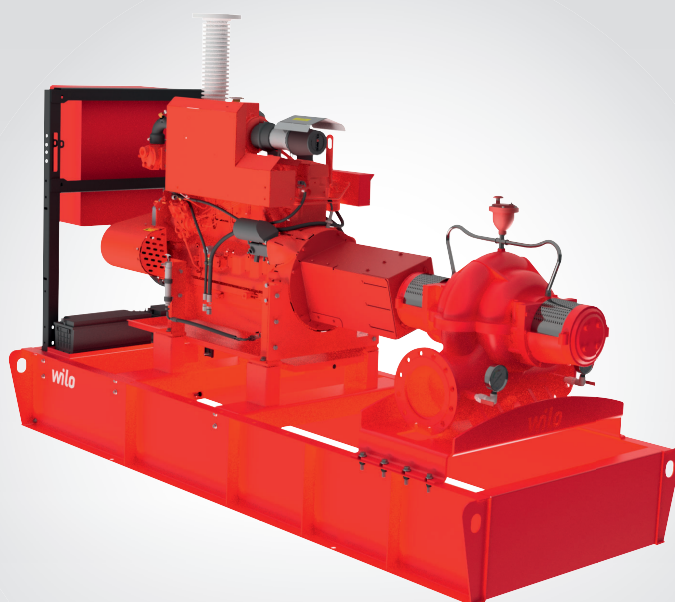


## Wilo-FireSet



en Installation and operating instructions

Fig. 1:

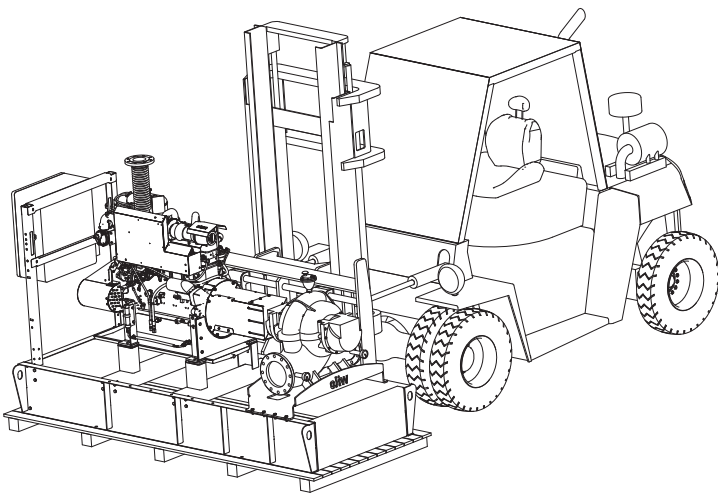


Fig. 1a:

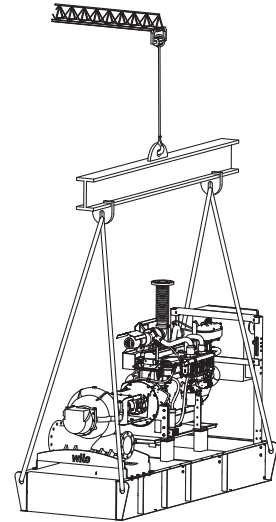


Fig. 1b:

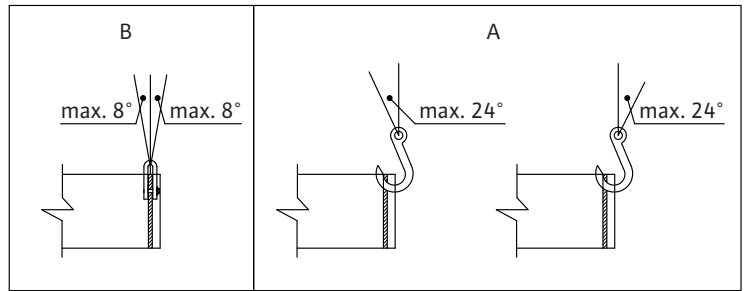
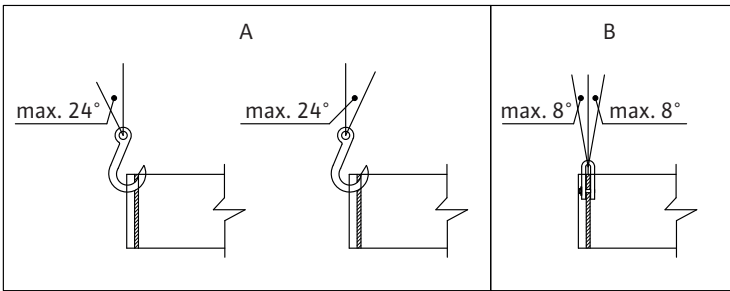


Fig. 2:

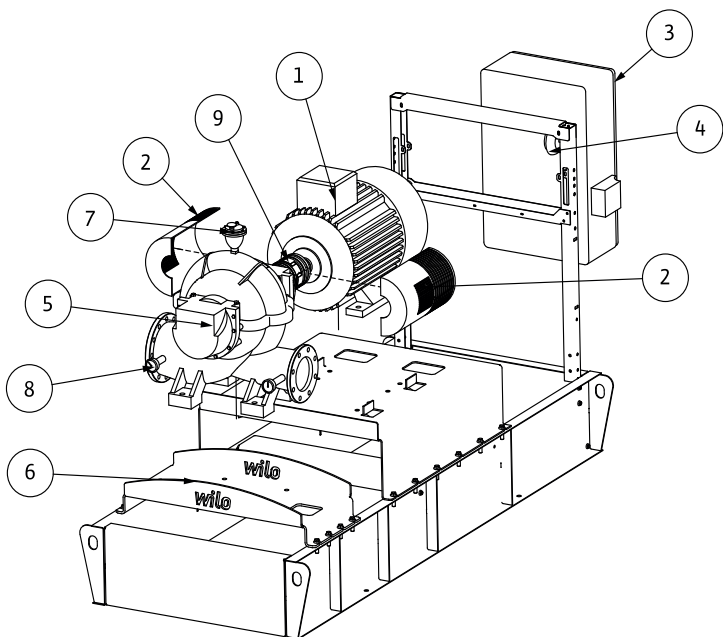


Fig. 2a:

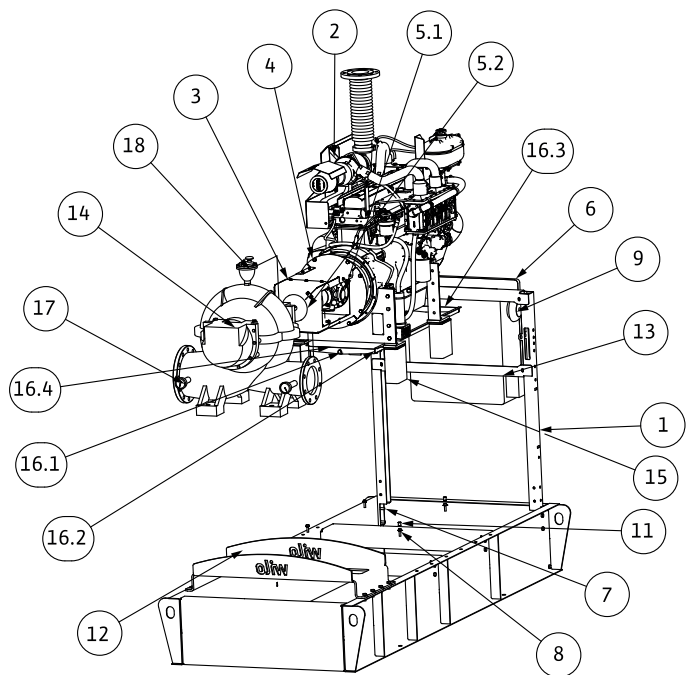


Fig. 3:

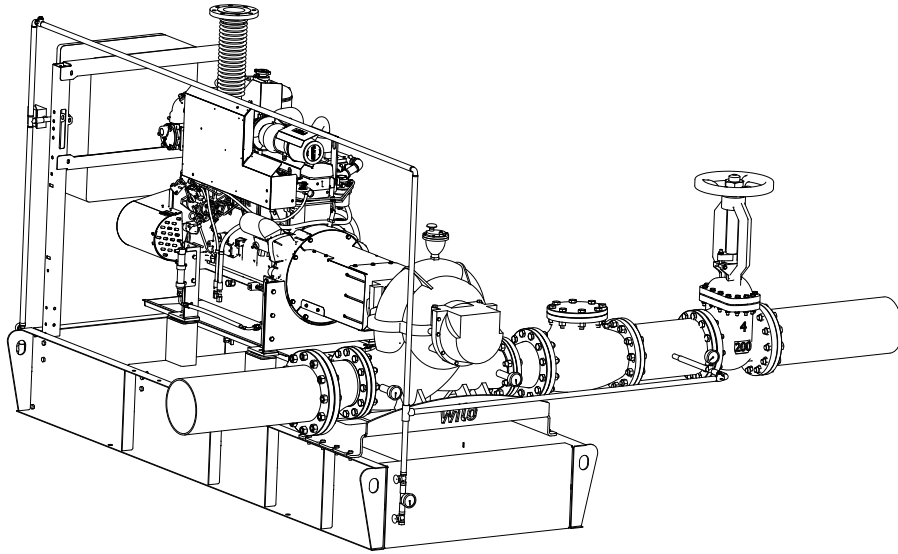


Fig. 4:

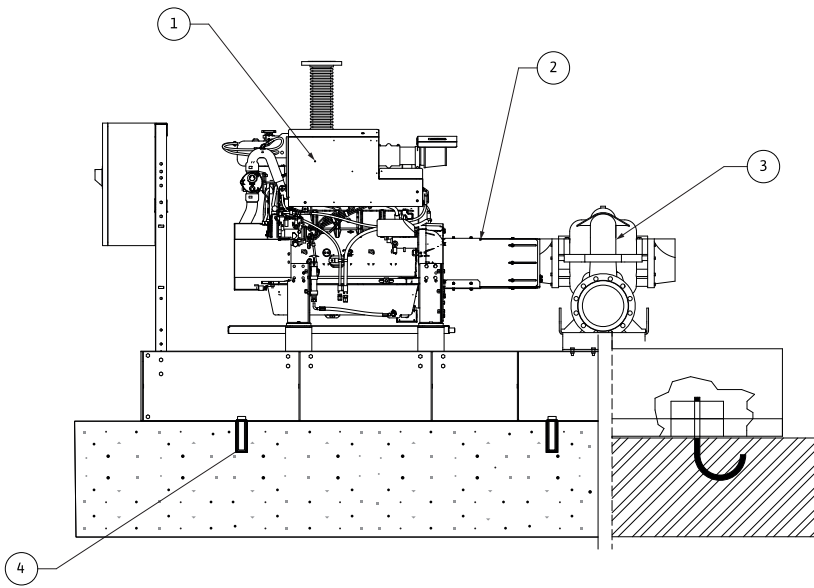


Fig. 4a:

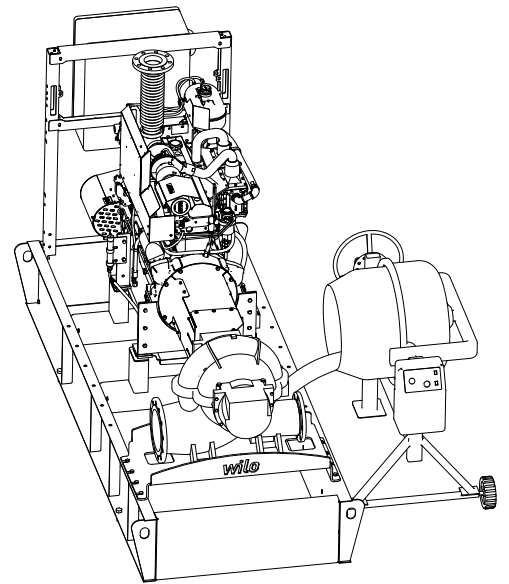


Fig. 4b:

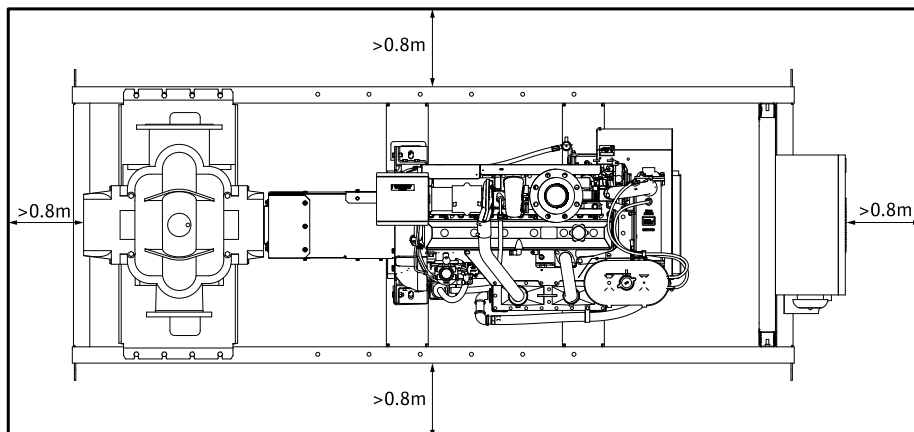


Fig. 5:

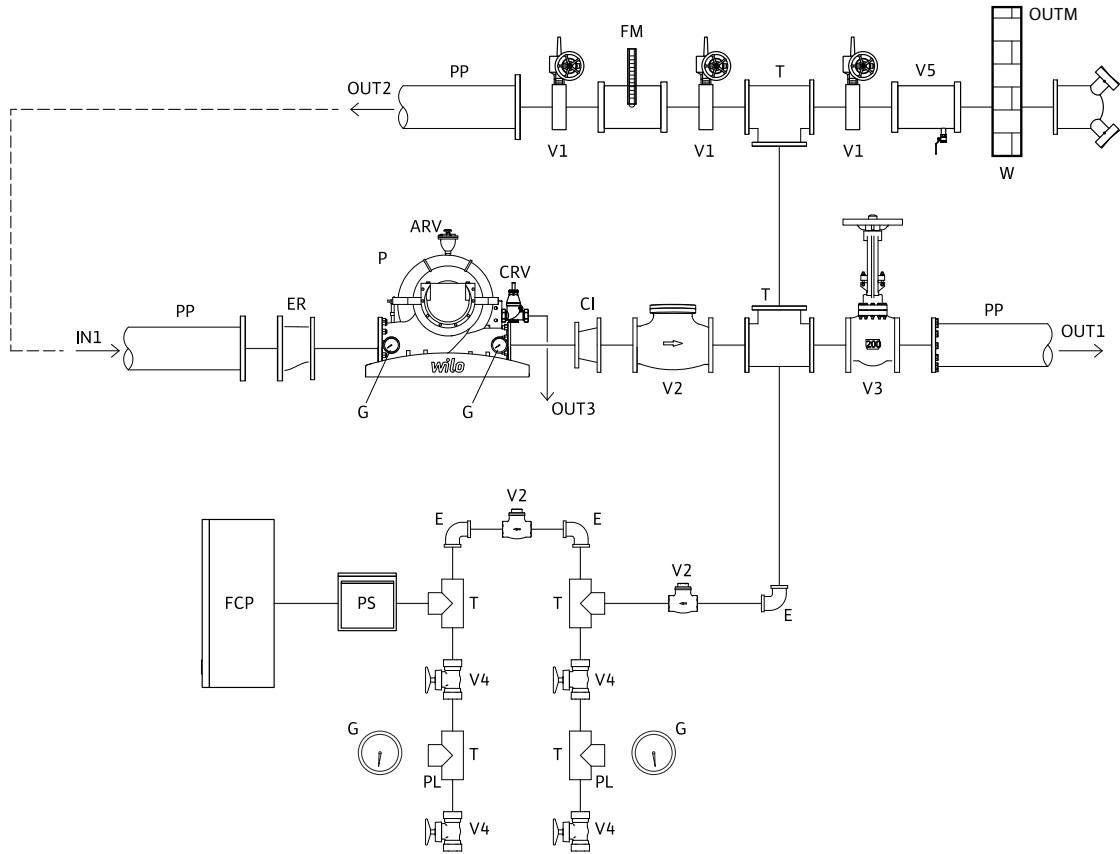


Fig. 5a:

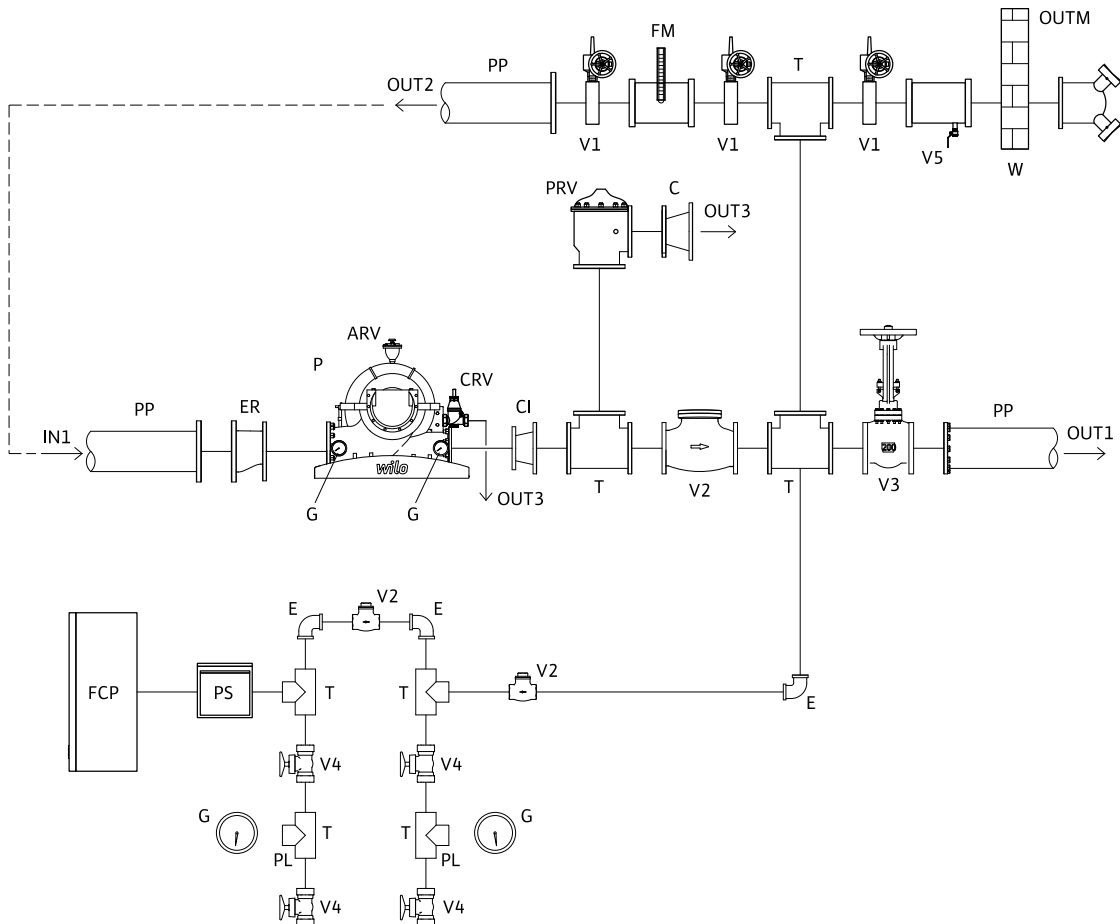
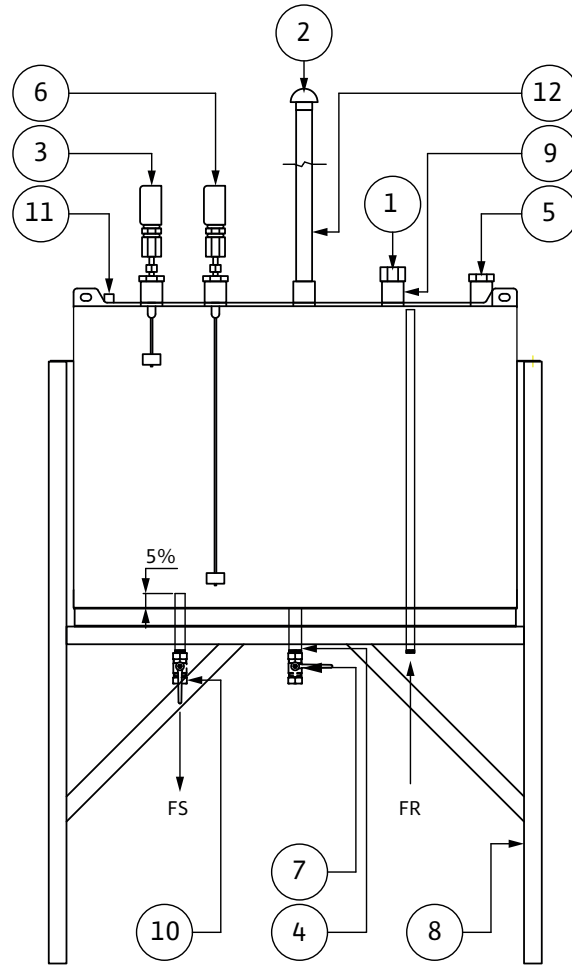


Fig. 6:



### Captions

<b>Fig. 1</b>	<b>Transport (example 1)</b>
<b>Fig. 1a</b>	<b>Transport (example 2)</b>

<b>Fig. 1b</b>	<b>Transport (example 3)</b>
<b>A</b>	<b>With hook</b>
<b>B</b>	<b>With shackle</b>

<b>Fig. 2</b>	<b>Pressure-boosting system (Electric)</b>
<b>1</b>	<b>Electric motor</b>
<b>2</b>	<b>Coupling guard</b>
<b>3</b>	<b>Switchgear</b>
<b>4</b>	<b>Switchgear</b>
<b>5</b>	<b>Wilo-SCP FF split case pump</b>
<b>6O</b>	<b>Base frame</b>
<b>7</b>	<b>Air vent valve</b>
<b>8</b>	<b>Pressure gauge</b>
<b>9</b>	<b>Coupling</b>

<b>Fig. 2a</b>	<b>Pressure-boosting system (Diesel)</b>
<b>1</b>	<b>Base frame components/parts</b>
<b>2</b>	<b>Diesel motor</b>
<b>3</b>	<b>Coupling guard</b>
<b>4</b>	<b>Coupling guard</b>
<b>5.1</b>	<b>Cardan joint</b>
<b>5.2</b>	<b>Cardan joint</b>
<b>6</b>	<b>Switchgear</b>
<b>7</b>	<b>Base frame components/parts</b>
<b>8</b>	<b>Base frame components/parts</b>
<b>9</b>	<b>Fuel tank</b>
<b>11</b>	<b>Base frame components/parts</b>
<b>12</b>	<b>Base frame components/parts</b>
<b>13</b>	<b>Base frame components/parts</b>
<b>14</b>	<b>Wilo-SCP FF split case pump</b>
<b>15</b>	<b>Base frame components/parts</b>
<b>16.1</b>	<b>Base frame components/parts</b>
<b>16.2</b>	<b>Base frame components/parts</b>
<b>16.3</b>	<b>Base frame components/parts</b>
<b>16.4</b>	<b>Base frame components/parts</b>
<b>17</b>	<b>Pressure gauge</b>
<b>18</b>	<b>Air vent valve</b>

<b>Fig.3</b>	<b>Installation</b>
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<b>Fig. 4</b>	<b>Anchoring on the floor 1</b>
<b>1</b>	<b>Motor</b>
<b>2</b>	<b>Flexible coupling</b>
<b>3</b>	<b>Pump</b>
<b>4</b>	<b>Foundation bolt</b>
<b>Fig. 4a</b>	<b>Anchoring on the floor 2</b>
<b>Fig. 4b</b>	<b>Installation drawing</b>

<b>Fig. 5</b>	<b>Hydraulic diagram (Electric)</b>
<b>ARV</b>	<b>Air vent valve</b>
<b>CI</b>	<b>Concentric increaser</b>
<b>CRV</b>	<b>Circulation relief valve</b>
<b>E</b>	<b>Elbow</b>
<b>ER</b>	<b>Eccentric reducer</b>
<b>FCP</b>	<b>Fire pump switchgear</b>

<b>FM</b>	<b>Flow meter</b>
<b>G</b>	<b>Gauge</b>
<b>IN1</b>	<b>From water supply</b>
<b>OUT1</b>	<b>To system</b>
<b>OUT2</b>	<b>To water supply</b>
<b>OUT3</b>	<b>To waste</b>
<b>OUTM</b>	<b>Outside distributor connection</b>
<b>P</b>	<b>Pump</b>
<b>PL</b>	<b>Plug 1/4"</b>
<b>PP</b>	<b>Pipe</b>
<b>PS</b>	<b>Pressure sensor</b>
<b>T</b>	<b>T-connector</b>
<b>V1</b>	<b>Shutting gate</b>
<b>V2</b>	<b>Non-return valve</b>
<b>V3</b>	<b>Gate valve</b>
<b>V4</b>	<b>Ball valve</b>
<b>V5</b>	<b>Drain valve</b>
<b>W</b>	<b>Wall</b>

<b>Fig. 5a</b>	<b>Hydraulic diagram (Diesel)</b>
<b>ARV</b>	<b>Air vent valve</b>
<b>C</b>	<b>Cone</b>
<b>CI</b>	<b>Concentric increaser</b>
<b>CRV</b>	<b>Circulation relief valve</b>
<b>E</b>	<b>Elbow</b>
<b>ER</b>	<b>Eccentric reducer</b>
<b>FM</b>	<b>Flow meter</b>
<b>FCP</b>	<b>Fire pump switchgear</b>
<b>G</b>	<b>Gauge</b>
<b>IN1</b>	<b>From water supply</b>
<b>OUT1</b>	<b>To system</b>
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<b>OUTM</b>	<b>Outside distributor connection</b>
<b>P</b>	<b>Pump</b>
<b>PL</b>	<b>Plug 1/4"</b>
<b>PP</b>	<b>Pipe</b>
<b>PRV</b>	<b>Pressure Relief Valve</b>
<b>PS</b>	<b>Pressure sensor</b>
<b>T</b>	<b>T-connector</b>
<b>V1</b>	<b>Shutting gate</b>
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<b>V4</b>	<b>Ball valve</b>
<b>V5</b>	<b>Drain valve</b>
<b>W</b>	<b>Wall</b>

<b>Fig. 6</b>	<b>Fuel tank</b>
<b>1</b>	<b>2" NPT fuel cap</b>
<b>2</b>	<b>2" screwed tank vent</b>
<b>3</b>	<b>High fuel gauge</b>
<b>4</b>	<b>1" NPT drain plug</b>
<b>5</b>	<b>2" NPT pipe plug</b>
<b>6</b>	<b>Low fuel gauge</b>
<b>7</b>	<b>1" NPT valve</b>
<b>8</b>	<b>Fuel tank frame</b>
<b>9</b>	<b>2" NPT fuel fill pipe</b>
<b>10</b>	<b>3/4" NPT valve</b>
<b>11</b>	<b>1/2" NPT fuel fill</b>
<b>12</b>	<b>Piping for vent</b>
<b>FS</b>	<b>Fuel supply</b>
<b>FR</b>	<b>Fuel return</b>

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## 1 General

### About this document

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

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

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

### EC-Declaration of conformity:

A copy of the EC-Declaration of conformity is an integral part of these installation and operating instructions.

If a technical modification is made on the designs named there without our agreement or the declarations made in the installation and operating instructions on product/personnel safety are not observed, this declaration loses its validity.

## 2 Safety

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

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

### 2.1 Symbols and signal words in the operating instructions

#### Symbols:



General danger symbol



Danger due to electrical voltage



Danger due to suspended loads



Danger due to inflammable materials



Risk of electrification



Risk of poisoning



Danger due to hot surfaces



Danger due to hot products



Risk of cuts



Risk of fall



Risk of irritation



Risk of pollution



Risk of explosion



General ban symbol



No access for unauthorized persons



Do not touch live parts



Smoking prohibited



Open fire prohibited



NOTICE

#### Signal words:

#### DANGER!

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

#### WARNING!

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

#### CAUTION!

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



**NOTICE:**

Useful information on handling the product. It draws attention to possible problems. Information that appears directly on the product, such as

- Rotation/direction of flow symbol,
  - Identifiers for connections,
  - Rating plate,
  - Warning stickers,
- must be strictly complied with and kept in a fully legible condition.

**2.2 Personnel qualifications**

The installation, operating, and maintenance personnel must have the appropriate qualifications for this work. Area of responsibility, terms of reference and monitoring of the personnel are to be ensured by the operator. If the personnel are not in possession of the necessary knowledge, they are to be trained and instructed. This can be carried out, if necessary, by the product manufacturer at the operator's request.

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

Non-observance of the safety instructions can result in risk of injury to persons and damage to the environment and the product/unit.

Non-observance of the safety instructions lead to the loss of any claims to damages.

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

- Danger to persons from electrical, mechanical, and bacteriological influences,
- Damage to the environment due to leakage of hazardous materials,
- Material damage,
- Failure of important product/unit functions,
- Failure of required maintenance and repair procedures.

**2.4 Safety consciousness on the job**

The safety instructions included in these installation and operating instructions, the existing national regulations for accident prevention, together with any operator's internal working, operating, and safety regulations are to be complied with.

**2.5 Safety instructions for the operator**

This device is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the device.

- If hot or cold components on the product/the unit lead to hazards, measures must be taken by the customer to prevent them from being touched.
- Guards for moving components (such as the coupling) must not be removed while the product is in operation.
- Leakages (for example, from the shaft seals) of hazardous fluids (which are explosive, toxic, or hot) must be led away so that no danger to persons or to the environment arises. National statutory provisions are to be complied with.
- Highly flammable materials should always be kept a safe distance from the product.
- Danger from electrical current must be eliminated. Local directives or general directives [for example, IEC, VDE and so on] and instructions from local energy supply companies must be adhered to.
- Danger from unintended start must be taken into account every time during installation, commissioning, normal use, and maintenance.

**2.6 Safety instructions for installation and maintenance work**

The operator must ensure that all installation and maintenance work is carried out by authorized and qualified personnel, who have sufficiently familiarized themselves with the installation and operating instructions by studying them in detail. Work on the product/unit must only be carried out when at a standstill. The procedure described in the installation and operating instructions for shutting down the product/unit must be strictly observed. Immediately upon completing work, all safety and protective devices must be put back in position and/or recommissioned. Danger from unintended start must be taken into account every time.

**2.7 Unauthorized modification and manufacture of spare parts**

Unauthorized modification and manufacture of spare parts impair the safety of the product/personnel and void the manufacturer's declarations regarding safety.

Modifications to the product are only permissible following consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer ensure safety. If other parts are used, the manufacturer is no longer liable for any consequences which arise from this.

**2.8 Improper use**

The operational reliability of the supplied product is only guaranteed for intended use in accordance with section 4 of the installation and operating instructions. The limit values must on no account fall below or exceed those values specified in the catalogue/data sheet.

### 3 Transport and temporary storage

The pump set is supplied on a wooden pallet. Protect it from bad weather conditions during transport and storage even if it is protected from moisture and dust by a plastic bag.

Transport and unload the equipment by authorized persons and load devices.

The equipment must be stored indoors and for maximum six months with proper covering. After this period, especially for Diesel motor models, the equipment must be retested.

(See example on Fig.1, 1a, 1b)

Before operation, observe the specific instructions in the operating manuals of the load/unload devices.



**WARNING! Risk of personal injury!**

Consider the static stability of the unit. Qualified personnel must carry out the handling of the material, using only suitable and authorized equipment.

Lifting straps must be fastened to the ring bolts placed on the base frame.

The pump or the motor do not fit with the handling of the system and must not be used to fix loads in transit.



**CAUTION! Risk of product damages!**

Handling by using discharge manifold can cause leakages!

When the product is delivered, check it for any damage in transit. In case of damage, take any necessary measures from the delivery company (forwarding agent).



**CAUTION! Risk of product damages!**

If the product shall be installed later on, store it in a dry place. Protect it from impacts and any outside influences (moisture, frost, and so on...). Handle the product with care.

#### 3.1 Residual risk during transport and storage



**WARNING! Risk of cuts!**

Sharp edges or any unprotected threaded parts entail the risk of being cut.

Take necessary cautions to avoid injuries and use protective equipment (wear specific gloves).



**WARNING! Risk of personal injury!**

Do not stand or put members under the suspended parts during handling and installation. Use clothing dedicated to protection against accidents (wear helmet and safety shoes).



**WARNING! Risk of impact!**

Be careful of prominent parts and parts at head level. Use clothing dedicated to protection against accidents.



**DANGER! Risk of fall!**

Prohibit access to the technical room, where pumps are installed.



**WARNING! Risk of irritation!**

During handling, avoid spillage of battery acid solution, which could cause irritations or material damage. Use special protection to avoid contact.



**CAUTION! Risk of environmental pollution!**

Avoid oil leakage from the motor or diesel fuel from the tank. During handling, keep them flat. Use suitable protection and take necessary measures to prevent pollution of oil, water, etc.

### 4 Intended use

The fire-extinguishing system is designed for fixed installation and professional use. It is used when an increase or maintaining under pressure of the fire-extinguishing system is necessary. The fire-extinguishing system must be installed in a special room, which is protected from frost and rain, fireproof and sufficiently ventilated, with enough space provided around the pumps for maintenance work. The room must be in accordance with the NFPA20 requirements. Airflow for ventilation and for the cooling of motors, more specifically the diesel motor – if present – must be sufficient.

### 5 Product data

#### 5.1 Type key

Example: Wilo-FireSet- 125-360-300/137D

Wilo-FireSet    Name of the series

- **FireSet-**: Name of the fire-extinguishing system assembled according to NFPA20
- 125-360 Type of the pump Wilo SCPFF UL listed – FM-approved
- 300: Nominal impeller diameter [mm] – Actual diameter: Refer to the rating plate
- 137 Nominal power of the drive [kW]
- E – D: Drive
  - E: Electric motor
  - D: Diesel motor

Technical data	
Maximum operating pressure	16 bar
Maximum ambient temperature	5 to +25°C (10 to 25°C if diesel pump is installed)
Maximum water temperature	30°C
Supply voltage	3x400V +/- 10% (1x230V +/- 10%, for diesel pump switchgear)
Frequency	50 Hz
Maximum relative humidity	50% with T.max 40°C (*)
Maximum altitude for installation (standard product)	Diesel: 91 m - Electric: 300 m
Protection class of switchgear	Refer to the rating plate
Protection class electric motor	Refer to the rating plate
Insulation class electric motor	Refer to the rating plate
Efficiency class electric motor	Refer to the rating plate

(\*) Ask Wilo and check the specific graphs and tables in the catalogues and maintenance manuals for the details of class variations for electric motors and diesel motors regarding different temperatures, altitudes, atmospheric pressure, fuel temperature, and viscosity compared to standard test conditions.

### 5.2 Scope of delivery

- Fire-extinguishing system (pump, drive, coupling, base frame, switchgear)
- Automatic air vent valve
- Suction and discharge pressure gauges
- Installation and operating instructions for fire extinguishing system.
- Installation and operating instructions for pumps
- Installation and operating instructions for switchgears (one manual per switchgear type)
- Installation and operating instructions and maintenance instructions of the drive.

### 5.3 Accessories

- Exhaust kit for diesel engine
- Flow meter
- Eccentric reducer
- Concentric increaser
- Pressure relief valve
- Circulation relief valve.
- Independent fuel tank for the diesel motor with accessories;

VALVE DETAILS					
Sr. No.	Description	Pressure rating	Size	Make	Model
1	Air vent valve	300 PSI	1/2" (15 mm)	CLA VAL	CLA-VAL 3450 -AR 116.3 - Air vent valve DI - FM-approved
2	Circulation relief valve	20-200 PSI	1/2" (15 mm)	CLA VAL	CLA-VAL 55L-60
3	Circulation relief valve	20-200 PSI	3/4" (20 mm)	CLA VAL	MOC: bronze, body stainless steel Trim Pressure range: adjustable range 20-200 PSI
4	Circulation relief valve	100-300 PSI	3/4" (20 mm)	CLA VAL	CLA-VAL 55L-60 MOC: bronze, body Stainless Steel Trim Pressure range: adjustable range 100-300 PSI
5	Pressure relief valve	20-200 PSI	3" (75 mm)	CLA VAL	Model: 2050B-4KG1
6	Pressure relief valve	20-200 PSI	4" (100 mm)	CLA VAL	MOC: ductile iron
7	Pressure relief valve	20-200 PSI	6" (150 mm)	CLA VAL	Body with SST trim, copper tube, and fittings, bronze pilot
8	Pressure relief valve	20-200 PSI	8" (150 mm)	CLA VAL	Pressure range 20-200 PSI; Flange: DN 150 or DN 300 Pattern: angle pattern red epoxy coated

The installer is responsible for the assembly of the equipment supplied and for completion of the system in compliance with the requirements of NFPA20 and other applicable standards with regard to fire-extinguishing systems, as well as for integration of our supply with all other necessary components (circulation piping, flow rate metering circuits with meter, etc.).

See the specific instructions provided in the relevant Installation and operating instructions and/or the indications provided on the items themselves for details of how to assemble, set, and adjust the previously listed accessories or other particular accessories requested at the order stage and supplied with the standard pumping unit.

## 6 Description and function

### 6.1 General description

The Wilo-FireSet (Fire-extinguishing system) is built in several variants and models to satisfy customer requirements using the following main components:

- Base frame
- Wilo-SCP FF pump, coupled to an electrical motor or diesel motor
- Coupling for electric motor
- Cardan joint if diesel motor
- Coupling guard
- Electronic switchgear
- Batteries in the case of a diesel motor
- Cabling between motor and switchgear
- Air vent valve
- Pressure gauge discharge
- Pressure gauge suction

### 6.2 Description of the product

#### 6.2.1 Wilo-FireSet – Electric – See Fig. 2 – Position:

1.	Electric motor
2.	Coupling guard
3-4	Switchgear
5.	Wilo-SCP FF split case pump
6.	Base frame
7.	Air vent valve
8.	Pressure gauge
9.	Coupling

#### 6.2.2 Wilo-FireSet – Diesel – See Fig. 2a – Position:

1-7-8-10-11- 12-13-15-16	Base frame components/parts
2.	Diesel motor
3-4	Coupling guard
5.	Cardan joint
6.	Switchgear
14.	Wilo-SCP FF split case pump
17.	Pressure gauge
18.	Air vent valve

#### 6.2.3 Switchgear

- Ensure complete automatic operations of the pump
- Waterproof, protection class IP54.

### 6.3 Function of the product

The operational logic for the Wilo-FireSet unit is based on starting of the pump when the pressure drops down and reaches the set level. The pump stop is possible manually or automatically, according the relative standard. The pressure sensor to start the fire pump is normally located in the lower left-hand side of fire pump switchgear and must be connected to the FF system (see Fig. 3) In the case of a jockey pump, it is the first to start when the pressure drops and maintains the fire-extinguishing system under pressure. Start and stop control is set via the suitably calibrated pressure switch.

To set pressure switches/sensor – usual setting values:

- Fire Pump Stop Point = Fire Pump Shut Off Pressure + minimum Static Suction Pressure
- Jockey Pump Stop Point = Fire Pump Stop Point
- Jockey Pump Start Point = Jockey Pump Stop Point – 10 psi (0,69 bar)
- Fire Pump Start Point = Jockey Pump Start Point – 5 psi

## 7 Installation and electrical connection



### DANGER! Risk of electric shock!

The personnel dedicated to the connection of electrical equipment and motors must be skilled for such work. They must make the connection according to the wiring diagrams supplied, in accordance with regulations and laws in force. In addition, they must ensure that they have shut down power before performing any operation which provides the possible contact with the electrical parts. Check earth continuity.

### 7.1 Installation

Install the Wilo-FireSet in an easily accessible pump room, ventilated and protected from rain and frost.

Ensure that the Wilo-FireSet can pass through the room's door.

For maintenance works, a sufficient place must be provided. The unit must be easily accessible. The installation place has to be horizontal and flat. It must be robust enough to support the system's weight.

The pump room must be exclusively dedicated to the fire equipment, directly accessible from outside, and must have a fire resistance according to NFPA20 standards.

The location of and access to one or more fire pump rooms must be designed with the local fire department.

Fire pumps that are outdoors must be at least 50 ft (15.3 m) away from any buildings and other fire exposures.

Protect fire pump buildings or rooms enclosing diesel motor pump drives and day tanks with an automatic sprinkler system installed in accordance with NFPA 13 as an Extra Hazard Group 2 occupancy.

Protect fire pump buildings or rooms enclosing electric fire pump drives with an automatic sprinkler system installed in accordance with NFPA 13 as an Ordinary Hazard Group 1 occupancy.

## 7.2 Safety recommendations



**Avoid access to the room enclosing FireSet for unauthorised persons!**



**WARNING! Risk of cuts!**

Do not remove the protection on any rotating parts, belts, hot surfaces, etc. Never leave tools or disassembled parts of the FireSet on it or around it.



**WARNING! Risk of fatal injury!**

Do not remove the protection of live parts. Prevent each possibility to operate elements that isolate the installation or subassemblies on which work must be performed.



**DANGER! Risk of fatal injury!**

Take all precautions to avoid a risk of electrocution. Check earth connection, presence and continuity, and if a device for protection against indirect contact is installed (differential switch). If necessary, operate the unit by using required equipment (insulating gloves, isolating base-plate).

Never leave the electrical switchgear or the terminal box of electrical motor opened. Check if there is any possibility of contact with live parts. Check if electrical connections and auxiliary power are correctly connected. Check the label data of electrical switchgears, in particular tension and availability of an adapted power supply.



**WARNING! Risk of fire or flash fire!**

The charging diesel pump batteries may produce potentially explosive gas; Avoid flames and sparkles.

Never leave flammable liquids or rags dipped in acid around the fire-extinguishing system or electrical equipment.



**DANGER! Risk of fatal injury!**

Ensure the correct ventilation of the pump room. Check that the exhaust of the diesel motor is free and the tube allows exhaust gases to remove outside the room safely, away from doors, windows, and vents.



**WARNING! Risk of burns!**

Check that exhausting pipes are correctly supported, equipped with anti-vibration couplings/flexible vibration-damping sleeves, and protected against accidental contacts.



**CAUTION! Risk of damage of the installation (System)!**

Check if suction and discharge pipes of the pump are supported correctly to avoid weight load on the pump.



**CAUTION! Risk of product damage!**

Check that the fluid level of the diesel motor (oil/water) is correct and that the plugs of the water and oil circuit are properly fastened.

For internal combustion motors with heat exchanger water/water, check that the valve of the cooling circuit is in the correct position OPEN.

Check oil and diesel fuel, then check if there are no fluid leakages.



**CAUTION! Risk of product damage!**

For the heating of the oil/water of the diesel motor, an immersion or contact resistor supplied with 230 V/50 Hz may be installed.

## 7.3 Checking and environment

- Check electrical pumps or diesel pumps as mentioned in the Installation and operating instructions for both kind of pumps.
- Provide sufficient space (at least 0.8 m around the FireSet Fig. 4b) for the maintenance of pump, motor, switchgear, and installed accessories.
- The installation (system) must be evaluated to ensure that the net positive suction head available (NPSHA) exceeds the net positive suction head required (NPSHR), as stated by the pump performance curve.
- The foundation for the Wilo-FireSet must be rigid enough to absorb any vibration and stress encountered during pump operation. A raised foundation of concrete is preferable for most floor-mounted pumps. The raised foundation ensures a satisfactory base, protects against flooding, simplifies moisture drainage, and facilitates keeping the area clean. (Fig. 4)
- Bolt the Wilo-FireSet firmly to the foundation, whether it is a raised concrete base, steel work wall, or structural member. Position the mounting bolts or lag screws accurately (Fig. 4)
- Prepare a surface with reinforced concrete (RCK400) for installation of the fire-extinguishing system. It has to be perfectly flat and horizontal as shown in the book project, complete with bolts, which have the diameter adapted to the weight of the Wilo-FireSet. (See Fig. 4 -4a)
- Connect the pipes of different circuits without mechanical stress, which can damage the equipment or the pipes themselves

- Check the fluid levels of the diesel pump unit (engine oil, fuel, water for cooling, battery fluid, etc.). If necessary, restore the levels in accordance with Installation and operating instructions of the diesel motor.



**CAUTION! Risk of contamination and damage to health!**

**Protect fire pump buildings or rooms with diesel motor pump drives and day fuel tanks (water-proof), against the risk of contamination of the subsoil because of possible diesel or engine oil losses.**

## 7.4 Electrical connection

### 7.4.1 General



**DANGER! Risk of fatal injury!**

**Have the electrical connection carried out by authorized and trained personnel in accordance with the applicable standards and laws. Power supply must be available at any times.**

- Check the type of power supply and the available voltage, and compare them with the data of pumps, motors, electrical switchgears, and other devices. Check earth connection before any intervention.
- For connection to power supply networks use one-piece cables without joints, exclusively dedicated to the FireSet unit for the fire department, connected before the main power supply switch of the buildings.
- Use cables with a suitable diameter whose characteristics and dimensions are in compliance with standards in force.
- To protect the cables from direct exposure in case of fire, they must pass through the pipes buried outside the building or through parts of the building where the fire hazard is negligible. If it is not possible, they must also have an extra direct protection with at least 180-minutes fire resistance.
- Make connections as shown and described in the Installation and operating instructions and in the wiring diagrams supplied with the switchgears.
- The main electronic switchgear must be located in a fire-protected compartment, exclusively used for power supply.
- Electrical connections in the main power distribution box must be made to ensure that electricity remains supplied to the pump switchgear even when power is cut to other utilities.
- Connect batteries for diesel pumps before commissioning.
- Check the tightening of all electrical connections.

### 7.4.2 Hydraulic connection

Refer to Fig. 5 for FireSet Electric and Fig. 5a for FireSet Diesel.

Take in account the important information in the Installation and operating instructions of the SCP FF pump provided with the FireSet documentation.

#### SUCTION PIPE:

Keep the suction line short, but not less than ten pipe diameters in length, and direct with as few elbows and fittings as possible to keep head loss arising from friction at a minimum. However, lay the suction line in an uninterrupted minimum length of ten pipe diameters to the pump suction flange. Lay a horizontal suction line with a gradual rise to the pump, and pass under any interfering piping.

Design the suction pipe diameter with at least the same diameter as the suction nozzle on the pump, and preferably larger. The use of a smaller diameter pipe results in loss of delivery head due to friction. All joints must be tight to maintain prime on the pump.

#### REDUCERS:

Install eccentric reducers directly on the suction nozzle, with the taper at the bottom to prevent the formation of air pockets. Never use straight cone reducers in a horizontal suction line because of the air pocket formed at the leg of the reducer and the pipe. Refer to Fig. 5-5a.

#### DISCHARGE PIPE:

Dimension the discharge pipe as short and direct as possible, with only few elbows and fittings to reduce head loss arising from friction.

#### PIPE:

Select the discharge pipe diameter to be equal to or larger than the diameter of the discharge nozzle. For more details, refer to the table below.

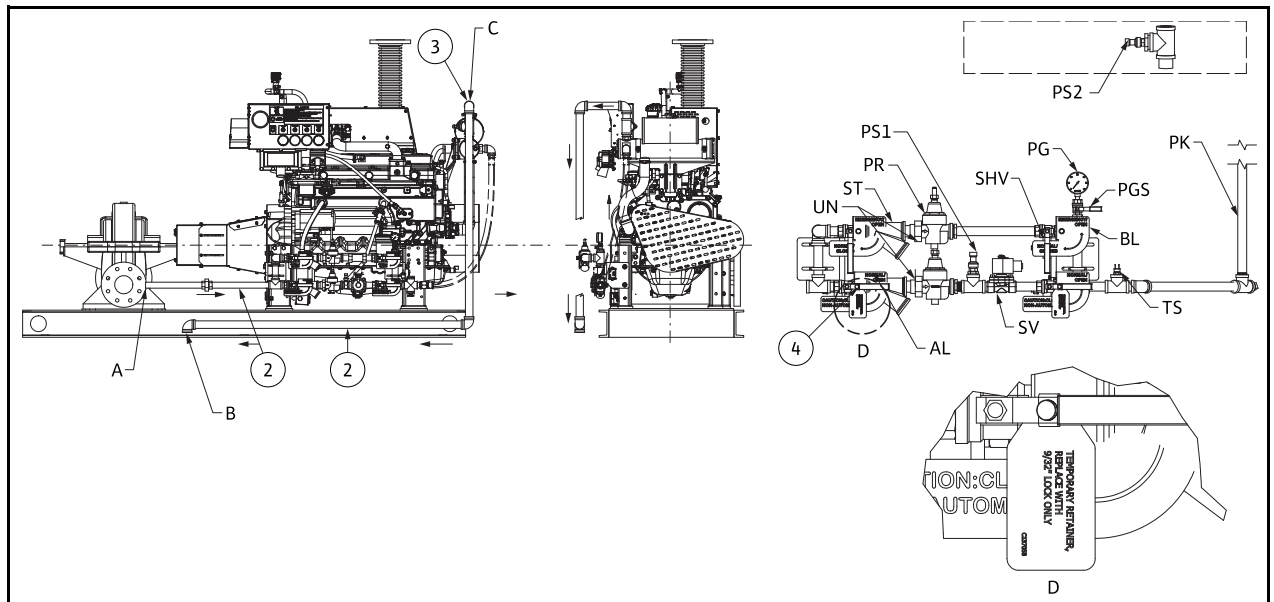
#### DISCHARGE VALVES:

Install a non-return valve and a gate valve in the discharge pipe. Install the non-return valve between the gate valve and the pump. If an increaser is used in the discharge pipe, install the increaser between the pump nozzle and the non-return valve. If the drive fails, the non-return valve protects the pump against a reverse flow of the fluid.

Summary of centrifugal fire pump data (U.S. Customary)								
Pump rating (gpm)	Minimum pipe sizes (Nominal) (in.)							
	Suction	Discharge	Relief valve	Relief valve discharge	Meter device	Number of hose valves	Size of hose valve	Hose header supply
25	1	1	3/4	1	1 1/4	1	1 1/2	1
50	1 1/2	1 1/4	1 1/4	1 1/2	2	1	1 1/2	1 1/2
100	2	2	1 1/2	2	2 1/2	1	2 1/2	2 1/2
150	2 1/2	2 1/2	2	2 1/2	3	1	2 1/2	2 1/2
200	3	3	2	2 1/2	3	1	2 1/2	2 1/2
250	3 1/2	3	2	2 1/2	3 1/2	1	2 1/2	3
300	4	4	2 1/2	3 1/2	3 1/2	1	2 1/2	3
400	4	4	3	4	4	2	2 1/2	4
450	5	5	3	4	4	2	2 1/2	4
500	5	5	3	5	5	2	2 1/2	4
750	6	6	4	5	5	3	2 1/2	6
1000	8	6	4	6	6	4	2 1/2	6
1250	8	8	6	6	6	6	2 1/2	8
1500	8	8	6	8	8	6	2 1/2	8
2000	10	10	6	8	8	6	2 1/2	8
2500	10	10	6	8	8	8	2 1/2	10
3000	12	12	8	8	8	12	2 1/2	10
3500	12	12	8	10	10	12	2 1/2	12
4000	14	12	8	10	10	16	2 1/2	12
4500	16	14	8	10	10	16	2 1/2	12
5000	16	14	8	10	10	20	2 1/2	12

**7.4.3 Cooling loop and combustion exhaust air outlet for diesel motor. Refer to the Installation and operating instructions of the diesel motor.**

**Cooling loop**



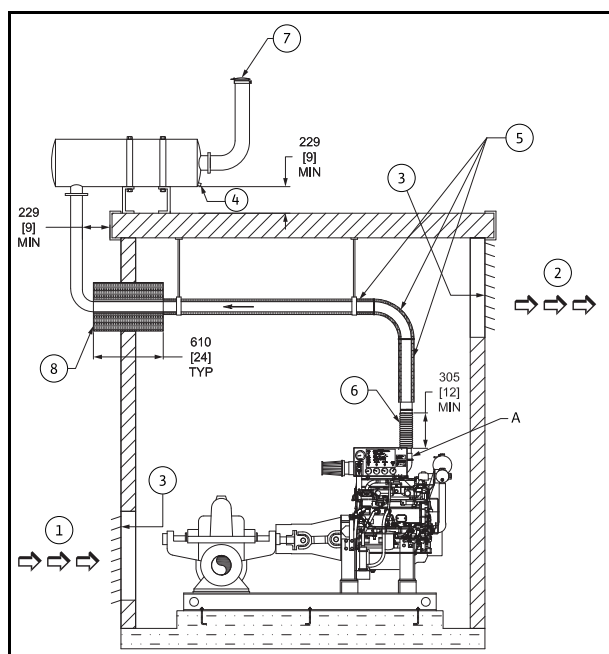
**NOTICE:**

1. Piping arrangement according to NFPA-20.
2. Piping arrangement by other
3. Discharge pipe from heat exchanger outlet is at a minimum one pipe size larger than the inlet pipe to the heat exchangers.

4. Shut-off valves in the automatic flow line are provided with lockable handles for cooling loops tested according to FM requirements. These valves have been provided with a temporary locking pin to keep them in open position. Replace the retainer with a 9/32" lock.  
→ Cooling loop water – direction of flow

Legend	
A	Pump discharge connection
AL	Automatic line indicating plate (QTY 2)
B	Motor cooling water piped to drain
BL	Bypass line indicating plate (QTY 2)
C	Raw water outlet flow
PG	0-60 psi pressure gauge
PGS	Pressure gauge shut-off valve
PK	Piping kit to charge air cleaner or heat exchanger
PR	Pressure regulator (QTY 2)
PS1	Pressure sensor (cooling loop)
PS2	Pressure sensor (heat exchanger outlet)
SHV	Shut-off valve (QTY 4)
ST	WYE strainer (QTY 2)
SV	Solenoid valve (not used with vertical turbine fire pumps)
TS	105°F temperature switch
UN	Union (QTY 2)

### Exhaust air for combustion



Legend	
1	Air supply ventilator
2	Air discharge ventilator
3	Dampers
4	Condensate drain plug
5	Exhaust insulation
6	Flexible exhaust connection
7	Rain cap
8	Wall bushing

#### WARNING:

The backpressure to the motor exhaust considerably influences the power of the motor and its thermal loadings. Excessive backpressure measured at the motor exhaust outlet connection (point "a") decreases power, increases the temperature of the exhaust gas, produces smoke,

increases fuel consumption, sulphurises the internal cooling water (with subsequent damage to the lubricants) and produces serious consequences for other motor components (for example, turbo-charger, etc.).

#### INSTALLATION GUIDELINES:

- (G). Refer to NFPA-20 2016, section 11.5 for additional information. Other piping systems are possible. The diagram shown is for passage through wall, and silencer side in, side out.
- The exhaust piping system and the silencer must be suitable for the use intended, and the exhaust backpressure must not exceed the recommendations of the motor manufacturer. (see warning below)(11.5.2.5)
- The exhaust pipe must not be smaller in diameter than the motor exhaust outlet.
- The exhaust pipe must be covered with a high-temperature insulation or guarded otherwise to protect personnel from injury. (11.5.2.4)
- The system must be supported in such a way that there is no weight on the flexible exhaust connection.
- The exhaust pipe must be positioned in such a way as to prevent the exhaust gases from returning to the pump room
- The Exhaust pipe and the point of passage from the pump room must be constructed or insulated so that it does not cause a fire ignition risk to the structure.
- The exhaust system must terminate outside the structure at a point where hot gases, sparks, or products of combustion are discharged to a safe location.
- The exhaust system terminations must not be directed towards combustible material or structures, or into atmospheres containing flammable gases, flammable vapors, or combustible dust.
- Exhaust pipes must be installed with clearances of at least 9 in. (229 mm) to combustible materials. (11.5.2.6)
- Exhaust pipes passing directly through combustible roofs must be guarded at the point of passage by ventilated metal Wall bushings that extend not less than 91inch. (229 mm) below roof construction and are at least 61inch. (152 mm) larger in diameter than the exhaust pipe. (11.5.2.7)
- Exhaust pipes passing directly through combustible walls or partitions must be guarded at the point of passage by one of the following methods;
  - (1) Metal ventilated thimbles not less than 12 in. (305 mm) larger in diameter than the exhaust pipe.
  - (2) Metal or burned clay thimbles built in brickwork or other approved materials providing not less than 8 in. (203 mm) of insulation between the thimble and construction material.



## 8 Commissioning

For the commissioning of the Wilo-FireSet, contact the closest Wilo service agent or contact the Wilo after-sales call centre.

Only an informed and skilled person must perform the commissioning of the Wilo FireSet.

### 8.1 General check

Before starting the Wilo-FireSet commissioning procedures, check that:

- The specification for installation in the NFPA20 have been applied
- The specification in the pump's Installation and operating instructions have been applied
- The specification in the Switchgear's Installation and operating instructions have been applied
- The wiring was done correctly, particularly the earth connection
- The rigid connections are not exposed to mechanical stress
- There are no faults during visual inspection after filling the system
- Gate valves on pump sides and on the discharge pipe are open
- Fluids levels in the diesel motor are sufficient
- The pump/drive are correctly aligned



**CAUTION! Risk of product damage!**

**Tighten all the supply terminals before commissioning!**



**WARNING! Risk of cuts!**

**Ensure that all protections on any rotating parts, belts, hot surfaces, etc., have not been removed, or have been reinstalled. Never leave tools or disassembled parts of the FireSet on it or around it.**



**WARNING! Risk of fatal injury!**

**Ensure that all protections on any dangerous parts have not been removed, or have been reinstalled. Prevent each possibility to operate element that isolate the installation or subassemblies on which work must be performed.**

If it is necessary to conduct tests during installation, make sure that the pumps are properly filled with water before switching them on.

Before filling the pump unit with water, check the tightness of the components, which could be loosened during transport and handling.

Do not let the FireSet in automatic mode before the fire-extinguishing system is completely assembled according to the standard; for the commissioning of an incomplete fire-extinguishing system no warranty claims will be accepted.

## PROCEDURE FOR COMMISSIONING

- During the automatic mode setting, maintenance program procedures and responsibility of operation in the case of accidental starting must be defined.
- For models with diesel motor, check the correct filling of batteries before operation.
- For inspection of batteries follow the instructions provided by the manufacturer.
- Keep batteries away from flames and sparkles. For safety reasons do not lean above the batteries during operation, installation or removal.
- Check the correct level of fuel in tanks of diesel motors and if necessary add fuel only when the motor is cold.
- Be careful not to spill fuel on motors, on rubber or plastic materials of the system.
- Do not add fuel when the motor is hot.
- Before switching on the electric pump, check the correct motor-pump alignment. Respect operation from the specific Installation and operating instructions delivered with the pumps. Only skilled persons must perform the motor-pump alignment operations.
- Only qualified technicians must perform the installation.

### 8.2 Operation check

#### 8.2.1 Commissioning of main electric pump

- Make sure that all hydraulic, mechanical, and electrical connections indicated in the NFPA 20, in this Installation and operating instructions, in the Installation and operating instructions of the pump, the motor and switchgear are done correctly.
- Ensure that the valves at the suction and the discharge side of the pump are open.
- Ensure that the pump sucks and is filled with water.
- Check that the power supply matches the data indicated on the rating plate and that three-phase power supply is connected.



**CAUTION! Risk of product damage!**

**Make sure that none of the following points exists. Otherwise immediately stop the pump and remove malfunctioning causes before starting it again (also refer to the chapter Faults, causes and remedies):**

- **Rotating parts in contact with fixed parts,**
- **Unusual noises and vibrations,**
- **Loosened bolts,**
- **High temperature on motor housing,**
- **Differences in current at each phase,**
- **Leakages on pump body,**
- **Vibrations, noise, and excess temperatures could be caused by a misalignment of the motor/pump coupling.**

## 8.2.2 Commissioning of main diesel pump

- Make sure that all hydraulic, mechanical, and electrical connections indicated in the NFPA 20, in this Installation and operating instructions, in the Installation and operating instructions of the pump, the motor and switchgears, are done correctly.
- Ensure that valves on the suction and the discharge side of the pump are open.
- Ensure that the pump sucks and is filled with water; drain air by using the tap on the pump housing.
- Check if the supply voltage matches the data indicated on the rating plate and if it is present.
- Ensure that the fuel is compatible with the motor functioning, that the fuel tank is completely filled with fuel (the fuel level inside the tank is displayed on the switchgear).
- Ensure that the pipe connections are done correctly without connection between the tank and the motor.
- Ensure that the electric float switch cable of the tank is connected correctly to the electronic switchgear of the diesel pump.
- Check the oil and coolant level of the motor.
- For motors cooled by a heat exchanger, check the specific operations indicated in the Installation and operating instructions of the motor.
- To top up the level of fluids, use oil and coolant as specified in the Installation and operating instructions of diesel motors in addition to this Installation and operating instructions.



### CAUTION! Risk of product damage!

Ensure that none of the following points exists. Otherwise immediately stop the pump and remove malfunctioning causes before starting it again (also refer to the chapter Faults, causes and remedies:

- Rotating parts in contact with fixed parts,
- Unusual noises and vibrations,
- Loosened bolts,
- High temperature on motor housing,
- Exhaust gas in the pump room,
- Leakage on mechanical seal,
- Vibrations, noise, and excess temperatures could be caused by a misalignment of the motor/pump coupling.

## 9 Maintenance

The Wilo-FireSet is an equipment in the fire-extinguishing system, thus possible modifications and repair that affect its efficiency must be made in such a way that the 'out of order' state is minimized.

If there is more than one pump, disconnect the pumps one at a time by the selection switches of electrical switchgears and the gate valves provided.



Prohibit access to the pump room to unauthorized persons.



**WARNING! Risk of personal injury!**

People must always wear personal protective devices. Maintenance must ONLY be carried out by qualified personnel. If there are missing instructions, always contact the supplier or expert staff.

Never work alone on works which require the presence of more than one person.



Do not remove the protection on any rotating parts, belts, hot surfaces, etc. Never leave tools or disassembled parts of the group on it or around it.



Do not remove the protection of live parts; prevent any possibility to operate elements that isolate the installation or subassemblies on which work must be performed.



**CAUTION! Risk of product damage!**

The FireSet is NOT equipped with an emergency stop. The main pumps can only be stopped manually by interrupting the automatism.

For this reason, ensure that you are in possession of clear instructions and the device to stop the pump before you make any intervention.



**DANGER! Risk of fatal injury!**

If there are interventions with an open door of the switchgear, even after opening the main isolating switch, input terminals from the supply line and those of remote transmission of alarms could still be powered.



**DANGER! Risk of fatal injury!**

For an intervention on the diesel motor, it is advisable to disconnect the positive terminal of battery to prevent undesired start-ups.



**DANGER! Risk of fatal injury!**

Before changing the motor oil, make sure that the temperature is below 50°C. For water-cooled motors, remove the radiator cap or the heat exchanger very slowly. The cooling systems are normally under pressure and violent hot liquid leaks could occur. Check the correct level of motor fluids (oil/water) and the correct tightening of the water circuit and the circuit oil closure plugs.

**NEVER ADD COOLANT TO AN OVERHEATED MOTOR. LET IT COOL DOWN FIRST.**

**For diesel motors with heat exchanger, check that the valves of the cooling circuit are in the open position. Check diesel and oil hoses for fluid leakage.**



**DANGER! Risk of fatal injury!**

**For oil/diesel motor water heating, emersion or contact supplied with 230 V resistance can be installed.**



**WARNING! Risk of fire and personal injury! Connecting or disconnecting the battery can produce sparks.**

**Never connect or disconnect the battery cables when the motor is running.**



**WARNING! Risk of burns!**

**Hot diesel motor and exhaust pipe surfaces.**



**DANGER! Risk of explosion!**

**While charging the diesel pump batteries, potentially explosive gas could be formed; avoid flames and sparks. Never leave flammable liquids or rags soaked with these liquids around the unit of pumps or electrical devices.**



**DO NOT SMOKE OR USE FLAMES DURING THE CHANGE OF MOTOR OIL OR FUEL PROVISION.**

### 9.1 General steps for maintenance

- General inspection of the FireSet pump and system (including water and power supplies) to check the apparent conditions of all components,
- General cleaning
- Tightness check of non-return valves,
- Check the operating configuration of the electrical switchgear,
- Check the correct operation of alarm pilot lights on the switchgear,
- Check the correct operation of the minimum tank/well level alarms,
- Check the electrical connections and ensure that there are no signs of insulation damages, burning, loosening of terminals,
- See also specific operations indicated in the particular Installation an operating instructions for the various components of the FireSet,
- Check the correct functioning of the minimum fuel level alarm,
- Check the correct functioning of the motor oil heater resistor,
- Check the battery charge level and the efficiency of the battery charger,
- Check the correct functioning of the stop solenoid valve for diesel motor,
- Check the pump cooling oil level and viscosity.

During all checks, the following points have to be carried out with particular attention:

- All the different pressures of the manometer for water and air of the buildings, pressures for main pipes and pressure tanks,
- All water levels in storage tanks,
- The correct position of all main gate valves.

### 9.2 Test of automatic start of pump

Tests on automatic pumps must include the following:

- Check motor oil and fuel level.
- Reduce the water pressure on the starting device, in this way simulating an automatic start request.
- When the pump starts, the starting pressure must be checked and recorded.
- Check the oil pressure on the diesel pump and the cooling circuit's water flow.



**CAUTION! Risk of malfunction of the pump!**

**Always top up fuel and other fluids after performing the tests.**

### 9.3 Test of automatic start of diesel pump

After testing the start, diesel motors must be tested as follows:

- Let the motor run for 20 min or for the time recommended by the supplier. Then stop the motor and immediately restart it by using the test button 'manual start'.
- Check the water level in the primary cooling circuit.

During the test, you must check the oil pressure, the motor temperature, and the coolant flow. Then check the oil hoses and make a general check to detect any possible fuel, coolant, or exhaust smoke leakage.

### 9.4 Periodic tests

#### MONTHLY CHECKS

Check level and density of the electrolyte of all lead storage battery cells (including diesel motor starting batteries and batteries used to the electronic switchgear power supply). If the density is low, check the battery charger, and if it is working correctly, replace the faulty battery.

#### QUARTERLY CHECKS

To be performed maximum every 13 weeks. An inspection report must be recorded, signed, and handed over to the final user. This report must include details of each procedure carried out or planned, details of external factors, such as weather conditions, which could have influenced the results.

Check the pipes and supports to check the possible corrosion points and protect them if necessary.

Check pipes for correct earth connection. Sprinkler pipes cannot be used for electrical equipment earth connection. Remove all connections of this kind and implement an alternative solution.

Check each water supply on each control station of the system. The pump(s) must automatically start, pressure values and measured volume flow cannot be less than that reported values on the project. Each change must be recorded.

Check all valves that supply sprinklers with water to ensure that they are working. Then return them to their normal running position. Realize the same operation for all the water supply valves, the control valves and alarm valves and all local or auxiliary valves.

Check the amount and packaging of spare parts that are in stock.

#### SEMI-ANNUAL CHECKS

To be performed maximum every six months. Check the alarm system and remotely alarm system report to the central supervision.

#### YEARLY CHECKS

To be performed maximum every 12 months. Test the efficiency of each pump when fully loaded (with the connection between the test pipes to the pump discharge) to check if the values of pressure/volume flow correspond with those indicated on the rating plate of the pump. Consider any pressure losses in the supply pipes and in the valves between the water source and each control station.

Test a diesel motor start failure, then check that an alarm in accordance with the standards is working.

After this test, immediately restart the diesel motor by using the manual start-up procedures. Check that the float valves in the storage tanks are working correctly.

Check the strainers on the pump suction and deposit tank of filtration accessories. Clean them if necessary.

#### 3-YEARLY CHECKS

To be performed maximum every three years. After draining all tanks, check the outside and inside for corrosion. If necessary, all tanks must be painted or corrosion protection must be applied again.

Check all water supply valves, alarm, and control valves. If necessary, replace them or maintain them.

### 9.5 Residual risks during facility management



#### WARNING! Risk of cuts!

Sharp edges or any unprotected threaded parts entail the risk of being cut. Take necessary cautions to avoid injuries and use protective equipment (wear specific gloves).



#### WARNING! Risk of impact injury!

Be careful of prominent parts and height. Wear special protection clothing.



#### DANGER! Risk of fatal injury!

Do not exceed the nominal pressure limits for the vessel of the jockey pump in order to avoid possible explosions.



#### DANGER! Risk of electric shock!

The staff dedicated to the connection of electrical equipment and motors must have obtained a certificate for this kind of work and make the connection in accordance with regulations and laws in force.

They must ensure that the power supply is switched off before carrying out any work that provides possible contact with the electrical parts. Check earth continuity. Avoid contact with water.



#### WARNING! Risk of fall

Take precautions to protect access to tanks or wells. Wells must have a closing cover.



#### WARNING! Risk of burns!

Take precautions to avoid contact with motor parts with a high temperature. Use protections for hot parts of the motor and the exhaust pipe. Top up fuel in the tank only when the diesel motor is cold. During refilling, do not drop fuel on hot parts of the diesel motor. Wear special gloves.



#### WARNING! Risk of irritation!

During refilling and level checks, avoid spillage of battery acid solution which could cause irritations or material damage. Do not approach the refilling area with the eyes. Use special protections to avoid contact.



**DANGER! Risk of fatal injury!**

**Avoid turning on the diesel pumps if exhaust smoke pipes were not connected towards outside the room.**



**CAUTION! Risk of environmental pollution!**

**During controls and refilling, avoid oil leakage from the motor or diesel fuel from the tank during checks and refilling. Use appropriate protection and implement the necessary precautions.**



**DANGER! Risk of fatal injury!**

**Risk of unintended start. Avoid maintenance operations on the FireSet if the automatic mode is switched on.**

## 10 Faults, causes and remedies

The operations indicated in the following table must ONLY be carried out by qualified personnel. Never carry out any work without having first carefully read and understood this manual. Never attempt to carry out repairs of materials and equipment without having fully and correctly understood the manual.

If people do not have sufficient knowledge about the product and the operating logic required by specific standards relatives to fire-extinguishing systems, or if people do not have the technical skills needed, contact Wilo to make regular maintenance checks.

Faults	Causes	Remedies
The switchgear is off.	No power supply	Make sure that the supply line is connected and voltage is present.
	Out-of-order fuses	Check and/or replace fuses. Check and/or replace the switchgear.
	Auxiliary circuit failing	Check voltage of primary and secondary circuits in the transformer. Check and/or replace fuses of the transformer.
Motor does not start	No power supply	Check connections and electric switchgear.
	Short-circuit in winding	Check windings of the motor.
	Switchgear faulty/Wrong connections	Check the connections.
	Overload	Check sizing of the supply line. Make sure that the pump is not blocked.
Pump works, but does not supply water, or has a low volume flow/delivery head.	Wrong direction of rotation	Invert two of the motor supply phases.
	Excessive suction depth. Pump in cavitation	Review calculations to suit pump's NPSHr.
	Wrong diameter of the suction pipe and valves. Pump in cavitation	Review calculations to suit pump's NPSHr.
	Air inlet in the suction line	Make sure that there are no leaks in the suction line. Check the distance between the suction points if several pumps have been installed. Fit anti-vortex plates.
	Valves partially/totally closed	Open the suction and discharge valves.
	Worn pump	Check and repair.
	Pump rotor obstructed	Check and repair.
	Strainer/filters obstructed	Check and repair.
	Coupling between pump and worn motor	Check and repair.
	Motor fails to reach nominal speed or has vibrations	Check speed. See above.
	Pump bearings are worn or not lubricated	Lubricate with lubricators.
Motor fails to reach nominal speed	Too low voltage at motor terminals	Check power supply voltage, connections, and the cross-section of the cables in the power line.
	False contacts in the power contactor or problem with the start-up device	Check and repair.
	Phase failure	Check line, connection, and fuses.
	False contacts in power supply cables	Check terminal fixation.
	Winding to the earth or short-circuit	Dismantle the motor, repair or change it.

Faults	Causes	Remedies
Pumps not ready for operation suddenly started	Incorrect sizing of power line	Check and replace.
	Insufficient voltage	Check power supply.
	Pump sizing	Remove the rotating parts, then check the sizing.
Presence of voltage on motor housing	Contact between live conductor and earth	Correct connections.
	Humid or old Insulation	Dry the motor or rewind it.
	Short-circuit between terminals and external housing	Check insulation between terminals and housing.
Unusual overheating of motor's exterior	Pump overload	Dismantle and check.
	Coupling out of axis	Align correctly.
	Ambient temperature higher than 40°C	Ventilate the space.
	Voltage higher/lower than nominal value	Check upstream power supply.
	Phase failure	Check power supply and fuses.
	Insufficient ventilation	Check strainers and pipes. Resize.
	Sliding between stator and rotor	Repair or change the motor.
Main pump starts before jockey pump	Unbalanced voltage on three-phases	Check power supply.
	Pressure switch on main pump calibrated at a higher value than the jockey pump	Check pressure switch settings.
Main pump starts immediately, with inhibition indicator in position 1	Pressure switch calibrated at a lower value than the system pressure	Check pressure switch settings. Increase the pressure level in the installation.
	Water level in priming tank too low	Check level of priming tank.
Sudden speed drop	Instantaneous overload/foreign part in pump	Dismantle the pump.
	Single-phase operation	Check supply and fuses
	Voltage drop	Check supply
Magnetic noise, sudden whistling	Motor winding or short-circuit	Dismantle the motor, then repair or change it.
	Friction between stator and rotor	Dismantle the motor, then repair or change it.
Mechanical noise	Loosened bolts	Check and tighten them.
	Loosened screws in fan cover cap/coupling cover cap	Check and tighten them.
	Sliding between fan and motor, and between coupling and coupling cover cap, etc.	Ensure the correct distance and reassemble.
	Foreign parts in motor or pump	Dismantle and remove.
	Coupling not aligned	Realign.
	Bearings little oiled/worn/broken	Lubricate or replace them.
Pump/motor bearings overheating	Bearings damaged	Replace them.
	Insufficient lubrication	Lubricate again.
	Pump and motor not aligned	Realign.
Unusual vibrations	No vibration-damping sleeve devices on the unit	Install or repair them.
	Pump in cavitation	Review the sizing of the installation.
	Too much air in water	Make sure that there are no leaks in the suction line. Check the distance between the suction points if several pumps have been installed. Fit anti-vortex plates.
	Bearings, pump /motor shaft worn	Replace.
	Pump/motor coupling are worn	Replace.
	Pump and motor not aligned	Realign pump and motor.
Motor does not stop after using stop button	This is normal if the system pressure is not restored	Stop the automatic mode, then stop the pump.
	Switchgear failure	Turn off the switchgear, then check.
	Electromagnet for stopping diesel pump switchgear failure	Use the fuel lever on which the electromagnet works manually

Faults	Causes	Remedies
Motor fails to reach nominal speed or oscillates	Accelerator lever in wrong position	Check and adjust rpm and secure lever.
	Dirty fuel strainer	Clean or replace it.
	Faulty injector/pump	Call customer service centre.
The starter pinion does not remove after starting the motor	Speed counter failure	Check the distance from the pinion wheel. Replace.
	Failure of switchgear on switchgear	Call customer service centre.
Motor does not start or tries to start, then stops	Unloaded batteries	Check battery and battery charger. Charge battery and replace it if necessary.
	Lack of fuel	If it is not indicated on the switchgear's indicating light, check the fuel tank and alarm float. Replace the switchgear. Replace the tank
	Air in fuel circuit	Remove air from the circuit by draining the injectors and diesel fuel strainers.
	Dirty fuel strainer	Replace it.
	Dirty air strainer	Replace it.
	Fuel circuit failure: injectors blocked, injection pump failure	Call customer service centre.
	Too low temperature	Check that ambient temperature is not less than 10°C. Then check the correct working of oil/water heater. Replace it if necessary.
	Loosened or rusty connections between battery/starter/relay	Check cables and terminals. Rewire. Tighten correctly. Replace.
	Diesel pump switchgear failure	Check and replace if necessary.
	Starter failure	Call customer service centre.
Black smoke	Dirty/blocked air strainer	Replace.
	Too high oil level	Remove excess oil.
	Problem with injector, fuel pump, etc.	Call customer service centre.
Unusual heating – too high water/oil temperature	Pump overload (frictions)	Dismantle and check.
	Coupling out of axis	Align correctly.
	Ambient temperature higher than 40°C	Ventilate the space.
	Insufficient ventilation	Check filters and ventilation grille. Clean or resize.
	Dirty or blocked radiator/coolant	Dismantle and clean.
	Lack of water in radiator/heat exchanger	After the cooling, fill with water and check if leaks are present.
	Closed or not sufficiently open heat exchanger circuit valve	Check that pump has a water flow, then open the shutting gate.
	Water circulation pump failure	Call customer service centre.
	Fan belt failure (air-cooled motors)	Check voltage and replace the fan belt if necessary.
	Corresponding alarm failure	Check sensor, connections, and control unit on switchgear. Replace if necessary.
Jockey pump does not start	No power supply	Check connections and the electronic switchgear.
	The pressure switch is calibrated to a lower pressure than the main pump.	Check the pressure switch settings.
	Short-circuit in winding	Check winding.
	Intervention of the thermal protection	Check the sizing of the supply line. Check that the pump is not locked, then check pressure switch setting and the tank inflation.
	Switchgear failure and wrong connections.	Check.

## 11 Decommissioning and removal

If the Wilo-FireSet must be decommissioned, first disconnect the unit from the power supply and water circuit, and then separate the different materials of the unit to eliminate them separately. Assign a company that is in charge for the removal of industrial machinery.

Check that there are no residues of any polluting liquids inside the pump and pipes.

The unit equipped with diesel motor may have batteries, which contain lead and electrolytic liquid including acids, solutions of water and anti-freeze liquid, oil and fuel.

Pay particular attention to the elimination of batteries and make all necessary actions to prevent any spillage of liquid on the ground that can pollute the environment.

If materials of the unit are spread in the environment, they can create serious environmental damages.



### NOTICE

#### Disposal in 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.

All materials and components must be collected, and eliminated in accordance with the regulations in force. Even during the installation operations and handling, the following materials must be sent to centres specialized in the collection and removal of waste:

- Electromechanical and electronic components
- Electric cables
- Batteries
- Strainers
- Oil drain
- Mix of water and antifreeze
- Rags and smooth material used for various operations or cleaning
- Materials for packaging

Liquids and polluting materials must be eliminated according to the specific standards in force.

Make a separated elimination allows to retrieve equipment, and to reduce pollution.

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

- Only hand over these products at designated, certified collecting points.
- Observe the locally applicable regulations!

Consult your local municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal.

For further information on recycling, go to [www.wilo-recycling.com](http://www.wilo-recycling.com).

## 12 Spare parts

For rapid intervention and recovery of the Wilo-FireSet and according to the type of pumping conditions, it is advisable having a minimum amount of spare parts in stock, according the recommendation in the operating manual of the single main components (pump, drive, coupling, switchgear), for example:

### Main electric pump

Complete seal, protection fuses, starting pressure switch, step relay coil.

### Main diesel pump

Complete seal, protection fuses, starter kit, oil heater, starting pressure switch, two fuel strainers, two oil strainers, two sets of straps, two injector nozzles for the diesel motor, a complete kit of connections, gear and oil and fuel circuit hoses, tools recommended by the manufacturer of the diesel motor.

### Electric jockey pump

Complete mechanical seal, protection fuses, and starting pressure switch.



**13 APPENDIX A – Checklist for commissioning and maintenance contract**

<b>Checklist</b>			
for commissioning and maintenance contract			
<b>Wilо-FireSet</b> with electric/diesel motors			
Page 1			
Company / customer:		Job no.:	
Equipment no.: Installation site:			
Reason for visit:		Commissioning <input type="checkbox"/>	
		Maintenance and repair <input type="checkbox"/>	
<b>Pump information</b>			
Description of unit			
Art. no./model year			
Unit no.			
Pump type/model year			
	Pump 1	Electric motor <input type="checkbox"/>	Diesel motor <input type="checkbox"/>
	Pump 2	Electric motor <input type="checkbox"/>	Diesel motor <input type="checkbox"/>
	Pump 3	Electric motor <input type="checkbox"/>	Diesel motor <input type="checkbox"/>
Rated duty point	Volume flow	m <sup>3</sup> /h	Pressure bar
<b>Performance</b>			
Main pump 1 ON		bar	Jockey pump on bar
Main pump 2 ON		bar	Jockey pump off bar
Main pump 3 ON		bar	
		Pump 1	Pump 2 Pump 3
Pressure at pump startup	bar		
Motor running time (min.)	min		
Suction pressure	bar		
Discharge pressure	bar		
Electric motor power supply voltage	V		
Electric motor current value	Amp		
Level of water supplies (priming tank must be filled to capacity)	m		
Water temperature in suction tank/reservoir	°C		
Pump room temperature	°C		
Motor instrument readings:			
- Rotational speed	RPM		
- Oil pressure	bar		
- Oil temperature	°C		
- Water temperature in cooling circuit	°C		
- Battery charge	V		
- Fuel tank level	%		
- Current value on battery charger	Amp		
- Cooling system strainer condition	%		
- Cooling system water temperature	°C		
- Room ventilation dampers IN/OUT surface	m <sup>2</sup>		
- Room ventilation air speed on dampers IN	m/s		
<b>Check</b>			
<b>Installation general conditions</b>			
Check installation conditions: room ventilation			<input type="checkbox"/>
Check installation conditions: room temperature (> 4°C for electric pump; > 10°C for diesel pump)			<input type="checkbox"/>
Check installation conditions: free and safe access to FireSet main components			<input type="checkbox"/>
Check the correct ground fixing of the base skid			<input type="checkbox"/>
Check correct installation of hydraulic circuits and anti-vibration sleeves on suction and pressure side of the FireSet			<input type="checkbox"/>
Check electrical connections			<input type="checkbox"/>
Check the correct installation of the diaphragm circuit			<input type="checkbox"/>
Check the correct installation of the priming tank (for suction lift installations)			<input type="checkbox"/>
<b>Electric pump</b>			
Check that the coupling between the motor and the pump is correctly aligned			<input type="checkbox"/>
Check the lubrication of the pump housing (for oil/grease lubricated pumps)			<input type="checkbox"/>
Check and tighten mounting bolts			<input type="checkbox"/>

Check the correspondence of power supply to rating plate data	<input type="checkbox"/>	
Check voltage on lines L1-L2, L1-L3, L2-L3	<input type="checkbox"/>	
Check the correct direction of rotation of the three-phase electric motor	<input type="checkbox"/>	
Check manual start-up *	<input type="checkbox"/>	
Check that there is no abnormal noise and/or vibration	<input type="checkbox"/>	
Check that the pump is not working in cavitation condition	<input type="checkbox"/>	
Check sealing of valves	<input type="checkbox"/>	
Check that there is no leakage in the hydraulic circuit	<input type="checkbox"/>	
Check current value on each phase	<input type="checkbox"/>	
Check manual stop button functioning	<input type="checkbox"/>	
Check automatic start-up by pressure switch *	<input type="checkbox"/>	
Check automatic start-up by float switch (for suction lift installations) *	<input type="checkbox"/>	
Check the correct volume flow in the diaphragm circuit	<input type="checkbox"/>	
Check normal operation of the indicators lights/alarms	<input type="checkbox"/>	
<b>Diesel pump</b>		
Check that the coupling between the motor and the pump is aligned correctly	<input type="checkbox"/>	
Check and tighten mounting bolts	<input type="checkbox"/>	
Check manual stop button functioning	<input type="checkbox"/>	
Check that the air filter is clean and installed correctly	<input type="checkbox"/>	
Check that the fuel connections are tight	<input type="checkbox"/>	
Check the correct flow into the cooling circuit (water or air)	<input type="checkbox"/>	
Check that the pole shoes for the batteries are fixed and not dirty	<input type="checkbox"/>	
Check that the V-belts tension on the motor is correct	<input type="checkbox"/>	
Check all motor hose connections	<input type="checkbox"/>	
Check exhaust leakage/back pressure/isolation/silencer installation/condensate trap	<input type="checkbox"/>	
Check all hose clamps	<input type="checkbox"/>	
Check the correspondence of power supply to rating plate data	<input type="checkbox"/>	
Check and/or replace lubricating oil	<input type="checkbox"/>	
Check and/or replace the cooling liquid	<input type="checkbox"/>	
Check the lubrication of the pump housing (for oil/grease lubricated pumps)	<input type="checkbox"/>	
Check manual start-up *	<input type="checkbox"/>	
Check that there is no abnormal noise and/or vibration	<input type="checkbox"/>	
Check that the pump is not working in cavitation condition	<input type="checkbox"/>	
Check sealing of valves	<input type="checkbox"/>	
Check that there is no leakage in the hydraulic circuit	<input type="checkbox"/>	
Check current value of water and oil temperature	<input type="checkbox"/>	
Check automatic start-up by pressure switch *	<input type="checkbox"/>	
Check automatic start-up by float switch (for suction lift installations) *	<input type="checkbox"/>	
Check the correct volume flow in the diaphragm circuit	<input type="checkbox"/>	
Check normal operation of the indicators lights / alarms	<input type="checkbox"/>	
<b>Jockey pump</b>		
Check voltage on lines L1-L2, L1-L3, L2-L3	<input type="checkbox"/>	
Check the correct direction of rotation of the three-phase electric motor	<input type="checkbox"/>	
Check that there is no abnormal noise and/or vibration	<input type="checkbox"/>	
Check that the pump is not working in cavitation condition	<input type="checkbox"/>	
Check sealing of valves	<input type="checkbox"/>	
Check that there is no leakage in the hydraulic circuit	<input type="checkbox"/>	
Check automatic start-up and stop by pressure switch	<input type="checkbox"/>	
<b>Checklist</b> for commissioning and maintenance contract <b>Wilco-FireSet with electric/diesel motors</b>		
		
Page 2		
Equipment no.:	Job no.:	
<b>Maintenance program</b>		
<input type="checkbox"/> <b>Weekly checks</b>		
1	Check room ventilation and temperature	<input type="checkbox"/>
1	General inspection of the unit (including the electrical and water supplies) to check the apparent condition of all components (no leaks)	<input type="checkbox"/>
2	General cleaning	<input type="checkbox"/>
3	Test the tightness of the non-return valves	<input type="checkbox"/>
4	Check that the switchgear is in automatic start mode	<input type="checkbox"/>

5	Check the efficiency of the electronic control panel	<input type="checkbox"/>
6	Check the efficiency of the control panel alarm LEDs	<input type="checkbox"/>
7	Check the efficiency of the minimum tank/cistern/well level alarm	<input type="checkbox"/>
8	Check electrical connections ensuring there are no burns, no damage to the insulation and no loosened screws on the terminal boards	<input type="checkbox"/>
10	Check the preloading of the diaphragm tanks	<input type="checkbox"/>
13	Check the efficiency of the minimum fuel level alarm	<input type="checkbox"/>
14	Check the efficiency of the motor oil heater	<input type="checkbox"/>
15	Check the battery charge level and efficiency of the battery charger	<input type="checkbox"/>
16	Check the efficiency of the stop electromagnet	<input type="checkbox"/>
17	Check the viscosity and level of the pump cooling oil	<input type="checkbox"/>
18	Check the efficiency of the priming circuit (especially if there are units with suction lift)	<input type="checkbox"/>
During all checks, make a notice of the following:		
19	a) all pressure readings on the water and air pressure gauges (plant, main conduits, and pressurized tanks);	<input type="checkbox"/>
20	b) all water levels in private elevated storage tanks, rivers, canals, lakes, storage tanks (including pump priming tanks and pressurized tanks);	<input type="checkbox"/>
21	c) the correct position of all the main On/Off valves	<input type="checkbox"/>
<b>Automatic start-up test</b>		
The following aspects of the automatic pumps must be checked and tested:		
22	a) check the fuel and lubricant oil levels in the diesel motor;	<input type="checkbox"/>
23	b) lower the water pressure in the start-up device to simulate automatic start-up conditions;	<input type="checkbox"/>
24	c) check and record the pressure when the pump starts;	<input type="checkbox"/>
25	d) check the pressure of the oil in diesel motor pumps	<input type="checkbox"/>
	e) check if the water flow through the heat exchanger (if present) is adequate	<input type="checkbox"/>
<b>Diesel motor restart test</b>		
Check the diesel motors immediately after the preceding pump start-up test:		
26	a) Let the motor run for 20 minutes at rated duty point. Stop the motor and then immediately start again using the manual start-up test button;	<input type="checkbox"/>
27	b) Check the water level in the primary circuit of the closed-circuit cooling system. Check the oil pressure (read on the pressure gauges), the motor temperature, and the coolant flow during this test. Check the oil pipes and inspect the plant generally for leaks (fuel, coolant, or exhaust fumes).	<input type="checkbox"/>
28	Check the inlet system/ventilation (air filter, operations, obstructions)	<input type="checkbox"/>
<input type="checkbox"/> <b>Monthly checks</b>		
1	Check the level and density of the electrolyte in all cells of the lead battery (including the diesel motor start-up batteries and those used to supply the electronic switchgear).	<input type="checkbox"/>
2	If the density is low, check the battery charger and, if this is efficient, replace any battery or batteries not in perfect condition.	<input type="checkbox"/>
3	Check for corrosion of diesel motor battery terminals and conditions of cable lines and connections.	<input type="checkbox"/>
<input type="checkbox"/> <b>Quarterly checks</b>		
An inspection report must be signed, dated, and handed over to the end-user. This must include details of all work carried out or required and any external factors that can affect the results, such as the weather, etc.		
1	Check the pipes and supports for corrosion and, where necessary, paint them.	<input type="checkbox"/>
2	Check the pipes for proper earthing. Do not use the sprinkler pipes to earth the electrical equipment. Remove all earth connections on these and make alternative connections	<input type="checkbox"/>
3	Check all the water supplies at each control station in the system. All pumps must start automatically and the minimum pressure and flow rate values must not be lower than the nominal values in the project. Record all changes	<input type="checkbox"/>
4	Test all On/Off valves that control the water flow to the sprinklers to make sure that these work properly and then return the valves to their normal position. Do the same for all the water supply On/Off valves, the control, and alarm valves and all local or auxiliary On/Off valves.	<input type="checkbox"/>
5	Check the efficiency of the flow switches.	<input type="checkbox"/>
6	Check the quantity and condition of all spare parts held in stock.	<input type="checkbox"/>
<input type="checkbox"/> <b>Six-monthly checks</b>		
1	Check the alarm system and remote alarm system in the central control unit.	<input type="checkbox"/>
1	Check coupling alignment	<input type="checkbox"/>
<input type="checkbox"/> <b>Yearly checks</b>		
1	Test the efficiency of every pump when fully loaded (connect the test line to the pump delivery circuit) and make sure that the pump pressure and flow rate values match those on the rating plate. Consider any loss in pressure in the supply lines and valves between the water supply source and each control station unit.	<input type="checkbox"/>
2	Test the diesel motor for non start-up and check that the no start-up alarm works, in compliance with the requirements of the applicable standard. Then start the diesel motor again using the manual start-up procedure.	<input type="checkbox"/>
3	Check the efficiency of the float valves in the storage tanks	<input type="checkbox"/>
4	Inspect the suction filters in the pumps and deposit chambers fitted with filtering panels; clean if necessary	<input type="checkbox"/>
5	Change motor oil and filters (oil and fuel)	<input type="checkbox"/>
Have spare parts been replaced related to this task? <input type="checkbox"/> Yes, see below <input type="checkbox"/> No, see below		
<b>Remarks:</b>		
<b>WILO SE</b>		
Place/date	Customer service technician	Handed over to

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