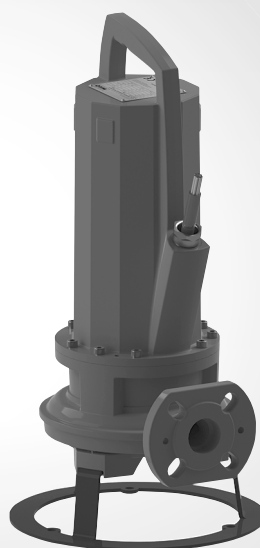


## Wilo-Rexa CUT



**de** Einbau- und Betriebsanleitung  
**en** Installation and operating instructions  
**fr** Notice de montage et de mise en service  
**es** Instrucciones de instalación y funcionamiento  
**sv** Monterings- och skötselanvisning  
**fi** Asennus- ja käyttöohje  
**el** Οδηγίες εγκατάστασης και λειτουργίας  
**tr** Montaj ve kullanma kılavuzu

**pl** Instrukcja montażu i obsługi  
**cs** Návod k montáži a obsluze  
**sk** Návod na montáž a obsluhu  
**ru** Инструкция по монтажу и эксплуатации  
**lv** Uzstādīšanas un ekspluatācijas instrukcija  
**ro** Instrucțiuni de montaj și exploatare  
**uk** Інструкція з монтажу та експлуатації

Fig. 1

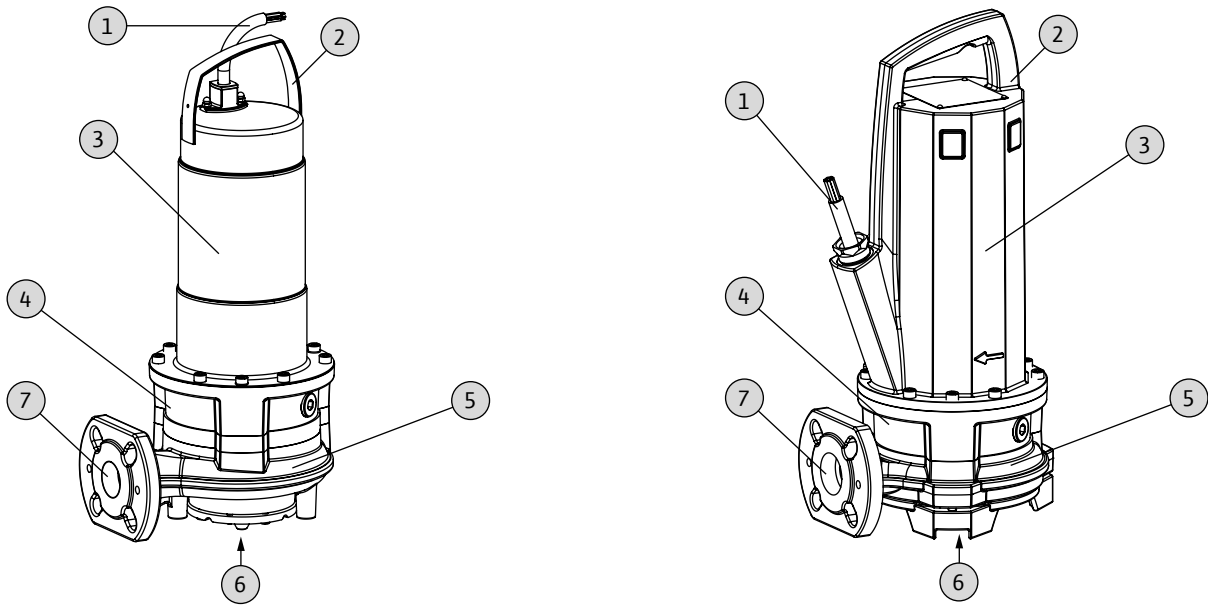


Fig. 2

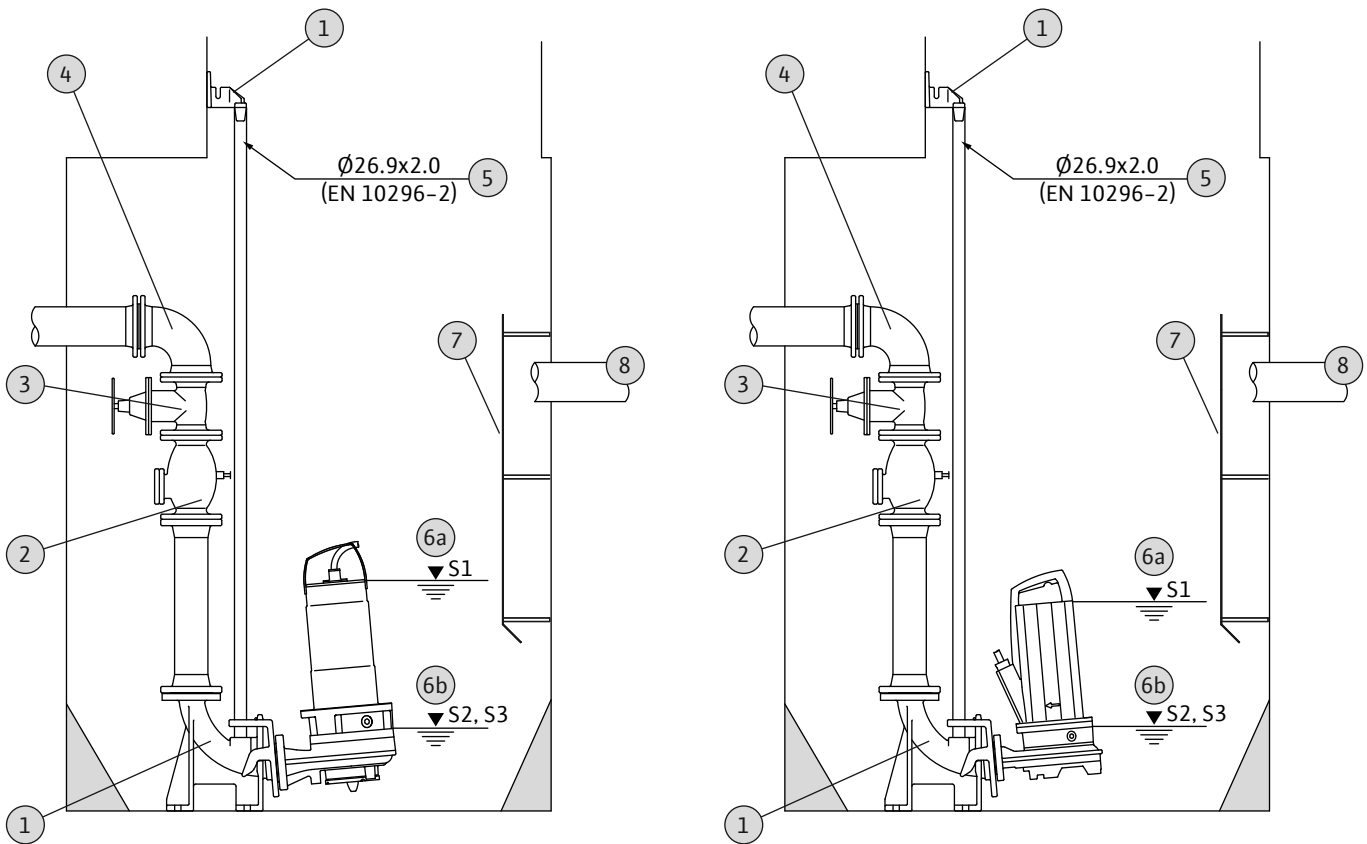


Fig. 2

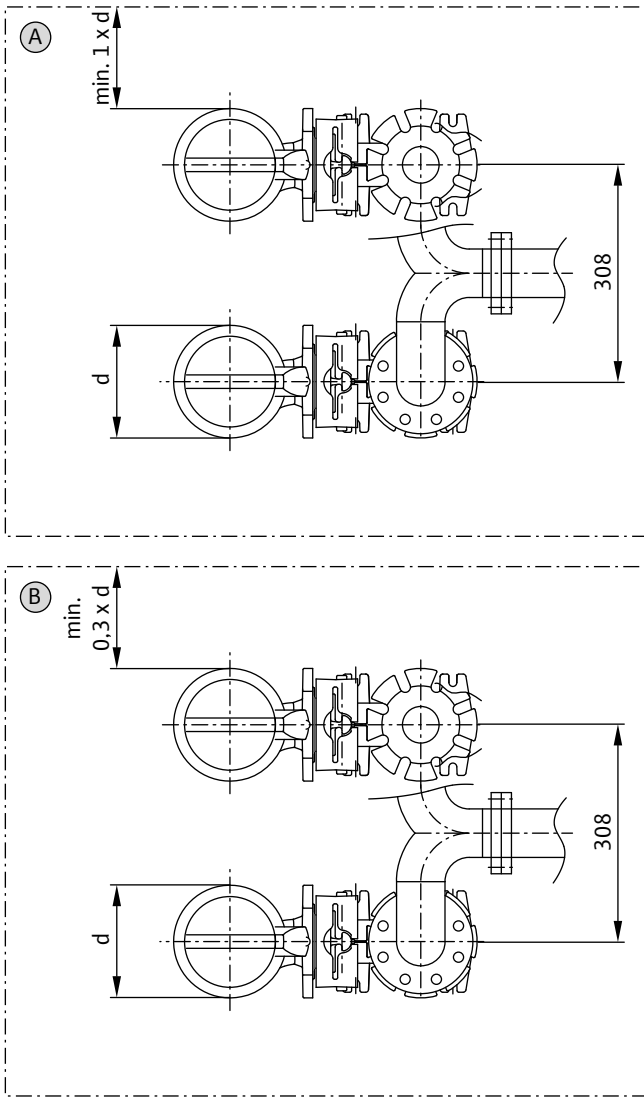


Fig. 4

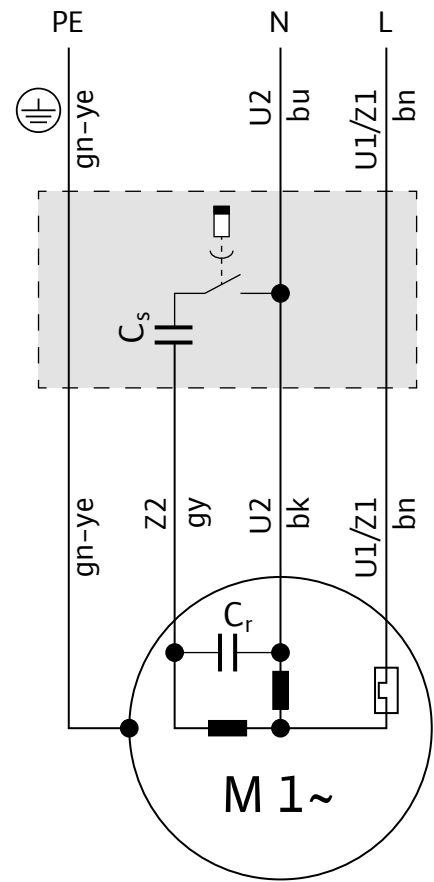


Fig. 3

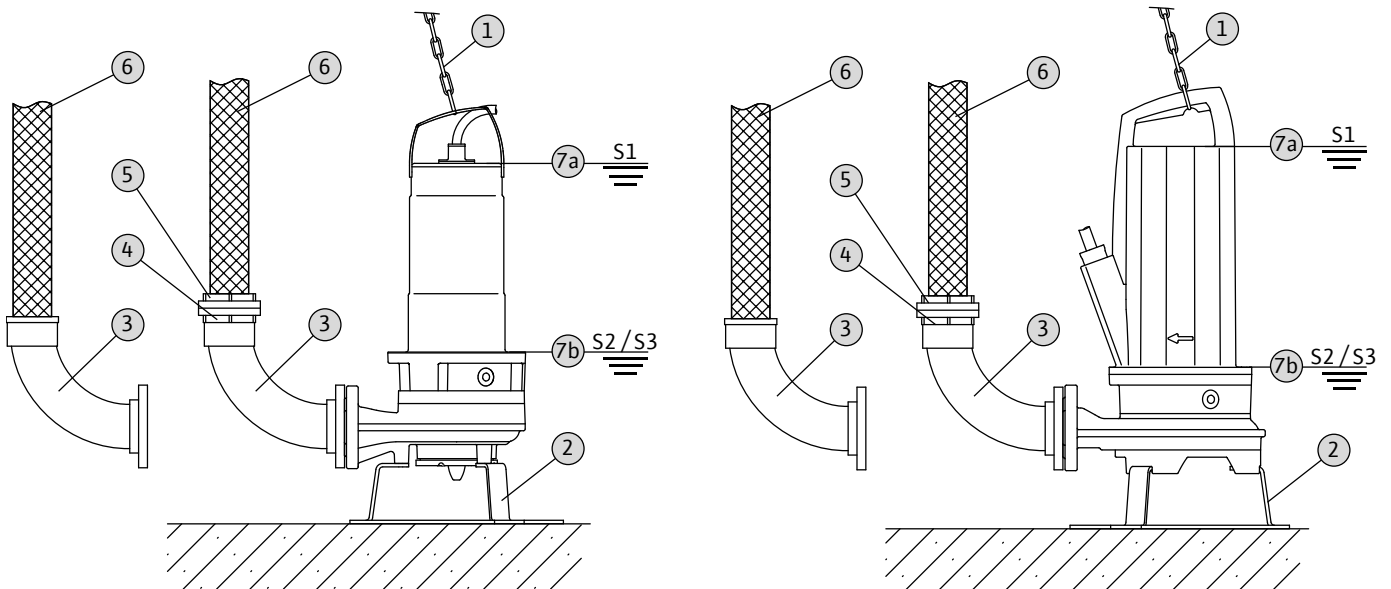


Fig. 5

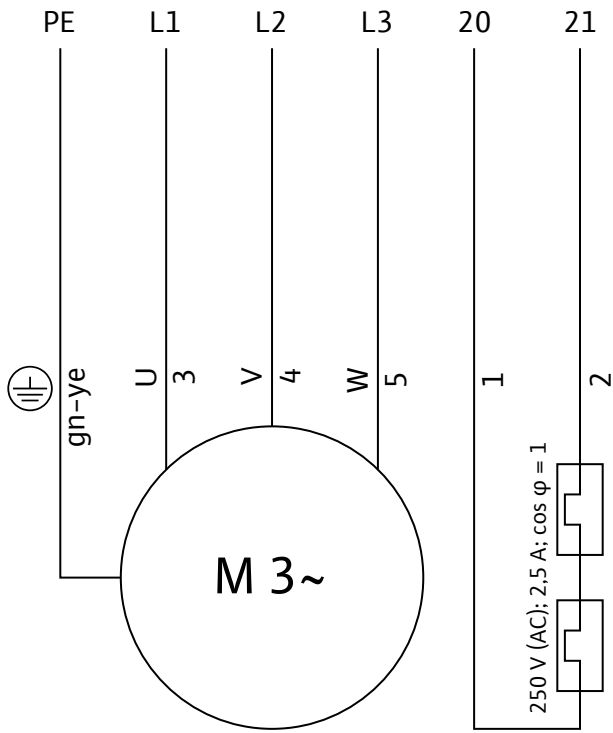


Fig. 6

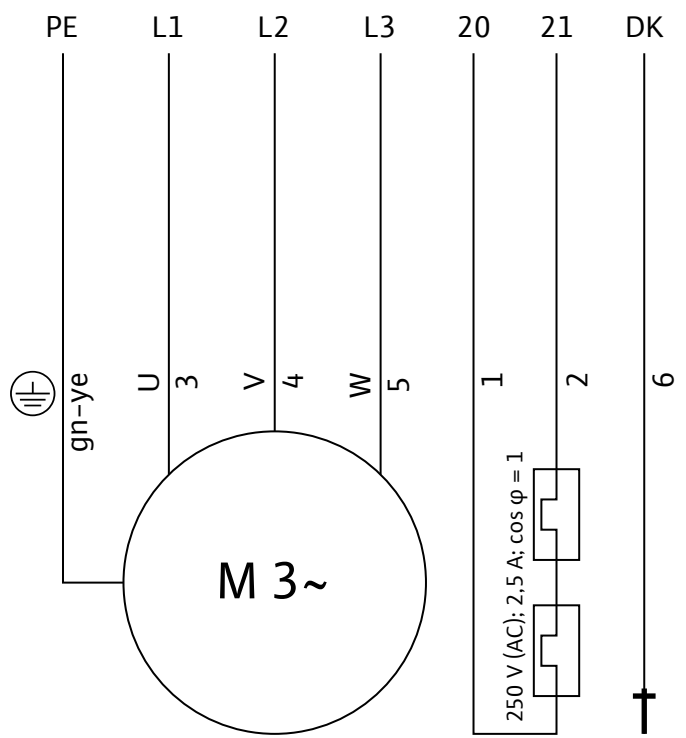


Fig. 7

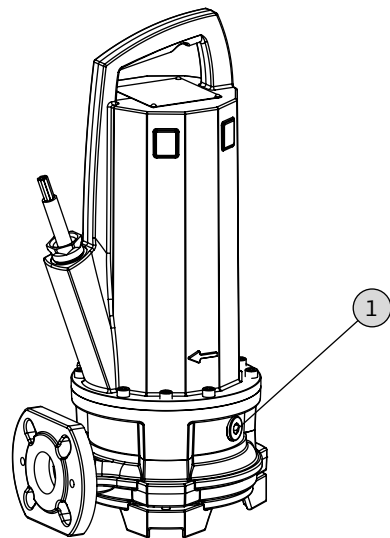
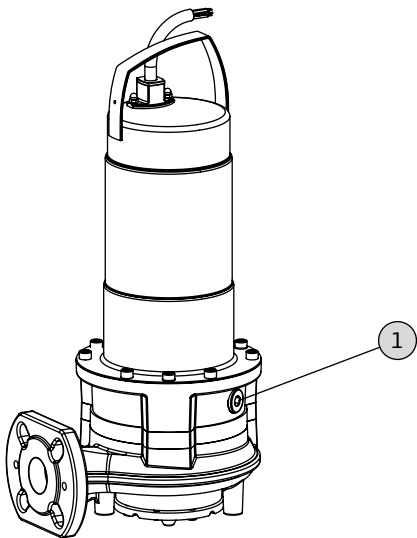


Fig. 8

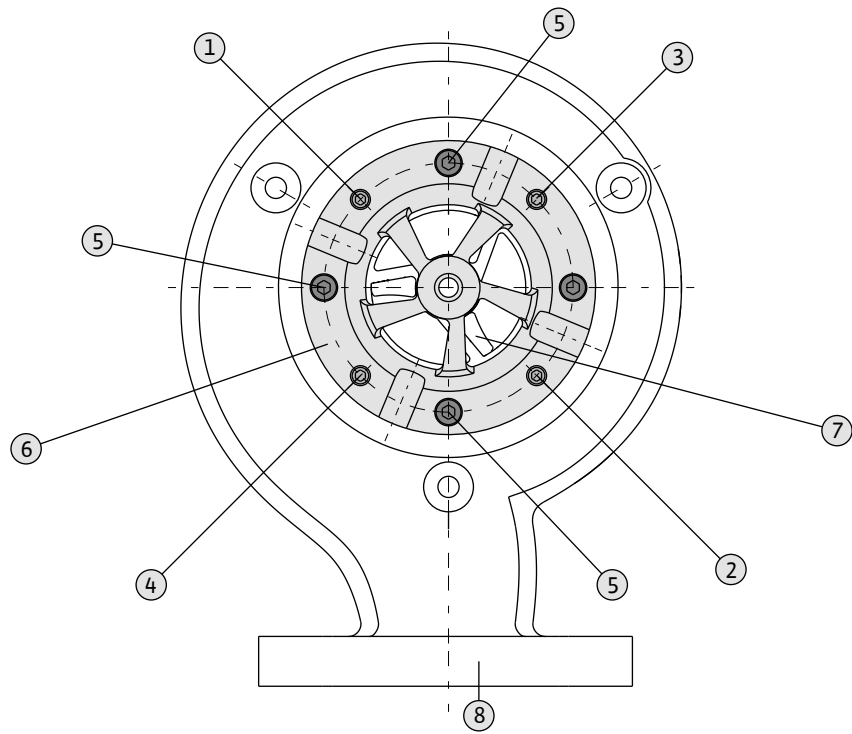
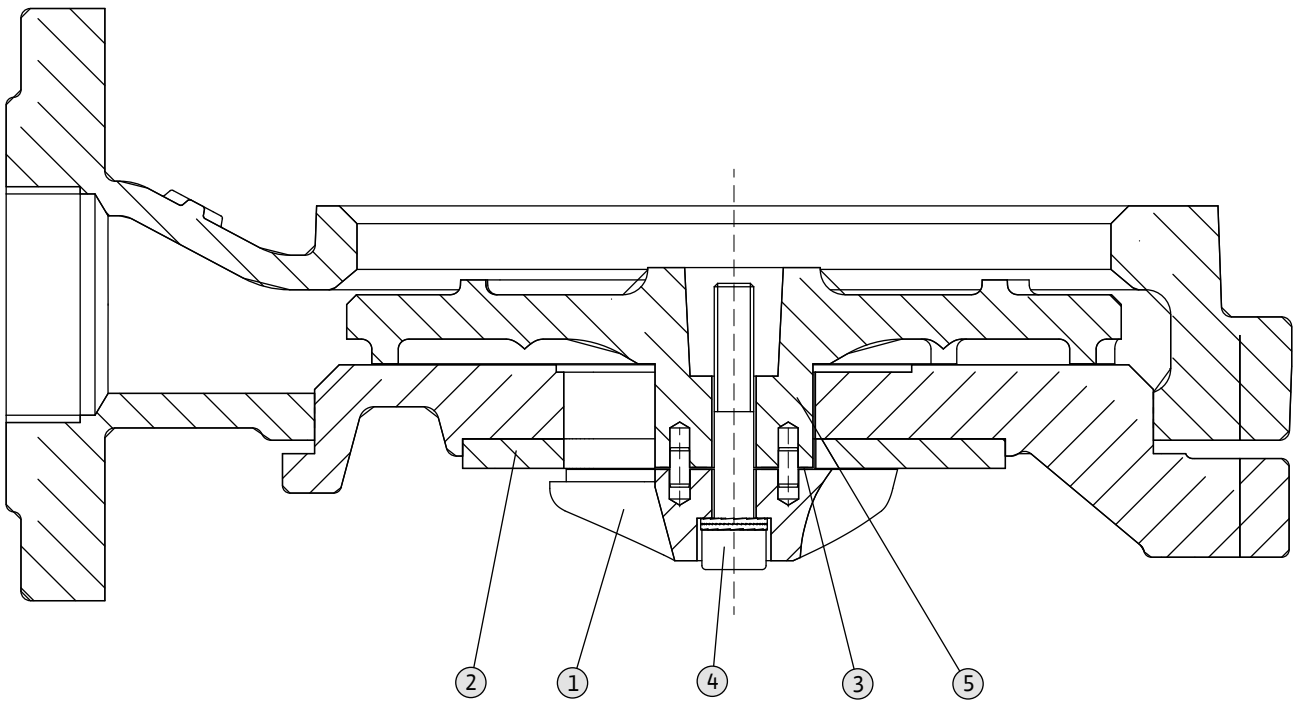


Fig. 9



## 1. Introduction

### 1.1. About this document

The language of the original operating instructions is German. All other languages of these instructions are translations of the original operating instructions.

This manual is divided into individual sections, which are listed in the table of contents. Each section has a heading which clearly describes its content.

A copy of the EC declaration of conformity is supplied as a separate document.

If a technical modification is made on the designs named there without our agreement, this declaration loses its validity.

### 1.2. Personnel qualifications

All personnel who work on or with the pump must be qualified for such work; electrical work, for example, may only be carried out by a qualified electrician. All personnel must be of legal age.

Operating and maintenance personnel must also observe national accident prevention regulations. It must be ensured that personnel have read and understood the instructions in this operating and maintenance handbook; if necessary, this manual must be ordered from the manufacturer in the required language.

This pump is not intended for use by persons (including children) with limited physical, sensory or mental capacities or without the relevant experience or knowledge, unless they are supervised by a person responsible for their safety and receive instructions from this person on how to use the pump.

Children must be supervised in order to ensure that they do not play with the pump.

### 1.3. Copyright

This operating and maintenance manual has been copyrighted by the manufacturer. The operating and maintenance manual is intended for use by installation, operating and maintenance personnel. It contains technical regulations and drawings which may not be reproduced or distributed, either in whole or in part, or used for purposes of competition without the express consent of the manufacturer or shared with others. The illustrations used may differ from the original and are only intended as an exemplary representation of the pumps.

### 1.4. Subject to changes proviso

The manufacturer reserves the right to make technical modifications to units or components. This operating and maintenance manual refers to the pump shown on the title page.

### 1.5. Warranty

In general, the specifications in the current "general terms and conditions" apply for the warranty. You can find these here:  
[www.wilo.com/legal](http://www.wilo.com/legal)

Any deviations must be contractually agreed and shall then be given priority.

#### 1.5.1. General

The manufacturer is obliged to correct any defects found in the pumps it sells, provided that the defects meet one or more of the following requirements:

- The defects are caused by the materials used or the way the product was manufactured or designed.
- The defects were reported in writing to the manufacturer within the agreed warranty period.
- The pump was used only as prescribed.
- All monitoring devices are connected and were tested before commissioning.

#### 1.5.2. Warranty period

The duration of the warranty period is stipulated in the "general terms and conditions".

Any deviations must be contractually agreed.

#### 1.5.3. Spare parts, attachments and modifications

Only genuine spare parts from the manufacturer may be used for repairs, replacements, attachments and modifications. Unauthorized add-ons and modifications or the use of non-original spare parts can seriously damage the pump and/or injure personnel.

#### 1.5.4. Maintenance

The prescribed maintenance and inspection work should be carried out regularly. This work may only be carried out by qualified, trained and authorised personnel.

#### 1.5.5. Damage to the product

Damage and malfunctions that endanger safety must be eliminated immediately by trained personnel. The pump may only be operated if it is in perfect working order.

In general, repairs should only be carried out by Wilo customer service.

#### 1.5.6. Disclaimer

No warranty claims will be accepted or liability will be assumed for pump damage if any of the following items apply:

- The manufacturer deems that information provided by the operator or customer is insufficient or incorrect
- Non-compliance with safety instructions and working instructions as specified in this operating and maintenance manual
- Improper use
- Incorrect storage and transport
- Improper assembly/dismantling
- Insufficient maintenance
- Incorrect repairs
- Inadequate construction site or construction work
- Chemical, electrochemical and electrical influences
- Wear

This means the manufacturer's liability excludes all liability for personal injury, material damage or financial losses.

## 2. Safety

This section lists all the generally applicable safety instructions and technical information. In addition, all the other sections contain specific safety instructions and technical information. All instructions and information must be observed and followed during the various phases of the pump's life cycle (installation, operation, maintenance, transport etc.!) The end-user is responsible for ensuring that all personnel follow these instructions and guidelines.

### 2.1. Instructions and safety instructions

This manual uses instructions and safety instructions for preventing injury and damage to property. To clearly identify them for personnel, the instructions and safety instructions are distinguished as follows:

- Instructions appear in bold and refer directly to the preceding text or section.
- Safety instructions are slightly indented and bold and always start with a signal word.
  - **Danger**  
Serious or fatal injuries can occur!
  - **Warning**  
Serious injuries can occur!
  - **Caution**  
Injuries can occur!
  - **Caution** (instruction without symbol)  
Substantial property damage can occur. Irreparable damage is possible!
- Safety instructions that refer to personal injury appear in black and are always accompanied by a safety symbol. Danger, prohibition or instruction symbols are used as safety symbols.

Example:



Danger symbol: General hazard



Danger symbol, for example, electrical current



Prohibition symbol, for example, Keep out!



Instruction symbol, for example, wear protective clothing

The safety symbols used conform to the generally applicable directives and regulations, such as DIN and ANSI.

- Safety instructions that only refer to material damage are printed in grey, without safety symbols.

### 2.2. General safety

- When installing or removing the pump, never work alone in rooms and sump. A second person must always be present.
- The pump must always be switched off before any work is performed on it (assembly, dismantling, maintenance, installation). The pump must be disconnected from the electrical system and secured against being switched on again. All rotating parts must have come to a stop.
- The operator should inform his/her superior immediately should any defects or irregularities occur.
- The end-user must shut down the equipment immediately if defects occur that represent a safety risk. These include:
  - Failure of the safety and/or monitoring devices
  - Damage to important parts
  - Damage to electrical equipment, cables, and insulation.
- Tools and other objects should be kept in their designated places so that they can be found quickly.
- Sufficient ventilation must be provided in enclosed rooms.
- When welding or working with electronic devices, make sure there is no risk of explosion.
- Only use lifting gear which is legally defined as such and officially approved.
- The lifting gear must be kept safely and must be suitable for the conditions of use (weather, hooking unit, load, etc.).
- Mobile equipment for lifting loads should be used in such a way that it is guaranteed to remain stable during operation.
- When using mobile equipment for lifting non-guided loads, take action to prevent tipping, shifting, sliding, etc.
- Measures should be taken to ensure that no person is ever directly beneath a suspended load. Furthermore, it is also prohibited to move suspended loads over workplaces where people are present.
- If mobile equipment is used for lifting loads, a second person should be present to coordinate the procedure if required (for example, if the operator's field of vision is blocked).
- The load to be lifted must be transported so that no-one will be injured if there is a power failure. Furthermore, if such work is being carried out outdoors, it must be cancelled if the weather conditions worsen.

**These instructions must be strictly observed. Non-observance can result in injury or substantial material damage.**

### 2.3. Electrical work



#### **ELECTRICAL hazard!**

**Incorrectly performed electrical work can result in fatal injury! This work may only be carried out by a qualified electrician.**

#### **BEWARE of moisture!**

**Moisture penetrating the cable will damage both the pump and the cable. Never immerse the cable end in fluid and always protect it from moisture. Unused wires must be insulated!**

Our pumps are operated with alternating or three-phase current. The governing national directives, standards and regulations (e.g. VDE 0100) as well as the requirements of the local energy supply company must be observed.

The person operating the pump must know where it is supplied with power and how to cut off the supply. A motor protection switch must be installed by the customer for three-phase AC motors. It is advisable to install a residual-current device (RCD). If there is a possibility that people can come into contact with the pump and the fluid (for example on construction sites), the connection **must** be equipped with an additional residual-current device (RCD).

The section entitled "Electrical connection" must be observed when connecting the product. The technical specifications must be observed strictly. Our pumps must always be grounded.

**If the pump has been switched off by a protective device, it must not be switched on again until the error has been corrected.**

When the pump is connected to the electrical control panel, particularly when electronic devices such as soft start-up control or frequency converters are used, the switchgear manufacturer's specifications must be followed to comply with the electromagnetic compatibility (EMC) requirements. Special separate shielding measures (e.g. shielded cables, filters, etc.) may be necessary for the power supply and control cables.

**Connections may only be made providing the switchgear meets the harmonised EU standards. Mobile radio equipment may cause malfunctions in the system.**



#### **BEWARE of electromagnetic radiation!**

**Electromagnetic radiation can pose a fatal risk for people with cardiac stimulators. Put up appropriate signs and make sure anyone affected is aware of the danger!**

### 2.4. Safety and monitoring devices

The pumps are equipped with the following monitoring devices:

- Thermal winding monitoring
- Motor compartment (motor version "P" only)

The pump is switched off if the motor gets too hot during operation or if liquid gets into the motor.

These devices must be connected by an electrician and checked to ensure that they function correctly before commissioning.

Personnel must be informed about the installed systems and how they work.

#### **CAUTION!**

**Never operate the pump if the monitoring devices have been removed or damaged, or if they do not work.**

### 2.5. Conduct during operation

When operating the pump, always follow the locally applicable laws and regulations for work safety, accident prevention and handling electrical machinery. To help ensure safe working practice, the responsibilities of employees should be clearly specified by the operator. All personnel are responsible for ensuring that regulations are observed.

Due to their design, centrifugal pumps have rotating parts that are easily accessible. Depending on the operating condition, sharp edges can develop on these parts.



#### **BEWARE of the macerator!**

**The pump is equipped with a macerator. When coming into contact with the blade, limbs may be crushed or be amputated! Never reach directly into the macerator.**

- **Before performing maintenance or repairs, switch off the pump, disconnect it from the mains and secure it against being switched on again without authorization.**
- **Always allow the macerator to come to a standstill!**
- **Wear protective gloves during maintenance and repair work!**

### 2.6. Fluids

Each fluid differs in respect of composition, corrosiveness, abrasiveness, dry matter content and in many other aspects. Generally, our pumps can be used for many applications. Please note that if requirements change (density, viscosity or general composition), this can also affect many parameters of the pump.

When using or replacing the pump in a different fluid, observe the following points:

- The fluid can be contaminated by oil from the sealing chamber if the mechanical shaft seal is defective.

**Use with drinking water is not permitted!**

- Pumps that have been operated in dirty waste water must be cleaned thoroughly before being used for other fluids.
- Pumps that have been operated in sewage water containing faeces and/or fluids that are hazardous to health must be decontaminated before being used with other fluids.



**Clarification must be sought as to whether the pump can be used at all with another fluid.**

**2.7. Sound pressure**

The pump has a sound pressure of less than 80 dB (A). We recommend that the end-user takes an additional measurement at the workplace once the pump is running at its duty point and under all operating conditions.



**CAUTION: Wear ear defenders! According to applicable laws and regulations, ear protection must be worn if the sound-pressure level is 85 dB(A) or more! The end-user must make sure that this is complied with!**

**2.8. Standards and guidelines used**

The pump is subject to various European directives and harmonised standards. See the EC declaration of conformity for precise information about these. In addition, various standards are used as a basis for operating, assembling and dismantling the pump.

**2.9. CE marking**

The CE marking is attached to the rating plate.

**3. Product description**

The pump is manufactured with great care and is subject to constant quality controls. Trouble-free operation is guaranteed if it is installed and maintained correctly.

**3.1. Intended use and fields of application**



**ELECTRICAL hazard**  
**When using the pump in swimming pools or other basins that can be entered, there is a risk of electrocution. Note the following:**

- Use is strictly forbidden if there are people in the basin!
- If there are no people in the basin, protective measures must be taken according to DIN VDE 0100-702.46 (or the appropriate national regulations).



**DANGER - explosive fluids!**  
**It is strictly prohibited to pump explosive fluids (gasoline, kerosene, etc.). The pumps are not designed for these fluids!**

Wilo-Rexa CUT... submersible pumps are suitable for intermittent and continuous pumping of wastewater and sewage, as well as sewage containing faeces, out of pump chambers and tanks in pressure drainage systems.



**NOTE**  
Cleaning cloths and wipes may lead to clogging and blockages. Avoid such fluids by mechanically cleaning the inflowing fluid beforehand.

The submersible pumps must not be used for pumping:

- Drinking water
- Rainwater, drainage water or other surface water
- Fluids containing hard components such as stone, wood, metal, sand etc.
- Highly flammable and explosive fluids in pure form

The intended use includes complying with these instructions. Any other use is considered to be outside the intended use.

**3.1.1. Notes on compliance with DIN EN 12050-1 and EN 12050-1**

According to DIN EN 12050-1 (according to the German preface) an Ex-rated certificate is required for sewage pumps. Based on EN 12050-1, Ex rating is not an explicit requirement. The local regulations need to be checked in each case.

**3.2. Set-up**

Wilo-Rexa CUT pumps are submersible sewage pumps with an upstream macerator. The pumps can be operated upright in a stationary and portable wet well installation.

**Fig. 1.: Description**

1	Cable	5	Hydraulics housing
2	Handle	6	Macerator
3	Motor housing	7	Pressure connection
4	Seal housing		

**3.2.1. Hydraulics**

Rotodynamic hydraulics with upstream internal (GUT GL...) or external (CUT GE...) macerator. The macerator breaks up admixtures suitable for cutting for transfer in a 1¼" discharge pipeline or larger. The pressure side connection is designed as a horizontal flange connection.

**The hydraulics are not self-priming, in other words, the fluid must flow in either automatically or with supply pressure.**

**CAUTION! The fluid may contain hard components!**  
**Hard admixtures like sand/grit, stones, metals, wood etc. cannot be cut by the macerator. These admixtures can destroy the macerator and the hydraulics and therefore lead to a pump malfunction! Filter these admixtures beforehand out of the fluid before they enter the pump.**

### 3.2.2. Motor

In the AC or three-phase current version, glanded motors are used as the motors. The motor is cooled by the fluid around it. The waste heat is transferred directly to the fluid via the motor housing. The motor may emerge during operation.



#### NOTE

When the motor is non-immersed, observe and comply with the specifications for "Non-immersed operating mode".

On the single-phase AC motors in the "S" motor version, the operating capacitor is integrated into the motor and the starting capacitor is installed in a separate housing. On the single-phase AC motors in the "P" motor version, the operating and starting capacitors are installed in a separate housing.

The connection cable has a length of 10 m and is available in the following versions:

- Single-phase version: Cable with shockproof plug
  - Three-phase version: bare cable end
- In the "P" motor version, the connection cable has a longitudinally watertight seal.

### 3.2.3. Monitoring equipment

- **Motor compartment monitor** ("P" motor version only):  
The motor compartment monitor signals water ingress into the motor compartment.
- **Thermal motor monitor:**  
The thermal motor monitor protects the motor winding from overheating. On AC motors, this is integrated and self-switching. This means that the motor is switched off if it overheats and is automatically switched on again when it has cooled down. Bimetallic strips are used for this as standard.
- The motor can also be fitted with an external pencil electrode to monitor the sealing chamber. This signals if there is water ingress into the sealing chamber through the mechanical seal on the fluid side.

### 3.2.4. Seal

The seal for the fluid and the motor compartment is made via two mechanical shaft seals. The sealing chamber between the mechanical shaft seals is filled with ecologically safe medicinal white oil.

### 3.2.5. Materials

- Motor housing:
  - Motor version "S": 1.4301
  - Motor version "P": EN-GJL-250
- Hydraulic housing: EN-GJL 250
- Impeller: EN-GJL 250
- Macerator:
  - CUT GI: 1.4528
  - CUT GE: Abrasit/1.4034
- Shaft end: 1.4021
- Static gaskets: NBR
- Seal

- On pump side: SiC/SiC
- On motor side: C/MgSiO<sub>4</sub>

### 3.2.6. Attached plug

A shockproof plug is fitted on single-phase motors and a CEE plug on three-phase motors. These plugs are designed for use in commercially available sockets and are not overflow-proof.

#### BEWARE of moisture!

**Ingress of moisture will result in damage to the plug. Never immerse the plug in fluid and always protect it from moisture.**

### 3.3. Operation in an explosive atmosphere

Pumps marked as explosion-protected are suitable for operation in an explosive atmosphere. The pumps must meet certain guidelines for this type of use. Certain rules of conduct and guidelines must be also followed by the operator.

Pumps that have been approved for use in an explosive atmosphere must be marked as follows on the rating plate:

- "Ex" symbol
- Information on Ex classification

**For use in an explosive atmosphere, observe the further specifications in the appendix to this manual**



#### INCORRECT use can result in danger!

**When used in an explosive atmosphere, the pump must have a corresponding approval. Also, the accessories must be approved for this application. Check the pump as well as all accessories before use to verify that they conform to this directive.**

### 3.4. Operating modes

#### 3.4.1. Operating mode S1 (continuous duty)

The pump can operate continuously at the rated load without exceeding the permissible temperature.

#### 3.4.2. Operating mode S2 (short-time duty)

The maximum operating period is specified in minutes, e.g. S2-15. The pause must last until the machine temperature no longer differs from the temperature of the coolant by more than 2 K.

#### 3.4.3. Operating mode S3 (intermittent operation)

This operating mode defines a combination of periods of operation and standstill. In S3 operation, the values given are always calculated based on a period of 10 minutes. **For example: S3 20 %**  
Operating time 20 % of 10 min = 2 min / standstill time 80 % of 10 min = 8 min

**3.5. Technical data**

General data	
Mains connection [U/f]:	See rating plate
Power consumption [P <sub>1</sub> ]:	See rating plate
Rated power [P <sub>2</sub> ]:	See rating plate
Maximum delivery head [H]:	See rating plate
Maximum volume flow [Q]:	See rating plate
Activation type [AT]:	See rating plate
Fluid temperature [t]:	3...40 °C
Protection class:	IP 68
Insulation class [Cl.]:	F
Speed [n]:	See rating plate
Pressure connection:	DN 32/DN 40/Rp 1¼
Max. immersion depth:	20 m
Explosion protection	
Motor version "S":	-
Motor version "P":	ATEX
Operating modes	
Immersed [OT <sub>s</sub> ]:	S1
Non-immersed [OT <sub>e</sub> ]	
Motor version "S":	S2 15min, S3 10%*
Motor version "P":	S2 30min, S3 25%*
Switching frequency	
Recommended:	20/h
Maximum:	50/h

\* Operating mode S3 25% (motor version "S") or S3 50% (motor version "P") is permitted if the necessary motor cooling is guaranteed by complete immersion for at least 1 minute before the motor is switched back on again.

**3.6. Type key**

Example: Wilo-Rexa CUT GE03.25/P-T15-2-540X/P	
<b>Rexa</b>	Centrifugal pump for sewage
<b>CUT</b>	Series
<b>GE</b>	Macerator pump with GI = Internal macerator GE = External macerator
<b>03</b>	Size of pressure connection: DN 32
<b>25</b>	Max. delivery head in m
<b>P</b>	Motor version
<b>T</b>	Mains connection version: M = 1~ T = 3~
<b>15</b>	/10 = Rated power P <sub>2</sub> in kW
<b>2</b>	Number of poles
<b>5</b>	Frequency 5 = 50 Hz 6 = 60 Hz
<b>40</b>	Key for rated voltage

<b>X</b>	Ex-rated: No supplement = not Ex-rated X = Ex-rated
<b>P</b>	Additional electrical equipment No supplement = With bare cable end P = with plug

**3.7. Scope of delivery**

- Pump with 10 m cable
  - Single-phase version with shockproof plug
  - Three-phase version with bare cable end
- Installation and operating instructions

**3.8. Accessories**

- Cable lengths up to 30 m (single-phase version) or 50 m (three-phase version) in fixed length increments of 10 m
- Suspension unit
- Pump foot
- External pencil electrode for sealing chamber control
- Level control devices
- Fixing accessories and chains
- Switchgear, relays and plugs

**4. Transport and storage**

**4.1. Delivery**

On delivery, check immediately that the shipment is complete and undamaged. If any parts are damaged or missing, the transport company or the manufacturer must be notified on the day of delivery. Claims made after this date cannot be recognised. Damage to parts must be noted on the freight documentation.

**4.2. Transport**

Only the designated and approved fastening devices, transportation and lifting equipment may be used for transportation. These must have sufficient load-bearing capacity to ensure that the pump can be transported safely. If chains are used they must be secured against slipping.

The personnel must be qualified for the tasks and must follow all applicable national safety regulations during the work.

The pump is delivered by the manufacturer or shipping agency in suitable packaging. This normally precludes the possibility of damage occurring during transport and storage. The packaging should be stored in a safe place for reuse if the product is frequently used at different locations.

**4.3. Storage**

Newly supplied pumps are prepared so that they can be stored for at least 1 year. The pump should be cleaned thoroughly before it is put into temporary storage.

The following should be taken into consideration for storage:

- Place the pump securely on a solid surface and secure it against slipping. Submersible sewage pumps must be stored upright.



**DANGER due to falling over!**  
**Never set the pump down if unsecured. If the pump falls over, this may lead to injuries!**



**NOTE**  
 On pumps with an internal macerator, the transport bolts must be attached for storage.



**NOTE**  
 Make sure that no objects collide with the macerator. This can lead to damage of the macerator!

- Our pumps can be stored at temperatures down to  $-15\text{ }^{\circ}\text{C}$ . The store room must be dry. We recommend a frost-protected room for storage with a temperature between  $5\text{ }^{\circ}\text{C}$  and  $25\text{ }^{\circ}\text{C}$ .
- The pump is not allowed to be stored in rooms in which welding work is carried out, because the resulting gases or radiation can damage the elastomer components and coating.
- Suction and pressure connections must be sealed securely to prevent contamination getting in.
- All power supply cables must be protected against kinking, damage and moisture ingress.



**ELECTRICAL hazard!**  
**Damaged power supply cables can cause fatal injury! Defective cables must be replaced by a qualified electrician immediately.**

**BEWARE of moisture!**  
**Moisture penetrating the cable will damage both the pump and the cable. Never immerse the cable end in fluid and always protect it from moisture.**

- The pump must be protected from direct sunlight, heat, dust, and frost. Heat or frost can cause serious damage to impellers and coatings!
- If the pump has been stored for a long period of time, it should be cleaned of impurities such as dust and oil residue before commissioning. Check the housing coatings for damage.

**Prior to commissioning, the fill level in the sealing chamber should be checked and topped up, if necessary!**  
**Damaged coatings must be repaired immediately. Only an intact coating fulfils its intended purpose.**

Please note that elastomer parts and coatings become brittle over time. If the product is to be stored for longer than 6 months, we recommend checking these parts and replacing them as necessary. Consult the manufacturer for details.

#### 4.4. Return delivery

Pumps that are returned to the factory must be properly packaged. This means that impurities have been removed from the pump and that it has

been decontaminated if used with fluids that are hazardous to health.

For shipping, the parts must be packed in tear-proof plastic bags of sufficient size in such a manner that they are tightly sealed and leak-proof. Furthermore, the packaging must protect the pump from damage during transportation. If you have any questions, please contact the manufacturer!

## 5. Installation

In order to prevent damage to the product or serious injury during installation, the following points must be observed:

- Installation work – assembly and installation of the pump – may only be carried out by qualified persons. The safety instructions must be followed at all times.
- The pump must be inspected for transport damage before any installation work is carried out.

### 5.1. General

For planning and operation of technical sewage systems, observe the pertinent local regulations and directives for sewage technology (such as those of the German Association for Water, Wastewater and Waste).

Note that pressure surges can occur, in particular with stationary installations where water is pumped with longer discharge pipes (especially with steady ascents or steep terrain).

Pressure surges can result in destruction of the pump/system and noise pollution due to flap knock. Pressure surges can be prevented by applying suitable measures (e.g. non-return valves with an adjustable closing time or special routing of the discharge pipeline).

If you are using level control, make sure that the minimum water coverage is present. Air pockets in the hydraulic housing or piping system must be avoided at all costs and must be removed using a suitable ventilation system and/or placing the pump at a slight angle (if installed as a portable pump). Protect the pump from frost.

### 5.2. Installation methods

- Vertical stationary wet well installation with suspension unit
- Vertical portable wet well installation with pump foot

### 5.3. Installation



**DANGER of falling!**  
**When installing the pump and its accessories, work is sometimes performed directly at the edge of the basin or pump chamber. Carelessness or wearing inappropriate clothing could result in a fall. There is a risk of fatal injury! Take all necessary safety precautions to prevent this.**

The following information should be taken into consideration when installing the pump:

- This work must be carried out by a qualified person and electrical work must be carried out by an electrician.
- The operating space must be clean, free of coarse solids, dry, frost-free and, if necessary, decontaminated. It must also be suitable for the particular pump.
- When working in pump chambers, a second person must be present for safety reasons. If there is a risk of poisonous or asphyxiating gases forming, the necessary precautions must be taken.
- Depending on the ambient conditions in operation, the unit planner must select the chamber size and motor cooling time accordingly.
- Ensure that lifting equipment can be fitted without any trouble, since this is required for assembly and removal of the pump. It must be possible to reach the pump safely in its operating and storage locations using the lifting equipment. The machine must be positioned on a firm bearing surface. For transporting the pump, the load-carrying equipment must be secured to the lifting eyelets provided. When using chains, they must be connected with a shackle to the lifting eyelets or the carrying handle. Lifting gear must be technically approved.
- Power supply cables must be laid out in such a way that safe operation and trouble-free assembly/dismantling are possible at all times. The pump must never be carried or dragged by the power supply cable. Check whether the cable present is long enough for its cross-section and its installation type.
- When using switchgear, the corresponding protection class must be observed. In general, switchgear must be overflow-proof and is to be installed outside potentially explosive areas.
- When used in an explosive atmosphere, it must be ensured that the pump and all accessories are approved for this purpose.
- Structural components and foundations must be of sufficient stability in order to allow the product to be fixed securely and functionally. The operator or the supplier is responsible for provision of the foundations and their suitability in terms of dimensions, stability and strength.
- If the motor housing is to be taken out of the fluid during operation, the operating mode for non-immersed operation should be followed.  
**To keep dry motors sufficiently cooled in S3 mode, they must be flooded completely before being switched back on if the motor has been taken out of the fluid!**
- Never let the pump run dry. The water level must never fall below the minimum. Therefore, we recommend installing a level control system or a dry-running protection system where there are great variations in the level.
- Use guide and deflector plates for the fluid intake. If the water jet reaches the surface of the water, air will be introduced into the fluid, which can

accumulate in the pipe system. This can result in inadmissible operating conditions and to deactivation of the entire system.

- Check that the available planning documentation (installation diagrams, layout of the operating space, intake ratios) is complete and correct.
- Please observe all regulations, rules and legal requirements for working with and underneath heavy suspended loads. Wear appropriate protective clothing/equipment.
- Please also observe the applicable national accident prevention regulations and trade association safety provisions.

### 5.3.1. Maintenance work

After a storage period of more than 6 months, the following maintenance work must be carried out before installation:

#### Check oil level in sealing chamber

The sealing chamber has a hole for draining and filling the chamber.

1. Position the pump horizontally on a firm surface with the screw plug facing upward.

**Make sure that the pump cannot fall over and/or slip!**

2. Unscrew the screw plug (see Fig. 7).
3. The oil should reach up to about 1 cm below the hole for the screw plug.
4. If there is not enough oil in the sealing chamber, top it up. To do so, follow the instructions under "Oil change" in the "Maintenance and repair" chapter.
5. Clean the screw plug, replace the joint ring, if necessary, and screw it back in.

### 5.3.2. Stationary wet well installation

A suspension unit must be installed for wet well installation. This must be ordered from the manufacturer separately. The pipe system on the pressure side is connected to this.

**The connected pipe system must be self-supporting, i.e. it may not be supported by the suspension unit.**

The operating space must be laid out so that the suspension unit can be installed and operated without difficulty.

If the motor emerges during operation, the following operating parameters must be strictly observed:

- The **max. fluid temperature and ambient temperature** is **40 °C**.
- Details for "Non-immersed operating mode"

Fig. 2.: Wet well installation

1	Suspension unit	6a	Min. water level for immersed operation
2	Non-return valve	6b	Min. water level for non-immersed operation
3	Gate valve	7	Impact protection plate
4	Pipe elbow	8	Inlet
5	Guide pipe (to be provided by the customer!)		
A	Minimum distances in parallel operation		
W	Minimum distances in alternating operation		

**Work steps**

1. Installation of the suspension unit: about 3–6 h (please see the operating manual for the suspension unit).
2. Preparing the pump for operation on a suspension unit: about 1–3 h (please see the operating manual for the suspension unit).
3. Installing the pump: about 3–5 h
  - Check that the suspension unit is firmly fixed and functions properly.
  - Secure the lifting equipment to the pump with the shackle, lift the pump and then lower slowly on to the guide pipes in the operating space.
  - Hold the power supply cables slightly taut when lowering.
  - When the pump is connected to the suspension unit, make sure that the power supply cables are secured adequately against falling off and damage.
  - Have the electrical connections made by a qualified electrician.
  - The pressure connection is sealed by its own weight.
4. Installing optional accessories, such as dry-running protection or level controls.
5. Commissioning the pump: about 2–4 h
  - As described in the “Commissioning” section
  - For new installation: Flood the operating space
  - Vent the pressure pipe.

**5.3.3. Portable wet well installation**

In this installation type, the pump has to be equipped with a pump foot (available as an option). This is attached to the suction port and ensures the minimum ground clearance and a secure footing if placed on a solid bearing surface. In this version, the pump can be positioned anywhere in the operating space. If used in an operating space with a soft bearing surface, a hard base must be used to prevent sinking. A pressure hose is connected on the pressure side.

If operated for longer periods of time in this installation type, the pump must be fastened to the floor. This prevents vibration and ensures quiet and low-wearing running.

If the motor emerges during operation, the following operating parameters must be strictly observed:

- The **max. fluid temperature and ambient temperature is 40 °C.**
- Details for “Non-immersed operating mode”

Fig. 3.: Portable installation

1	Lifting gear	5	Storz hose coupling
2	Pump foot	6	Pressure hose
3	Pipe elbow for hose connection or Storz pipe coupling	7a	Min. water level for immersed operation
4	Storz pipe coupling	7b	Min. water level for non-immersed operation

**Work steps**

1. Preparing pumps: about 1 h
  - Install the pump foot on the suction connection.
  - Install the pipe elbow on the pressure connection.
  - Fasten the pressure hose to the pipe elbow with a hose clip. Alternatively, a Storz pipe coupling can be installed on the pipe elbow and a Storz hose coupling can be installed on the pressure hose.
2. Installing the pump: about 1–2 h
  - Position pump in installation location. If necessary, secure lifting equipment to the pump with a shackle, lift the pump and then lower to the intended location (pump chamber, pit).
  - Check that the pump is vertical and on a solid bearing surface. Avoid sinking.
  - Route the power supply cable in such a way that it cannot be damaged.
  - Have the electrical connections made by a qualified electrician.
  - Route the pressure hose so that it is not damaged and fasten it at certain points (e.g. outflow).



**RISK of pressure hose becoming separated! Uncontrolled separation or movement of the pressure hose can result in injuries. Secure the pressure hose appropriately. Prevent buckling of the pressure hose.**

3. Commissioning the pump: about 1–3 h
  - As described in the “Commissioning” section

**5.3.4. Level control**

Fill levels can be determined using the level control system, meaning the pump is switched on and off automatically. The fill level can be recorded using float switches, pressure and ultrasound measurements or electrodes.

Note the following information:

- When using float switches, ensure that they can move freely in the operating area!
- The water level must not fall below the minimum!
- The maximum switching frequency may not be exceeded!

- If the fill levels fluctuate strongly, then a level control should be made on two test points as standard. This means larger differential gaps are reached.

#### Installation

For correct installation, please see the installation and operation instructions for the level control device.

**Observe the information on the maximum switching frequency and the minimum water level!**

#### 5.4. Dry-running protection

To ensure the necessary cooling, the pump must be immersed when in operation, depending on the operating mode. In addition, make sure that no air enters the hydraulics housing.

The pump must therefore always be immersed in the fluid up to the top edge of the hydraulic housing or, if applicable, up to the top edge of the motor housing. For optimum operational reliability, we recommend installing a dry-running protection system.

Correct running is ensured by float switches or electrodes. The float switch or electrode is fixed in the pump chamber and switches off the pump when the water level falls below the minimum coverage level. If the dry-running protection only includes one floater or electrode and the fill levels deviate significantly, then the pump may turn on and off constantly! This can result in the maximum number of motor activations (switching cycles) being exceeded.

##### 5.4.1. Remedies for avoiding excessive switching cycles

- Manual reset  
The motor is switched off when the water level falls below the minimum coverage level and switched back on when a sufficient water level is reached.
- Separate reactivation point  
A second switching point (additional floater or electrode) is used to obtain a sufficient difference between the activation and deactivation points. This prevents constant switching. This function can be put into effect with a level control relay.

#### 5.5. Electrical connection



##### **ELECTROCUTION hazard!**

**Incorrect electrical connections can cause fatal electric shocks. Electrical connections may only be carried out by a qualified electrician approved by the local energy supply company, in accordance with locally applicable regulations.**



**INCORRECT connection can result in danger! With Ex-rated pumps, the power supply cable must be connected outside the potentially explosive area, or inside a housing with ignition protection conforming to DIN EN 60079-0! Non-observance may lead to fatal injury due to explosion!**

- Always have the connection carried out by a qualified electrician.
- Note the additional information about this in the appendix.
- The mains connection current and voltage must be as stated on the rating plate.
- Connect the power supply cable in accordance with the applicable standards and regulations and according to the conductor assignment.
- Any available monitoring equipment, e.g. for thermal motor monitoring, must be connected and tested to ensure that it is working properly.
- For three-phase AC motors, a clockwise rotating field must be available.
- Ground the pump properly.  
Pumps that are permanently installed must be grounded in compliance with nationally applicable standards. If a separate grounding conductor is available, it must be connected to the marked hole or earth terminal (⊕) using a suitable screw, nut, toothed washer and flat washer. The cross section of the cable for the grounding conductor connection must correspond to the local regulations.
- A motor protection switch must be used for motors with a free cable end. We recommend using a residual-current device (RCD).
- Switchgear must be purchased as accessories.

##### 5.5.1. Mains fuses

The back-up fuse must be rated according to the starting current. You will find the starting current on the rating plate.  
Only slow-blow fuses or K characteristic automatic cut-outs may be used as a back-up fuse.

##### 5.5.2. Checking the insulation resistance and monitoring devices before commissioning

If the values measured deviate from the specifications, moisture may have penetrated into the motor or the power supply cable or the monitoring unit may be defective. Do not connect the pump and consult Wilo customer service.

##### **Insulation resistance of the motor winding**

Before connecting the power supply cable, the insulation resistance must be tested. This can be measured with an insulation tester (measuring voltage = 1000 V):

- On initial commissioning: insulation resistance may not be less than 20 MΩ.
- For further measurements: value must be larger than 2 MΩ.

**For motors with an integrated capacitor, the windings must be short-circuited before checking.**

### Temperature sensor and pencil electrode (available as an option) for sealing chamber control

Before connecting the monitoring devices, these must be checked with an ohmmeter. The following values must be complied with:

- Bimetallic strip: Value = "0" passage
- Pencil electrode: This value must approach infinity. If the value is low, there is water in the oil. Also observe the instructions of the optional evaluation relay.

### 5.5.3. AC motor

Fig. 4.: Connection diagram

L	Mains connection	PE	Earth
N	Earth		

The single-phase version is equipped with a shockproof plug.

The connection to the mains is established by inserting the plug into a socket. If the pump is to be connected directly to the switchgear, the plug must be removed and the electrical connection must be established by a qualified electrician!

The wires of the connection cable are assigned as follows:

3-wire connection cable	
Wire colour	Terminal
brown (bn)	L
blue (bu)	N
green/yellow (gn-ye)	Earth (PE)

### 5.5.4. Three-phase AC motor

Fig. 5.: Connection diagram for motor version "S"

L1	Mains connection	PE	Earth
L2		20	Bimetallic strip
L3		21	

Fig. 6.: Connection diagram for motor version "P"

L1	Mains connection	DK	Leakage detection for motor compartment
L2			
L3		20	Bimetallic strip
PE	Earth	21	

The three-phase current version is supplied with bare cable ends. The connection to the mains is made at the switchgear.

**Electrical connections may only be made by a qualified electrician!**

The wires of the connection cable are assigned as follows:

6-wire connection cable	
Wire number	Terminal
1	Temperature monitor for winding
2	
3	U
4	V
5	W
green/yellow (gn-ye)	Earth (PE)

7-wire connection cable	
Wire number	Terminal
1	Temperature monitor for winding
2	
3	U
4	V
5	W
6	Leakage detection for motor compartment
green/yellow (gn-ye)	Earth (PE)

If the pump is fitted with a plug, it is connected to the mains by inserting the plug into a socket.

### 5.5.5. Connecting the monitoring devices



#### RISK of fatal injury due to explosion!

If the monitors are not connected correctly, there is a risk of fatal injury due to explosion if used in potentially explosive areas! Always have the connection carried out by an electrician. If the pump is used in potentially explosive areas:

- the temperature monitor must be connected via an evaluation relay. We recommend the "CM-MSS" relay for this. The threshold is already pre-set.
- Deactivation by the temperature limiter must be conducted with an anti-reactivation device! Reactivation should only be possible if the "release button" has been manually activated!
- The pencil electrode for sealing chamber control must be connected via an intrinsically safe circuit with an evaluation relay. We recommend the "XR-41x" relay for this. The threshold is 30 kOhm.
- Also note the additional information in the appendix!

All monitoring devices must be connected at all times!

### Temperature monitoring of the single-phase AC motor

The temperature monitoring unit is integrated in the single-phase AC motor and switches automatically. The monitoring function is always



active and does not need to be connected separately.

#### Temperature monitoring of the three-phase AC motor

The pump is equipped with a temperature limit as standard (1-circuit temperature monitoring). Bi-metallic strips must be connected in the switch-gear itself or via an evaluation relay. When the threshold is reached, the pump must switch off. Connection values: max. 250 V(AC), 2.5 A,  $\cos \varphi = 1$

For this reason, no warranty claims can be accepted for any damage to the winding resulting from unsuitable motor monitoring!

#### Motor compartment (motor version "P" only)

The motor compartment monitor must be connected via an evaluation relay. We recommend the "NIV 101/A" relay for this. The threshold is 30 kOhm. When the threshold is reached, the pump must switch off.

#### Connecting the pencil electrode (available as an option) for sealing chamber control

The pencil electrode must be connected via an evaluation relay. We recommend the "NIV 101/A" relay for this. The threshold is 30 kOhm. When the threshold is reached, a warning must be given or the unit switched off.

#### CAUTION!

**If there is only a warning, the pump could be irreparably damaged by water ingress. We always recommend switching the pump off!**

### 5.6. Motor protection and activation types

#### 5.6.1. Motor protection

The minimum requirement for motors with a free cable end is a thermal relay/motor protection switch with temperature compensation, differential triggering and an anti-reactivation device in accordance with VDE 0660 or the appropriate national regulations.

If the pump is connected to electrical systems in which faults frequently occur, we recommend installing additional protective devices provided by the customer (overvoltage, undervoltage or phase failure relays, lightning protection etc.). We also recommend installing a residual-current device (RCD).

Local and national regulations must be observed when connecting the pump.

#### 5.6.2. Activation types

##### Direct activation

At full load, the motor protection should be set to the rated current shown on the rating plate. At partial load, we recommend that the motor protection

be set 5 % above the current measured at the duty point.

##### Soft start activation

- At full load, the motor protection should be set to the rated current at the duty point. At partial load, we recommend that the motor protection be set 5 % above the current measured at the duty point.
- The current consumption must be below the rated current throughout the entire operation.
- Due to the upstream motor protection, starting or stopping should be completed within 30 seconds.
- To avoid power dissipation during operation, bypass the electronic starter (soft start) once normal operation is reached.

#### 5.6.3. Operation with frequency converters

Operation with a frequency converter is only possible with motor version "P". Note the information about this in the appendix.

**Motor version "S" motors may not be operated with frequency converters.**

### 6. Commissioning

The "Commissioning" section contains all the important instructions for the operating personnel for starting up and operating the pump.

The following conditions must be adhered to and monitored:

- Type of installation
- Operating mode
- Minimum water submersion/max. immersion depth

**These general conditions must also be checked after a lengthy period without operation, and any defects detected must be repaired!**

Always keep this manual either by the pump or in a place specially reserved for it, where it is accessible for the entire operating personnel at all times.

In order to prevent damage or serious injury when commissioning the pump, the following points must be observed:

- Commissioning of the pump may only be carried out by qualified and trained personnel in accordance with the safety instructions.
- All persons working on or with the pump must have received, read and understood this operating and maintenance manual.
- All safety devices and emergency cut-outs must be connected and checked to ensure that they work properly.
- Electrical engineering and mechanical adjustments must be made by qualified personnel.
- The pump is suitable for use under the specified operating conditions.
- The work area of the pump is not a recreational area and is to be kept free of people! No persons are allowed in the work area during start-up or operation.

- When working in pump chambers, a second person must be present for safety reasons. Adequate ventilation must be ensured if there is danger of poisonous gases forming.

### 6.1. Electrical system

Connect the pump and install the power supply cables as described in the "Installation" section and in accordance with the VDE guidelines and applicable national regulations.

The pump must be properly protected and grounded.

Observe the direction of rotation. If the direction of rotation is incorrect, the pump will not perform as specified and may be damaged.

Make sure all monitoring devices are connected and have been tested.



#### **ELECTRICAL hazard!**

**Electrical current can cause fatal injuries if not handled correctly! All pumps with free cable ends (i.e. without plugs) must be connected by a qualified electrician.**

### 6.2. Rotation control

The pump is checked and adjusted in the factory to ensure that the direction of rotation is correct. The connection must be made according to the wiring labels.

**A test run must be performed under general operating conditions!**

#### 6.2.1. Checking the direction of rotation

The direction of rotation must be checked with a rotating field tester by a local electrician. For the correct direction of rotation, a clockwise rotating field must be available.

**The pump is not approved for operation with a counter-clockwise rotating field!**

#### 6.2.2. If the direction of rotation is incorrect

If the direction of rotation is incorrect for direct start motors, 2 phases must be swapped. In the case of star-delta motors, the connections of two windings must be swapped, e.g. U1 with V1 and U2 with V2.

### 6.3. Level control

Check that the level control device is installed properly and inspect the switching points. For the required information please refer to the installation and operating instructions for the level control device, as well as the consulting documentation.

### 6.4. Operation in potentially explosive areas

If the pump is labelled accordingly, it can be used inside potentially explosive areas.



**RISK of fatal injury due to explosion!**  
**Pumps without Ex labelling may not be used in potentially explosive areas! There is a risk of fatal injury due to explosion! Check your pump before use to verify that it has corresponding approval:**

- **Ex symbol**
- **Ex classification, e.g. II 2G Ex d IIB T4**
- **Also note the additional information in the appendix!**

### 6.5. Commissioning

The pump must have been installed properly as specified in the "Installation" chapter. This must be checked before the system is switched on.

Minor oil leakage in the mechanical shaft seal on delivery is no cause for concern. However, it must be removed prior to submersion in the fluid.

**Keep out of the pump's work area. No persons are allowed in the work area during start-up or operation.**

If the pump falls over, it must be switched off before setting it up again.



#### **WARNING: Danger of crushing!**

**In portable installations, the pump can fall over when it is switched on or during operation. Make sure that the pump is positioned on a firm bearing surface and that the pump foot is mounted correctly.**

In the version with a plug, note the plug's IP protection class.

#### 6.5.1. Before switching on

Check the following:

- Cable guidance – no loops, slightly taut
- Min./max. temperature of the fluid
- Max. immersion depth
- Clean the pipe system on the pressure side (hose, piping) – flush with clean water to prevent deposits forming clogging.
- The hydraulics housing must be completely filled by the fluid and there must be no air in the housing. It can be vented by suitable venting devices in the system or, if available, using vent screws on the pressure port.
- Check switching points of level control and dry-running protection systems
- Check to ensure all accessories are properly fitted
- Clean the pump sump of coarse contaminants
- Open all slide valves on the pressure side

#### 6.5.2. Switching on/off

The pump is switched on and off using a separate operating point (on/off switch, switchgear) provided by the customer.

During the start-up procedure, the rated current is temporarily exceeded. After the start-up procedure is finished, the current must not exceed the rated current again.

If the motor does not start up, it must be switched off without delay. Before switching it on again, wait for the specified start pause and make sure to rectify the fault.

## 6.6. Conduct during operation



### **BEWARE of the macerator!**

**The pump is equipped with a macerator. When coming into contact with the blade, limbs may be crushed or be amputated! Never reach directly into the macerator.**

When operating the pump, always follow the locally applicable laws and regulations for work safety, accident prevention and handling electrical machinery. To help ensure safe working practice, the responsibilities of employees should be clearly specified by the operator. All personnel are responsible for ensuring that regulations are observed.

Due to their design, centrifugal pumps have rotating parts that are easily accessible. Depending on the operating condition, sharp edges can develop on these parts.

The following must be checked at regular intervals:

- Operating voltage (permissible deviation +/- 5% of the rated voltage)
- Frequency (permissible deviation +/- 2 % of the rated frequency)
- Current consumption (permissible deviation between phases is a maximum of 5%)
- Voltage difference between the individual phases (max. 1%)
- Switching frequency (see technical data)
- Avoid air entry in the inlet, a deflector plate should be fitted if necessary
- Minimum water submersion
- Switching points for level control device or dry-running protection
- Smooth running
- All slide valves must be open.

## 7. Decommissioning/disposal

- All work must be carried out with the greatest care.
- Proper protective clothing is to be worn.
- When carrying out work in basins and/or tanks, the respective local protection measures must be observed. A second person must be present for safety reasons.
- Only lifting equipment that is in a technically perfect condition and load-carrying equipment that has been officially approved may be used for lowering and raising the pump.



### **RISK of fatal injury due to malfunctions!**

**Lifting gear and equipment must be in perfect technical condition. Work may only commence if the lifting equipment has been checked and found to be in perfect working order. If it is not inspected, fatal injuries may result.**

### 7.1. Temporary decommissioning

For this type of deactivation, the pump remains installed and is not cut off from the electricity supply. In the event of temporary decommissioning the pump must remain completely immersed so that it is protected from frost and ice. Ensure that the temperature of the fluid and in the operating space does not fall below +3 °C.

This ensures that the pump is always ready for operation. For extended downtime, a regular (monthly to quarterly) 5 minute function test should be carried out.

#### **CAUTION!**

**Only perform function runs under the proper operating and usage conditions. Never run the machine dry! This can result in irreparable damage!**

### 7.2. Decommissioning for maintenance work or storage

The system must be switched off and the pump must be disconnected from the mains by an electrician and secured against being switched on again without permission. Pumps with plugs must be unplugged (do not pull the cable!). Work on removal, maintenance and storage can then commence.



### **BEWARE of poisonous substances!**

**Pumps that pump liquids hazardous to health must always be decontaminated before undertaking any other work. Otherwise, there is a risk of fatal injury! Wear the necessary physical protection equipment!**



### **BEWARE of burns!**

**The housing parts can heat up to well above 40 °C. There is a risk of burns! After switching it off, let the pump cool down to ambient temperature.**

### 7.3. Removal

#### 7.3.1. Portable wet well installation

Pumps in portable wet well installation can be lifted out of the pit once they have been disconnected from the mains and the pressure pipe has been drained. It may be necessary to dismantle the hose first. It may be necessary to use a suitable lifting device.

### 7.3.2. Stationary wet well installation

Pumps in stationary wet well installations with a suspension unit are raised out of the pump chamber using the appropriate lifting equipment. During lifting, always hold the power supply cable slightly taut to prevent it being damaged.

The operating space does not have to be emptied especially for this purpose. All pressure- and suction-side slide valves must be closed to prevent the operating space overflowing or the discharge pipe being emptied.

### 7.4. Return delivery/storage

For shipping, the parts must be packed in tear-proof plastic bags of sufficient size in such a manner that they are tightly sealed and leak-proof.

**For return delivery and storage please also refer to the "Transport and storage" section!**

### 7.5. Disposal

#### 7.5.1. Operating materials

Oils and lubricants must be collected in appropriate containers and properly disposed of in terms of EC Directive 75/439/EEC as well as in compliance with the provisions of sections 5a and 5b of the German Waste Act or the applicable local laws.

#### 7.5.2. Protective clothing

Protective clothing worn for cleaning and maintenance work is to be disposed of in accordance with the German Waste Code TA 524 02 and EC Directive 91/689/EEC.

#### 7.5.3. Product

Proper disposal of this product avoids damage to the environment and risks to personal health.

- Use the services of public or private waste disposal companies, or consult them for the disposal of the product or parts thereof.
- For more information on proper disposal, please contact your local council or waste disposal office or the supplier from whom you purchased the product.

## 8. Maintenance and repair

### ELECTROCUTION hazard!

**There is a risk of fatal electric shocks when performing work on electrical devices. With all maintenance or repair work, the pump must be disconnected from the mains and secured against being switched on again without permission. Damage to the power supply cable may only be rectified by a qualified electrician.**



**UNAUTHORISED work could result in fatal injuries!**

**Maintenance and repair work that impairs the safety of Ex protection must only be carried out by the manufacturer or authorised service workshops.**

**Also note the additional information in the appendix!**

- Before any maintenance or repair work, the pump must be deactivated and dismantled as described in the "Decommissioning/disposal" chapter.
- After maintenance or repair work, the pump must be installed and connected as described in the "Installation" chapter.
- The pump is switched on as described in the "Commissioning" chapter.  
Note the following:
- All maintenance and repair work must be carried out by Wilo customer service, authorised service workshops or trained specialists with the greatest of care and in a safe workplace. Proper protective clothing is to be worn.
- This manual must be available to and observed by the maintenance staff. Only maintenance and repair work described in this manual may be carried out.

**Any other work and/or alterations to the construction must only be carried out by Wilo customer service.**

- When carrying out work in basins and/or tanks, the respective local protection measures must be observed in all cases. A second person must be present for safety reasons.
- Only lifting equipment that is in a technically perfect condition and load-carrying equipment that has been officially approved may be used for lowering and raising the pump. Make sure that the pump does not jam during lifting and lowering. If the pump does jam, no lifting forces greater than 1.2 times the pump weight must be applied. The maximum permissible bearing capacity must never be exceeded!

**Make sure that the lifting gear, ropes and the lifting equipment's safety devices are in perfect working order. Work may only commence if the lifting equipment has been checked and found to be in perfect working order. If it is not inspected, fatal injuries may result.**

- Electrical work on the pump and the system must be carried out by a qualified electrician. Defective fuses must be replaced immediately. They must never be repaired. Only fuses for the specified electric current and of the specified type may be used.
- If flammable solvents and cleaning agents are used, naked flames and smoking are prohibited.
- Pumps that circulate fluids that are hazardous to health or come into contact with such fluids must be decontaminated. In addition, make sure that no gases that are hazardous to health form or are present.



**If injuries are caused by fluids or gases that are hazardous to health, apply the first-aid measures specified on the notice at the working premises and notify a doctor immediately.**

- Make sure that the necessary tools and materials are available. Order and cleanliness ensure safe and smooth work on the pump. After working on the pump, remove any used cleaning materials and tools from the pump. Store all materials and tools in their proper place.
- Operating materials should be collected in suitable containers and disposed of properly. Always wear appropriate protective clothing when performing maintenance and repair work. This must also be disposed of properly.

### 8.1. Operating materials

#### 8.1.1. Overview of white oil

The sealing chamber is filled with white oil that is potentially biodegradable.

When changing the oil, we recommend the following oil types:

- Aral Autin PL\*
- Shell ONDINA 919
- Esso MARCOL 52\* or 82\*
- BP WHITEMORE WOM 14\*
- Texaco Pharmaceutical 30\* or 40\*

All oil types marked with "\*" are approved for use with foods in accordance with "USDA-H1".

#### Filling quantities

- Motor version "S": 900 ml
- Motor version "P": 900 ml

#### 8.1.2. Overview of grease

The following lubricating grease can be used in accordance with DIN 51818/NLGI Class 3:

- Esso Unirex N3

### 8.2. Maintenance intervals

To ensure reliable operation, various maintenance tasks must be carried out regularly.

The maintenance intervals must be specified according to the load on the pump. Regardless of the specified maintenance intervals, the pump or installation must be checked if strong vibrations occur during operation.

**When used in sewage lifting units inside buildings or on areas of land, the maintenance intervals and work shown in DIN EN 12056-4 must be adhered to.**

#### 8.2.1. Intervals for normal operating conditions

##### 2 years

- Visual inspection of the power supply cable
- Visual inspection of accessories
- Visual inspection of the coating and housing for wear
- Functional inspection of all safety and monitoring devices
- Inspection of the switchgear/relays used



- Oil change

#### NOTE

If a pencil electrode is installed to monitor the sealing chamber, the oil is changed based on the indicator.

#### **15000 operating hours or after 10 years at the latest (motor version "P" only)**

- General overhaul

#### 8.2.2. Intervals for harsh operating conditions

Under harsh operating conditions, the specified maintenance intervals must be shortened accordingly. In this case, contact Wilo customer service. If using the pump under harsh conditions, we also recommend signing a maintenance contract.

Harsh operating conditions include:

- A large proportion of fibrous material or sand in the fluid
- Turbulent inlet (e.g. due to air entry, cavitation)
- Strongly corrosive fluids
- Strongly gassing fluids
- Unfavourable duty points
- Operating states subject to water hammers

#### 8.2.3. Recommended maintenance measures to ensure smooth operation

We recommend regular inspections of the current consumption and the operating voltage in all 3 phases. In normal operation, these values remain constant. Slight fluctuations depend on the characteristics of the fluid. The current consumption can provide an early indication of damage and/or malfunctions in the impeller, bearings and/or motor, which can be rectified. Larger voltage fluctuations strain the motor winding and can cause the pump to break down. Regular inspections can therefore largely prevent major secondary damage and reduce the risk of total breakdown. We recommend the use of remote monitoring for regular inspections. Please contact Wilo customer service.

### 8.3. Maintenance work

Before carrying out maintenance work:

- Disconnect the pump from the power and secure it against being switched on inadvertently.
- Allow the pump to cool down and clean it thoroughly.
- Make sure that all the operationally-relevant parts are in good condition.

#### 8.3.1. Visual inspection of the power supply cable

The power supply cables must be checked for blisters, cracks, scratches, abrasion and/or crushing. If any damage is detected, the pump must be decommissioned immediately and the damaged power supply cable must be replaced.

**The cables may only be replaced by Wilo customer service or an authorised or certified service workshop. The pump may only be started up again once the damage has been properly remedied.**

**8.3.2. Visual inspection of accessories**

Accessories must be checked to ensure they are properly fitted and function correctly. Loose and/or faulty accessories must be repaired or replaced immediately.

**8.3.3. Visual inspection of coating and housing for wear**

The coatings and housing parts must not show any signs of damage. If there is visible damage to the coatings, repair the coating accordingly. If there is visible damage to housing parts, contact Wilo customer service.

**8.3.4. Functional inspection of safety and monitoring devices**

Monitoring devices include the temperature sensors in the motor, humidity electrodes, overload relay, overvoltage relay, etc.

- Motor protection, overvoltage relay and other triggers can generally be triggered manually for test purposes.
- To check the pencil electrode or the temperature sensor, the pump has to be cooled to the ambient temperature and the electrical connection for the monitoring equipment has to be disconnected in the switchgear. The monitoring equipment can then be checked with an ohmmeter. The following values should be measured:
  - Bimetallic strip: Value = "0" passage
  - Pencil electrode: This value must approach infinity. If the value is low, there is water in the oil. Also observe the instructions of the optional evaluation relay.

**If there are larger deviations, consult the manufacturer.**

**8.3.5. Inspection of the switchgear/relays used**

See the relevant installation and operating instructions for a description of the individual work steps for inspecting the switchgear/relay. Faulty devices must be replaced immediately as they provide no protection to the pump.

**8.3.6. Oil change in sealing chamber**

The sealing chamber has a hole for draining and filling the chamber.



**RISK of injury from hot and/or pressurised oil! After the pump is switched off, the oil is still hot and pressurised. This can cause the screw plug to be ejected and hot oil to escape. There is a risk of injury or burns! First allow the oil to cool down to ambient temperature.**

2. Carefully and slowly unscrew the screw plug.  
**Attention: the oil may be pressurised! This can cause the screw to be ejected at speed.**
3. Empty out oil by rotating the pump until the hole points downwards. Collect the oil in a suitable container and dispose of it in accordance with the requirements in the "Disposal" chapter.
4. Rotate the pump back until the hole is pointing upwards again.
5. Pour the new oil in through the hole for the screw plug. The oil should reach up to about 1 cm below the hole. Note the recommended oils and filling quantities.
6. Clean the screw plug, replace the joint ring and screw it back in.

**8.3.7. General overhaul (motor version "P" only)**

In a general overhaul, the normal maintenance work is carried out and in addition the motor bearings, shaft seals, O-rings and power supply cables are checked and replaced, if necessary. This work may be performed only by the manufacturer or an authorised service workshop.

**8.4. Repairs**

Before carrying out repairs:

- Disconnect pump from power supply (disconnect from mains network).
- Allow the pump to cool down and clean it thoroughly.
- Place the pump on a firm surface and secure it against slipping.
- Always replace O-rings, seals and screw locking devices (spring lock washers, Nord-Lock washers).
- Note and comply with the specified tightening torques in the appendix and in the individual work steps.
- Never use force when carrying out this work!

**8.4.1. Readjusting the macerator**



**BEWARE of the macerator!**

**The pump is equipped with a macerator. When coming into contact with the blade, limbs may be crushed or be amputated! Never reach directly into the macerator. Wear the correct protective gloves when working on the unit!**

**Internal macerator (CUT GI)**

Normally, the gap between the cutting plate and rotating blade is 0.1 mm. If the gap is larger, the cutting performance may decline and clogging may increase. In this case, the gap needs to be readjusted.

Fig. 7.: Screw plugs

1	Screw plug
1.	Position the pump horizontally on a firm surface with the screw plug facing upward. <b>Make sure that the pump cannot fall over and/or slip!</b>

Fig. 8.: Overview of macerator

1...4	Grub screw	7	Rotating blade
5	Cylinder head screw	8	Pressure connection
6	Cutting plate		

**Necessary tools**

- Torque wrench with size 4 Allen wrench insert
- Size 5 allen wrench
- Size 4 allen wrench

**Work steps**

1. Unscrew the grub screws from the cutting plate.
2. Press the cutting plate against the internal blade so that they come into contact.
3. Slowly screw in the four cylinder head screws, **gently and by hand**, until they are against the cutting plate.

**Attention: do not screw in tightly!**

4. Screw the grub screws back into the cutting plate and tighten them crosswise using the torque wrench.

Tighten as follows:

- Grub screw 1: 3 Nm
- Grub screw 2: 6 Nm
- Grub screw 1: 6 Nm
- Grub screw 3: 3 Nm
- Grub screw 4: 6 Nm
- Grub screw 3: 6 Nm

**External macerator (CUT GE)**

Normally, the gap between the cutting plate and rotating blade is 0.1 to 0.2 mm. If the gap is larger, the cutting performance may decline and clogging may increase. In this case, the gap needs to be readjusted.

The gap here is determined by the shims between the rotating blade and the impeller. The shims have a thickness of 0.1 mm and 0.2 mm.

**Fig. 9.: Overview of macerator**

1	Rotating blade	4	Fastening screw
2	Cutting plate	5	Impeller
3	Shims		

**Necessary tools**

- Torque wrench with size 5 Allen wrench insert
- Size 5 allen wrench
- Suitable equipment for fixing the rotating blade in place

**Work steps**

1. Fix the rotating blade in place with suitable equipment and unscrew the fastening screw.  
**Attention: the blade has sharp edges! Wear suitable protective gloves!**
2. Remove the rotating blade.
3. Set a gap of 0.1 to 0.2 mm by removing or replacing shims.

**Attention: the blade must not grind against the cutting plate.**

4. Replace the blade and screw in the fastening screw. Tighten the fastening screw with 37 Nm.
5. Measure the gap and repeat the work steps if necessary.

**9. Troubleshooting and possible solutions**

In order to prevent damage or serious injury while rectifying pump faults, the following points must be observed:

- Only attempt to rectify a fault if you have qualified staff. This means that each job must be carried out by trained specialist staff. For example, electrical work must be performed by a trained electrician.
- Always secure the pump against an accidental restart by disconnecting it from the mains. Take appropriate safety precautions.
- Always have a second person on hand to ensure the pump is switched off in an emergency.
- Secure moving parts to prevent injury.
- Unsanctioned changes to the pump are made at the operator's own risk and release the manufacturer from any warranty obligations.

**Fault: Pump does not start**

1. Electricity supply interrupted, short-circuit or earth fault in the cable and/or motor winding
  - Have the motor and wires checked by a specialist and replaced if necessary
2. Fuses, the motor protection switch and/or monitoring devices are triggered
  - Have a specialist inspect the connections and correct them as necessary.
  - Have the motor protection switches and fuses installed or adjusted according to the technical specifications, and reset monitoring equipment.
  - Clean the macerator.
3. The sealing chamber control (optional) has interrupted the electric circuit (operator-related)
  - See fault: Mechanical seal leaks, sealing chamber control reports a fault or switches the pump off

**Fault: The pump starts, but the motor protection switch triggers shortly after commissioning**

1. The thermal trigger on the motor protection switch is incorrectly set
  - Have a specialist compare the setting of the trigger with the technical specifications and correct it as necessary
2. Increased power consumption due to major voltage drop
  - Have an electrician check the voltage on each phase and rewire if necessary
3. Two-phase operation
  - Have a specialist inspect the connection and correct it as necessary
4. Excessive voltage differences on the three phases
  - Have a specialist inspect the connection and the switching system and correct as necessary
5. Incorrect direction of rotation
  - Swap the 2 phases of the mains supply
6. Macerator blocked
  - Switch off the pump, secure it against being switched back on again, clean the macerator and correct the cutting gap if necessary

- In the event of frequent clogging, contact Wilo customer service to have the macerator replaced
7. The fluid is too dense
    - Contact the manufacturer

**Fault: Pump is running but not pumping**

1. No fluid available
  - Open inlet for tank or slide valve
2. Intake blocked
  - Clean the supply line, slide valve, suction piece, suction port or suction strainer
3. Macerator blocked
  - Switch off the pump, secure it against being switched back on again, clean the macerator and correct the cutting gap if necessary
  - In the event of frequent clogging, contact Wilo customer service to have the macerator replaced
4. Faulty hose/piping
  - Replace defective parts
5. Intermittent operation
  - Check switching system

**Fault: The pump runs, but not within the specified operating parameters**

1. Intake blocked
  - Clean the supply line, slide valve, suction piece, suction port or suction strainer
2. Slide valve in the pressure pipe shut
  - Fully open the slide valve
3. Macerator blocked
  - Switch off the pump, secure it against being switched back on again, clean the macerator and correct the cutting gap if necessary
  - In the event of frequent clogging, contact Wilo customer service to have the macerator replaced
4. Incorrect direction of rotation
  - Replace two phases on the mains supply
5. Air in the system
  - Check the pipelines, pressure shroud and/or hydraulics, and vent if necessary
6. Pump pumping against excessive pressure
  - Check the slide valve in the pressure pipe and open it completely if necessary, use a different impeller, consult the plant
7. Signs of wear
  - Replace worn parts
8. Faulty hose/piping
  - Replace defective parts
9. Inadmissible levels of gas in the fluid
  - Contact the manufacturer
10. Two-phase operation
  - Have a specialist inspect the connection and correct it as necessary
11. Excessive decrease in the water table during operation
  - Check the supply and capacity of the system, and inspect the level control settings and functionality

**Fault: The pump does not run smoothly and is noisy**

1. Pump is operating in an inadmissible range
  - Check the operational data of the pump and correct if necessary and/or adjust the operating conditions
2. Suction port, suction strainer and/or impeller clogged
  - Clean the suction port, suction strainer and/or impeller
3. Macerator blocked
  - Switch off the pump, secure it against being switched back on again, clean the macerator and correct the cutting gap if necessary
  - In the event of frequent clogging, contact Wilo customer service to have the macerator replaced
4. Inadmissible levels of gas in the fluid
  - Contact the manufacturer
5. Two-phase operation
  - Have a specialist inspect the connection and correct it as necessary
6. Incorrect direction of rotation
  - Replace two phases on the mains supply
7. Signs of wear
  - Replace worn parts
8. Defective motor bearing
  - Contact the manufacturer
9. Pump is installed under tension
  - Check installation, use expansion joints if necessary

**Fault: Mechanical seal leaks, sealing chamber control reports a fault or switches the pump off**

1. Condensation build-up due to extended storage and/or temperature fluctuations
  - Operate the pump briefly (max. 5 min.) without pencil electrode
2. Increased leakage when running in new mechanical shaft seals
  - Change the oil
3. Defective pencil electrode cables
  - Replace pencil electrode
4. Mechanical shaft seal is defective
  - Replace the mechanical shaft seal and contact the manufacturer!

**Further steps for troubleshooting**

If the points listed here do not rectify the fault, contact Wilo customer service. They can help you as follows:

- Telephone and/or written support from Wilo customer service
  - On-site support from Wilo customer service
  - Inspection or repair of the pump at the factory
- Please note that you may be charged for some services provided by our customer service. For more details, please contact Wilo customer service.



## 10. Appendix

### 10.1. Tightening torques

Rust-free screws (A2/A4)		
Thread	Tightening torque	
	Nm	kp m
M5	5.5	0.56
M6	7.5	0.76
M8	18.5	1.89
M10	37	3.77
M12	57	5.81
M16	135	13.76
M20	230	23.45
M24	285	29.05
M27	415	42.30
M30	565	57.59

Geomet-coated screws (strength 10.9) with Nord-Lock washer		
Thread	Tightening torque	
	Nm	kp m
M5	9.2	0.94
M6	15	1.53
M8	36.8	3.75
M10	73.6	7.50
M12	126.5	12.90
M16	155	15.84
M20	265	27.08

### 10.2. Operation with frequency converters

Any standard motor conforming to IEC 60034-17 can be used. If the rated voltage is above 415 V/50 Hz or 480 V/60 Hz, you must consult the manufacturer. Because of the additional heating caused by harmonics, the rated power of the motor should be around 10 % more than the power requirement of the pump. For frequency converters with a low-harmonic output, it may be possible to reduce the 10 % power reserve. This is normally done by using output filters. **Furthermore, the standard motors are not equipped with shielded cables.** The frequency converter and filter must be synchronized with each other. Ask the manufacturer.

The configuration of the frequency converter depends on the rated motor current. Make sure that the pump operates without jerking or vibrating, especially in the lower speed range. Otherwise, the mechanical shaft seals could be damaged and start leaking. You must also consider the flow rate in the pipe. The slower the flow rate, the greater the risk of solids depositing in the pump and piping. **For applications covered by DIN EN 12050, a minimum flow rate of 0.7 m/s at a pumping**

**pressure of 0.4 bar is required.** We also recommend these figures for other applications.

It is important that the pump operates across the entire control range without vibrations, resonance, oscillation or excessive noise (ask the manufacturer if necessary). Increased motor noise caused by the harmonics of the power supply is normal.

When configuring the frequency converter, always make sure the quadratic curve (U/F pump curve) for pumps and fans is correctly set! This ensures that the output voltage at frequencies greater than the rated frequency (50 Hz or 60 Hz) is adjusted to the power requirement of the pump. Newer frequency converters feature an automatic power optimization function which achieves the same effect. For the frequency converter setting, please refer to its installation and operating instructions.

Faults with the motor monitor may occur on motors fed by a frequency converter depending on the frequency converter type used and installation conditions present. The following general measures could help to reduce or avoid faults:

- Keeping within the thresholds stated in IEC 60034-17 for the voltage peaks and rise speed (output filters may be necessary).
- Varying the pulse frequency of the frequency converter.
- Using our external double pencil electrode for faults with the sealing chamber monitor. The following construction measures could also help to reduce or prevent faults:
- Using shielded power cables.

#### Summary

- Continuous operation between 1 Hz and the rated frequency (50 Hz or 60 Hz), while considering the min. flow speed.
- Consider additional measures with regard to EMC (choice of frequency converter, using filters, etc.).
- Never exceed the rated current or rated speed of the motor.
- It must be possible to connect the motor's own temperature monitor (bimetallic strip or PTC sensor).

### 10.3. Ex-approval

This section contains special information for owners and operators of pumps which have been built and certified for use in environments where explosions may occur.

It expands on and therefore supplements the standard instructions for this pump. It also expands on and supplements the "General safety information" section and must be read and fully understood by all users and operators of the pump.

**This section applies only to Ex-rated pumps and contains additional instructions for these pumps!**

### 10.3.1. Identification of Ex-rated pumps

Pumps that have been approved for use in an explosive atmosphere are marked as follows on the rating plate:

- “Ex” symbol of the corresponding approval
- Information on Ex classification
- Certification number

### 10.3.2. ATEX approval

The motors are certified for use in potentially explosive areas in accordance with EC directive 94/09/EC, which requires device group II, category 2.

The motors can be used in both zone 1 and zone 2.

**These motors may not be used in zone 0!**

Non-electrical devices (e.g. hydraulics) also comply with EC directive 94/09/EC.

#### ATEX classification

The Ex classification, for example, II 2G Ex de IIB T4 Gb on the rating plate indicates the following:

- II = device group
- 2G = device category (2 = suitable for zone 1, G = gas, vapour and mist)
- Ex = explosion-protected device complying to Euro norm
- d = ignition protection type for motor casing: Pressure-resistant encapsulation
- e = ignition protection for terminals: Increased safety
- II = intended for places where explosions may occur, with the exception of mines
- B = intended for use with gases in sub-group B (all gases excluding hydrogen, acetylene, carbon disulphide)
- T4 = max. surface temperature of the device is 135 °C
- Gb = device protection level “b”

#### “Pressure-resistant encapsulation” protection class

Motors in this protection type must be equipped with a temperature limit (1-circuit temperature monitoring).

#### Non-immersed operation

The motor **must be** immersed in an explosive atmosphere!

#### Certification number

The certification number of the approval is located on the rating plate, in your order confirmation as well as on the technical data sheet.

### 10.3.3. Electrical connection



#### ELECTROCUTION hazard!

**Incorrect electrical connections can cause fatal electric shocks and/or explosion. Electrical connections may only be carried out by a qualified electrician approved by the local energy supply company, in accordance with locally applicable regulations.**

In addition to the information in the “Electrical connection” section, the following points must be observed for Ex-rated pumps:

- The power supply cable must be connected outside the potentially explosive area, or inside a housing with ignition protection conforming to DIN EN 60079-0!
- Voltage tolerance:  $\pm 10\%$   
Units with a rated voltage of **380...415 V** have a voltage tolerance of **max.  $\pm 5\%$** .
- All monitoring devices outside the “spark-proof areas” must be connected via an ex-rated cut-off relay.

#### Temperature monitoring device connection

The motor is equipped with a temperature limit (1-circuit temperature monitoring).

The motor can be optionally equipped with a temperature control and limit function (2-circuit temperature monitoring).

#### RISK of fatal injury due to incorrect connection!

**Risk of explosion due to overheating of the motor! The temperature monitoring device must be connected in such a way that, when triggered, it can only be restarted after the “release button” has been activated manually!**



In 2-circuit temperature monitoring, automatic restarting can be implemented via the temperature control. The maximum switching frequency (15/h with a 3-minute pause) must be observed.

- Bimetallic strips must be connected via an evaluation relay. We recommend the “CM-MSS” relay for this. The threshold is already pre-set. Connection values: max. 250 V(AC), 2.5 A,  $\cos \varphi = 1$
- PTC sensors (optionally available and in accordance with DIN 44082) must be connected via an evaluation relay. We recommend the “CM-MSS” relay for this. The threshold is already pre-set. When the threshold is reached, the pump must switch off.

#### Motor compartment monitor

- The motor compartment monitor must be connected via an evaluation relay. We recommend the “NIV 101/A” relay for this. The threshold is 30 kOhm. When the threshold is reached, the pump must switch off.

#### Connection of sealing chamber control

- The pencil electrode must be connected via an evaluation relay. We recommend the "XR-41x" relay for this. The threshold is 30 kOhm.
- The connection must be made using an intrinsically safe electric circuit!

#### Operation on the frequency converter

- Continuous operation up to rated frequency (50 Hz or 60 Hz), observing the min. flow rate
- Consider additional measures with regard to EMC (choice of frequency converter, using filters, etc.).
- Never exceed the rated current or rated speed of the motor.
- It must be possible to connect the motor's own temperature monitor (bimetallic strip or PTC sensor).

#### 10.3.4. Commissioning



**RISK of fatal injury due to explosion!**  
**Pumps without Ex labelling may not be used in potentially explosive areas! There is a risk of fatal injury due to explosion! Observe the following when using the pump in explosion hazard areas:**

- **The pump must be approved for use in potentially explosive areas!**
- **The power supply cable must be connected outside the potentially explosive area, or inside a housing with ignition protection conforming to DIN EN 60079-0!**
- **Switchgears must be installed outside the potentially explosive area, or inside a housing with ignition protection conforming to DIN EN 60079-0! Furthermore, these must be configured for operation of pumps with explosion approval.**
- **The mounted accessories must be approved for use on Ex pumps.**



**RISK of fatal injury due to explosion!**  
**The housing of the hydraulics must be fully flooded (completely filled with the fluid) during operation. If the housing is not immersed or there is air in the hydraulics, flying sparks may cause an explosion, for example due to static charge! Ensure that dry-running protection is in place for switching off.**

In addition to the information in the "Commissioning" section, note the following points for Ex-rated pumps:

- The operator is responsible for defining the potentially explosive area. Only pumps with Ex approval may be used within a potentially explosive area.
- Ex-rated pumps must be identified accordingly.
- To keep dry motors sufficiently cooled in S3 mode, they must be flooded completely before being switched back on if the motor has been taken out of the fluid!

#### 10.3.5. Maintenance and repair



##### **ELECTROCUTION hazard!**

**There is a risk of fatal electric shocks when performing work on electrical devices. With all maintenance or repair work, the pump must be disconnected from the mains and secured against being switched on again without permission. Damage to the power supply cable may only be rectified by a qualified electrician.**

In addition to the information in the "Maintenance and repair" section, note the following points for Ex-rated pumps:

- The maintenance and repair work described in this operating and maintenance manual must be carried out properly.
- Repairs and alterations to the construction which are not listed in this operating and maintenance handbook or which may impair explosion protection may only be performed by the manufacturer or by service dealers certified by the manufacturer.
- The spark-proof gaps may only be repaired according to the manufacturer's design specifications. It is not permitted to carry out repairs according to the values in tables 1 and 2 of DIN EN 60079-1.
- Only the plugs stipulated by the manufacturer, fulfilling at least a strength category of 600 N/mm<sup>2</sup>, may be used.

##### **Cable changes**

Cable changes are strictly prohibited and may only be carried out by the manufacturer or by service centres certified by the manufacturer.

#### 10.4. Spare parts

Spare parts can be ordered from Wilo customer service. To avoid return queries and incorrect orders, the serial and/or article number must always be supplied.

**Subject to change without prior notice!**

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