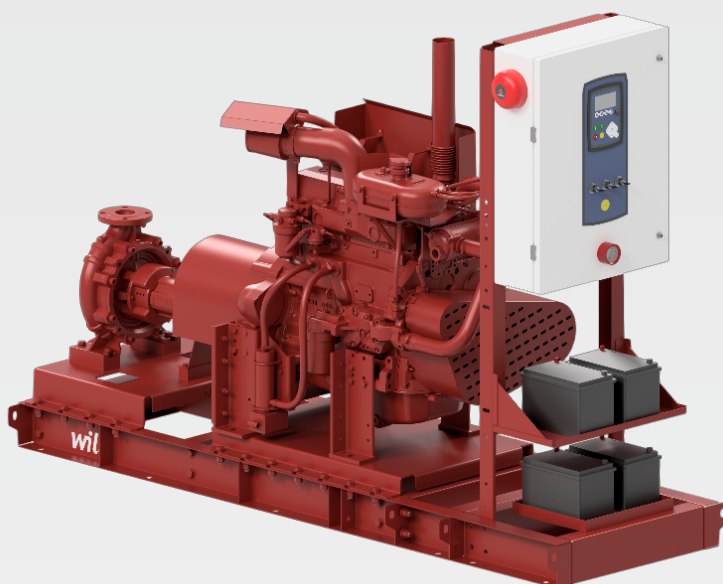


Wilo-FireSet FRN Diesel



en Installation and operating instructions



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1 General

1.1 About these instructions

These instructions form part of the product. Compliance with the instructions is essential for correct handling and use:

- Read the instructions carefully before all activities.
- Keep the instructions in an accessible place at all times.
- Observe all product specifications.
- Observe the markings on the product.

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

1.2 Copyright

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1.3 Subject to change

Wilo shall reserve the right to change the listed data without notice and shall not be liable for technical inaccuracies and/or omissions. The illustrations used may differ from the original and are intended as an exemplary representation of the product.

1.4 Exclusion from warranty and liability

Wilo shall specifically not assume any warranty or liability in the following cases:

- Inadequate configuration due to inadequate or incorrect instructions by the operator or the client
- Non-compliance with these instructions
- Improper use
- Incorrect storage or transport
- Incorrect installation or dismantling
- Insufficient maintenance
- Unauthorised repairs
- Inadequate construction site
- Chemical, electrical or electrochemical influences
- Wear

2 Safety

This chapter contains basic information for the individual phases of the life cycle. Failure to observe this information carries the following risks:

- Injury to persons from electrical, mechanical and bacteriological factors as well as electromagnetic fields
- Environmental damage from discharge of hazardous substances
- Property damage
- Failure of important functions of the product

Failure to observe the information contained herein will result in the loss of claims for damages.

The instructions and safety instructions in the other chapters must also be observed!

2.1 Identification of safety instructions

These installation and operating instructions set out safety instructions for preventing personal injury and damage to property. These safety instructions are shown differently:

- Safety instructions relating to personal injury start with a signal word, are **preceded by a corresponding symbol** and are shaded in grey.



DANGER

Type and source of the danger!

Consequences of danger and instructions for avoidance.

- Safety instructions relating to property damage start with a signal word and are displayed **without** a symbol.

CAUTION

Type and source of the danger!

Consequences or information.

Signal words

- **DANGER!**
Failure to follow the instructions will result in serious injuries or death!

- **WARNING!**
Failure to follow the instructions can lead to (serious) injury!
- **CAUTION!**
Failure to follow the instructions can lead to potentially irreparable property damage as well as to total loss.
- **NOTICE!**
Useful information on handling the product

Markups

- ✓ Prerequisite
- 1. Work step/list
 - ⇒ Notice/instructions
 - ▶ Result

Symbols

These instructions use the following symbols:



General danger symbol



Danger caused by electric voltage



General warning symbol



Useful information

2.2 Personnel qualifications

- Personnel have been instructed on locally applicable regulations governing accident prevention.
- Personnel have read and understood the installation and operating instructions.
- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Installation/dismantling work: qualified fire protection expert according to the state of the art.
Correct installation and connection of the system to the supply line.
- Operation/control: Operating personnel, instructed in the functioning of the complete system
- Setting/operating the switchgear: trained expert for fire protection according to the state of the art.
Specialised linguistic knowledge in the areas of fire protection and motor technology.
- Maintenance work: trained fire protection expert according to the state of the art
Correct installation and connection of the system to the supply line.
Specialised linguistic knowledge in the areas of fire protection and motor technology.

2.3 Electrical work



NOTICE

Make electrical connection in accordance with EN12845.

- Electrical work must be carried out by a qualified electrician.
- Observe applicable local fire protection regulations when connecting to the mains power supply.
- Earth the device.
- Before commencing work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Disconnect battery packs before carrying out any work.
- Train personnel on how to make electrical connections.
- Train personnel on the options for switching off the device.
- Wear the following protective equipment:
 - Safety footwear
 - Safety gloves for protection against cuts
 - Safety helmet (when using lifting equipment)

2.4 Transport

2.5 Installing/dismantling

- Locally applicable laws and regulations on work safety and accident prevention must be complied with.
- Demarcate and cordon off the working area.
- Keep unauthorised persons away from the working area.
- Only use legally prescribed and approved lifting gears and lifting devices.
- Select the lifting gear based on the prevailing conditions (weather, attachment point, load, etc.).
- Always attach the lifting gear to the attachment points.
- Standing under suspended loads is not permitted. Do **not** move suspended loads over workplaces where people are present.



NOTICE

Carry out installation in accordance with EN12845.

2.6 During operation

- Wear the following protective equipment:
 - Safety footwear
 - Safety gloves for protection against cuts
 - Safety helmet (when using lifting equipment)
- Locally applicable laws and regulations on work safety and accident prevention must be complied with.
- Demarcate and cordon off the working area.
- Keep working area free from ice.
- Keep the working area free of any objects lying around.
- Keep unauthorised persons away from the working area.
- Work must always be carried out by two persons.
- Disconnect the product from the mains and secure it against being switched on again.
- Disconnect battery packs before carrying out any work.
- Cover open wells and water tanks or attach a safety harness.
- Only use legally prescribed and approved lifting gears and lifting devices.
- Stay outside the swivel range of the lifting device.
- Wear protective equipment according to work regulations.
- Demarcate and cordon off the working area.
- No persons are allowed in the working area during operation.
- Depending on the process, the product is activated and deactivated using separate controls. Product may automatically activate following power cuts.
- Superior must be informed immediately of any faults or irregularities.
- Operator must switch product off immediately if faults occur.
- Open all gate valves in the inlet and pressure pipe.
- Ensure protection against dry running.

2.7 Maintenance tasks

- Wear the following protective equipment:
 - Safety footwear
 - Safety gloves for protection against cuts
- Disconnect device from the mains and secure it against being switched on again without authorisation.
- Ensure cleanliness, dryness and good lighting in the work area.
- Only carry out maintenance tasks described in these installation and operating instructions.
- Only original parts of the manufacturer may be used. The use of any non-original parts releases the manufacturer from any liability.
- Collect any leakage of fluid and operating fluid immediately and dispose of it according to the locally applicable guidelines.
- Clean the device thoroughly.

2.8 Operating fluids

Systems with diesel motors use the following operating fluids:

- Diesel fuel
- Motor oil
- Battery acid

The operating fluids are harmful to the environment and must not be released into the soil or waters.

- Wipe up drips immediately!

Diesel fuel

- R 40: suspected carcinogenic effect
- R 65: hazardous to health; may cause lung damage if swallowed.
- R 66: repeated exposure may cause skin roughness or cracking.

- R 51/53: toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Battery acid

- R 35: causes severe burns.
- Provide installation and operating instructions in a language which the personnel can understand.
- Make sure that the personnel have received the required training for the specified work.
- Provide protective equipment. Ensure that the protective equipment is worn by personnel.
- Ensure that safety and information signs mounted on the device are always legible.
- Train the personnel on the function of the system.
- Eliminate any risk from electrical current.
- Equip hazardous components inside the entire system with an on-site guard.
- Demarcate and cordon off the working area.
- Define personnel responsibilities to ensure safe working practice.

Children and persons younger than 16 years or with reduced physical, sensory or mental capacities or limited experience are prohibited from handling the product! A technician must supervise persons younger than 18 years!

2.9 Operator responsibilities

3 Application/use

3.1 Intended use

Pump group for professional application in sprinkler systems:

- Water supply of automatic sprinkler systems through pressure boosting and maintaining pressure for firefighting.

3.2 Improper use



DANGER

Danger of death due to explosion!

The pumping of highly inflammable and explosive fluids (petrol, paraffin, etc.) is prohibited.

The pump group is not designed for applications that are not explicitly intended for it by the manufacturer. This includes, in particular:

- Drinking water supply.
- Pumping fluids that chemically or mechanically attack the materials used in the system.
- Pumping fluids that contain abrasive or long-fibre components.
- Pumping fluids that are not intended for this purpose by the manufacturer.

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

4 Product description

4.1 Type key

Example	Wilo-FireSet-80/200-219-D-FRN
Wilo	Brand name
FireSet	Fire-fighting system
80/200	Pump type
219	Nominal diameter of the impeller in mm
D	D: Pump with diesel motor
FRN	Code for the special version of the system

4.2 Technical data

Mains voltage	Diesel motor: 1~ 230 V ±10% Jockey pump: 1~ 230 V ±10%
Mains frequency	50 Hz
Max. operating pressure	16 bar
Ambient temperature	+0 °C ... +25 °C
Relative humidity	50% at 25 °C
Max. installation height	91m* above SL
Min. air pressure	760 mmHg (*)

Max. fluid temperature	+25 °C
IP rating – diesel motor	IP55
IP rating – motor, jockey pump (optional)	IP55
IP rating – switchgear, diesel motor	IP54
IP rating – switchgear, jockey pump (optional)	IP54
Switchgear IP rating	IP54

For further technical information, see the rating plate of the motor and the switchgear.

* Derating is required for greater installation heights. Contact Wilo if you have any questions.

* Deviations from the standard test conditions: Note details on the class deviations for the motor in terms of temperature, height, atmospheric pressure and fuel viscosity. See specific tables and diagrams in catalogues and maintenance manuals.

4.3 Scope of delivery

- Fire-fighting system
 - Ready for connection
 - Pre-assembled and set at the factory
 - Checked for impermeability
 - Including function test
- Installation and operating instructions
- Accessories, depending on order

4.4 Accessories

- Jockey pump with pressure switch pipework
- Horizontal priming tank 500 L, with float valve and alarm pressure switch for low water level
- Flow meter
- Eccentric suction cone set with shut-off valve
- Vacuum gauge with valve
- Valves with electrical contact
- Vibration damping sleeve for manifold
- Accessories for diesel motor:
 - Battery tester
 - Spare part set
 - Silencer
- Heat exchanger for diesel motor (standard for performances of ≥ 26 kW).



NOTICE

The installer is responsible for installing the supplied equipment, completing the system in accordance with the requirements of EN12845, and for other applicable regulations for fire-protection systems. The installer is responsible for installing all additionally required components (circulation pipes, flow rate measuring circuits with flow meter, priming tank, etc.).

For information on the installation, calibration and adjustment of the accessories described above or special accessories required at the time of ordering and supplied with the pump group, see the relevant installation and operating instructions and instructions on the accessories.

The installer is obliged to produce the final certificate of "Installation according to EN12845" as required by the relevant standards. The installer is obliged to provide the end user with all the documentation required in the applicable standards.

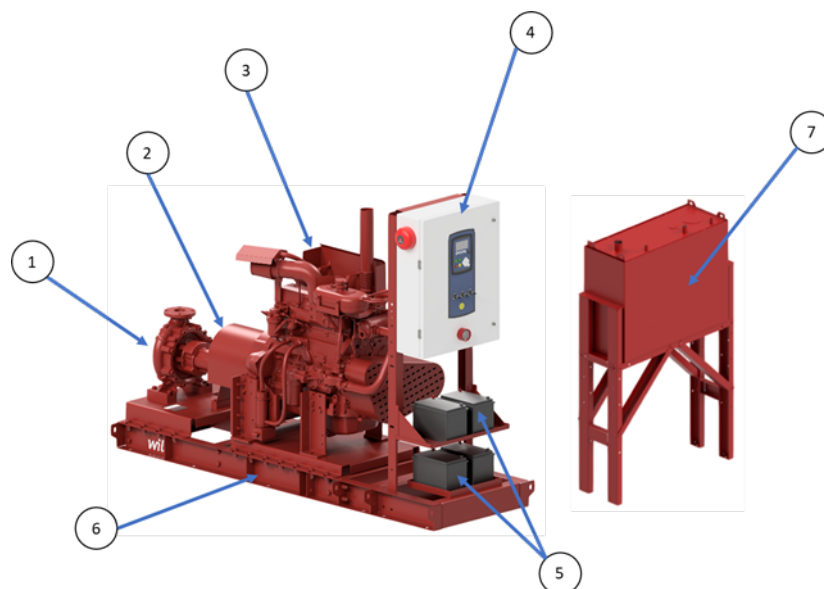
4.5 Description of the system

The pump group is designed for professional use in fire-fighting systems, e.g. a sprinkler system, to ensure the required pressure and water flow in the event of a fire alarm.

The pump group is equipped with a standard pump in accordance with EN 12259-12 and can optionally be equipped with a CNPP-listed standard pump. Refer to the pump rating plate for specific information.

The A2P configuration is applicable for the switchgear. The pump group with switchgear is suitable for installations in accordance with EN 12845.

4.5.1 Components of the fire-fighting system



1	Pump
2	Coupling
3	Diesel motor
4	Switchgear
5	Battery packs
6	Base frame
7	Fuel tank

The pump group is powered by battery packs and the fuel (diesel).



NOTICE

- For further information on the pump, see the enclosed installation and operating instructions for the pump.
- For more information on the switchgear, see the enclosed installation and operating instructions for the switchgear.
- For more information on the motor, see the enclosed installation and operating instructions for the motor.

4.5.2 Function

The main pump is started and stopped automatically in the event of a fire. This ensures that the maximum amount of water is pumped. The main pump and the jockey pump (optional) are controlled by separate pressure switches.

After switching on the system and activating the automatic mode, the jockey pump (optional) is started first. The jockey pump fills the system with water and keeps the system pressure constant. The jockey pump starts and stops automatically.



NOTICE

- Fire-fighting systems without jockey pumps must be filled manually with water.

When the water circuits of the sprinkler system are opened, the pressure in the system decreases. The main pump is activated, and the water is pumped into the sprinkler system. Once the water circuits of the sprinkler system are closed again, the pump group restores the holding pressure.

The main pump is not automatically switched off.

- To switch off the main pump, press the "Stop" button on the switchgear.

5 Transportation and storage



WARNING

Risk of injury from battery acid.

Batteries are filled with battery acid. Contact with battery acid leads to chemical burns.

- Seal batteries properly.
- Wear safety gloves.



WARNING

Environmental damage from operating fluids.

Diesel motors use the following operating fluids: Motor oil, diesel fuel (R 40, R 65, R 66, R 51/53) and battery acid (R 35). Operating fluids are harmful to the environment and must not enter the ground or water bodies.

- Use a suitable protection device (collector tank, oil mat, etc.).
- Wear safety gloves.
- The installation site must be fluid-resistant.

5.1 Delivery

The product is delivered on a pallet pre-assembled ex works. The product is protected from moisture and dust by foil.

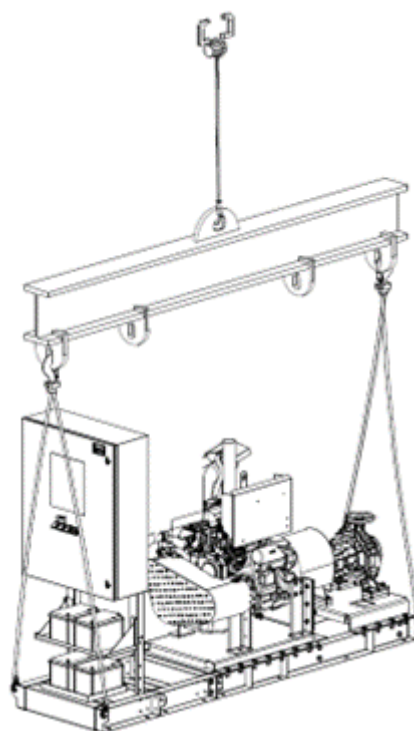
- On delivery and before removing the packaging, check the packaging for damage.

If damage is found which may have been caused by a fall or similar:

- Inspect product and accessories for possible damage.
- Notify the delivery company (forwarding agent) or customer service, even if you do not find any obvious damage to the system or its accessories.

Claims cannot be asserted if the notification of defects takes place at a later date.

5.2 Transport



- If the outer packaging is damaged or no longer present, apply suitable protection from humidity and dirt.
- Do not remove the outer packaging until you are at the installation site.
- If the system is transported again at a later date, fit new suitable protection against moisture and contamination.
- Demarcate and cordon off the working area.
- Keep unauthorised persons away from the working area.
- Use approved lifting slings: Sling chains or polyester webbing slings.
- Attach lifting slings to base frame:
 - Transport with lifting gear.

- Fixation lugs on base frame: Sling chain with sling hook with safety latch.
- Screw in eyelets: Sling chain or polyester webbing sling with shackle.
- Permissible angle specification for the lifting sling:
 - Use load bar.
- Ensure horizontal alignment to prevent the operating fluids in the motor (motor oil, diesel fuel and battery acid) from leaking.

5.3 Storage

- Place the system on a firm and even surface.
- Ambient conditions: 0 °C to 40 °C, at max. relative humidity of 95%, non-condensing
- Dry hydraulics and pipework before packing.
- Protect the system from humidity and dirt.
- Protect the system from direct exposure to sunlight.
- All threaded cable glands with open threads must be sealed.
- Protect connected cables against kinking, damage and moisture ingress.

6 Installation and electrical connection



DANGER

Danger of death due to dangerous lone working practices!

Work in chambers and narrow rooms as well as work involving risk of falling are dangerous work. Such work may not be carried out autonomously!

- Only carry out work with another person!



WARNING

Risk of injury from falling!

Falls into open wells and tanks can occur.

- Cover open wells and tanks and wear protective equipment against falling during installation.



WARNING

Risk of personal injury due to inadvertent start!

The pump group has two battery packs. The pump group can be activated unintentionally.

- Before installation, ensure that the battery packs are disconnected.
- If the battery packs are not disconnected, have the battery packs disconnected by an approved electrician.



WARNING

Hand and foot injuries due to lack of protective equipment!

Danger of (serious) injuries during work. Wear the following protective equipment:

- Safety gloves for protection against cuts
- Safety shoes
- Safety helmet must be worn if lifting accessories are used!



NOTICE

The pump group is used for fire protection.

- Carry out installation and electrical connection in accordance with EN 12845 and local regulations.

6.1 Personnel qualifications

- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Installation/dismantling work: qualified fire protection specialist according to the state of the art (EN 12845)
Correct installation and connection of the system to the supply line

6.2 Operator responsibilities

- Lifting work: trained specialist for the operation of lifting devices
Lifting equipment, lifting gear, attachment points
- Observe locally applicable accident prevention and safety regulations.
- The installation company is responsible for ensuring that the entire completed fire protection system complies with the appropriate standards. The installation company provides the operator with the "Installation in accordance with EN 12845" certification as well as the required documents.
- Observe local regulations for operating fire protection systems.
- Check that the available consulting documents (installation plans, installation location, inflow conditions) are complete and accurate.
- Provide protective equipment. Ensure that the protective equipment is worn by personnel.
- Demarcate the working area.
- Keep unauthorised persons away from the working area.
- The foundation must be of sufficient stability in order to allow the system to be fixed in a secure and functional manner. The operator is responsible for the provision and suitability of the foundation!
- Observe all regulations for working with heavy loads and under suspended loads.

6.3 Monitoring devices

- For the main pump, a fuse protection against short-circuiting is provided. Fuse protection in accordance with EN 12845 is installed in the switchgear.
- Do not provide thermal overload protection for the main pump.
- For the jockey pump, thermal overload protection is provided. The overload protection is installed in the switchgear of the jockey pump or the switchgear of the system. Set overload protection to the rated current of the jockey pump; see rating plate.
- Do not provide protection against low water level.
- The switchgear controls the operating parameters of the diesel motor. Alarm signals are shown on the switchgear. For more information, refer to the installation and operating instructions for the switchgear.

6.4 Installation location



WARNING

Environmental damage from operating fluids.

Diesel motors use the following operating fluids: Motor oil, diesel fuel (R 40, R 65, R 66, R 51/53) and battery acid (R 35). Operating fluids are harmful to the environment and must not enter the ground or water bodies.

- Use a suitable protection device (collector tank, oil mat, etc.).
- Wear safety gloves.
- The installation site must be fluid-resistant.

- Only install the pump group in a special room in accordance with EN 12845:
 - Directly and easily accessible from the outside at all times.
 - Protected from frost, rain and snow.
 - Fire resistant.
 - Doors must not be blocked or obstructed.
 - Access by authorised staff only.
 - Maintain a distance of 1000 mm around the pump group for maintenance work.
 - Provide lighting around the pump group.
 - Sufficient air circulation for cooling the motor and for the aeration of the pump room.
 - Observe positioning of the ventilation openings: Supply air opening: below/near the floor; exhaust air opening: above/near the ceiling
 - Direct waste gases into the open air.
- Install and fasten the pump group on a stable concrete slab. The subsurface must withstand all loads associated with the product due to transport, installation, operation, maintenance and dismantling.

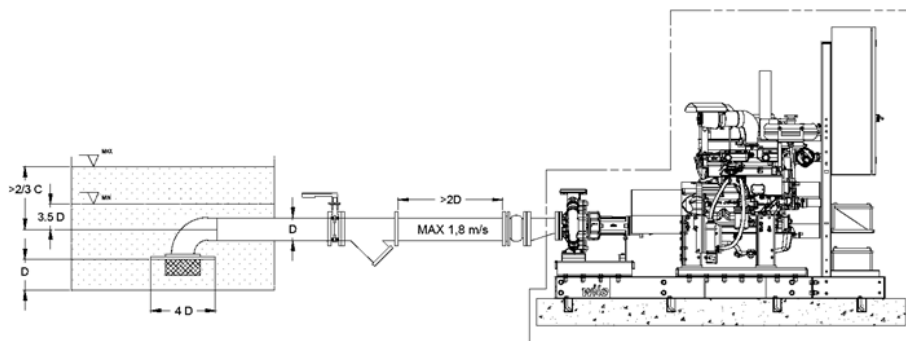
6.5 Installation

6.5.1 Installation type

The pump group can be installed in two ways in accordance with EN 12845 9.6:

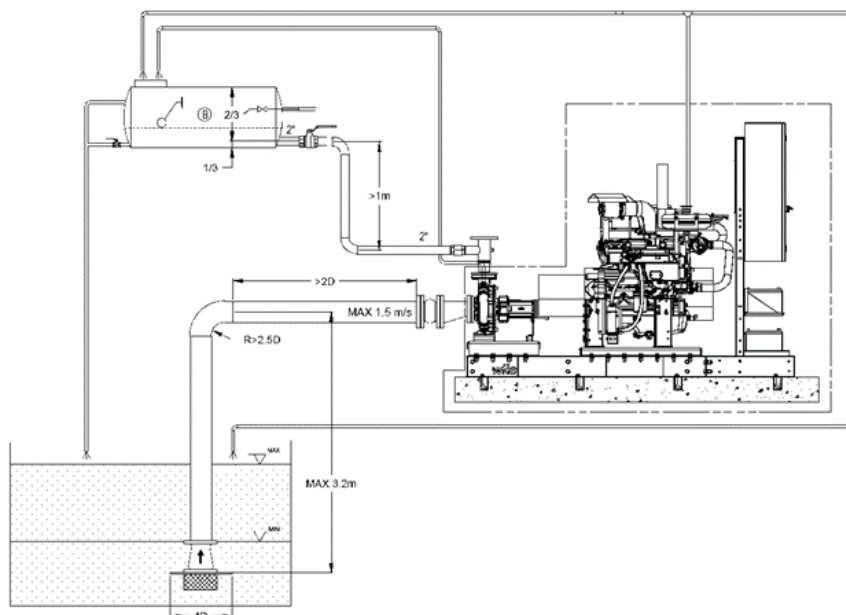
- Positive suction head
- Negative suction head

Positive suction head



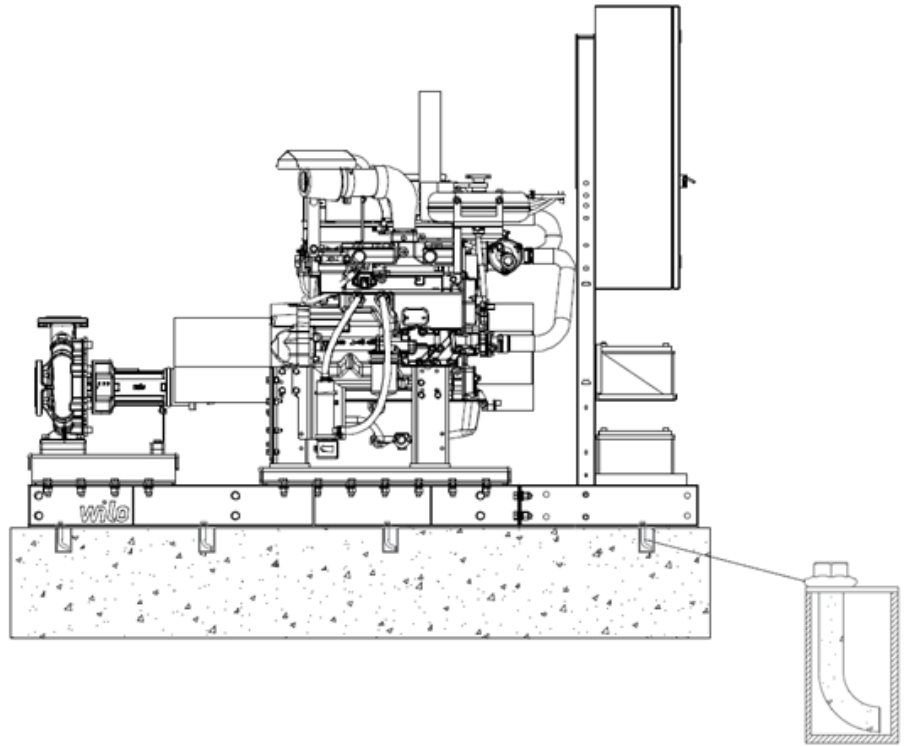
- At least 2/3 of the tank volume must be located above the centre line of the pump.
- The centre line of the pump must not be located more than 2 m above the lowest water level in the tank.
- If more than one sixth of the water volume is between the centre line of the pump and the lowest water level, install a foot valve with pump venting. Each pump must have its own suction line connected.
- The pipe diameter of the suction line must not be less than DN 65. Dimension the pipe diameter so that a flow velocity of 1.8 m/s is not exceeded at maximum demand. The flow velocity may be increased to 2.5 m/s, whereby an underpressure of 0.4 bar must not be exceeded.
- From an operating overpressure of 0.5 bar on the suction side, increase the motor power determined to 1.2 times the original value.
- Install the strainer in the suction line:
 - Diameter: at least 1.5 times the nominal diameter of the suction line.
 - Mesh size: max. 5 mm.
 - Install a shut-off valve between the filter and the tank.

Negative suction head



- The pipe diameter for a suction line must not be less than DN 80. Dimension the pipe diameter so that a velocity of 1.5 m/s is not exceeded at maximum demand flow. The flow velocity may be increased to 2.5 m/s, whereby an underpressure of 0.4 bar must not be exceeded.
- Do not combine the suction lines of several pumps. In the case of multiple water sources, this condition does not apply if the sprinkler pumps can be fed from any of the water sources as long as the pumps are not installed in separate locations.
- The height from the lowest water level to the centre line of the pump must not exceed 3.7 m. The lower fill level in the tank must be higher than the connection of the suction line.
- Fit the suction line in the tank in accordance with EN 12845. A foot valve must be fitted at the lowest point of the suction line. Each pump must have an automatic priming device in accordance with EN 12845.

6.5.2 Installation



- ✓ Fixation material available: Anchor rod of a suitable size for fastening the base frame to the foundation.
- 1. Set up the product at the installation location.
- 2. Drill holes through the base frame into the foundation. The drilling depth corresponds to the anchor rod manufacturer's specifications.
- 3. Insert anchor rods. Observe the manufacturer specifications.
- 4. Once the anchor rods have hardened, fasten the base frame to the foundation.
- 5. Secure screw connections with threadlocker.

6.6 Hydraulic connection



NOTICE

- Observe all applicable regulations, guidelines and conditions of the water suppliers.
- Observe the special features of the location. E.G.: Install pressure reducer if the inlet pressure fluctuates.

- All piping must be self-supporting.
- Install the pipes without mechanical tension. Use compensators.
- Lay the pipes so that air cushions cannot form.
- Check the pipes for impermeability.
- Prevent the penetration of foreign, pathogenic substances.

Make hydraulic connection in accordance with EN 12845:

- Connect the discharge side to the sprinkler system.
- Connect the suction line at the suction port of the main pump.
 - The suction line is to be kept as short as possible.
 - If not available, connect the suction line to the pump with a straight or conical pipe. The pipe must be at least twice as long as the nominal diameter. The reducer must run straight at the top. A conical pipe attached to the pump outlet must expand in the direction of flow at an angle of no more than 20°.
 - Install the shut-off valve.
 - Lay the piping horizontal or with a slight gradient toward the pump.
 - If the centre line of the pump is above the lowest fill level in the tank, install a foot valve.
 - Dimensioning of the NPSH value including all valves and fittings at maximum fluid temperature: The NPSH value at the pump connection must exceed the required NPSH value by 1 m (at max. volume flow).
- Connect a separate suction line to the suction port of the jockey pump.
- Install a recirculation circuit. (Separate water circuit for manual mode and test runs)

- Lead the outlet of the hydraulic pressure compensation valve into the tank or break tank.

Ø Suction port – main pump	Ø Discharge port – main pump	Ø Test line	Ø Manifold
DN 50	DN 32	DN 50	DN 50
DN 65	DN 40	DN 50	DN 50
DN 65	DN 50	DN 65	DN 65
DN 80	DN 65	DN 80	DN 80
DN 100	DN 80	DN 125	DN 125
DN 125	DN 100	DN 150	DN 150
DN 150	DN 125	DN 200	DN 200
DN 200	DN 150	DN 200	DN 200

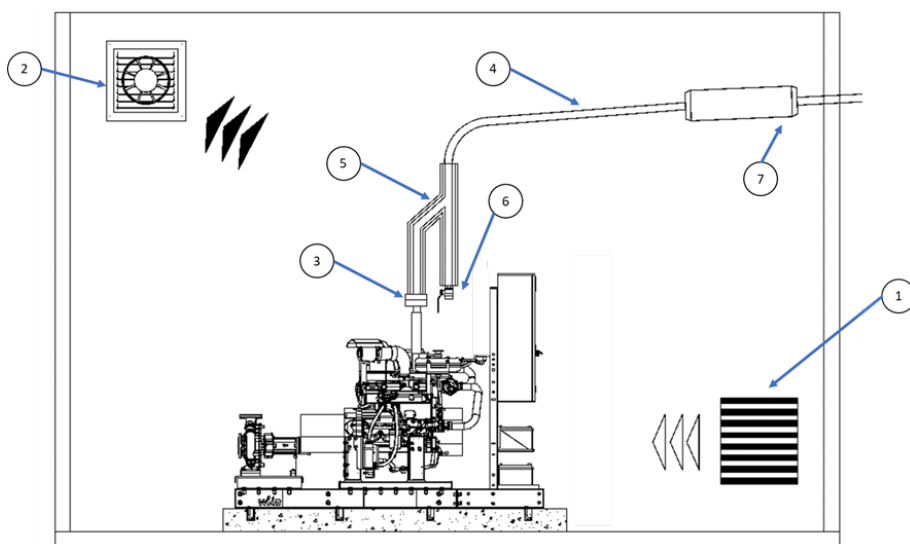
6.7 Exhaust system and aeration



DANGER

Risk of suffocation from exhaust gases!

- Discharge exhaust gases to the outside air using an exhaust gas system.
- Only put the pump group into operation with a fully installed exhaust gas system.



1	Supply air opening
2	Exhaust air opening
3	Vibration absorber
4	Exhaust pipe
5	Thermal insulation
6	Condensate return
7	Silencer

Aeration with cross ventilation without exhaust system

- Supply air opening (white arrows)
- Exhaust air opening (black arrows)

The waste heat and combustion gases must be dissipated from the room. The pump group handles aeration by using the fan to move the air and the integrated waste gas system to dissipate the waste gases. The fan supplies the cooling air, which is also used for the aeration of the fire pump. The value for the cooling air is always greater than the flow rate required for the pump's aeration.

Power [kW]	Cooling	Cooling air [m³/h]	Required quantity of water heat exchanger [m³/h]	Room ventilation [m³/h]
4.2	Ambient air	300	–	420
6.0	Ambient air	330	–	600

Power [kW]	Cooling	Cooling air [m³/h]	Required quantity of water heat exchanger [m³/h]	Room ventilation [m³/h]
10.5	Ambient air	710	–	1050
17.7	Ambient air	1578	–	1770
26	Fan or water heat exchanger	3000	8	1325
31.5	Fan or water heat exchanger	3900	8	1575
37	Fan or water heat exchanger	8800	8	1850
47.7	Fan or water heat exchanger	8800	8	2385
66	Fan or water heat exchanger	8800	10	3300
100	Fan or water heat exchanger	16500	12	5000
109	Fan or water heat exchanger	12000	12	5450
145	Fan or water heat exchanger	14800	12	7250
197	Fan or water heat exchanger	16200	24	9850
222	Fan or water heat exchanger	16200	24	11100
246	Fan or water heat exchanger	16200	24	12300

Requirements for the exhaust gas system

The exhaust gas system is already integrated into the pump group and is suitable for outdoor installation. If an indoor installation is required, observe the following requirements:

- Lay the exhaust pipe to the outside (silencer is optional).
- The total counter pressure must not exceed the values stipulated by the motor manufacturer. See the installation and operating instructions of the motor.
- Install heat protection on the exhaust pipe.
- The exhaust pipe must not be installed near doors or windows.
- To prevent exhaust gases from flowing back into an operating space, lay exhaust pipe accordingly.
- Install the exhaust pipe in accordance with weather conditions (to prevent ingress of rain and snow).
- Ensure that the condensate cannot flow back into the motor.
- Condensation drain must be made of acid-resistant material.
- Keep exhaust pipe as short as possible (max. 5 m). Avoid bends. Maximum bend radius: 2.5 times the pipe diameter.

6.8 Fuel tank

The fuel tank is separate from the pump group.

- Install the fuel tank within a radius of 3 metres from the motor.

6.9 Electrical connection



DANGER

Danger of death due to electrical current!

Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Only have electrical connection established by an electrician approved by the local energy supply company.
- Observe applicable local regulations.
- Before swapping the phases, switch off the main switch of the system and secure it against unauthorised restarting.



NOTICE

- For the electrical connection, observe the relevant installation and operating instructions.
- Observe the enclosed electrical circuit diagrams and connection diagrams.

Points to be taken into account:

- Plan the mains connection and the connection of the main switch cabinet in accordance with EN12845.
- Technical current type, voltage and frequency of the power supply network must match the details on the rating plate of the motor and the switchgear.

- Mains connection must only provide power to the fire-fighting system.
- Connect each fire-fighting system to its own mains connection.
- Establish mains connection upstream of the building's main switch.
- The mains connection must be available at all times.
- If other consumers are switched off, do not switch off the mains connection of the system.
- Secure the mains connection only against short-circuit and fault current.
- Earth the pump group.
- Protection against overload is prohibited.
- Use single, continuously laid cables.
- Select and lay cables in such a way that the function of the fire-fighting system is ensured in the event of a fire:
 - Use flame-retardant cables. Min. fire resistance: 180 min.
 - Lay cables underground with coverage of at least 70 cm.
 - Lay cables in non-combustible materials with sufficient coverage.
- Connect the fire-fighting system according to the circuit diagrams in the switchgear.

Frequency converter

- The pump group must not be operated with a frequency converter. The pump and the switchgear are not designed for operation with a frequency converter.

Battery packs



DANGER

Risk of fatal injury due to electrical current!

The battery packs are pre-charged. Electric shock may occur.

- Do not touch or short-circuit battery pack poles.



WARNING

Risk of injury!

The pump group will start if the battery packs are connected.

- Switch off the main switch before connecting the battery packs.
- Secure the main switch against being switched on again.

- Connect battery packs to the switchgear.
 - Connect the negative pole.
 - Once the negative pole is connected, connect the positive pole.
- When the switchgear is activated, the battery packs are charged.

Heating (diesel motor)

Install a suitable heating element to preheat the motor oil and fuel.

Jockey pump (optional)



WARNING

Risk of injury!

When the power supply is established, the jockey pump starts.

- Read the commissioning instructions before establishing the power supply to the jockey pump.

The jockey pump fills the system with water and builds up pressure.

- The jockey pump is supplied pre-assembled and wired.
- Provide a shockproof socket on-site.
- Protect the power supply of the jockey pump with 16 A.

**DANGER****Danger of death due to electrical current!**

Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Before all electrical work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Electrical work must be carried out by a qualified electrician!
- Observe local regulations!

**DANGER****Risk of suffocation from exhaust gases!**

Exhaust gases in closed rooms lead to suffocation.

- Only start the diesel motor when the exhaust gas system is connected to the outside air.

**WARNING****Hand, foot or eye injuries due to the absence of protective equipment!**

Danger of (serious) injuries during work. Wear the following protective equipment:

- Safety gloves for protection against cuts
- Safety shoes
- Sealed safety glasses

CAUTION**Property damage due to dry run!**

Dry running can lead to the pumps developing leakages and to motor overload.

- Ensure that the pumps do not run dry to protect the mechanical seal and the plain bearings.
- If there is no water in the diaphragm expansion tank of the jockey pump, build up pressure 0.5 bar lower than the starting pressure of the jockey pump.
- Do not exceed the maximum filling pressure of the diaphragm expansion tank.

CAUTION**Property damage due to incorrect commissioning!**

- Before filling the pump group with water, check all components for impermeability as they may come loose during transport.
- If tests need to be performed during commissioning, make sure that the pumps are filled with water before activation.
- The pump group must not be in automatic mode until the fire-fighting system has been fully installed in compliance with the standards. Commissioning an incomplete fire-fighting system will invalidate the warranty.

**NOTICE**

We recommend that the initial commissioning of the system is performed by the Wilo customer service department.

- Contact your dealer, your nearest Wilo representative or the Wilo customer service department.



NOTICE

Automatic activation after power cut

Depending on the process, the product is activated and deactivated using separate controls. The product may automatically be activated following power cuts.

7.1 General preparations and control measures

In order to comply with the applicable directives and standards, it is necessary for the proper operation and safety of the pump group that all stipulated system components are installed.

In accordance with Machinery Directive 2006/42/EC Annex II 1(B), the fire-fighting system must be completed and declared compliant with the applicable directives and standards before commissioning of the pump group is allowed.

- Check that all on-site wiring has been performed correctly, in particular the earthing, prior to initial activation.
- Check that the pipe adaptors are not under stress.
- Fill the system and carry out a visual inspection for leakages.
- Open the shut-off valves at the pumps and in the suction and discharge pipe.
- Before adjusting the automatic mode, define the maintenance programme procedure and responsibilities for intervention in the event of unintentional starting.
- Check whether the battery packs are charged.
- Follow the battery manufacturer's instructions.
- Keep battery packs away from flames and sparks. Do not bend over the battery packs during operation and during installation and removal.
- Check fuel level. Only top up the fuel when the diesel motor is cold.
- Fuel must not get on motors, rubber or plastic parts.
- Check correct alignment of pump and motor. The alignment must be carried out by qualified staff.
- The installation must be carried out by qualified staff.

7.1.1 Commissioning with positive suction head

The following measures must be taken when commissioning a system with a positive suction head (suction mode):

- Open the drain-priming plug of the jockey pump.
- Check whether the air vent valves of the pumps are open.
- Close shut-off valves on the discharge side.
- Slowly open the shut-off valves on the discharge side and check whether water is escaping from the air venting circuit of each pump.
- Start the pumps briefly in manual mode.
- Ensure that there is no air in the circuits, loops and pumps.
- Repeat the process until the air in the piping has escaped.
- Close the drain-priming plug of the jockey pump.
- Fully open the shut-off valves on the suction side and discharge side.
- Check whether there are any foreign bodies in the loops and circuit (dirt, solid deposits, etc.).

7.1.2 Commissioning with negative suction head

The following measures must be taken when commissioning a system with a positive suction head (suction mode):

- Check whether the air vent valves of the pumps are open.
- Close shut-off valves on the discharge side.
- Fill the main pumps with water via the break tank.
- Fill the jockey pump via the filling port. See installation and operating instructions.
- Start the pumps briefly in manual mode.
- Ensure that there is no air in the circuits, loops and pumps.
- Repeat the process until the air has fully escaped.
- Close the drain-priming plug of the jockey pump.
- Fully open the shut-off valves on the suction side and discharge side.
- Check whether there are any foreign bodies in the loops and circuit (dirt, solid deposits, etc.).

7.2 Carry out commissioning

7.2.1 Commissioning – main pump

CAUTION

Material damage due to overheating!

Overheating will damage the pump.

- Check the water flow in the recirculation circuit with the specifications in the installation and operating instructions for the pump.
- If there are problems with the recirculation circuit or if the minimum flow rate is not ensured, open other circuits (e.g. flow meter, leak test valve of the shut-off valve, drain valve, etc.).

CAUTION

Property damage due to incorrect commissioning!

If the following circumstances occur, stop the pump and rectify the fault; see Troubleshooting.

- Rotating parts in contact with the fixed parts
- Unusual vibrations and noises
- Loose screwed connection
- High temperature on motor housing
- Voltage differences between the phases
- Leakage in the mechanical seal
- Vibrations, noises and excessive temperatures caused by misaligned connection between motor and hydraulics.

7.2.2 Commissioning of the jockey pump

7.2.3 Filling the system

- Check the hydraulic, mechanical and electrical connections.
- Open shut-off valves on the suction and discharge side of the pump.
- Check whether the pump is filled.
- Check whether the power supply matches the specifications on the pump's rating plate and that all three phases are connected correctly.
- Follow the commissioning instructions, see installation and operating instructions for the switchgear.
- Check whether the fuel is suitable for the motor.
- Check that the fuel tank is completely full. The fill level can be read on the display next to the fuel tank.
- Check that the connections to the fuel lines are correct. The fuel line must be continuous and must not be extended.
- Check that the fill-level sensor cable in the fuel tank is correctly connected to the switchgear.
- Check motor oil and coolant level.
- If the motor is cooled using a water heat exchanger, carry out the necessary work; see installation and operating instructions for the motor.
- Only top up the oil and coolant as recommended by the motor manufacturer; see installation and operating instructions.
- Follow further commissioning instructions; see installation and operating instructions for the switchgear.
- To check that the motor speed matches the specifications on the rating plate of the pump group, start the pump for 20 minutes.
- To ensure that the jockey pump delivers less volume flow than is required for a single sprinkler, adjust the flow rate of the jockey pump using the shut-off valve at the input of the manifold. For adjustment of the jockey pump, see the characteristic curves for the various pump types in the corresponding data sheets.
- For problems with starting the pump, see installation and operating instructions of the jockey pump or associated switchgear.
- Follow the instructions for commissioning; see installation and operating instructions for the jockey pump switchgear.
- If the system is not filled, use the jockey pump for filling.
- To remove the air from the system, open one or more venting lines of the sprinkler circuit.
- Start the jockey pump. If water is escaping from the venting lines, close the venting lines. When the preset pressure has built up in the system, the jockey pump stops.



NOTICE

The jockey pump only stops at a volume flow of zero. The system reaches the maximum pressure of the jockey pump. The maximum pressure of the jockey pump must be higher than the automatic starting pressure of the main pump.

- If the pump does not stop automatically, check the pump for leakage.
- When the pressure has stabilised, set the system to automatic mode.

7.2.4 Testing automatic mode

The tests for the automatic starting of the pumps must include the following checks:

- Check oil and fuel fill level.
- To simulate an automatic start request, reduce the water pressure in the system.
- When the pump starts, check and document the starting pressure.
- Check the oil pressure and flow rate in the coolant loop.
- Check the water flow through the heat exchanger (if present).

8 Maintenance



DANGER

Danger of death due to electrical current!

Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Before all electrical work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Electrical work must be carried out by a qualified electrician!
- Observe local regulations!



DANGER

Risk of fatal injury due to electrical current!

When working with the switchgear open, the input terminals of the power supply line and those of the remote alarm transmission may still be under voltage even after the power supply has been disconnected.

- Do not remove protection from current-carrying parts.
- Avoid any contact with the insulating elements of the system or the subassemblies.



DANGER

Danger of death due to explosion!

Explosive gases can form when charging the battery packs.

- Avoid flames and sparks.
- Do not store flammable liquids or materials soaked in acidic substances near the pump group or electrical devices.
- Ensure sufficient aeration.



DANGER

Risk of personal injury due to inadvertent start!

The pump group has two battery packs. In automatic mode, the pumps can start automatically.

- Only carry out maintenance work when automatic mode is deactivated.
- Before maintenance, ensure that the battery packs are disconnected.
- If the battery packs are not disconnected, have the battery packs disconnected by an approved electrician.



DANGER

Risk of injury from explosion!

Pressure in the diaphragm expansion tank that is too high leads to explosion.

- Comply with the rated pressure limits of the diaphragm expansion tank.



DANGER

Risk of injury from hot surfaces!

Diesel motors and attachments get hot.

- Use protection devices (insulation) for motor and exhaust pipes.
- Only top up the fuel tank when the diesel motor is cold.
- When filling the tank, keep fuel away from hot surfaces.
- Wear protective equipment.



DANGER

Risk of injury from hot operating fluids!

Cooling systems are under pressure and hot liquid leaks may occur.

- Only change operating fluids at motor temperatures below 60 °C.
- Check that the motor's fluid level (oil/water) is correct and that the stoppers of the water loops and oil circuits are correctly fitted.
- For diesel motors with water/water heat exchangers, check whether the cooling system valves are locked in the open position.
- Check the oil and fuel pipes and ensure that no fluid is leaking.



WARNING

Hand, foot or eye injuries due to the absence of protective equipment!

Danger of (serious) injuries during work. Wear the following protective equipment:

- Safety gloves for protection against cuts
- Safety shoes
- Sealed safety glasses



WARNING

Risk of injury from battery acid.

Batteries are filled with battery acid. Contact with battery acid leads to chemical burns.

- Seal batteries properly.
- Wear safety gloves.



WARNING

Environmental damage from operating fluids.

Diesel motors use the following operating fluids: Motor oil, diesel fuel (R 40, R 65, R 66, R 51/53) and battery acid (R 35). Operating fluids are harmful to the environment and must not enter the ground or water bodies.

- Use a suitable protection device (collector tank, oil mat, etc.).
- Wear safety gloves.
- The installation site must be fluid-resistant.



WARNING

Risk of injury from sparks!

Sparks may form at the contacts of the battery packs.

- Only disconnect the battery packs when the motor is at a standstill.

CAUTION

Property damage due to incorrect maintenance!

The pump group has no emergency shutdown. The main pumps can only be stopped manually by deactivating the switchgear.

- Switch off the main switch of the relevant pump and secure it against being switched on again.

The pump group is a safety device to protect objects and people. All modifications and repairs that affect the functionality must be carried out in such a way that the temporary shutdown is as short as possible.

Pump groups installed in accordance with these instructions operate with minimal maintenance. The regular maintenance and inspections stipulated and specified in the EN 12845 standard serve to maintain the efficiency of the fire-fighting system.

8.1 General maintenance work

- Observe the inspection and control plan.
- To check the external condition of all components, carry out a general inspection of the assemblies (including hydraulic and electrical supply systems).
- Clean pump group.
- Inspect check valves for impermeability.
- Check seal (stuffing box packing or mechanical seal) regularly. Replace seal in the event of heavy leakage.
- Check operating configuration of the switchgear.
- Check warning lights for proper function.
- Check alarm for minimum tank/well level for proper function.
- Check electrical connections for insulation damage, burns, loose terminals, etc.
- Refer to the maintenance instructions in the enclosed installation and operating instructions for the system components.
- Check the required minimum operating material according to EN 12845 for completeness.
- Check idling fuel level alarm for proper function.
- Check the charge level of the battery packs and the voltage of the charger.
- Check that the magnetic shut-off valve on the motor housing is working correctly.
- Check maintenance material for completeness.
- Check the fill level and viscosity of the lubricating oil in the pump bearings.
- Check the suction circuit (especially for suction lifting units) for the following points.
 - Check the water and air pressure gauges of the system, the main lines and the pressure tanks.
 - Check the water levels of all storage tanks (including the pump priming tanks and pressure tanks).
 - Check main shut-off valves for correct position.



NOTICE

Diesel motors are subject to special maintenance intervals.

- For diesel motor maintenance, refer to the provided installation and operating instructions of the motor manufacturer.

8.2 Checking the diesel motor

Automatic start test

The following inspections must be conducted for automatic pumps:

- Check fuel and oil level.
- To simulate an automatic start, reduce the water pressure in the system.
- When the pump starts, check and document the starting pressure.
- Check the oil pressure and flow rate in the coolant loop.
- Check the water flow through the heat exchanger (if present).
- Refill fuel tank.

Diesel motor restart test

Start the diesel motor immediately after the automatic start test mentioned above:

- Run the diesel motor at the rated duty point for 20 minutes. Stop the diesel motor and restart it manually immediately.
- Check the fill level in the primary closed cooling loop.
- Check the oil pressure (on the pressure gauges), motor temperature and coolant flow.
- Check oil lines and pump group for leakage (fuel, coolant or exhaust gases).
- Check suction/aeration system (air filter, operation, clogging).
- Refill fuel tank.

8.3 Maintenance intervals

CAUTION

Property damage due to lack of operating fluid!

Missing operating fluids (e.g. coolant, etc.) will damage the product.

- Check and top up the fill levels of operating fluids after all maintenance work.



NOTICE

- Observe detailed maintenance work of all supplied installation and operating instructions.
- Replace components only with original spare parts or parts with the same certified properties.

- Document the following values during all maintenance work:
 - Pressure values on the water and air pressure gauges (system, main lines and pressure tank).
 - Water levels of the water supply, e.g. in rivers, canals, lakes, break tanks (including priming tanks for pumps and pressure tanks).
 - Correct position of all main valves.

Weekly

- Check aeration.
- Check room temperature.
- Visual check of the pump group (including power and water supply).
- Clean pump group.
- Inspect check valves for impermeability.
- Check whether switchgear is in automatic mode.
- Check functionality of switchgear.
- Check functionality of the switchgear's alarm LEDs.
- Check functionality of minimum fill level alarm of the tank.
- Check electrical connections for burns, insulation damage and loose terminals.
- Check the filling pressure of the diaphragm expansion tank if present.
- Check functionality of minimum fill level alarm of the fuel tank.
- Check the charge level of the battery packs and the proper function of the charger.
- Check functionality of motor stop magnets.
- Check the viscosity and coolant level of the pump.

Monthly

- Check the fill level and charge status of all battery packs (including the starter batteries of the diesel motor and the batteries used for the switchgear power supply).
 - Check functionality of the charger if the charge level is too low.
 - If a sufficient charge level is not reached, replace the battery packs.

3 Monthly

- Create a maintenance report, sign it and hand it over to the operator. The maintenance report must include details of any procedure carried out or planned and details of any external factors, such as weather conditions, which affect the results.
- Check pipework and brackets for corrosion and protect if necessary.
- Check pipework earthing. Sprinkler system pipework must not be used for electrical earthing. If present, remove earthing connections and replace with suitable alternative.
- Check the water supply to each control station in the system. The pump(s) must start automatically and the measured pressure and volume flow values must not be below the duty point values.
- Log every change.

- Check all valves in the pipes of the sprinkler system for proper function. Return the valves to their operating position. Perform a test for all water supply, control and alarm valves, as well as for all valves in the local or auxiliary circuits.
- Check the quantity of spare parts in stock and ensure they are packaged correctly.

Every six months

- Check alarm and telecommunication system.

Annually

- Check the efficiency of each pump at full load (by connecting the test pipes to the pump outlet). Compare the values for pressure and volume flow with the information on the rating plate of the pump.
- Check pressure losses in the supply lines and valves between the water source and each control station. Check whether the diesel motor starts and whether the prescribed alarm functions correctly.
- Start diesel motor manually.
- Check the float valves in the tanks for proper function.
- Check the suction baskets and filter accessories in the tank. Clean if necessary.

Every 3 years

- Drain all tanks and check for corrosion on the outside and inside. If necessary, apply new corrosion protection to the tank.
- Check water supply valves, alarm and control valves. If necessary, replace or repair.

Every 10 years

- Check and clean the inside of all water supply pipes. Check the water supply pipes for impermeability. Contact Wilo customer service for the overhaul or replacement of damaged or functionally impaired system components.

9 Faults, causes and remedies



NOTICE

- Have faults, particularly those affecting the pumps or the control unit, remedied exclusively by the Wilo customer service or a specialist company.



NOTICE

- The general safety instructions must be observed during any maintenance or repair work.
- Observe all installation and operating instructions.

- If the staff does not have sufficient knowledge of the product and the operating logic required by the specific regulations for fire-fighting systems, or if they do not have the necessary technical skills, contact Wilo for regular maintenance.

Main pump

Fault	Cause	Remedy
Motor does not start, start attempt fails.	Battery packs discharged	Check battery packs and chargers. Charge battery packs and replace if necessary.
	Fuel low	If the control lamp does not light up, check the fuel tank and floater. Replace. Top up fuel.
	Air in the fuel line	Vent the fuel line by venting the injection nozzles and the fuel filter.
	Fuel filter clogged	Replace fuel filter.
	Air filter clogged	Replace air filter.
	Injection system fault: Injection nozzle clogged High-pressure pump fault	Contact customer service.
	Temperature too low	The ambient temperature must not be below 10 °C. Check whether the oil/water heating is working properly. Replace heating.
	Battery/starter/servo relay connections loose or corroded	Check cables and connections. Repair or replace where necessary.

Fault	Cause	Remedy
	Motor switchgear fault	Check and, if necessary, replace switchgear or have it repaired.
	Starter fault	Contact customer service.
Pinion of the starter does not retract after the motor is started.	Motor switchgear fault	Contact customer service.
Pump generates no or insufficient power	Negative suction head too high. Pump in cavitation.	Review configuration based on NPSHr value of pump.
	Valves and nominal diameter of the suction line incorrect. Pump in cavitation.	Review configuration based on NPSHr value of pump.
	Air in the inlet	Check and, if necessary, seal the piping and vent the pumps. Check the distance between the priming devices if more than one pump is installed. Install anti-vortex plates.
	Shut-off valves in the system closed or not sufficiently open	Check and if necessary, fully open the shut-off valve.
	Bearing damage	Check the pump/motor and replace it or have it repaired if necessary.
	Impellers clogged	Check the pump and replace it or have it repaired if necessary.
	Filter clogged	Check and replace it if necessary.
	Bearing damage and flange damage	Check the pump/motor and replace it or have it repaired if necessary.
	Motor does not reach target or idling speed.	Check speed of the switchgear. See next line
Motor does not reach target speed or speed fluctuates	Throttle lever in wrong position	Check, adjust, secure.
	Fuel filter clogged	Replace fuel filter.
	Injection system fault	Contact customer service.
	Overload due to blocked pump	Check and, if necessary, dismantle pumps.
	Incorrect flange	Align.
Motor or pump getting too hot	Ambient temperature higher than 40 °C	Cool the environment.
	Insufficient aeration	Check air supply (supply air opening), clean or enlarge if necessary.
	Heat exchanger contaminated or clogged	Dismantle and clean.
	Low water in the heat exchanger loop	After the motor has cooled down, top up water. Check for leakage.
	Shut-off valve on the discharge side not fully opened	Check volume flow. Open shut-off valve.
	Pump fault in heat exchanger loop	Contact customer service.
	Fan belt fault (air-cooled motor)	Check drive (power supply); replace if necessary.
	Alarm signal fault	Check the sensor. Replace connections and switchgear if necessary
Drop in speed	Sudden overload / foreign object in the pump	Stop motor. Dismantle and repair pump if necessary.
	Air filter clogged	Replace air filter.
Black smoke	Oil fill level too high	Remove excess oil.
	Fault in injection, fuel pump, etc.	Contact customer service.
	Screwed connection loose	Check, tighten if necessary.
	Cover of connection between motor and pump loose	Check, tighten if necessary.
Unusual noises	Friction between fan and cover, etc.	Check, re-align if necessary.
	Foreign object in the pump	Check and, if necessary, dismantle pumps.
	Incorrect flange	Align.

Fault	Cause	Remedy
	Insufficient bearing lubrication	Lubricate or replace bearings.
	Bearing damage	Replace bearings.
Pump / bearings overheat	Insufficient bearing lubrication	Lubricate or replace bearings.
	Incorrect flange	Align.
	Vibration absorber wear	Check and replace it if necessary.
	Pump in cavitation	Check the dimensioning of the system.
Vibrations	Air in the inlet	Check suction line for presence of leaks. Check the distance between the priming devices if more than one pump is installed. Install anti-vortex plates.
	Bearing / shaft wear	Check and replace or have repaired if necessary.
	Wear on pump/motor coupling rubber plugs	Check and replace it if necessary.
	Incorrect flange	Align.
Pump does not switch off when the stop button is pressed	Normal, if the pressure in the system has not yet been restored.	Switch off automatic mode by setting the selection switch to AUTOMATIC OFF and pressing the STOP button.
	Switchgear fault	Close the fuel tap on which the electromagnet acts.

Jockey pump

Fault	Cause	Remedy
If one of the system taps is opened, the pump does not start or only starts after a few seconds	The set P_{\min} value is too low or a check valve has been installed downstream of the system.	Check correct connection between switchgear and pump. Check the setting of the P_{\min} parameter.
Switching frequency too high or fluttering	Leakage in system	Check hydraulic connections. Check on the display whether there is a pressure drop when the taps are closed. Check switchgear. Examine check valve for dirt and clean if necessary. Install a diaphragm expansion tank.
Dry run is detected	If the system is not in operation, the suction line of the pump drains.	Check the foot valve.
If the water flow is low, the pump runs unevenly	Flow rate too low.	Install a diaphragm expansion tank (1–2 litres) to reduce the number of restarts.
System pressure is above the set value of P_{\max} .	Protection against ice or blocking of mechanical parts may have been activated. The pump starts regardless of the programmed values of P_{\max} and P_{\min} for 15 seconds.	Reduce system pressure.
Switchgear does not start	Electronics defective	Check and replace it if necessary.
Motor does not start	No power supply	Check the fuses, cables and connections.
	Pressure switch calibrated to a lower pressure than the main pump.	Check pressure switch and adjust if necessary.
	Turn-to-turn fault in the motor	Check and replace motor or have it repaired if necessary.
	Thermal motor monitoring has been tripped	Check the dimensioning of the power supply line. Check pump for blockage. Check the calibration of the pressure switch and the pre-filling of the diaphragm expansion tank.
	Switchgear fault / cabling fault	Check switchgear and cabling.
	Incorrect direction of rotation of the motor	Check the direction of rotation and swap 2 phases if necessary.
Pump generates no or insufficient power	Negative suction head too high. Pump in cavitation.	Review configuration based on NPSHr value of pump.

Fault	Cause	Remedy
	Valves and nominal diameter of the suction line incorrect. Pump in cavitation.	Review configuration based on NPSHr value of pump.
	Air in the inlet	Check and, if necessary, seal the piping and vent the pumps.
	Shut-off valves in the system closed or not sufficiently open	Check and if necessary, fully open the shut-off valve.
	Bearing damage	Check the pump/motor and replace it or have it repaired if necessary.
	Impellers clogged	Check the pump and replace it or have it repaired if necessary.
	Filter clogged	Check filter if necessary.
	Motor provides no or too little power	See next line
Motor provides no or too little power	Voltage too low in motor	Check supply voltage, connections and cable cross-section of the supply line
	Loose contact in the power contactor	Check and, if necessary, replace or repair.
	Phase error	Check the fuses, cables and connections.
	Loose contact in the connection cable	Check terminals and, if necessary, replace or repair.
	Turn-to-turn fault in the motor	Check and replace motor or have it repaired if necessary.
Performance too low after commissioning	Insufficient dimensioning of the switch and the safeguards.	Check or adjust fuses, cables and connections.
	Power supply too low	Check power supply.
	Impellers clogged	Check the pump and replace it or have it repaired if necessary.
Motor housing is live	Short circuit	Check the motor and replace it or have it repaired if necessary.
	Insulation damp or defective	Dry motor or have it repaired.
	Short circuit between terminals and housing	Check insulation of terminals.
	Overload due to clogged impellers	Check the pump and, if necessary, remove the clogging or have it repaired.
Motor or pump getting too hot	Ambient temperature higher than 40 °C	Cool the environment.
	Mains voltage: too high / too low	Check the power supply.
	Mains voltage: A phase is missing	Check the fuses, cables and connections.
	Phase voltages not identical	Check and replace motor or have it repaired if necessary.
Drop in pump speed	Sudden overload / foreign object in the pump	Check and, if necessary, dismantle pumps.
	Mains voltage: A phase is missing	Check the fuses, cables and connections.
	Mains voltage: Voltage too low	Check the power supply.
Pump is not stable and/or making unusual noises	Turn-to-turn fault in the motor	Check and replace motor or have it repaired if necessary.
	Friction between stator and rotor	Check and replace motor or have it repaired if necessary.
	Screwed connection loose	Check, tighten if necessary.
	Fan screw connection loose	Check, tighten if necessary.
	Friction between fan and cover, etc.	Check, create a gap and tighten if necessary.
	Foreign object in the pump	Check and, if necessary, dismantle pumps.
	Possible bearing damage	Lubricate or replace bearings.
	No vibration absorbers	Replace vibration absorbers.
Vibrations	Pump in cavitation	Check the dimensioning of the system.

Fault	Cause	Remedy
	Air in the inlet	Check suction line for presence of leaks. Check the distance between the priming devices if more than one pump is installed. Install anti-vortex plates.
	Bearing / shaft wear	Check and replace motor or have it repaired if necessary.
	Incorrect direction of rotation of the motor	Check the direction of rotation and swap 2 phases if necessary.
Pump does not switch off automatically	Insufficient switch-off pressure of the pressure switch in relation to the pump curve	Check pressure switch and adjust if necessary.
	Pressure switch set incorrectly	Check pressure switch and adjust if necessary.
Switching frequency too high or fluttering	Break tank not sufficiently filled	Check size of break tank. Check supply pressure.

- If a fault cannot be repaired, contact an installer or Wilo customer service centre.

10 Spare parts

Spare parts are ordered via customer service. To avoid return queries and incorrect orders, the serial or article number must always be supplied. **Subject to change without prior notice!**

10.1 Recommended spare parts inventory

To ensure that interventions can be made and the system can be restored quickly, maintaining a stock of the following spare parts is recommended:

Main pump with diesel motor

- 1x mechanical seal spare part kit
- 1x start-up pressure switch
- 1x set of main fuses
- 1x set of starters
- 2x fuel filters
- 2x oil filters
- 2x set of toothed belts
- 2x diesel motor injection nozzles
- 1x complete valve set
- 1x complete set of seals and piping for oil and fuel circuit
- 1x tool set, see motor manufacturer's documentation

Jockey pump

- 1x mechanical seal spare part kit
- 1x start-up pressure switch
- 1x set of main fuses

11 Disposal

11.1 Oils and lubricants

Operating fluids must be collected in suitable containers and disposed of in accordance with the locally applicable guidelines. Wipe up drips immediately!

11.2 Water-glycol mixture

The operating fluid complies with Water Hazard Class 1 of the German Administrative Regulation of Substances Hazardous to Water (VwVWS). When disposing of it, the locally applicable guidelines (e.g. DIN 52900 on propanediol and propylene glycol) must be observed.

11.3 Protective clothing

Used protective clothing must be disposed off in accordance with the locally applicable guidelines.

11.4 Information on the collection of used electrical and electronic products

Proper disposal and appropriate recycling of this product avoids environmental damage and risks to personal health.



NOTICE

Disposal in domestic waste is prohibited!

In the European Union this symbol may be 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.

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

- Hand over these products at designated, certified collection points only.
- 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. Further recycling information at <http://www.wilo-recycling.com>.

Subject to change without prior notice!

11.5 Batteries/rechargeable batteries

Batteries and rechargeable batteries must not be disposed of with domestic waste and they must be removed before product disposal. End consumers are legally obliged to return all used batteries and rechargeable batteries. For this purpose, you can return used batteries and rechargeable batteries free of charge at municipal collection points or specialist retailers.



NOTICE

Disposal in domestic waste is prohibited!

Batteries and rechargeable batteries affected are marked with this symbol. The identifier for the heavy metal they contain is displayed beneath the graphic:

- **Hg** (mercury)
- **Pb** (lead)
- **Cd** (cadmium)

11.6 Diesel motor

As a result of the design, the diesel motor contains motor oil and diesel fuel. These operating fluids are harmful to the environment and must not be released into the soil or waters. All information necessary for disposal can be found in the motor instructions. If the disposal information is missing or incomplete, contact the motor manufacturer's customer service.





Pioneering for You



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