

# Series T Immersion pump

Original operating manual



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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: <ul style="list-style-type: none"> <li>• ATEX additional instructions</li> <li>• Resistance lists               <ul style="list-style-type: none"> <li>– Resistance of materials used to chemicals</li> </ul> </li> <li>• Data sheet               <ul style="list-style-type: none"> <li>– Technical specifications, operating conditions, dimensions</li> </ul> </li> <li>• <a href="http://www.schmitt-pumpen.de/en/services/downloads">www.schmitt-pumpen.de/en/services/downloads</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 for the drive <ul style="list-style-type: none"> <li>• Technical documentation for drives</li> </ul>	
Declaration of conformity <ul style="list-style-type: none"> <li>• Conformity with standards</li> <li>• (→ 9.4 Declaration of conformity in accordance with EC machinery directive, Page 29).</li> </ul>	

Tab. 1 Other application documents, purpose and where found

### 1.3 Warnings and symbols


Warning sign	Level of risk	Consequences if disregarded
	immediate acute risk	Death, serious bodily harm
	potentially acute risk	Death, serious bodily harm
	potentially hazardous situation	Minor injury
	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 cavitation: 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.
  - Note minimum flow (→ Data sheet).
- 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 (→ 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 and motor become overloaded (→ data sheet).  
A lower specific gravity is permissible. Adapt the auxiliary systems accordingly.
- Do not convey 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:
  - Installation in the immediate vicinity of extreme heat or cold sources
  - Installation too close to a wall
  - horizontal 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

### 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 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 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](http://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.



## 3 Layout and Function

### 3.1 Marking

#### 3.1.1 Name plate

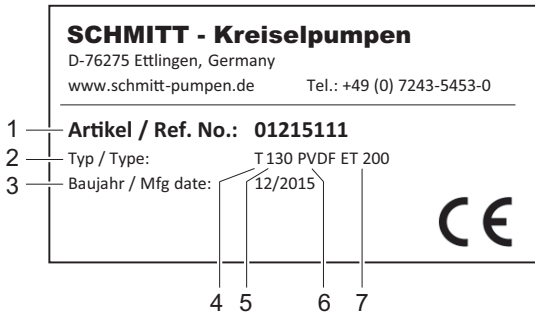


Fig. 1 Name plate (example)

- 1 Article numbers
- 2 Type
- 3 Year of manufacture (month/year)
- 4 Pump series
- 5 Size
- 6 Pump material
- 7 Immersion depth

#### 3.1.2 ATEX type plate



Fig. 2 ATEX type plate (example)

- 1 Explosion protection label

### 3.2 Description

Non-self-priming immersion pumps in modular construction:

- Sealless
- Safe to run dry
- Vertical installation in open or closed, but depressurized tanks, pits or vessels
- Direction of conveying:
  - Suction flange, vertical
  - Discharge flange, vertical
- Optional accessory parts on request:
  - Strainer
  - Suction line extension

### 3.3 Assembly

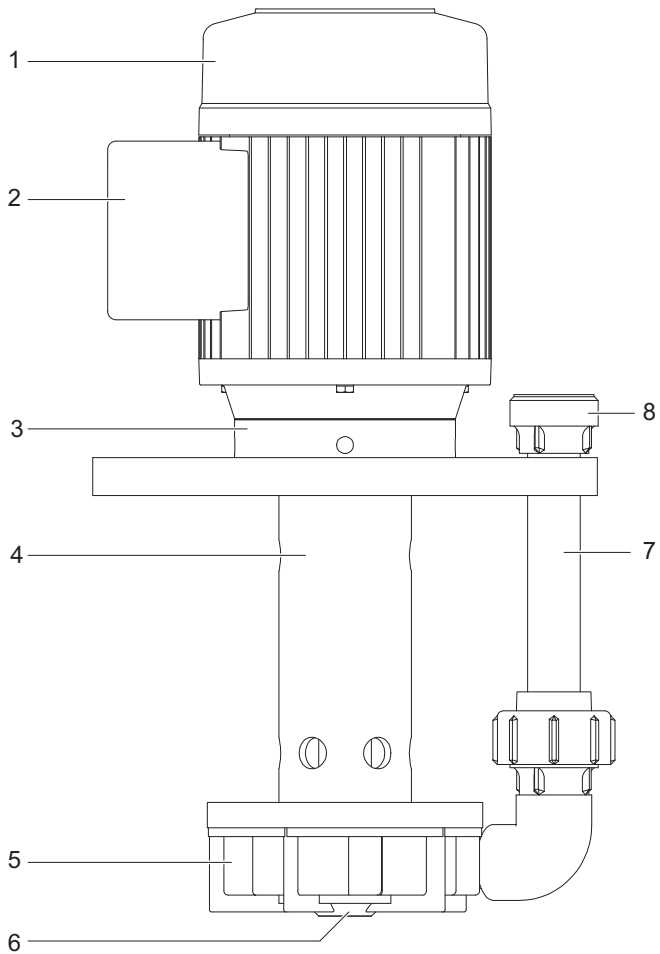




Fig. 3 T layout

- |                    |                  |                    |
|--------------------|------------------|--------------------|
| 1 Motor            | 4 Support pipe   | 7 Riser            |
| 2 Terminal box     | 5 Housing        | 8 Discharge flange |
| 3 Flange extension | 6 Suction branch |                    |

## 4 Transport, Storage and Disposal

### 4.1 Transport

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

 Weight specification (→ Data sheet)

#### 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.

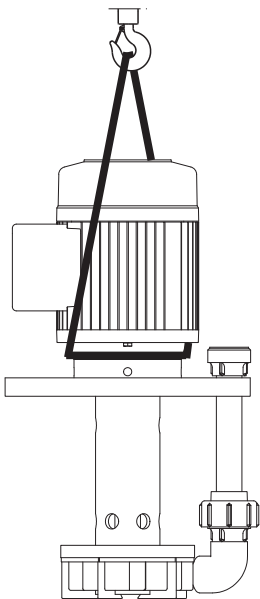


Fig. 4 Attach the lifting gear to the immersion pump (illustration of general principle)

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

### 4.2 Storage

### DANGER

**Risk of death or crushed limbs due to pump tipping over!**


- ▶ If stored vertically: Place the pump on a horizontal surface and secure it so it does not tip over.

### NOTE

**Material damage due to inappropriate storage!**

- ▶ Store the pump properly.
1. Seal all openings with blind plugs or plastic covers.
  2. Make sure the storage room meets the following conditions:
    - Dry
    - Frost-free
    - Vibration-free
    - UV protected
  3. If stored horizontally: Secure the pump using proper supports to prevent it from sagging.
  4. Rotate the pump shaft twice a month.
  5. Make sure the shaft changes its 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).

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### NOTE

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#### 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 25).
2. Ensure the required dimensions for the tank section (→ 9.2.4 Support flange installation dimensions, Page 26).
3. Ensure reliable air supply/ventilation during all operating phases.
4. Ensure required fill levels and minimum distance (→ 9.2.5 Tank fill levels and minimum distance, Page 27).


#### 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
  - Pump not exposed to external corrosive influences
  - Frost protection

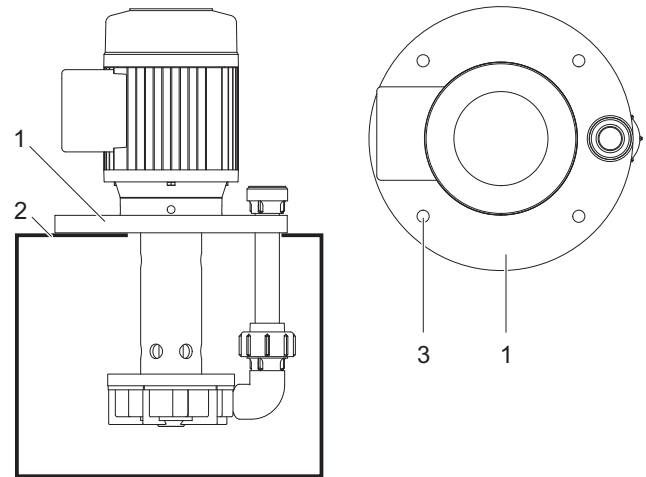
#### 5.1.3 Preparing the support surface

- ✓ Aids, tools, materials:
  - Spirit level
- 1. Ensure that the support 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
  - Resonance-free
- 2. Clean the tanks, pits or vessels thoroughly and protect them against further contamination e.g. by installing overflow walls upstream of the tank or vessel inlet.

### 5.2 Setting up


 Insert an appropriate seal between the support flange and support surface if necessary.

1. Remove the sealing cover if necessary.
2. Install optional accessory parts on the suction branches if necessary.
3. Lift up the machine drive (→ 4.1 Transport, Page 11).



4. Place the machine drive with the support flange (1) on the support surface (2).
5. Insert suitable screws in the through holes (3) and tighten them crosswise. Make sure that the pump is not distorted.

### 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 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)

#### 5.3.2 Arranging the supports and connections

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### NOTE


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

- ▶ Ensure pipe connection without stress.

1. Support the pipes.
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. Set the diameter of the optional suction line extension is the same as nominal suction branch width.
2. Make sure the nominal pressure line width is not smaller than the nominal discharge flange width.

### 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 contamination

- ▶ Fit the strainer onto the discharge flange.

#### Avoid reverse running

1. Install a non-return fitting between the discharge flange and stop fitting, 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 fitting.

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

 For maintenance and repair work.

- ▶ Provide shut-off valves in the pressure line.

#### Make provisions for measuring the operating conditions

- ▶ Provide monitoring sensors for both pressure and flow rate.

#### Make provisions for shutting off the pump during operation with suction line extension

- ▶ If tank fill level < 5 mm over the suction line inlet: Provide suitable measures for shutting off the pump.

## 5.4 Connecting the pipes

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### NOTE

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

- ▶ Ensure pipe connection without stress.
- 

### 5.4.1 Keeping the piping clean

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### NOTE

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#### 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 the pressure pipe

1. Remove the transport and sealing covers from the pump.
2. Fit the pressure line stress-free and sealed.
3. Make sure the seals do not protrude on the inside.

### 5.4.3 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 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.
- 

### 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.

### 5.5.2 Check direction of rotation

1. Switch on motor for max. 2 seconds and switch it off again immediately.
2. Visually check the sense of rotation of the motor fan impeller and make sure that the sense of rotation of the motor matches the direction arrow on the motor casing.
3. If the sense of rotation is different: Change over the two phases (→ [5.5 Electrical connection, Page 13](#)).

## 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:
  - If the hydraulic parts are dirty, clean them.
  - Check that the impeller runs freely.

#### 6.1.2 Filling and bleeding

1. Close the pressure-side fitting.
2. Fill the pump with the conveyed fluid. Pay attention to the correct fill levels (→ 9.2.5 Tank fill levels and minimum distance, Page 27).
3. Verify that no pipe connections are leaking.

### 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, pit or vessel filled sufficiently

#### NOTE

##### Material damage due to overheating!

- ▶ Do not operate the pump for long periods with the pressure-side fitting closed.

1. Close the pressure-side fitting.
2. Switch on the motor and check it for smooth running.
3. Once the motor has reached its nominal speed, open the pressure-side fitting slowly until the operating point is reached.
4. Make sure temperature change is smaller than 5 K/min for pumps with hot fluids.
5. After the initial stress due to the pressure and operating temperature, check that the pump is not leaking.
6. If leaks are present at the casing seals or discharge 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 bolts and tighten them to the specified torque (→ 9.2.6 Tightening torques of casing screws, Page 27).

### 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 14).
...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 (→ 4.2 Storage, Page 11).

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,	▶ 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 14).

## 6.5 Operating the stand-by pump


- ✓ Stand-by pump filled and bled
-  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 14](#)).


## 7 Maintenance

Opening the pump casing invalidates the warranty.


When used for the intended purpose the 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. 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. 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:
  - Normal operating conditions unchanged
  - Tank fill level
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

#### 7.2.1 Maintenance in accordance with maintenance schedule

- ▶ Perform maintenance work in accordance with the maintenance schedule (→ [9.3 Maintenance schedule, Page 28](#)).

#### 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 extension.

- ▶ 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 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 Dismount the pump

 Following the drawings for disassembly (→ 9.1.2 Drawings, Page 23).

When dismantling the motor, observe the supplier's documentation (→ 1.2 Other applicable documents, Page 4).

- ✓ Tools, aids:
  - Vise
  - Shaft puller
- 1. Remove the hexagon screws, washers and nuts (13).
- 2. Remove the cap nuts on the riser.
- 3. Remove the housing (12).
- 4. Remove the O-ring (14).
- 5. For version T:
  - Unscrew the threaded cap (11). Note the right-hand thread.
  - Remove the O-ring (10).
- 6. Remove the impeller with shaft casing (09) from the shaft (04).
- 7. Remove the key from the shaft (04) and place it in a safe location.
- 8. Remove the cylinder screws (06).
- 9. Remove the support pipe (05).
- 10. Remove the housing seal (08).
- 11. Remove the pressure-side O-ring (07).
- 12. Remove the flange extension (02).
- 13. Remove the O-ring (03).
- 14. Prepare the motor (01) for shaft disassembly as follows:
  - Remove the fan cover.
  - Remove the fan propeller.
  - Fix the motor with exposed shaft end on the fan side in a vise.
- 15. Remove the grooved taper pin from the motor shaft and shaft (04) and dispose of it.
- 16. Remove the shaft (04) from the motor shaft using a shaft puller.
- 17. Mount the motor (01).
- 18. 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 9 ).
  - 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](http://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](mailto: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 dismantling/installation of the pump!**

- ▶ Only specialist mechanics should complete dismantling/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.

#### 7.5.1 Preparations for installation

- ▶ 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.

### 7.5.2 Installing the pump

 Following the drawings for assembly ([→ 9.1.2 Drawings, Page 23](#)).

Note the correct tightening torque for assembly ([→ 9.2.6 Tightening torques of casing screws, Page 27](#)).

When installing the shaft, the support pipe and flange extension are mounted and dismantled in order to set the correct installation dimension.


- ✓ Tools, aids:
  - Drill
  - Dial gage
- 1. Press the shaft (04) onto the end of the motor shaft.
- 2. Insert the O-ring (03) into the groove on the flange extension (02).
- 3. Mount the flange extension (03) onto the support pipe (05). Align the through holes flush.
- 4. Mount the support pipe (05) with flange extension (03) to the motor (01).
- 5. Screw the support pipe (05) and flange extension (03) to the motor (01) crosswise using cylinder screws (06).
- 6. Set the correct distance between the shaft (04) and the support pipe (05) ([→ 9.2.3 Shaft installation dimensions, Page 25](#)).
- 7. Check the shaft (04) for run-out. Ensure a run-out precision at the shaft end of  $\leq 0.02$  mm.
- 8. If you detect a deviating run-out precision, realign the shaft (04).
- 9. Remove the cylinder screws (06).
- 10. Carefully remove the support pipe (05) with flange extension (03).
- 11. In the area of the motor shaft, drill a hole in the shaft (04) and motor shaft. Note the dimensions and the position of the groove tapered pin ([→ 9.2.3 Shaft installation dimensions, Page 25](#)).
- 12. Insert the grooved tapered pin (04) flush into the hole.
- 13. Mount the support pipe (05) with flange extension (03) to the motor (01). Align the terminal box and discharge plan according to the installation situation.
- 14. Screw the support pipe (05) and flange extension (03) to the motor (01) crosswise using cylinder screws (06).
- 15. Insert the housing seal (08) into the groove on the support pipe (05).
- 16. Fit the O-ring (07) onto the discharge flange.
- 17. Insert the key into the end of the shaft (04).
- 18. Slide the impeller with shaft casing (09) onto the shaft (04). Make sure that the impeller is seated securely on the end of the shaft (04).
- 19. For version T:
  - Fit the O-ring (10) onto the threaded cap (11).
  - Screw on the threaded cap (11). Note the right-hand thread.
- 20. Turn the impeller (09) and check whether it runs easily and smoothly.
- 21. Fit the O-ring (14) onto the connecting piece.
- 22. Fit the housing (12) onto the support pipe (05) and the riser.

- 23. Fit the hexagon screws, washers and nuts (13) and tighten them crosswise.
- 24. Screw the cap nuts onto the connecting piece.

### 7.5.3 Install the pump into the system

- ▶ Install the pump in the system ([→ 5 Disposal, Page 12](#)).

## 8 Troubleshooting

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

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	-	-	-	-	-	-	-	-	Pressure pipe 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	-	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	-	X	-	-	-	Pump or strainer blocked or encrusted	▶ Clean the pump or strainer.
X	X	-	X	-	X	-	-	-	Air is sucked in	▶ Check the fill level of the tank/pit/vessel.
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	▶ Clean the impeller.
X	X	-	-	X	X	-	-	-	Pressure pipe blocked	▶ Clean the pressure pipe.
X	-	-	-	-	X	-	-	-	Tank/pit/vessel not filled	▶ Fill the tank/pit/vessel. ▶ Fill the pump completely.
-	X	-	X	-	X	-	-	-	Hydraulic parts of the pump dirty, clotted or encrusted	▶ Dismount the pump. ▶ Clean the parts.

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
-	X	-	X	-	X	-	-	-	Suction head too large: $NPSH_{\text{pump}}$ is larger than $NPSH_{\text{system}}$	<ul style="list-style-type: none"> <li>▶ Increase pump inlet pressure.</li> <li>▶ Consult the manufacturer.</li> </ul>
-	X	-	X	-	X	-	-	-	Back pressure of the system is too high, pump selected is too small.	<ul style="list-style-type: none"> <li>▶ Consult the manufacturer.</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	-	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>
-	X	-	X	-	-	-	X	X	Viscosity or specific gravity of the pumped liquid outside the range specified for the pump	<ul style="list-style-type: none"> <li>▶ Consult the manufacturer.</li> </ul>
-	X	-	X	-	-	-	-	X	Geodetic differential head and/or pipe flow resistances too high	<ul style="list-style-type: none"> <li>▶ Remove sediments from the pump and/or pressure pipe.</li> <li>▶ Install a larger impeller and consult the manufacturer.</li> </ul>
-	X	-	-	X	X	-	-	-	Pressure-side fitting not opened wide enough	<ul style="list-style-type: none"> <li>▶ Open the pressure-side fitting.</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	-	-	-	-	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	-	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	X	-	Pump distorted	<ul style="list-style-type: none"> <li>▶ Check the pipe connections and pump attachment.</li> <li>▶ Check the attachment of the support flange.</li> </ul>

Fault number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
-	-	-	-	-	X	-	-	-	Pipes and fittings blocked	▶ Disassemble and clean the pipes and fittings.
-	-	-	-	-	-	X	-	-	Connecting bolts not correctly tightened	▶ Check all connecting bolts and tighten them to the specified torque (→ <a href="#">9.2.6 Tightening torques of casing screws, Page 27</a> ).
-	-	-	-	-	-	X	-	-	Faulty housing seal	▶ Replace the housing seal.

Tab. 7 Troubleshooting list

## 9 Appendix

### 9.1 Replacement parts

#### 9.1.1 Part numbers and designations

Part no.	Designation
01	Motor
02	Flange extension
03	O-ring
04	Shaft, grooved taper pin, key
05	Support pipe
06	Cylinder-head bolt
07	Pressure-side O-ring
08	Housing seal
09	Impeller with shaft casing <sup>1</sup>
10	O-ring <sup>1</sup>
11	Threaded cap <sup>1</sup>
12	Housing
13	Hex-head bolt, washer, nut
14	O-ring

Tab. 8 Designation of components according to part numbers

1) Only available in version T

9.1.2 Drawings  
Sectional drawing

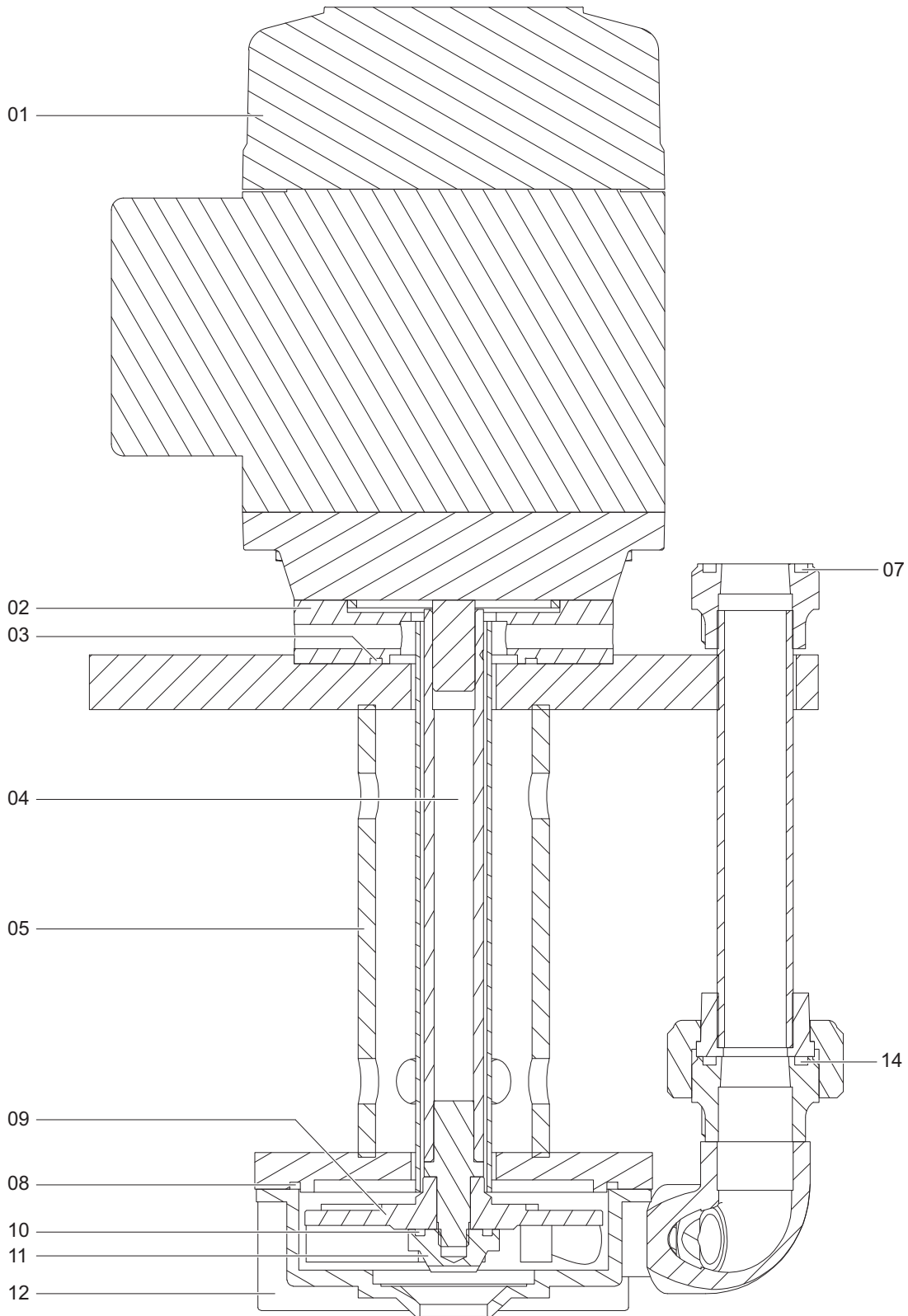


Fig. 5 Sectional drawing

Exploded drawing

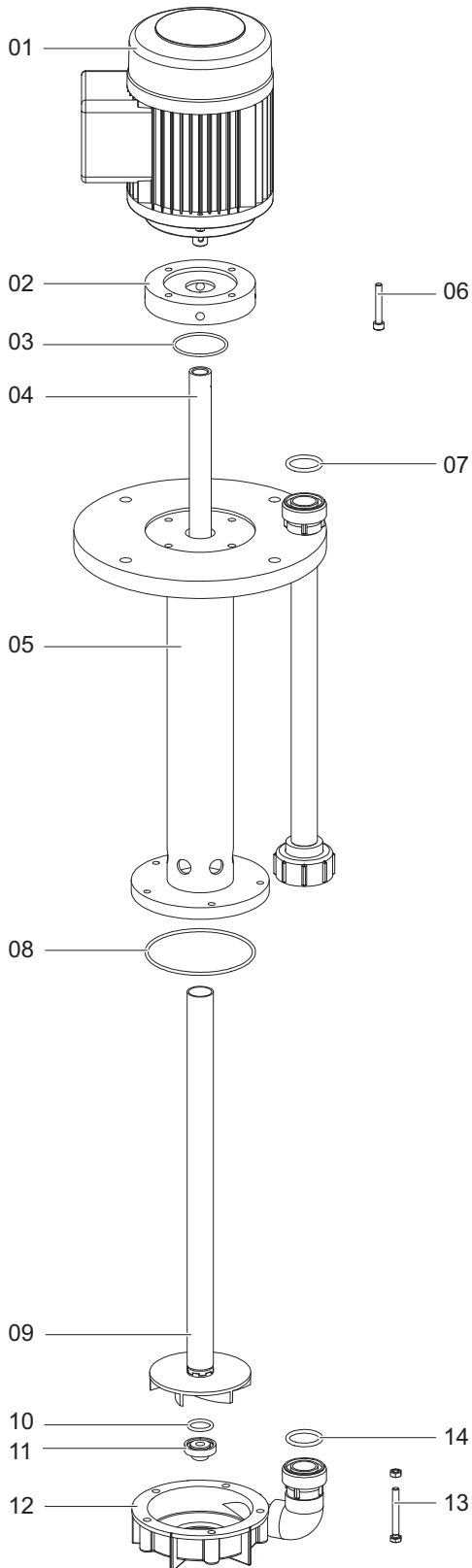




Fig. 6 Exploded drawing



## 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.


Temperature [°C]	Relative humidity [%]		Installation height above sea level [m]
	Long-term	Short-term	
-20 to +40 <sup>1)</sup>	≤ 85	≤ 100	≤ 1000

Tab. 9 Ambient conditions

1) material-dependent

No corrosive gases are permitted.

### 9.2.2 Total pressure

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

Max. permissible total pressure ( $p_t$ ) up to 6 bar

Standard variant is not suitable for overpressure

### 9.2.3 Shaft installation dimensions

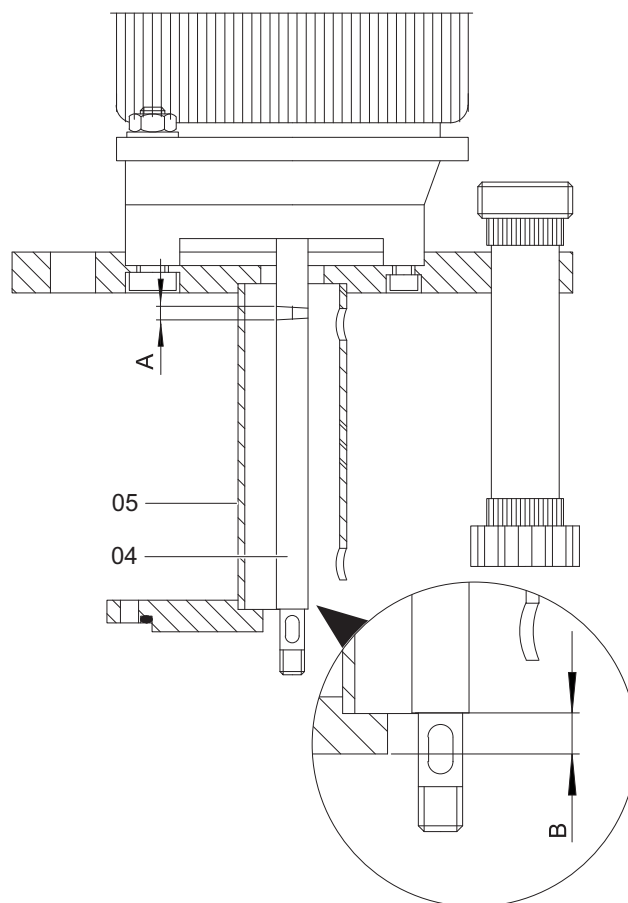


Fig. 7 Shaft installation dimensions

A Dimensions and position of the grooved taper pin

B Distance between the shaft (04) and the support pipe (05)

Size	A Diameter x length [mm]	B mm]
100	2 x 15	6
115	3 x 20	4
130	3 x 20	1
150	4 x 25	3
170	5 x 30	6
180H	5 x 30	9
190	5 x 30	4.5

Tab. 10 Shaft installation dimensions

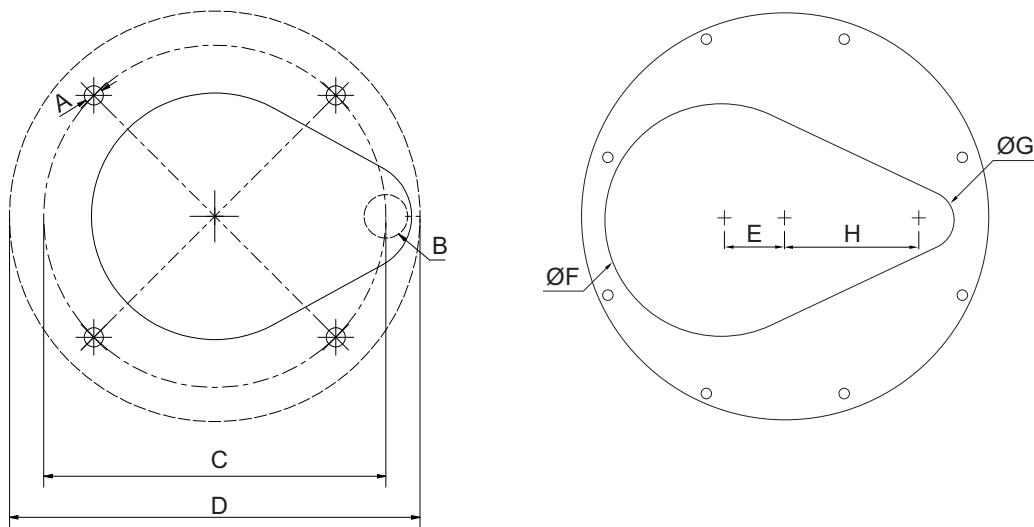
**9.2.4 Support flange installation dimensions**


Fig. 8 Support flange installation dimensions

- |   |                                      |   |  |   |                               |
|---|--------------------------------------|---|--|---|-------------------------------|
| A | Through hole diameter                | D | Support flange external diameter   | G | Tank cutout pressure pipe     |
| B | Pressure pipe nominal width          | E | Distance from the center of the hole to the center of the support flange | H | Distance cutout pressure pipe |
| C | Bolt circle<br>(size 180H = 8 holes) | F | Tank cutout flange plate   |   |                               |

Size	A [mm]	B [DN]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]
100	11	15	150	220	–	100	56	83
115	11	20	170	230	–	120	60	82
130	11	20	200	240	–	144	64	83
150	11	20	225	265	–	185	66	96
170	13	25	280	320	–	210	66	120
180H	9	51	330	350	52	250	80	160
190	13	25	280	330	–	220	66	126

Tab. 11 Support flange installation dimensions

### 9.2.5 Tank fill levels and minimum distance

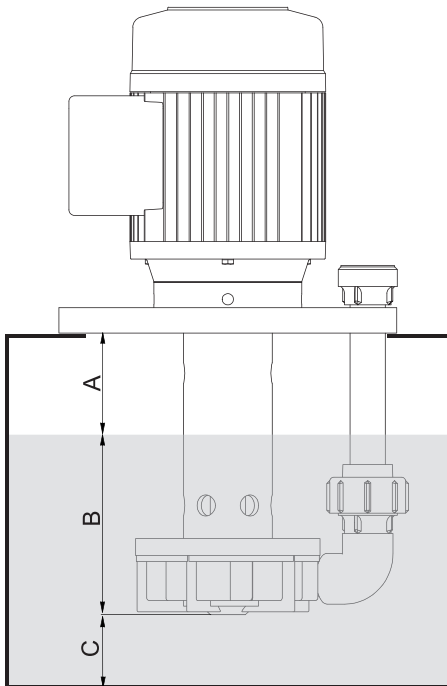


Fig. 9 Tank fill levels and minimum distance

A Tank maximum fill level

B Tank minimum fill level

C Minimum distance between the pump and the tank floor

Parameter	Value
A	> 50 mm below the support flange
B	> 70 mm over the suction branch
C	> 40 mm to the tank floor

Tab. 12 Tank fill levels and minimum distance

### 9.2.6 Tightening torques of casing screws

Depending on the type of material of the pump, comply with the following tightening torques, and use a torque wrench:

Size	PVDF [Nm]	PP [Nm]
100	2	2
115	2	2
130	3	3
150	3	3
170	5	4
180H	7	7
190	7	6

Tab. 13 Tightening torques of casing screws

### 9.2.7 Flow rate

The pump is operated at the following max. permissible flow rate:


Size	Motor power rating [kw]	Flow rate $Q_{max}$ [m <sup>3</sup> /h]
100	0.12	3.9
115	0.25	5.5
130	0.55	8.1
150	0.75	13
170	1.5	21
180H	2.2	29
190	2.2	23

Tab. 14 Flow rate

### 9.2.8 Cleaning agents

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

### 9.3 Maintenance schedule

 The operating company should choose the maintenance intervals appropriate to the medium being conveyed.

Interval	Designation	Action
Daily	Conveyed fluid	<ul style="list-style-type: none"> <li>▶ Check temperature.</li> <li>▶ Check discharge pressure.</li> </ul>
	Tank	<ul style="list-style-type: none"> <li>▶ Check the fill level.</li> </ul>
Weekly	Operating temperatures	<ul style="list-style-type: none"> <li>▶ Check motor temperature.</li> </ul>
	Pump	<ul style="list-style-type: none"> <li>▶ Check the pump for leaks and vibration.</li> </ul>
Quarterly	Undoable screwed connections	<ul style="list-style-type: none"> <li>▶ Check all connecting bolts and tighten them to the specified torque (<a href="#">→ 9.2.6 Tightening torques of casing screws, Page 27</a>).</li> </ul>
	Impeller	<ul style="list-style-type: none"> <li>▶ Check the impeller for dirt and damage:               <ul style="list-style-type: none"> <li>– If the impeller is dirty, clean it.</li> <li>– If the impeller is damaged, replace it.</li> </ul> </li> </ul>
	Shaft	<ul style="list-style-type: none"> <li>▶ Check the shaft for damage and correct run-out:               <ul style="list-style-type: none"> <li>– If the shaft is damaged, replace it.</li> <li>– Ensure a run-out at the shaft end of <math>\leq 0.02</math> mm.</li> </ul> </li> </ul>
	Housing seal	<ul style="list-style-type: none"> <li>▶ Visually check the housing seal for damage and change it if necessary.</li> </ul>
As required	Motor	<ul style="list-style-type: none"> <li>▶ Check the motor against the supplier's documentation and perform maintenance if necessary (<a href="#">→ 1.2 Other applicable documents, Page 4</a>).</li> </ul>

Tab. 15 Maintenance schedule

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

### EU Declaration of Conformity



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

Type of pump **Immersion pump**

Pump type **T 100, T 115, T 130, T 150, T 170, T 180H, T 190**

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	<b>2006 / 42 / EC</b>
Low Voltage Directive	<b>2014 / 35 / EU</b>
Electromagnetic Compatibility	<b>2014 / 30 / EU</b>
Harmonized standards applied	<b>EN ISO 12100:2010 EN 809:1998+A1:2009+AC:2010</b>



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