

Wilo-Drain MTC 32

de Einbau- und Betriebsanleitung

en Installation and operating instructions

fr Notice de montage et de mise en service

it Istruzioni di montaggio, uso e manutenzione

sv Monterings- och skötselanvisning

el Οδηγίες εγκατάστασης και λειτουργίας

tr Montaj ve kullanma kılavuzu

hu Beépítési és üzemeltetési utasítás

cs Návod k montáži a obsluze

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ru Инструкция по монтажу и эксплуатации

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uk Інструкція з монтажу та експлуатації

Fig. 1: MTC 32F17...F33

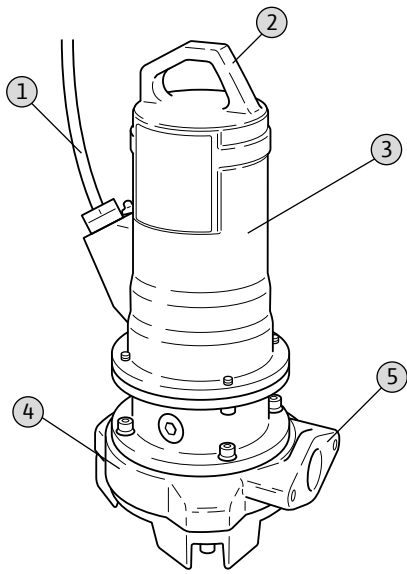


Fig. 1: MTC 32F39...F55

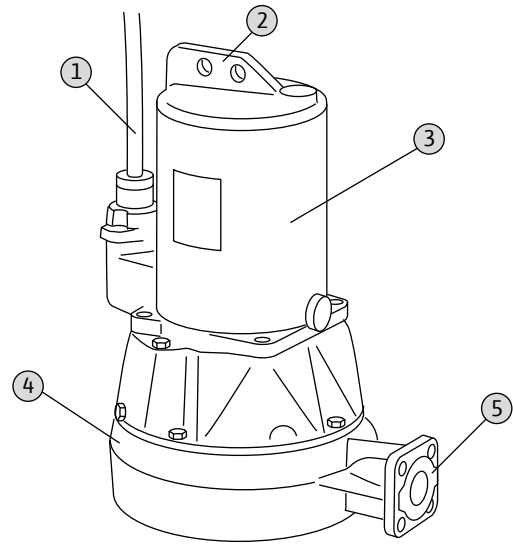


Fig. 2

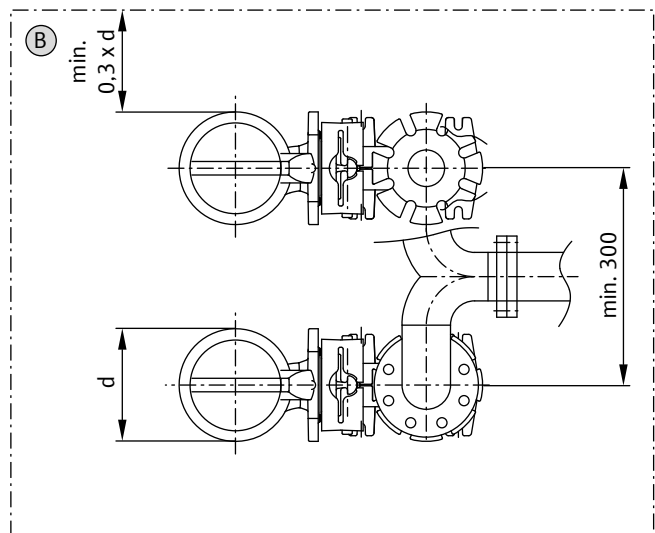
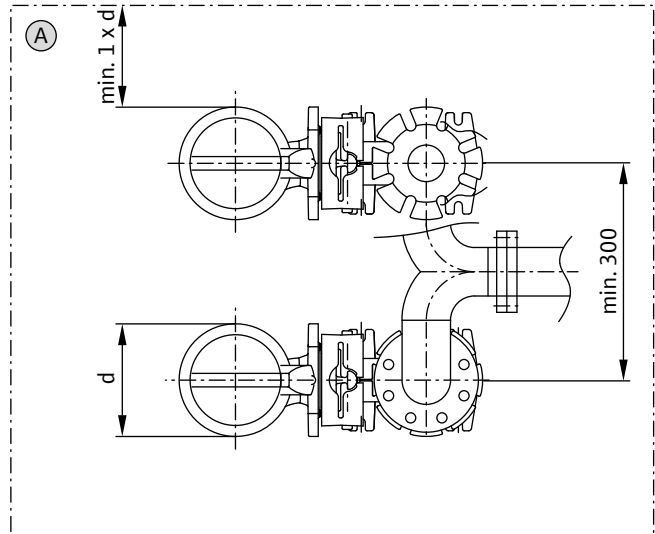
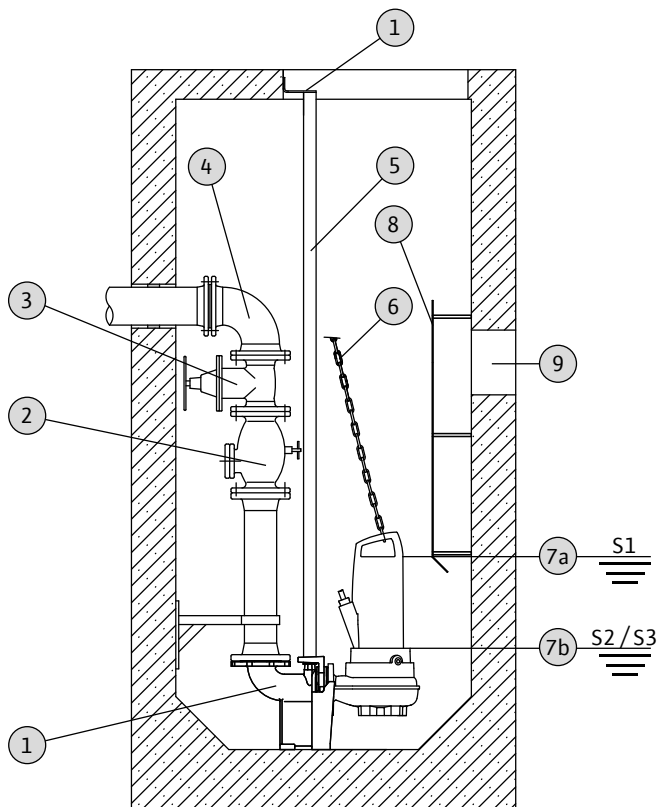


Fig. 3

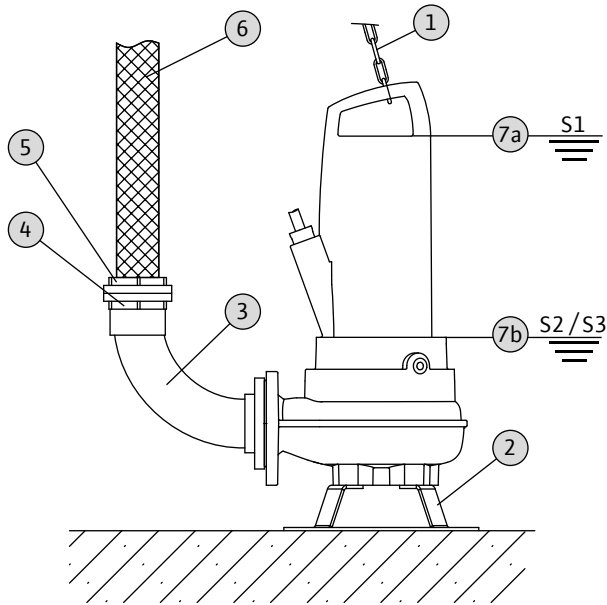


Fig. 4: MTC 32F17...F33

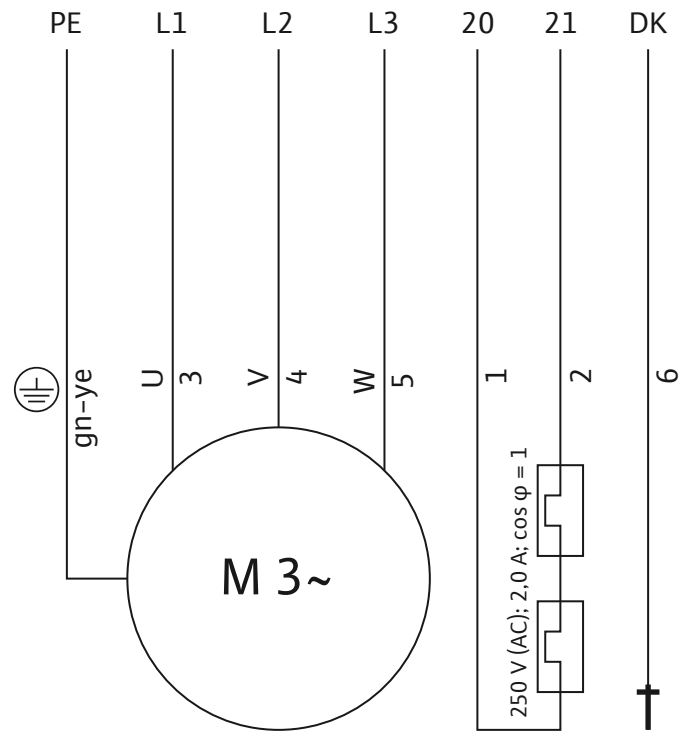


Fig. 4: MTC 32F39...

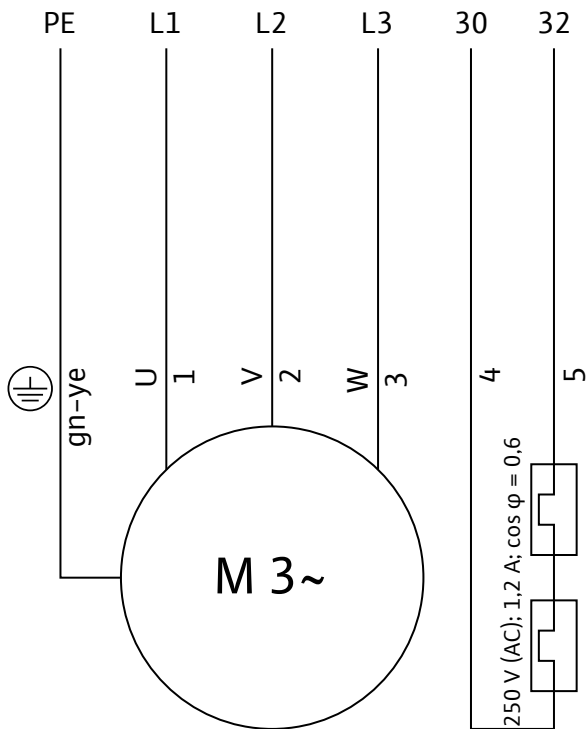


Fig. 5: MTC 32F49...F55

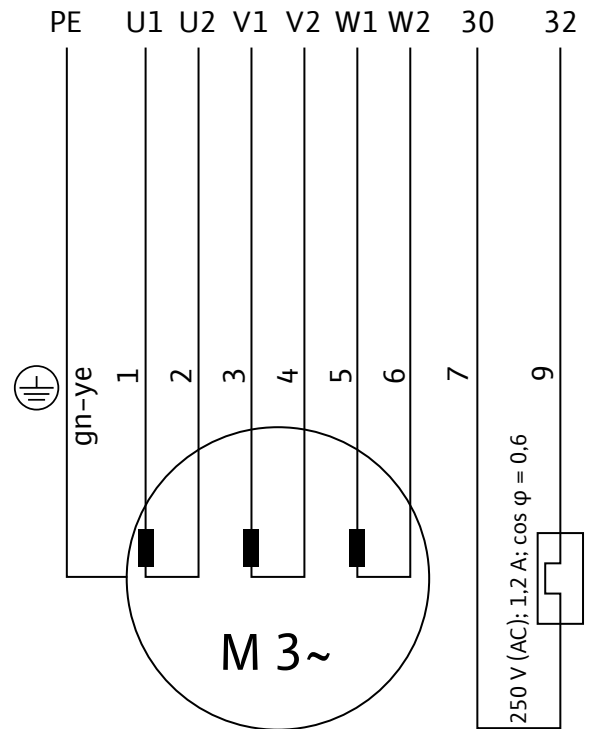


Fig. 6: MTC 32F17...F33

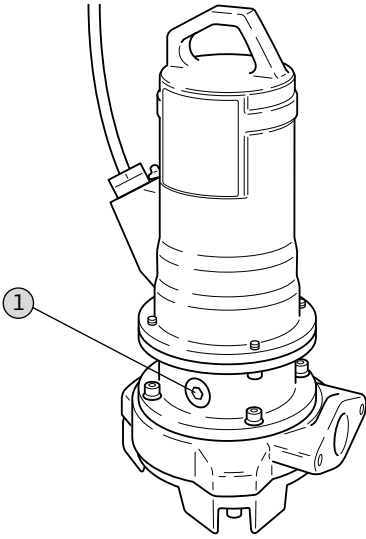


Fig. 7: MTC 32F17...F33

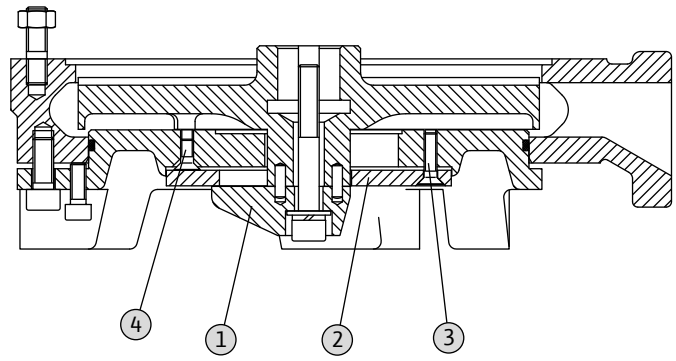


Fig. 8: MTC 32F39...

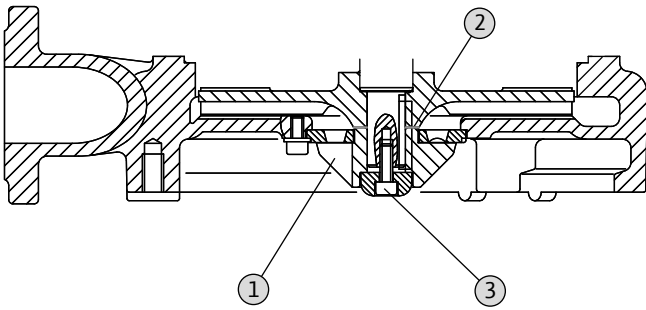
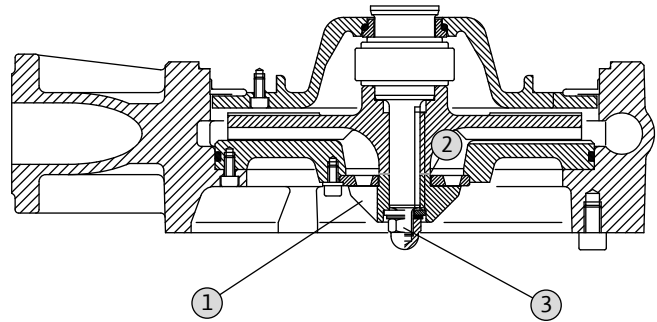


Fig. 8: MTC 32F49...F55



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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 operating manual contains a copy of the EC Declaration of Conformity.

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 product 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 the 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 product 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 product.

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

1.4. Abbreviations and technical terms

Various abbreviations and technical terms are used in this operating and maintenance manual.

1.4.1. Abbreviations

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

1.4.2. Terms

Dry running

The product is running at full speed, however, there is no liquid to be pumped. Dry running must be strictly avoided. If necessary, a safety device must be installed.

Dry-running protection

The dry-running protection is designed to automatically shut down the product if the water level falls below the minimum immersion level. This is done, for example, by installing a float switch or level sensor.

Level controller

The level controller switches the product on or off at various filling levels. This is done by installing either one or two float switches.

1.5. Illustrations

Dummies and original drawings of the products are used in the illustrations. This is the only sensible solution given our wide range of products and the differing sizes offered by the modular system. More exact drawings and specifications can be found on the dimension sheet, the planning information and the installation plan.

1.6. Copyright

This operation and maintenance manual has been copyrighted by the manufacturer. The operation and maintenance handbook is intended for use by assembly, operating, and maintenance personnel. It contains technical specifications and diagrams which may not be reproduced or distributed, either completely or in part, or used for any other purpose without the express consent of the manufacturer.

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 product indicated 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 defects found in the products it sells, provided that the following requirements have been fulfilled:

1.8.1. General 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 product was used only as prescribed.
- All safety and control devices were connected and inspected by qualified personnel.

1.8.2. Warranty period

If no other provisions have been made, the warranty period covers the first 12 months after initial start-up or up to 18 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 product has expired.

1.8.3. Spare parts, add-ons and modifications

Only genuine spare parts from the manufacturer may be used for repairs, replacements, add-ons and modifications. These are the only parts that guarantee a long service life and maximum safety. These parts have been specially designed for our products. Unauthorized add-ons and modifications or the use of non-original spare parts can seriously damage the product and 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 not listed in this operation and maintenance manual, and any type of 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 eliminated immediately by trained personnel. The product may only be operated if it is in proper working order. During the agreed warranty period, the product 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 product to the factory for inspection.

1.8.6. Exclusion from liability

No liability will be assumed for product 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
- Unqualified repairs
- Inadequate construction site or construction work
- Chemical, electrochemical and electrical influences
- Wear

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

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 every phase of the product'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 products 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 applicable directives and regulations, such as DIN and ANSI.

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

- **Danger**

This can result in serious or fatal injuries!

- **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 device and let the impeller come to a halt.

2.2. General safety information

- When installing or removing the product, never work alone in rooms and shafts. A second person must always be present.
- The product must always be switched off before any work is performed on it (assembly, dismantling, maintenance, installation). The product must be disconnected from the electrical system and secured against being switched on again. All rotating parts must have come to a stop.
- The person operating the product must notify his or her supervisor immediately should any defects or irregularities occur.
- It is of vital importance that the system be shut down immediately by the operator if any problems arise which may endanger safety of personnel. Problems of this kind include:
 - Failure of the safety or control devices
 - Damage to important parts
 - Damage to electrical equipment, cables, and insulation.
- Tools and other objects should be kept in a place reserved for them 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 lashing equipment which is legally defined as such and officially approved.
- The lashing 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 always remains 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. 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 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 strictly observed.

Non-observance can result in injury or substantial material damage.

2.3. Directives used

This product is subject to:

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

See the EC Declaration of Conformity for precise details of and the guidelines and standards used. Also, various national standards are used as a basis for operating, assembling and dismantling the product. These include the German accident prevention regulations, VDE regulations and German Equipment Safety Law.

2.4. CE marking

The CE marking is found either on or near the name plate. The name plate is attached to the motor casing or to the frame.

2.5. Electrical work

Our electrical products are operated with alternating or three-phase current. The local regulations (e.g. VDE 0100) must be observed. The section entitled "Electrical connection" must be observed when connecting the product. The technical specifications must be strictly adhered to.

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



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 product and the cable. Never immerse cable ends in the pumped fluid or other liquids. Unused wires must be insulated!

2.6. Electrical connection

The person operating the machine must know where it is supplied with power and how to cut off the supply. It is advisable to install a residual current device (RCD).

The relevant national directives, standards and regulations as well as the requirements of the local public utility company must be observed.

When the product is connected to the electrical control panel, particularly when electronic devices

such as soft startup control or frequency drives are used, the relay 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.

The connections may only be made if the relays 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!

2.7. Ground connection

Our products (unit including protective devices and control station, auxiliary hoisting gear) must always be grounded. If there is a possibility that people can come into contact with the product and the pumped liquid (for example on construction sites), the connection must be additionally equipped with a residual current circuit breaker.

The pump units are submersible and conform to protection class IP 68 in terms of the applicable standards.

The protection class of the installed switching devices can be found on the device housing and the operation manual.

2.8. Safety and monitoring devices

Our products can be equipped with mechanical (e.g. intake strainer) and/or electrical (thermo sensors, moisture sensors, etc.) safety and monitoring devices. These devices must be attached and connected.

Electrical devices such as thermo sensors or float switches must be connected and tested by an electrician before start-up.

Please note that certain devices require a relay to function properly, for example a PTC thermistor and PT100 sensor. This relay can be obtained from the manufacturer or an electrical supply dealer.

Personnel must be informed of the systems used and how they work.

CAUTION!

Never operate the product if the safety and monitoring devices have been removed or damaged, or if they do not work.

2.9. Safety rules during operation

When operating the product, always follow the locally applicable laws and regulations for work safety, accident prevention and handling electrical machinery. To help to ensure safe working practice, the responsibilities of employees should

be clearly set out by the owner. All personnel are responsible for ensuring that regulations are observed.

The product has moving parts. During operation, these parts turn to pump the fluid. Certain materials in the pumped fluid 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 the moving parts during operation.

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

2.10. Operation in an explosive atmosphere

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

Products that have been approved for use in an explosive atmosphere are marked as follows:

- An "Ex" symbol must be attached to the name plate.
- Information on the explosion protection classification and certification must be stated on the name plate.

When using a product in an explosive atmosphere, observe the information on explosion protection provided in the other sections.



BEWARE of using accessories not approved for use in an explosive atmosphere!

If you use explosion-certified products in an explosive atmosphere, the accessories must also be approved for this use. Check all accessories before use to verify that they conform to this directive.

2.11. Pumped liquids

Each pumped liquid differs in respect of composition, corrosiveness, abrasiveness, dry matter content and in many other aspects. Generally, our products 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 product.

When using or replacing the product in a different pumped liquid, observe the following points:

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

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

Use in drinking water is not permitted!

- If a product is operated with a lubricant or cooling fluid (such as oil), the pumped liquid can be contaminated by these substances if the mechanical shaft seal is defective.
- It is strictly prohibited to pump explosive or highly flammable liquids in pure form!

**DANGER – explosive liquids!**

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

2.12. Sound pressure

Depending on the size and output (kW), the product generates a sound pressure of approximately 70 dB (A) to 110 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. Once the product has been installed, we recommend that the operator make additional measurements under all operating conditions.

**CAUTION: Wear ear protectors!**

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

3. Transport and storage**3.1. 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.

3.2. 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 product 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 product 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.

3.3. Storage

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

The following should be taken into consideration for storage:

- Place the product on a firm surface and secure it against slipping and falling over. Wastewater and sewage submersible pumps are stored vertically.

DANGER from falling over!

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



- Our products 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 product may 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 suction 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 product and the cable. Therefore, never immerse cable ends in the pumped liquid or other liquids.

- The machine 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 the film of lubricant on the mechanical shaft seal is renewed.

BEWARE of sharp edges!

Sharp edges can form on impellers and hydraulic ports. There is a risk of injuries! Wear protective gloves.



- If the product has been stored for a long period of time it should be cleaned of impurities such as dust and oil deposits before start-up. Rotors should be checked for smooth operation. The housing coatings should be checked for damage. **Before start-up, the filling levels (oil, motor filling, etc.) 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 product can be stored for a length 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.

3.4. Returning the product

Products that are returned to the factory must be properly packaged. This means that impurities have been removed from the product and that it has been decontaminated if used with fluids that are hazardous to health. The packaging must protect the product from damage during transportation. If you have any questions please contact the manufacturer.

4. Product description

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

4.1. Proper use and fields of application

Wilo-Drain MTC 32... submersible motor pumps are available in two sizes:

- Small for a pump head up to 33 m
 - Large for a pump head from 39 m up to 55 m
- The submersible motor pumps are suitable for intermittent and continuous operation, pumping the following fluids:
- Without explosion approval:
 - Sewage and wastewater with the usual admixtures
 - Foul water from toilets and urinals (provided **no** explosion protection is required)

From shafts, pits and pumping stations that are **not** connected to the public sewer system.

- With explosion approval:
 - Sewage and waste water
 - Waste water containing feces
 - Municipal and industrial waste water

From shafts, pits, pumping stations and pressure drainage systems that are connected to the public sewer system.

The submersible motor pumps must not be used for pumping:

- Drinking water
- Fluids with hard components such as stone, wood, metal and sand.



ELECTRICAL hazard

When using the product 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 the appropriate national regulations).**

The product is used for pumping wastewater. Therefore, pumping drinking water is strictly prohibited!

Proper use also includes observation of this manual. Any other use is regarded as improper.

4.1.1. Notes on compliance with EN 12050-1/ DIN EN 12050-1

Without explosion approval

Units without explosion approval meet the requirements of the EN 12050-1 standard.

With explosion approval

Units with explosion approval meet the requirements of the EN 12050-1 standard.

4.2. Construction

The Wilo-Drain MTC units are floodable submersible waste water motor pumps with an external macerator, which can be operated vertically as both stationary and portable wet installations.

Fig. 1.: Description

1	Cable	4	Hydraulic housing
2	Handle	5	Discharge port
3	Motor housing		

4.2.1. Hydraulics with upstream macerator

The hydraulic housing and impeller are made of cast iron. Multiple-channel impellers are used. The upstream macerator is made of carbide. The discharge port is a horizontal threaded flange connection.

The product is not self-priming, in other words, the pumped fluid must flow in either automatically or with an upstream pressure device.

4.2.2. Motor

The motor housing is made of cast iron. Three-phase dry impeller motors are used. The motor is cooled by the fluid around it. The waste heat is directly transferred via the motor housing to the pumped liquid. Therefore, these units must always be submerged for continuous operation (S1). The units can be used in short-term mode (S2) and interval mode (S3) when the motor is either submerged or above the fluid.

The motors have the following monitoring devices:

- **Motor chamber leak monitor** (MTC 32F17...F33 only):
The leak monitor reports water penetration in the motor chamber.
- **Thermal motor monitor:**
The thermal motor monitor protects the motor winding from overheating. Bi-metal sensors are used for this as standard.
- **Oil separation chamber monitor:**
The motor can also be fitted with an external leak electrode to monitor the oil separation chamber. It reports water penetrating the oil separation chamber through the mechanical shaft seal on the fluid side.
The power cable is 10 m long, is watertight along its length and has a free cable end.

4.2.3. Sealing

The pump is always sealed against the fluid with a mechanical seal. Depending on the type of pump, the motor chamber has a shaft seal ring or a mechanical seal.
The oil separation chamber between the seals is filled with medicinal white oil.
The sealing chamber is fully filled with white oil when the product is assembled.

4.3. Explosion protection in accordance with ATEX

The motors are certified for use in atmospheres at risk of explosion 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.



EXPLOSION hazard!

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

4.3.1. Ex labeling



The **II 2G Ex d IIB T4** explosion label on the name plate indicates the following:

- II = device group
- 2G = device category (2 = suitable for zone 1, G = gas, vapor, mist)
- Ex = explosion-proof device complying to Euro norm
- d = ignition protection type for motor casing: Pressure-resistant encapsulation
- IIB = 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 disulfide)
- T4 = max. surface temperature of the device is 135 °C

4.3.2. "Pressure-resistant encapsulation" protection type

Motors with this protection type are equipped with a temperature control system.

The temperature control system should be connected in such a way that if the temperature limiter is triggered, it can only be switched back on after the release button has been manually activated.

4.3.3. Explosion protection certification number

- MTC 32F17...F33: PTB 99 ATEX 1156
- MTC 32F39...F55: PTB 08 ATEX 1005 X

4.4. Operating modes

4.4.1. Operating mode "S1" (continuous operation)

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

4.4.2. 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.

4.4.3. 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

4.5. Technical data

Wilco-Drain MTC 32F	17...33	39...55
General data		
Mains supply [U/f]:	3~400 V, 50 Hz	
Power consumption [P ₁]:	See name plate	
Rated motor output [P ₂]:	See name plate	
Maximum pump head [H]:	See name plate	

Wilo-Drain MTC 32F	17...33	39...55
Maximum pump flow [Q]:	See name plate	
Activation type [AT]:	See name plate	
Liquid temperature [t]:	3 to 40 °C	3 to 35 °C
Protection class:	IP 68	IP 68
Insulation class [Cl.]:	F	F
Speed [n]:	See name plate	
Max. submersion:	20 m	20 m
Explosion protection:	ATEX	ATEX
Free passage:	6 mm	7 mm
Discharge port (PN6):	DN 36/G 1¼/ G2	DN 32
Operating modes		
Submerged [OT _s]:	S1	S1
Emerged [OT _e]:	S2 15 min*	S3 30%*
Starts per hour		
Recommended:	-	20/h
Maximum:	15/h	50/h

* To ensure the motor is cooled sufficiently, it must be completely flooded for at least one minute before it is switched on again!

4.6. Type code

Example: Wilo-Drain MTC 32F17.16/20/3-400-50-2-Ex	
MTC	Gray cast waste water pump with macerator
32	Nominal discharge port diameter
F	Open multi-channel impeller
17	Max. pump head (m)
16	Maximum flow volume (m³/h)
20	/10 = rated output P2 (kW)
	Motor version
3	1 = 1~ 3 = 3~
400	Rated voltage
50	Frequency
2	Number of poles
Ex	With ATEX ex-approval

4.7. Scope of delivery

- Unit with 10 m cable and free cable end
- Installation and operation manual

4.8. Accessories (optionally available)

- Cable lengths up to 50 m in fixed increments of 10 m or individual cable lengths on request
- Suspension device
- Pump pedestal
- External leak electrode
- Level controllers
- Fixing accessories and chains
- Switching devices, relays and plugs

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 machine – may only be carried out by qualified persons. The safety instructions must be followed at all times.
- The machine must be inspected for transport damage before carrying out any installation work.

5.1. General requirements

For planning and operation of technical waste water systems, pay attention the pertinent local regulations and directives for wastewater technology (such as the German Association for Water, Wastewater and Waste).

Pay attention to pressure surges, 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 unit/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 product 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 equipment or by inclining the product slightly (with a portable installation). Protect the product from frost.

5.2. Types of installation

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

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 product. When working in shafts, a second person must be present for safety reasons. If there is risk of poisonous or asphyxiating gases forming, the necessary precautions 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 when they are not submerged, they must be flooded completely before being switched back on!

It must be ensured that hoisting gear can be fitted without any trouble, since this is required for assembly and removal of the product. It must

be possible to reach the product safely in its operating and storage locations using the hoisting gear. The machine must be positioned on a firm foundation. For transporting the product, the load-carrying equipment must be secured to the provided lifting eyelets.

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 product 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.

When used in an explosive atmosphere, it must be ensured that the product and all accessories are approved for this purpose.

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 machine 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 will lead to unfavorable current and pumping conditions for the unit. As a result of cavitation, the product will not run smoothly and will be subjected to increased wear.

5.4. Installation



DANGER of falling!

When installing the product 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 must be observed when installing the product:

- This work must be carried out by a qualified person and electrical work must be carried out by an electrician.
- Lift the unit 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 machine run dry. We recommend that dry-run protection be installed. If fluid levels deviate dramatically, a dry-run protection must be installed.
- Check whether the cross-section of the cable used is sufficient for the length of the cable. (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 risk of poisonous or asphyxiating gases forming, the necessary precautions must be taken!
- Please also observe the applicable national accident prevention regulations and trade association safety provisions.
- The coating must be examined before installation. If defects are found, these must be rectified before installation.

5.4.1. Stationary wet installation

Fig. 2.: Wet installation

1	Suspension device	6	Lashing gear
2	Return flow prevention	7a	Minimum water level for S1 operation
3	Shut-off valve	7b	Minimum water level for S2 and S3 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		

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

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.

1. Install the suspension device in the operating area and prepare the product for operation on a suspension device.
2. Check that the suspension device is firmly fixed and functions properly.

3. Secure the product to the load-carrying equipment, lift and lower it slowly on to the guide pipes in the operating area. Hold the electric power cables slightly taut when lowering. When the product is connected to the suspension device, make sure that the electric power cables are secured adequately against falling off and damage.
4. The correct operating position is reached automatically and the discharge port is sealed by its own weight.
5. For new installation: Flood the operating area and bleed the discharge pipe.
6. Start the product in accordance with the section entitled "Start-up".



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.



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

5.4.2. Portable wet installation

Fig. 3.: Portable installation

1	Load-carrying equipment	5	Storz hose coupling
2	Pump pedestal	6	Discharge hose
3	Pipe bend	7a	Minimum water level for S1 operation
4	Storz fixed coupling	7b	Minimum water level for S2 and S3 operation

With this installation type, the product 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 on a soft foundation, a hard base must be used to prevent the machine from subsiding. A discharge hose is connected on the discharge side.

The unit must be anchored to the floor for longer operating times with this type of installation. This prevents vibrations as well as guaranteeing quiet and low-wearing running.

1. Mount the pedestal at the intake port.
2. Attach the pipe bend to the discharge port.
3. Screw the fixed Storz coupling onto the pipe elbow and fasten it.
4. Lay the power supply cable so that it cannot be damaged.
5. Position the product in the operating area. If necessary, secure the load-carrying equipment to the carrying handle, lift the product and set it down at the intended operating position (pit, shaft).
6. Check that the product is upright and standing on a firm base. Do not let it subside!
7. Have an electrician connect the product to the mains power supply and check the direction of rotation in accordance with the "Start-up" section.
8. Lay the discharge hose so that it cannot be damaged. Secure at a suitable place as necessary (e.g. drain).

5.4.3. Level controller

Fill levels can be determined using the level control system, meaning the unit 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

For correct installation, please see the installation and operation manual for the level control device. **Observe the information on the maximum starts per hour and the minimum water level.**

5.5. Dry-running protection

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

The product 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 machine when the water level falls below the minimum coverage level. If the dry-run protection only consists of one float or electrode, the unit may turn on and off constantly if filling levels fluctuate strongly. This can result in the maximum number of motor start-ups (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 carried out 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 name 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 product properly.
Products 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 name plate.

Only slow-blow fuses or K characteristic automatic cut-outs may be used for pre-fusing.

5.6.2. Three-phase current motor

Fig. 4.: Wiring diagram for delta connection

6-core cable (MTC 32F39...)	
Wire no.	Terminal
1	U
2	V
3	W
4	Temperature monitor for winding
5	

PE (gn-ye)	Ground (PE)
7-core cable (MTC 32F17...F33)	
Wire no.	Terminal
3	U
4	V
5	W
1	Temperature monitor for winding
2	
6	Seal integrity monitor for motor chamber
PE (gn-ye)	Ground (PE)

Fig. 5.: Wiring diagram for star-delta connection

10-core cable (MTC 32F49...F55)	
Wire no.	Terminal
1	U1
2	U2
3	V1
4	V2
5	W1
6	W2
7	Temperature monitor for winding
8	None
9	Temperature monitor for winding
PE (gn-ye)	Ground (PE)

The three-phase current version is supplied 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!

5.6.3. Monitoring device connections

Each monitoring device must always be connected.

Motor temperature monitor

- Bi-metal sensors must be connected via an evaluation relay. We recommend the CS-MSS relay for this. The threshold is already preset. When used **outside explosion hazard zones**, the sensors can be connected directly in the control cabinet. Connection values:
 - MTC 32F17...F33:
max. 250 V(AC), 2.5 A, $\cos \varphi = 1$
 - MTC 32F39...F55:
max. 250 V(AC), 1.2 A, $\cos \varphi = 0.6$
- When the threshold is reached, the unit must switch off.

When used in explosive atmospheres: The temperature monitor must switch off the system and lock it against being switched on again! Switching on again should only be possible if the release button has been manually activated!

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

Motor chamber leak monitor (MTC 32F17...F33 only):

- The seal integrity electrode in the motor chamber must be connected via an evaluation relay. We recommend the "NIV 101" relay for this. The threshold is 30 kOhm. When the threshold is reached, the unit must switch off.

Connecting the optionally available leak electrode for the oil separation chamber

- The leak electrode must be connected via an evaluation relay. We recommend the "ER 143" relay for this. When used **outside explosion hazard areas** the "NIV 101" relay is suitable. 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 unit could be irreparably damaged by water entering. We always recommend switching 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 product 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 circuit breaker.

Local and national regulations must be adhered to when connecting the product.

5.7.2. Activation types

Direct activation

At full load, the motor protection should be set to the rated current shown on the name plate. At partial load, we recommend that the motor protection be set 5% above the current measured at the operating point.

Star-delta activation

If the motor protection is installed in the motor line: Set the motor protection to 0.58 x the rated current.

If the motor protection is installed in the mains supply line: Set the motor protection to the rated current.

The maximum start-up time in star-connection is 3 seconds.

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.

Operation with frequency transformers

The product may not be operated on frequency transformers.

6. Start-up

The "Start-up" section contains all the important instructions for the operating personnel for start-up and operating the product safely.

The following conditions must be observed to and monitored:

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

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

Always keep this manual must either by the product 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 starting up the product, the following points must always be observed:

- The product may only be started up by qualified, trained persons. The safety advice must be followed at all times.
- All persons working on or with the product 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 product is suitable for use under the specified operating conditions.
- The work area of the product 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.
- 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 product and the power supply cables installed as described in the "Installation" section and in accordance with the VDE guidelines and applicable national regulations.

The product must be properly protected and grounded.

Pay attention to the direction of rotation. If the direction of rotation is incorrect, the unit 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 products with free cable ends (i.e. without plugs) must be connected by a qualified electrician.

6.2. Check the direction of rotation

The product 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 code information.

Before submerging, the product must be checked to ensure that the rotation direction is correct.

A test run should only be performed under general operating conditions. Switching on a unit that has not been submerged is strictly forbidden!

6.2.1. Checking the rotation direction

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

The product 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 products are driven in the right direction. If the rotation direction is wrong, 2 phases/leads of the mains supply to the switching device must be replaced.

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 controller

For correct adjustment, please see the installation and operation manual for the level control device. Note the following information:

- When using float switches, ensure that they can move freely in the operating area.
- Make sure the cables are correctly laid.
- The water level must not fall below the minimum.

- The maximum starts per hour may not be exceeded.

6.4. Operation in explosion hazard areas

The operator is responsible for defining the explosion hazard area. Only products with ex-approval may be used within an explosion hazard area.

Attached switching devices and plugs must be checked for use in explosion hazard areas.



Products that are ex-approved are labeled on the name plate as follows:

- ATEX symbol
- Ex-classification, e.g. Ex d IIB T4
- Ex-certification number, e.g. ATEX1038X



RISK of fatal injury due to explosion!

Products without ex-labeling are not ex-approved and may not be used in explosion hazard areas! All accessories (incl. attached switching device/plugs) must be approved for use in explosion hazard areas!

To keep dry motors sufficiently cooled when they are not submerged, they must be flooded completely before being switched back on!

6.5. 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 unit. No persons are allowed in the work area during start-up or 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.



BEWARE of serious injuries!

In portable installations, the unit can fall over when it is switched on or during operation. Make sure that the unit is positioned on a firm foundation and that the pump pedestal is mounted correctly.

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

6.5.1. 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 sliders 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 fluid 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 unit to explode! Before switching on the unit, ensure that all the valves are open.

- The hydraulic housing must be flooded, i.e. it should be completely full of fluid, with no air in it at all. Bleeding can be carried out 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 unit are properly fitted
- Check all level control and dry-run protection systems

6.5.2. After starting up

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 unit 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 unit must be switched off again immediately. The unit may only be restarted, once the fault has been rectified.

6.6. Safety rules during operation

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

The product has moving parts. During operation, these parts turn to pump the fluid. Certain materials in the pumped fluid 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 the moving parts during operation.

- **Before performing maintenance or repairs, switch off the product, 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 +/-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%)
- 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 fluid 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 unit to explode! Before switching on the unit, 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 product.



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 auxiliary 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 product remains installed and is not cut off from the electricity supply. For temporary shutdown, the product 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 product will be ready for operation at all times. For longer standstills, a regular (monthly to quarterly) function test should be carried out for a period of 5 minutes.

CAUTION!

Only carry out a function run 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 product must be disconnected from the mains by an electrician and secured against being switched on again without permission. Work on removing the product, maintenance and storage can then commence.

**BEWARE of poisonous substances!**

Products that pump fluids 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 off, let the product cool down to ambient temperature.

7.2.1. Removal

Products in portable wet installations can be lifted out of the pit after being disconnected from the mains power supply and emptying the discharge pipe. You may have to disconnect the hose first. The use of appropriate hoisting gear may also be necessary here.

Products in stationary wet installations with suspension units are raised out of the pit using the chain or lifting cable with the help of hoisting gear. This does not have to be emptied especially for this purpose. Make sure the power supply cable is not damaged while doing this!

7.2.2. Return delivery/storage

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

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

7.3. Starting up again

Clean the product of dust and oil 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 product can be installed and connected to the electricity supply by an electrician. This work must be carried out in accordance with the “Installation” section.

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

The product 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 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.

7.4.2. 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.

- To dispose of the product, as well as its components, public or private waste disposal companies should be used, or contacted.
- More information about proper disposal can be obtained from the urban administration, the waste disposal authorities or from the supplier from whom the product was purchased.

8. Maintenance

Before performing maintenance or repair work, switch off and dismantle the product as described in the section entitled “Final shutdown/disposal”. After completing maintenance or repair work, the product must be installed and connected according to the “Installation” section. The product must be switched on as described in the “Start-up” section.

Maintenance or repair work must be carried out by an authorized service center, Wilo customer service or a qualified specialist.

Maintenance or repair work and/or constructional changes that are not listed in this operating and maintenance manual or which could impair explosion protection, may only be carried out by the manufacturer or by authorized service centers.

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 screws stipulated by the manufacturer, fulfilling at least strength category A4-70, may be used.

**ELECTROCUTION hazard!**

There is a risk of fatal electric shocks when performing work on electrical devices. With all maintenance or repair work, the unit 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.

Note the following information:

- This manual must be available to the maintenance personnel and its instructions must be followed. Only the repair and maintenance measures listed here may be performed.
- All maintenance, inspection and cleaning work on the machine and the system may only be carried out by trained specialists exercising extreme care in a safe workplace. Proper protective clothing is to be worn. The machine must be disconnected from the electrical system and secured against being switched on again. It must be prevented from being switched on inadvertently.
- 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 product.
Make sure that all fastening devices, ropes and safety devices of the hoisting gear are in a 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 product and system must be carried out by an electrician. Defective fuses must be replaced. Never attempt to repair them. 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.
- Products that circulate fluids hazardous to health, or that come into contact with these fluids, must be decontaminated. It must be ensured that no dangerous gases can form or are present.
If injuries involving hazardous pumping liquids or gases occur, perform first aid in accordance with the notices in the workplace and call a doctor immediately.
- Ensure that all necessary tools and materials are available. Tidiness and cleanliness guarantee safe and trouble free operation of the product. After working on the unit, 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 §§ 5a, 5b AbfG). Appropriate protective clothing must be worn for cleaning and maintenance jobs. This is to 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 are have food safety certification in accordance with "USDA-H1".

Filling quantities

The filling quantities depend on the type:

- MTC 32F17...: 550 ml
- MTC 32F22...: 550 ml
- MTC 32F26...: 550 ml
- MTC 32F33...: 500 ml
- MTC 32F39...: 520 ml
- MTC 32F49...: 2600 ml
- MTC 32F55...: 2600 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
- SKF GJN
- NSK EA5, EA6
- Tripol Molub-Alloy-Food Proof 823 FM (food safety certification according to USDA-H1)

8.2. Maintenance intervals

Overview of the maintenance intervals needed:
When the equipment is used in waste water pump stations inside buildings or on properties, the maintenance intervals and work shown in DIN EN 12056-4 must be adhered to.

Otherwise the following maintenance intervals apply.

8.2.1. Before initial start-up or after a longer period of storage

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

8.2.2. After 1000 service hours or 1 year

- Functional inspection of all safety and control devices
- Check the cutting gap
- Change the oil
Moisture sensors, if used, indicate when the oil is to be changed.

8.2.3. 10,000 service hours or 10 years at the latest

- General overhaul

8.3. Maintenance tasks**8.3.1. Checking 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 following values may not be exceeded:

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

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

8.3.2. Functional test of safety and monitoring devices

Monitoring devices include temperature sensors in the motor, sealed volume monitors, motor protection relays, overvoltage relays, etc.

- Motor protection relays, overvoltage relays and other tripping devices can generally be triggered manually for test purposes.
- To inspect the sealing room monitor or the temperature sensor, the unit must be cooled to ambient temperature and the electrical supply cable of the monitoring device in the switch cabinet must be disconnected. Then test the monitoring device with an ohmmeter. The following values should be measured:
 - Bi-metal sensor: Value = "0" – throughput
 - Moisture sensor: This value must tend towards infinity. If there is a low value, there is water in the oil. Also observe the instructions of the optionally available evaluation relay.

In the case of larger deviations, please consult the manufacturer.

8.3.3. Turn the impeller

1. Lay the unit horizontally on a firm surface.
Make sure that the unit cannot fall over and/or slip away.
2. Hold the blade of the macerator and turn the impeller.



BEWARE of sharp edges!
The blade of the macerator has sharp edges.
There is a risk of injuries! Wear protective gloves.

8.3.4. Oil check or oil change

The oil separation chamber has a plug for draining and filling oil.

On the MTC 32F17...F33 this is marked on the illustration.

On the MTC 32F39...F55 the plug is marked on the housing with the label "oil".

Fig. 6.: Position of the plug

1	Plug
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Oil level check

1. Lay the unit horizontally on a firm surface with the plug facing upwards.
Make sure that the unit cannot fall over 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.

Oil change

1. Lay the unit horizontally on a firm surface with the plug facing upwards.
Make sure that the unit cannot fall over 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 unit 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 unit back until the opening is facing 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 filling quantities.
6. Clean the plug, fit with a new sealing ring and screw it in again.

8.3.5. Checking the cutting gap

Use a feeler gage to measure the gap between the blade and the cutting plate. If the gap is more than 0.2 mm, the macerator has to be adjusted.

8.3.6. General overhaul

During a general overhaul, the bearings, shaft seals, O rings and power supply cables are inspected and replaced as required in addition to normal maintenance work. This work may only be

conducted by the manufacturer or an authorized service workshop.

8.4. Repairs

The following repairs can be carried out on these units:

- Adjusting the cutting gap
 - Subsequently installing the sealing chamber electrode for monitoring the oil separation chamber
- When carrying out repair work, the following information should always be observed:
- Round sealing rings as well as existing seals should always be replaced.
 - Screw fasteners (spring rings, Nord-Lock screw adhesive, Loctite screw adhesive) must always be replaced.
 - The correct torques must be observed.
 - Never use brute force during this work.

8.4.1. Adjusting the macerator

Wear to the blade can increase the gap to the cutting plate. This impairs pumping and cutting performance. You can adjust the cutting gap to counteract this.

Adjusting the macerator on the MTC 32F17...F33

Fig. 7.: Adjusting the macerator

1	Blade	3	Cutting plate fastening
2	Cutting plate	4	Cutting plate height adjustment

1. Loosen and remove the three hex socket screws (3) that fasten the cutting plate.
2. Turn the cutting plate (2) clockwise until you can see the three screws (4) for adjusting the height of the cutting plate through the holes in the cutting plate (2).
3. Turn the adjusting screws (4) anticlockwise so that the distance between the cutting plate (2) and the blade (1) is evenly reduced.

Caution: The blade (1) must not scrape the cutting plate (2).

4. Then turn back the cutting plate (2) and fasten it again with the hex socket screws (3).

Adjusting the macerator on the MTC 32F39...F55

Fig. 8.: Adjusting the macerator

1	Blade	3	Blade fastening*
2	Shim		

*The blade fastening consists of:

- MTC 32F39: Hex socket screw, spring ring and cap
 - MTC 32F49...F55: Cap nut and washer
1. Block the blade (1) with a suitable tool and loosen and remove the blade fastening (3).

2. Remove the blade (1).
3. Adjust the gap by removing a shim (2).
4. Put on the blade (1) and attach the blade fastening (3) again.
5. Check the gap and the blade movement.
6. If the gap is correct, loosen the fastening (3), coat it with Loctite screw adhesive and firmly tighten the fastening (3) (MTC 32F39: 8 Nm; MTC 32F49...F55: 60 Nm).

8.4.2. Subsequently installing the sealing chamber electrode for the oil separation chamber

To monitor water penetration of the oil separation chamber, a rod electrode can be installed or a defective electrode replaced.

The rod electrode is simply screwed into an existing hole in the seal housing.

Checking the sealing chamber for MTC 32F17...F33

The rod electrode is screwed into the hole for draining and filling the oil. Replace the plug with the rod electrode.

Checking the sealing chamber for MTC 32F39...F55

The rod electrode is screwed into a separate hole. This is marked "DKG". Replace the plug with the rod electrode.

Assembling the sealing chamber monitor

1. Lay the unit horizontally on a firm surface with the plug facing upwards.
Make sure that the unit cannot fall over and/or slip away.
2. Slowly and carefully remove the plug.
Caution: The lubricant may be pressurized. This can force the plug out.
3. Screw in and tighten the rod electrode.
4. The "Electrical connection" section describes how to connect the sealing chamber monitor.

9. Troubleshooting and possible solutions

In order to prevent damage or injury while rectifying product faults, the following points must be observed in all cases:

- 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 product against an accidental restart by disconnecting it from the mains. Take appropriate safety precautions.
- Always have a second person on hand to ensure that the product has been switched off for safety.
- Secure moving parts to prevent injury.
- Unsanctioned changes to the product are made at the operator's own risk and release the manufacturer from any warranty obligations.

9.1. Fault: The unit will not start

1. Electricity 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 leak, moisture sensors report a fault or shut down the unit

9.2. Fault: The unit 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 if 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 it as necessary
5. Incorrect direction of rotation
 - Swap the 2 phases from the mains supply
6. Impeller impeded by adhesive material, blockages and/or solid matter, increased current consumption
 - Switch off the unit, 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: Unit runs but does not pump

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

9.4. Fault: The unit runs, but not within stated operating parameters

1. Intake blocked
 - Clean the intake, slider, intake port or intake strainer
2. Valve in the discharge pipe closed
 - Fully open the valve
3. Impeller blocked or obstructed
 - Switch off the unit, secure it against being switched on again and free the impeller
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 bleed if necessary
6. Unit is pumping against excessive pressure
 - Check the valve in the discharge pipe and open it completely if necessary, 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 unit does not run smoothly and is noisy

1. Unit is operating in an inadmissible range
 - Check the operational data of the unit 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 obstructed
 - Switch off the unit, 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
 - Replace two phases on the mains supply
7. Signs of wear
 - Replace worn parts
8. Defective motor bearing
 - Contact the manufacturer
9. The unit is installed under mechanical strain
 - Check the installation, use rubber spacers if necessary

9.6. Fault: Mechanical shaft seal leak, moisture sensors report a fault or shut down the unit

Sealing chamber monitoring is optional, and is not available for all types. For details, see the catalog or ask Wilo customer service.

1. Condensation build-up due to lengthy storage and/or temperature fluctuations
 - Operate the unit 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 unit 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. 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 supplied.

Technical changes reserved

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