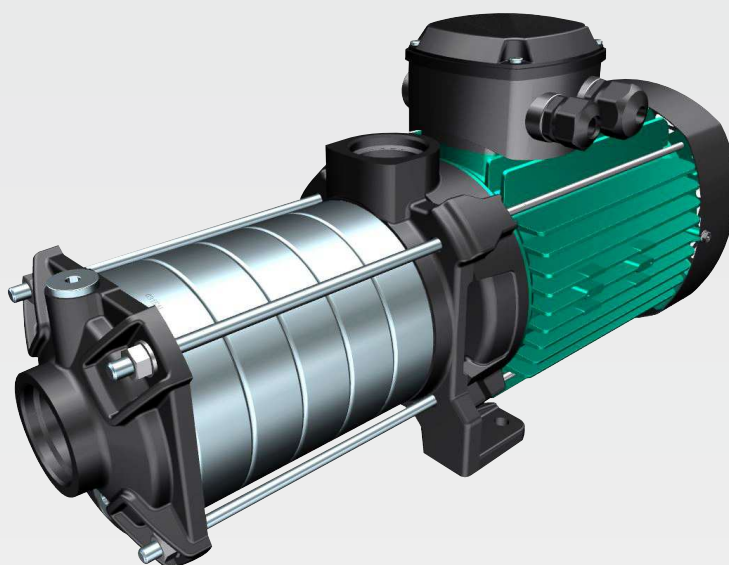


Wilo-Medana CH1-LC



en Installation and operating instructions



Fig. 1

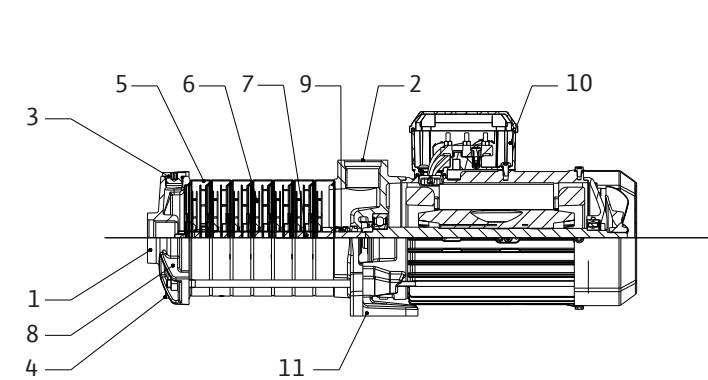


Fig. 2

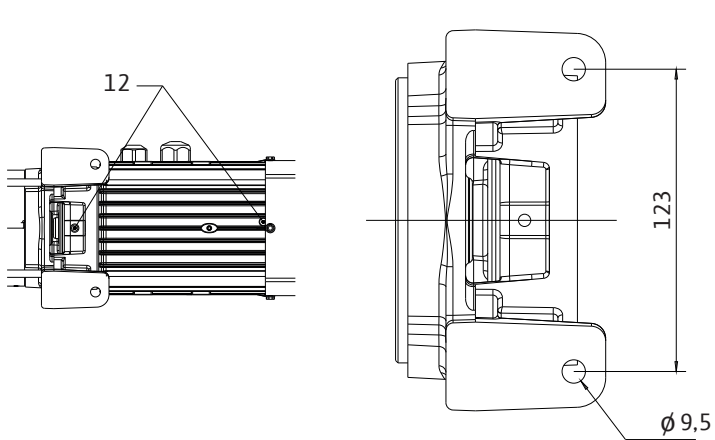


Fig. 3a

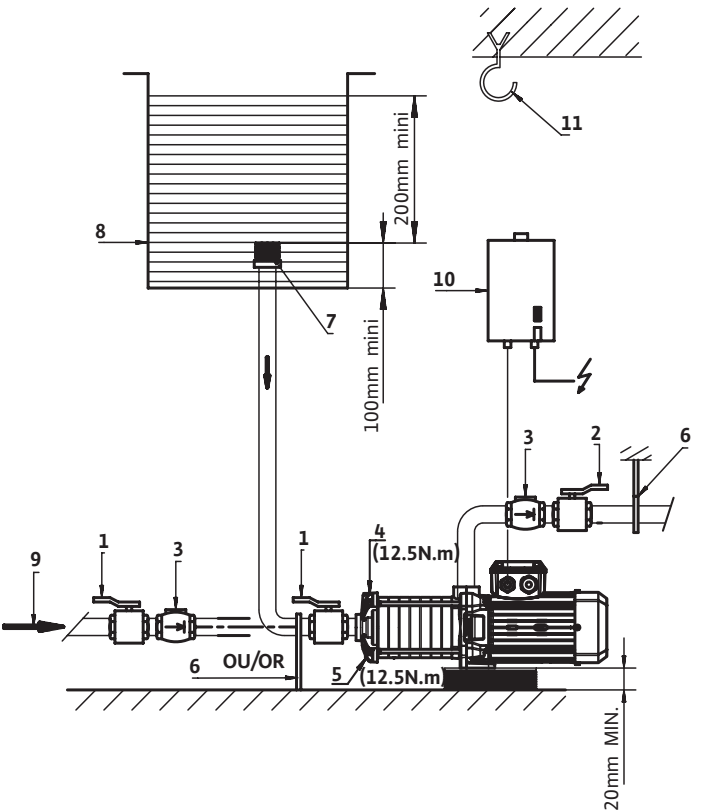


Fig. 3b

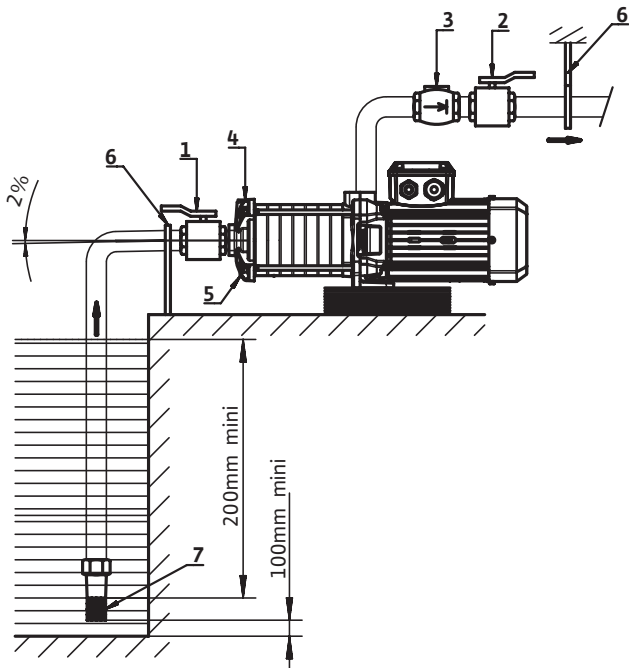


Fig. 3c

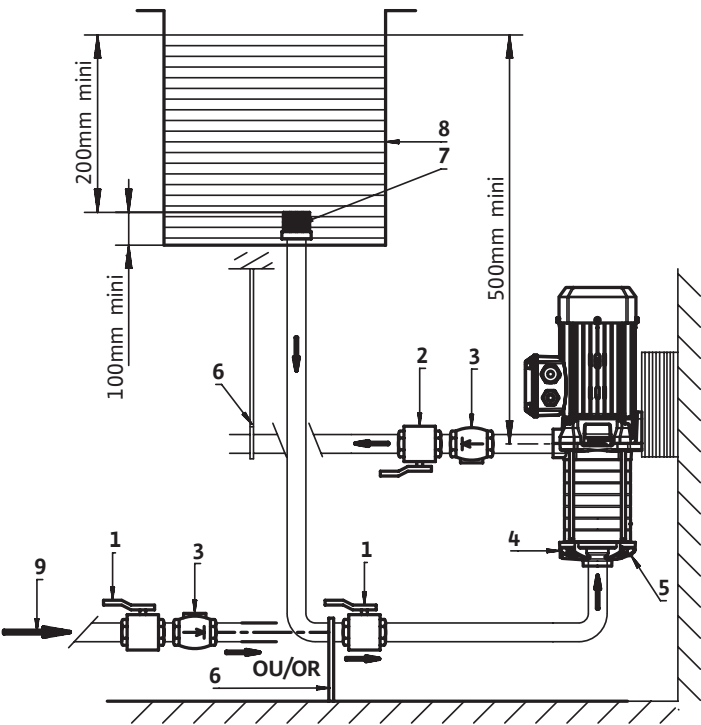


Fig. 4

Fig. 5

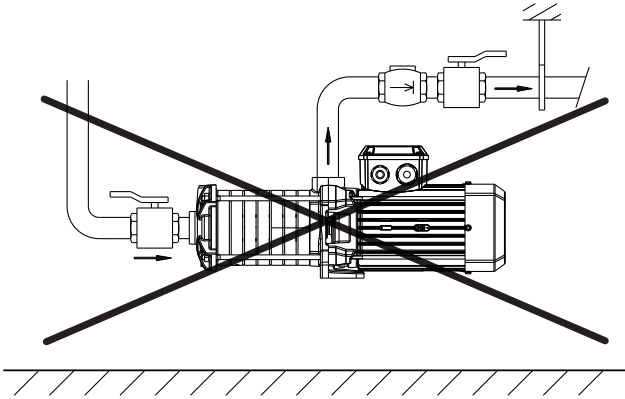
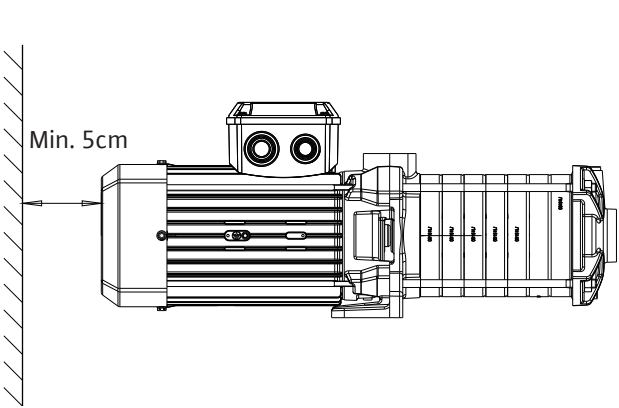


Fig. 6

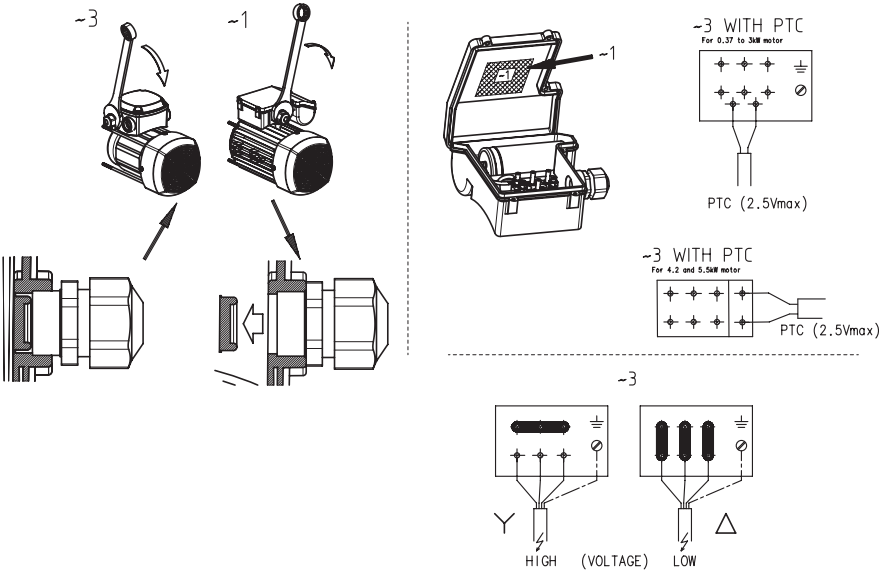


Fig. 7

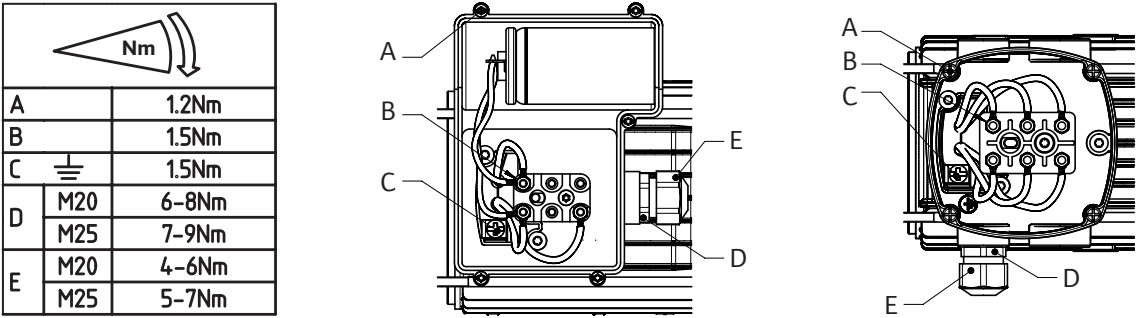
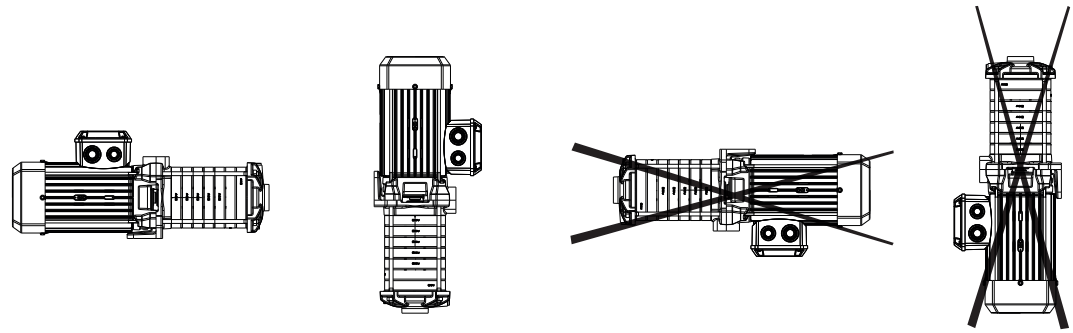


Fig. 8





1. Introduction

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3. Methodology

4. Results

5. Conclusion

6. References

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1 General

1.1 About this document

The installation and operating instructions are an integral part of the product. Read these instructions before carrying out any work and keep them at hand at all times. Strict adherence to these instructions is a precondition for the correct installation and application of the product. Comply with all indications and signs appearing on the product.

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

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.

2.2 Personnel qualifications

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.

- 2.3 Safety consciousness on the job** 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.
- 2.4 Safety instructions for the operator** 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.
- Children must be supervised to ensure that they do not play with the device.
- 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.
 - Guards protecting against touching moving components (such as the coupling) must not be removed whilst the product is in operation.
 - 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.
 - 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.
- 2.5 Safety instructions for installation and maintenance work** 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.
- Immediately on conclusion of the work, all safety and protective devices must be put back in position and recommissioned.
- 2.6 Unauthorised modification of components and use of unauthorised spare parts** 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.
- 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.
- 2.7 Improper use** 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.

3 Product information

3.1 Type key

Example:	Medana CH1-LC.404-5/E/A/10T
Wilo	Brand
Medana	Multistage centrifugal pump
C	Commercial series
H	Horizontal pump
1	Series level (1 = entry level, 3 = standard level, 5 = premium level)
LC	L = Long shaft C = Pump housing in cast iron
4	Delivery rate in m ³ /h
04	Number of impellers
5	Pump housing in cast iron + hydraulics in 1.4307 stainless steel
E	EPDM seal

Example:	Medana CH1-LC.404-5/E/A/10T
A	A = Frequency 50 Hz / single-phase / 230 V (Δ) IE2 B = Frequency 60 Hz / single-phase / 220 V (Δ) IE2 C = Frequency 60 Hz / single-phase / 230 V (Δ) IE2 D = Frequency 50 Hz / three-phase / 400 V (Δ) IE3 E = Frequency 50 Hz / three-phase / 230 V (Δ) ... 400 V (Y) IE3 F = Frequency 60 Hz / three-phase / 220 V (Δ) ... 380 V (Y) IE3 G = Frequency 60 Hz / three-phase / 265 V (Δ) ... 460 V (Y) IE3 I = Frequency 60 Hz / three-phase / 460 V (Δ) IE3 L = Frequency 60 Hz / three-phase / 380 V (Δ) IE3
10	Maximum pressure of the pump in bar
T	Screwed connections
xxxx	Option code (optional) C1 = Color RAL3000 M1nn = Original equipment manufacturer M0nn = Internal code QQ = Silicon carbide mechanical seal

3.2 Data table

Maximum utilisation pressure	
Maximum operating pressure	See pump type key on rating plate and paragraph 3.1
Maximum suction pressure	6 bar
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). $P_{\text{input}} + P_{\text{zero delivery rate}} \leq P_{\text{max}}$. Refer to the pump rating plate for the maximum operating pressure: P max.	
Temperature range	
Fluid temperature	-20 °C to +90 °C with EPDM seals
Ambient temperature	-15 °C to +50 °C
Electrical data	
Motor protection rating	See rating plate
Insulation class	See rating plate
Frequency	See rating plate
Voltage	See rating plate
Motor efficiency	See rating plate
Other characteristics	
Humidity	< 90 % without condensation
Altitude	≤ 1000 m (> 1000 m on request)

Noise level

Motor power (kW)	Frequency (Hz)	Phase	dB(A) at 1 m, BEP tolerance 0 – 3 dB(A)
0.37	50	3	54
0.55	50	3	54
0.75	50	3	55
1.1	50	3	55
1.5	50	3	56
1.85	50	3	57
2.5	50	3	58
3	50	3	59

4.2	50	3	61
0.55	60	3	58
0.75	60	3	58
1.1	60	3	59
1.5	60	3	59
1.85	60	3	60
2.5	60	3	61
3	60	3	62
4.2	60	3	64
5.5	60	3	66
0.37	50	1	52
0.55	50	1	53
0.75	50	1	53
1.1	50	1	54
1.5	50	1	56

3.3 Scope of delivery

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

3.4 Accessories

Please consult Wilo catalogue for the list of accessories.

4 Transport and interim storage

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.

5 Application

This product has been designed to pump hot or cold water, water/glycol mixtures or other low-viscosity fluids that are free of mineral oil, solid or abrasive substances, or materials containing long fibres.

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 to convey flammable or explosive liquids.

Fields of application:

Version with housing in cast iron:

MEDANA CH1-LC

Distribution and boosting

Industrial systems

Cooling water circulation systems

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. Suction housing
9. Mechanical seal
10. Terminal box
11. Lantern
12. Condensate plugs
13. Variator

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 axle (2 to 7 stages depending on the model), non-self-priming.
- Suction/discharge ports with screwed connections. Axial suction, radial discharge upwards.
- Shaft sealing with standardised mechanical seal.
- Integrated thermal motor protection (single-phase version), automatic reset.
- Condenser integrated into the terminal box (single-phase version).
- To move only the pump, use straps that are securely fastened to the motor transport lugs ≥ 4.2 kw (Fig. 8).

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 fixed in place using the 2 holes on the bearing bracket (Ø M8 screw) (Fig. 2). The recommended tightening torque is 10 Nm.
- 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 axis to facilitate its disassembly.
- Remove the condensate plugs (Fig. 1, pos. 12) when the pump is in a condensing environment. In this case, the motor protection class IP55 will no longer be guaranteed.



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 Mains connection

- The weight of the piping should not be borne by the pump (Fig. 5).
- Permitted pump installation positions (Fig. 8).
- We recommend installing gate valves on the suction and pressure sides of the pump.
- Use expansion joints to mitigate noise and vibration from the pump if required.
- The pipe cross-section must be at least equal to the diameter of the suction port on the pump housing.
- The installation of a non-return valve in the discharge pipe is recommended to protect the pump against pressure surges.
- If connected directly to the public potable water mains, the suction pipe socket must also be fitted with a non-return valve and a stop valve.
- If connected indirectly via a tank, the suction pipe socket must be fitted with a suction strainer to stop impurities from entering the pump, and a non-return valve.

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 setting rated 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. Ø6 – max. Ø12

M25 = min. Ø13 – max. Ø18

7.5 Operation with a frequency converter

It is possible to adjust the speed of the pump using a frequency converter. The limit values for adjusting the speed are as follows:

40 % rated $\leq n \leq$ 100 % rated. The installation and commissioning instructions for the frequency converter must be followed when connecting it and starting operation. To avoid overloading the motor winding, which could lead to damage and unwanted noise, the frequency converter cannot produce voltage rise speed stages higher than 500 V/ μ s or voltage spikes $U > 650$ V.

To make such voltage rise speed stages possible, an LC filter (motor filter) should be installed between the frequency converter and the motor. The specifications for this filter must be provided by the manufacturer of the frequency converter / filter. Control devices with a frequency converter delivered by Wilo have an integrated filter.

8 Commissioning

8.1 Filling and deaeration

Check whether the water level in the tank and the inlet pressure are sufficient.



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 run the pump dry. The pump must be filled before starting.



CAUTION

Risk of damage to the pump

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

Pump in horizontal position below the water line (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 end pressure side (pos. 2).

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



NOTICE

Ensure that the suction pipe does not trap air at the transitions and bends.

It may take a long time for the pump and suction pipe to fill.

Close the gate valve (pos. 2).

Open the gate valve (pos. 1).

Unscrew the filler screw (pos. 4).

Using a funnel inserted into the filling port, slowly and completely fill the pump and the suction pipe. Close the filler screw once the air has escaped and the liquid is flowing in the pump (pos. 4).

After checking the deblocking function and the direction of rotation of the motor:

- Briefly start the motor with an impulse then wait for a few seconds to allow the air to settle.
- Slightly unscrew the filler screw (pos. 4) to remove the air. If a trickle of water does not appear, remove this screw to fill the right water level in the pump. Put this screw back in place before restarting.
- If necessary, repeat this operation.

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

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 end pressure 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 end pressure side closed) for more than 10 minutes.

We recommend maintaining a minimum discharge of 10 % 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 end pressure side and stop the pump.

9 Maintenance

All maintenance work must be carried out by authorised and qualified personnel!



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. 1, 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
	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 pump discharges irregularly	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
	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
Insufficient pressure	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
The pump is vibrating	Foreign matter in the pump	Remove all foreign matter

Faults	Causes	Remedies
	The pump is not firmly secured	Tighten the anchor screws
The motor is overheating, the motor protection engages	Insufficient voltage	Check the fusible cut-outs, the wiring and the connections
	Foreign matter present, bearing damaged	Clean the pump Get the pump repaired by customer service
	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

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.

Subject to change without prior notice.





Pioneering for You



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