2...5.5	80
5.5...11	82
11...18.5	85
18.5...30	88

Tab. 10 Sound pressure level

Measuring conditions:

- Distance to the pump: 1 m
- Operation: cavitating, gate valve fully open
- Tolerance ±3 dB

9.3.4 Tightening torques

Comply with the following tightening torques and use a torque wrench:

Housing

Thread size	Tightening torque [Nm]
M8	12
M10	25
M12	45
M16	85
M20	160

Tab. 11 Tightening torques for the housing

Suction flange and pressure flange

Thread size	Tightening torque [Nm]
M12	45
M16	70

Tab. 12 Tightening torques for the suction flange and pressure flange

9.3.5 Wear limits

Wear limits of individual parts

The manufacturer recommends replacing the part when it reaches the wear limit.

Size NEOChem ...	Part (measurement)	Dimension [mm]	
		New	Wear limit
40-25-160 50-32(40)-160	Shaft (outer diameter)	22	21.4
	Bearing (inner diameter)	22	22.6
	Raceway (thickness)	9	8
	Wear ring (thickness)	8	7
40-25-200 50-32(40)-200	Shaft (outer diameter)	28	27.4
	Bearing (inner diameter)	28	28.6
	Raceway (thickness)	9	8
	Wear ring (thickness)	8	7
65-50-160	Shaft (outer diameter)	28	27.4
	Bearing (inner diameter)	28	28.6
	Raceway (thickness)	10	9
	Wear ring (thickness)	10	9
80-65-160	Shaft (outer diameter)	34	33.4
	Bearing (inner diameter)	34	34.6
	Raceway (thickness)	11	10
	Wear ring (thickness)	10	9
100-80-200	Shaft (outer diameter)	43	42.4
	Bearing (inner diameter)	43	43.6
	Raceway (thickness)	11	10
	Wear ring (thickness)	10.5	9.5

Tab. 13 Wear limits

Total wear between individual parts

If the following total wear limit is exceeded, the manufacturer recommends replacing the part with the greater wear:

- Bearing and shaft > 6 mm
- Raceway and wear ring > 1 mm

9.3.6 Permissible forces and torques on the suction flange and pressure flange

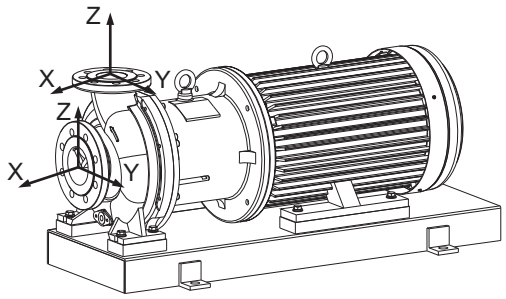


Fig. 13 Forces and torques on the suction flange and pressure flange

Size NEOChem ...	Suction flange							
	Forces [N]				Torques [Nm]			
	Fx	Fy	Fz	ΣF	Mx	My	Mz	ΣM
40-25-160 40-25-200	380	350	440	680	460	320	370	670
50-32(40)-160 50-32(40)-200	580	530	470	900	490	350	400	720
65-50-160	740	650	600	1100	530	380	420	770
80-65-160	790	720	880	1300	560	400	460	820
100-80-200	1100	1000	900	1700	580	420	480	870

Tab. 14 Forces and torques on the suction flange

Size NEOChem ...	Pressure flange							
	Forces [N]				Torques [Nm]			
	Fx	Fy	Fz	ΣF	Mx	My	Mz	ΣM
40-25-160 40-25-200	300	260	250	460	320	210	250	460
50-32(40)-160 50-32(40)-200	380	350	440	680	460	320	370	670
65-50-160	530	470	580	910	490	350	400	720
80-65-160	650	600	740	1100	530	380	420	770
100-80-200	750	680	830	1300	530	380	430	780

Tab. 15 Forces and torques on the pressure flange

9.3.7 Screw specification for the flanges

Size NEOChem ...	Thread size					
	Suction flange			Pressure flange		
	JIS 10K	ISO 16 bar	ANSI 150 lb	JIS 10K	ISO 16 bar	ANSI 150 lb
40-25-160 40-25-200	M16	M16	M12	M16	M12	M12
50-32(40)-160 50-32(40)-200	M16	M16	M16	M16	M16	M12
65-50-160 80-65-160	M16	M16	M16	M16	M16	M16
100-80-200	M16	M16	M16	M16	M16	M16

Tab. 16 Screw specification for the flanges

9.3.8 Minimum volume flow

Size NEOChem ...	Motor power rating [kW]	Minimum volume flow [l/min] by temperature			
		40 °C	60 °C	70 °C	> 100 °C
40-25-160	1.5 / 2.2	15	15	20	30
	3.7	25	25	30	40
40-25-200	5.5 / 7.5	20	20	30	40
50-32(40)-160	1.5 / 2.2	30	30	40	60
	3.7	50	50	60	80
50-32(40)-200	5.5 / 7.5	50	50	60	80
65-50-160	5.5 / 7.5	60	60	80	120
80-65-160	5.5 / 7.5	80	100	120	150
	11 / 15 / 18.5	100	120	150	180
100-80-200	11 / 15 / 18.5	100	120	150	180
	22 / 30	150	150	200	250

Tab. 17 Minimum volume flow

9.3.9 Cleaning agents

- Weakly alkaline soap solution
- Steam jet (only for individual parts)

9.4 Maintenance schedule

The manufacture recommends shorter maintenance intervals if the medium being conveyed contains solid matter. The operating company should choose the maintenance intervals appropriate to the medium being conveyed.

Interval	Designation	Action
Daily	Conveyed fluid	▶ Check temperature. ▶ Check discharge pressure.
	Tank	▶ Check the fill level.
Weekly	Operating temperatures	▶ Check motor temperature.
	Pump	▶ Check the pump for leaks and vibration.
Quarterly	Housing	▶ Check the housing for dirt and damage: – Replace the housing if damaged. – Clean the housing if dirty. – Consult the manufacturer in the event of deformed shaft bearings and scratches.
	O-ring and seal	▶ Check the O-ring and seal for damage and replace them if necessary (→ 7.3.2 Disassembling and checking the pump, Page 20). Consult the manufacturer for corroded and swollen parts.
	Impeller	▶ Check the impeller for dirt and damage (→ 7.3.2 Disassembling and checking the pump, Page 20).: – If the impeller is dirty, clean it. – If the impeller is damaged, replace it. – Consult the manufacturer in the event of the following types of damage: Deformations, cracks or scratches.
	Plain bearing	▶ Check plain bearings for wear (→ 7.3.2 Disassembling and checking the pump, Page 20).: – Replace worn parts (→ 9.3.5 Wear limits, Page 32). – Consult the manufacturer in the event of damage.
	Shaft and race	▶ Check the shaft and race for damage (→ 7.3.2 Disassembling and checking the pump, Page 20).: – Replace damaged or worn parts (→ 9.3.5 Wear limits, Page 32). – Consult the manufacturer in the event of scratches.
	Undoable screwed connections	▶ Check all connecting screws and tighten them to the specified torque (→ 9.3.4 Tightening torques, Page 31).
As required	Motor	▶ Check the motor against the supplier's documentation and perform maintenance if necessary (→ 1.2 Other applicable documents, Page 5).

Tab. 18 Maintenance schedule

9.5 Declaration of conformity

EU Declaration of Conformity

SCHMITT
chemical resistant pumps

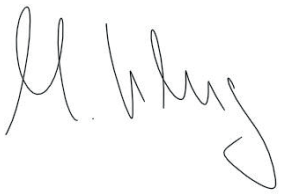
Manufacturer **SCHMITT-Kreiselpumpen GmbH & Co. KG**
Einsteinstrasse 33
D-76275 Ettlingen

Type of pump **Centrifugal pump**

Pump type **NEOChem Core**

We declare that the design of the listed pumps satisfies the provisions of the EU Directives.
The relevant points satisfy the requirements of the

EC Machinery Directive	**2006 / 42 / EC**
Low Voltage Directive	**2014 / 35 / EU**
Electromagnetic Compatibility	**2014 / 30 / EU**
Harmonized standards applied	**EN ISO 12100:2010** **EN 809:1998+A1:2009+AC:2010** **ISO 15783:2002+A1:2008**



Ettlingen, März 2025, **Moritz Klug**
Einsteinstrasse 33, 76275 Ettlingen
Managing Director / Documentation Officer
SCHMITT-Kreiselpumpen GmbH & Co. KG