

## Wilo-Medana CH1-LSP



**en** Installation and operating instructions



Fig. 1

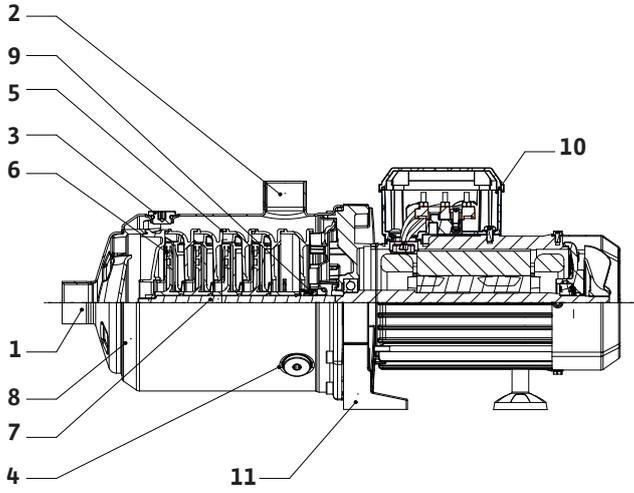


Fig. 2

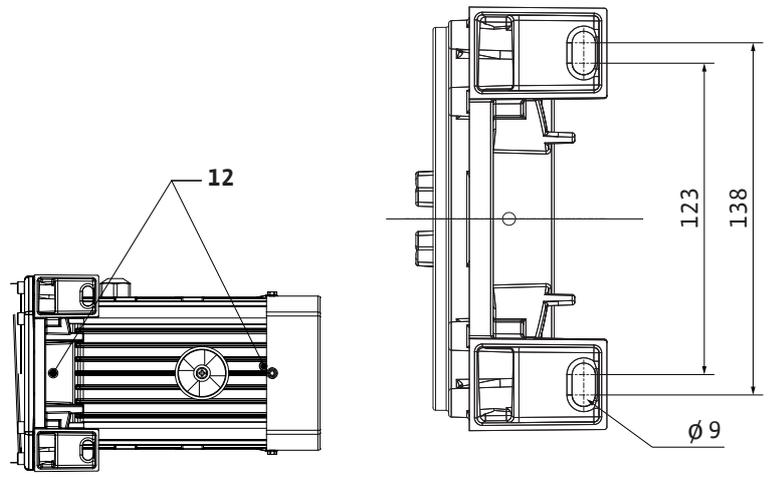


Fig. 3a

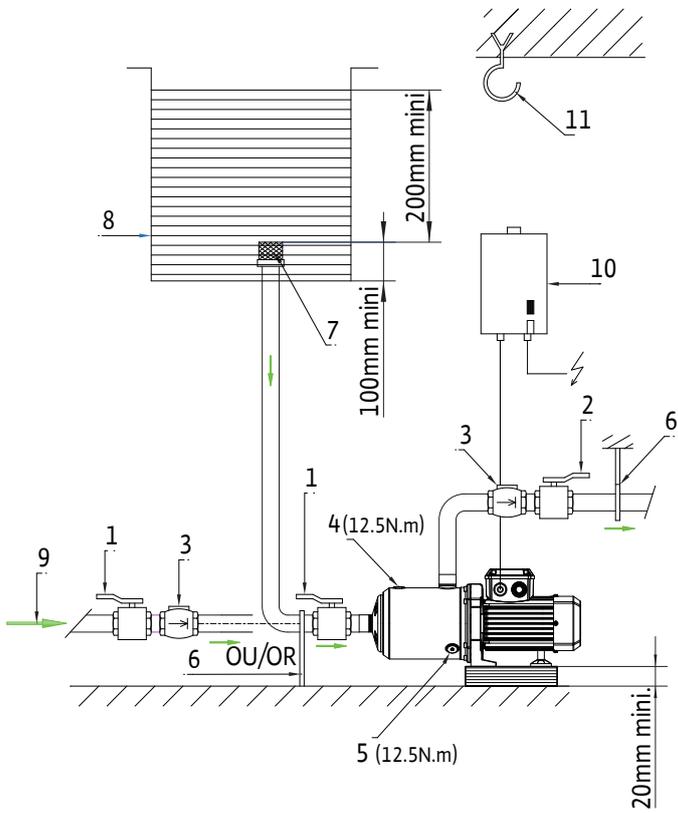


Fig. 3b

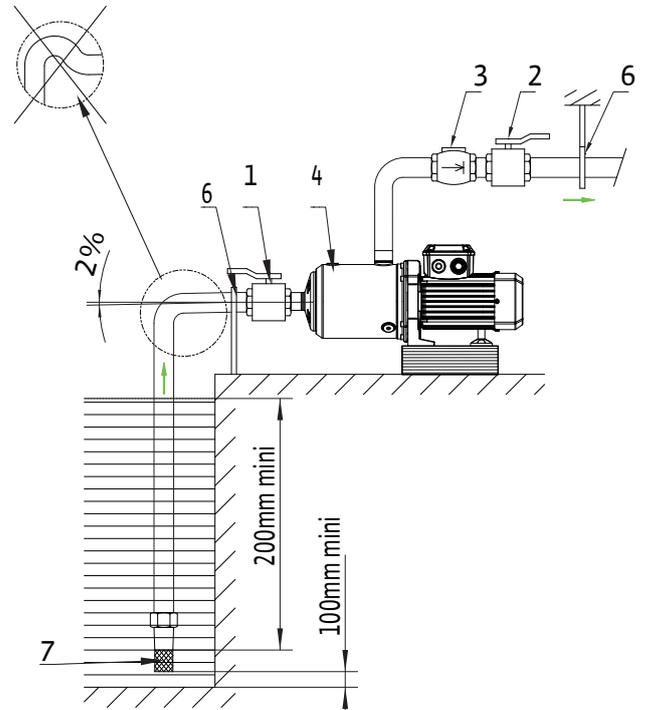


Fig. 3c

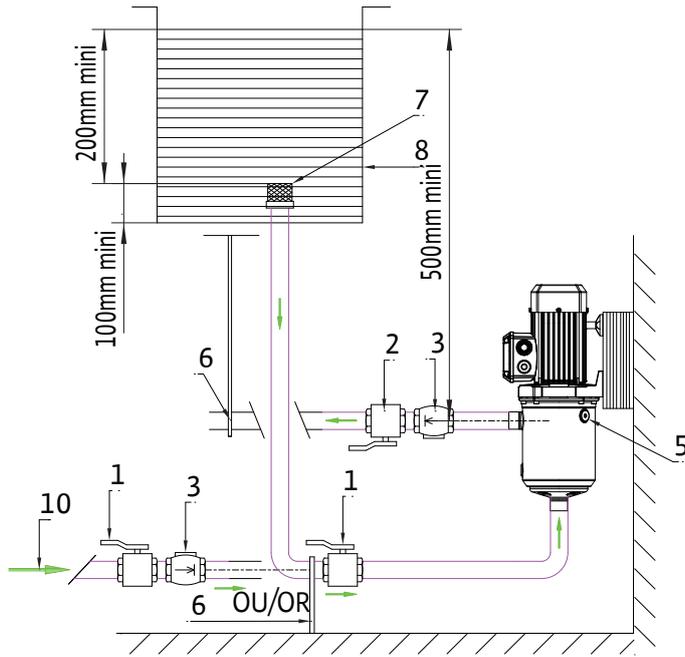


Fig. 4

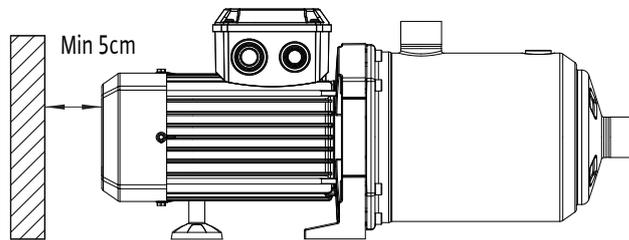


Fig. 5

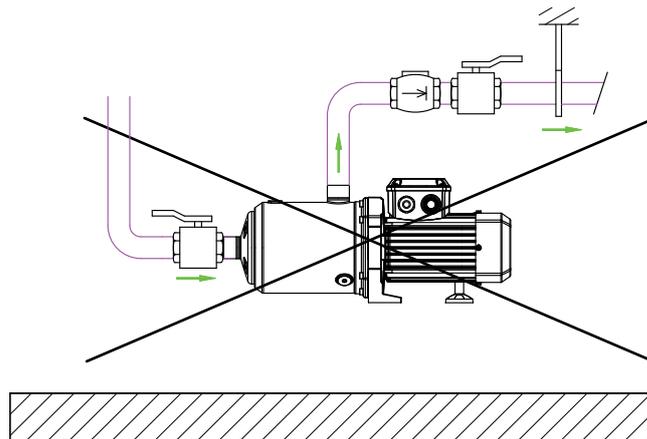


Fig. 6

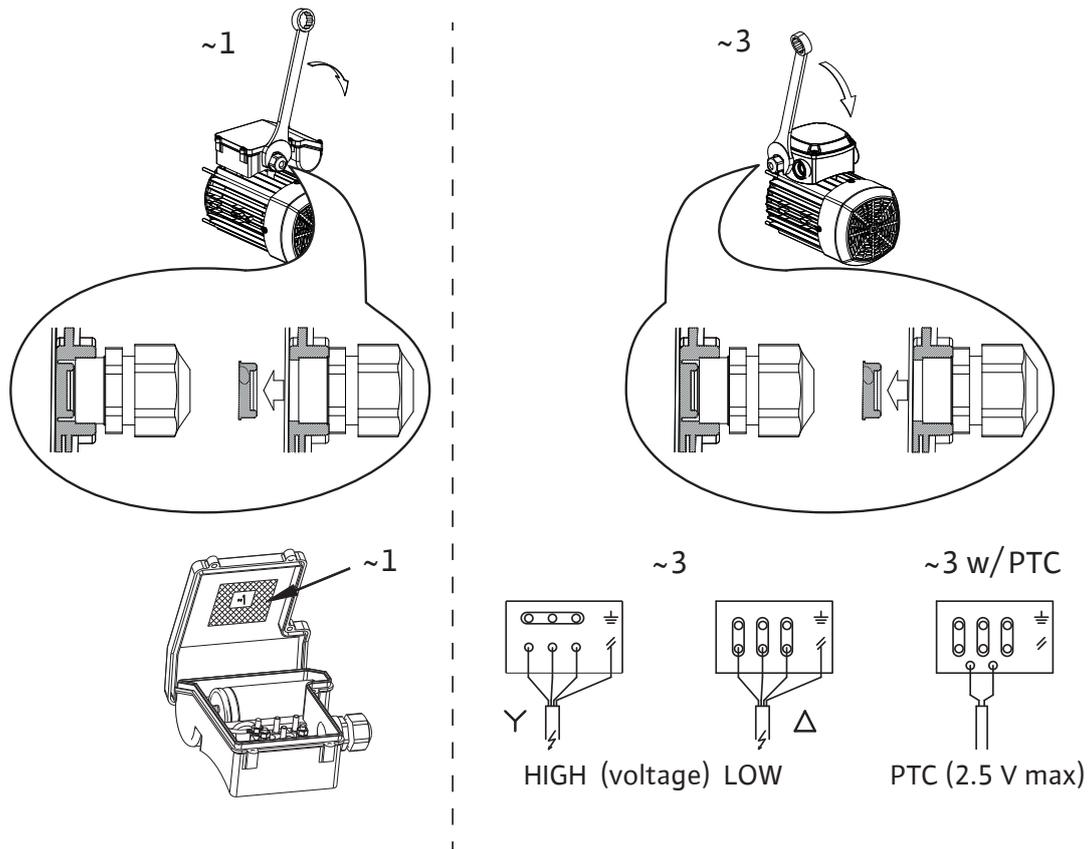


Fig. 7

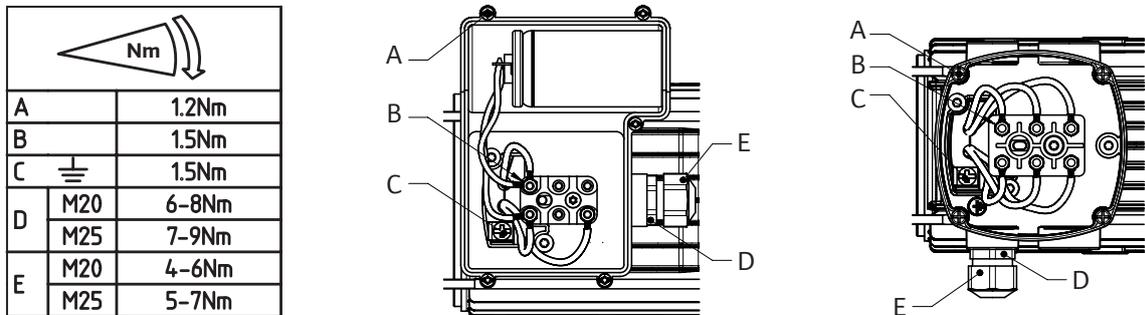
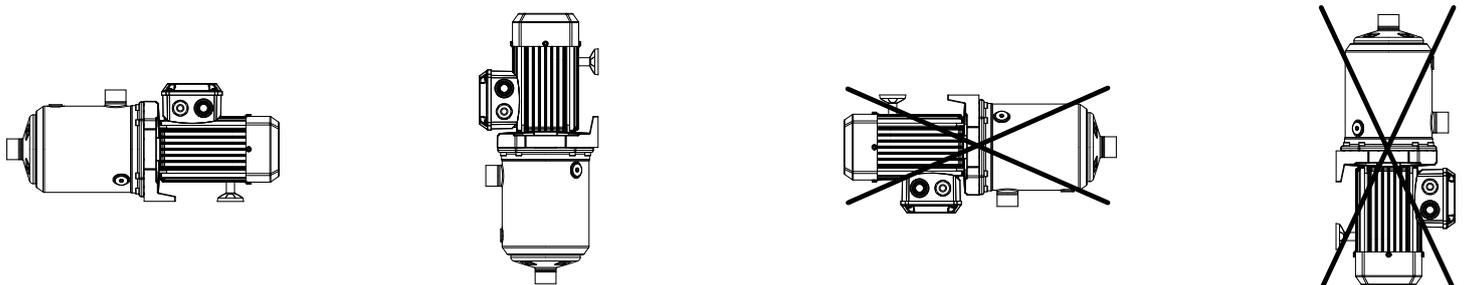


Fig. 8





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## 1 General

### 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 ©

The reproduction, distribution and utilisation of this document in addition to communication of its contents to others without express authorisation is prohibited. Offenders will be held liable for payment of damages. All rights reserved.

### 1.3 Subject to modifications

Wilo reserves the right to change the above-listed data without prior notice and is not liable for technical inaccuracies and/or omissions. The figures used may differ from the original product and are intended for illustrative purposes only.

### 1.4 Warranty and disclaimer

Wilo accepts no liability and provides no guarantee in the following cases:

- Inadequate dimensioning due to insufficient or incorrect information being provided by the operator or contractor
- Failure to comply with these instructions
- Improper application
- Improper storage or transport
- Incorrect installation or dismantling
- Insufficient maintenance
- Unauthorised repair work
- Insufficient foundations
- Chemical, electrical or electrochemical influences
- Wear

## 2 Safety

This chapter contains essential instructions that must be followed during the different phases of the pump's service life. Non-observance of these instructions may constitute a danger to persons, the environment and the product, and may invalidate the warranty. Non-observance may lead to the following hazards:

- Injuries due to electrical, mechanical and bacteriological factors and electromagnetic fields.
- Damage to the environment due to leakage of hazardous materials.
- Damage to the installation.
- Failure of important product functions.

**Also comply with the indications and safety instructions in other chapters!**

### 2.1 Symbols

**Symbols:**



#### **WARNING**

General safety symbol



#### **WARNING**

Electrical risks



#### **NOTICE**

Notes

**Warnings:**



#### **DANGER**

Imminent danger.

May result in death or severe injuries if the hazard is not prevented.

**WARNING**

Non-observance may result in (very) severe injury.

**CAUTION**

The product risks becoming damaged. "Caution" is used when there is a risk to the product if the user does not observe procedures.

**NOTICE**

Note containing useful information for the user about the product. It assists the user in the case of an issue.

- |            |  |  |
|------------|--|--|
| <b>2.2</b> | <b>Personnel qualifications</b>  | The installation, application and maintenance personnel must have the appropriate qualifications to complete this work. The operator must ensure the personnel's areas of responsibility, terms of reference and their supervision. If the personnel are not in possession of the necessary knowledge, they are to be trained and instructed. If necessary, this training can be carried out by the product's manufacturer on the operator's behalf.   |
| <b>2.3</b> | <b>Safety consciousness on the job</b>   | 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 instructions from local energy supply companies must be respected.  |
| <b>2.4</b> | <b>Safety instructions for the operator</b>  | <p>This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or a lack of experience or knowledge, unless they are monitored or have been given detailed instructions concerning use of the device by a person responsible for their safety.</p> <p>Children must be supervised to ensure that they do not play with the device.</p> <ul style="list-style-type: none"> <li>• If hot or cold components of the product or installation pose a danger, it is the customer's responsibility to guard them against being touched.</li> <li>• Guards protecting against touching moving components (such as the coupling) must not be removed whilst the product is in operation.</li> <li>• Hazardous fluids (i.e. which are explosive, toxic or hot) which have leaked (e.g. from the shaft seals) must be disposed of so that they pose no danger to persons or to the environment. National statutory provisions must be respected.</li> <li>• Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and instructions from local energy supply companies must be respected.</li> </ul> |
| <b>2.5</b> | <b>Safety instructions for installation and maintenance work</b>                   | <p>The operator must ensure that all maintenance and installation work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the installation and operating instructions. Work on the product/unit must only be carried out when at a standstill. The procedures described in the installation and operating instructions for deactivating the product/installation must always be complied with.</p> <p>Immediately on conclusion of the work, all safety and protective devices must be put back in position and recommissioned.</p>  |
| <b>2.6</b> | <b>Unauthorised modification of components and use of unauthorised spare parts</b> | <p>Unauthorised modification of components and use of unauthorised spare parts will impair the safety of the product/personnel, and will render the manufacturer's declarations regarding safety void. Modifications to the product are only permissible following consultation with the manufacturer.</p> <p>Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts absolves the manufacturing company of any and all liability.</p>   |
| <b>2.7</b> | <b>Improper use</b>  | The operational reliability of the supplied product is only guaranteed for conventional use in accordance with Chapter 4 of the Installation and operating instructions. The limit values must on no account fall below or exceed the values specified in the catalogue/data sheet.  |
| <b>3</b>   | <b>Transport and interim storage</b>   | When receiving the product, check that it has not been damaged during transport. If any damage is found, take all necessary measures with the carrier in the time provided.  |



## CAUTION

### Risk of material damage

If the delivered material is to be installed at a later date, store it in a dry place and protect it from impacts and any external influences (humidity, frost etc.). Temperature range for transport and storage: -30 °C to +60 °C.

Handle the product with care so as not to damage it prior to installation.

## 4 Application

This product is designed for pumping and overpressure of clean water or lightly contaminated water in industrial and agricultural sectors.



## CAUTION

### Risk of motor heating

A technical opinion is required prior to pumping fluid that is denser than water.



## DANGER

### Risk of explosion

Do not use this pump for pumping flammable or explosive liquids.

Fields of application:

- Water supply and pressure boosting
- Industrial systems
- Cooling water circulation systems
- Cleaning and irrigation systems
- Rainwater utilisation

## 5 Product information

### 5.1 Type key

|                 |  |
|-----------------|--|
| <b>Example:</b> | <b>Medana CH1-LSP 204-6/E/A/10T</b>  |
| <b>Medana</b>   | Product family (surface pump)  |
| <b>CH</b>       | Series<br>C = commercial<br>H = horizontal pump  |
| <b>1</b>        | Series level (1 = entry level, 3 = standard level, 5 = premium level)                                    |
| <b>L<br/>SP</b> | Features<br>L = long shaft<br>SP = self-priming  |
| <b>2</b>        | Volume flow in m <sup>3</sup> /h   |
| <b>04</b>       | Number of impellers  |
| <b>6</b>        | Pump material: housing / hydraulics<br>6 = pump housing in stainless steel 1.4301 / composite hydraulics |
| <b>E</b>        | Type of seal<br>E = EPDM<br>V = FKM  |
| <b>A</b>        | <b>Motor</b><br>A = 1~230 V, 50 Hz<br>B = 1~220 V, 60 Hz<br>E = 3~230 V (Δ)/400 V (Y) IE3, 50 Hz         |
| <b>10</b>       | Maximum pressure of the pump in bar  |

|                 |  |
|-----------------|--|
| <b>Example:</b> | <b>Medana CH1-LSP 204-6/E/A/10T</b>  |
| <b>T</b>        | Connections<br>T = Screwed<br>P = Victaulic<br>N = With captive nut  |
| <b>xxxx</b>     | Option code (optional)<br>C1 = Color RAL3000<br>M1nn = Original equipment manufacturer<br>M0nn = Internal code<br>QQ = Silicon carbide mechanical seal |

## 5.2 Data table

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| <b>Maximum utilisation pressure</b>  |                                   |
| Maximum operating pressure $P_{max}$ | See pump type key on rating plate |
| Maximum suction pressure in bar      | 3                                 |
| <b>Temperature range</b>             |                                   |
| Fluid temperature in °C              | +5 ... +40                        |
| Ambient temperature in °C            | -15 ... +50                       |
| <b>Electrical data</b>               |                                   |
| Motor protection rating              | See rating plate                  |
| Insulation class                     | See rating plate                  |
| Frequency                            | See rating plate                  |
| Voltage                              | See rating plate                  |
| Motor efficiency                     | See rating plate                  |
| <b>Other characteristics</b>         |                                   |
| Humidity                             | < 90% without condensation        |
| Altitude                             | ≤ 1000 m (> 1000 m on request)    |



### NOTICE

The suction pressure (P input) + the pressure at zero delivery rate (P zero delivery rate) must always be lower than the maximum permitted operating pressure (P max).

$P_{input} + P_{zero\ delivery\ rate} \leq P_{max\ pump}$

Refer to the pump rating plate for the maximum operating pressure: P max.

### Noise level

| Motor power (kW) | Frequency (Hz) | Phase | dB(A) at 1 m, BEP tolerance<br>0 – 3 dB(A) |
|------------------|----------------|-------|--|
| 0.55             | 50             | 3     | 54   |
| 0.75             | 50             | 3     | 55   |
| 0.55             | 50             | 1     | 53   |
| 0.75             | 50             | 1     | 53   |
| 0.75             | 60             | 1     | 57   |

### 5.3 Scope of delivery

- High-pressure multistage centrifugal pump
- Installation and operating instructions for the pump

### 5.4 Accessories

Please consult Wilo catalogue for the list of accessories.

## 6 Description and function

### 6.1 Description of the product

See Fig. 1

1. Suction port

2. Pressure port
3. Filler screw
4. Drainage screw
5. Stage casing
6. Impeller
7. Hydraulic shaft
8. Pump housing
9. Mechanical seal
10. Terminal box
11. Lantern
12. Condensate plugs

**See Fig. 3a**

1. Valve on the suction side
2. Valve on the discharge side
3. Non-return valve
4. Filler screw
5. Drainage screw
6. Piping or clamp holders
7. Strainer
8. Tank
9. Mains water supply
10. Motor protection switch
11. Lifting hook

**6.2 Product characteristics**

- Multistage centrifugal pump with horizontal shaft, self-priming.
- Suction/discharge ports with screwed connections. Axial suction, radial discharge upwards.
- Shaft sealing with mechanical seal.
- Integrated thermal motor protection (single-phase version), automatic reset.
- Condenser integrated into the terminal box (single-phase version).

**7 Installation and electrical connection**

**All installation and electrical connection work must be carried out solely by authorised and qualified personnel, in accordance with applicable regulations.**



**WARNING**

**Physical injuries**

The applicable regulations for the prevention of accidents must be complied with.



**WARNING**

**Risk of electric shock**

Hazards from electric current must be prevented.

**7.1 Receipt of the product**

Unpack the pump and recycle or dispose of the packaging in an environmentally responsible manner.

**7.2 Installation**

The pump must be installed in a dry, well-ventilated location free of frost on a flat, rigid surface using the appropriate screws.



**CAUTION**

**Risk of damaging the pump**

The presence of foreign matter or impurities in the pump housing may affect the functioning of the product.

It is recommended to perform any welding and soldering work before installing the pump.

Rinse the circuit completely before installing and commissioning the pump.

- The pump must be installed in a place easy to access for the purposes of inspection or replacement.
- Install the pump on a smooth surface.

- The pump must be attached using the 2 holes in the pump bracket (Ø M8 screw) (Fig. 2a). The recommended tightening torque is 10 Nm (Fig. 10)
- Ensure there is a minimum distance between the motor fan and any surfaces (Fig. 4).
- For heavy pumps, install a lifting hook (Fig. 3a , pos. 11) in line with the pump shaft to facilitate its disassembly.
- Remove the condensate plugs (Fig. 1 [12]) when the pump is in a condensing environment. In this case, the motor protection class IP55 will no longer be guaranteed.
- Note that the altitude of the installation site and the water temperature will reduce the suction capacity of the pump.

| Altitude | Loss of height (HA) | Temperature | Loss of height (HA) |
|----------|---------------------|-------------|---------------------|
| 0 m      | 0 mCE               | 20 °C       | 0.20 mCE            |
| 500 m    | 0.60 mCE            | 30 °C       | 0.40 mCE            |
| 1000 m   | 1.15 mCE            | 40 °C       | 0.70 mCE            |
| 1500 m   | 1.70 mCE            | –           | –                   |
| 2000 m   | 2.20 mCE            | –           | –                   |
| 2500 m   | 2.65 mCE            | –           | –                   |
| 3000 m   | 3.20 mCE            | –           | –                   |

Table 1: Reduction in suction altitude



### WARNING

#### Risk of accident due to hot surfaces!

The pump must be installed in such a way that no one can touch the hot surfaces of the product when it is in operation.



### WARNING

#### Risk of tipping

Ensure that the pump is secured to a flat, rigid surface.



### CAUTION

#### Risk of foreign matter in the pump

Ensure that all blanking plugs are removed from the pump housing before installation.



### NOTICE

Each pump may have been factory-tested to verify its hydraulic performance, and water may be present in the product. For hygiene purposes, the pump should be rinsed before use.

Install insulating material (cork or reinforced rubber) under the pump to avoid noise pollution and vibrations being transmitted to the installation.

## 7.3 Hydraulic connections

### Connections in general

- The weight of the piping should not be borne by the pump (Fig. 5).
- Permitted pump installation positions (Fig. 8).
- It is recommended to install gate valves on the suction and discharge sides of the pump.
- Use expansion joints to mitigate noise and vibration from the pump if required.
- Seal the piping well using appropriate products.
- Ensure that a system for protection against low water level is installed to prevent the pump from running dry.
- Limit the horizontal length of the piping and avoid anything that may cause friction loss (shrinkage, pipe elbows, crushing, etc.).

### Suction connections

- The diameter of the suction piping must never be less than the opening of the pump. In addition, for pumps in the 4 m<sup>3</sup>/h series that have a suction head (HA) greater than 6 m,

a piping of a diameter greater than the DN of the pump is recommended in order to limit friction loss.

- The pump must be the highest point of the installation and the piping must always run upwards on a rising gradient from the point of use to the pump, in order to prevent air bubbles forming in the suction pipe (Fig. 3b).
- **Air must not be allowed to enter the suction piping while the pump is in operation.**
- The installation of a non-return valve in the discharge pipe is recommended to protect the pump against pressure surges.
- If connected indirectly via a tank, the suction pipe socket must be fitted with a suction strainer (max. 2 mm cross-section) to stop impurities from entering the pump and a non-return valve.
- If the pump is in suction mode, immerse the strainer (min. 200 mm). Ballast the flexible pipe if necessary.

## 7.4 Electrical connection



### WARNING

#### Risk of damage to the terminal box and the motor's electrical connection terminal block

- Do not use a drill or any other drilling equipment for the cable gland.
- Tighten the cable gland with a spanner until the terminal box cover is ejected (see Fig. 6)



### DANGER

#### Risk of electrocution

In case of a non-compliant electrical connection, there is a risk of electrocution.

- Have the electrical connection established by an electrician approved by the local energy supply company in accordance with local regulations.
- Prior to the electrical connection, the pump must be voltage-free and protected against unauthorised restart.
- To ensure safe installation and operation, the pump must be earthed correctly with the earth terminals of the power supply (Fig. 6 & Marking "C" Fig. 7).

- Verify that the rated current, voltage and frequency used match the information on the pump's rating plate.
- The pump must be connected to the power supply using a cable fitted with a socket or a main switch.
- The three-phase motors must be connected to an authorised protection system. The rated setting current must match the value indicated on the motor's sticker.
- Single-phase motors are equipped as standard with thermal motor protection, which stops the pump if the permissible winding temperature is exceeded and starts it up again automatically once it has cooled down.
- Connection cables must never touch the piping, pump or motor housing.
- The pump/installation should be earthed in accordance with local regulations.
- Appropriate measures for protection against insulation malfunctions must be taken. For example, the use of a residual-current device. The breaking capacities of the overcurrent protection devices must be greater than the assumed short-circuit current at the devices.
- The power supply connection must comply with the wiring diagram (Fig. 6).



### WARNING

#### Risk of injuries and water penetration in the connection area

Observe the tightening torques (Fig. 7)

Observe the diameter value of the cable gland wiring to ensure IP55 protection (see Fig. 7 [E]):

M20 = min.  $\varnothing 6$  – max.  $\varnothing 12$

M25 = min.  $\varnothing 13$  – max.  $\varnothing 18$

**It is not permitted to use an external frequency converter to control the pump.**

## 8 Commissioning

### 8.1 Filling and deaeration



#### WARNING

##### Risk of infection

Our pumps may be factory-tested to verify their hydraulic performance. If some water remains, the pump should be rinsed before use for hygiene reasons.



#### CAUTION

##### Risk of damage to the pump

Never let the pump run dry. The pump must be filled before starting.



#### CAUTION

##### Risk of damage to the pump

Observe the tightening torques of the filler screw (Fig. 3a, pos. 4) and drain plug (Fig. 3a, pos. 5).

#### Pump in horizontal position in inlet mode (Fig. 3a)

Close the gate valves (pos. 1+2).

Unscrew the filler screw (pos. 4).

Slowly open the valve on the suction side (pos. 1).

Close the filler screw again once the water has exited via the screw port (air removed) (pos. 4).

Open the valve on the suction side completely (pos. 1).

Open the valve on the discharge side (pos. 2).

#### Pump in horizontal position in suction mode (Fig. 3b)

Ensure that all accessories connected to the pump discharge are open (slide valves, valves, sprinkling guns).

- Open the valve on the discharge side (pos. 2).
- Open the valve on the suction side [1].
- Unscrew the filler screw [4] located on the pump housing.
- Completely fill the pump and the suction pipe, which must be fitted with a bottom valve.
- Close the filler screw again [4].
- Using the switch, start the pump for a few seconds. After switching it off, unscrew the filler screw and add water to completely finish filling the pump.
- When the suction head is greater than 6 m, ensure the discharge pipe is kept in a vertical position and at a minimum height of 500 mm until the pump is primed; this will prevent water from escaping from the pump through the discharge pipe.

#### Pump in vertical position in inlet mode (Fig. 3c)

Close the gate valves (pos. 1+2).

Unscrew the plug [5].

Slowly open the valve on the suction side (pos. 1).

Close the plug again once the water has exited via the plug opening [5] (air removed).

Open the valve on the suction side completely (pos. 1).

Open the valve on the discharge side (pos. 2).

### 8.2 Starting



#### CAUTION

##### Risk of damaging the pump

The pump must not be operated at a zero flow rate flow (valve on the discharge side closed) for more than 10 minutes.

We recommend maintaining a minimum discharge of 15% of rated discharge.

**WARNING****Risk of injury**

Depending on the operating conditions of the pump or the installation (the temperature of the discharged liquid and the volume flow), the pump assembly including the motor may become extremely hot. There is a real risk of burns when coming into contact with the pump.

**CAUTION****Direction of rotation**

An incorrect direction of rotation will cause poor pump performance and may overload the motor.

**Checking the direction of rotation** (only for three-phase current motors)

By starting the pump up briefly, check whether the direction of rotation of the pump matches the arrow on the pump's rating plate. If the direction of rotation is incorrect, swap 2 phases in the pump's terminal box.

**NOTICE**

Single-phase motors are intended to operate in the correct direction of rotation.

Open the valve on the discharge side and stop the pump.

In the event of suction installation, at the time of the initial commissioning, the suction pipework will not be filled so priming may take a few minutes (ensure that the discharge valve is kept open).

If the water does not exit after 3 minutes, switch off the pump and repeat the filling procedure.

Once the pump has been primed, close the discharge valve completely and then reopen it to ensure that the pump reaches the maximum performance curve; this is achieved with the priming valve closed.

Check that the current consumed is less than or equal to that indicated on the motor plate.

**9 Maintenance****Any maintenance work must be carried out by authorised and qualified staff!****WARNING****Risk of electric shock**

Danger from electrical current must be eliminated. Ensure that the pump's power supply is switched off and secured against unauthorised reactivation before performing any work on the electric system.

**WARNING****Risk of burns**

In case of high water temperatures and high system pressures, close the guard valves upstream and downstream of the pump. First, allow pump to cool down.

**WARNING****Risk of injury**

Depending on the operating conditions of the pump or the installation (the temperature of the discharged liquid and the volume flow), the pump assembly including the motor may become extremely hot. There is a real risk of burns when coming into contact with the pump.

- No special maintenance required during operation.

- Pumps that are not being used during periods of frost should be drained to avoid damage.  
Close the gate valves, fully open the drainage and filler screws (Fig. 1, pos. 3 and 4) and empty the pump.



### CAUTION

#### Risk of damaging the pump

Observe the tightening torques of the filler screw (Fig. 1, pos. 4) and drain plug (Fig. 3a, pos. 5).

## 10 Faults, causes and remedies



### WARNING

#### Risk of electric shock

Danger from electrical current must be eliminated. Ensure that the pump's power supply is switched off and secured against unauthorised reactivation before performing any work on the electric system.



### WARNING

#### Risk of burns

In case of high water temperatures and high system pressures, close the guard valves upstream and downstream of the pump. First, allow pump to cool down.



### WARNING

#### Risk of injury

Depending on the operating conditions of the pump or the installation (the temperature of the discharged liquid and the volume flow), the pump assembly including the motor may become extremely hot. There is a real risk of burns when coming into contact with the pump.

| Faults   | Causes   | Remedies  |
|--|--|---|
| The pump is not functioning                        | No electrical power supply                                       | Check fuses, switches and wiring  |
|  | The motor protection device has cut off the power                | Eliminate any motor overload  |
| The pump operates but does not discharge any fluid | Wrong direction of rotation                                      | Swap 2 phases in the power supply   |
|  | The piping or parts of the pump are obstructed by foreign matter | Check and clean the piping and the pump   |
|  | Presence of air in the suction pipe                              | Make the suction pipe air-tight   |
| The pump discharges irregularly                    | Suction pipe too narrow  | Install wider suction pipe  |
|  | The pressure at the pump inlet is insufficient                   | Review the installation conditions and recommendations described in this manual |
|  | The suction pipe has a smaller diameter than that of the pump    | The suction pipe must have the same diameter as the pump suction opening        |
|  | Air in the suction pipe socket                                   | Make the suction pipe socket air-tight  |
| Insufficient pressure                              | The strainer and the suction pipe are partially blocked          | Dismantle and clean them  |
|  | Incorrect choice of pump   | Install more powerful pumps   |
|  | Wrong direction of rotation                                      | For the three-phase current version, swap 2 phases in the power supply          |
|  | The flow rate is too low, the suction pipe is blocked            | Clean the suction filter and the suction pipe                                   |
|  | The valve is not sufficiently open                               | Open the valve  |
|  | The pump is obstructed by foreign matter                         | Clean the pump  |

| Faults   | Causes                         | Remedies   |
|--|--------------------------------|--|
| The pump is vibrating                                  | Foreign matter in the pump     | Remove all foreign matter                                  |
|  | The pump is not firmly secured | Tighten the anchor screws                                  |
| The motor is overheating, the motor protection engages | Voltage too high or too low    | Check the fusible cut-outs, the wiring and the connections |
|  | Foreign matter in the pump     | Clean the pump   |
|  | Ambient temperature too high   | Provide cooling  |

**If the fault cannot be resolved, please contact the Wilo customer service.**

## 11 Spare parts

All spare parts should be ordered directly from the Wilo customer service. To prevent errors, always quote the data on the pump's rating plate when making an order. The spare parts catalogue is available at [www.wilo.com](http://www.wilo.com)

## 12 Disposal

### 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 as domestic waste is forbidden!

In the European Union, this symbol can appear 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 municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal. For further information on recycling, go to [www.wilo-recycling.com](http://www.wilo-recycling.com).

Subject to change without prior notice.



# wilo



Local contact at  
[www.wilo.com/contact](http://www.wilo.com/contact)

Pioneering for You

WILO SE  
Wilopark 1  
44263 Dortmund  
Germany  
T +49 (0)231 4102-0  
T +49 (0)231 4102-7363  
[wilo@wilo.com](mailto:wilo@wilo.com)  
[www.wilo.com](http://www.wilo.com)