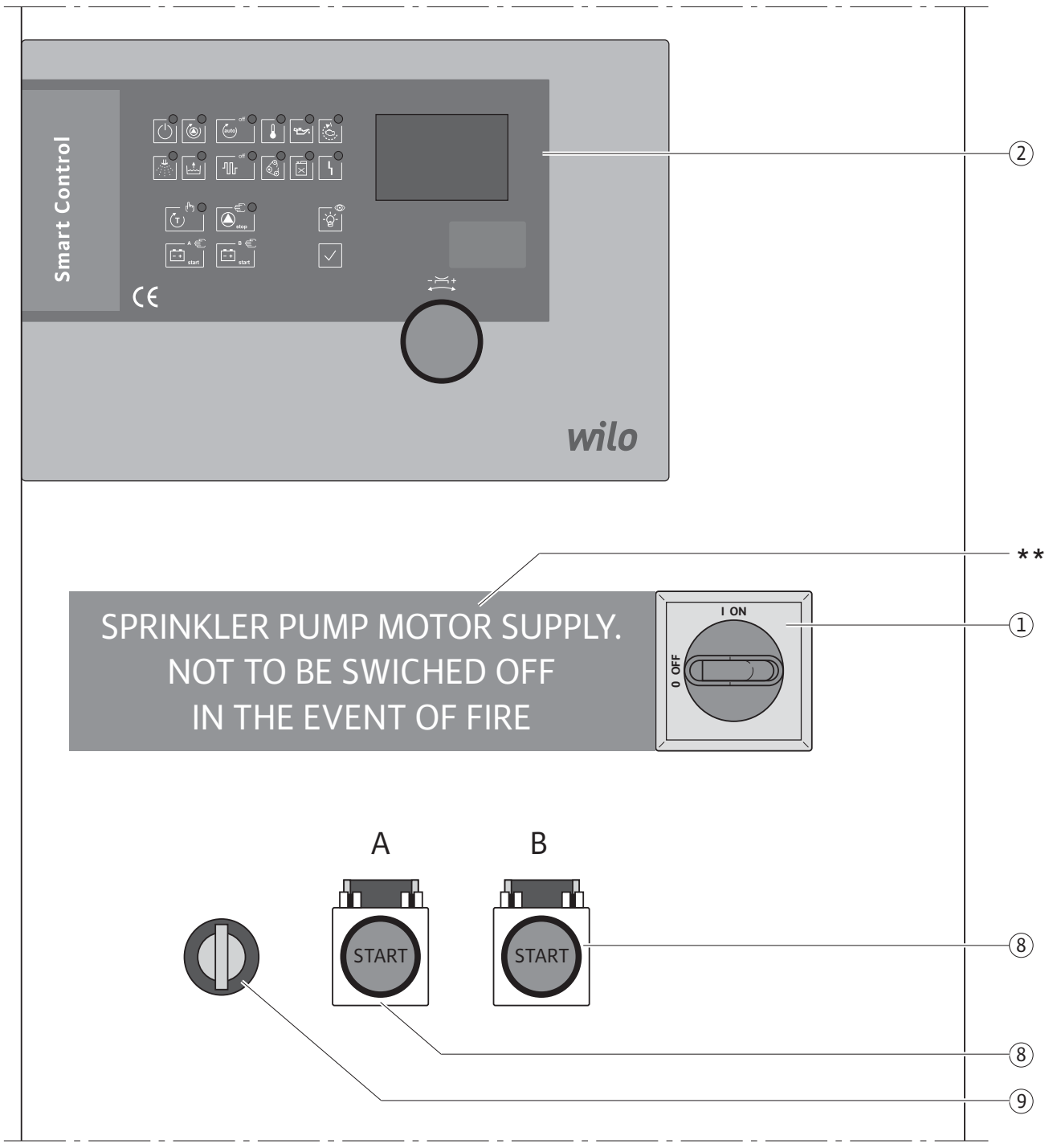
Pioneering for You

Wilo-Control SC-Fire Diesel

de Einbau- und Betriebsanleitung
en Installation and operating instructions
fr Notice de montage et de mise en service
nl Inbouw- en bedieningsvoorschriften

2 541 367-Ed.02 / 2015-10-Wilo

Fig. 1:


Smart Control
wilo
2
**
SPRINKLER PUMP MOTOR SUPPLY.
NOT TO BE SWICHED OFF
IN THE EVENT OF FIRE
I ON
0 OFF
1
A
B
START
START
8
8
9

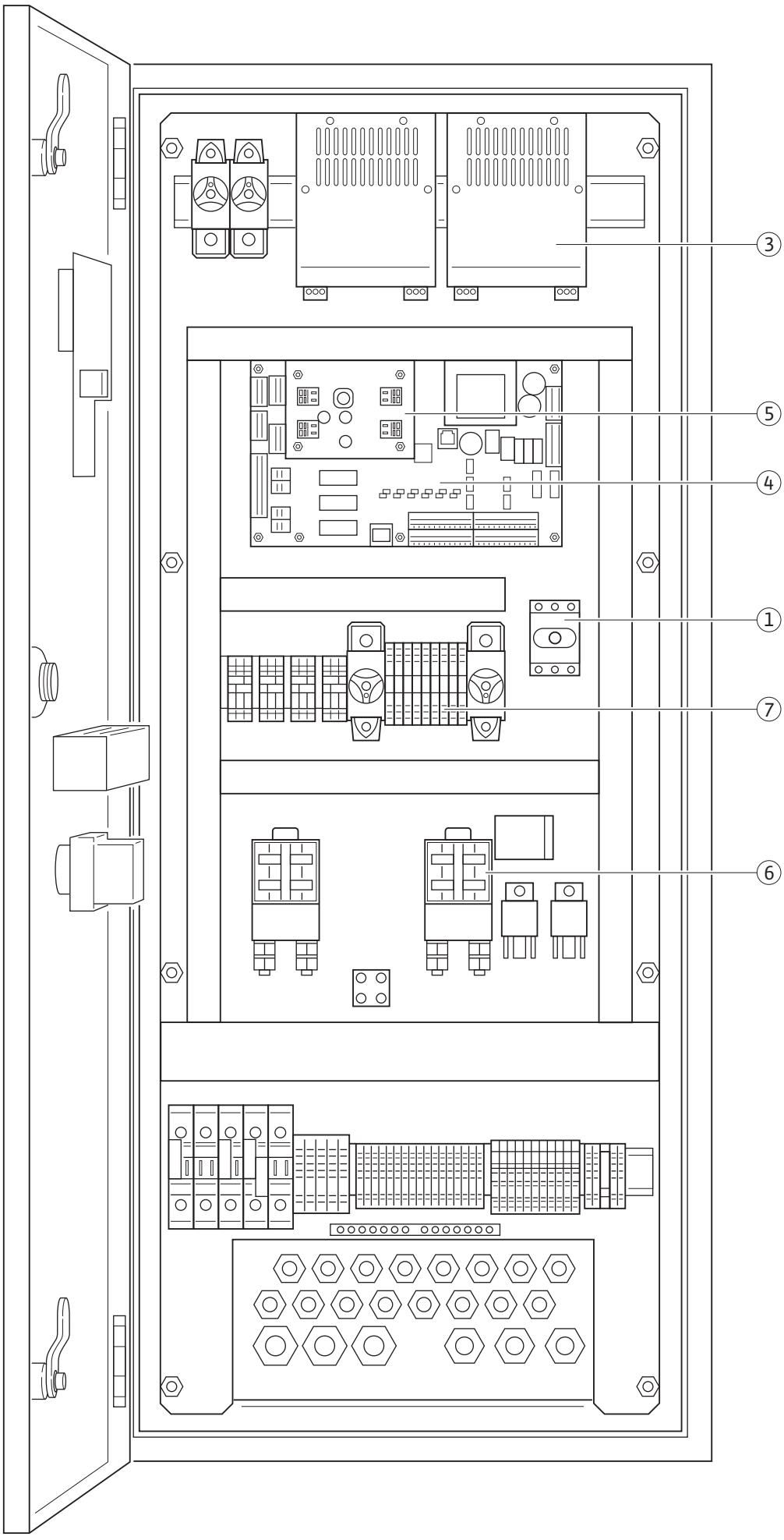

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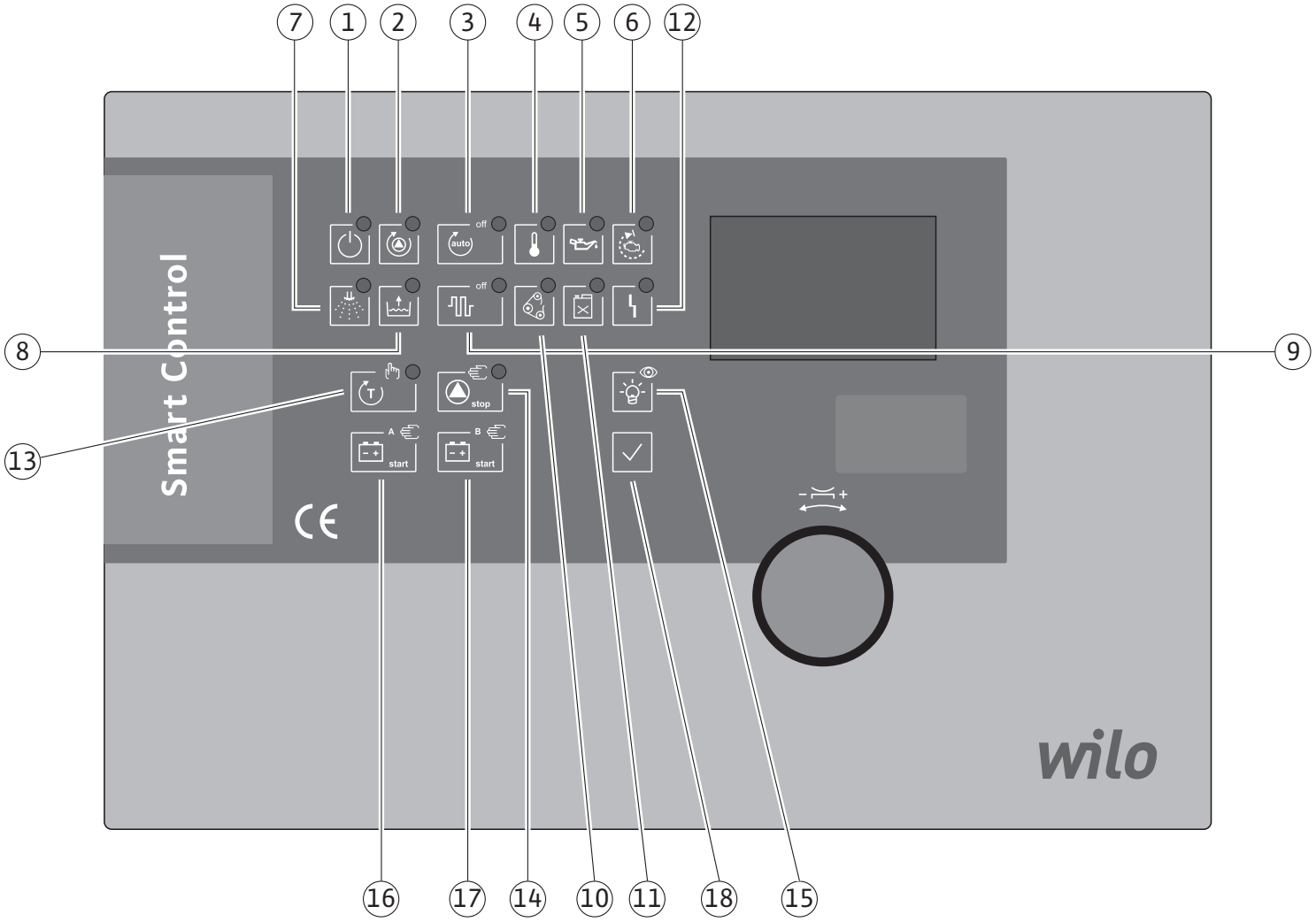
Fig. 2:


7
1
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12
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13
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Smart Control
off
auto
off
stop
A
start
B
start
wilo

Captions

Fig. 1	Switchgear set-up
1	Main switch: for switching the switchgear on/ off
2	Menu selection and parameter input
3	Chargers for automatic charging of the starter batteries
4	Base board: printed circuit board with micro-controller
5	Converter board
6	Contactors/relay for connecting the starter and magnetic switch
7	Fusible cut-outs
8	Emergency start button battery A and B
9	Key-operated selector switch
**	Note regarding the main switch: Power supply for the sprinkler pump motor. DO NOT SWITCH OFF IN THE EVENT OF A FIRE!

Fig. 2	Switchgear display elements
1	LED (green): Operational standby
2	LED (green): Pump operation
3	LED (yellow): Automatic mode
4	LED (yellow): Excess motor temperature (cooling water)
5	LED (yellow): Oil pressure fault
6	LED (yellow): False start
7	LED (white): Sprinkler request
8	LED (yellow): Float switch request (pump priming tank)
9	LED (yellow): Heating fault
10	LED (yellow): Belt break
11	LED (yellow): Lack of fuel
12	LED (yellow): Collective fault
13	LED (green) and button: Test device for manual starter device
14	LED (red) and button: Manual pump stop
15	Button: Lamp test
16	Button: Manual start of battery A
17	Button: Manual start of battery B
18	Button: Acknowledgement of error messages

1 General

1.1 About this document

The language of the original operating instructions is German. 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 the proper use and correct operation of the product.

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

EC declaration of conformity:

A copy of the EC declaration of conformity is a component of these 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 operating instructions must, without fail, be read by the service technician and the responsible specialist/operator before installation and commissioning.

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

2.1 Indication of instructions in the operating instructions

Symbols:

General danger symbol

Danger due to electrical voltage

NOTE

Signal words:

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

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

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

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

Information that appears directly on the product, such as:

- Direction of rotation arrow,
- Identification for connections,
- Rating plate,
- Warning sticker,

must be strictly complied with and kept in 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 accomplished if necessary by the manufacturer of the product at the request of the operator.

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 results in the loss of any claims to damages.

In detail, 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
- Property 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 internal working, operating and safety regulations of the operator are to be complied with.

2.5 Safety instructions for the operator

This appliance 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 appliance.

- If hot or cold components on the product/the unit lead to hazards, local measures must be taken to guard them against touching.
- Guards protecting against touching moving components (such as the coupling) must not be removed whilst the product is in operation.
- Leakages (e.g. 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 are always to be kept at a safe distance from the product.
- Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and instructions from local energy supply companies must be adhered to.

2.6 Safety instructions for installation and maintenance work

The operator must ensure that all installation and maintenance work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions.
Work on the product/unit must only be carried out when at a standstill. It is mandatory that the procedure described in the installation and operating instructions for shutting down the product/unit be complied with.
Immediately on conclusion of the work, all safety and protective devices must be put back in position and/or recommissioned.

2.7 Unauthorised modification and manufacture of spare parts

Unauthorised modification and manufacture of spare parts will impair the safety of the product/ personnel and will make void the manufacturer's declarations regarding safety.
Modifications to the product are only permissible after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts will absolve us of liability for consequential events.

2.8 Improper use

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

3 Transport and interim storage

Immediately after receiving the product:

- Check product for transport damage.
- In the event of damage in transit, take the necessary steps with the forwarding agent within the respective time limits.

CAUTION! Risk of property damage!
Incorrect transport and interim storage can cause property damage.

- **The switchgear is to be protected against moisture and mechanical damage.**
- **It must not be exposed to temperatures outside the range of –10°C to +50°C.**

4 Application (intended use)

The SC Fire switchgear is used to control an individual diesel pump in automatic sprinkler systems, in accordance with EN 12845.
The device is used in residential and office buildings, hospitals, hotels, administrative and industrial buildings.
The pump is used in conjunction with suitable signal transmitters and it is switched according to the pressure or the level.
The intended use includes complying with these instructions.
Any other use is considered to be outside the intended use.

5 Product information

5.1 Type key

Example:	W-CTRL-SC-F-1x4.25-47.7KW-M-FM-ND4-D
W	W = WILO
CTRL	Control
SC	Smart Control = control unit
F	F = fire fighting purposes
1x	Number of pumps
47.7 kW	Rated power of diesel engine [kW]
M	1~230 V, 50 Hz
FM	Frame mounted (on a base frame)
ND4	New Design switchbox 400x950x250mm
D	Switchgear for diesel pump

5.2 Technical data (standard version)	
Mains supply voltage [V]:	1~230 V (L, N, PE)
Frequency [Hz]:	50/60 Hz
Control voltage [V]:	12 / 24 VDC
Max. current consumption [A]:	See rating plate
Protection class:	IP 54
Max. fuse protection on mains side [A]:	See wiring diagram
Ambient temperature [°C]:	0 to +40°C
Electrical safety:	Degree of contamination II
Alarm/signalling contact	250 VAC, 1 A

5.3 Scope of delivery

- Switchgear
- Wiring diagram
- Installation and operating instructions
- Test report acc. to EN 60204-1

6 Description and function

6.1 Description of the product (Fig. 1)

6.1.1 Function description

The switchgear is used to control a diesel pump in sprinkler systems, in accordance with EN 12845. The diesel engine is automatically started by the control and the starter once the pressure switch is tripped. A maximum of 6 start attempts are made. Once the motor has started, it can only be stopped manually if the pressure in the system has not been reached.
The diesel engine can be controlled via a connected float switch in order to automatically replenish the pump priming tank. The system's operating status is displayed visually via LEDs and an LC display in the door. The system is operated using the rotary knob and the buttons in the door. Potential-free contacts are available for forwarding run or fault signals messages to the building management system.

6.1.2 Set-up of the switchgear (Fig. 1)

The set-up of the switchgear depends on the capacity of the pump to be connected. It consists of the following main components:

- Main switch: Switches the switchgear on/off (Fig. 1, item 1)
- Human-machine interface (HMI): LCD for displaying operating data (see menus), LEDs for displaying the operating status (operation/fault), operating knob for menu selection and parameter input (Fig. 1, item 2)
- Base board: printed circuit board with microcontroller (Fig. 1, item 4)
- Converter board: conversion of the voltage from 12 VDC to 24 VDC, conversion of the speed signal (Fig. 1, item 5)
- Fuse protection for components: fuse protection for control and connected components using fusible cut-outs (Fig. 1, item 7)
- Contactors/relay: contactors/relay for connecting the starter and magnetic switch (Fig. 1, item 6)
- Chargers: chargers for automatic charging of the starter batteries (Fig. 1, item 3)
- Emergency start button: start the diesel motor independently of the control with battery A or battery B (Fig. 1, item 8)
- Key-operated selector switch: Automatically switches on/off (auto on/off) (Fig. 1, item 9)

6.2 Function and operation

DANGER! Risk of fatal injury!
When working on the open switchbox, there is a danger of electric shock from touching the live components.
This work must only be carried out by qualified personnel!

NOTE:
After connecting the switchgear to the supply voltage, as well as after every power interruption, the switchgear returns to the operating mode set before the power interruption.

6.2.1 Switchgear operating modes (Fig. 2)

Switching the switchgear on/off
After the batteries have been connected to the switchgear and the power supply has been connected, the control is ready for operation after a few seconds (the start phase). The green standby LED (Fig. 2, item 1) lights up. The LC display alternately displays the battery voltage of the connected batteries and the charging current. The chargers and the heating system to ensure a constant engine oil temperature can be switched on and off using the main switch. To switch the control off, disconnect the batteries.

Pump request
If the pressure drops below the set target pressure at one or both of the pressure switches, this is indicated by a white LED (Fig. 2, item 7). If the LED flashes, this indicates that the set delay time has expired (see menu 1.2.5.1). After the set delay time has expired, the LED lights up continuously for as long as the pressure switch remains tripped. The automatic start cycle for the diesel engine takes place, with a maximum of 6 start attempts. The starting time (menu 1.2.2.1) and the pause time (menu 1.2.2.2) can be set using the software. After each start attempt, the system switches to a different battery. A non-engaged pinion in the motor's gear rim is detected. Additional attempts are carried out to engage the pinion.
Once the diesel engine has started, the green LED (Fig. 2, item 2) indicates this. The LED lights up if the measured speed exceeds the set switching threshold for “motor in operation” (menu 1.2.1.3). The LC display shows the current speed when the motor is running. The engaged starting pinion is automatically disengaged. The diesel engine can only be stopped manually be pressing the “stop” button (Fig. 2, item 14). The green LED (Fig. 2, item 2) goes out when the speed drops below the switching threshold for “motor in operation” and the LC display shows the battery voltage and charging current again.

Priming device
If the level of the pump priming tank falls below 2/3, the float switch closes and this is indicated by a yellow LED (Fig. 2, item 8). If the LED flashes, this indicates that the set delay time has expired (see menu 1.2.5.2). After the set delay time has expired, the LED lights up continuously for as long as the float switch remains tripped. The automatic start cycle for the diesel engine takes place, with a maximum of 6 start attempts. The starting time (menu 1.2.2.1) and the pause time (menu 1.2.2.2) can be set using the software. After each start attempt, the system switches to a different battery. A non-engaged pinion in the motor's gear rim is detected. Additional attempts are carried out to engage the pinion.
Once the diesel engine has started, the green LED (Fig. 2, item 2) indicates this. The LED lights up if the measured speed exceeds the set switching threshold for “motor in operation” (menu 1.2.1.3). The LC display shows the current speed when the motor is running. The engaged starting pinion is automatically disengaged. The diesel engine can only be stopped manually by pressing the “stop” button (Fig. 2, item 14). The green LED (Fig. 2, item 2) goes out when the speed drops below the switching threshold for “motor in operation” and the LC display shows the battery voltage and charging current again.

Voltage monitoring of batteries
To improve operational reliability, the batteries and the mains power supply to the chargers are monitored continuously. The chargers report any faults to control, such as a wire break, short-circuit, battery fault or mains supply fault. The control evaluates the faults and displays them in the fault menu.
In addition, a minimum battery voltage can be set in menu 5.4.1.0. If the voltage in one of the connected batteries falls below this value, an error message appears on the display.

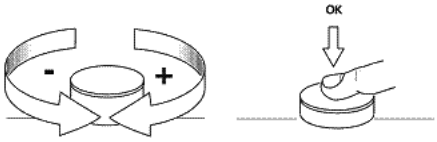
Monitoring the motor start
After the pressure or float switch trips, the motor's automatic start cycle takes place. The motor start is monitored for malfunctions by the control, such as the pinion engaging in the motor's gear rim and false motor starts. If no confirmation that the pinion is engaged is received during starter activation, the system performs an additional activation to attempt to throw the pinion into gear. An error message is shown on the display. After each start attempt, the system switches to a different battery. After 6 unsuccessful start attempts, the system interrupts the process, the yellow LED (Fig. 2, item 13) lights up, an error message is shown on the display and the allocated fault signal contacts are active.

Logic reversal of the collective fault signal (SSM)
The required logic of the SSM can be set in menu 5.5.2.0. In this case, it is possible to select between negative logic (falling edge in case of a fault = “fall”) or positive logic (rising edge in case of a fault = “raise”).

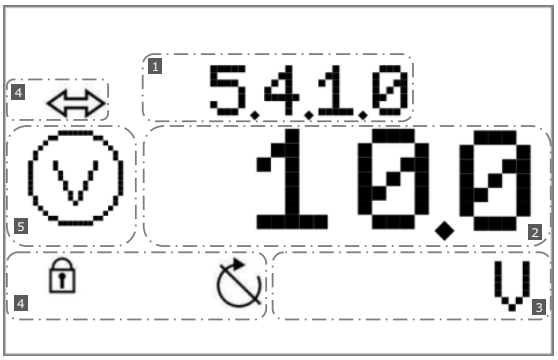
6.2.2 Operation of the switchgear

Operating elements

- **Main switch** on/off (lockable in “Off” position)
- The **LCD** shows the operating statuses of the pump and the settings menu. The menu selection and parameter input are performed using the **operating knob**. Turn the knob to change values or to scroll through a menu level; press it in order to select and confirm:



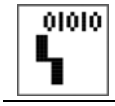
Information appears on the display as shown in the sample illustration below:

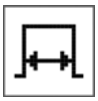


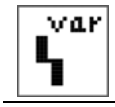
Item	Description
1	Menu number
2	Value display
3	Units display
4	Standard symbols
5	Graphic symbols

The following graphic symbols are used:

Symbol	Function/description	Availability
	Go back (brief press: one menu level; long press: main screen)	All
	EASY menu	All
	EXPERT menu	All
	1st meaning: Service not logged in 2nd meaning: Display value – no entry possible	All
	Service menu	All
	Parameter	All
	Information	All
	Fault	All
	Reset fault	All

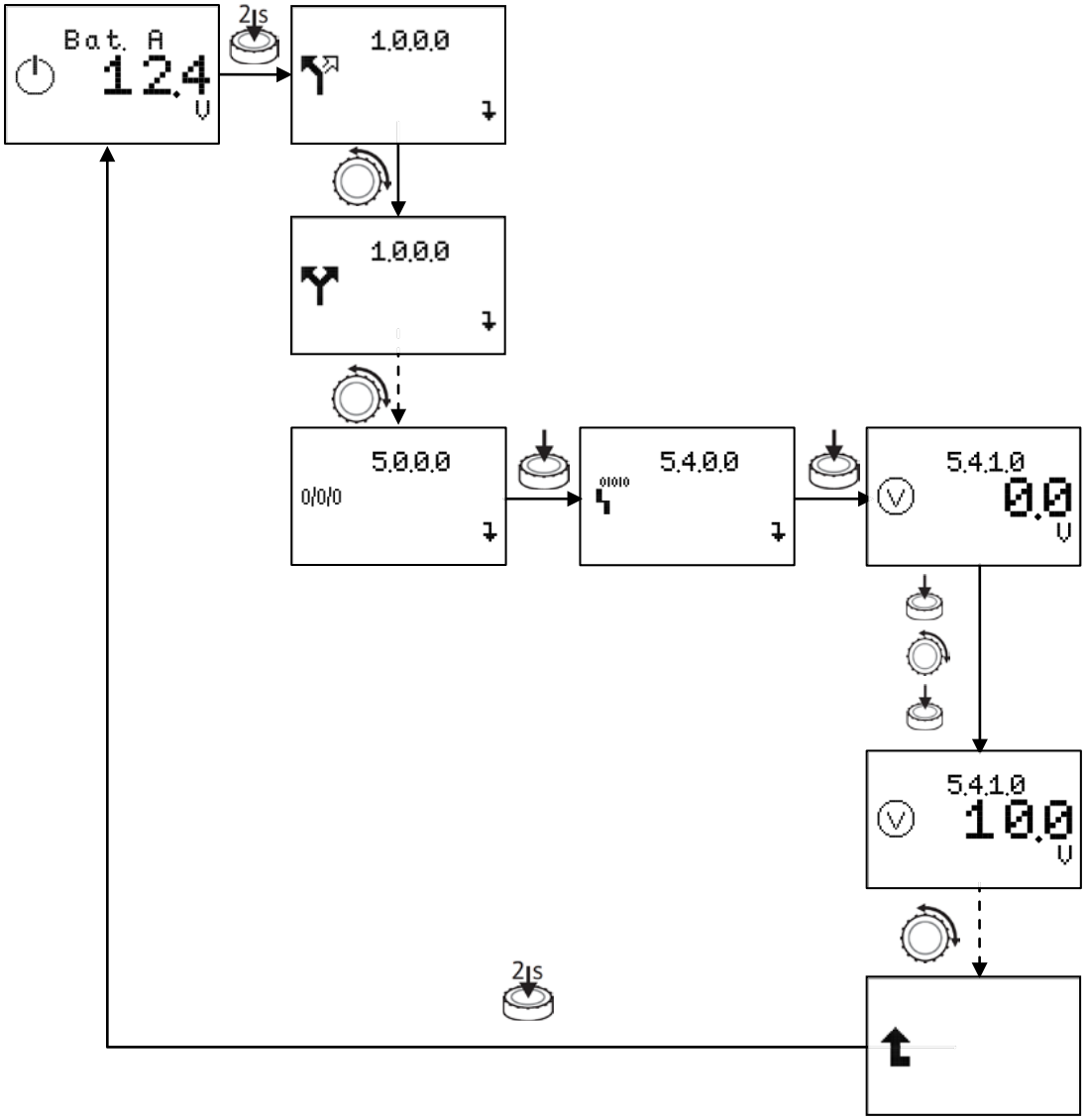
Symbol	Function/description	Availability
	Alarm settings	All
	Pump	All
	Setpoints	All
	Actual value	All
	Sensor signal	All
	Sensor measurement range	Electrical equipment
	Delay time	All
	Operating mode/application	All
	Stand-by	All
	Operating data	All
	Switchgear data: Controller type; ID number; software/firmware	All
	Operating hours	All
	Pump's operating hours	All
	Switchgear's switching cycles	All
	Pump's switching cycles	All
	Communication	All
	Output parameters	All

Symbol	Function/description	Availability
	SSM parameter	All
	Set motor speed	Diesel
	Starting time per start attempt	Diesel
	Pause between start attempts	Diesel
	Fuel	Diesel
	Battery A	Diesel
	Battery B	Diesel
	Sprinkler (pressure switch)	All
	Pump priming tank (float switch)	All
	Heating	Diesel
	Engine oil	Diesel
	Motor temperature thermostat	Diesel
	Cooling water (temperature)	Diesel
	Belt break	Diesel
	False start	Electrical equipment
	Pressure	Electrical equipment
	Mains power supply	Electrical equipment

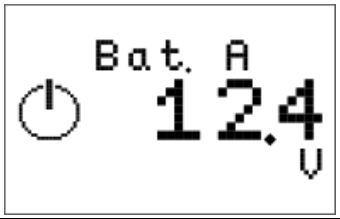
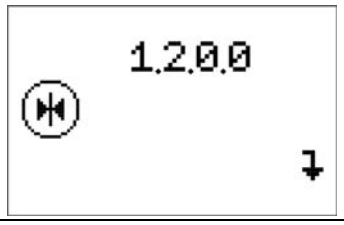
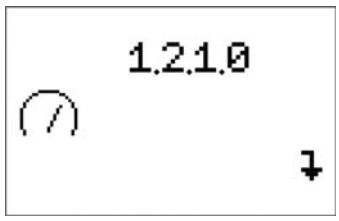
Symbol	Function/description	Availability
	Voltmeter	All
	Ampere meter	All
	Star–delta switching	Electrical equipment
	Freely configurable fault signal	All
	Fault input	All
	Start attempts counter	Diesel
	Duration	All
	Power meter	Electrical equipment
	Communication parameters	All
	Modbus	All
	BACnet	All
	Factory setting	All
	Resetting the settings to the factory settings	All
	Alarm counter	All
	Maintenance interval	All
	Reset	All
	Motor speed	Diesel

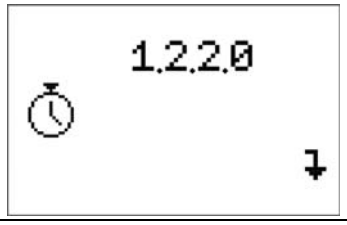
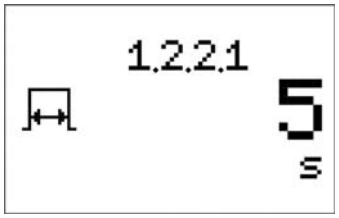
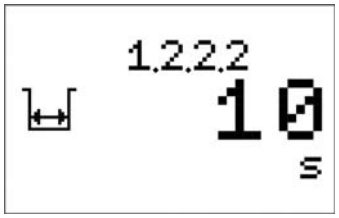
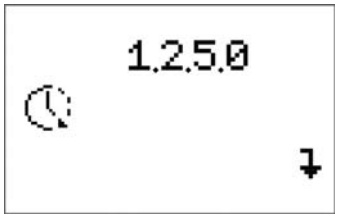
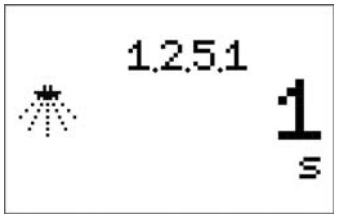
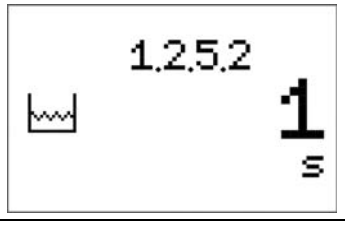
Symbol	Function/description	Availability
	Set motor speed	Diesel
	Minimum speed for “motor in operation”	Diesel
	Reset starting counter	Diesel

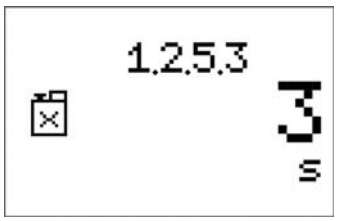
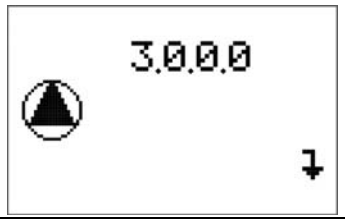
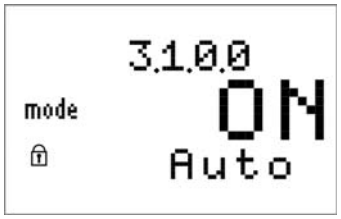
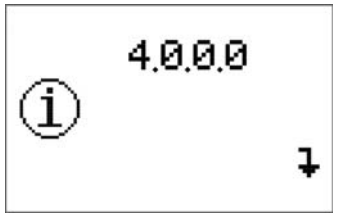
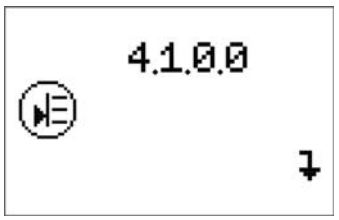
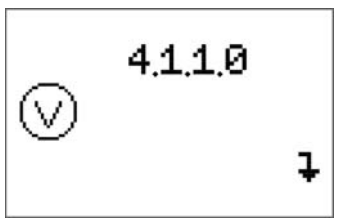
Menu structure:
The menu structure of the control system has 4 levels.
Navigation in the individual menus as well as the parameter input are described in the following example (change of minimum battery voltage):

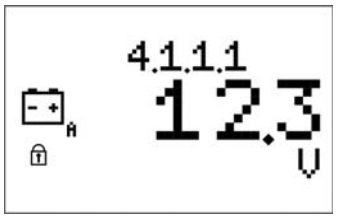
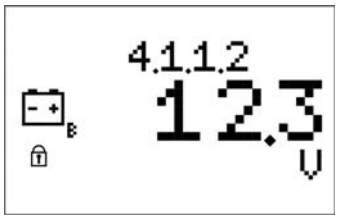
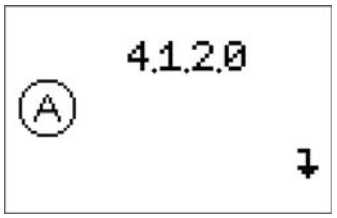
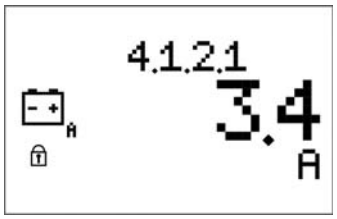
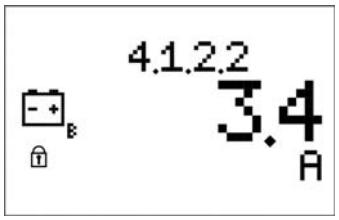
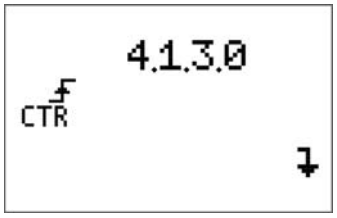
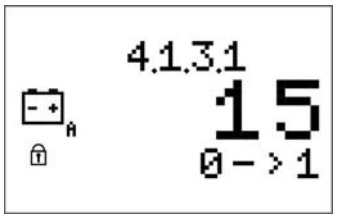
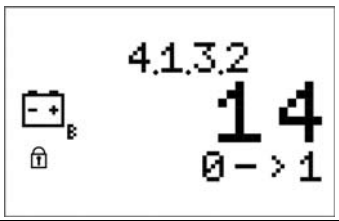


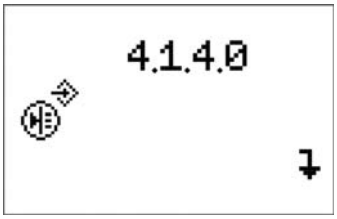
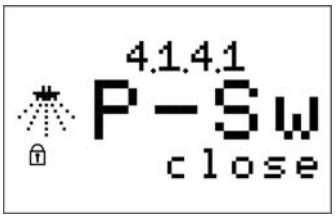
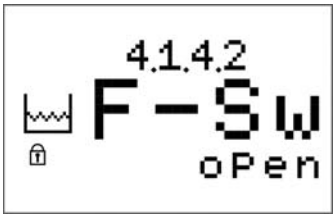
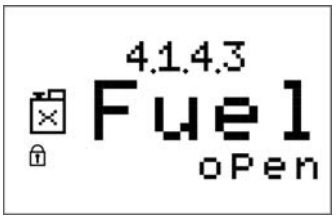
Refer to the following table for a description of the individual menu items:

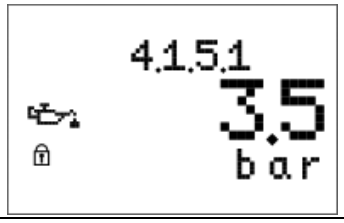
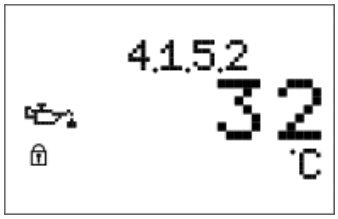
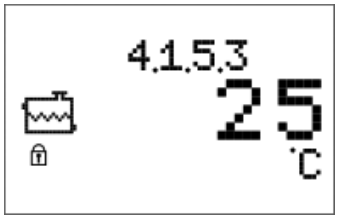
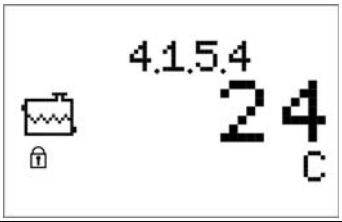
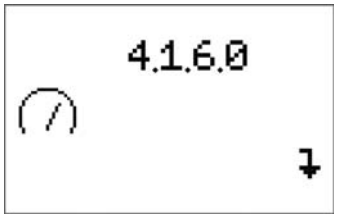
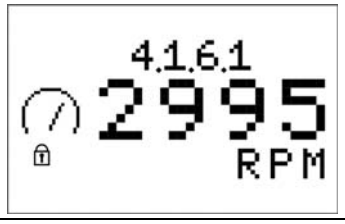
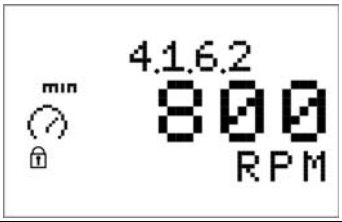
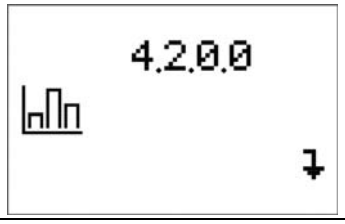
Menu no. /	Display	Description	Parameter range Factory setting
		The main screen shows the status of the system. The display continuously switches between the voltage and charging current for the connected batteries.	
		When the motor is running, the current speed is shown on the display.	
		The EASY menu makes it possible to adjust the motor speed and set the speed for “motor in operation”.	
		The EXPERT menu contains other settings that can be used for a detailed setting of the switchgear.	
		The parameter menu for all settings that influence operation.	
		The setting menu for the speed parameters	
		Setting the speed for speed adjustment.	100 ... **3000** ... 4000

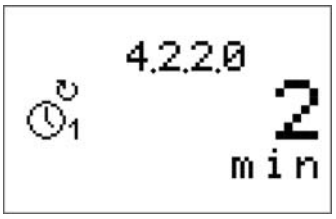
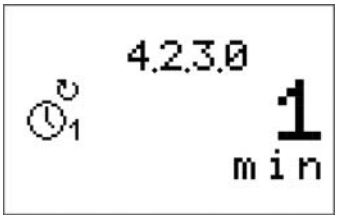
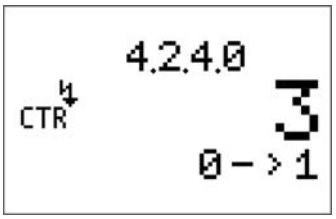
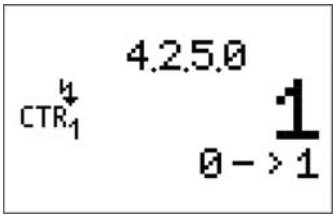
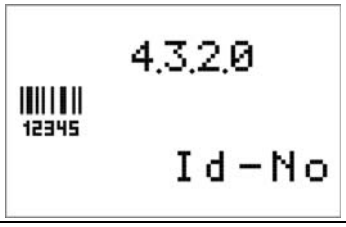
Menu no. /	Display	Description	Parameter range Factory setting
		Starts speed adjustment.	**Finished** Start
		Speed for “motor in operation” signal	200 ... **800** ... 3000
		The parameter menu for all settings that influence operation.	
		Starting time: duration of start attempt	**5** ... 10
		Pause time: pause between start attempts	5 ... **10**
		Delays	
		Start delay when pressure switch trips	**1** ... 10
		Start delay when float switch trips	**1** ... 10

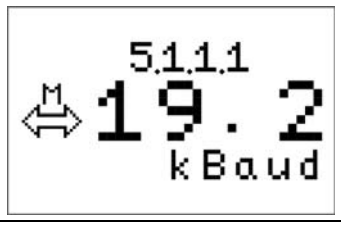
Menu no. /	Display	Description	Parameter range Factory setting
		Delay for “out of fuel” signal	0 … **3** … 5
		Communication	
		Display of currently activated fieldbus	**No bus** Modbus BACnet
		Pump menu	
		Automatic display on/off	
		Information	
		Operating values	
		Current battery voltages	

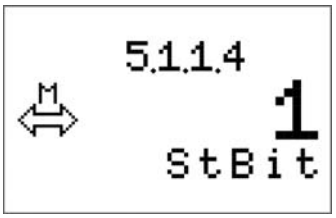
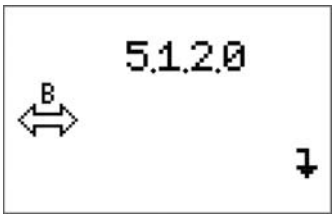
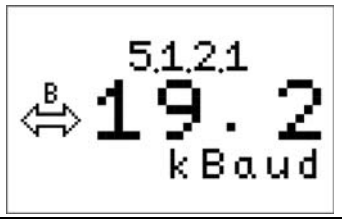
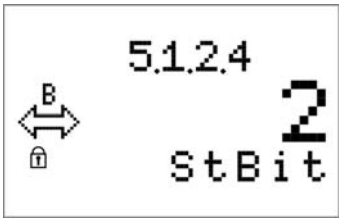
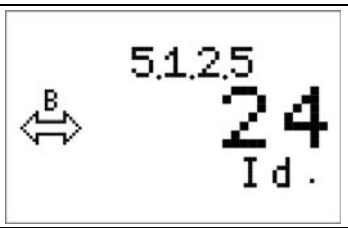
Menu no. /	Display	Description	Parameter range Factory setting
		Voltage of battery A	
		Voltage of battery B	
		Current charging currents	
		Charging current of battery A	
		Charging current of battery B	
		Start attempts counter	
		Start attempts for battery A	
		Start attempts for battery B	

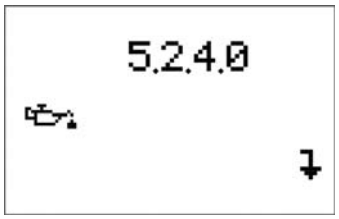
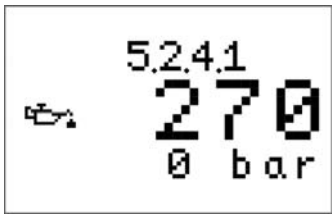
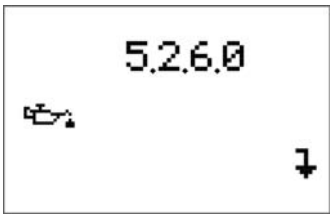
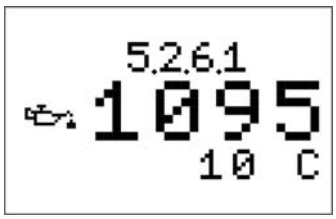
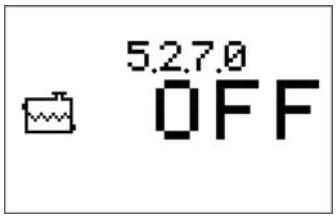
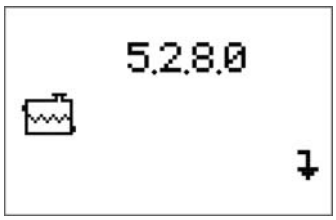
Menu no. /	Display	Description	Parameter range Factory setting
		Status (switch status) of connected sensors	
		Status of pressure switch	
		Status of float switch	
		Status of fuel float switch	
		Status of heating temperature switch	
		Status of oil temperature switch	
		Status of cooling water temperature switch	
		Sensor values	

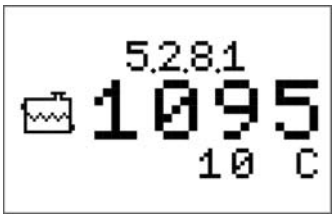
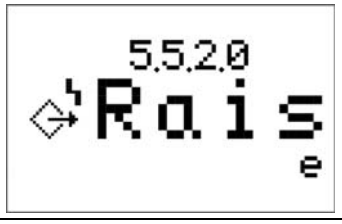
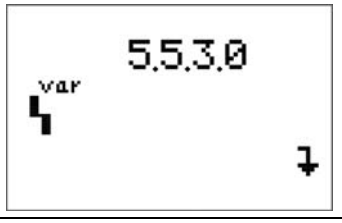
Menu no. /	Display	Description	Parameter range Factory setting
		Oil pressure	
		Oil temperature	
		Cooling water temperature	
		Cooling water temperature (external)	
		Speed	
		Motor speed	
		Speed for “motor in operation” signal	
		Operating data	

Menu no. /	Display	Description	Parameter range Factory setting
		Total running time of the system	
		Total running time of pump	
		Running time of pump during last start	
		System's switching cycles	
		Pump's switching cycles	
		System data	
		System type	SC diesel
		Serial number as ticker format	

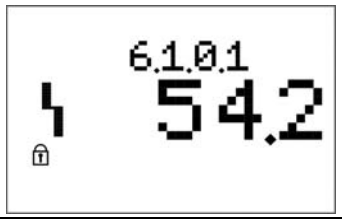
Menu no. /	Display	Description	Parameter range Factory setting
		Software version	
		Firmware version	
		Settings	
		Communication	
		Modbus	
		Baud rate	9.6 **19.2** 38.4 76.8
		Slave address	1 … **4** … 247
		Parity	**even** none odd

Menu no. /	Display	Description	Parameter range Factory setting
		Stop bits	**1** 2
		BACnet	
		Baud rate	9.6 **19.2** 38.4 76.8
		Slave address	1 ... **4** ... 255
		Parity	even **none** odd
		Stop bits	1 **2**
		BACnet device instance ID	0 ... **24** ... 9999
		Sensor settings	

Menu no. /	Display	Description	Parameter range Factory setting
		Activation of oil pressure sensor	**OFF** ON
		Correspondence values for oil pressure sensor	
5.2.4.1 to 5.2.4.9		Drag coefficients input	0 ... 3000
		Activation of oil temperature sensor	**OFF** ON
		Correspondence values for oil temperature sensor	
5.2.6.1 to 5.2.6.9		Drag coefficients input	0 ... 3000
		Activation of cooling water temperature sensor	**OFF** ON
		Correspondence values for cooling water temperature sensor	

Menu no. /	Display	Description	Parameter range Factory setting
5.2.8.1 to 5.2.8.9		Drag coefficients input	0 ... 3000
		Activation of belt break monitoring	**OFF** ON
		Limit values	
		Minimum battery voltage	**0** ... 30
		Signal output parameters	
		SSM	Fall **Raise**
		Freely configurable fault signal	
		Acknowledgement process for fault signal	**Not store** ON store

Menu no. /	Display	Description	Parameter range Factory setting
		Logic reversal of input signal	Fall **Raise**
		Activation of configurable fault signal	**OFF** ON
		Active: Always Only when pump in operation	**Ever** Pump
		Response delay	**0** ... 60
		Start-up inspection	
		Start of start-up inspection	**Finished**, Start
		Fault signals	
		Reset for fault signals	

Menu no. /	Display	Description	Parameter range Factory setting
6.1.0.1 to 6.1.1.6		Fault signal 1 to 16	

Operation levels:
The parameterisation of the switchgear is divided into the menu areas EASY and EXPERT.
For rapid commissioning using the factory presets, it is enough to set the speed values and the speed adjustment in the EASY area.
The EXPERT area is provided in case other parameters need to be changed, or for reading out data from the device.
Menu level 7.0.0.0 is reserved for Wilo customer service.

- **Automatic control on/off** (Fig. 1, item 9)
  The key-operated selector switch can be shut off in the "on" position. The key can only be removed in the "on" position. Once the "off" position has been selected, automatic starting of the pumps via the pressure switch or float switch no longer takes place. The deactivated automatic control is indicated by the flashing signal lamp (Fig. 2, item 3) and can only be started again manually.

- **Manual start of battery A and battery B** (Fig. 2, item 16 and item 17)
  Pressing the button starts the diesel engine manually via battery A or battery B. The starter is active as long as the button is pressed. Once the motor has started, it can only be stopped by the "stop" button.

- **Manual stop** (Fig. 2, item 14)
  This button is used to stop the motor. If the relevant signal lamp (Fig. 2, item 14) lights up red when the motor is running, the motor can be stopped. The motor can only be stopped if there is no request from the pressure switch present (sprinkler request). Once the motor has stopped, the signal lamps for "pump in operation" and "stop" go out (Fig. 2, items 2 and 14).

- **Test device for manual starter device** (Fig. 2, item 13)
  Test button and signal lamp for regular inspection of the manual electric starter device. The button becomes functional if an automatic motor start was followed by a manual switch-off, or if six consecutive automatic start attempts are unsuccessful. In both operating statuses, the signal lamp lights up and the button has to be pushed.

- **Lamp test** (Fig. 2, item 15)
  Pushing the button switches on all the signal lamps for as long as the button is pushed, allowing you to check that the lamps function. When you release the button, the signal lamps go out again or only light up according to the function.

- **Acknowledgement** (Fig. 2, item 18)
  Pressing the button resets all the error messages or signal lamps provided that the cause of the error no longer exists.

6.2.3 Switchgear display elements

Operational standby (Fig. 2, item 1)
The signal lamp lights up green when the power supply is connected.

Pump operation (Fig. 2, item 2)
The signal lamp lights up green when the diesel engine has started and the speed recorded by the speed transmitter has reached or exceeded the value set for "motor in operation" (menu 1.2.1.3).

Automatic mode (Fig. 2, item 3)
The signal lamp flashes yellow when automatic mode is switched off with the key-operated selector switch.

Excess motor temperature (cooling water) (Fig. 2, item 4)
The signal lamp lights up yellow when a connected thermostat is triggered.

Oil pressure fault (Fig. 2, item 5)
The signal lamp lights up yellow when a connected oil pressure monitor is triggered.

False start (Fig. 2, item 6)
The signal lamp lights up yellow after six consecutive unsuccessful automatic start attempts.

Sprinkler request (Fig. 2, item 7)
The signal lamp lights up white if the pressure in the system falls below the set/requested pressure and at least one of the two pressure switches is triggered. Once the start delay has expired (menu 1.2.5.1), the signal lamp lights up continuously. If the pressure rises accordingly, the signal lamp goes out.

Float switch request (Fig. 2, item 8)
The signal lamp flashes yellow when the level in the pump priming tank falls to 2/3 and the float switch is triggered. Once the start delay has

expired (menu 1.2.5.2), the signal lamp lights up continuously. If the level rises accordingly, the signal lamp goes out.

Heating fault (Fig. 2, item 9)
The signal lamp lights up yellow when a connected thermostat is triggered.

Belt break (Fig. 2, item 10)
The signal lamp lights up yellow when a belt break is detected.

Belt break (Fig. 2, item 11)
The signal lamp lights up yellow when the fuel float switch is triggered.

Collective fault (Fig. 2, item 12)
The signal lamp lights up red when a fault occurs. When the cause of the fault has been rectified, it is necessary to acknowledge the fault.

Test device for manual starter device
(Fig. 2, item 13)
The signal lamp lights up if an automatic motor start was followed by a manual switch-off, or if six consecutive automatic start attempts are unsuccessful.

Manual pump stop (Fig. 2, item 14)
The signal lamp lights up red as soon as the stop function for the stop button is enabled when the motor is running. The stop function is not enabled when the pressure switch (sprinkler request) has been triggered.

7 Installation and electrical connection

Installation and electrical connection must be carried out in accordance with local regulations and only by qualified personnel!

WARNING! Risk of injury!
The existing directives for accident prevention must be adhered to.

Warning! Danger of electric shock!
Danger from electrical current must be eliminated.
Local directives or general directives [e.g. IEC] and instructions from local energy supply companies must be adhered to.

7.1 Installation

Install the switchgear/system at a dry location. Protect the place of installation from direct exposure to sunlight.

7.2 Electrical connection

DANGER! Risk of fatal injury!
Improper electrical connections can lead to fatal electric shocks.

- **Have the electrical connection established by an electrician approved by the local electricity supplier only and in accordance with local regulations.**
- **Observe the installation and operating instructions for the pumps and accessories!**
- **Disconnect the power supply before any work.**

Warning! Danger of electric shock!
There is a potentially fatal voltage on the supply side, even when the main switch is turned off.

- The type of mains, current and voltage of the mains connection must match the details on the rating plate of the control device.

NOTE:
- Fuse on mains side in accordance with the information in the wiring diagram
- Feed the ends of the mains cable through the threaded cable connections and cable inlets and wire them according to the markings on the terminal strips.
- Earth the pump/installation in accordance with the regulations.

7.2.1 Power supply connection

Connect the on-site 3-wire cable (L, N, PE) for the supplying network to the main switch, in accordance with the wiring diagram.

7.2.2 Battery connection

Connect the batteries using the cables provided. Firmly tighten the screws on the fixation clips.

7.2.3 Fault signal / run signals connection

A signal can be taken from the terminal strip for the fault signal/run signal via a potential-free contact in order to indicate a fault/operation (see wiring diagram).
Potential-free contacts, max. contact load 250 V~ / 1 A

Warning! Danger of electric shock!
There is a potentially fatal voltage on these terminals, even when the main switch is turned off.

8 Commissioning

WARNING! Risk of fatal injury!
Commissioning by qualified personnel only!
Improper commissioning poses a risk of fatal injury. Have commissioning performed by qualified personnel only.

DANGER! Risk of fatal injury!
When working on the open switchgear, there's a danger of electric shock from touching the live components.
This work must only be carried out by qualified personnel!

We recommend that you have the switchgear commissioned by Wilo customer service.
Before switching on for the first time, the on-site wiring must be checked, in particular the earthing.

Tighten all terminals prior to commissioning!

8.1 Factory setting

The control is factory preset.
The factory settings can be restored by Wilo customer service.

8.2 Checking the speed adjustment

The motor speed is adjusted in the factory. To check the speed adjustment, start the motor manually. Once the motor has started, record the speed with a portable rev counter and compare it to the speed on the display. If the two values match, no correction is necessary.
If the difference is large, readjustment is necessary. Proceed as follows. Set the motor to a constant, known speed. Enter and confirm this value in menu 1.2.1.1. Go to the next menu item. In menu 1.2.1.2, change the setting to “Start” and confirm. After the adjustment, “Finished” appears on the display. The speed adjustment is complete and saved. The motor can be stopped by pressing the “stop” button (Fig. 2, item 14).

8.3 Start-up inspection at installation site

The automatic starter device of the diesel motor must be tested during start up at the installation site. In order to do so, the fuel supply must be interrupted. In menu 5.9.1.0, change the setting to “Start” and confirm. Then press the “Acknowledge” button (Fig. 2, item 18) within 10s. Then 6 automatic start attempts are made. After the end of the 6 start attempts, a false start is indicated via the yellow LED (Fig. 2, item 13). The fuel supply must be reconnected and the motor must start when the manual starter device button is pressed.

9 Maintenance

Have maintenance and repair work carried out by qualified skilled personnel only!
DANGER! Risk of fatal injury!
There is a risk of fatal injury from electric shock when working on electrical equipment.

- **The switchgear should be electrically isolated and secured against unauthorised switch-on during any maintenance or repair work.**
- **Any damage to the connection cable should only ever be eradicated by a qualified electrician.**

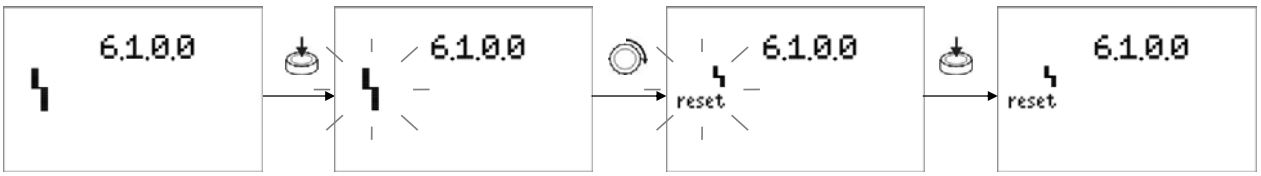
- The switchbox must be kept clean.
- Visual inspection of the electric system parts in the switchbox

10 Faults, causes and remedies

DANGER! Risk of fatal injury!
There is a risk of fatal injury from electric shock when working on electrical equipment.
Have faults remedied by qualified skilled personnel only! Follow the safety instructions in Section “2 Safety”.
Before all work to remedy faults, disconnect the unit from the power supply, and make sure it cannot be switched back on by unauthorised persons.

10.1 Fault indication

If a fault occurs, the relevant fault signal LED lights up, the collective fault signal and associated individual fault contact are activated and the fault is displayed on the LCD (fault code number).
The fault can be acknowledged by pressing the acknowledgement button (Fig. 2, item 18) or in menu 6.1.0.0 by proceeding as follows:



10.2 History memory for faults

A history memory has been set up for the switchgear and operates according to the FIFO principle (first-IN, first-OUT).
The memory is configured for 16 faults. The fault memory can be called up using menus 6.1.0.1 – 6.1.1.6.

Code	Fault description	Causes	Remedy
E04.1	No supply voltage to charger A	Main switch switched off	Switch on the main switch
		Fuse defective	Check fuse and replace, if necessary
E04.2	No supply voltage to charger B	Main switch switched off	Switch on the main switch
		Fuse defective	Check fuse and replace, if necessary

Code	Fault description	Causes	Remedy
E04.3	No supply voltage to battery A	Connection to battery A interrupted	Check connection
		Fuse defective	Check fuse and replace, if necessary
E04.4	No supply voltage to battery B	Connection to battery B interrupted	Check connection
		Fuse defective	Check fuse and replace, if necessary
E04.5	Undervoltage in battery A	Voltage has fallen below value set in menu 5.4.1.0	Check battery A and replace, if necessary
			Check charger
			Check setting in 5.4.1.0 and correct, if necessary
E04.6	Undervoltage in battery B	Voltage has fallen below value set in menu 5.4.1.0	Check battery B and replace, if necessary
			Check charger
			Check setting in 5.4.1.0 and correct, if necessary
E54.0	No bus communication to HMI board	Connection to HMI board interrupted	Check connection
			Request customer service
E54.1	No bus communication to charger for battery A	Connection to charger for battery A interrupted	Check connection
			Request customer service
E54.2	No bus communication to charger for battery B	Connection to charger for battery B interrupted	Check connection
			Request customer service
E54.3	Faulty data transfer from charger for battery A	Faults on the data cable	Request customer service
E54.4	Faulty data transfer from charger for battery B	Faults on the data cable	Request customer service
E100.1	Battery fault in battery A	Battery A defective	Check battery A and replace, if necessary
			Request customer service
E100.2	Battery fault in battery B	Battery B defective	Check battery B and replace, if necessary
			Request customer service
E105.1	Short-circuit in battery A	Battery A defective	Check battery A and replace, if necessary
			Request customer service
E105.2	Short-circuit in battery B	Battery B defective	Check battery B and replace, if necessary
E106.1	Cable break in battery A	Connection to battery A interrupted	Check connection to battery A
			Request customer service
E106.2	Cable break in battery B	Connection to battery B interrupted	Check connection to battery B
			Request customer service
E109.0	Freely configurable fault	Depending on the fault configuration	Depending on the fault configuration
E130.0	Lack of fuel	Fuel below minimum level	Refuel
E131.0	Heating fault	Thermostat for the heating has triggered	Check heating
E132.0	Low oil pressure	Oil pressure switch has triggered	Check oil level and refill, if necessary
			Request customer service
E133.0	Excess motor temperature	Thermostat for the motor has triggered	Check cooling water level
			Request customer service
E134.0	Starting pinion not engaged	Confirmation from starting pinion missing	Check starter
			Check fuse
			Request customer service

Code	Fault description	Causes	Remedy
E135.0	Pinion rim interrupted	Confirmation from starting pinion missing	Check fuse
			Request customer service
E136.0	Starts failed	6 unsuccessful start attempts performed	Request customer service
E137.0	Belt break	No tension for generator	Check V–belt and replace, if necessary
			Request customer service

If the fault cannot be remedied, please contact your nearest Wilo customer service point or representative.

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Pioneering for You

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