

# STÜBBE X-CLASS

## Vertical chemical centrifugal plastic pump (Cantilever design) - type VCX

Original operating manual

Series VCX



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## 1 About this document

This manual

- is an integral part of the pump
- it applies to all the series listed
- it 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






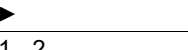

- Mechanics qualification:
  - Qualified employees with additional training for fitting the respective pipework
- Electrical qualification:
  - Qualified electrician
- Transport qualification:
  - Qualified transport specialist
- Responsibility:
  - Read, observe and follow this manual and the other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

### 1.2 Other applicable documents

| Document/purpose  | Where found   |
|---|---|
| Installation drawing <ul style="list-style-type: none"> <li>• Dimensions when installed, fitting dimensions, etc.</li> </ul>  | Documentation included  |
| Resistance lists <ul style="list-style-type: none"> <li>• Resistance of materials used to chemicals</li> <li>• <a href="http://www.stuebbe.com/pdf/300051.pdf">www.stuebbe.com/pdf/300051.pdf</a></li> </ul>                      |    |
| CE declaration of conformity <ul style="list-style-type: none"> <li>• Conformity with standards</li> </ul>  | (→ 9.5 Declaration of conformity in accordance with EC machinery directive, Page 34). |
| Data sheet (302 409) <ul style="list-style-type: none"> <li>• Technical specifications, operating conditions, dimensions</li> <li>• <a href="http://www.stuebbe.com/pdf/302409.pdf">www.stuebbe.com/pdf/302409.pdf</a></li> </ul> |   |
| Spare parts list <ul style="list-style-type: none"> <li>• Ordering spare parts</li> </ul>   | Documentation included  |
| Sectional drawing <ul style="list-style-type: none"> <li>• Sectional drawing, part numbers, component designations</li> </ul>   | Documentation included  |
| Supplier documentation <ul style="list-style-type: none"> <li>• Technical documentation for parts supplied by subcontractors</li> </ul>   | Documentation included  |


Tab. 1 Other application documents, purpose and where found

## 1.3 Warnings and symbols

| Symbol   | Meaning  |
|--|--|
|   | <ul style="list-style-type: none"> <li>• Immediate acute risk</li> <li>• Death, serious bodily harm</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Potentially acute risk</li> <li>• Death, serious bodily harm</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Potentially hazardous situation</li> <li>• Minor injury</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>• Potentially hazardous situation</li> <li>• Material damage</li> </ul>   |
|   | <p>Safety warning sign</p> <ul style="list-style-type: none"> <li>▶ Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.</li> </ul> |
|   | Instruction  |
| 1., 2., ...  | Multiple-step instructions   |
| ✓  | Precondition   |
| →  | Cross reference  |
|  | Information, notes   |

Tab. 2 Warnings and symbols

## 2 Safety

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

### 2.1 Intended use


- Use the pump only with suitable media (→ resistance lists).
- Do not use pump for combustible or explosive fluids.
- Adhere to the operating limits and size-dependent minimum flow rates. For versions with a suspension pipe of plastic (PP or PVDF), the temperature of the medium may deviate +/- 20 °C relative to the value stated in the quotation / in the order acknowledgement.
- Before operating the pump, check that the volute casing is completely immersed. Check compliance with the minimum and maximum start-up levels (→ [9.2.8 Installation dimensions and filling heights, Page 30](#)).
- Avoid cavitation: Do not open the pressure-side fitting further than the agreed operating point.
- Avoid extreme shaft deflection:
  - Do not operate the pump to deliver against the pressure-side fitting when it is closed.
  - Note minimum flow (→ Data sheet).
- Avoid damage to the motor:
  - Do not open the pressure-side fitting further than 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.
- If pumps are delivered without motors, then final assembly as a pump assembly must take place in accordance with the provisions of the Machinery Directive 2006/42/EC.

#### Prevention of obvious misuse (examples)

- Observe pump limits of use regarding temperature, pressure, flow and speed (→ data sheet).
- 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, coupling and motor become overloaded (→ data sheet).  
A lower specific gravity is permissible. Adapt the auxiliary systems accordingly.
- Pumps used with water as the pumped liquid must not be used for foodstuffs or drinking water. Use for food or drinking water only if specified in the data sheet.

- The type of installation should be selected only in accordance with these operating instructions. For example, the following are not allowed:
  - Installation where there is insufficient clearance above the motor (minimum clearance required = overall length of the pump)
  - Installation overhead
  - Installation in the immediate vicinity of extreme heat or cold sources
  - Installation too close to a wall
  - Installation where there is no lifting gear above the pump
- Only use the pump as part of large systems/tools.

### 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.
- Ensure that all work is carried out by specialist technicians only:
  - Installation, repair and maintenance work
  - Transportation
  - Work on the electrical system
- Make sure that trainee personnel only work on the pump under supervision of specialist technicians.

### 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 potential electrostatic charging: provide suitable grounding

### 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, coupling guard 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 use the hot pump or motor components as a heating point
  - Do not de-ice the pump using gas burners or similar tools
- Do not remove the safety guarding for hot, cold or moving parts during operation.
- Use personal protective equipment if necessary.
- 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 discharge 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 Hazardous pumped liquids

- When handling hazardous fluids, observe the safety regulations for the handling of hazardous substances.
- Use personal protective equipment when carrying out any work on the pump.
- Collect leaking pumped liquid and residues in a safe manner and dispose of in accordance with environmental regulations.

## 3 Layout and function

### 3.1 Marking

#### 3.1.1 Name plate

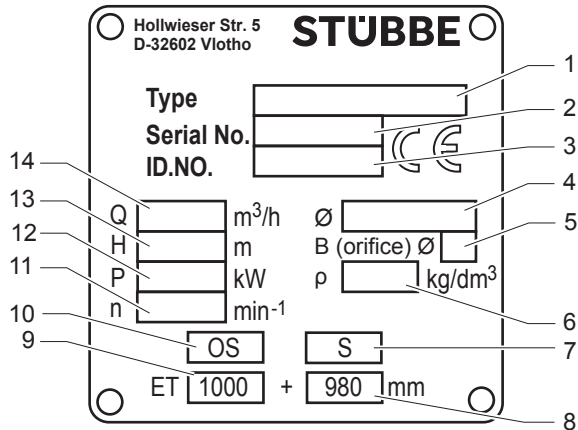


Fig. 1 Name plate (example)

- 1 Pump type
- 2 Serial number
- 3 Identification number
- 4 Impeller diameter (main vanes, back vanes) [mm]
- 5 Diaphragm diameter
- 6 Specific gravity
- 7 Suction strainer yes/no
- 8 Extension
- 9 Immersion depth
- 10 Shaft seal
- 11 Speed
- 12 Power consumption of pump/motor
- 13 Differential head
- 14 Flow rate

#### 3.1.2 Pump type code

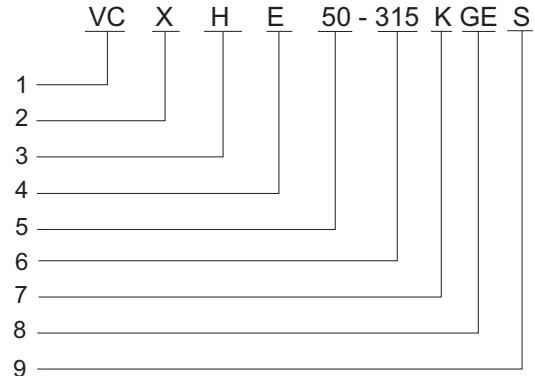


Fig. 2 Pump type code (example)

- 1 Pump series
  - **VC** – Vertical Cantilever Pump
- 2 Series
  - **X** – Heavy-Duty Plastic Pump
- 3 Impeller profile
  - **H** – Half-open impeller
  - **F** – 3-channel free-flow impeller
- 4 Material
  - **E** – UHMW-PE (ultra-high molecular weight low-pressure polyethylene)
  - **D** – PVDF (polyvinylidene fluoride)
- 5 Discharge nozzle diameter [mm]
- 6 Impeller nominal diameter [mm]
- 7 Immersion depth
  - **K** – Short (650 mm)
  - **S** – Standard (1000 mm)
  - **L** – Long (1500 mm)
- 8 Material of the suspension pipe
  - **D** – PVDF
  - **GD** – Rubberized steel PVDF
  - **GE** – Rubberized steel PE
  - **H** – Steel coated with E-CTFE (Halar)
  - **P** – PP-H
- 9 Deviations
  - **S** – Special version
  - **T** – For dry installation



### 3.1.3 Shaft seal type code

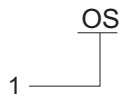


Fig. 3 Shaft seal code (example)

- 1 Shaft seal
- **OS** – Without flushing
  - **ST** – Flushing with hose connector as flushing connection
  - **SG** – Flushing with internal thread as flushing connection

### 3.2 Description

Non self-priming, vertical, single-stage submersible plastic pump without any bearings in the wet area (Cantilever design) Use in open or closed unpressured containers or pits/trenches. The pump is suitable for dry running.

### 3.3 Assembly

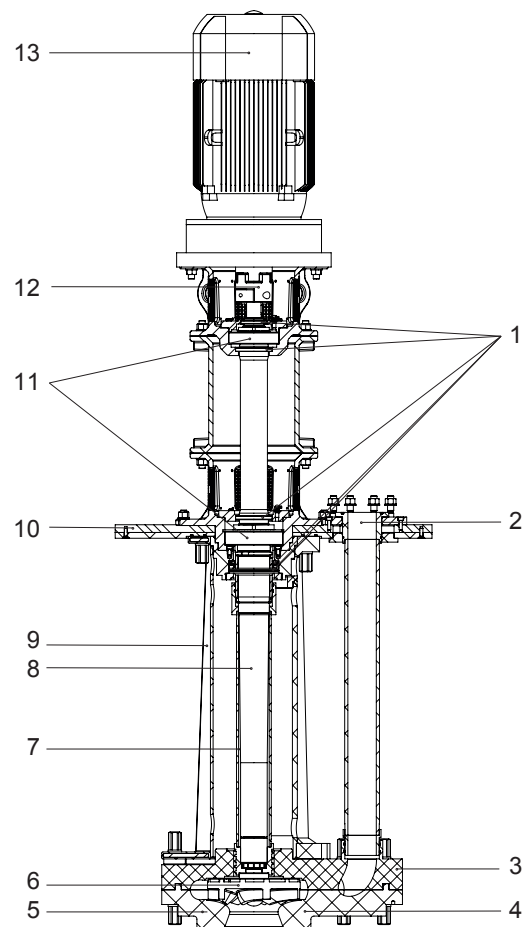




Fig. 4 Assembly

- 1 V-ring seal
- 2 Discharge nozzle
- 3 Volute casing
- 4 Suction strainer (optional)
- 5 Suction pipe extension (optional)
- 6 Impeller
- 7 Shaft protection tube
- 8 Shaft
- 9 Suspension pipe
- 10 Mounting plate
- 11 Shaft bearing
- 12 Coupling
- 13 Motor

## 4 Transport, storage and disposal


### 4.1 Transport

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

 Weight specifications (→ documents for the particular order)

#### 4.1.1 Unpacking and inspection on delivery

1. Unpack the pump/pump assembly upon 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 transport damage to the manufacturer immediately.
5. Dispose of packaging material according to local regulations.

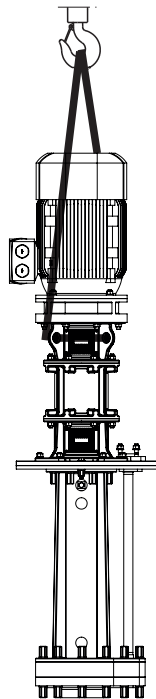
 Retain the transport frame for horizontal storage (recommended).

### 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 diagrams.
- ▶ Never use the lifting eye of the motor as the attachment point for lifting the entire pump (the lifting eye of the motor may be used for securing a pump assembly with a high center of gravity against being knocked over).
- ▶ Do not stand under suspended loads.



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

## 4.2 Storage

### DANGER

**Death or limbs crushed as a result of the pump overturning!**


- ▶ For vertical storage:
  - Place pump on a horizontal underground and secure against overturning.

### NOTE

**Material damage due to inappropriate storage!**

- ▶ Store the pump properly.
1. Seal all openings with blanking flanges, blanking plugs or plastic covers.
  2. Make sure the storage room meets the following conditions:
    - Dry
    - Frost-free
    - Vibration-free
    - UV protected
  3. For horizontal storage:
    - Protect pump against sagging by means of proper support.
  4. Rotate the pump shaft twice 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 or oil!**

- ▶ 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 or oil 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 Setup and connection

### NOTE

#### Material damage due to distortion or passage of electrical current in the bearing!

- ▶ Do not make any structural modifications to the pump assembly or volute casing.
- ▶ Do not carry out any welding work on the pump assembly or volute casing.

### 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

1. Ensure the required operating conditions are met:
  - Resistance of body and seal material to the medium (→ resistance lists).
  - Required ambient conditions (→ 9.2.1 Ambient conditions, Page 27).
2. Ensure necessary dimensions for tank cut-out (→ data sheet).
3. Ensure safe aeration and venting of the container in all operating phases.
4. Ensure required installation dimensions and filling levels (→ 9.2.8 Installation dimensions and filling heights, Page 30).
  - Minimum distances
  - Maximum start-up level
  - Minimum start-up level

#### 5.1.2 Preparing the installation site

- ▶ Ensure the installation site meets the following conditions:
  - Pump is freely accessible from all sides
  - Lifting gear or attachment points for lifting gear are available above the pump (minimum space requirement = accommodate the pump length and pump weight)
  - Sufficient space for the installation/removal of the pipes and for maintenance and repair work, especially for the removal and installation of the pump and the motor (particularly above the motor)
  - Pump not exposed to external vibration (damage to bearings)
  - No corrosive exposure
  - Frost protection


#### 5.1.3 Surface preparation

- ✓ Aids, tools, materials:
  - Spirit level
- 1. 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 pump assembly and all operating forces**
  - **The stability of the pump unit is ensured on a solid supporting substructure**
  - Resonance-free
- 2. Clean containers, basins or pits carefully and protect from further contamination, e.g. by installing overflow wall in front of the container or pit inlet.

### 5.2 Setting up

1. Remove the suction-side cover if present.
2. Lift pump/pump assembly (→ 4.1 Transport, Page 10).
3. Place pump/pump assembly on the mounting surface of the container/pit.
4. Attach mounting plate to the mounting surface.
  - Pump must not be mechanically under stress as a result of being attached
5. Screw on the mounting plate

## 5.3 Planning pipelines

 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 Specifying supports and flange connections


#### NOTE

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

► Ensure pipe connection without stress.

1. Plan pipes for safe operation:
  - No tensile or compressive forces
  - No bending moments
  - Compensate for changes in length due to changes in temperature (compensators, expansion shanks)
2. Support pipes in front of the pump.
3. Ensure the pipe supports have permanent low-friction properties and do not seize up due to corrosion.

### 5.3.2 Specifying nominal widths

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

1. Make sure the diameter of the suction pipe extension is not smaller than the nominal width of the suction flange.
2. Make sure the nominal width of the pressure pipe is not smaller than the nominal width of the discharge flange.
  - Ensure the flow velocity is less than 3 m/s.

### 5.3.3 Designing the pipe layout

► Plan pipes for safe operation:
 

- No tensile or compressive forces
- No bending moments
- Compensate for changes in length due to changes in temperature (compensators, expansion shanks)

### 5.3.4 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.

### 5.3.5 Providing safety and control devices (recommended)

#### Avoid reverse running

1. Install a non-return valve between the discharge flange and stop 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 discharge flanges and non-return valve.

#### Make provisions for isolating and shutting off the pipes

 For maintenance and repair work.

► Provide shut-off devices in the pressure pipe.

#### Allow measurements of the operating conditions

1. Provide a pressure gauge in the pressure line for pressure measurement.
2. Provide pressure measurement on the pump side.

## 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.

1. Clean all piping parts and fittings prior to assembly.
2. Flush all pipes carefully with neutral medium.
3. Ensure no flange gaskets protrude inwards.
4. Remove any blanking flanges, plugs, protective films and/or protective paint from the flanges.

### 5.4.2 Installing the pressure pipe

1. Remove the transport and sealing covers from the pump.
2. Fit the pressure line stress-free and sealed
3. Ensure no seals protrude inwards.

### 5.4.3 Inspection for stress-free pipe connections


- ✓ Piping installed and cooled down
1. Disconnect the pipe connecting flanges from the pump.
  2. Check whether the pipes can be moved freely in all directions within the expected range of expansion:
    - Nominal width < 150 mm: by hand
    - Nominal width > 150 mm: with a small lever
  3. Make sure the flange faces are parallel.
  4. Reconnect the pipe connecting flanges to the pump.
  5. If present, check support foot for stress.

## 5.5 Planning the electrical system

- ▶ Ensure the following in the electrical supply to the pump unit:
  - Provide a device for isolating from the power supply.
  - The device for isolating from the power supply must be capable of their actuated during normal operation and also in an emergency (emergency stop switch). The emergency stop switch must satisfy ISO 13850.
  - If the pump unit stops due to a power failure it must be protected against automatic restarting (on restoration of power).
  - Install a motor protection switch to act as a cut-out in the event of overheating and adjust it in accordance with the particulars on the motor nameplate.
  - If a frequency inverter is to be used at low speeds, check whether an external cooler may be necessary.
  - The encapsulation of the control systems must satisfy the protection classes specified in EN 60529.

## 5.6 Connecting the pump

### 5.6.1 Making the electrical connections to the motor

 Follow the instructions of the motor manufacturer.

**⚠ DANGER**

#### Risk of electrocution!

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

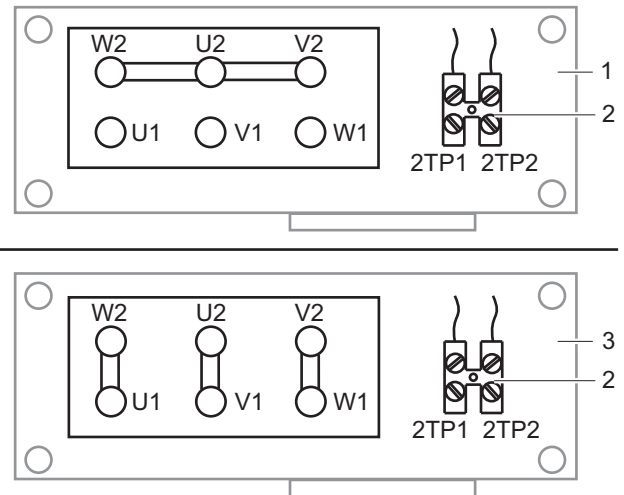
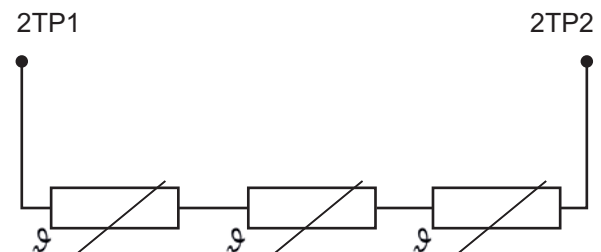


Fig. 5 Connecting the motor

- 1 Star connection
- 2 Connecting the PTC thermistor
- 3 Delta connection

1. Connect the motor as shown in the circuit diagram, as a delta connection (1) or a star connection (3).
2. Make sure no danger arises due to electric power.
3. Install an EMERGENCY STOP switch.



4. Connect the PTC thermistor (2) to the motor protector:
  - Test voltage 2.5 V
5. Connect the optional standstill heating for the motor. When making the electrical connections, make sure that the voltage matches that on the name plate (motor) and work to the terminal diagram provided.

## 5.6.2 Check direction of rotation

### DANGER

#### Risk of electrocution!

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

### DANGER

#### Danger to life from rotating parts!

- ▶ Use personal protective equipment when carrying out any work on the pump.
- ▶ Maintain an adequate distance from rotating parts.
- ▶ After testing disconnect the motor and secure it against reconnection.
- ▶ When checking the direction of rotation, ensure that the protective grille is installed.

### NOTE

#### Damage to the hydraulics as a result of the wrong direction of rotation!

The impeller will become detached from the shaft.

- ▶ Make sure that the motor is disconnected from the pump.
1. Switch on motor for max. 2 seconds and switch it off again immediately.
  2. Check whether the sense of rotation of the motor matches the direction of rotation on the fan impeller.
  3. If the sense of rotation is different: Change over the two phases (→ [5.6.1 Making the electrical connections to the motor, Page 14](#)).
  4. Disconnect the motor from the mains and secure it against being switched back on again.

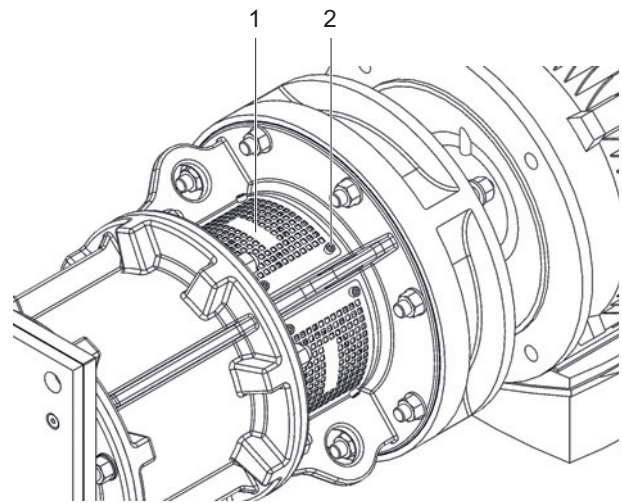
## 5.7 Installing the coupling

The pump is supplied with the coupling displaced on the pump shaft (no connection between the pump and motor).

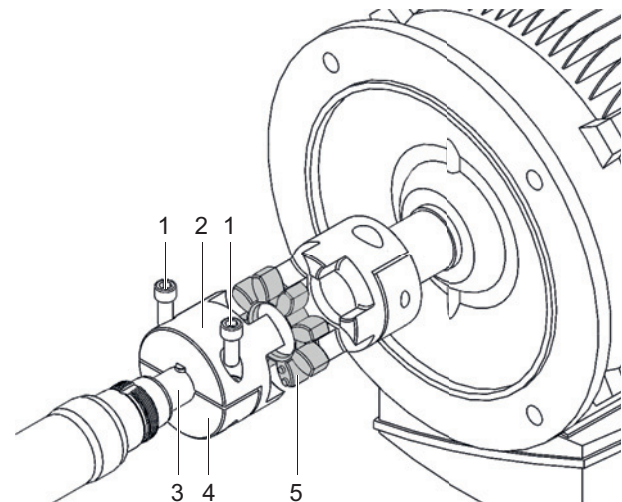
### NOTE

#### Material damage through bangs and knocks!

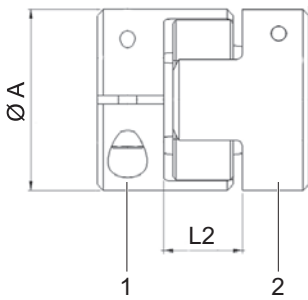
- ▶ When pushing the coupling half on, do not allow it to become skew.
- ▶ Do not bang and knock pump components.



1. Unscrew all screws (2).
2. Remove the protective grille (1).



3. Remove the half shells (4) from the hub body (2).
4. Assemble the hub body (2) to the gear ring (5).
5. Install the assembly with the half shell (4) on the end of the pump shaft (3).
6. Screw in the clamping screws (1) finger-tight until the hub (2) and half shell (4) lie on the shaft.



7. Move the pump-side clamping hub (1) in the axial direction until the dimension  $L2$  is reached ([→ 9.2.10 Values for adjusting the coupling, Page 32](#)).
8. Secure the clamping hub by tightening the clamping screws alternately. When doing so, comply with the correct torque  $TA$  ([→ 9.2.10 Values for adjusting the coupling, Page 32](#)).
9. Attach the protective grille with screws.

### 5.8 Performing the hydrostatic test

- ⓘ Because the VCX is an open system (cantilever arrangement without a mechanical seal), a hydrostatic test of the overall system can be performed only once the pump has been isolated.



## 6 Operation

### 6.1 Preparing for commissioning

#### 6.1.1 Check downtimes

- ▶ Check downtimes (→ [6.4 Restoring the pump to service, Page 18](#)).

#### 6.1.2 Filling and bleeding

### WARNING

#### Risk of injury and poisoning due to hazardous pumped liquids!

- ▶ Use protective equipment for any work on the pump.
- ▶ Collect leaking liquid safely and damage fitting in accordance with local regulations.

1. Open the pressure-side fitting slightly.
2. Fill the pump sump/immersion tank.  
When doing so, verify the minimum start-up level and ensure compliance with the maximum filling level so as to avoid possible damage to the bearings (→ [Tab. 16 Installation dimensions , Page 30](#)).
3. Verify that no pipe connections are leaking.

### 6.2 Commissioning

#### 6.2.1 Switching on

- ✓ Pump correctly set up and connected
- ✓ Direction of rotation of the motor is correct
- ✓ Motor correctly coupled and installed
- ✓ All connections stress-free and sealed
- ✓ All safety equipment installed and tested for functionality
- ✓ Pump correctly prepared, pump sump/immersion tank filled
- ✓ Pump sump/immersion tank filled sufficiently to the minimum start-up level (→ [9.2.8 Installation dimensions and filling heights, Page 30](#)).

### DANGER

#### Risk of injury due to running pump!

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

### DANGER

#### Risk of injury and poisoning due to pumped liquid spraying out!

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

### NOTE

#### Risk of cavitation if suction flow is restricted!

- ▶ Do not open the pressure-side fitting further than the operating point.

### NOTE

#### Damage to bearing due to extreme shaft deflection!

- ▶ Do not start the pump and operate it to deliver against the pressure-side fitting when it is closed.
- ▶ Observe minimum flow (→ [order data sheet](#)).

1. Open the pressure-side fitting slightly.
2. Switch on the motor and check it for smooth running.
3. Once the motor has reached its nominal speed, slowly open the pressure-side fitting further until the operating point is reached.

#### 6.2.2 Switching off

- ✓ Pressure-side fitting closed (recommended)

  1. Switch off motor.
  2. Check all connecting bolts and tighten them if necessary (only after initial commissioning).

## 6.3 Shutting down the pump

### DANGER

#### Risk of injury due to running pump!

- ▶ Do not touch the pump when it is running.
- ▶ Do not carry out any work on the pump when it is running.
- ▶ Before all installation and maintenance work, disconnect the motor from the mains and secure it against being switched back on again.

### DANGER

#### Risk of electrocution!

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

### WARNING

#### Risk of injury and poisoning due to hazardous pumped liquids!

- ▶ Use protective equipment for any work on the pump.
- ▶ Collect leaking liquid safely and damage fitting in accordance with local regulations.
- ▶ Take the following measures whenever the pump is shut down:

| Pump is             | Action  |
|---------------------|---|
| shut down           | ▶ Take measures appropriate for the fluid (→ <a href="#">Tab. 4 Measures depending on the behavior of the pumped liquid, Page 18</a> ). |
| ...emptied          | ▶ Close the 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.  |

Tab. 3 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. 4 Measures depending on the behavior of the pumped liquid

## 6.4 Restoring the pump to service

1. Complete all steps as for commissioning (→ [6.2 Commissioning, Page 17](#)).
2. If the pump has been shut down for more than 1 year, replace the elastomer seals (O-rings, shaft sealing rings).


## 6.5 Operating the stand-by pump

- ✓ Filling level checked before operation: Volute casing of the stand-by pump completely immersed


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

- ▶ 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

 Trained service technicians are available for fitting and repair work. Submit evidence of conveyed medium on request (DIN safety data sheet or safety certificate).

### 7.1 Inspections

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

#### DANGER

##### Risk of injury due to running pump!

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


#### WARNING

##### Risk of injury and poisoning due to hazardous pumped liquids!

- ▶ Use protective equipment for any work on the pump.

1. Check at appropriate intervals:
  - Adherence to the minimum flow rate
  - Normal operating conditions unchanged
  - Filling level of the container
2. For trouble-free operation, always ensure the following:
  - No leaks
  - No cavitation
  - Free and clean filters
  - No unusual running noises or vibrations

### 7.2 Servicing

 Operating life of antifriction bearings when operated within the permissible range: >2 years.

Intermittent operation, high temperatures, low viscosities and aggressive ambient and process conditions reduce the service life of antifriction bearings.

#### DANGER

##### Risk of injury due to running pump!

- ▶ Do not touch the pump when it is running.
- ▶ Do not carry out any work on the pump when it is running.
- ▶ Before all installation and maintenance work, disconnect the motor from the mains and secure it against being switched back on again.

#### DANGER

##### Risk of electrocution!

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

#### WARNING

##### Risk of injury and poisoning due to hazardous or hot fluid!

- ▶ Use protective equipment for any work on the pump.
- ▶ Allow the pump to cool down completely before commencing any work.
- ▶ Make sure the pump is depressurized.
- ▶ Empty the pump, safely collect the pumped liquid and damage it in accordance with environmental rules and requirements.

#### 7.2.1 Maintenance in accordance with maintenance schedule

- ▶ Perform maintenance work in accordance with the maintenance schedule ([→ 9.3 Maintenance schedule, Page 32](#)).

#### 7.2.2 Cleaning the pump

#### NOTE

##### High water pressure or spray water can damage bearings!

- ▶ Do not clean bearing areas with a water or steam jet.
- ▶ Clean large-scale grime from the pump.

## 7.3 Dismounting

### DANGER

#### Risk of injury due to running pump!

- ▶ Do not touch the pump when it is running.
- ▶ Do not carry out any work on the pump when it is running.
- ▶ Before all installation and maintenance work, disconnect the motor from the mains and secure it against being switched back on again.

### DANGER

#### Risk of electrocution!

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

### DANGER

#### Death or limbs crushed as a result of the pump overturning!

- ▶ Place pump on a horizontal underground and secure against overturning.

### WARNING

#### Risk of injury and poisoning due to hazardous or hot fluid!

- ▶ Use protective equipment for any work on the pump.
- ▶ Allow the pump to cool down completely before commencing any work.
- ▶ Make sure the pump is depressurized.
- ▶ Empty the pump, safely collect the pumped liquid and damage it in accordance with environmental rules and requirements.

### 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 gate valve against accidental opening.
- ▶ Wear protective gloves, components can become very sharp-edged due to wear or damage.
- ▶ Remove spring-loaded components carefully (e.g. mechanical seal, stressed bearing, valves etc.), as components can be ejected by the spring stress.
- ▶ Observe the manufacturer's specifications (e.g. for the motor, coupling, mechanical seal, blocking pressure system, cardan shaft, drives, belt drive etc.).

### 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
- ▶ When dismounting, observe the following:
  - Mark the precise orientation and position of all components before dismounting them.
  - Dismount components concentrically without canting.
  - Dismount pump (→ sectional drawing).


## 7.4 Replacement parts and return

1. Have the following information ready to hand when ordering spare parts (→ type plate).
  - Device type
  - ID number
  - Nominal pressure and diameter
  - Body and seal material
2. Please complete and enclose the document of compliance for returns (→ [www.stuebbe.com/en/service/downloads/](http://www.stuebbe.com/en/service/downloads/)).



3. Use only spare parts from Stübbe.

## 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!

- ▶ Install spring-loaded components carefully (e.g. mechanical seal, stressed bearing, valves etc.), as components can be ejected by the spring stress.
- ▶ Observe the manufacturer's specifications (e.g. for the motor, coupling, mechanical seal, blocking pressure system, cardan shaft, drives, belt drive etc.).

### 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.

1. When installing please observe:
  - Replace worn parts with genuine spare parts.
  - Replace seals, inserting them in such a way that they are unable to rotate.
  - Do not apply synthetic or mineral oil, grease or cleaning agents to elastomer components.
  - Adhere to the prescribed tightening torques (→ [9.2.4 Tightening torques of casing screws, Page 27](#)).
2. Installing the pump:
  - in reverse order to the dismounting (→ [7.3 Dismounting, Page 20](#)).
  - → sectional drawing
3. Installing the pump in the system (→ [5 Setup and connection, Page 12](#)).

### 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          | 6      |
| Pump leaks                    | 7      |
| Excessive motor power uptake  | 8      |

Tab. 5 Fault/number assignment

| Fault number |   |   |   |   |   |   |   | Cause   | Remedy  |
|--------------|---|---|---|---|---|---|---|---|---|
| 1            | 2 | 3 | 4 | 5 | 6 | 7 | 8 |   |   |
| X            | - | - | - | - | - | - | - | Pressure pipe closed by fitting   | ▶ Open the fitting.   |
| X            | X | - | X | - | X | - | - | Pump or suction strainer blocked or encrusted   | ▶ Clean intake/suction pipe, pump or suction strainer.  |
| X            | - | - | - | - | - | - | - | Transport and sealing cover still in place  | ▶ Remove the transport and sealing cover.   |
| -            | X | - | X | - | X | - | - | Back pressure of the system is too high, pump selected is too small.                        | ▶ Consult the manufacturer.   |
| X            | - | - | - | - | - | - | - | Filling level too low (volute casing not completely immersed)                               | ▶ Increase the filling level in the pump sump/immersion tank.   |
| X            | X | - | X | - | X | - | - | Air is sucked in  | ▶ Check the filling level of the container.   |
| X            | X | - | X | - | X | - | - | Proportion of gas too high: pump is cavitating  | ▶ Consult the manufacturer.   |
| -            | X | - | X | - | X | - | - | Temperature of fluid is too high: pump is cavitating  | ▶ Increase the filling level.<br>▶ Lower temperature.<br>▶ Contact the manufacturer.                                |
| -            | 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.<br>▶ 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.  |

| Fault number |   |   |   |   |   |   |   | Cause   | Remedy  |
|--------------|---|---|---|---|---|---|---|---|---|
| 1            | 2 | 3 | 4 | 5 | 6 | 7 | 8 |   |   |
| X            | X | - | X | - | X | - | - | Pump running in the wrong direction   | <ul style="list-style-type: none"> <li>▶ Check sense of rotation and correct it if necessary (→ 5.6.2 Check direction of rotation, Page 15).</li> </ul>   |
| X            | X | - | X | - | - | - | - | Motor speed too low   | <ul style="list-style-type: none"> <li>▶ Compare the required motor speed with the specifications on the pump type plate. Replace the motor if necessary.</li> <li>▶ Increase the motor speed if speed control is available.</li> </ul>       |
| -            | X | - | X | - | X | - | - | Pump parts worn   | <ul style="list-style-type: none"> <li>▶ Replace the worn pump parts.</li> </ul>  |
| -            | - | X | X | - | X | - | X | Pressure-side fitting opened too wide   | <ul style="list-style-type: none"> <li>▶ Throttle down at the pressure-side fitting.</li> <li>▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.</li> </ul>  |
| -            | - | X | - | - | X | - | X | Geodetic differential head, pipe flow resistances and/or other resistances lower than specified | <ul style="list-style-type: none"> <li>▶ Throttle down the flow rate at the pressure-side fitting. Observe the minimum flow rate.</li> <li>▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.</li> </ul> |
| -            | - | X | - | X | - | - | - | Viscosity lower than expected   | <ul style="list-style-type: none"> <li>▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.</li> </ul>   |
| -            | - | X | - | X | X | - | X | Motor speed too high  | <ul style="list-style-type: none"> <li>▶ Compare the required motor speed with the specifications on the pump type plate. Replace the motor if necessary.</li> <li>▶ Reduce the motor speed if speed control is available.</li> </ul>         |
| -            | - | X | - | X | X | - | X | Impeller diameter too large   | <ul style="list-style-type: none"> <li>▶ Throttle down the flow rate at the pressure-side fitting. Observe the minimum flow rate.</li> <li>▶ Machine the impeller down. Consult the manufacturer and adjust the impeller diameter.</li> </ul> |
| X            | X | - | X | - | X | - | - | Impeller out of balance or blocked  | <ul style="list-style-type: none"> <li>▶ Clean the impeller.</li> </ul>   |
| -            | X | - | X | - | X | - | - | Hydraulic parts of the pump dirty, clotted or encrusted   | <ul style="list-style-type: none"> <li>▶ Dismount the pump.</li> <li>▶ Clean the parts.</li> </ul>  |
| -            | - | - | - | - | X | - | X | Shaft bearing faulty  | <ul style="list-style-type: none"> <li>▶ Replace shaft bearing.</li> </ul>  |
| -            | - | - | - | - | X | - | X | Defective antifriction bearing in motor   | <ul style="list-style-type: none"> <li>▶ Replace the antifriction bearing (→ manufacturer's specifications).</li> </ul>   |
| -            | - | - | - | - | - | X | - | Connecting bolts not correctly tightened  | <ul style="list-style-type: none"> <li>▶ Tighten the connecting bolts.</li> </ul>   |
| -            | - | - | - | - | - | X | - | Faulty housing seal   | <ul style="list-style-type: none"> <li>▶ Replace the housing seal.</li> </ul>   |
| -            | - | - | - | - | X | X | X | Pump distorted  | <ul style="list-style-type: none"> <li>▶ Check the pipe connections and pump attachment.</li> </ul>   |
| -            | X | - | X | - | X | - | X | Motor running on 2 phases   | <ul style="list-style-type: none"> <li>▶ Check the fuse and replace it if necessary.</li> <li>▶ Check the cable connections and insulation.</li> </ul>  |

Tab. 6 Troubleshooting list

## 9 Appendix

### 9.1 Replacement parts

#### 9.1.1 Part numbers and designations

| Part no. | Designation                |
|----------|----------------------------|
| 010      | Plating for mounting plate |
| 020      | Riser pipe adapter         |
| 102.01   | Volute casing              |
| 102.02   | Volute casing              |
| 132      | Motor flange adapter       |
| 211      | Pump shaft                 |
| 213      | Drive shaft                |
| 233      | Anticlockwise impeller     |
| 322      | Cylindrical roller bearing |
| 323      | Four point bearing         |
| 340      | Bearing lantern            |
| 341      | Drive lantern              |
| 342      | Support bearing lantern    |
| 360.01   | Bearing cover              |
| 360.02   | Bearing cover              |
| 412.02   | O-ring                     |
| 412.03   | O-ring                     |
| 412.04   | O-ring                     |
| 412.05   | O-ring                     |
| 412.06   | O-ring                     |
| 412.07   | O-ring                     |
| 412.08   | O-ring                     |
| 412.09   | O-ring                     |
| 412.10   | O-ring                     |
| 412.12   | O-ring                     |
| 412.14   | O-ring                     |
| 412.15   | O-ring                     |
| 412.16   | O-ring                     |
| 421.01   | Radial rotary shaft seal   |
| 421.02   | Radial rotary shaft seal   |
| 421.03   | Radial rotary shaft seal   |
| 421.04   | Radial rotary shaft seal   |
| 421.05   | Lip seal ring              |
| 421.06   | Lip seal ring              |

| Part no. | Designation                        |
|----------|------------------------------------|
| 441.01   | Sealing cover                      |
| 441.02   | Clamping disk                      |
| 524      | Shaft sleeve                       |
| 525.01   | Driver for shaft protection sleeve |
| 525.02   | Spacer ring                        |
| 543      | Spacer                             |
| 550.14   | Supporting washer                  |
| 550.16   | Supporting washer                  |
| 551      | Shim washer                        |
| 554.01   | Washer                             |
| 554.02   | Washer                             |
| 554.03   | Washer                             |
| 554.04   | Washer                             |
| 554.05   | Washer                             |
| 554.06   | Washer                             |
| 554.07   | Washer                             |
| 554.08   | Washer                             |
| 554.09   | Washer                             |
| 554.10   | Washer                             |
| 636.01   | Lubrication nipple                 |
| 636.02   | Lubrication nipple                 |
| 681.01   | Coupling protection                |
| 681.02   | Coupling protection                |
| 709.01   | Hose pipe                          |
| 709.14   | Hose pipe                          |
| 709.16   | Hose pipe                          |
| 711      | Riser pipe                         |
| 713      | Suspension pipe                    |
| 714.01   | Protection tube                    |
| 714.02   | Shaft protection tube              |
| 718      | Nipple                             |
| 723      | Flange                             |
| 731.01   | Fitting                            |
| 731.02   | Fitting                            |
| 731.03   | Fitting                            |
| 731.04   | Fitting                            |
| 731.05   | Fitting                            |



| Part no. | Designation                         |
|----------|-------------------------------------|
| 739.01   | Hose nozzle                         |
| 739.02   | Nipple                              |
| 757      | Flow regulator                      |
| 801      | Flange motor                        |
| 842      | Claw coupling                       |
| 893      | Mounting plate                      |
| 901.04   | Hex screw                           |
| 901.06   | Hex screw                           |
| 901.09   | Hex screw                           |
| 901.12   | Hex screw                           |
| 902.01   | Stud bolt                           |
| 902.02   | Stud bolt                           |
| 902.05   | Stud bolt                           |
| 902.06   | Stud bolt                           |
| 902.08   | Stud bolt                           |
| 902.10   | Stud bolt                           |
| 902.14   | Stud bolt                           |
| 904      | Thread pin                          |
| 912      | Screw plug                          |
| 914.03   | Cylinder screw                      |
| 914.07   | Cylinder screw                      |
| 914.11   | Cylinder screw                      |
| 914.13   | Flat head screw with hexagon socket |
| 914.15   | Cylinder screw                      |
| 914.17   | Cylinder screw                      |
| 920.01   | Hex nut                             |
| 920.02   | Hex nut                             |
| 920.05   | Hex nut                             |
| 920.06   | Hex nut                             |
| 920.08   | Hex nut                             |
| 920.10   | Hex nut                             |
| 920.12   | Hex nut                             |
| 920.14   | Molded hex nut                      |
| 920.16   | Molded hex nut                      |
| 921.01   | Grooved nut                         |
| 921.02   | Grooved nut                         |
| 931.01   | Circlip                             |
| 931.02   | Circlip                             |
| 932.01   | Retaining ring                      |

| Part no. | Designation      |
|----------|------------------|
| 932.02   | Retaining ring   |
| 932.03   | Retaining washer |
| 940      | Key              |

Tab. 7 Designation of components by part numbers

## 9.1.2 Sectional drawing

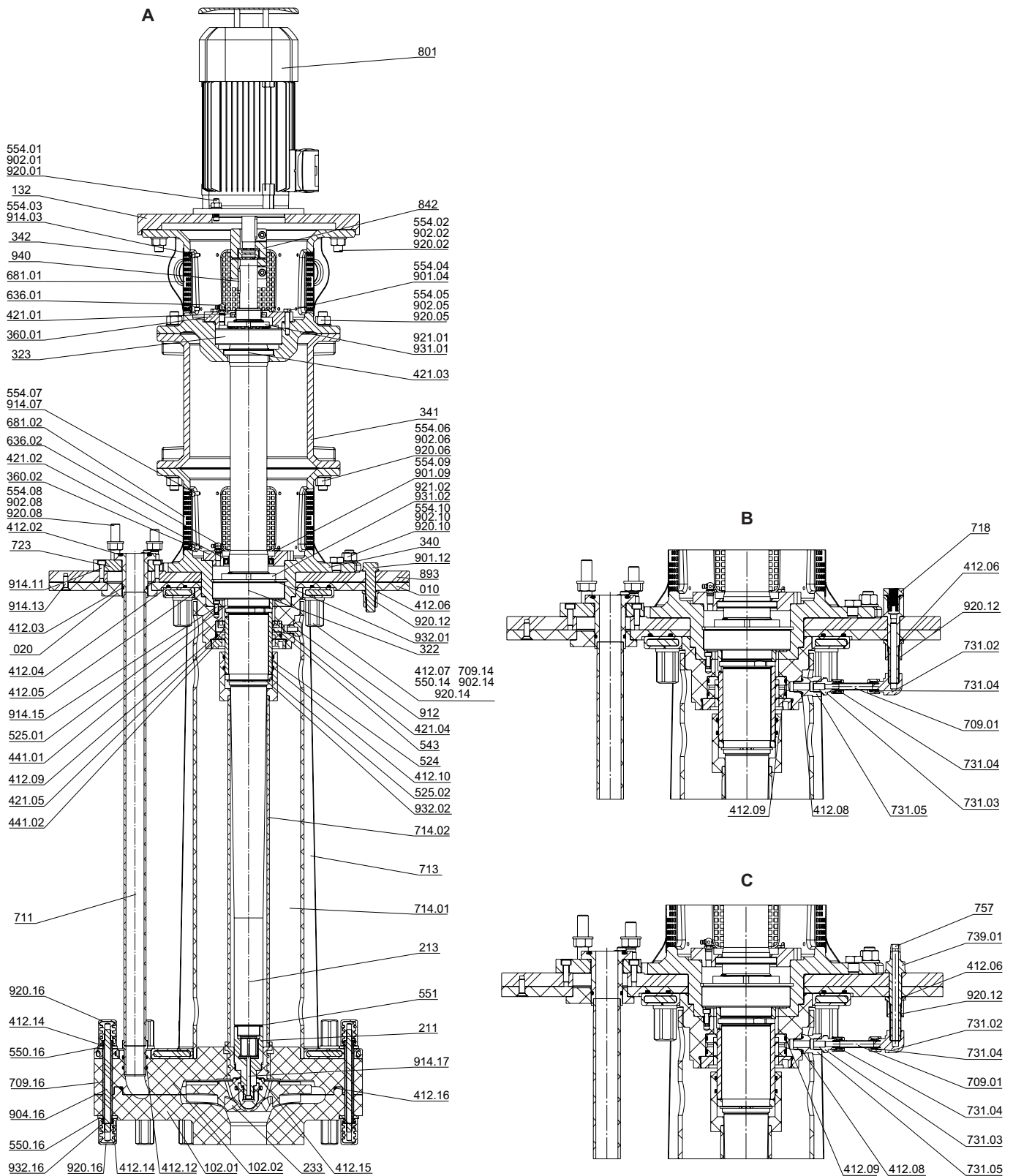



Fig. 6 Sectional drawing

A Shaft seal type OS


B Shaft seal type SG

C Shaft seal type ST

## 9.2 Technical specifications

 Further technical data (→ data sheet).

### 9.2.1 Ambient conditions

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

| Material | Temperature [°C] | Relative atmospheric humidity [%] |            | Installation height above mean sea level [m] |
|----------|------------------|-----------------------------------|------------|--|
|          |                  | Long-term                         | Short-term |  |
| PP-H     | +5 to +50        | ≤ 85                              | ≤ 100      | ≤ 1000                                       |
| PVDF     | -30 to +50       | ≤ 85                              | ≤ 100      | ≤ 1000                                       |
| UHMW-PE  |                  |                                   |            |  |

Tab. 8 Ambient conditions

### 9.2.2 Temperature of the medium


For versions with a suspension pipe of plastic (PP or PVDF), the temperature of the medium may deviate +/- 20 °C relative to the value stated in the quotation / in the order acknowledgement. Otherwise the linear expansion of the suspension pipe will lead to blockage of the impeller (the impeller will foul the volute casing).

### 9.2.3 Parameters for auxiliary systems

| Flushing medium | Parameter   |
|-----------------|---|
| Pressure [bar]  | <ul style="list-style-type: none"> <li>0.8 to 8 bar when a flowmeter is used</li> <li>Max. 1 bar without a flowmeter</li> </ul> |

Tab. 9 Flushing medium pressure

### 9.2.4 Tightening torques of casing screws

 Apply graphite paste to metallic connections prior to assembly.

| Size | Metal on                           |                             | Metal/plastic <sup>3)</sup> [Nm] | Metal in metal inserts/plastic <sup>4)</sup> [Nm] |
|------|------------------------------------|-----------------------------|----------------------------------|---|
|      | Steel/cast iron <sup>1)</sup> [Nm] | Aluminum <sup>2)</sup> [Nm] |                                  |   |
| M5   | 5                                  | 4                           | 4                                | 4   |
| M6   | 7.2                                | 6                           | 6                                | 5   |
| M8   | 17.6                               | 10                          | 10                               | –   |
| M10  | 35                                 | 20                          | 17                               | –   |
| M12  | 60                                 | 30                          | 22                               | –   |
| M16  | 90                                 | 40                          | –                                | –   |

Tab. 10 Tightening torques of casing screws

- 1) Screws of metal, screwed into nuts of metal or into metal housing parts of steel/cast iron
- 2) Screws made of metal, screwed into metal housing parts (aluminum)
- 3) Screws and nuts made of metal that tighten the plastic housing.
- 4) Screws made of metal, screwed into metal inserts in housing parts made of plastic. Inserts screwed-in or insert-molded.

### 9.2.5 Switching frequency

| Motor power rating        | Switch on / switch off actions per hour |
|---------------------------|---|
| 0.18 kW ≤ motors ≤ 7.5 kW | 15                                      |
| 11 kW ≤ motors ≤ 30 kW    | 12                                      |
| 30 kW < motors ≤ 37 kW    | 8                                       |
| 37 kW < motors ≤ 55 kW    | 6                                       |

Tab. 11 Switching frequency

### 9.2.6 Operational limits

If operating point differs, consult the manufacturer.

|                  |  |
|------------------|--|
| Q <sub>min</sub> | Short-time operation: 0.1 x Q <sub>opt</sub> (approx. 5 min.)<br>Continuous operation: 0.25 x Q <sub>opt</sub> |
| Q <sub>max</sub> | See pump capacity curve (→ data sheet)   |
| Q <sub>opt</sub> | Flow rate in pump capacity curve efficiency optimum  |

Tab. 12 Volumetric flow of the pumped liquid

### 9.2.7 Sound pressure level

Maximum noise level LpA for 2-pole, 4-pole and 6-pole motors, in dB (A)

#### Noise level for 2-pole motors 2.2 kW to 90 kW

| Motor size  | 90S/L |    | 100L |     | 112M |    | 132S |      |    | 160L/M |    |    | 180M |    | 200L |  | 225M1 |  | 250M1 |  | 280S1 |  |
|-------------|-------|----|------|-----|------|----|------|------|----|--------|----|----|------|----|------|--|-------|--|-------|--|-------|--|
| Rating [kW] | 2.2   | 3  | 4    | 5.5 | 7.5  | 11 | 15   | 18.5 | 22 | 30     | 37 | 45 | 55   | 75 | 90   |  |       |  |       |  |       |  |
| VCX 32-200  | 65    | 67 | 69   | 69  | 68   | 68 | 70   | 70   | 70 | 73     |    |    |      |    |      |  |       |  |       |  |       |  |
| VCX 32-250  |       |    |      |     | 68   | 68 | 70   | 70   | 70 | 73     | 74 | 72 | 73   |    |      |  |       |  |       |  |       |  |
| VCX 50-200  |       |    |      |     | 68   | 68 | 70   | 70   | 70 | 73     | 74 | 72 |      |    |      |  |       |  |       |  |       |  |
| VCX 50-250  |       |    |      |     | 68   | 68 | 70   | 70   | 70 | 73     | 74 | 72 | 73   | 74 |      |  |       |  |       |  |       |  |
| VCX 80-200  |       |    |      |     | 68   | 68 | 70   | 70   | 70 | 73     | 74 | 72 | 73   | 74 |      |  |       |  |       |  |       |  |
| VCX 100-250 |       |    |      |     |      |    |      |      |    |        |    |    | 73   | 74 | 74   |  |       |  |       |  |       |  |

Tab. 13 Noise level for 2-pole motors 2.2 kW to 90 kW

#### Noise level for 4-pole motors 0.55 kW to 90 kW

| Motor size  | 80M  |      | 90S/L |     | 100L |    |    | 112M |     | 132S/M |    | 160 M/L |    | 180 M/L |    | 200L |    | 225S/M2 |    | 250M2 |  | 280S2 |  |
|-------------|------|------|-------|-----|------|----|----|------|-----|--------|----|---------|----|---------|----|------|----|---------|----|-------|--|-------|--|
| Rating [kW] | 0.55 | 0.75 | 1.1   | 1.5 | 2.2  | 3  | 4  | 5.5  | 7.5 | 11     | 15 | 18.5    | 22 | 30      | 37 | 45   | 55 | 75      | 90 |       |  |       |  |
| VCX 32-200  | 53   | 53   | 56    | 56  | 60   | 60 | 60 |      |     |        |    |         |    |         |    |      |    |         |    |       |  |       |  |
| VCX 32-250  |      |      |       | 56  | 60   | 60 | 60 | 58   | 64  | 64     |    |         |    |         |    |      |    |         |    |       |  |       |  |
| VCX 50-200  |      |      | 56    | 56  | 60   | 60 | 60 | 58   | 64  |        |    |         |    |         |    |      |    |         |    |       |  |       |  |
| VCX 50-250  |      |      | 56    | 56  | 60   | 60 | 60 | 58   | 64  | 64     | 65 | 65      |    |         |    |      |    |         |    |       |  |       |  |
| VCX 50-315  |      |      |       |     | 60   | 60 | 60 | 58   | 64  | 64     | 65 | 65      | 66 | 68      |    |      |    |         |    |       |  |       |  |
| VCX 80-200  |      |      | 56    | 56  | 60   | 60 | 60 | 58   | 64  | 64     | 65 |         |    |         |    |      |    |         |    |       |  |       |  |
| VCX 80-250  |      |      |       |     | 60   | 60 | 60 | 58   | 64  | 64     | 65 | 65      | 66 | 68      |    |      |    |         |    |       |  |       |  |
| VCX 80-315  |      |      |       |     |      |    |    |      | 64  | 64     | 65 | 65      | 66 | 68      | 65 | 65   | 66 | 69      |    |       |  |       |  |
| VCX 100-250 |      |      |       |     | 60   | 60 | 60 | 58   | 64  | 64     | 65 | 65      | 66 | 68      | 65 | 65   | 66 |         |    |       |  |       |  |
| VCX 100-315 |      |      |       |     |      |    |    |      |     |        |    | 65      | 66 | 68      | 65 | 65   | 66 | 69      | 69 |       |  |       |  |

Tab. 14 Noise level for 4-pole motors 0.55 kW to 90 kW

#### Noise level for 6-pole motors 0.75 kW to 22 kW

| Motor size  | 90S/L |     | 100L |     | 112M |    | 132S/M |     |    | 160 M/L |      | 180L |  | 200L |  |
|-------------|-------|-----|------|-----|------|----|--------|-----|----|---------|------|------|--|------|--|
| Rating [kW] | 0.75  | 1.1 | 1.5  | 2.2 | 3    | 4  | 5.5    | 7.5 | 11 | 15      | 18.5 | 22   |  |      |  |
| VCX 50-315  | 43    | 43  | 59   | 59  | 63   | 65 | 63     | 67  |    |         |      |      |  |      |  |
| VCX 80-250  |       | 43  | 59   | 59  | 63   | 63 | 63     | 67  | 67 |         |      |      |  |      |  |
| VCX 80-315  |       |     | 59   | 59  | 63   | 63 | 63     | 67  | 67 | 67      | 67   |      |  |      |  |
| VCX 100-250 |       |     | 59   | 59  | 63   | 63 | 63     | 67  | 67 | 67      | 67   |      |  |      |  |
| VCX 100-315 |       |     |      |     | 63   | 63 | 63     | 67  | 67 | 67      | 67   | 67   |  |      |  |

Tab. 15 Noise level for 6-pole motors 0.75 kW to 22 kW

Measuring conditions:

- Distance to the pump: 1 m
- Operation: free of cavitation
- Motor: IEC standard motor
- Tolerance  $\pm 3$  dB
- Determination of the sound power by the sound intensity measurement method (DIN EN ISO 9614-2) and Determination of the workplace-related emission value (sound pressure level) LpA to DIN EN ISO 11203

## 9.2.8 Installation dimensions and filling heights

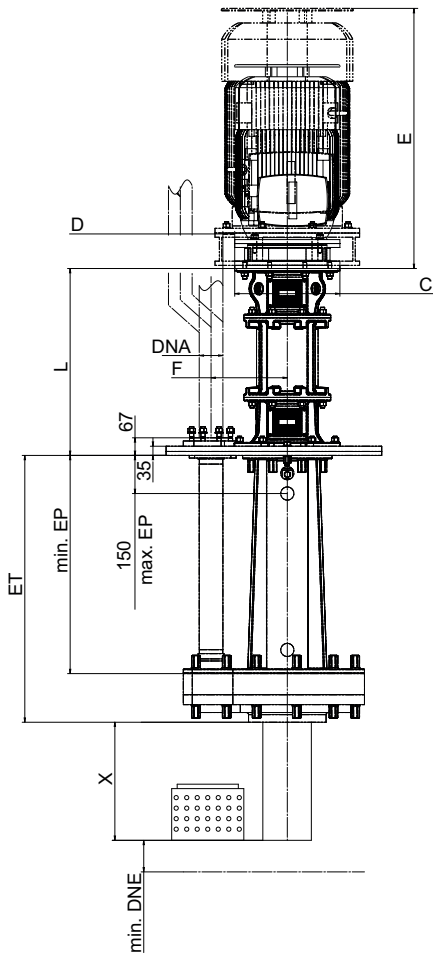


Fig. 7 Installation dimensions and filling heights [mm]

The dimensions of the motor are specified in the table below:

| Motor size | C    | E    |
|------------|------|------|
|            | [mm] |      |
| 90L        | 400  | 405  |
| 100L       | 400  | 450  |
| 112M       | 400  | 435  |
| 132S/M     | 400  | 555  |
| 160L       | 400  | 715  |
| 180 M/L    | 400  | 780  |
| 200L       | 400  | 825  |
| 225S       | 450  | 885  |
| 225M1      | 450  | 985  |
| 225M2      | 450  | 1025 |
| 250M       | 550  | 1055 |
| 280S1      | 550  | 1065 |

Key to abbreviations:

D = Minimum clearance of the pressure pipe from the motor flange

DNA = Nominal diameter of the outlet

DNE = Nominal diameter of the inlet

EP = Min. start-up level

ET = Immersion depth

F = Distance of the centerline of the pump from the centerline of the pressure pipe

X = Length of the suction pipe extension/suction strainer

The minimum dimensions specified in the table must not be less than stated, nor the maximum dimensions greater than stated:

| Pump size | DNE | DNA | D    | Immersion depth ET |        |      | Min. start-up level EP |        |      | F   | L   | X             |
|-----------|-----|-----|------|--------------------|--------|------|------------------------|--------|------|-----|-----|---------------|
|           |     |     |      | Short              | Medium | Long | Short                  | Medium | Long |     |     |               |
|           |     |     |      | [mm]               |        |      |                        |        |      |     |     |               |
| 32-200    | 65  | 32  | 15   | 650                | 1000   | 1500 | 495                    | 845    | 1345 | 205 | 651 | vari-<br>able |
| 32-250    | 65  | 32  | 15   | 650                | 1000   | 1500 | 495                    | 845    | 1345 | 225 | 651 |               |
| 50-200    | 100 | 50  | 15   | 650                | 1000   | 1500 | 495                    | 845    | 1345 | 215 | 651 |               |
| 50-250    | 100 | 50  | 13.5 | –                  | 1000   | 1500 | –                      | 830    | 1330 | 245 | 711 |               |
| 50-315    | 100 | 50  | 13.5 | –                  | 1000   | 1500 | –                      | 830    | 1330 | 245 | 711 |               |
| 80-200    | 150 | 80  | 35   | –                  | 1010   | 1510 | –                      | 830    | 1330 | 280 | 711 |               |
| 80-250    | 150 | 80  | 35   | –                  | 1010   | 1510 | –                      | 830    | 1330 | 280 | 711 |               |
| 80-315    | 150 | 80  | 45   | –                  | 1015   | 1515 | –                      | 830    | 1330 | 290 | 711 |               |
| 100-250   | 150 | 100 | 40   | –                  | 1025   | 1525 | –                      | 830    | 1330 | 295 | 711 |               |
| 100-315   | 150 | 100 | 60   | –                  | –      | 1500 | –                      | –      | 1282 | 315 | 851 |               |

Tab. 16 Installation dimensions

## 9.2.9 Loads on the connection stubs and maximum speeds

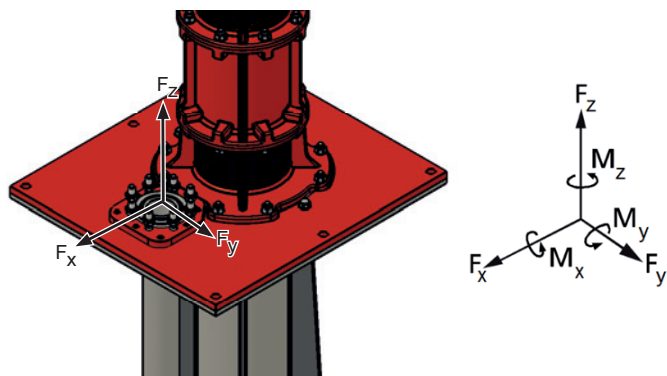


Fig. 8 Forces and torques on the discharge flange

| Pump size | Bearing carrier size | max. speed [1/min] | Nominal width [DN] | Forces and torques |        |        |                |         |         |         |
|-----------|----------------------|--------------------|--------------------|--------------------|--------|--------|----------------|---------|---------|---------|
|           |                      |                    |                    | Fx [N]             | Fy [N] | Fz [N] | $\Sigma F$ [N] | Mx [Nm] | My [Nm] | Mz [Nm] |
| 32-200    | 1                    | 3500               | 32                 | 515                | 404    | 696    | 955            | 273     | 130     | 211     |
| 32-250    | 1                    | 3500               | 32                 | 515                | 404    | 696    | 955            | 273     | 130     | 211     |
| 50-200    | 1                    | 3500               | 50                 | 719                | 585    | 894    | 1288           | 464     | 231     | 355     |
| 50-250    | 2                    | 3500               | 50                 | 719                | 585    | 894    | 1288           | 464     | 231     | 355     |
| 50-315    | 2                    | 1750               | 50                 | 719                | 585    | 894    | 1288           | 464     | 231     | 355     |
| 80-200    | 2                    | 3500               | 80                 | 1073               | 894    | 1341   | 1936           | 952     | 477     | 721     |
| 80-250    | 2                    | 1750               | 80                 | 1073               | 894    | 1341   | 1936           | 952     | 477     | 721     |
| 80-315    | 2                    | 1750               | 80                 | 1073               | 894    | 1341   | 1936           | 952     | 477     | 721     |
| 100-250   | 2                    | 1750               | 100                | 1425               | 1162   | 1786   | 2563           | 1330    | 680     | 1006    |
| 100-315   | 3                    | 1750               | 100                | 1425               | 1162   | 1786   | 2563           | 1330    | 680     | 1006    |

Tab. 17 Forces and torques on the discharge flange

## 9.2.10 Values for adjusting the coupling

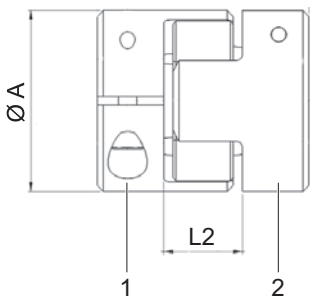


Fig. 9 Values for adjusting the coupling

- 1 Clamping hub, pump-side
- 2 Clamping hub, motor-side

| Type WKE/H | A   | L2 | TA  |
|------------|-----|----|-----|
| Size       | mm  | mm | Nm  |
| 28         | 65  | 20 | 18  |
| 38         | 80  | 24 | 18  |
| 42         | 95  | 26 | 37  |
| 48         | 105 | 28 | 65  |
| 55         | 120 | 30 | 65  |
| 65         | 135 | 35 | 65  |
| 75         | 160 | 40 | 161 |

Tab. 18 Values for adjusting the coupling

## 9.3 Maintenance schedule

| Designation                    | Interval   | Maintenance   |
|--------------------------------|--|---|
| Operating temperatures         | Weekly   | <ul style="list-style-type: none"> <li>▶ Check storage temperature.</li> <li>▶ Check motor temperature.</li> </ul>        |
| Undoable screwed connections   | Weekly   | <ul style="list-style-type: none"> <li>▶ Check for correct and tight fitting.</li> </ul>                                  |
| Shaft bearing                  | Monthly  | <ul style="list-style-type: none"> <li>▶ Re-grease shaft bearing (<a href="#">→ 9.4 Lubrication, Page 33</a>).</li> </ul> |
| Coupling and intermediate ring | After the first 2,000 h (max. after 3 months)  | <ul style="list-style-type: none"> <li>▶ Perform a visual inspection.</li> </ul>  |
|                                | Every 4,000 h (max. after 1 year)  |   |
| Intermediate ring              | 3 years  | <ul style="list-style-type: none"> <li>▶ Replace intermediate ring.</li> </ul>  |
|                                | Event: <ul style="list-style-type: none"> <li>• during routine inspections</li> <li>• during repairs to the drive train</li> </ul> |   |

Tab. 19 Maintenance schedule



## 9.4 Lubrication

### 9.4.1 Lubricating points

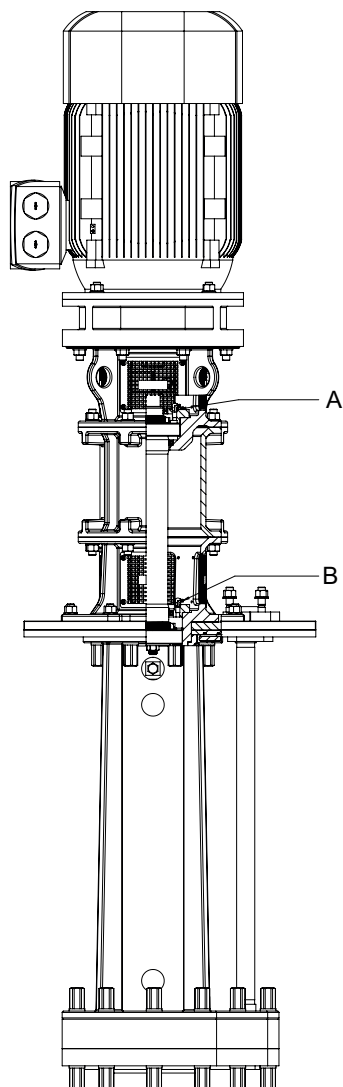


Fig. 10 Lubricating points (bearings A und B)

### 9.4.2 Lubricant


| Manufacturer | Type of lubricant<br>Temperature range<br>-35 °C ... +140 °C |
|--------------|--|
| Aral         | Aralub HL3   |
| BP           | Energrease LS3   |
| Glissando    | Glissando FT3<br>Glissando 30                                |
| Esso         | Beacon 3   |
| Mobilux      | Mobilux EP3  |
| Shell        | Alvania R3   |

Tab. 20 Lubricant

| Pump size | Bearing carrier size | Lubricant quantity [g] |           |
|-----------|----------------------|------------------------|-----------|
|           |                      | Bearing A              | Bearing B |
| 32-200    | 1                    | 17                     | 20        |
| 32-250    | 1                    | 17                     | 20        |
| 50-200    | 1                    | 17                     | 20        |
| 50-250    | 2                    | 20                     | 27        |
| 50-315    | 2                    | 20                     | 27        |
| 80-200    | 2                    | 20                     | 27        |
| 80-250    | 2                    | 20                     | 27        |
| 80-315    | 2                    | 20                     | 27        |
| 100-250   | 2                    | 20                     | 27        |

Tab. 21 Lubricant quantities

## 9.5 Declaration of conformity in accordance with EC machinery directive

|   |   |
|---|---|
| <b>EU Declaration of Conformity</b>   |   |
|    |   |
| Stübbe GmbH & Co. KG, Hollwieser Straße 5, 32602 Vlotho, Germany, declares on its own authority that the following products |   |
| Description   |   |
| Centrifugal pumps with mechanical seal<br><b>BE, BX, NX, SHB</b>  |   |
| Magnetically-coupled pumps<br><b>SHM</b>  |   |
| Sump pumps<br><b>ETLB, ETLB-E, ETLB-S, ETLB-ST, ETLB-T, ETLB-W, VCX</b>   |   |
| to which this declaration relates, are in conformity with the following standards:  |   |
|   | Machinery Directive 2006/42/EC<br>EMC Directive 2014/30/EU<br>ROHS Directive 2011/65/EU<br>With regard to electrical hazards the protective aims of Low Voltage Directive 2014/35/EU have been complied with according to Appendix I no. 1.5.1 of the Machinery Directive 2006/42/EU. |
| Place and date  | Name and signature of authorized person   |
| <hr style="width: 150px; margin-left: 0;"/> <b>Vlotho, 20.02.2023</b>   | <hr style="width: 250px; margin-left: 0;"/> <b>pp Achim Kaesberg,</b><br>Corporate Data   |