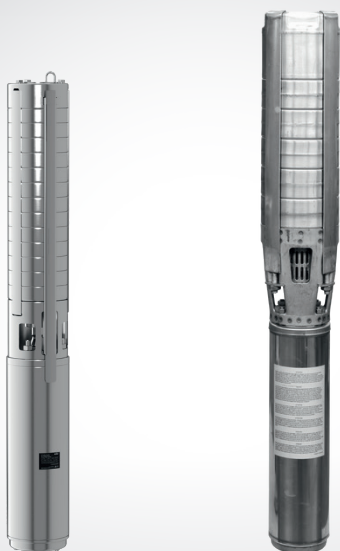


Wilo-Sub TWI 4 ... 6



en Installation and operating instructions

Fig.1:

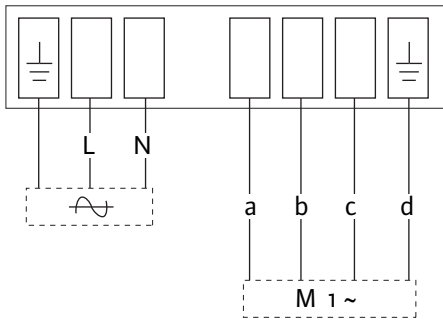


Fig.2:

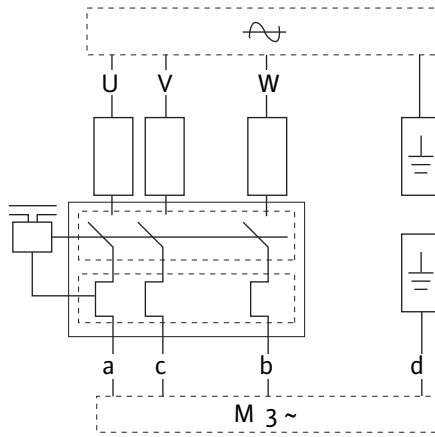


Fig.3:

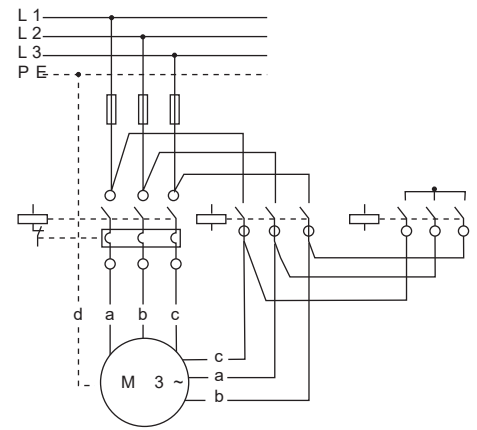


Fig.4:

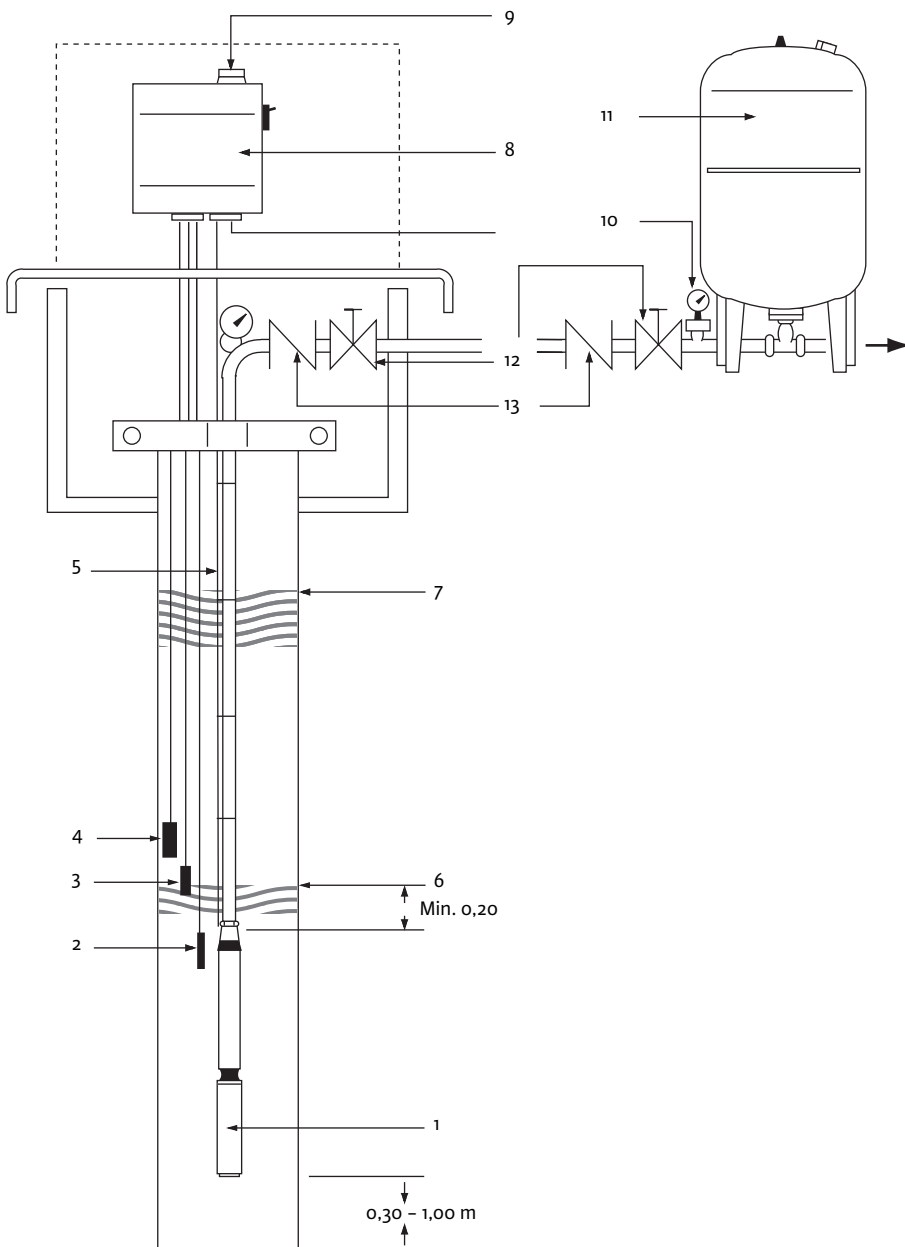


Fig.5:

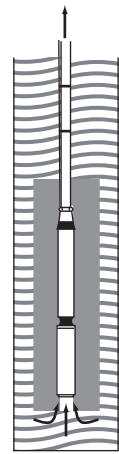
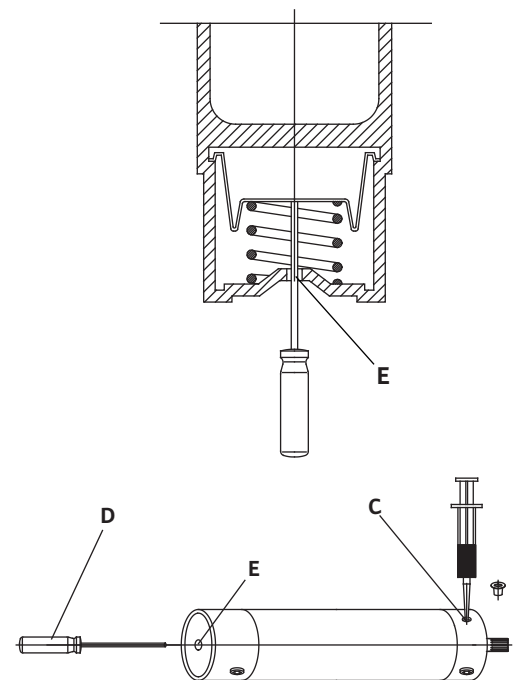


Fig.6:



1 General

About this document

These installation and operating instructions are an integral part of the product. They must be kept readily available at the place where the product is installed. Strict adherence to these instructions is a precondition for the proper use and correct operation of the product.

These installation and operating instructions correspond to the relevant version of the product and the underlying safety standards valid at the time of going to print.

2 Safety

These operating instructions contain basic information which must be adhered to during installation and operation. For this reason, these operating instructions must, without fail, be read by the service technician and the responsible operator before installation and commissioning.

It is not only the general safety instructions listed under the main point "safety" that must be adhered to but also the special safety instructions with danger symbols included under the following main points.

2.1 Indication of instructions in the operating instructions

Symbols:

General danger symbol



Danger due to electrical voltage



NOTE



Signal words:

DANGER!

Acutely dangerous situation.

Non-observance results in death or the most serious of injuries.

WARNING!

The user can suffer (serious) injuries. 'Warning' implies that (serious) injury to persons is probable if this information is disregarded.

CAUTION!

There is a risk of damaging the pump/unit. 'Caution' implies that damage to the product is likely if this information is disregarded.

NOTE: Useful information on handling the product. It draws attention to possible problems.

2.2 Personnel qualifications

The installation personnel must have the appropriate qualifications for this work.

2.3 Danger in the event of non-observance of the safety instructions

Non-observance of the safety instructions can result in risk of injury to persons and damage to pump/unit. Non-observance of the safety instructions can result in the loss of any claims to damages.

In detail, non-observance can, for example, result in the following risks:

- Failure of important pump/unit functions
- Failure of required maintenance and repair procedures
- Danger to persons from electrical, mechanical and bacteriological influences
- Property damage

2.4 Safety instructions for the operator

The existing directives for accident prevention must be adhered to.

Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and local power supply companies must be adhered to.

2.5 Safety instructions for inspection and installation work

The operator must ensure that all inspection and installation work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions.

Work to the pump/unit must only be carried out when at a standstill.

2.6 Unauthorised modification and manufacture of spare parts

Modifications to the pump/unit are only permissible after consultation with the manufacturer.

Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts can nullify the liability from the results of their usage.

2.7 Improper use

The operating safety of the supplied pump/unit is only guaranteed for conventional use in accordance with Section 4 of the operating instructions. The limit values must on no account fall under or exceed those specified in the catalogue/data sheet.

3 Transport and interim storage

Immediately after receiving the product:

- Check the product for damage in transit.
- If damage is found, the necessary procedures involving the forwarding agent must be taken within the specified period.



CAUTION! Danger of material damage!

The product may be damaged if it is not transported and stored correctly.

- **For transport, the pump may only be lifted or carried using the brackets intended for that purpose. The cable should never be used for lifting!**
- **The pump must be protected from moisture, frost, heat, direct sunlight and mechanical damage during transport and interim storage.**
- **Firmly seal the pump pressure port to avoid contamination.**
- **During transport and interim storage observe that the freezing point of the motor fluid is -8 °C.**
- **Protect all electricity supply cables from kinking, damage and the penetration of moisture.**
- **Store the pump horizontally on a solid, level surface.**

4 Intended use

Wilo-Sub TWI submersible pumps are suitable for pumping clean or slightly muddy water not containing long fibrous and abrasive components. They are used for the following applications:

- for boreholes and cisterns,
- for pumping and distributing secondary hot water for:
 - domestic use (potable water supply)
 - agriculture (irrigation, sprinkling)
 - industry (pressure boosting etc.)



NOTE: Follow the locally applicable regulations for the intended application.

The pumps are only installed flooded (immersed) and can be installed horizontally and vertically with cooling jacket pipe.



CAUTION! Danger of material damage! Pumping materials which are not approved can lead to damage to the product.

The pumps are not suitable for water containing coarse contaminants such as fibres or flammable liquids or for use in potentially explosive areas.

Correct use of the pump/installation also includes following these instructions.

Any use over and beyond these is considered to be incorrect use.

5 Product information

5.1 Type key (standard versions)

| Example: WILO-Sub TWI 4.01-09-B EM | |
|------------------------------------|--|
| TWI | Submersible pump |
| 4 or 6 | Minimal diameter: 4" and 6" borehole diameters Pump diameter max. 98 mm for 4", max. 152 mm for 6" |
| .01 | Rated volume flow rate (m ³ /h) |
| -09 | Number of pump stages |
| -B | Pump generation |
| EM | EM = Single-phase 1~230 V (50 Hz/60 Hz) with soft starter DM = Three-phase current 3~400 V (50 Hz), 3~480 V (60 Hz) SD = Three-phase current, star-delta-start (6" motors only) |

| 5.2 Technical data | 50 Hz | 60 Hz |
|--------------------------------------|---|--|
| Permissible fluid components: | max. sand content 50 g/m ³ | |
| Mains voltage: | 1~230 V (4"), 3~400 V (4", 6") | 1~230 V (4") 3~480 V (4", 6") |
| Protection class: | IP 68 | |
| Max. volume flow: | 4" = 20 m ³ /h 6" = 78 m ³ /h | 4" = 25 m ³ /h 6" = 97 m ³ /h |
| Max. delivery head: | 4" = 320 m 6" = 410 m | 4" = 340 m 6" = 520 m |
| Pressure port: | 1¼", 1½", 2" for 4" hydraulics 2½", 3" for 6" hydraulics | |
| Permissible fluid temperature range: | +3 to 30 °C | |
| Max. submersion depth: | 350 m | |
| Max. switching frequency: | 20/h | |

5.3 Scope of delivery (standard versions)

- Submersible motor pump
- Integrated non-return valve
- Connecting cable
 - 1.5 m, 2.5 or 5 m long, detachable connecting cable (4x1.5 mm²) for 4" motors or
 - 4 m long connecting cable (4x4 mm²) for 6" motors
- 230 V incl.:
 - Switchbox with capacitor
 - Integrated thermal motor protection
 - On/Off switch



NOTE: Electrical connections are prepared at the works.

- Installation and operating instructions

5.4 Accessories (optional):

- Non-return valve on the borehole output
- Dry-running protection system: Float switch or electrode
- WILO-ER switchgear (motor protection + water-level monitoring)
- Motor cable: as kit (incl. plug) or by the meter (without plug)

- Shrinkage hoses, or moulded sleeves (for motor cable extension)
- Pressure vessel, tank
- WILO Fluidcontrol or WILO pressure switching ER as Plug & Pump package (see separate installation and operating instructions)

6 Description and function

6.1 Description of the pump (Fig. 4)

| Pos. | Description of component |
|------|--|
| 1 | Wilo-Sub pump DM version |
| 2 | Submersible electrode ground |
| 3 | Submersible electrode low water |
| 4 | Submersible electrode upper level |
| 5 | Motor connecting cable |
| 6 | Dynamic level (pump in operation) |
| 7 | Static level (pump switched-off) |
| 8 | Switchbox (with dry-running protection system) |
| 9 | Mains supply |
| 10 | Pressure switch with pressure gauge |
| 11 | Pressure vessel/tank |
| 12 | Shut-off valve |
| 13 | Non-return valve |

Fully submersible, multistage submersible pump with radial or semi-axial impellers. Coupling and flange usable for motors with pumps, installation dimensions in compliance with NEMA standards. Built-in non-return valve in the pump head. Intermediate bearing in each stage, specially designed to optimise the shaft bearings. Sturdy cable protection. Optimised hydraulics components for achieving high efficiency. High resistance against corrosion and abrasion, thanks to the qualities of the stainless steel. Easy servicing, thanks to simple dismantling and installation characteristics of the unit.

Corrosion-free single-phase or three-phase motor with enamelled windings in hermetically cast stator for direct starting with self-lubricating bearings.

Motor cooling is achieved by transferring lost heat to the fluid around the outer jacket of the motor. The minimum flow speed of the fluid along the motor is 10 cm/sec for a 4" motor and is 16 cm/sec for a 6" motor.

6.2 Soft starter and frequency converter

As a general rule all motors can, within the limits described in the following, be operated in combination with frequency converters and electronic starters (soft starter).



CAUTION! Danger of material damage!
If these operating requirements are not met, the service life of the pump will be reduced and can destroy the motor!

6.2.1 Requirements when using electronic starters (soft starter)

- The minimum required cooling flow speed must be ensured at all duty points (4" motors – 10 cm/sec, 6" motors – 16 cm/sec.)
- The current consumption must remain below the nominal current (In) level during the entire operation (see name plate information).
- The ramp time for the start/stop procedures between 0 and 30 Hz should be set to maximum 1 sec. The ramp time between 30 Hz and the nominal frequency should be set to maximum 3 sec.
- During start-up the voltage must be at least 55 % of the nominal motor voltage.
- After normal operation has been reached, bridge the electronic starter (soft starter) in order to avoid power dissipation during operation.

6.2.2 Requirements when using frequency converters

- Permanent operation can only be ensured between 30 Hz and 50 Hz (60 Hz).
- A time of min. 60 seconds between pump stop and restart is recommended to cool the motor winding.
- Never exceed the nominal current (see name plate information).

Maximum voltage peak: 1000 V

Maximum rate of voltage rise: 500 V/μs

- Additional filters are required if the control voltage required exceeds 400 V.
- During start-up the voltage must be at least 55 % of the nominal motor voltage.

7 Installation and electrical connection



DANGER! Risk of fatal injury!

Incorrect installation and incorrect electrical connection can result in death.

- **Installation and electrical work must only be done by qualified personnel and in accordance with applicable regulations!**
- **Accident prevention regulations must be observed.**

7.1 Installation

The pump can be installed vertically or horizontally with a cooling jacket pipe.



CAUTION! Danger of material damage!

Danger of damage due to incorrect handling.

Boreholes or pumping stations must be arranged/designed according to generally valid rules of technology.



CAUTION! Danger of material damage!

If installed in a > 4" or 6" borehole (see Fig. 4) or if installed horizontally in a tank, it is imperative that a suction shroud is fitted on the pump and motor in order to ensure sufficient motor cooling!

- A 6" borehole is recommended for 4" pumps with >9 m³/h rated volume flow rate, an 8" borehole is recommended for 6" pumps with >30 m³/h rated volume flow rate.
- The water inlet in a borehole or well must be adequate for the pump's flow capacity.
- The pump is lowered into place using a block and tackle and tripod, heavy pumps are lowered into place using a cable winch. Installation should take place away from the incoming water or the filter pipe.
- Never allow the pump to run dry. It must be ensured that, even during dry periods, the water level never falls below the top of the unit.
- A consistent inner pipe diameter of 4" (102 mm) or 6" (152 mm) should be ensured in order to guarantee that the pump can be lowered easily.
- The pump must never be lowered or pulled up using the electrical cable.
- Electrical connection work and extension of the motor cable must be performed before lowering the pump.
- The pump must be installed at least 0.30 m above the bottom of the well or the borehole (Fig. 4).
- The system name plate must be fitted near the borehole to ensure access to the technical data of the installation.
- The insulation resistance on the motor and cable must be checked prior to lowering (and during lowering in deep boreholes) (min. 2 M Ω).
- Depending on pump design, the pump can be connected via a solid or flexible pipe, 1¼" to 3" nominal diameter.
- The pump must be secured using a safety rope when using flexible pipes. Use the steel eye bolts on the pump head for this (TWI4). If these attach-

ment points are not available (TWI6), an intermediate flange must be installed which has these attachment points. Solid pipes are preferred.

- It is recommended that you fit an additional non-return valve and shut-off valve on the borehole output.



CAUTION! Danger of material damage!
When the water pressure is raised (>180 m Ws) a non-return valve must be installed directly at the pump outlet. The non-return valve must be designed for a permissible operating pressure of at least 20 bar!

- Observe the required motor cooling (see table under "Fluid temperature")!

7.2 Electrical connection



DANGER! Risk of fatal injury!
A fatal shock may occur if the electrical connection is not made correctly.

Only allow the electrical connection to be made by an electrician approved by the local electricity supplier and in accordance with the local regulations in force.

- The current type and voltage of the mains connection must correspond to the specifications on the name plate.
- Use the connecting cable in accordance with applicable standards/regulations and connect it according to the switchgear or switch cabinet terminal diagram.



CAUTION! Danger of material damage!
The max. length of the cable is dependent on the nominal current consumption of the motor and the cable cross-section!

Refer to the table and check the lengths and diameters of the cable before connection!

Diameter and max. lengths of the cable for direct start:

| Motor version | Motor | Cable | | | | | |
|--|-------|-------------------------|-------------------------|-----------------------|-----------------------|------------------------|------------------------|
| | kW | 4 x 1.5 mm ² | 4 x 2.5 mm ² | 4 x 4 mm ² | 4 x 6 mm ² | 4 x 10 mm ² | 4 x 16 mm ² |
| EM 1~ 50/60 Hz 230 V | 0.25 | 100 | -- | -- | -- | -- | -- |
| | 0.37 | 85 | 144 | -- | -- | -- | -- |
| | 0.55 | 64 | 107 | 140 | -- | -- | -- |
| | 0.75 | 49 | 83 | 110 | 165 | -- | -- |
| | 1.10 | 32 | 54 | 80 | 120 | 195 | -- |
| | 1.50 | 25 | 35 | 60 | 95 | 153 | 245 |
| | 2.20 | 17 | 25 | 45 | 65 | 102 | 163 |
| DM 3~ 50 Hz 400 V 3~ 60 Hz 480 V | 0.37 | 661 | 1102 | 1764 | 2646 | 4411 | 7057 |
| | 0.55 | 454 | 758 | 1213 | 1819 | 3032 | 4852 |
| | 0.75 | 341 | 569 | 911 | 1367 | 2279 | 3647 |
| | 1.10 | 245 | 409 | 655 | 983 | 1639 | 2623 |
| | 1.50 | 179 | 299 | 478 | 718 | 1196 | 1915 |
| | 2.20 | 121 | 202 | 324 | 486 | 811 | 1298 |
| | 3.00 | 94 | 157 | 252 | 378 | 630 | 1008 |
| | 3.70 | 76 | 128 | 204 | 307 | 512 | 819 |
| | 4.00 | 70 | 118 | 188 | 283 | 472 | 755 |
| | 5.50 | 52 | 87 | 140 | 210 | 351 | 562 |
| | 7.50 | 39 | 65 | 104 | 157 | 261 | 418 |
| Cable weight (kg/m) | | 0.20 | 0.25 | 0.30 | 0.40 | 0.65 | 0.85 |

Diameters and max. lengths of the cable for direct start:

| Motor version | Motor | Cable | | | | | |
|---------------------|-------|-------------------------|-------------------------|-----------------------|-----------------------|------------------------|------------------------|
| | kW | 4 x 1.5 mm ² | 4 x 2.5 mm ² | 4 x 4 mm ² | 4 x 6 mm ² | 4 x 10 mm ² | 4 x 16 mm ² |
| DM | 9.30 | 32 | 54 | 87 | 130 | 217 | 348 |
| 3~ 50 Hz 400 V | 11.00 | -- | 45 | 72 | 109 | 181 | 291 |
| 3~ 60 Hz 480 V | 15.00 | -- | -- | 54 | 81 | 135 | 216 |
| | 18.50 | -- | -- | 44 | 66 | 110 | 176 |
| | 22.00 | -- | -- | -- | 55 | 92 | 147 |
| | 30.00 | -- | -- | -- | -- | 67 | 108 |
| | 37.00 | -- | -- | -- | -- | -- | 89 |
| | 45.00 | -- | -- | -- | -- | -- | 73 |
| Cable weight (kg/m) | | 0.20 | 0.25 | 0.30 | 0.40 | 0.65 | 0.85 |

Diameters and max. lengths of the cable (6" motors) for star-delta start:

| Motor version | Motor | Cable | | | | | |
|---------------------|-------|-------------------------|-------------------------|-----------------------|-----------------------|------------------------|------------------------|
| | kW | 4 x 1.5 mm ² | 4 x 2.5 mm ² | 4 x 4 mm ² | 4 x 6 mm ² | 4 x 10 mm ² | 4 x 16 mm ² |
| DM | 2.20 | 182 | 304 | 486 | 730 | 1217 | 1947 |
| 3~ 50 Hz 400 V | 3.00 | 141 | 236 | 378 | 567 | 945 | 1513 |
| 3~ 60 Hz 480 V | 3.70 | 115 | 192 | 307 | 461 | 768 | 1229 |
| | 4.00 | 106 | 177 | 283 | 425 | 708 | 1133 |
| | 5.50 | 79 | 131 | 210 | 316 | 527 | 843 |
| | 7.50 | 58 | 98 | 157 | 235 | 392 | 628 |
| | 9.30 | 48 | 81 | 130 | 195 | 326 | 522 |
| | 11.00 | 40 | 68 | 109 | 163 | 272 | 436 |
| | 15.00 | 30 | 50 | 81 | 121 | 203 | 324 |
| | 18.50 | 24 | 41 | 66 | 99 | 165 | 264 |
| | 22.00 | -- | 34 | 55 | 83 | 138 | 221 |
| | 30.00 | -- | -- | 40 | 60 | 101 | 162 |
| | 37.00 | -- | -- | -- | 50 | 83 | 134 |
| | 45.00 | -- | -- | -- | -- | 68 | 109 |
| Cable weight (kg/m) | | 0.20 | 0.25 | 0.30 | 0.40 | 0.65 | 0.85 |

1~ 230 V (50 Hz, 60 Hz), EM version (Fig. 1)

| Capacity | Current consumption 230V | Operating capacitor |
|----------|--------------------------|---------------------|
| kW | A | µF |
| 0.37 | 3.2 | 16 |
| 0.55 | 4.3 | 20 |
| 0.75 | 5.3 | 30 |
| 1.10 | 7.8 | 40 |
| 1.50 | 9.9 | 50 |
| 2.20 | 14.9 | 75 |

3~400 V 50 Hz, 3~480 V 60 Hz, DM version (Fig. 2 / 3)

| Capacity | Current consumption 400/480 V |
|----------|-------------------------------|
| kW | A |
| 0.37 | 1.3 |
| 0.55 | 1.7 |
| 0.75 | 2.2 |
| 1.10 | 3.2 |
| 1.50 | 4.0 |
| 2.20 | 5.9 |
| 3.00 | 7.8 |
| 3.70 | 9.1 |
| 4.00 | 10.0 |
| 5.50 | 13.7 |
| 7.50 | 18.0 |
| 9.30 | 20.3 |
| 11.00 | 23.3 |
| 15.00 | 31.3 |
| 18.50 | 38.5 |

Connections

(wire identification)

Fig. 1 - 3

| | |
|---|--------------|
| a | black |
| b | blue / grey |
| c | brown |
| d | green/yellow |

**CAUTION! Danger of material damage!****Connecting the motor incorrectly can damage it!**

- Check the mains voltage
- Do not cut the cable between the switchbox and pump. The switchbox contains the necessary motor capacitors (EM versions only).
- Fit ground
- Motor protection is regulated by a thermal or magnetic switch (fitted on EM version, to be fitted on the DM version)

8 Commissioning**8.1 Direction of rotation check (three-phase motors only, the direction of rotation cannot be confused on single-phase motors)**

In order to define the correct direction of rotation, it suffices to check the water pressure on the pressure side of the pump that is running.



NOTE: If the pump is being operated with the wrong direction of rotation, a reduction in the volume flow occurs.

If the direction of rotation is incorrect, 2 phases of the mains connection (in the switchbox or on the contact maker) have to be changed.

8.2 Commissioning



CAUTION! Danger of material damage!

Danger of damage to the mechanical seal. Never allow the pump to run dry, even for a short time.

- Check all electrical connections, the electrical protection, and fuses once again.
- Check the current consumption intermittently and compare with the values on the name plate.
Never exceed the motor nominal current (In) permissible for the motor (see name plate)
- Check the voltage with the motor running.
Permissible tolerance: $\pm 10\%$.
- Vent the pressure ports in order to avoid pressure surge during start-up.
- Close the valves during initial commissioning to minimise fluid hammers due to start-up and briefly increased amounts of sand in the fluid (during initial use of the well).
- Do not start the pump more than 20 times an hour (danger of overheating).
- Ensure that the pump is only operated within the area printed in bold of the curve illustrated in the catalogue. Under no circumstances operate the pump to the right or left beyond the curve area printed in bold.
- Never operate the pump for an extended period with the valve closed.

8.3 Fluid temperature

Submersible pumps may, at nominal current, be operated between min. 3 °C and max. 30 °C. In order to guarantee effective cooling, the circulation flow velocity of the cooling water over the surface of the motor must be at least 10 cm/sec. for 4" motors and 16 cm/sec. for 6" motors.

Min. required volume flow for motor cooling up to a water temperature of 30 °C

| Inside diameter of the side of the well or cooling jacket pipe | 4" motor | 6" motor |
|--|------------------------|-------------------------|
| 102 mm (4") | 0.30 m ³ /h | -- |
| 127 mm (5") | 1.60 m ³ /h | -- |
| 152 mm (6") | 3.00 m ³ /h | 2.10 m ³ /h |
| 178 mm (7") | 4.60 m ³ /h | 6.00 m ³ /h |
| 203 mm (8") | 6.90 m ³ /h | 10.30 m ³ /h |

Fluid temperature

| Water temperature | Adjustment (%) of the nominal current from 0.37 kW to 5.5 kW |
|-------------------|--|
| 35 °C | 95 % |
| 40 °C | 95 % |
| 45 °C | 90 % |
| 50 °C | 80 % |
| 55 °C | 70 % |

In order to guarantee motor cooling at higher temperatures, the flow rate must be reduced proportionally to the motor power (see table above)

NOTE: Do not operate the motors where the fluid temperature exceeds 55 °C!



8.4 Checking and correcting the motor filling level (Fig. 6)

The checking and correction of the filling level of the motor fluid must be performed by qualified personnel. The TWI4 motor may only be refilled by the manufacturer.

- Lie the motor horizontally with opening (C) facing upwards
- Insert the pin gauge into the drilling (E) on the diaphragm housing and check the diaphragm level (D) –see table 1–. The notch on the pin gauge must be level with the outer edge of the drilling.
- If the water level is too low, remove the filter (C) (for TWI6 only).
- Place a filled syringe on the valve and inject water into the motor.
- To vent the valve, briefly press the valve in with the pin gauge until water that is free of bubbles emerges. Caution over pressure!
- Continue filling with water until the diaphragm level (D) has been reached.
- Re-insert the filter (C).

| Type of motor | Test dimension (D) | Tolerance |
|------------------|--------------------|-----------|
| 4" | 10 mm | +/- 2 mm |
| 6" (AISI 304 SS) | 59 mm | +/- 2 mm |
| 6" (AISI 316 SS) | 19 mm | +/- 2 mm |

9 Maintenance

Maintenance and repairs may only be carried out by qualified experts!

DANGER! Risk of fatal injury!



When working on electrical equipment, there is a risk of a fatal shock.

- **The pump should be electrically isolated and secured against unauthorised switch-on during any maintenance or repair work.**
- **Any damage to the connecting cable should always be rectified by a qualified electrician only.**



NOTE: No particular maintenance necessary during normal operation.

10 Faults, causes and remedies

Only have faults remedied by qualified personnel!

Follow the safety instructions in Maintenance.

| Faults | Causes | Remedy |
|---------------------------------|---|--|
| Pump does not start. | Incorrect voltage or voltage drop. | Check voltage during start, a too narrow a cable cross-section can lead to a voltage drop and the pump does not start. |
| | Breaks in the connecting cable. | Measure the phase resistances, pull up the pump and check the cable. |
| | The motor protection switch has been triggered. | Check the protective switch setting of the triggering current strength and compare it with the nominal current being drawn. |
| | The pump starts too often. | Reduce the number of starting procedures, danger of motor overheating (approx. 1 min.). |
| Pump running but does not pump. | No water or the water level is too low | <ul style="list-style-type: none"> • Check the water level, ensure there is min. 0.20 m water above the suction port. • Vent pump. |
| The volume flow is too low. | The suction filter is blocked | Pull up the pump and clean the filter. |
| | Incorrect direction of rotation (DM version) | Change two phases in the connection box. |
| The pump starts too often. | The difference between the switch-on and switch-off pressure too low | Increase the difference between the switch-on and switch-off pressure. |
| | Electrodes are installed incorrectly. | Arrange the electrodes at a distance from each other so adequate time between pump standstill and pump operation is guaranteed. |
| | The diaphragm expansion tank is too small or has incorrect supply pressure. | Check and regulate the pressure (switch on and off). Check the tank supply pressure. Replace the diaphragm expansion tank with a larger one or supplement with an additional diaphragm expansion tank. |

If the operating fault cannot be remedied, please consult a skilled professionals or the nearest Wilo after-sales service or representative office.

11 Spare parts

Spare parts may be ordered via local professional technicians and/or the Wilo after-sales service. To avoid queries and incorrect orders, all data on the name plate should be submitted for each order.

Subject to change without prior notice!





wilo



Local contact at
www.wilo.com/contact

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