

Pioneering for You

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Wilo-Actun INITIAL 3



en Installation and operating instructions

Fig. 1

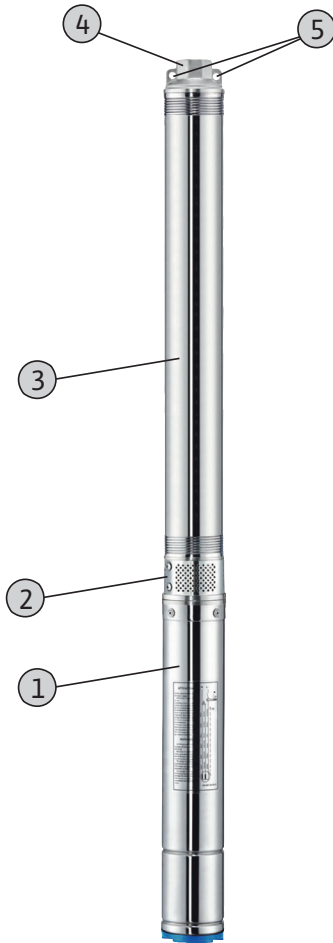


Fig. 2

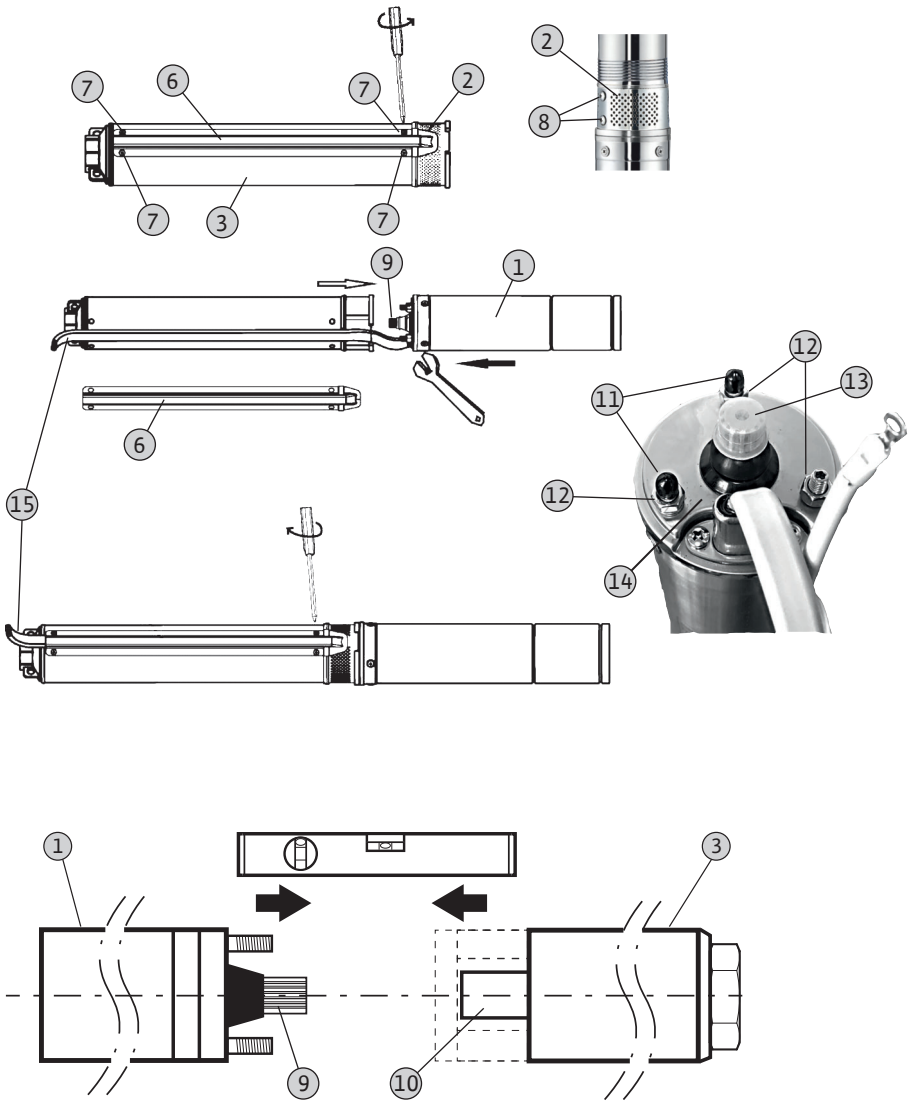


Fig. 3a

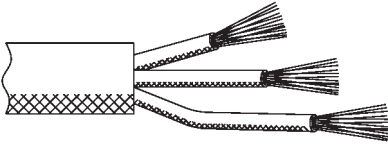


Fig. 3b



Fig. 3c



Fig. 3d

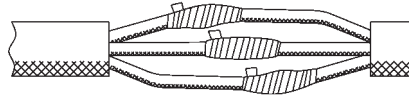


Fig. 3e

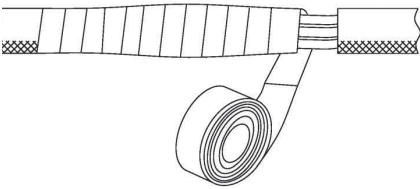


Fig. 3f

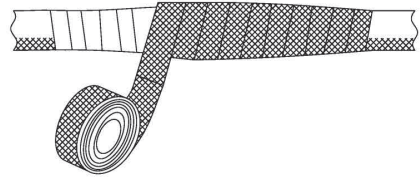


Fig. 4a

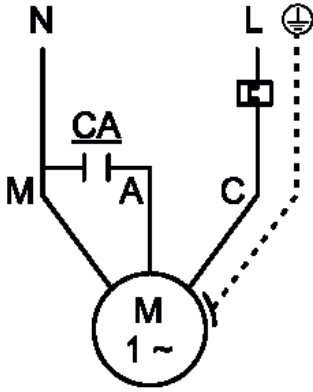


Fig. 4b

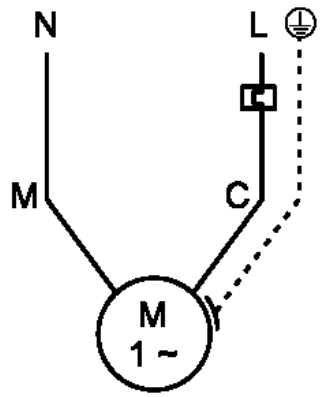


Fig. 5

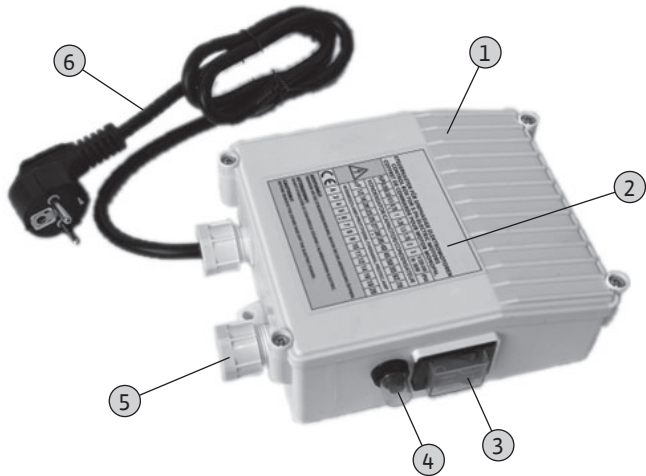


Fig. 6

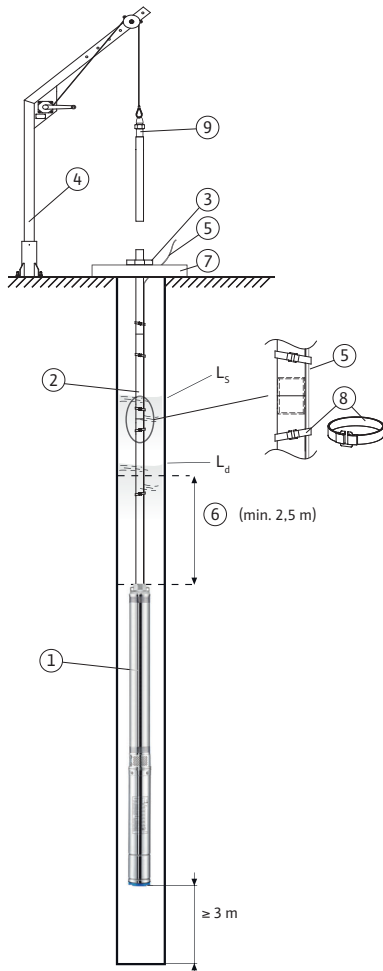
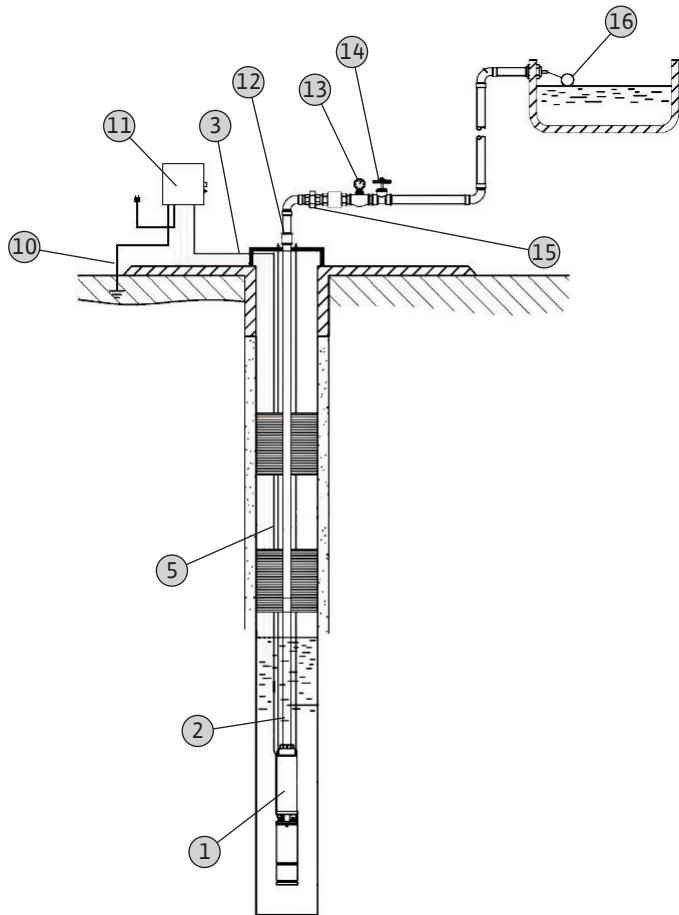


Fig.7





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1. Introduction

1.1. About these instructions

These instructions are a part of the product. It is essential to follow the instructions for correct handling and use:

- Before all activities, read the instructions carefully.
- Always keep the instructions in an accessible place.
- Observe all product specifications.
- Observe the markings on the product.

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

1.2. Copyright

WILO SE © 2024

The reproduction, distribution, and utilisation of this document and the communication of its contents to others without express consent is prohibited. Infringement results in the obligation to pay for damages. All rights reserved.

1.3. Subject to changes

Wilo reserves the right to change the listed data without prior notice and is not liable for technical inaccuracies and/or omissions. The illustrations vary from the original and are intended as a sample representation of the product.

1.4. Exclusion from warranty and liability

Wilo assumes no warranty or liability in the following cases:

- Improper configuration due to insufficient or incorrect instructions by the operator or the customer
- Non-compliance with these instructions
- Improper use of the product
- **Incorrect storage or transport**
- **Incorrect installation or dismantling**
- Insufficient maintenance
- Unauthorised repairs
- Unsuitable installation location
- Chemical, electrical or electrochemical influences
- Wear of product components

2. Safety

This section contains safety information for the individual phases of the product's life cycle. Disregarding this information leads to:

- Danger to persons
- Danger to the environment
- Property damage

- Loss of liability claim if damage occurs

2.1. Identification of safety instructions

The safety instructions are presented as follows:

- Danger to persons: Signal word with a preceding safety symbol and shaded grey.
- Property damage: Signal word without safety symbol.

Signal words

- **DANGER!**
Disregarding the instructions results in death or serious injury!
- **WARNING!**
Disregarding the instructions leads to (serious) injury!
- **CAUTION!**
Disregarding the instructions leads to property damage or even a total loss.
- **NOTICE!**
Useful information for handling the product.

Text markups

- Precondition
- a) Work step/list
- ⇨ Notice/instructions
- ⇨ Result

Symbols

The following symbols are used in these instructions:



Danger symbol: General hazard



Danger symbol, for example, electrical current



Danger symbol: Risk of cuts



Danger symbol: Risk of explosion



Danger symbol: Suspended loads



Danger symbol: Risk of falling



Danger symbol: Hot surfaces



Danger symbol: Risk of crushing



Useful information

2.2. Personnel qualifications

Personnel must:

- Be informed of the locally applicable accident prevention regulations.
- Have read and understood the installation and operating instructions.
The personnel must have the following qualifications:
- Electrical work: A qualified electrician must carry out the electrical work.
- Installation/dismantling work: The technician must be trained to handle the necessary tools and required fixation materials for the available installation site.
- Maintenance work: The technician must be familiar with the use of operating fluids and their disposal. Furthermore, the technician must have basic knowledge of engineering.

Definition “Qualified Electrician”

A qualified electrician is someone with suitable technical training, knowledge and experience who can identify and avoid the dangers associated with electricity.

2.3. Electrical work

- A qualified electrician must carry out the electrical work.
- When connecting to the power supply, adhere to the local regulations as well as the provisions of the local energy supply company.
- Before all work, disconnect the product from the power supply and take measures to prevent unauthorised switch-on.

- The personnel is instructed in how to implement the electrical connection as well as in the shutdown methods of the product.
- Adhere to the technical information in these installation and operating instructions as well as on the rating plate.
- Ground the product.
- Observe the manufacturer's regulations when connecting to electrical switchgears.
- Immediately replace faulty connection cables. Contact customer service.

2.4. Monitoring devices

The following monitoring devices must be provided by the customer if the pump is connected to a power supply grid:

Circuit breaker

- Install the circuit breaker in accordance with the manufacturer instructions. Observe local regulations.
- Further protection devices (e.g. overvoltage, undervoltage, or phase failure relay, etc.) must be provided on-site for sensitive power supplies.

Residual-current device (RCD)

- Adhere to the regulations of the local energy supply company! We recommend using a residual-current device.
- If persons could come into contact with the product and conductive liquids, secure connection with a residual-current device (RCD).

2.5. During operation

When operating the pump, always follow the locally applicable laws and regulations for work safety, accident prevention, and handling electrical machinery.

The operator must specify a personnel work plan for a safe workflow. All personnel is responsible for ensuring that regulations are observed.

The pump is equipped with moving parts. During operation, these parts rotate in order to pump the fluid. Certain substances in the fluid can result in very sharp edges forming on the moving parts.



WARNING: rotating parts!

The rotating parts can crush and sever limbs. Do not reach into the hydraulics or touch the rotating parts when the machine is in operation. Switch off the pump and allow the rotating parts to come to a standstill prior to maintenance and repair work!

2.6. Fluids

Each fluid differs in respect of composition, corrosiveness, abrasiveness, dry matter content, and in many other aspects. Generally, our pumps can be used for many appli-

cations. Please note that if requirements change (density, viscosity or general composition), this can also affect many operating parameters of the pump.

If the pump is used in or switched over to a different fluid, observe the following:

The pumps must not be used in drinking water, wastewater and sewage and/or with fluids that are hazardous to health.

2.7. Operator's obligations

- Provide the installation and operating instructions in a language that personnel can understand.
- Ensure the required level of training of personnel for the specified work.
- Provide the required protective equipment and ensure that the personnel wear the protective equipment.
- Ensure that the attached safety and information signs on the product are always legible.
- Instruct personnel in how the system operates.
- Eliminate any potential risks posed by electricity.
- Fit dangerous components within the system with an on-site guard.
- Secure and mark the work area.
- Define a personnel work plan for safe workflow.

Children and persons under 16 years of age or with limited physical, sensory or cognitive capacities are prohibited from handling the product! Persons under 18 years of age must be supervised by a technician!

3. Transport and storage

3.1. Delivery

The shipment must be checked for defects immediately upon receipt (damage, completeness). Document any defects on the freight documentation! The transport company or manufacturer must be notified of any identified defects on the day the shipment was received. Claims reported after this date can no longer be invoked.

3.2. Transport



WARNING!

Suspended loads!

Persons must not remain under suspended loads!

There is a risk of (serious) injury due to falling parts.

The load must not be moved over work areas in which persons are present!

**WARNING!**

Head and foot injuries due to a lack of protective equipment!

During work there is a risk of (serious) injury.

Wear the following protective equipment:

- **Safety shoes**
- **If lifting equipment is used, a protective helmet must also be worn!**

**DANGER! Tipping loads!**

Do not place the unit without having secured it.

Risk of injury if the pump tips over!

Only the appropriate and approved lifting gear, transportation and hoisting 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 pumps are delivered by the manufacturer or shipping agency in suitable packaging. This normally precludes the possibility of damage occurring during transportation and storage. The packaging must be stored in a safe place for reuse if the product is frequently used at different locations.

3.3. Storage

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

Observe the following for storage:

- Place the pump on a firm surface and secure it against slipping and falling over. Submersible pumps can be stored vertically or horizontally. If pumps are stored horizontally, ensure that they do not bend.

Otherwise, impermissible bending stress can arise in the hydraulics and the pump may be damaged. Support the hydraulics accordingly to prevent damage!

**DANGER! Tipping loads!**

Do not place the unit without having secured it.

Risk of injury if the pump tips over!

- New Wilo-Actun INITIAL submersible pumps can be stored in temperatures between $-15\text{ }^{\circ}\text{C}$ and $50\text{ }^{\circ}\text{C}$. The storage area must be dry (max. **humidity** $\leq 90\%$). We recommend a frost-proof room for storage with a temperature between $5\text{ }^{\circ}\text{C}$ and $25\text{ }^{\circ}\text{C}$.

- The submersible pump must not be stored in rooms in which welding work is carried out because the resulting gases or radiation can damage the elastomer components and coating.
- The pump's suction and pressure connections must be permanently sealed to prevent contamination.
- All connection cables must be protected against kinking, damage, and moisture ingress.

**DANGER: electricity!****Damaged connection cables can cause fatal injury!****Defective cables must be replaced by a qualified electrician immediately.****CAUTION: beware of moisture!****Moisture penetrating the cable will damage both the pump and the cable. For this reason, never immerse the cable end in the fluid or any other liquid.**

- The submersible pump must be protected from direct sunlight, heat, dust and frost.
- If the submersible pump has been stored for a long **period**, it must be cleaned of impurities such as dust and oil residue before commissioning. Check the impellers to make sure they run smoothly.

Note:

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 in this regard.

- The storage period should not exceed one year!
- If the storage period exceeds one year:
 - We recommend removing rotating parts and checking their correct condition and function. During rotation, the pump shaft shall rotate smoothly and without stuck phenomenon.

3.4. Return delivery

Pumps that are returned to the factory must be properly packaged. This means that impurities have been removed from the pump and that it has been decontaminated if used with fluids that are hazardous to health.

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

4. Application/Use



DANGER: electrical hazard

When using the pump in swimming pools or other basins that can be entered, there is a risk of electrocution.

NOTE:

- Use is strictly forbidden if there are people in the pool or basin!
- If there are no people in the basin, protective measures must be taken according to DIN EN 62638 (or the appropriate national regulations).

4.1. Intended use

Submersible motor pumps are suitable for the following applications:

- Supplying water from **boreholes**, wells and cisterns.
- Domestic and commercial water supply, sprinkling and irrigation.
- Pumping water without long-fiber and abrasive materials.

4.2. Improper use



DANGER – explosive fluids!

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

Submersible pumps must **not be used** for pumping:

- Wastewater
- Sewage/faeces
- Untreated sewage

Intended use also includes observance of these instructions. Any use other than the intended use is regarded as improper use.

5. Product description

5.1. Design

Fully submersible, multistage submersible pump with integrated non-return valve to supply water, available as centrifugal pump in flanged bowl construction.

The unit must be installed vertically. The motor is cooled by the pumped fluid. Therefore, the unit must always be operated immersed. The limit values for maximum fluid temperature, minimum flow rate and voltage ranges must be adhered to.

Vertical installation is possible with or without cooling shroud depending on the configuration.

Fig. 1: Description of the submersible pump

1	Motor	4	Discharge port
2	Screen/Intake port	5	Transport lugs (lifting eyes)
3	Hydraulic housing		

5.1.1. Hydraulics

The pump is not self-priming, i.e. the fluid must flow in either automatically or with supply pressure and the minimum submersion (2.5 m) must be ensured at all times.

The pump contains a multistage hydraulics with radial impellers in sectional construction. The hydraulics housing and the pump shaft are made of stainless steel (AISI 304). The impellers are made of plastic (POM).

The connection on the pressure side is designed as a vertical threaded flange with a female thread and integrated non-return valve.

5.1.2. Motor

Type key "B":

The drive unit is a stainless steel, encapsulated AC motor with a capacitor connection.

Type key "C":

The drive unit is a stainless steel, encapsulated AC motor with an integrated capacitor.

The motor is cooled by the pumped fluid. Therefore, the motor must always be operated immersed. The limit values for maximum fluid temperature and minimum flow velocity must be adhered to.

The connection cable has bare cable ends. Depending on the specific type, the pump is equipped and delivered with the **customer specific** cable length. For other pump types, the final cable length has to be added at site, according to **chapter 6.4.1. "Extending cable"**.

5.1.3. Motor filling

The motor has been filled ex works with food oil.

The motor is designed in such a way that it cannot be filled from outside. The manufacturer alone can fill the motor.

5.1.4. Seal

A mechanical seal has been installed between motor and hydraulics.

5.2. Starting box (Fig. 5)

1	Starting box	4	Reset switch overload protection
2	Warning label	5	Connection for power cable from pump motor
3	ON/OFF switch	6	Cable (1 m) with plug

Pump models of the type B are equipped with a starting box.

The starting box is equipped with

- A built-in capacitor
- A reset switch for the overload protection
- An ON/OFF switch to start and stop the pump.
- A plug for connecting to the mains (only pumps with index "P" in type key)

Alternatively the pump can be switched on and off using a separate switch (main switch) that must be provided by the customer. The separate switch means the power supply can be cut if required. The pump need not be switched on or off manually. When the pump is switched on, it operates autonomously and is controlled as well as monitored by the integrated electronics.

5.3. Monitoring devices

The pump is not equipped with specific monitoring devices. The starting box supplies an overload protection (PTC):

5.4. Operating modes

Operating mode S1 (continuous duty)

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

5.5. Type key

Example:	Wilo-Actun INITIAL 3.03-21-230/50 B/P 1.7
Actun	Submersible pump product range
INITIAL	Series
3	Diameter of the hydraulic unit in inches [“]
03	Nominal volume flow [m ³ /h]
21	Number of hydraulic stages
230	Voltage [V]
50	Frequency [Hz]
B	Variant B = Starting box C = build-in capacitor
P	Electrical connection via P = Plug
1.7	Motor cable length in m

5.6. Technical data

Wilo-Actun INITIAL...	
Voltage range:	110 V ±(10 %) 220 V-230 V ±(10 %)
Frequency [f DC]:	50/60 Hz
Rated power [P ₂]:	See rating plate
Rated speed [n]:	See rating plate
Max. delivery head [H]:	See rating plate
Max. volume flow [Q]:	See rating plate
Activation types [AT]:	Direct
Protection class (motor):	IP68
Protection class (starting box):	IP44
Insulation class [Cl.]:	F
Operating mode (immersed) [OT _s]:	S1
Operating mode (non-immersed) [OT _e]:	-
Maximum current consumption [I _{max}]:	See rating plate
Rated motor current [I _N]:	See rating plate

Wilo-Actun INITIAL...	
Max. switching frequency:	4/h
Max. immersion depth:	150 m
Fluid temperature [t]:	3...35 °C
Max. sand content:	150 g/m ³
Max. particle diameter	≤ 0.2 mm
pH value	6.5...8.5
Min. flow at motor:	0.2 m/s
Pressure connection	G 1¼

5.7. Scope of delivery

The articles of the series Wilo-Actun INITIAL are defined according to needs of various different markets. Therefore there exist several different scopes of delivery that contain:

- Submersible pump:
 - As complete unit with motor mounted or
 - Hydraulic (bareshaft) or
 - Motor
- Installation and operating instructions (all countries)
- A starting box (only pump variant B!)
- 30 cm shrinking tube (only Indonesia + Philippines)
- Synthetic rope (only nordic and baltic countries), to lower and lift the pump

5.8. Accessories (optionally available)

No special accessories are defined for the product. If required, please send an enquiry to Wilo.

6. Installation

Observe the following to prevent damage to the product or serious injury during installation:

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

6.1. General

In the event of pumping through longer pressure pipes (particularly in the case of longer ascending pipes), pressure surges can occur.

Pressure surges can result in destruction of the pump/system and noise pollution due to valves opening and closing suddenly. Water hammers can be reduced or prevented by applying suitable measures (e.g. non-return valves with an adjustable closing time, electrically actuated shut-off devices, special routing of the pressure pipe).

Observe the minimum water submersion when using level control devices. It is imperative to prevent trapped air in the hydraulics housing and the pipe system and remove any trapped air using suitable ventilation systems. Protect the submersible pump from frost.

6.2. Motor and hydraulics assembly (Fig. 2)

Fig. 2: Assembly/alignment

1	Motor	10	Pump shaft
2	Screen/Intake port	11	Nut cap
3	Hydraulic housing	12	Nut, fixation of motor and lantern bracket
6	Cable protection	13	Shaft cap (motor shaft)
7	Screw; fixation of cable protection	14	Motor protection plate
8	Screw, fixation of screen	15	Power cable
9	Motor shaft		

Thoroughly store all parts (washers, nuts, etc.) loosened during this process.

- After unpacking the pump hydraulics, remove the cable protection (item 6).
- Remove the four screws (item 7).
- Detach the cable protection (item 6). **Be cautious of sharp edges!**
- Unscrew the two screws (item 8) holding the screen (item 2).
- Extract the screen (item 2) from the hydraulic housing (item 3).
- Set aside screws (items 7+8), the cable protection (item 6), and the screen (item 2) for reassembly.

- Unpack the motor (item 1) and clean the area where the motor shaft (item 9) connects to the pump shaft (item 10).
- Remove nut caps (item 11), nuts (item 12), and shaft cap (item 13) from the motor shaft (item 1).
- Turn the motor shaft by hand before assembly to check that it turns freely.
- Apply acid-free, waterproof grease to both motor shaft (item 9) and pump shaft (item 10).
- Position the motor and pump hydraulics horizontally and set level with the motor shaft.
- Align the motor shaft (item 9) with the pump shaft (item 10). **Make sure that the four screw holes of the hydraulic housing (item 3) are aligned with the lantern bracket and the nuts (item 12). Take care, the motor cable (item 15) is on the same side as the cable protection (item 6).**
- Use the nuts (item 12) to secure the motor stud. Tighten the nuts (item 12) (maximum torque 20 Nm).
- Manually rotate the connected shaft (item 9) to check for any obstructions. **If it does not rotate freely, review the assembly process.**

CAUTION! Risk of damage to the product!

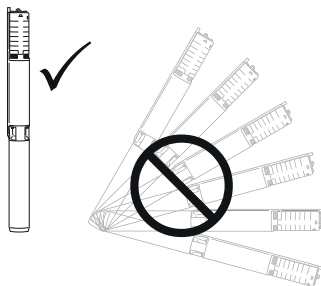
There must not be a rigid connection between the motor and the hydraulics, as otherwise, the motor and pump hydraulics will be damaged.

- Check the radial play and axial play of the motor shaft.
- Position the power cable (item 15) onto the motor's protection plate (item 14) and secure it.
- Align the power cable (item 15) carefully along the hydraulic housing (item 3) and reattach the cable protection (item 6) with the belonging screws (item 7).
- Reinstall the screen (item 2) onto the hydraulic housing (item 3) using the corresponding screws (item 8).

6.3. Installation types

- Vertical stationary installation, immersed. If the submersible pump is not installed in a well, it is necessary to install a cooling shroud.

No horizontal or tilted installation!



6.4. Electrical connection



RISK of fatal injury due to electrocution!
Improper electrical connections can lead to fatal electrical shocks. Electrical connections may only be carried out by a qualified electrician approved by the local energy supply company, in accordance with locally applicable regulations.

- The mains connection current and voltage must be as stated on the rating plate.
- Connect the power cable in accordance with the applicable standards and regulations and according to the conductor assignment.
- Any available monitoring devices must be connected and tested to ensure that they are working properly.
- **Earth the submersible pump according to the regulations!**
Units that are permanently installed must be grounded in compliance with nationally applicable standards.
- If a separate protective ground conductor connection is available, it must be connected to the marked drilled hole or ground terminal (⊕) using a suitable screw, nut, toothed lock washer, and flat washer. The **cross-section** of the cable for the protective ground conductor must comply with the local regulations.
- A power supply separator **must** be provided by the customer!
 - Main switch for connection to a power supply grid
- We recommend using a residual-current device (RCD).
- For pump types without starting box in the scope of **delivery**, switchgear units must be purchased as accessories.

6.4.1. Extending cable (Fig. 3)

The pump is delivered ex works with a mounted connection cable for the power supply. The Wilo-Atmos INITIAL pumps can be ordered with several different cable lengths. The cable length is visible in the **corresponding** index in the article's type key.

In case that the pump's power cable must be extended to the required length on site prior, act according to the following instructions.

Certain articles contain a connection kit for shrinking tube connections.

Standard procedure for a cable extension

1. Strip the cable sheath's ends of the motor cable and the extension cable by **50 ... 60 mm** with a wire stripper **without damaging the insulation of the inner cores**.
2. Cut the individual inner wires of motor and extension cable to the specified lengths so that associated individual wires correspond accordingly.

CAUTION! Risk of damage to the product!

Each wire shall be connected with the corresponding wire of the same colour.

- Check the correct alignment of the wires.
3. Strip the isolation of each inner wire to reveal a **20 ... 30 mm copper wire** (Fig. 3a).
 4. Tighten two wires **of the same colour** into spiral shape to ensure close connection (Fig. 3b).
 5. Tightly wind and cover each copper wire connection with electrical insulating tape over its length of 15 ... 20 mm (Fig. 3c).
 6. Wrap the wire connection that is covered with the electrical insulating tape with a waterproof adhesive tape (Fig. 3d).

NOTE:

The covering of waterproof adhesive tape should be 10 mm longer than the electrical insulating tape at both ends. Before the wrapping, the waterproof tape should be stretched out 1-fold its length, following the normal use.

7. Wrap the open junction of the cable sheath with all wires wrapped with the waterproof adhesive tape with electrical insulating tape (Fig. 3e). On both sides 10 mm longer than the open laying inner wires.
8. Wrap the cable sheath that is wrapped with the electrical insulating tape another time with waterproof adhesive tape (Fig. 3f). The covering of waterproof adhesive tape should be 10 mm longer than the electrical insulating tape at both ends. Before the wrapping, the water proof tape should be stretched out 1-fold its length, following the normal use.
9. Immerge the cable junction into water for 12 hours.
Once you have completed this step, check that the connections are not damaged and check the earthing duct. Then measure the resistance between the motor housing / pump and the ground terminal of the cable connection and check that it is below 3 Ω.

Once again measure the insulation resistance prior to connecting the connection cables to the switchbox / main switch. This way, you can identify damage caused during installation.

- Use an insulation tester (measuring voltage is 500 V) to measure the resistance of the connection cable.
- The resistance must not fall below the following values during initial commissioning:
 - Power supply connection cable: min. 50 MΩ,**If the insulation resistance is too low, it is possible that moisture has penetrated into the cable and/or the motor. Do not connect the pump. Consult the manufacturer!**

Electrical connections may only be made by a qualified electrician!

If the insulation resistance is OK, connect the unit to the mains supply by connecting the connection cables to the starting box or the switchbox on site.

Isolating cables with a shrinking tube

Certain articles contain a shrinking tube in their scope of **delivery**:

- 1 shrinking tube; black, in a length of 30 cm

The heat-shrink tubing can be used instead of the additional layer of waterproof adhesive tape to seal the two ends of the sheathed cable watertight.

To do this, push the heat-shrink tubing over the motor-side cable before starting the cable extension. Follow the instructions in the standard procedure up to and including point 7. Then go on with:

- 8a. Wrap the cable sheath that is wrapped with the electrical insulating tape another time with waterproof adhesive tape (Fig. 3f). The covering of waterproof adhesive tape should be 10 mm longer than the electrical insulating tape at both ends. Before the wrapping, the water proof tape should be stretched out 1-fold its length, following the normal use.
- 9a. Carefully slide the heat-shrink tubing over the centre of the area of the cable connection wrapped in insulating tape.
- 10a. Starting from the centre, heat the heat-shrink tubing with a hot air gun. Continue working alternately on both sides, until the heat-shrinking tube fits tight to the complete cable junction.

CAUTION! Risk of damaging the connection!

If the joint is heated too quickly and too strongly, the internal parts may be damaged. The heat-shrink tubing itself can also tear if the temperature is too high.

- Heat the joint slowly from the centre over a longer **period**. This reduces temperature differences between the internal parts and the heat-shrink tubing and prevents damage

Once you have completed this step, check that the connections are not damaged and check the earthing duct. Then measure the resistance between the motor housing / pump and the ground terminal of the cable connection and check that it is below 3 Ω.

Once again measure the insulation resistance prior to connecting the connection cables to the switchbox / main switch. This way, you can identify damage caused during installation.

- Use an insulation tester (measuring voltage is 500 V) to measure the resistance of the connection cable.
- The resistance must not fall below the following values during initial commissioning:
 - Power supply connection cable: min. 50 MΩ,

If the insulation resistance is too low, it is possible that moisture has penetrated into the cable and/or the motor. Do not connect the pump. Consult the manufacturer!

Electrical connections may only be made by a qualified electrician!

6.4.2. Wilo-Actun INITIAL electrical connection (Fig. 4a, 4b)

Fig. 4: Wilo-Actun INITIAL connection cable

Item	Wire colour	Connection
M	Blue	N conductor
A	Brown	Capacitor connection (only motors without built-in capacitor)
C	Black	L conductor
⊕	Yellow/green	Earthing

Cable lengths and diameters

If the power line needs to be extended the cable must have a sufficient **cross-sectional** diameter, corresponding to the cable length. This is mandatory to avoid abnormal operation of the pump.

Motor Power [kW]	Cable length/Cross sectional Area of Conductor [mm ²]					
	0 ... 15 m	16 ... 30 m	31 ... 45 m	46 ... 60 m	61 ... 75 m	76 ... 90 m
0.25	0.75	0.75	0.75	0.75	1.0	1.25
0.37	0.75	0.75	0.75	1.0	1.25	1.25
0.55	0.75	0.75	1.0	1.25	1.25	1.5
0.75	0.75	1.0	1.25	1.25	1.5	1.5
0.92	1.0	1.25	1.25	1.5	1.5	2.0
1.1	1.0	1.25	1.5	1.5	2.0	2.0
1.5	1.25	1.5	2.0	2.0	2.5	2.5
1.8	1.5	2.0	2.0	2.5	2.5	3.0
2.2	1.5	2.0	2.5	2.5	3.0	4.0
2.6	2.0	2.5	2.5	3.0	4.0	4.0
3.0	2.0	2.5	3.0	4.0	4.0	5.0

6.5. Motor protection

We recommend installing a residual-current device (RCD).

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

6.6. Installation



DANGER: Heights!

When installing the pump and its accessories, work is sometimes performed directly at the edge of the well or tank. Carelessness and/or wearing inappropriate clothing may result in a fall. There is a risk of fatal injury! Take all safety precautions to prevent a fall.

Observe during pump installation:

- This work must be carried out by qualified personnel and electrical work must be carried out by an electrician.
- The operating space must be clean, free of coarse solids, dry, frost-free and, if necessary, decontaminated. It must also be suitable for the particular pump. There must be sufficient water inflow for the submersible pump's maximum output in order to prevent dry run and/or air intake.
- When working in tanks, wells or boreholes, a second person must be present for safety reasons. If there is a risk of toxic or asphyxiating gases building up, the necessary precautions must be taken.
- Ensure that lifting equipment can be set up without any trouble, since this is required for installing and dismantling the pump. It must be possible to reach the pump safely in its operating and storage locations using the lifting equipment. The set-down location must have a solid bearing surface. The lifting gear must be attached to the defined lifting eyes to transport the pump. When using chains, these must be connected to the lifting eyes using a shackle. Lifting gear must be technically approved.
- Connection cables must be routed in such a way that safe operation and easy installation/dismantling are possible at all times. Do not carry or pull the pump by the connection cable.
The pump is delivered ex works with a connected connection cable for the power supply. The length of the cable is indicated in the article number (see chapter "Type key"). If the power supply connection cable must be extended to the required length on site, do this **prior to installation**. Check the cable cross-section used and the routing type chosen. Make sure the available cable length is sufficient.
- Observe the corresponding protection class when using an accessory switchgear.

- Structural components and foundations must be of sufficient stability in order to allow the product to be fixed securely and functionally. The operator is responsible for the provision of the foundations and their suitability in terms of dimensions, stability, and strength.
- Check that the available consulting documents (installation plans, operating space configuration, feed conditions) are complete and correct.
- Observe all regulations, rules and laws for working with heavy and under suspended loads. Wear appropriate protective clothing!
- Observe the locally applicable accident prevention and safety regulations of professional and trade associations.



NOTICE:

- To achieve the necessary cooling, the pump must always be immersed when in operation. Ensure minimum water submersion at all times!
- Do not use an additional non-return valve on the pressure side. This would result in system malfunction.

6.6.1. Pump installation (Fig. 6, 7)

In this installation method, the submersible pump is installed directly on the ascending pipe. The installation depth is determined by the length of the ascending pipe. In narrow well shafts, a centring device must be used because the pump must not come into contact with the walls of the well as this could damage the cable and pump. Use hoisting gear with sufficient bearing capacity.

The motor must not sit on the bottom of the well as this can lead to tensions and slagging of the motor. This would mean that heat dissipation is no longer guaranteed and the motor could overheat.

In addition, the pump should not be installed at the same height as the filter pipe. The intake current can draw up sand and solid material, which would mean that the motor cooling is no longer guaranteed. This would also result in increased wear of the hydraulics. To prevent this, it may be necessary to use a cooling shroud or install the pump in the vicinity of unperforated well casings.

Installation with threaded pipes, example (Fig. 6)

Fig. 6: Installation

1	Pump	7	Square timber (2x)
2	Ascending pipe	8	Cable clip
3	Supporting clamp	9	Mounting bracket

4	Lifting equipment	Ls	Static water level (pump not in operation)
5	Connection cable	Ld	Dynamic water level (pump in operation)
6	Minimum submersion		

**NOTICE:**

Observe the following prior to installing threaded pipes:

- The threaded pipes must be screwed into each other leak-tight and firmly. To achieve this, wrap the threaded pin with hemp or Teflon tape.
 - When screwing in the pipes, make sure that the pipes are aligned (not tilted) to ensure that the thread is not damaged.
 - Observe the submersible pump's direction of rotation and use suitable threaded pipes (right-hand or left-hand thread) so that they do not come loose by themselves.
 - Threaded pipes must be secured against inadvertently coming loose.
1. If not ordered pre-equipped, extend the connection cable installed ex works according to the needs on site (see chapter 6.4.1).
 2. Fit the first pipe to the pressure connection **of the pump**. Screw together all necessary pipes if **only a** few pipes are required and the lifting equipment has reached a sufficient height.
 3. Fit a mounting bracket to the pressure connection of the respective last pipe and fit a supporting clamp below the flange.
Make sure that the cable is not damaged by the supporting clamp. The cable must always be routed outside the supporting clamp!
 4. Secure the lifting equipment to the mounting bracket and lift the complete unit.
 5. Swivel the unit over the borehole and slowly lower it.
Make sure the cable and well walls are not damaged!
 6. Route the connection cable along the piping. Always fasten the cable below and above a pipe adaptor using a cable clip.
 7. Place two square timbers over the well shaft. Lower the unit until the supporting clamp is resting on the square timbers.
 8. If necessary, connect an additional pipe and repeat the process until the pump has been positioned at the required depth.
 9. Disassemble the mounting bracket from the pressure pipe and fit the well closure (e.g. well cover) on the discharge pipe.



WARNING: danger of crushing!
During installation, the entire weight is resting on the lifting equipment and the bearer cable may be subject to tension. This can result in severe crushing! Before disassembling the mounting bracket, make sure that the bearer cable is NOT under tension.

10. Fasten the lifting equipment to the well closure and hoist the entire unit (consisting of the pump, piping and well closure).
11. Remove the supporting clamp, square timbers and guide the connection cables to the outside through the well closure.
12. Place the unit on the well and fasten the well closure.
13. Fit the pressure pipe to the tap on the well closure and route the connection cables to the switchbox.

Installing piping for deep wells

Long piping is needed for deep wells. With lengths of 10 m or more, impermissible bending stress may occur when lifting the piping and it may become damaged. To prevent this, the piping must be installed successively in short lengths. To do this, the individual sections (recommendation: max. 3 m) are lowered into the borehole and installed one after the other. This way, longer piping can be installed for deep wells without any problems.



NOTICE:
 Metal pressure pipes must be integrated into equipotential bonding according to the locally applicable regulations and approved rules of technology:

- In this process, make sure the contacts are connected across an area that is as large as possible and guarantee a low-resistance connection!

Installation, equipped, example, (Fig. 7)

Fig. 7: Installation, example

1	Pump	12	Hose holder
2	Ascending pipe	13	Pressure gauge
5	Connection cable	14	Valve
10	Ground connection	15	Movable joint
11	Starting box	16	Float ball

Installing flexible piping

The pump can also be used with flexible piping (e.g. hoses). In this case, the piping is fitted to the pressure connection and then lowered into the borehole together with the pump.

Observe the following in the process:

- Synthetic or (stainless) steel **guy ropes** are used to lower the pump.
- The **guy rope** must have sufficient bearing capacity for the complete system (pump, piping, cable, water column).
- **The guy rope must be fastened to the attachment points (eyelets) provided on the pressure port for that purpose.**



DANGER due to improper fixation.

The **guy rope** must not be wound around the pressure port or affixed to the piping. This could result in slipping or the piping might become separated.

There is an increased risk of injury! Always attach the guy rope to the specified attachment points!

7. Commissioning

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

The following general conditions must always be met and checked:

- Installation type, including cooling (does a cooling shroud have to be installed?)
- Minimum water submersion / Max. immersion depth

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

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

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

- Commissioning of the pump may only be carried out by qualified and trained personnel in accordance with the safety instructions.
- All persons working on or with the pump must have received, read, and understood this operating and maintenance manual.
- All safety devices and emergency cut-outs must be connected and checked to ensure that they work properly.
- Electrical and mechanical adjustments must be made by qualified personnel.
- The pump is suitable for use under the specified operating conditions.

In general, people must be kept out of the working area of the pump. No persons are allowed in the work area during start-up or operation.

- Make sure a second person is present at all times when you are working in wells and tanks. Adequate ventilation must be ensured if there is danger of toxic gases forming.

7.1. Electrical system

Connection of the pump and installation of the connection cable as described in the “Installation” section and in accordance with the applicable national guidelines and regulations (for example the VDE guidelines in Germany).

- The pump must be properly protected and earthed.
- Ensure all monitoring devices are connected and have been tested.
- If not equipped with a starting box, a power supply separator (main switch) **must** be provided on site!



RISK of fatal injury due to electrocution!
Improper electrical connections can lead to fatal electrical shocks. Electrical connections may only be carried out by a qualified electrician approved by the local energy supply company, in accordance with locally applicable regulations.

Direction of rotation control

The direction of rotation is controlled via the integrated frequency converter. It internally guarantees correct polarity and the pump automatically rotates in the correct direction.

7.2. Initial commissioning

Check the following prior to initial commissioning:

- The pump was installed and connected correctly.
- Insulation check was carried out.
- For applications in closed pipe systems:
The system has been vented and flushed.

7.2.1. Venting the pump and piping (for closed pipe systems)

- Open all slide valves in the pressure pipe.
- Switch on the power supply. The pump now operates at maximum delivery rate.
The air escapes through the corresponding air vent valves. If air vent valves have not been installed, check the taps so the air can escape here!
- Once the pump and pipe system have been vented, once again disconnect the pump from the power supply and close any potentially open taps.

7.3. Operation

7.3.1. Before switching on

Check the following prior to switching on the submersible pump:

- Proper and secure cable routing (e.g. no loops)
- Firm fit of all components (pump, piping, etc.)
- Operating conditions:
 - Fluid temperature
 - Immersion depth
- Open all the gate valves in the pressure pipe. The pump must not be switched on when the slide valves are throttled or closed.

7.3.2. Switching on

- Switch on the power supply. If the supply voltage is available, the pump automatically switches on and off as per the operating conditions.

7.3.3. After having switched on

Behavior during mains operation

If the motor does not start immediately after the pump is switched on, immediately disconnect the power supply. The start pauses specified in the "Technical data" section must be observed before starting up again. If the fault recurs, the unit must be switched off again immediately. The pump must only be restarted once the fault has been rectified.

7.4. Conduct during operation

When operating the pump, always follow the locally applicable laws and regulations for work safety, accident prevention, and handling electrical machinery. Operators must clearly specify staff activities to guarantee safe operating processes. All personnel is responsible for ensuring that regulations are observed.

The pump is equipped with moving parts. During operation, these parts rotate in order to pump the fluid. Certain substances in the fluid can result in very sharp edges forming on the moving parts.



WARNING: rotating parts!

The rotating parts can crush and sever limbs. Do not reach into the hydraulics or touch the rotating parts when the machine is in operation. Switch off the pump and allow the rotating parts to come to a standstill prior to maintenance and repair work!

The following must be checked at regular intervals:

- Operating voltage (permissible deviation +/- 10 % of the rated voltage)

- Frequency (permissible deviation $\pm 2\%$ of the rated frequency)
- Current consumption (permissible deviation between phases is a maximum of 5%)
- Switching frequency and switching pauses (see technical data)
- Minimum water submersion
- Quiet and low-vibration running
- Gate valves in the pressure pipe must be open.

8. Decommissioning/Disposal

All work must be carried out with the greatest care.

Proper protective clothing is to be worn.

When carrying out work in wells and/or tanks, the respective local protection measures must be observed in all cases. A second person must be present for safety reasons.

Auxiliary lifting devices in technically perfect condition and officially certified lifting gear must be used to lift and lower the pump.



RISK of fatal injury due to malfunction!
Lifting gear and lifting devices must be in a perfect technical condition. Work may only commence if the lifting device has been checked and found to be in perfect working order. If it is not inspected, fatal injuries may result!

8.1. Temporary shutdown

For this type of shutdown, the pump remains installed and is not cut off from the electricity supply. In the event of temporary shutdown the pump must remain completely immersed so that it is protected from frost and ice. Ensure that the temperature of the fluid and in the operating space does not fall below $+3\text{ }^{\circ}\text{C}$.

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

CAUTION!

Only perform test runs under the proper operating and usage conditions. Never run the machine dry!
Failure to observe this provision can lead to irreparable damage!

8.2. Shutdown for maintenance work or storage

- Switch off the system and secure it against being switched on again by unauthorized persons.
- Have a qualified electrician disconnect the pump from the mains.
- Close the slide valves in the pressure pipe after the well cover.

You can then begin disassembly.



CAUTION: beware of burns!

Housing parts may heat up to well above 40 °C during operation. There is a risk of burns! After switching it off, let the pump cool down to ambient temperature.

8.2.1. Removal

Disassembly takes place in the same way as installation:

- Disassemble the well cover.
- Dismantle the ascending pipe and unit in the reverse order to installation.

When configuring and selecting lifting equipment make sure that it is adequate to lift the entire weight of piping, pump including connection cables and water column!

8.2.2. Return delivery /Storage

For shipping, the parts must be packed in tear-proof plastic bags of sufficient size in such a manner that they are tightly sealed and leak proof. The parts may only be shipped by forwarding agents who have been instructed appropriately.

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

8.3. Recommissioning

Before recommissioning, the submersible pump must be cleaned of contaminants.

The submersible pump can then be installed and put into operation in accordance with the specifications in this operating and maintenance manual.

The submersible pump may only be switched on again if it is in proper working order.

8.4. Disposal

8.4.1. Operating fluids

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.

Water-glycol mixtures have been categorized as water-polluting class 1 in accordance with VwVwS 1999. When disposing of the unit, adhere to DIN 52 900 (for propanediol and propylene glycol) and/or local guidelines.

8.4.2. 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.

8.4.3. Information on the collection of used electrical and electronic products

Proper disposal and appropriate recycling of this product prevents damage to the environment and dangers to your personal health.



NOTICE:

Disposal in domestic waste is prohibited!

In the European Union, this symbol may have been included on the product, the packaging or the accompanying documentation. It means that the electrical and electronic products in question must not be disposed of along with domestic waste.

To ensure proper handling, recycling and disposal of the used products in question, please note the following points:

- Only hand over these products at designated, certified collecting points.
 - Observe the locally applicable regulations!
- Please consult your local municipal authority, the nearest waste disposal site, or the dealer who sold the products to you for information on proper disposal. For further information on recycling, go to www.wilo-recycling.com.

9. Maintenance and repair

Any repairs to the motor or replacement of the motor filling must be carried out by Wilo customer service only.

10. Troubleshooting

In order to prevent damage or serious injury when repairing malfunctions on the unit, observe the following:

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

10.1. Faults

10.1.1. Fault: Motor out of operation

1. Too much low voltage leads to failed start-up
 - Use a voltage regulator for further adjustment;
2. Stuck impeller or stator and rotor
 - Check causes and then take the corresponding measures
3. **Three**-phase electric pump: power phase shortage
 - Take off the water inlet valve to clean stoppers of impellers as well as silt of sand-proof cover;
4. **The solder connections** of capacitor and protector **are broken** or to be burnt
 - Find reasons for phase shortage and then take measures for normal phase power;
5. Burnt stator winding or open circuit.
 - Re-**solder disconnected** wires or change damaged parts

10.1.2. Fault: No water or not enough water amount

1. Too much low voltage leads to not enough rotation or reduced water amount;
 - Adjust voltage
2. Too high **lift** that has exceeded electric pump's **lift** capacity
 - Decrease **lift** or buy another electric pump according to practical situation
3. Serious wear of impellers
 - Clean blocked sundries
4. Open circuit of stator winding
 - Change impeller or send it to maintenance unit;

10.1.3. Fault: Frequently worked protectors

1. Too much low voltage leads to increased current and serious motor heating
 - Clean the supply line, slide valve, suction piece, suction port, or suction strainer
2. Too much low **lift** leads to increased water drainage and serious motor overload
 - Use iron wire to narrow water outlet so as to reduce outflow
3. Abnormal wear of rotors or parts
 - Adjust or replace parts
4. The electric pump is exposed above water or operated in a dry environment
 - Reduce installation height
5. Damaged sealing; water inflow of machine winding
 - Replace sealing and dry the electric engine
6. Serious bearing wear (too much big noise) and increased friction force
 - Replace bearing

10.1.4. Further steps for troubleshooting

If the points listed here do not rectify the fault, contact customer service. They will be able to help you in the following ways:

- Telephone or written support from customer service
- On-site support from 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 service. For more details, please contact customer service.

11. Appendix

11.1. Spare parts

Spare parts can be ordered from the manufacturer's customer service. Provide the serial and/or article numbers to avoid return queries and incorrect orders.

Subject to change without prior notice.









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