

Wilo-Rexa FIT

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|-----------|---|-----------|--------------------------------------|
| de | Einbau- und Betriebsanleitung | da | Monterings- og driftsvejledning |
| US | Installation and operating instructions | no | Monterings- og driftsveiledning |
| fr | Notice de montage et de mise en service | sv | Monterings- och skötselanvisning |
| es | Instrucciones de instalación y funcionamiento | fi | Asennus- ja käyttöohje |
| it | Istruzioni di montaggio, uso e manutenzione | el | Οδηγίες εγκατάστασης και λειτουργίας |
| pt | Manual de Instalação e funcionamento | tr | Montaj ve kullanma kılavuzu |
| nl | Inbouw- en bedieningsvoorschriften | hr | Upute za ugradnju i uporabu |

Fig. 1

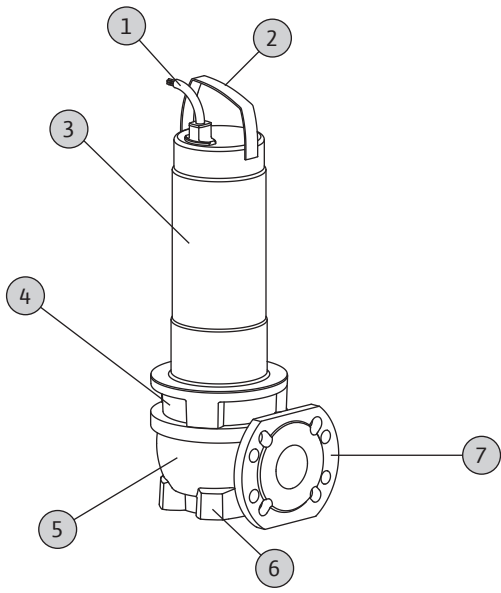


Fig. 3

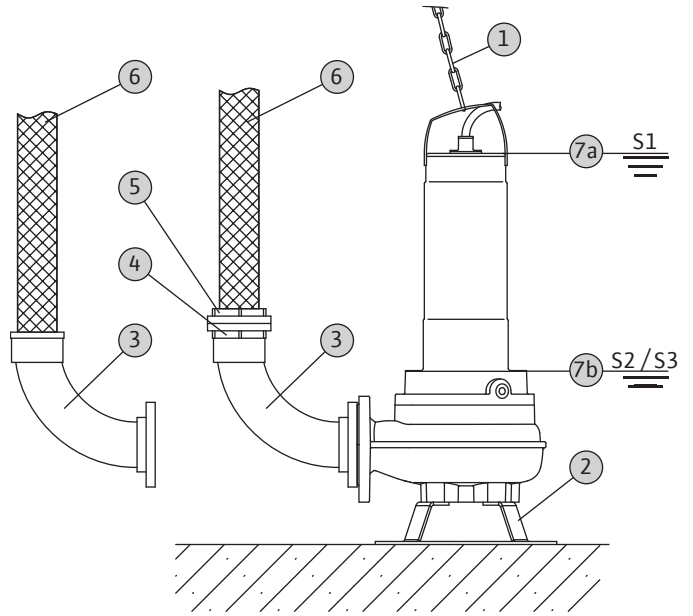


Fig. 2

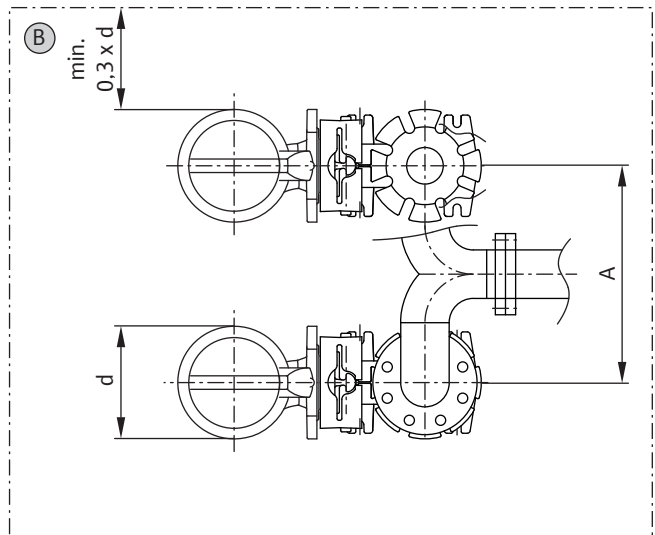
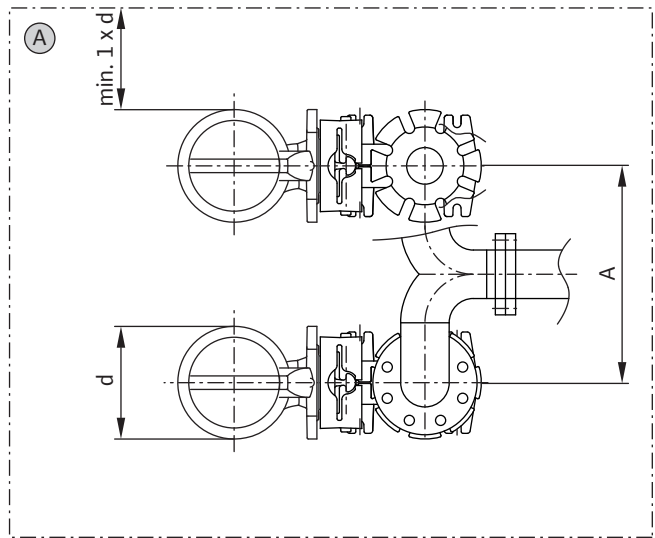
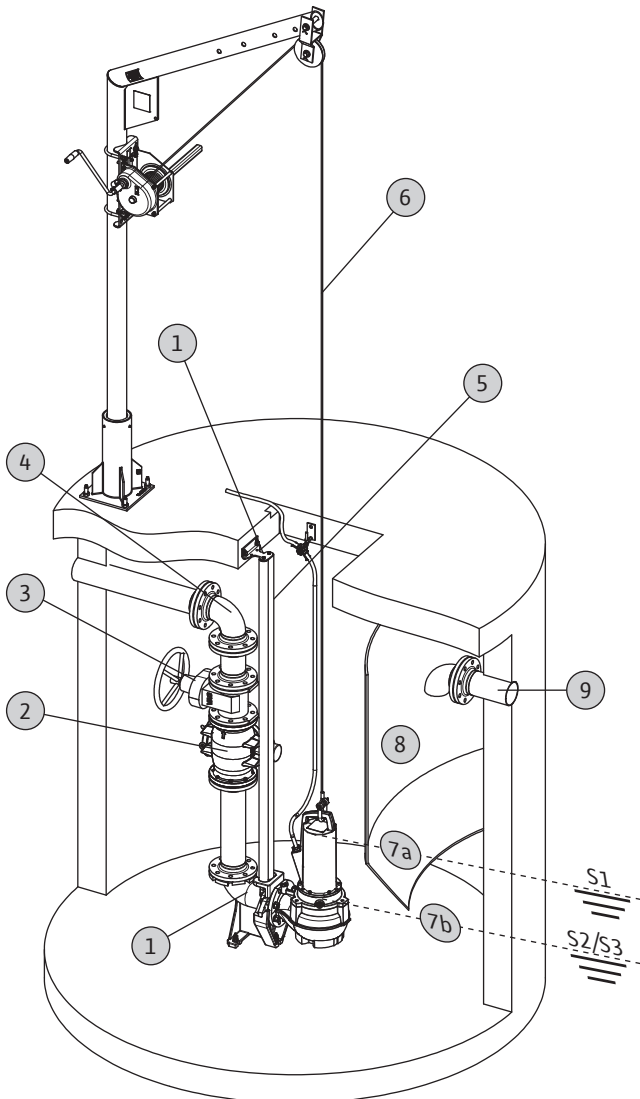


Fig. 4

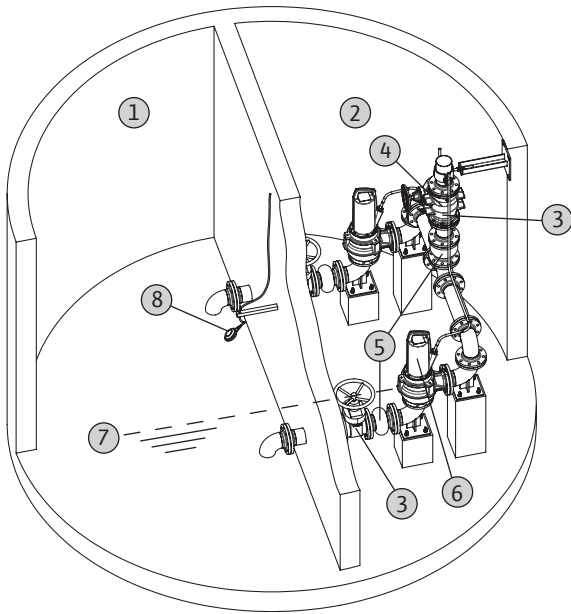


Fig. 5

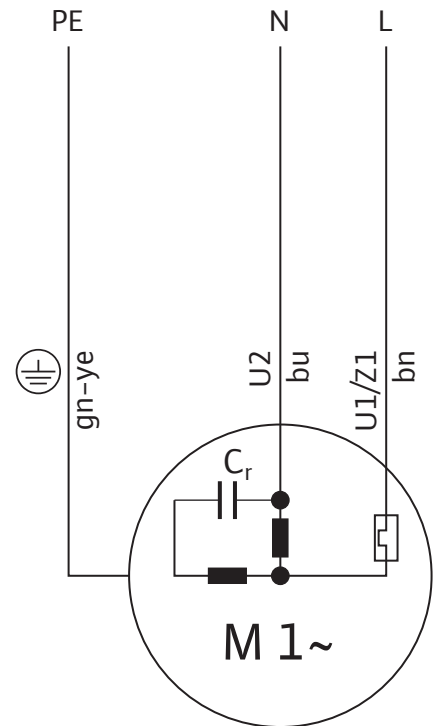


Fig. 6

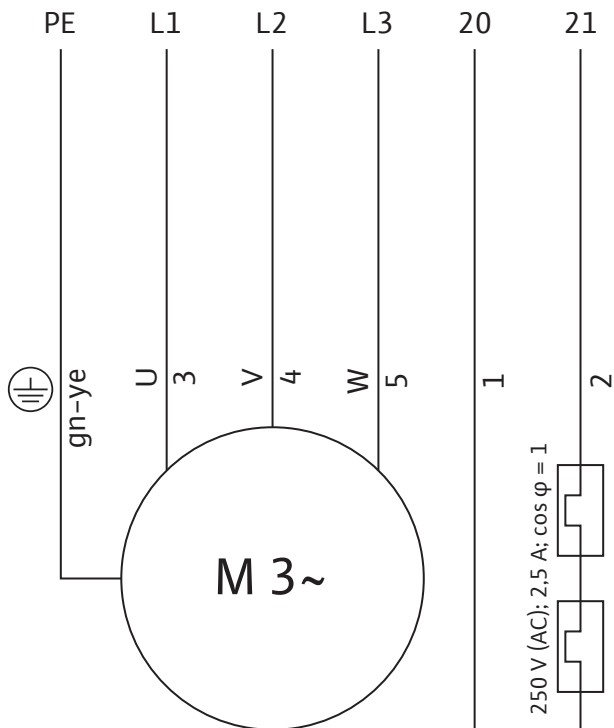
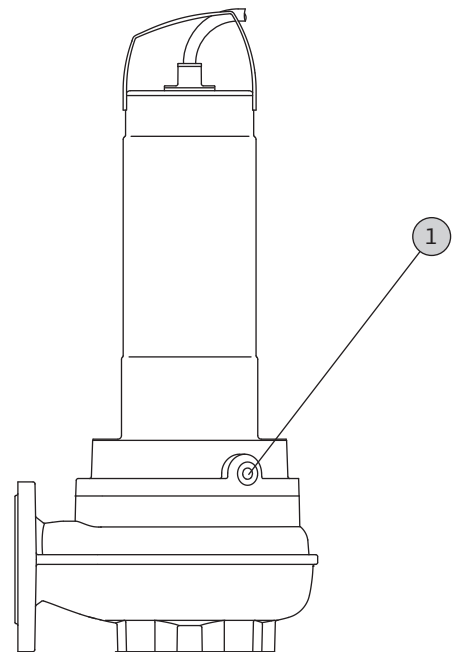


Fig. 7/8





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1. Introduction

1.1. About this document

The language of the original operating manual is German. All other language versions are translations of the original German manual. The EC Declaration of Conformity is a component of this manual. Any unauthorized or unapproved changes made to the design specified in it will nullify this declaration.

1.2. Structure of the manual

The manual is divided into individual sections. Each section has a heading which clearly describes its content. The table of contents also serves as a brief reference, since all the important sections have their own headers. All the important operating and safety instructions are highlighted. For detailed information on the structure of these texts, see "Safety" in section 2.

1.3. 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. Ensure that the personnel have read and understood the instructions in this operating and maintenance manual; if necessary, this manual must be ordered from the manufacturer in the required language. This pump is not intended to be used by persons (including children) with limited physical, sensory or mental capacities or without the experience or knowledge to do so, 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.

1.4. Abbreviations

- p.t.o. = please turn over
- re. = regarding
- approx. = approximately
- i.e. = that means
- poss. = possibly
- incl. = including
- min. = minimum
- max. = maximum
- etc. = and so on
- s.a. = see also
- e.g. = for example

1.5. Illustrations

The illustrations used are dummies and original drawings of the pumps. This is the only feasible solution given our wide range of pumps and the differing sizes offered by the modular system. More exact drawings and specifications can be found on the dimension sheet, the planning guide and the installation plan.

1.6. Copyright

This operation and maintenance manual has been copyrighted by the manufacturer. The operation and maintenance manual is intended for use by installation, operating and maintenance personnel. It contains technical specifications and drawings which may not be reproduced or distributed, either completely or in part, or used for purposes of competition without the express consent of the manufacturer or shared with others.

1.7. Rights of alteration

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

1.8. Warranty

This section contains the general information on the warranty. Contractual agreements have the highest priority and are not superseded by the information in this section. The manufacturer is obliged to correct any faults found in the pumps it sells, provided that the following requirements have been fulfilled.

1.8.1. General

- The faults are caused by the materials used or the way the product was manufactured or designed.
- The faults were reported in writing to the manufacturer within the agreed warranty period.
- The pump was used only as prescribed.
- All safety and control devices were connected and inspected by qualified personnel.

1.8.2. Warranty period

Unless otherwise agreed, the warranty period covers the first 24 months after initial commissioning or up to 30 months after the delivery date. Other agreements must be made in writing in the order confirmation. These remain valid at least until the agreed warranty period of the pump has expired.

1.8.3. Spare parts, attachments and modifications

Only genuine spare parts from the manufacturer may be used for repairs, replacements, attachments and modifications. These are the only parts that guarantee a long service life and maximum safety. These parts have been specially designed for our pumps. Unauthorized attachments and modifications or using non-original parts can seriously damage the pump and/or injure personnel.

1.8.4. Maintenance

The prescribed maintenance and inspection work should be carried out regularly. This work may only be carried out by qualified, trained and authorized personnel. Maintenance work not listed in this operation and maintenance manual, and all repair work may only be performed by the manufacturer and authorized service centers.

1.8.5. Damage to the product

Damage and malfunctions that endanger safety must be rectified immediately by trained personnel. The pump may only be operated if it is in perfect working order. During the agreed warranty period, the pump may only be repaired by the manufacturer or an authorized service center. The manufacturer reserves the right to ask the operator to return the damaged pump to the factory for inspection.

1.8.6. Disclaimer

No 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
- Failure to observe the safety instructions, the regulations and requirements of German law or the applicable local laws, or of this operating and maintenance manual
- Improper use
- Incorrect storage and transport
- Improper assembly or dismantling
- Insufficient maintenance
- Incorrect repairs
- Faulty 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. Furthermore, 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 operator is responsible for ensuring that personnel follow these instructions and guidelines.

2.1. Instructions and safety information

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

2.1.1. Instructions

Instructions are displayed in bold type. Instructions contain text that refers to the previous text or particular sections, or highlights short instructions.

Example:

Note that pumps stored with drinking water must be protected from frost.

2.1.2. Safety information

Safety information is slightly indented and displayed in bold type. It always commences with a signal word.

Information that only refers to material damage is printed in gray, without safety symbols.

Information that refers to personal injury is printed in black and is 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 valid directives and regulations, such as DIN and ANSI.

Each safety instruction begins with one of the following signal words:

- **Danger**
Serious or fatal injuries can occur!
 - **Warning**
Serious injuries can occur!
 - **Caution**
Injuries can occur!
 - **Caution** (instruction without symbol)
Substantial material damage can occur. Irreparable damage is possible!
- Safety instructions begin with a signal word and description of the hazard, followed by its cause and potential consequences, and end with advice on prevention.

Example:

Beware of rotating parts!

The moving impeller can crush and sever limbs. Switch off the pump and let the impeller come to a halt.

2.2. General safety information

- When installing or removing the pump, never work alone in rooms and shafts. 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 mains and secured against being switched on again. All rotating parts must have come to a stop.
- The operator must notify his or her supervisor immediately should any defects or irregularities occur.
- It is essential that the system be shut down immediately by the operator if any problems arise which endanger personnel. Problems of this kind include:
 - Failure of the safety and/or monitoring equipment
 - Damage to important parts
 - Damage to electrical equipment, cables, and insulation.
- Tools and other objects should be kept in dedicated locations so that they can be found quickly.
- Sufficient ventilation must be provided in enclosed rooms.
- When welding or working with electrical devices, make sure there is no risk of explosion.
- Only use lifting equipment which is legally defined as such and officially approved.
- The lifting equipment must be kept safely and must be suitable for the conditions of use (weather, hooking device, 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, sliding, etc.
- Measures should be taken to ensure that no person is ever directly beneath a suspended load. Also, suspended loads may not be moved over workplaces where people are present.
- If mobile working apparatus is used for lifting loads, a second person should be present to coordinate the procedure if this is required (for example, if the operator's field of vision is blocked).
- The load to be lifted must be transported in such a manner that nobody can be injured in the event of a power outage. Additionally, when working outdoors, such procedures must be stopped immediately if weather conditions worsen.

These instructions must be observed strictly. Failure to observe them 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 liquid 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 public utility company must be observed.

The person operating the pump must know about its power supply and how to switch it off. A motor protection switch must be installed by the customer for three-phase 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 pumped liquid (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 was switched off by a protective device, it must not be switched on again until the fault has been rectified.

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

The connections may only be made if the switching devices meet the harmonized 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 pacemakers. 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 a thermal winding monitor. The pump is switched off if the motor gets too hot during operation.

This device must be connected by an electrician and checked that it functions correctly before commissioning.

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

CAUTION!

Never operate the pump if the winding monitor has been removed or damaged, or if it does not work.

2.5. Safety rules 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.

The pump has moving parts. During operation, these parts turn to pump the liquid. Certain substances in the pumped liquid can cause very sharp edges to form on the moving parts.



BEWARE of rotating parts!

The rotating parts can crush and sever limbs. Never reach into the hydraulics or moving parts during operation.

- **Before performing maintenance or repairs, switch off the pump, disconnect it from the mains and secure it against being switched on again without authorization.**
- **Let the moving parts come to a stop!**

2.6. Pumped liquids

Each pumped liquid 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 switching the pump to a different pumped liquid, observe the following points:

- The pumped liquid can be contaminated by oil from the oil separation chamber if the mechanical shaft seal is defective.

Use in drinking water is not permitted!

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

It must be clarified whether the pump can be used at all with another pumped liquid.

2.7. Sound pressure

Depending on size and capacity (kW) of the pump, the sound pressure during operation is between approximately 70 dB (A) and 90 dB (A). The actual sound pressure, however, depends on several factors. These include the installation depth, configuration, fastening of accessories and pipeline, operating point, immersion depth, etc. We recommend that the operator makes an additional measurement at the workplace once the pump is running at its operating point and under all working conditions.



CAUTION: Wear ear protectors!

According to the applicable laws and regulations, ear protection must be worn if the sound pressure is greater than 85 dB (A). The operator is responsible for ensuring compliance with these regulations.

2.8. Directives used

This pump is subject to:

- Various EC directives
- Various harmonized standards
- Various national standards

See the EC Declaration of Conformity for precise details of the guidelines and standards used.

Also, various national standards are used as a basis for operating, assembling and dismantling the pump. These include the German accident prevention regulations, VDE regulations and German Equipment Safety Law.

2.9. CE mark

The CE mark is found on the rating plate and the rating plate is attached to the motor housing.

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 accessible pools, there is a risk of electrocution. Note the following information:

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



DANGER - explosive liquids!

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



The Wilo-Rexa FIT... submersible motor pumps are suitable for intermittent operation, pumping the following liquids:

- Sewage and wastewater
 - Wastewater containing feces
 - Sludge up to a maximum of 8 % dry solids (depending on the type) when draining buildings and properties in accordance with EN 12050 (while observing country-specific forewords and regulations such as DIN EN 12050-1) and when used in pits and reservoirs.
- The submersible motor pumps must not be used for pumping:
- Drinking water
 - Liquids with hard components such as stone, wood, metal and sand
 - Explosive or highly flammable liquids in pure form.

Intended use also includes observation of these instructions. Any other use is regarded as non-compliant with the intended use.

3.2. Construction

Wilo-Rexa pumps are floodable submersible wastewater motor pump, which can be operated as both a stationary and portable wet installation and as a stationary dry installation.

Fig. 1.: Description

1	Cable	5	Hydraulic housing
2	Handle	6	Intake port
3	Motor housing	7	Discharge port
4	Oil separation chamber		

3.2.1. Hydraulics

The hydraulic housing and impeller are made of cast iron. The discharge side connection is designed as a horizontal flange connection. Free-flow impellers are used.

The pump is not self-priming, in other words, the pumped liquid must flow in either automatically or with supply pressure.

3.2.2. Motor

The motor housing is manufactured in stainless steel.

In the AC or three-phase current version, dry run motors are used as the motors. The motor is cooled by the liquid around it. The waste heat is transferred directly to the pumped liquid via the motor housing. Therefore, these pumps must always be submerged for continuous operation. The pumps can be used in intervals when the motor is either submerged or emerged.

With AC motors, the operating capacitor is integrated in the motor.

Furthermore, the motors are equipped with the following monitoring devices:

• Thermal motor monitor:

The thermal motor monitor protects the motor winding from overheating. On pumps with an AC motor, it is integrated and self-switching. This means that the motor is switched off when it overheats and is automatically switched back on after it cools down. Bi-metal sensors are used for this as standard.

The motor can also be fitted with a sealing chamber electrode to monitor the oil separation chamber. It reports water penetrating the oil separation chamber through the mechanical shaft seal on the liquid side.

The connection cable is 10 m long and available in the following versions:

- AC version:
 - cable with safety plug
 - cable with safety plug and attached float switch
- Three-phase current version:
 - free cable end
 - cable with CEE plug and attached float switch

3.2.3. Sealing

The seal to the pumped liquid and to the motor compartment is implemented via two mechanical shaft seals. The oil separation chamber between the mechanical shaft seals is filled with medicinal white oil.

The white oil is poured in when the pump is assembled.

3.2.4. Float switch

The A version of the pump is fitted with a float switch. The float switch is connected directly to the motor.

The float switch makes it possible to set up a level control system which switches the pump on and off automatically.

3.2.5. Attached plug

In the P and F versions, AC motors have a safety plug and three-phase motors have a CEE plug attached.

These plugs are designed for use in conventional safety or CEE sockets, and are not protected from flooding.

BEWARE of moisture!

If moisture penetrates plugs, it can damage them. Never immerse the plug in liquid and always protect it from moisture.

3.3. Operating modes

3.3.1. Operating mode "S1" (continuous operation)

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

3.3.2. Operating mode "S2" (short-term operation)

The maximum operating period is given in minutes, for example, S2-15. The pause must continue until the machine temperature no longer

deviates from that of the coolant by more than 2 K.

3.3.3. Operating mode "S3" (interval operation)

This operating mode defines a combination of periods of operation and standstill. With S3 operation, the values given are always calculated based on a period of 10 minutes.

Examples

- S3 20 %
Operation 20 % of 10 min = 2 min / standstill
80 % of 10 min = 8 min
- S3 3 min
Operation 3 min / standstill 7 min
If two values are given, they relate to each other e.g.:
- S3 5 min/20 min
Operation 5 min / standstill 15 min
- S3 25 %/20 min
Operation 5 min / standstill 15 min

3.4. Technical data

General data	
Mains connection [U/f]:	See rating plate
Power consumption [P ₁]:	See rating plate
Rated motor power [P ₂]:	See rating plate
Maximum pump head [H]:	See rating plate
Maximum pump flow [Q]:	See rating plate
Activation type [AT]:	See rating plate
Liquid temperature [t]:	3 to 40 °C
Protection class:	IP 68
Insulation class [Cl.]:	F
Speed [n]:	See rating plate
Max. submersion:	20 m
Explosion protection:	-
Operating modes	
Submerged [OT _s]:	S1
Emerged [OT _e]:	S2 15min, S3 10%*
Starts per hour	
Recommended:	20/h
Maximum:	50/h
Free flow diameter	
FIT V05-... :	50 mm
FIT V06-... :	65 mm
FIT V08-... :	80 mm
Intake port	
FIT...05-... :	DN 50, PN 10
FIT...06-... :	DN 65, PN 10
FIT...08-... :	DN 80, PN 10
Discharge port:	
FIT...05-... :	DN 50/Rp2, PN 10

FIT...06-... :	DN 65/80, PN 10
FIT...08-... :	DN 80/100, PN 10

* Operation mode S3 at 25% is permitted, and the motor can be switched on again if the motor has been sufficiently cooled by flooding it completely for at least one minute!

3.5. Type code

Example: Wilo-Rexa FIT V06DA-110/EAD1-2-T0015-540-P	
FIT	Series
V	Impeller shape V = free-flow impeller
06	Discharge port size 05 = DN 50 06 = DN 65/80 08 = DN 80
D	Hydraulic version D = intake side drilled according to DIN N = intake side drilled according to North American Standard (ANSI)
A	Material version for hydraulics A = standard version
110	Hydraulics definition
E	Motor version E = dry motor R = performance-reduced dry motor
A	Material version for motor A = standard version
D	Seal version D = 2 independent mechanical shaft seals
1	IE efficiency class, e.g.: 1 = IE1 (based on IEC 60034-30)
-	Without Ex approval
2	Number of poles
T	Mains connection version M = 1~ T = 3~
0015	/10 = rated motor power P ₂ in kW
5	Frequency 5 = 50 Hz 6 = 60 Hz
40	Code for rated voltage
P	Additional electrical equipment O = with free cable end A = with float switch and plug P = with plug

3.6. Scope of delivery

- Pump with 10 m cable
- AC version with
 - Safety plug
 - Float switch and safety plug
- Three-phase current version with
 - free cable end
 - float switch and CEE plug
- Installation and operation manual

3.7. Accessories (optional)

- Cable lengths up to 30 m (AC version) or 50 m (three-phase current version) in fixed increments of 10 m
- Suspension device
- Pump pedestal
- External sealing chamber electrode
- Level controllers
- Fixing accessories and chains
- Switching devices, relays and plugs

4. Transport and storage

4.1. Delivery

On delivery, immediately check that the product 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 recognized. Damage to parts must be noted on the delivery or freight documentation.

4.2. Transport

Only the appropriate and approved fastening devices, transportation and lifting gear may be used. 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 on a firm surface and secure it against slipping and falling over. Wastewater submersible pumps are stored vertically.

DANGER from falling over!

Never set down the pump unsecured. If the pump falls over, injury can occur!



- Our pump can be stored at temperatures down to -15 °C. The store room must be dry. We recommend a frost-protected room for storage with a temperature between 5 °C and 25 °C.
- The pump must not be stored in rooms where welding work is conducted as the resulting gases and radiated heat can damage the elastomer parts and coatings.

- Any intake or discharge ports should be closed tightly before storage to prevent impurities.
- The current supply cables should be protected against kinking, damage, and moisture.



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 liquid and always protect it from moisture.

- The pump must be protected from direct sunlight, heat, dust, and frost. Heat and frost can cause considerable damage to rotors and coatings!
- The impellers must be turned at regular intervals. This prevents the bearings from jamming and renews the film of lubricant on the mechanical shaft seal.

BEWARE of sharp edges!

Sharp edges can form on impellers and hydraulic ports. There is a risk of injuries! Wear the necessary protective clothing, e.g. safety gloves.



- If the pump has been stored for a long period of time, it should be cleaned of impurities such as dust and oil deposits before start-up. Impellers should be checked for smooth operation. The housing coatings should be checked for damage.

Before start-up, the fill level in the oil separation chamber should be checked and topped up, if necessary.

Damaged coatings should be repaired immediately. Only a coating that is completely intact fulfills the criteria for intended use.

If these rules are observed, your pump can be stored for an extended period. Please remember 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 liquids that are hazardous to health. 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 wastewater systems, observe the pertinent local regulations and directives for wastewater 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 cause irreversible damage to the pump/system and noisy operation resulting from valve knocking. This can be avoided by taking appropriate measures (e.g. non-return valves with adjustable closure time or laying the discharge pipe in a special way).

After pumping water containing lime, clay or cement, flush out the pump with clean water in order to prevent encrustation and subsequent breakdowns.

If you are using level controllers, make sure that the minimum water coverage is present. Air pockets must not be allowed to enter the hydraulic housing or the pipeline system, and they must be removed with suitable bleeding devices or by inclining the pump slightly (with a portable installation). Protect the pump from frost.

5.2. Types of installation

- Vertical stationary wet installation with suspension device
- Vertical portable wet installation with pump pedestal
- Vertical stationary dry installation

5.3. The operating area

The operating area 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 shafts, a second person must be present for safety reasons. If there is danger of poisonous or asphyxiating gases forming, the necessary countermeasures must be taken!

When installing in shafts, the size of the shaft and the cool-down time of the motor must be determined by the system planner, depending on the ambient conditions prevailing during operation.

To keep dry motors sufficiently cooled in S3 mode, they must be flooded completely before being switched back on if the motor has been replaced!

Ensure that hoisting gear 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 hoisting gear. The machine must be positioned on a firm foundation. For transporting the pump, the load-carrying equipment must be secured to the lifting eyelets provided.

Electric power 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. When using switching devices, they must have the appropriate protection class. Switching devices must always be mounted in such a way that they are protected from flooding.

The structural components and foundations must be of sufficient stability in order to allow the product to be anchored securely and functionally. The operator or the supplier is responsible for the provision of the foundations and their suitability in terms of dimensions, stability and strength!

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-run protection system where there are great variations in the level.

Use guide and deflector plates for the pumped liquid intake. If the water jet reaches the surface of the water, air will be introduced into the pumped liquid. This leads to unfavorable inflow and pumping conditions for the pump, which in turn prevent the pump running smoothly and result in accelerated wear due to cavitation.

5.4. Installation



DANGER of falling!

When installing the pump and its accessories, work is sometimes performed directly at the edge of the basin or shaft. 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.
- Lift the pump by the handle or lifting eyelets, never by the power supply cable. When using chains, they must be connected with a shackle to the lifting eyelets or the carrying handle. Fastening devices must be technically approved.
- Check that the available planning documentation (installation plans, layout of the operating area, intake ratios) is complete and correct.



NOTE

- If the motor housing is to be taken out of the pumped liquid during operation, the operating mode for emerged operation should be followed.
- Never let the pump run dry. We recommend that dry-run protection be installed. If levels fluctuate dramatically, a dry-run protection must be installed.
- Check whether the cable present is long enough for its cross-section and its installation type. (For more information, consult the catalog, the planning manuals or Wilo customer service).
- Observe all regulations, rules and legal requirements for working with and underneath heavy suspended loads.
- Wear appropriate protective clothing/equipment.
- A second person must always be present when working in shafts. If there is danger of poisonous or asphyxiating gases forming, the necessary countermeasures must be taken!
- Please also observe the applicable national accident prevention regulations and trade association safety provisions.
- Inspect the coating before installation. If faults are found, these must be rectified before installation.

5.4.1. Stationary wet installation

A suspension device must be installed for wet installation. This must be ordered separately from the manufacturer. The pipeline system on the discharge side is connected to it.

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

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

If the motor is replaced during operation, the following temperature values must be observed strictly:

- The **max. liquid and ambient temperature is 40 °C.**

Fig. 2.: Wet installation

1	Suspension device	6	Lifting equipment
2	Non-return valve	7a	Min. water level for submerged operation
3	Shut-off valve	7b	Min. water level for non-submerged operation
4	Pipe bend	8	Deflector plate
5	Guide pipe (to be provided by the customer)	9	Intake
A	Minimum distances in parallel operation		
B	Minimum distances in alternating operation		

Distance "A"	
DN 50	308 mm
DN 65	385 mm
DN 80	615 mm
DN 100	615 mm

Work steps

1. Installation of the suspension device: about 3–6 h (please see the operating manual for the suspension device).
2. Preparing the pump for operation on a suspension device: about 1–3 h (please see the operating manual for the suspension device).
3. Installing the pump: about 3–5 h
 - Check that the suspension device is firmly fixed and functions properly.
 - Secure the hoisting gear to the pump with the shackle, lift the pump and then lower slowly on to the guide pipes in the operating area.
 - Hold the electric power cables slightly taut when lowering.
 - When the pump is connected to the suspension device, make sure that the electric power cables are secured adequately to prevent them falling and becoming damaged.
 - Have the electrical connections made by a qualified electrician.
 - The discharge port is sealed by its own weight.
4. Installing optional accessories, such as dry-run protection or level controllers.
5. Starting up the pump: about 2–4 h
 - As described in the "Start-up" section
 - For new installation: Flood the operating area
 - Bleed the discharge pipe.

5.4.2. Portable wet installation

With this installation type, the pump must be equipped with a pedestal (available as an optional extra). It is fitted to the intake port and ensures the minimum floor clearance and a secure position on a firm foundation. This installation type makes optional positioning in the operating area possible. For use in operating areas with a soft floor, a hard base must be used to prevent the machine from subsiding. A discharge hose is connected on the discharge side.

With this type of installation, the pump must be fixed to the floor for longer operating times. This prevents vibrations as well as guaranteeing quiet and low-wearing running.

If the motor is replaced during operation, the following temperature values must be observed strictly:

- The **max. liquid and ambient temperature is 40 °C.**

BEWARE of burns!

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



Fig. 3.: Portable installation

1	Load-carrying equipment	5	Storz hose coupling
2	Pump pedestal	6	Discharge hose
3	Pipe bend for hose connection or Storz fixed coupling	7a	Min. water level for submerged operation
4	Storz fixed coupling	7b	Min. water level for non-submerged operation

Work steps

1. Preparing the pump: about 1 h
 - Mount the pedestal at the intake port.
 - Attach the pipe bend to the discharge port.
 - Fix the discharge hose to the pipe bend with the hose clamp.
Alternatively, a Storz fixed coupling can be fitted to the pipe bend and a Storz hose coupling to the discharge hose.
2. Installing the pump: about 1–2 h
 - Position the pump at the place of use. If necessary, secure the lifting gear to the pump with shackles, lift the pump and set it down at the intended operating position (pit, shaft).
 - Check that the pump is upright and standing on a firm base. Do not let it subside!
 - Lay the power supply cable so that it cannot be damaged.
 - Have the electrical connections made by a qualified electrician.
 - Lay the discharge hose so that it cannot be damaged and secure it at a suitable place (e.g. drain).



BEWARE of the discharge hose being pulled off!
Injuries may result from the discharge hose being pulled or knocked off accidentally. The discharge hose must be secured appropriately. Avoid kinks in the discharge hose.

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

5.4.3. Stationary dry installation

There is a divided operating area when the machine is installed in this manner: Collector tank and machine area. The pumped liquid is captured in the collector tank, and the pump is fitted in the machine area. The operating area must be prepared according to the design or the manufacturer’s planning guide. The pump is connected with the intake and discharge side of the pipe system in the machine room at the place listed. The pump itself is not immersed in the pumped liquid.

The intake and discharge side pipeline must be self-supporting, i.e. it may not be supported by the pump. In addition, the pump must be connected to the system without vibration or tension. We therefore recommend the use of elastic connectors (compensators).

The following temperatures must be complied with for dry installation:

- Max. liquid temperature: **40 °C.**
- Max. ambient temperature: **25 °C.**

The pump is not self-priming, which means that the hydraulics housing must be filled completely with the pumped liquid. The min. liquid level in the collector tank must be the same height as the top edge of the hydraulics housing.



BEWARE of burns!

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

Fig. 4.: Stationary dry installation

1	Collector tank	5	Compensator
2	Machine area	6	Pump
3	Shut-off valve	7	Min. water level
4	Non-return valve	8	Dry-run protection

Work steps

1. Installing the pump: about 3–5 h
 - Check that the pipe system is firmly fixed.
 - Secure the hoisting gear to the pump with the shackle, lift the pump and lower slowly on to the pipe system.
 - When lowering, pay attention to the electric power cables.
 - If the pump is mounted on the pipeline, secure it to the piping system on the intake and discharge sides.
 - Run the power supply cables in accordance with the local regulations.
 - Have the electrical connections made by a qualified electrician.
2. Installing optional accessories, such as dry-run protection or level controllers.
3. Starting up the pump: about 2–4 h
 - As described in the “Start-up” section
 - Open the slide valves on the intake and discharge sides.
 - Bleed the discharge pipe.

5.4.4. 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 starts per hour 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

The A version in the FIT series is fitted with a float switch for recording the level. A contact is opened or closed here, depending on the angle of inclination on the float switch.

The switching level is defined by the cable length on the float switch.

When using a separate level control device, please consult the installation information in the installation and operation manual.

Observe the information on the maximum starts per hour and the minimum water level.

5.5. Dry-run protection

To guarantee the necessary cooling, the pump must be submerged in the pumped liquid, depending on the operating mode. Also make sure that no air enters the hydraulic housing.

The pump must therefore always be submerged in the pumped liquid up to the top edge of the hydraulic housing or the motor housing. For optimum reliability, we recommend installing a dry-run protection system.

Correct running is ensured by float switches or electrodes. The float switch or electrode is fixed in the shaft and switches off the pump when the water level falls below the minimum coverage level. If dry-run protection is only put into effect with one float or electrode when 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.

5.5.1. Corrective measures 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 float 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.

5.6. Electrical connection



ELECTROCUTION hazard!
Incorrect electrical connections can cause fatal electric shocks. Electrical connections may only be made by a qualified electrician who is approved by the local power supplier, in accordance with locally applicable regulations.

- The mains 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 wire assignment.

- Any available monitoring equipment, e.g. for the motor temperature, must be connected and tested to ensure that it is working properly.
- For three-phase current motors, a clockwise rotating field must be available.
- Ground the pump in accordance with the regulations.
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 grounding 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).
- Switching devices must be purchased as accessories.

5.6.1. Mains fuses

The pre-fusing must be rated according to the starting currents. You will find the starting currents on the rating plate.
Only slow-blow fuses or K characteristic automatic cut-outs may be used for pre-fusing.

5.6.2. AC motor

Fig. 5.: Connection plan

L	Mains connection	PE	Ground
N			

The AC version can be equipped with the following:

- with safety plug
- with float switch and safety plug
To connect it to the mains, plug it into the power outlet.
To connect the pump directly in the switch box, the plug must be removed and the electrical connection made by a qualified electrician!
The wires of the connection cable are assigned as follows:

3-wire connection cable	
Wire color	Terminal
Brown	L
Blue	N
Green/yellow	PE

5.6.3. Three-phase current motor

Fig. 6.: Connection plan

L1	Mains connection	PE	Ground	
L2		20		Bimetal sensor
L3		21		

The three-phase current version can be equipped with the following:

- float switch and CEE plug
- free cable end

The version with a plug is connected to the mains by plugging it into the power outlet.

For the version with free cable ends, the connection to the mains is made at the switch box terminals.

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 monitoring
2	Temperature monitoring
3	U
4	V
5	W
Green/yellow	Ground (PE)

5.6.4. Monitoring device connections

All monitoring devices must be connected at all times.

Temperature monitoring device for AC motor

- With the AC motor, the temperature monitoring device is integrated in the motor and is self-switching. The monitoring device is always active and does not have to be connected separately.

Temperature monitoring device for three-phase current motor

- Bimetal sensors can be directly connected in the control cabinet.

Connection values:
max. 250 V(AC), 2.5 A, $\cos \varphi = 1$

- When the threshold is reached, the pump must switch off.

For this reason, no warranty claims can be accepted for damages to the winding resulting from unsuitable motor monitoring.

Connecting the optional sealing chamber electrode for the oil separation chamber

- The sealing chamber 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 output or the pump 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!

5.7. Motor protection and activation types

5.7.1. 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 at 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 adhered to when connecting the pump.

5.7.2. 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 operating point.

Soft start activation

- At full load, the motor protection should be set to the rated current at the operating point. At partial load, we recommend that the motor protection be set 5 % above the current measured at the operating point.
- The current consumption must be less than the rated current during the entire operation period.
- Because of the upstream motor protection, the motor should be started and stopped within 30 seconds.
- To avoid power losses during operation, bypass the electronic starter (soft start) after normal operation has been established.

Pumps with plugs/switching devices

Insert the plug into the chosen plug outlet and press the on/off switch or let the pump switch on/off automatically by means of the attached level control system.

Switching devices can be ordered as accessories for pumps with free cable ends. In this case, also observe the instructions enclosed with the switching device.

Plugs and switching devices are not flood-proof. Note the IP protection class. Always install switching devices in such a way that they are protected from flooding.

5.7.3. Operation with frequency transformers

The pump may not be operated on frequency transformers.

6. Start-up

The "Start-up" 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 coverage / max. submersion

If the pump has not been operated for an extended period, also check these conditions and rectify any faults identified.

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 during start-up of the pump, the following points must be observed:

- The pump may only be started-up by qualified persons. The safety advice must be followed at all times.
- 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 and mechanical adjustments must be made by specialist staff.
- The pump is suitable for use under the specified operating conditions.
- The work area of the pump is not an openly accessible area and is to be kept free of people! No persons are allowed in the work area during switching on and/or during operation.
- A second person must be present when working in shafts. 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 direction check

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 rotation direction

The rotation direction must be checked with a rotating field tester by a local electrician. The rotating field must be clockwise for the correct rotation direction.

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

6.2.2. If the direction of rotation is not correct

When using Wilo switching devices

Wilo switching devices are designed so that the connected pumps are driven in the right direction. If the rotation direction is wrong, 2 phases/ conductors of the mains supply to the switching device must be swapped.

With switching devices provided by the customer:

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

6.3. Level control

Check the following points during level control:

- When using float switches, ensure that they can move freely in the operating area.
- Check that the cable of the float switch is fixed correctly on the pressure pipe or wall.
- The water level must not fall below the minimum.
- The maximum starts per hour may not be exceeded.

When using a separate level control device, please consult the setting information in the installation and operation manual.

6.4. Start-up

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 pumped liquid.

Keep out of the work area of the pump. No persons are allowed in the work area during switching on and/or during operation.

Before switching on for the first time, the installation must be checked as described in the "Installation" section and an isolation check must be carried out according to the "Maintenance" section.

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 foundation and that the pump pedestal is mounted correctly.



If the pump falls over, it must be switched off before setting it up again.
For versions with plugs, the plug must have the correct IP protection class.

6.4.1. Before switching on

Check the following:

- Cable guidance – no loops, slightly taut
- Check the temperature of the pumped liquid and the submersion depth – see technical data
- If a hose is used on the discharge side, it should be flushed out with clean water before use to prevent any sediment causing blockages
- Clean coarse deposits from the pump sump
- Clean the pipe systems on the discharge and intake sides
- Open all valves on the discharge and intake sides



LETHAL explosion hazard

If the shut-off valves on the intake and discharge side are closed during operation, the liquid in the hydraulic housing will be heated up by the pumping movement. Considerable pressure is created in the hydraulic housing by the heating. The pressure can cause the pump to explode! Before switching on the pump, ensure that all the valves are open.

- The hydraulic housing must be flooded, i.e. it should be completely full of liquid, with no air in it at all. It can be bled using a suitable bleeding device in the system, or, if available, with bleeder screws on the discharge port.
- Check that all accessories, the pipe system and suspension device are properly fitted.
- Check all level control and dry-run protection systems

6.4.2. Switching on/off

The pump is switched on and off using the defined operating position (switching device, switch cabinet) in the system.

6.4.3. After switching on

The rated current is briefly exceeded during the start-up procedure. Once the start-up procedure has completed, the operating current may no longer exceed the rated current.

If the motor does not start immediately after the pump is switched on, it must be switched off without delay. The start pauses specified in the "Technical data" section must be adhered to before starting up again. If the fault recurs, the pump must be switched off again immediately. The pump may only be restarted once the fault has been rectified.

6.5. Safety rules 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.

The pump has moving parts. During operation, these parts turn to pump the liquid. Certain substances in the pumped liquid can cause very sharp edges to form on the moving parts.



BEWARE of rotating parts!

The rotating parts can crush and sever limbs. Never reach into the hydraulics or moving parts during operation.

- Before performing maintenance or repairs, switch off the pump, disconnect it from the mains and secure it against being switched on again without authorization.
- Let the moving parts come to a stop!

The following must be checked at regular intervals:

- Operating voltage (permissible deviation $\pm 5\%$ of the rated voltage)
- Frequency (permissible deviation $\pm 2\%$ of the rated frequency)
- Current consumption (permissible deviation between phases is a maximum of 5 %)
- Voltage difference between the individual phases (max. 1 %)
- Starts and stops per hour (see technical data)
- Air entry in the intake, a deflector plate should be fitted if necessary
- Minimum water immersion level, level control unit, dry-run protection
- Smooth running
- Shut-off valves in the intake and discharge pipes must be open.



LETHAL explosion hazard

If the shut-off valves on the intake and discharge side are closed during operation, the liquid in the hydraulic housing will be heated up by the pumping movement. Considerable pressure is created in the hydraulic housing by the heating. The pressure can cause the pump to explode! Before switching on the pump, ensure that all the valves are open.

7. Shutdown/disposal

- All work must be carried out with the greatest care.
- Proper protective clothing must be worn.
- When carrying out work in basins or containers, the local protection measures must be observed in all cases. A second person must be present for safety reasons.
- Only hoisting gear 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!
Load-carrying and lifting equipment must be in a perfect technical condition. Work may only commence if the hoisting gear has been checked and found to be in perfect working order. If it is not inspected, fatal injuries may result.

7.1. Temporary shutdown

For this type of shutdown, the pump remains installed and is not cut off from the mains. For temporary shutdown, the pump must remain completely submerged so that it is protected from frost and ice. Ensure that the temperature of the pumped liquid and in the operating area 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. Final shutdown 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 removing the product, maintenance and storage can then commence.



BEWARE of poisonous substances!
Pumps that pump liquids which are hazardous to health must always be decontaminated before undertaking any other work. There is otherwise a risk of fatal injury! Wear the necessary protective clothing for this work.



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

7.2.1. Removal

Portable wet installation

Pumps in portable wet installations can be lifted out of the pit after being disconnected from the mains and emptying the discharge pipe. You may have to disconnect the hose first. Appropriate hoisting gear may have to be used.

Stationary wet installation

Pumps in stationary wet installations with suspension devices are raised out of the pit using appropriate lifting gear. During lifting, always hold the power cable slightly taut to prevent it being damaged.

The operating area does not have to be emptied especially for this purpose. The shut-off valves in the intake and discharge pipe must be closed to prevent the operating area overflowing or the discharge pipe being emptied.

Stationary dry installation

With stationary dry installation, the shut-off valves on the intake and discharge side must be closed before dismantling. During dismantling, please remember that liquid in the hydraulic housing will run out. Suitable containers must be put in place to catch all the liquid!

After unscrewing the connections on the intake and discharge port, the pump can be dismantled using suitable lifting gear. The operating area must be cleaned thoroughly after dismantling and any drops removed.

7.2.2. Return delivery / storage

Return delivery

For shipping, the parts must be packed and sealed in sufficiently large, non-tearing plastic sacks to prevent leakages. The pump must be shipped by carriers who have been briefed accordingly.

Please also refer to the “Transport and storage” section.

Storage

- Clean the pump thoroughly, decontaminating it if necessary.
- Store it in a clean, dry place protected from frost.
- Place it down vertically onto a firm foundation and secure it against falling.
- Seal the intake and discharge ports tight with suitable material (such as foil).
- Support the power cables at the cable lead-in to prevent permanent deformation and protect the ends from moisture.
- Protect the pump from direct sunshine to prevent the elastomer parts and housing coating becoming brittle.

Please also refer to the “Transport and storage” section.

7.3. Starting up again

Clean the pump of dust and deposits before starting up again. Then carry out all the maintenance tasks as described in the “Maintenance” section.

Once this work has been completed, the pump can be installed and connected to the mains by an electrician. This work must be carried out in accordance with the “Installation” section.

The pump must be switched on as described in the “Start-up” section.

The pump may only be restarted if it is in perfect condition and ready for operation.

7.4. Disposal

7.4.1. Lubricants

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

7.4.2. 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.

7.4.3. 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.
- More information about proper disposal can be obtained from the municipal authorities, the waste disposal authorities or from the supplier from whom the product was purchased.

8. Maintenance



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.

- Before performing maintenance or repair work, switch off and dismantle the pump as described in the Final shutdown/disposal section.
- After completing maintenance or repair work, the pump must be installed and connected according to the Installation section.
- The pump must be switched on as described in the Start-up section.
Observe the following points:
- All maintenance and repair work must be carried out by Wilo customer service, authorized service centers or by trained specialist personnel with utmost care, in a safe workplace. Proper protective clothing is to be worn.
- This manual must be available to and observed by the maintenance personnel. Only the maintenance and repair work listed here may be performed.

Further work and/or structural changes may only be carried out by Wilo customer service.

- When carrying out work in basins or containers, the local protection measures must always be observed. A second person must be present for safety reasons.
- Only hoisting gear 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. When lifting and lowering the pump, make sure that it does not become jammed. If, however, the pump does become jammed, the lifting forces must not exceed 1.2 x the pump weight. The maximum load-carrying capacity must never be exceeded.

Make sure that all fastening devices, ropes and safety devices of the hoisting gear are in technically perfect condition. Work may only commence if the hoisting gear 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 system must be carried out by an electrician. Defective fuses must be replaced. Under no circumstances are they to be repaired. Only fuses at the specified current and of the prescribed type may be used.
- When working with flammable solvents and cleaning agents, fires, naked lights and smoking are prohibited.
- Pumps that circulate liquids hazardous to health, or that come into contact with these liquids, must be decontaminated. Ensure that no dangerous gases can form or are present.

If injuries involving hazardous liquids or gases occur, first-aid measures must be taken in accordance with the notices in the workplace and a doctor should be called immediately.

- Ensure that all necessary tools and materials are available. Tidiness and cleanliness guarantee safe and problem-free operation of the pump. After working on the pump, all cleaning materials and tools should be removed from it. All materials and tools should be stored in an appropriate place.
- Lubricants, such as oil and grease, must be collected in suitable vessels and disposed of properly (in accordance with the 75/439/EEC directive and with Sections 5a, 5b of the German Waste Act [AbfG]). Appropriate protective clothing is to be worn for maintenance and repair work. It must be disposed of in accordance with waste code TA 524 02 and EC Directive 91/689/EEC. Only lubricants expressly recommended by the manufacturer may be used. Oils and lubricants should not be mixed.
- Only use genuine parts made by the manufacturer.

8.1. Lubricants

8.1.1. Overview of white oils

The oil separation chamber is filled with a white oil that is potentially biodegradable. We recommend the following oil types for an oil change:

- Aral Autin PL
 - Shell ONDINA G13, G15 or G17
 - Esso MARCOL 52 or 82
 - BP Energol WM2
 - Texaco Pharmaceutical 30 or 40
- All these oil types have food safety certification in accordance with USDA–H1.

Fill quantities

The fill quantities depend on the number of poles:

- 2-pole: 900 ml
- 4-pole: 1500 ml

8.1.2. Overview of greases

The following can be used as grease 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 determined according to the demands on the pump. If strong vibrations occur during operation, the pump or installation must be checked, regardless of the maintenance intervals.

When the equipment is used in wastewater pump stations inside buildings or on properties, the maintenance intervals and work per DIN EN 12056-4 must be observed.

8.2.1. Intervals for normal operating conditions

Before initial start-up or after an extended period of storage

- Check the insulation resistance
- Turn the impeller
- Check the oil level in the oil separation chamber

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 control devices
 - Check the switching devices/relays in use
 - Change the oil
- Moisture sensors, if used, indicate when the oil is to be changed.

8.2.2. Intervals for difficult operating conditions

For difficult operating conditions, the maintenance intervals stated should be shortened accordingly. If this is the case, please contact Wilo customer service. If the pumps are to be used in difficult conditions, we also recommend that you take out a maintenance contract.

The following are considered difficult operating conditions:

- Large quantities of fibrous materials or sand in the liquid
- Turbulent intake (caused by air entering or cavitation, for example)

- Highly corrosive liquids
- Highly gaseous liquids
- Unfavorable duty points
- Operation at risk from water hammers

8.2.3. Maintenance tasks recommended to ensure smooth operation

We recommend that the current consumption and operating voltage are checked regularly during all 3 phases. These values remain constant during normal operation. Slight fluctuations are a result of the composition of the pumped liquid. The current consumption can assist in early detection and correction of damage and/or faulty operation in the impeller, bearings and/or the motor. Larger voltage fluctuations strain the motor winding and can lead to failure of the pump. Regular checks can therefore prevent greater damage from occurring later and reduce the risk of a total failure. We recommend using remote monitoring for the regular checks. Please contact Wilo customer service about this.

8.3. Maintenance tasks

Before performing maintenance:

- Disconnect the pump from the electricity supply and secure it to prevent accidental activation.
- Let the pump cool down and clean it thoroughly.
- Ensure that all operating parts are in good condition.

8.3.1. Check the insulation resistance

To check the insulation resistance, the power supply cable must be disconnected. The resistance can then be measured with an insulation tester (measuring voltage = 1000 V). The values may not fall below the following level:

- For the initial start-up: The insulation resistance must not be less than 20 MΩ.
- For further measurements: The value must be greater than 2 MΩ.

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

If the insulation resistance is too low, moisture may have penetrated the cable and/or the motor. Do not connect the pump. Consult the manufacturer.

8.3.2. Turn the impeller

1. Lay the pump horizontally on a firm surface. **Make sure that the pump cannot fall and/or slip away.**
2. Slowly and carefully reach into the hydraulic housing from below and turn the impeller.

BEWARE of sharp edges!

Sharp edges can form on the impellers and hydraulic port. There is a risk of injuries! Wear the necessary protective clothing, e.g. safety gloves.



8.3.3. Checking the oil level in the oil separation chamber

The same opening is used to empty and fill the oil separation chamber.



BEWARE of injuries from hot and/or pressurized lubricants!

After the pump is switched off, the oil is still hot and under pressure. This can force out the plug, causing hot oil to escape. Beware of injuries or burns! Let the oil cool down to ambient temperature first.

Fig. 7.: Plugs

1	Plug
---	------

1. Lay the pump horizontally on a firm surface with the plug facing upwards.
Make sure that the pump cannot fall and/or slip away.
2. Slowly and carefully remove the plug.
Caution: The lubricant may be pressurized. This can force the plug out.
3. The lubricant must reach to about 1 cm below the plug opening.
4. If there is not enough oil in the oil separation chamber, top it up. When doing so, follow the instructions under "Changing the oil".
5. Clean the plug, fit with a new sealing ring if necessary and screw it in again.

8.3.4. Visual inspection of the power supply cable

The power supply cables must be examined for bubbles, cracks, scratches, chafed areas and/or crushed sections. If damage is found, the pump must be shut down immediately and the damaged power supply cable replaced.

The cables may only be changed by Wilo customer service or an authorized/certified service center. The pump may not be used again until the damage has been rectified professionally.

8.3.5. Visual inspection of accessories

Check that accessories are fitted correctly and working properly. Loose and/or defective accessories should be repaired or replaced immediately.

8.3.6. Visual inspection of the coating and housing for wear

The coatings or housing parts must not be damaged. Repair any visible damage to coatings. If there is visible damage to the housing, consult Wilo customer service.

8.3.7. Functional test of safety and monitoring devices

Monitoring devices include temperature sensors in the motor, moisture sensors, motor protection relays, overvoltage relays, etc.

- Motor protection relays, overvoltage relays and other triggering devices can generally be triggered manually for test purposes.
- To inspect the moisture sensor or the temperature sensor, the pump must be cooled to ambient temperature and the electrical supply cable of the monitoring device in the switch cabinet must be disconnected. The monitoring device is then tested with an ohmmeter. The following values should be measured:
 - Bi-metal sensor: Value = "0" throughout
 - Moisture sensor: This value must tend towards infinity. If the value is low, there is water in the oil. Also observe the instructions of the optional evaluation relay.

If the deviations are significant, please consult the manufacturer.

8.3.8. Check the switching devices/relays in use

Please see the respective operating manual for the procedure for checking the switching devices/relays used. Defective devices must be replaced immediately, as they cannot ensure safe operation of the pump.

8.3.9. Changing the oil in the oil separation chamber

The same opening is used to empty and fill the oil separation chamber.



BEWARE of injuries from hot and/or pressurized lubricants!

After the pump is switched off, the oil is still hot and under pressure. This can force out the plug, causing hot oil to escape. Beware of injuries or burns! Let the oil cool down to ambient temperature first.

Fig. 8.: Plugs

1	Plug
---	------

1. Lay the pump horizontally on a firm surface with the plug facing upwards.
Make sure that the pump cannot fall and/or slip away.
2. Slowly and carefully remove the plug.
Caution: The lubricant may be pressurized. This can force the plug out.
3. Drain off lubricant by turning the pump until the opening faces downwards. Collect the lubricant in a suitable container and dispose of according to the requirements in the "Disposal" section.
4. Turn the pump back until the opening faces upwards again.
5. Fill the new lubricant by means of the opening in the plug. The oil must reach to about 1 cm below the opening. Comply with the specified lubricants and fill quantities.
6. Clean the plug, fit with a new sealing ring and screw it in again.

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.

9.1. Fault: The pump will not start

1. Power supply interrupted, short circuit or earth fault in the cable or motor windings
 - 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.
 - Check that the impeller runs smoothly. Clean or free it as necessary
3. The moisture sensors (optional) have interrupted the power circuit (operator-related)
 - See fault: Mechanical shaft seal leaks, moisture sensors report a fault or switch the pump off

9.2. Fault: The pump starts, but the motor protection switch triggers shortly after start-up

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 two phases of the mains cable
6. Impeller impeded by adhesive material, blockages and/or solid matter, increased current consumption
 - Switch off the pump, secure it against being switched on again and free the impeller or clean the intake port

7. The pumped liquid is too dense
 - Contact the manufacturer

9.3. Fault: The pump runs but does not pump

1. No pumped liquid
 - Open the container intake or slide valves
2. Intake blocked
 - Clean the intake, slide valve, intake port or intake strainer
3. Impeller blocked or obstructed
 - Switch off the pump, secure it against being switched on again and free the impeller
4. Defective hose or pipeline
 - Replace defective parts
5. Intermittent operation
 - Check the switching system

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

1. Intake blocked
 - Clean the intake, slide valve, intake port or intake strainer
2. Slide valve in the discharge pipe closed
 - Fully open the slide valve
3. Impeller blocked or obstructed
 - Switch off the pump, secure it against being switched on again and free the impeller
4. Incorrect direction of rotation
 - Swap two phases of the mains cable
5. Air in the system
 - Check the pipelines, pressure shroud and/or hydraulics, and bleed if necessary
6. Pump pumping against excessive pressure
 - Check the slide valve in the discharge pipe. If necessary, open it completely, use a different impeller or contact the factory
7. Signs of wear
 - Replace worn parts
8. Defective hose or pipeline
 - Replace defective parts
9. Inadmissible levels of gas in the pumped liquid
 - 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

9.5. 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. The intake port, strainer and/or impeller is blocked
 - Clean the intake port, strainer and/or impeller
3. The impeller is impeded
 - Switch off the pump, secure it against being switched on again and free the impeller
4. Inadmissible levels of gas in the pumped liquid

- Contact the manufacturer
- 5. Two-phase operation
 - Have a specialist inspect the connection and correct it as necessary
- 6. Incorrect direction of rotation
 - Swap two phases of the mains cable
- 7. Signs of wear
 - Replace worn parts
- 8. Defective motor bearing
 - Contact the manufacturer
- 9. The pump is installed under mechanical strain
 - Check the installation, use expansion joints if necessary

9.6. Fault: Mechanical shaft seal leaks, moisture sensors report a fault or switch the pump off

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

9.7. 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 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 support. For more details, please contact Wilo customer service.

10. Appendix

10.1. Spare parts

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

Technical changes reserved



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Erreichbar Mo-Do 7-18 Uhr, Fr 7-17 Uhr.

- Antworten auf
 - Produkt- und Anwendungsfragen
 - Liefertermine und Lieferzeiten
- Informationen über Ansprechpartner vor Ort
- Versand von Informationsunterlagen

Standorte weiterer Tochtergesellschaften

Die Kontaktdaten finden Sie unter www.wilo.com.

* 0,14 €/Min. aus dem Festnetz,
Mobilfunk max. 0,42 €/Min.

Täglich 7-18 Uhr erreichbar
24 Stunden Technische
Notfallunterstützung

- Kundendienst-Anforderung
- Werksreparaturen
- Ersatzteilfragen
- Inbetriebnahme
- Inspektion
- Technische Service-Beratung
- Qualitätsanalyse

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