

Wilo-Control EC-Fire



en Installation and operating instructions

Fig. 1:

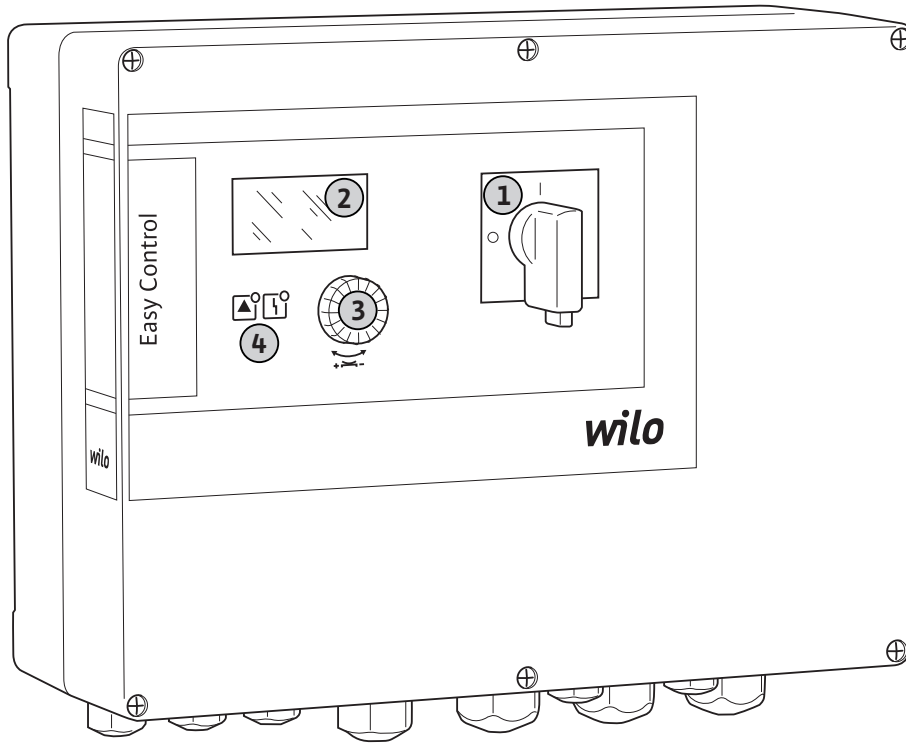


Fig. 2:

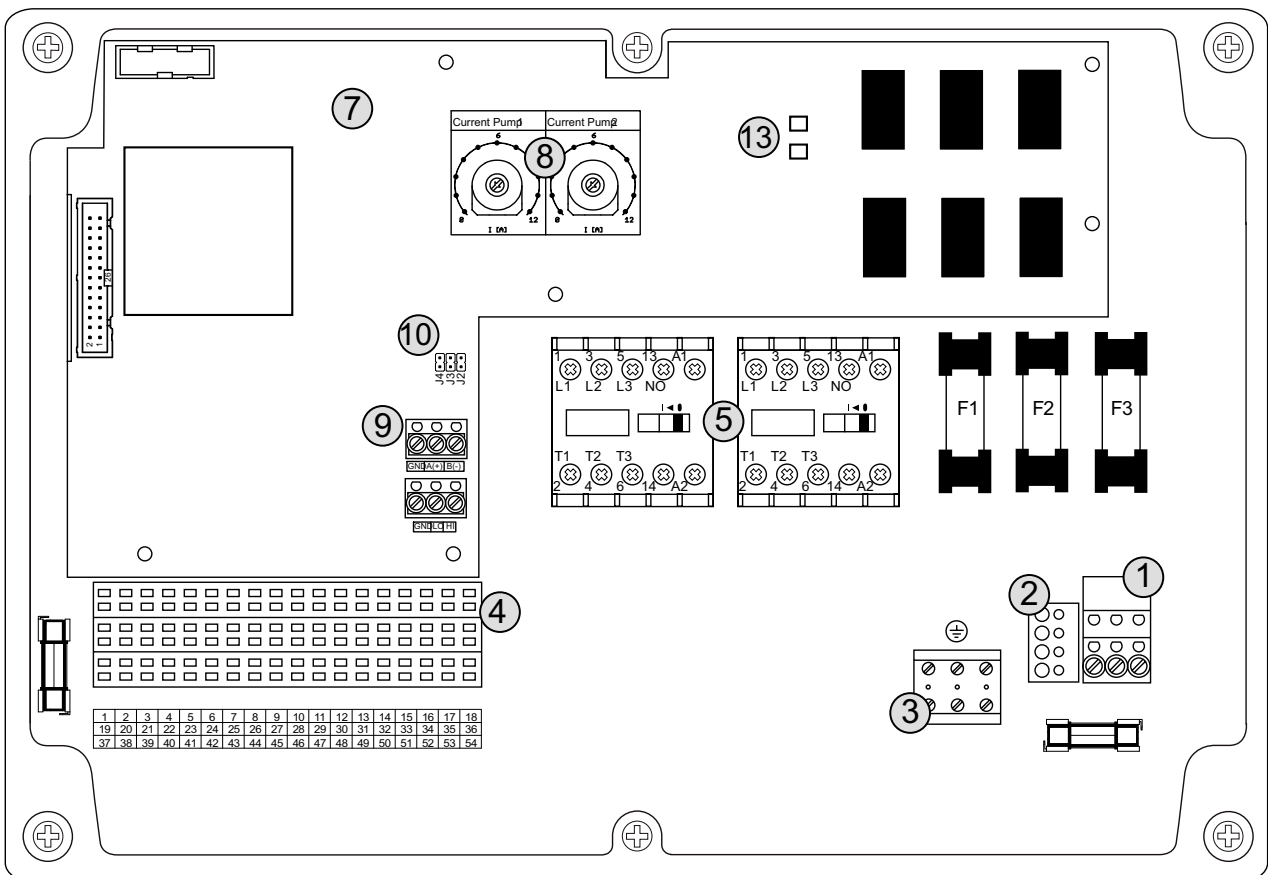


Fig. 3:

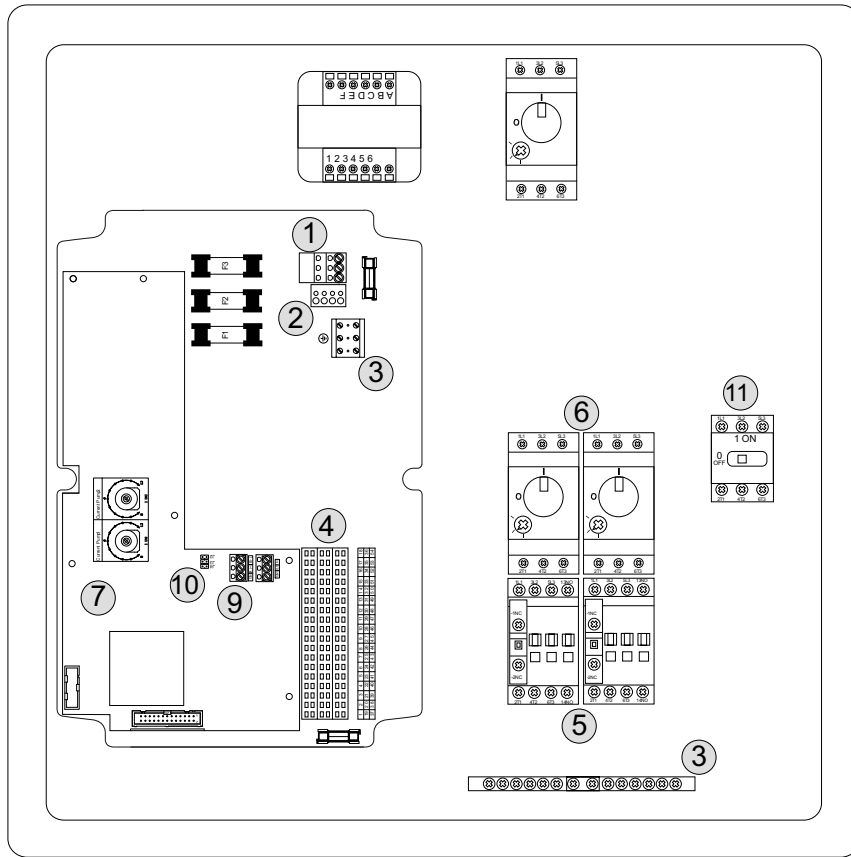


Fig. 4:

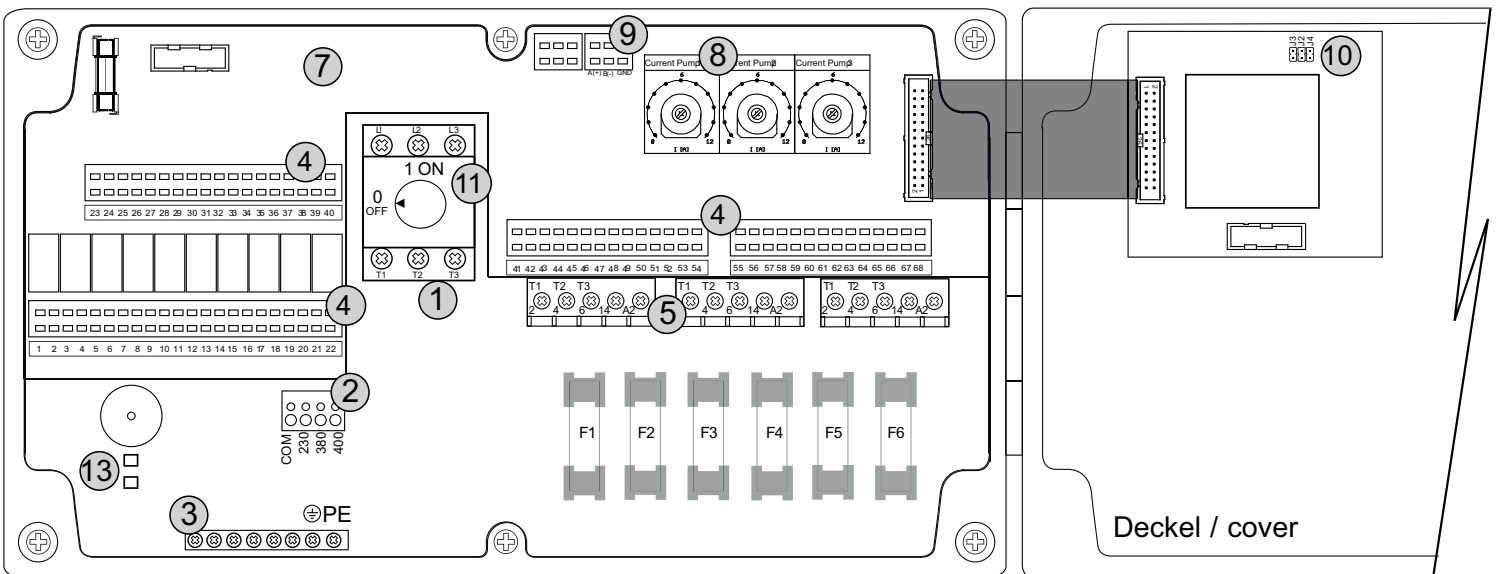


Fig. 5:

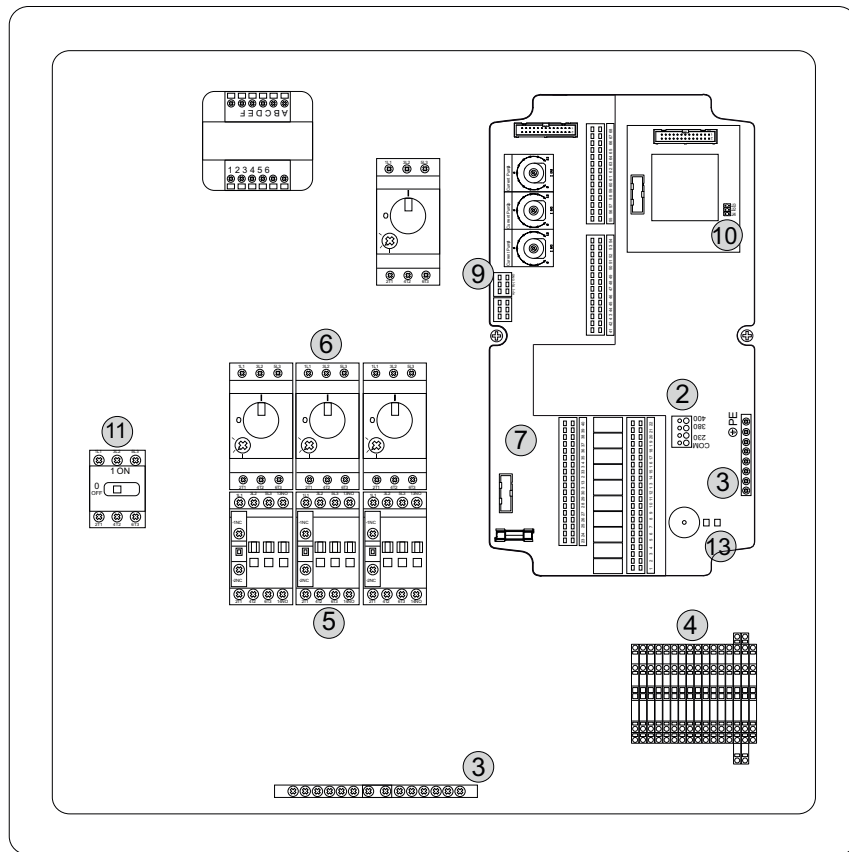


Fig. 6:

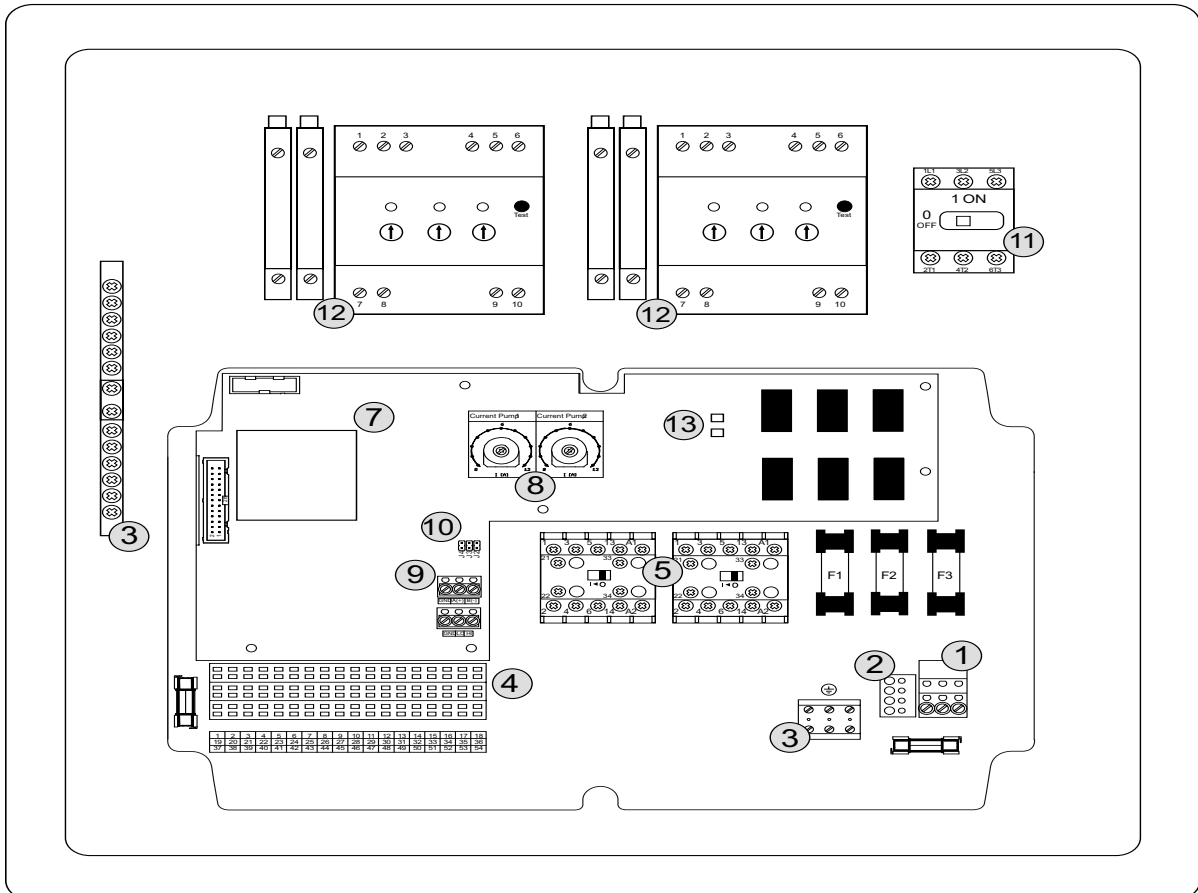


Fig. 7:

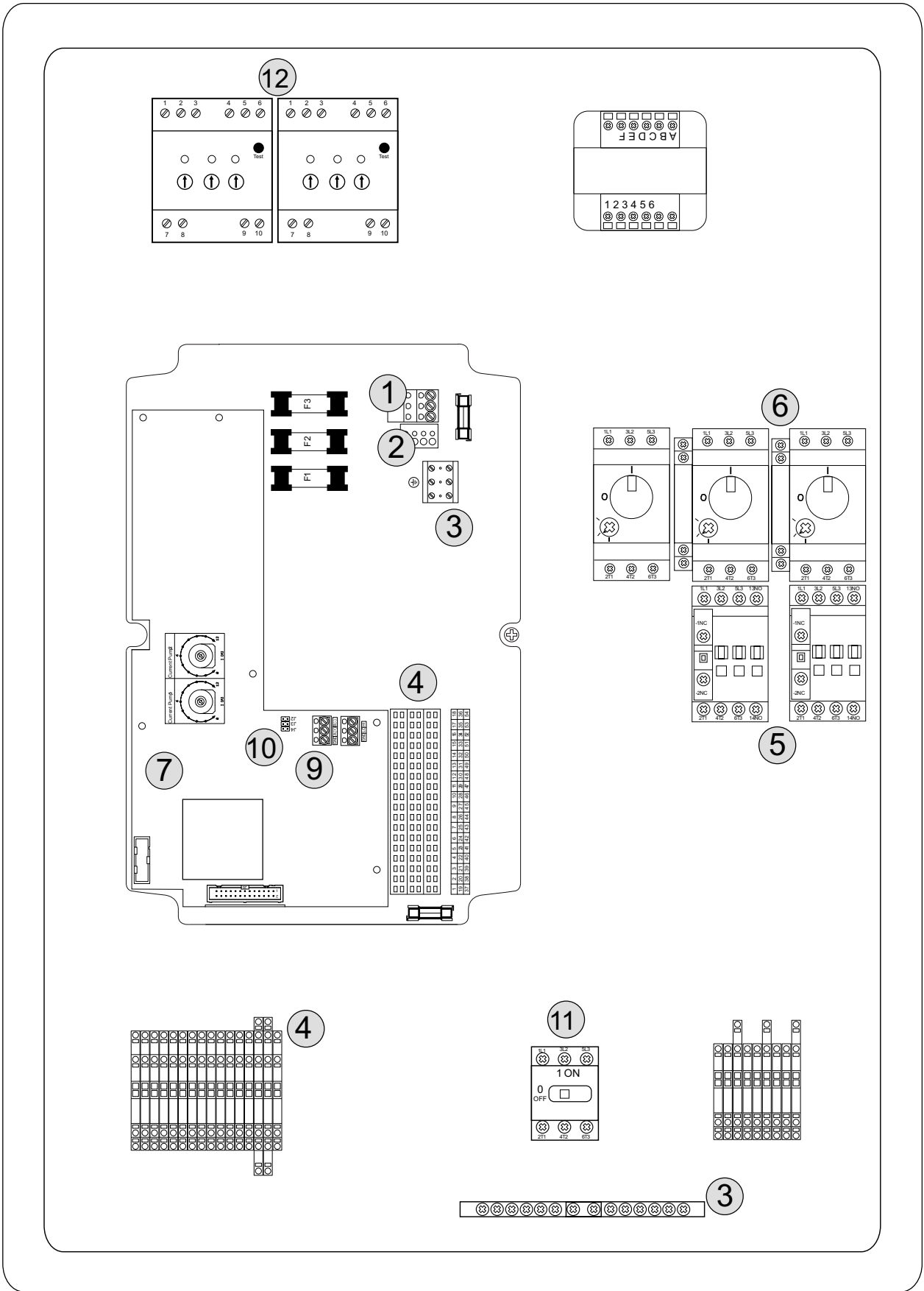


Fig. 8:

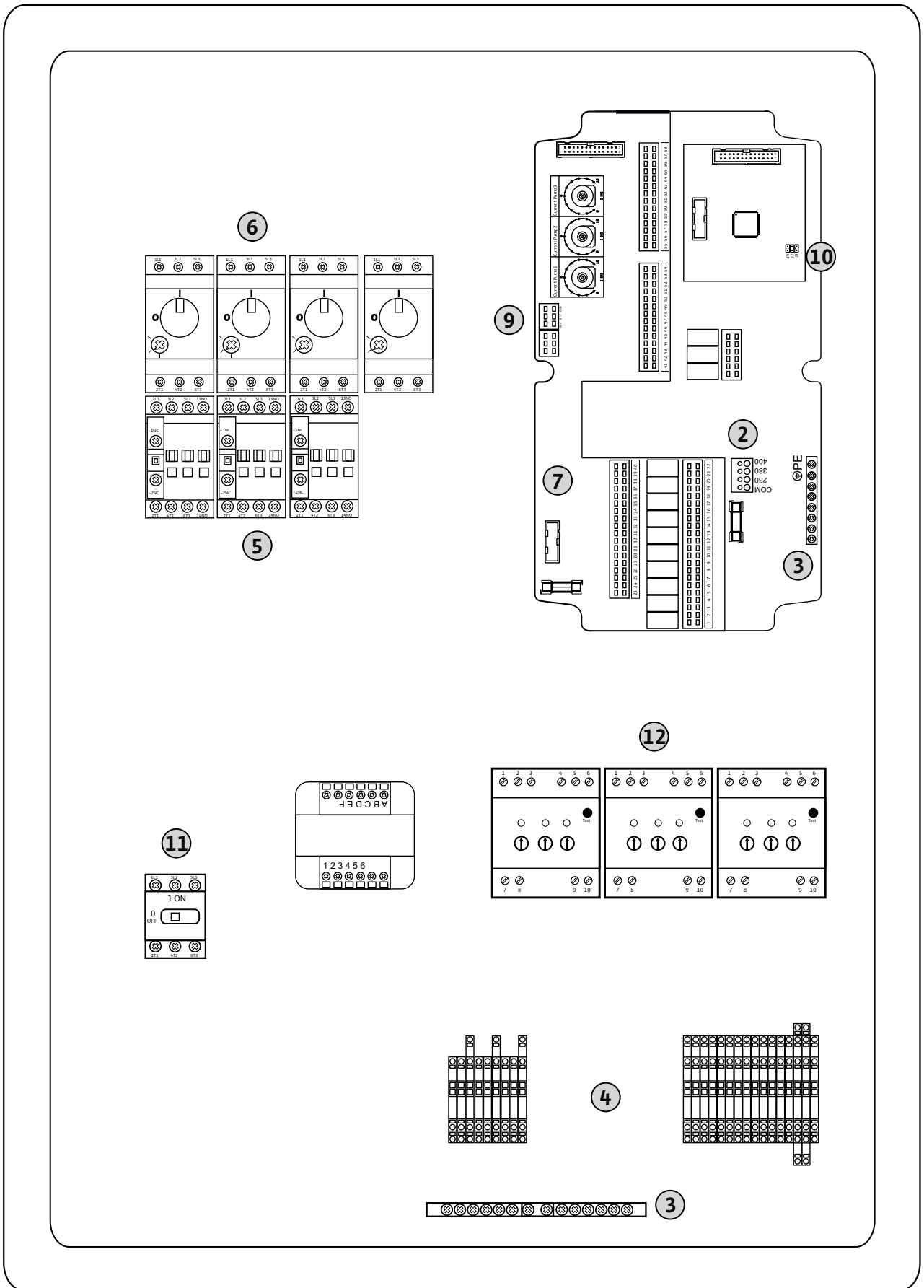


Fig. 9:

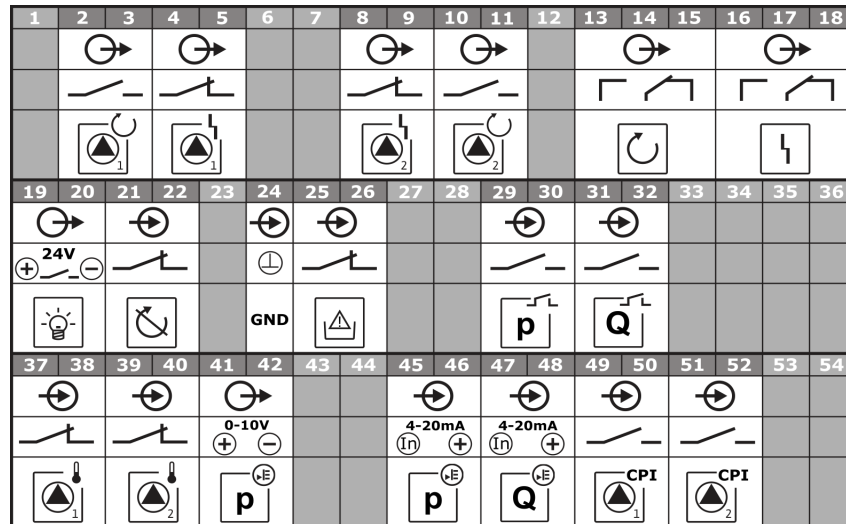


Fig. 10:

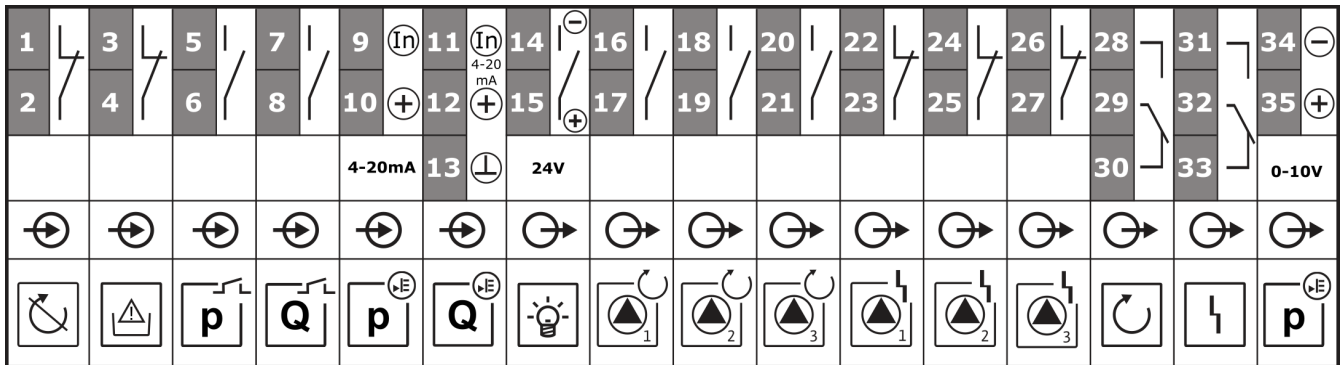


Fig. 10.2:

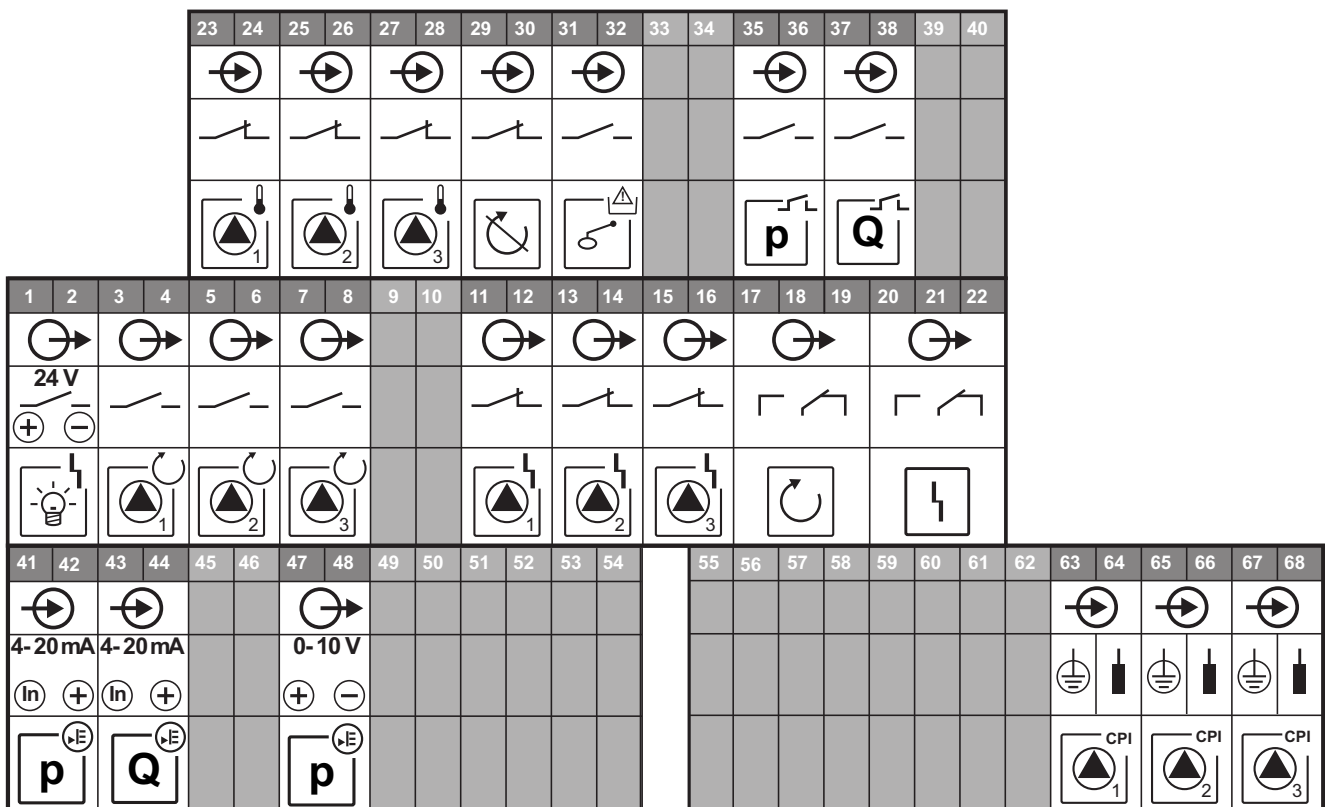


Fig. 11:

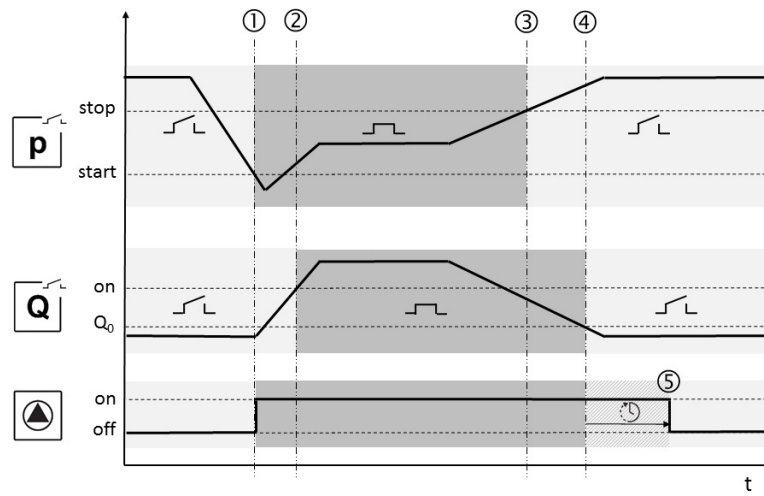


Fig. 12:

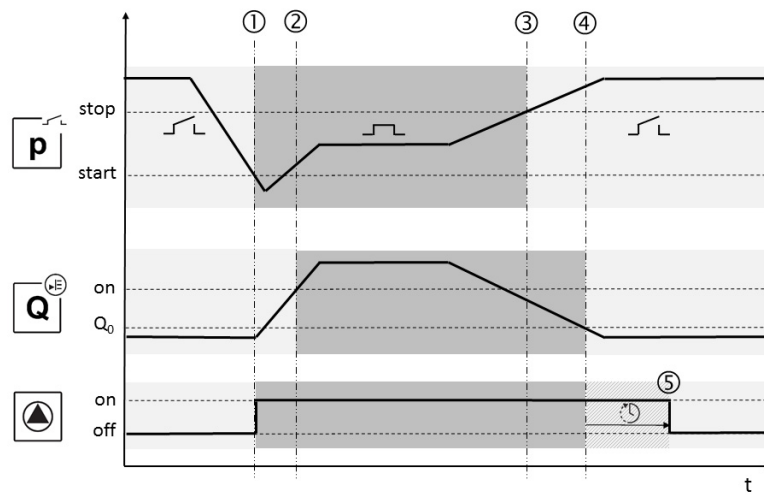


Fig. 13:

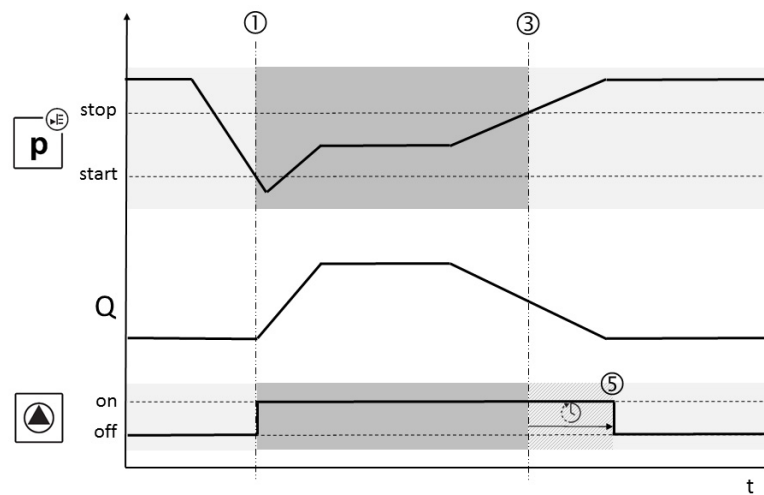


Fig. 14:

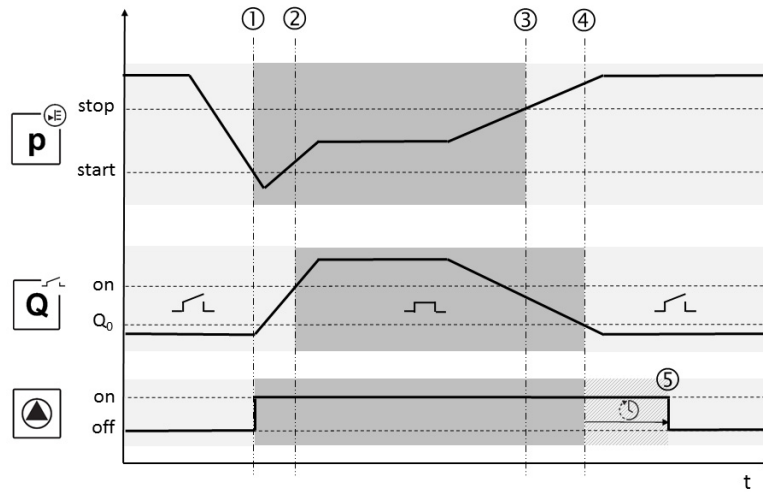


Fig. 15:

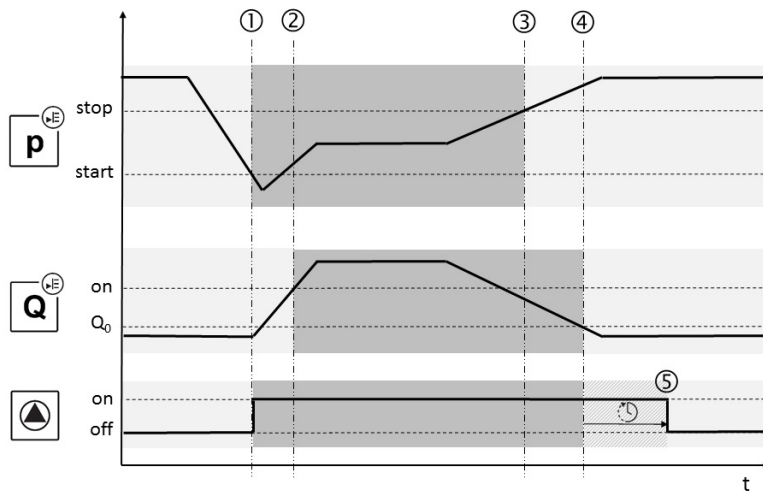
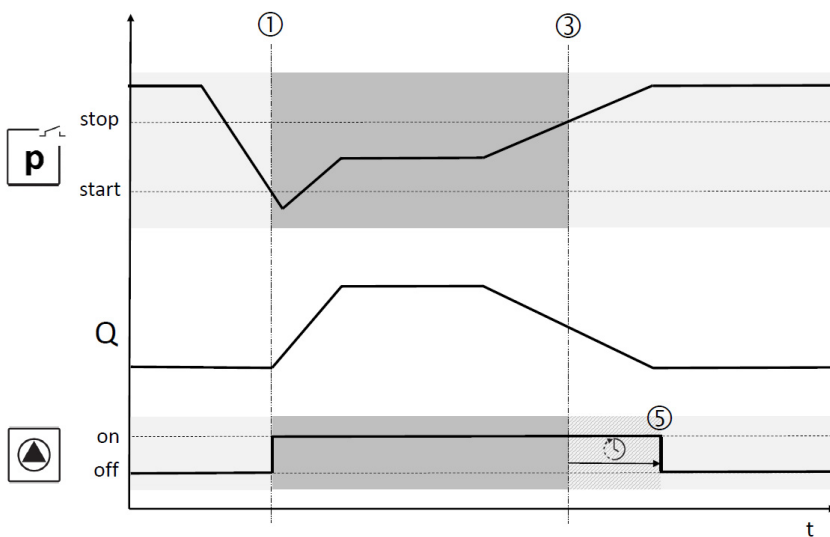


Fig. 16:



Captions

Fig. 1 External view of operating components	
1	Main switch: switching the switchgear on/off
2	LCD display
3	Operating button
4	LED indicators

Fig. 2 – 8 Interior view	
1	Mains connection terminal
2	Converter bridge for selecting the voltage of the mains connection
3	Earth terminal strip(s)
4	Terminal strips control/sensor
5	Contactors
6	Motor protection switch
7	Control board
8	Potentiometer for rated motor current
9	RS485 interface for ModBus RTU
10	Jumper for setting the termination/polarisation for the ModBus RTU
11	Main switch
12	Insulation monitoring device
13	Deactivating internal current monitoring

Fig. 2 Internal view, 1/2-pump version ≤ 12 A

Fig. 3 Internal view, 1/2-pump version > 12 A

Fig. 4 Internal view, 3-pump version ≤ 12 A

Fig. 5 Internal view, 3-pump version > 12 A

Fig. 6 Internal view, 1/2-pump version ≤ 12 A with insulation monitoring device

Fig. 7 Internal view, 1/2-pump version > 12 A with insulation monitoring device

Fig. 8 Internal view, 3-pump version with insulation monitoring device

Fig. 9 Terminal allocation, 1/2-pump version

Fig. 10 Terminal allocation, 3-pump version

Fig. 10.2 Terminal allocation, 3-pump version ≤ 12 A

Fig. 11 Signal sequence, mode 1

Fig. 12 Signal sequence, mode 2

Fig. 13 Signal sequence, mode 3

Fig. 14 Signal sequence, mode 3a

Fig. 15 Signal sequence, mode 3b

Fig. 16 Signal sequence, mode 4

1	General information	7
1.1	About this document	7
2	Safety	7
2.1	Symbols and signal words in the operating instructions	7
2.2	Personnel qualifications	7
2.3	Danger in the event of non-observance of the safety instructions	7
2.4	Safety consciousness on the job	7
2.5	Safety instructions for the operator	7
2.6	Safety instructions for installation and maintenance work	8
2.7	Unauthorised modification and manufacture of spare parts	8
2.8	Improper use	8
3	Transport and temporary storage	8
3.1	Delivery	8
3.2	Transport	8
3.3	Storage	8
3.4	Return delivery	8
4	Application (intended use)	9
5	Product information	9
5.1	Type key	9
5.2	Technical data	9
5.2.1	Switchgear	9
5.2.2	Inputs	9
5.2.3	Outputs	9
5.3	Scope of delivery	9
5.4	Accessories and options	9
5.4.1	Accessories	9
5.4.2	Options (factory installed)	10
6	Description and function	10
6.1	Description of the product	10
6.1.1	Function description	10
6.1.2	Switchgear set-up	10
6.2	Function and operation	10
6.2.1	Switchgear operating modes	10
6.2.2	Operation of the switchgear	13
6.2.3	Motor protection	22
6.2.4	Insulation monitoring (in the CPI version only)	22
7	Installation and electrical connection	23
7.1	Installation	23
7.2	Electrical connection	23
7.2.1	Connection diagrams	23
7.2.2	Switchgear mains connection	23
7.2.3	Pumps mains connection	24
7.2.4	Connection for pressure detection signal transmitter	24
7.2.5	Connection for volume flow detection signal transmitter	24
7.2.6	Connection for protection against low water level	24
7.2.7	Connection of remote deactivation of all pumps (Ext. Off)	24
7.2.8	Connection for actual pressure value display	24
7.2.9	Connection for collective run signal (SBM) and collective fault signal (SSM)	24
7.2.10	Connection for individual operation (EBM) and individual fault signal (ESM)	25
7.2.11	Connection of an external signalling unit	25
7.2.12	Field bus connection "ModBus RTU"	25
8	Commissioning	25
8.1	Factory setting	25
8.2	Activating the switchgear	25
8.3	Checking the motor direction of rotation	26

8.4	Adjusting the motor protection	26
8.5	Signal transmitters and optional modules	26
9	Maintenance	26
10	Faults, causes and remedies	26
10.1	Fault indication	26
10.2	Fault acknowledgement	27
10.3	Fault memory	27
10.4	Error codes	27
11	Spare parts	28
12	Decommissioning/disposal	28
12.1	Decommissioning	28
12.1.1	Deactivating automatic mode on the unit	28
12.1.2	Temporary decommissioning	28
12.1.3	Final shutdown	28
12.2	Disposal	28
13	Appendix	28
13.1	Overview of display symbols	28
13.2	System impedance overview	29
13.3	ModBus: Data types	30
13.4	Modbus: Parameter overview	30

1 General information

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 placed next to the product and be accessible at all times. 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 that apply 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 without our agreement is made to the designs named in the declaration, or the declarations made in the installation and operating instructions on product/personnel safety are not observed, this declaration is no longer valid.

2 Safety

These installation and 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 that are marked by danger symbols and 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



NOTICE:

Signal words:

Danger!

Acutely dangerous situation.

Non-observance will result in death or very serious injury.

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.

NOTICE:

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,
 - identifiers for connections,
 - rating plate, and
 - warning sticker
- 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 must 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 the risk of injury to persons and damage to the environment and the product/unit. Non-observance of the safety instructions will lead to the loss of any claims to damages.

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

- danger to persons due to electrical, mechanical and bacteriological factors,
- damage to the environment due to leakage of hazardous materials,
- material damage,
- failure of important product/unit functions, and
- 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 who lack experience and knowledge, unless they have been given supervision or instruction concerning the use of the

device 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/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 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 hazard is caused to persons or the environment. National statutory provisions must be observed.
- 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 [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 have sufficiently familiarised themselves with the installation and operating instructions by studying them in detail.

Work on the product/unit must only be carried out when it is 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.

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 void the manufacturer's declarations regarding safety.

Modifications to the product are only permissible following consultation with the manufacturer.

Genuine spare parts and accessories authorised 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 if used as intended and in accordance with section 4 of the installation and operating instructions. The limit values must on no account fall under or exceed those specified in the catalogue/data sheet.

3 Transport and temporary storage

3.1 Delivery

Upon delivery, check immediately that the shipment is complete and undamaged. If any parts are damaged or missing, the transport company or the manufacturer must be notified on the day of delivery since claims cannot be made afterwards. Damage to parts must be noted on the freight documentation!

3.2 Transport

Only the packaging used by the manufacturer or supplier may be used for transport. This normally precludes the possibility of damage occurring during transportation and storage. The packaging should be stored safely for reuse if the product is frequently used at different locations.

3.3 Storage

Upon delivery, switchgears may be placed into temporary storage for up to 1 year until use, provided the details below are observed. The following should be taken into consideration for storage:

- Correctly place the packaged switchgear on a firm surface.
 - Our switchgears may be stored at $-30\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ at a max. relative humidity of 90 %. The store room must be dry. We recommend a frost-proof room for storage where the temperature is kept between $10\text{ }^{\circ}\text{C}$ and $25\text{ }^{\circ}\text{C}$ and a relative humidity of 40 % to 50 %.
- Formation of condensation must be avoided!**
- Seal the threaded cable connection securely to prevent ingress of moisture.
 - Connected power supply cables should be protected against kinking, damage and moisture.



CAUTION! Beware of moisture!

The ingress of moisture will result in damage to the switchgear. During storage, pay attention to the permissible humidity and ensure the switchgear is stored so it is overflow-proof.

- The switchgear must be protected from direct sunlight, heat and dust. Heat or dust can cause damage to electrical components!
- Following a longer period of storage, the switchgear should be cleaned of dust before commissioning. If condensate has formed, check the individual components are working properly. Defective components must be replaced immediately.

3.4 Return delivery

Switchgears which are returned to the plant must be clean and correctly packaged. The packaging must protect the switchgear from damage during transportation. If you have any questions, please contact the manufacturer.

4 Application (intended use)

The EC-Fire switchgear is used for the pressure-dependent and volume-flow dependent control of up to 3 constant speed pumps in fire extinguishing systems. Signal detection occurs by means of pressure switch, pressure sensor, flow switch or volume flow sensor.

Intended use also means compliance with this manual. Any other use is regarded as non-compliant with the intended use.

5 Product information

5.1 Type key

Example:	W-CTRL-EC-F-2x12A-T34-DOL-CPI-WM
W	W = WILO
CTRL	Switchgear
EC	EC = Easy Control switchgear for fixed-speed pumps
F	Control for fire-extinguishing system
2x	Max. number of pumps that can be connected
12A	Max. rated current in ampere per pump
T34	Mains connection: T = three-phase current (3~) 34 = live wire, e.g. 380 – 400 V
DOL	Direct activation of the pump(s)
CPI	Insulation monitoring device(s) installed for pumps in the switchgear
WM	Wall fixation

5.2 Technical data

5.2.1 Switchgear	
Mains connection:	See rating plate
Max. current consumption:	See rating plate
Activation type:	Direct
Ambient/operating temperature:	0...+40 °C
Storage temperature:	-30...+60 °C
Max. relative humidity:	90 %, non-condensing
Protection class:	IP54
Control voltage:	See rating plate
Housing material:	Depending on version: Polycarbonate, UV-resistant Steel sheeting, powder coated
Electrical safety:	Pollution degree II

5.2.2 Inputs

- 1x analogue input 4 – 20 mA for the pressure sensor
- 1x analogue input 4 – 20 mA for the volume flow sensor
- 1x digital input for the pressure switch
- 1x digital input for the flow switch
- 1x digital input for the protection against low water level
- 1x digital input for remote switch-off of all pumps (Ext. Off)

5.2.3 Outputs

- 1x potential-free changeover contact for SSM
- 1x potential-free changeover contact for SBM
- 1x potential-free normally closed contact for ESM per pump
- 1x potential-free normally open contact for EBM per pump
- 1x output 24 V DC (max. 4 VA) for connection of a signal lamp etc.
- 1x analogue output 0 – 10 V for display of the actual pressure value

5.3 Scope of delivery

- Switchgear
- Installation and operating instructions
- Circuit diagram (for devices in a metal housing only)

5.4 Accessories and options

5.4.1 Accessories

- Float switch for dry-running protection
- Pressure switch for dry-running protection
- Pressure switch for pump control
- Pressure sensor for pump control
- Volume flow sensor for pump control
- Rotating beacon 24 V DC



NOTICE

In the event that the EC-Fire switchgear is delivered in a Wilo system, the accessories may already be fitted.

5.4.2 Options (factory installed)

- Insulation monitoring device (CPI)

6 Description and function

6.1 Description of the product

6.1.1 Function description

The microcontroller-controlled EasyControl switchgear is designed for control of up to 3 single pumps with a fixed speed which can be switched on independent of the pressure and switched off regardless of the pressure and volume flow.

In a 2-pump system only one pump is always running, in a 3-pump system, 2 pumps can be operated as base-load pump and peak-load pump.

A pump is kept as a standby pump in the event of failure.

Dry-running protection can be realised by the use of an optional switch input (e.g. a float switch in the break tank). In the event of a dry run, a visual signal is displayed and forced switch-off of the relevant pumps occurs.

Faults are recorded and stored in the fault memory.

The current operating data and operating states are indicated on the LCD display and via LEDs on the front side. Operation is carried out via a rotary knob on the front side.

6.1.2 Switchgear set-up

The switchgear comprises the following main components:

- Main switch: for switching the switchgear on/off
- Control panel:
 - LEDs for displaying the current operating state (operation/fault)
 - LCD display for displaying the current operating data and individual menu items
 - Operating button for menu selection and parameter input
- Contactor combinations for switching the individual pumps
- Fuse protection of pump motors

An overview of the individual components can be found in the following tables and the referenced illustrations.

Fig. 1: Overview of operating components

1	Main switch
2	LCD display
3	Operating button
4	LED indicators

Fig. 2 – 8: Internal structure

1	Mains connection terminal
2	Converter bridge for selecting the voltage of the mains connection
3	Earth terminal strip(s)
4	Terminal strips control/sensor
5	Contactor
6	Motor protection switch
7	Control board
8	Potentiometer for rated motor current
9	RS485 interface for ModBus RTU
10	Jumper for setting the termination/polarisation for the ModBus RTU
11	Main switch
12	Insulation monitoring device
13	Deactivating internal current monitoring

6.2 Function and operation

This section contains all of the information on how the switchgear functions as well as information on the menu structure.



DANGER due to electrical voltage!
When performing work on the uncovered switchgear, there is a risk of fatal electrocution!
All work on individual components must be performed by a qualified electrician.



NOTICE

Following a power supply interruption, the switchgear will automatically start up in the last operating mode set.

6.2.1 Switchgear operating modes

How it works

In automatic mode, a connected pump is switched on if the pressure drops below the start-up pressure. In systems with 2 pumps, one of the pumps is generally defined as a standby pump. In systems with 3 pumps, the second pump may cut-in depending on demand, in which case the third pump is then the standby pump.

A visual indicator appears on the LCD display and the green LED lights up while the pump(s) is/are in operation. Depending on parameterisation, the collective run signal is activated, as well as the signal lamp and internal buzzer.

Upon reaching the deactivation point (pressure/volume flow – see section 6.2.1 Switchgear operating modes). The pumps are switched off after the set switch-off delays have elapsed.

To optimise pump running times, general pump cycling is carried out every time the pump is switched off.

In the event of one pump malfunctioning, automatic changeover to a fully-functional pump occurs. An optical alarm signal is output.

Additionally, depending on parameterisation, an acoustic alarm signal can be output via the internal buzzer and the signal lamp activated.

Furthermore, the collective fault signal (SSM) as well as the individual fault contact (ESM) of the affected pump are active in the event of a fault. If dry-running protection is activated, forced deactivation of all available pumps occurs and a visual alarm signal is output. Additionally, depending on parameterisation, an acoustic alarm signal can be output via the internal buzzer and the signal lamp activated. Furthermore, the collective fault signal (SSM) is active.

Operating modes

The device always operates with a pressure-dependent cut-in and a pressure-dependent / volume-flow-dependent deactivation of the pumps. Various modes are possible, depending on the sensors used in the unit. The signal sequences (Fig. 11 – 16) are shown using a pump as an example.

Mode	Signal sequence	Pressure signal detection (menu 5.06)	Volume flow detection (menu 5.08)
1	Fig. 11		
2	Fig. 12		
3	Fig. 13		
3a*	Fig. 14		
3b	Fig. 15		
4	Fig. 16		

* Factory setting

Mode 1

If the system pressure falls below the start-up pressure (setting on the pressure switch), the pressure switch contact is closed and the switch-gear activates a connected pump immediately (1). The flow of water in the system closes the contact of the flow switch (2) and the pump continues running irrespective of the system pressure. If the volume flow requirement in the system falls, the pressure increases again; the pressure switch contact opens when the deactivation threshold (3) is exceeded. If the volume flow falls below the deactivation threshold of the flow switch, the contact is opened (4) and, after an adjustable follow-up time (menu 1.06), the pump is deactivated (5).

Mode 2

If the system pressure falls below the start-up pressure (setting on the pressure switch), the pressure switch contact is closed and the switch-gear activates a connected pump immediately (1). The flow of water in the system causes the volume flow to rise above the zero flow cut-off (2) set in menu 5.19 and the pump continues running irrespective of the system pressure. If the volume flow requirement in the system falls, the pressure increases again; the pressure switch contact opens when the deactivation threshold (3) is exceeded. If the volume flow falls below the zero flow cut-off (4) and, after an adjustable follow-up time (menu 1.06), the pump is deactivated (5).

Mode 3

If the system pressure falls below the start-up pressure (menu 1.04) a connected pump is immediately activated (1).

If the volume flow requirement in the system falls, the pressure increases again, and when the deactivation threshold (3) (menu 1.05) is exceeded, the pump is deactivated (5) after an adjustable follow-up time (menu 1.06).

In Mode 3a, pump deactivation occurs via a flow switch (see Mode 1).

In Mode 3b, pump deactivation occurs via volume flow sensor (see Mode 2).

Mode 4

If the system pressure falls below the start-up pressure (setting on the pressure switch), the pressure switch contact is closed and the switchgear activates a connected pump immediately (1). If the volume flow requirement in the system falls, the pressure increases again; the pressure switch contact opens when the deactivation threshold (3) is exceeded and, after an adjustable follow-up time (menu 1.06), the pump is deactivated (5).

Pump operating mode

The operating mode of the pumps (Hand, Off, Auto) can be selected in menus 3.02 to 3.04. In manual mode, the pump operates as long as the operating button is held down.

Standby pump

In devices with more than one pump, a pump is defined as the standby pump and is not actuated in normal operation. This pump only becomes active when a pump fails due to a fault.

The standby pump is, however, subject to standstill monitoring and is activated during pump cycling and pump kick.

This function is preset at the factory and cannot be changed.

Pump cycling

To prevent irregular running times of the individual pumps, general pump cycling takes place. This means that pumps are changed at the next start only after all pumps have been switched off.

Pump kick

To prevent longer standstill times for the connected pumps, a periodical test run can be performed (pump kick function) (menu 5.40 to "on"). A test run is only performed when all of the pumps have been brought to a standstill.

If pump kick is activated, the following parameters must also be set:

- Menu 5.41: definition of whether pump kick should also take place if pumps are switched off via "Ext. Off"

- Menu 5.42: time interval after which a pump kick should take place
- Menu 5.43: running time of the pump kick

Dry-running protection

A low water signal can be fed to the switchgear via a normally closed contact by means of the signal from a suction-side pressure switch or break tank float switch.

If the contact is open, the pumps are switched off after the adjustable delay time set in menu 5.62 has elapsed. If the signal input is closed again within the delay time, this does not lead to deactivation.

The system restart after a deactivation due to low water takes place automatically after the signal input closes (delay time acc. to menu 5.63).

The fault message is reset automatically after the restart, but can be read out from the history memory.

Ext. Off

It is possible to deactivate the switchgear externally using an NC contact. This function takes precedence; all pumps are switched off.

Behaviour during sensor fault (pressure sensor or volume flow sensor)

In the event that a sensor fault occurs (e.g. wire break) in the system, menu 5.45 can be used to define whether and with how many pumps the system (uncontrolled) continues to run. This means that the water supply can be maintained in the event of a such a fault.

Plausibility monitoring

If the system pressure falls and a pump starts, a volume flow should build up in the system. A corresponding signal must be sent by the flow switch/flow sensor within 10 s; otherwise, a plausibility alarm (E090) is triggered.

Plausibility is not monitored during a pump kick.

Logic of the collective run signal (SBM)

The desired function of the collective run signal can be set in menu 5.58:

- "On": switchgear ready for operation
- "Run": at least one pump is running

Logic of the collective fault signal (SSM)

The desired logic of the collective fault signal can be set in menu 5.59:

- "Fall": negative logic (falling edge)
- "Raise": positive logic (rising edge)

Integrated alarm buzzer

Depending on the application of the switchgear, the internal alarm buzzer parameters can be set as follows (menu 5.66):

- "off": deactivated – no warning function
- "Error": the alarm buzzer sounds when a fault occurs in the system
- "Run": the alarm buzzer sounds if at least one pump is running

Output for an external signalling unit

Depending on the application of the switchgear, the parameters of a 24 V (DC) output for an external signalling device can be set as follows (menu 5.67):

- “off”: deactivated – no warning function
- “Error”: the output is activated when a fault occurs in the system
- “Run”: the output is activated when at least one pump is running

Fieldbus connection

The switchgear is prepared for connection via ModBus RTU as standard. Connection is established via an RS485 interface (electrical connection as per section 7.2.12).

The switchgear works as a Modbus slave. Basic settings are made in menus 2.01 to 2.05. Different parameters can be read and also changed to some extent via the Modbus interface. An overview of individual parameters and a description of the data types used are shown in the appendix.

6.2.2 Operation of the switchgear

Operating elements

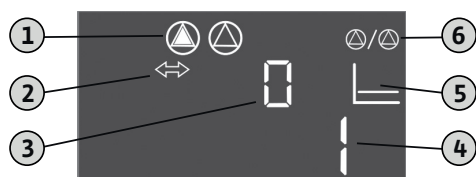
- Main switch on/off (lockable in “off” position)
- The menu is controlled via the operating button:
 - Turn: selection and set values
 - Press: change menu level or confirm value

Fig. 17: Operation



- The LCD display shows the operating statuses of the pumps and the controller.

Fig. 18: Appearance of display with pressure switch



1	Current pump status: number of registered pumps; pump on/pump off
2	The device is in fieldbus mode
3	Indicator of the volume flow (0 = volume flow is less than the zero-flow cut-off; 1 = volume flow is greater than the zero-flow cut-off)
4	Switching status of the pressure switch (0 = contact open; 1 = contact closed)
5	Indicator of the operating mode (here always: p-c)
6	Standby pump activated; basic state of EC-Fire

Fig. 19: Appearance of display with pressure sensor



1	Current pump status: number of registered pumps; pump on/pump off
3	Indicator of the volume flow (0 = volume flow is less than the zero-flow cut-off; 1 = volume flow is greater than the zero-flow cut-off)
4	Current system pressure
5	Indicator of the operating mode (here always: p-c)
6	Standby pump activated; basic state of EC-Fire



NOTICE

The display backlight is switched off if there is no operation for 6 minutes.

If the red fault LED lights up or flashes immediately after activation, observe the error code information on the display!

You can find an overview of all symbols in the appendix.

Operating menu

The menu is divided into two areas:

- EasyActions
- Parameters

EasyActions

EasyActions offers quick access to the following functions:

	Resetting error messages
	Pump 1 is switched on in the manual mode as long as the operating button is kept pressed
	Pump 2 is switched on in the manual mode as long as the operating button is kept pressed
	Pump 3 is switched on in the manual mode as long as the operating button is kept pressed

1. From the main screen, turn the operating button 180° to call up the first function.
2. Continue to turn the operating button by 180° at a time to call additional functions or to go back to the main screen



NOTICE

EasyActions can be deactivated in menu 7.06.

Menu overview

1. Start the menu by pressing the operating button for 3 sec.
2. Follow the menu structure below for the desired value and change this according to your specifications.

Parameter menu

All values can be displayed and adjusted via the parameter menu. The menu is divided into seven areas:

1. Control parameters: setpoints, start/stop delays
2. Communication parameters: ModBus
3. Operating modes: activation and deactivation of the connected pumps
4. Information: indicator of parameters currently set as well as data for the switchgear (type, serial number etc.)
5. Installation: basic settings for the switchgear
6. Fault memory
7. Service









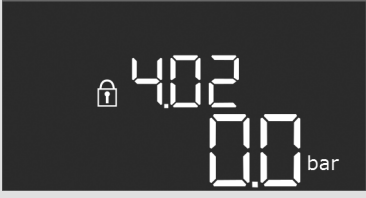
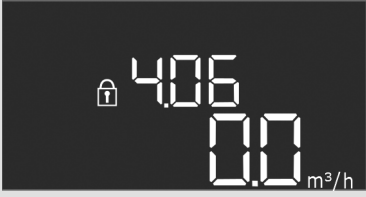
NOTICE

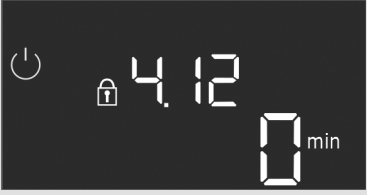
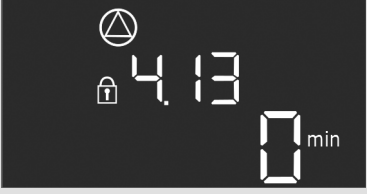
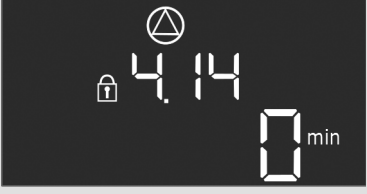
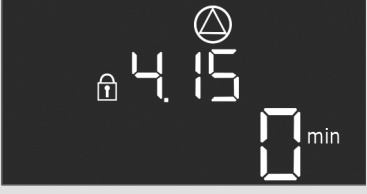
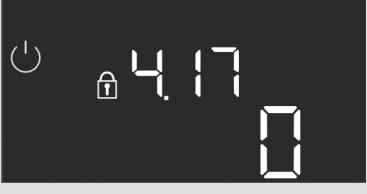
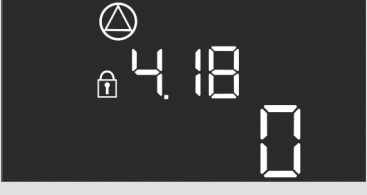
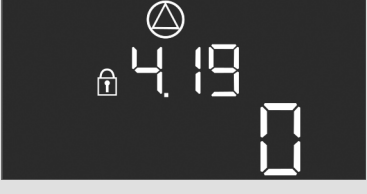
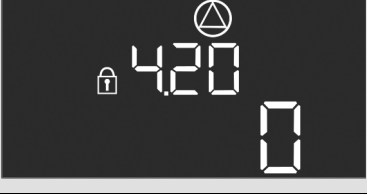
- Generally, values can only be displayed. Approval must be obtained to actually change the values. For this, set the value to "on" in menu 7.01.
- If there is no operation for approx. 6 minutes, parameter setting is locked again!
- Some parameters can only be adjusted if no pump is in operation.

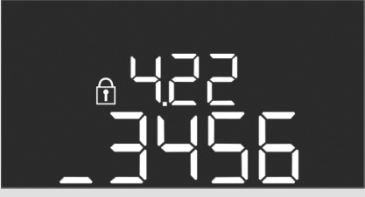
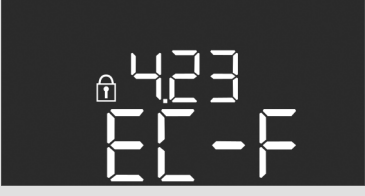


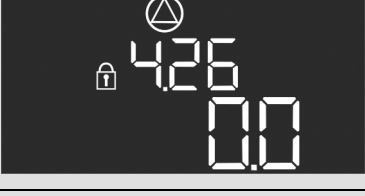
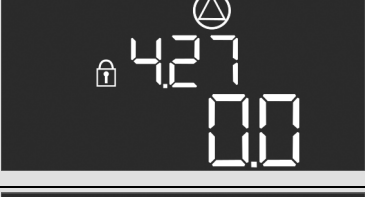

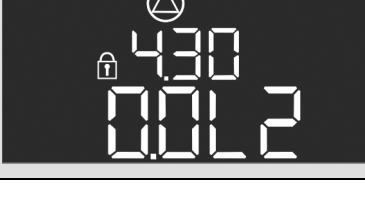
The menu structure is adapted automatically based on the settings. Menu 1.01 is only visible if a pressure sensor is connected and activated accordingly in menu 5.06.


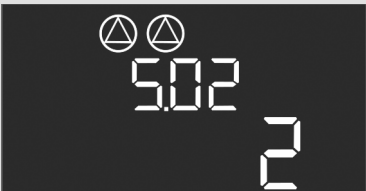





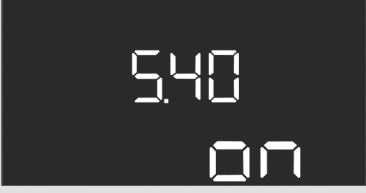
Furthermore, the menu structure is applicable and defined for all variants of the EC switchgears (HVAC, Booster, Fire, Rain, Lift). This may lead to gaps in numbering.









Menu no. /	Description	Display
<i>Menu 1.00: Control parameters</i>		
1.01	Pressure setpoint Value range: 0.1 ... 16.0 bar* Factory setting: 4.0 bar	
1.04	Activation threshold of the pump (in % from default value in 1.01) Value range: 50 ... 99 % Factory setting: 90 %	
1.05	Deactivation threshold of the pump (in % from default value in 1.01) Value range: 101 ... 130 % Factory setting: 115 %	
1.06	Pump switch-off time delay Value range: 10 ... 300 s Factory setting: 180 s	
1.10	Activation delay, peak-load pump Value range: 1 ... 10 s Factory setting: 1 s	
<i>Menu 2.00: Communication parameters (Modbus)</i>		
2.01	ModBus approval Values: off, on Factory setting: off	
2.02	ModBus: Baud rate Values: 9600; 19200; 38400; 76800 Factory setting: 19200	
2.03	ModBus: Slave address Value range: 1 ... 254 Factory setting: 10	








Menu no. /	Description	Display
2.04	ModBus: Parity Values: none, even, odd Factory setting: even	
2.05	ModBus: Number of stop bits Values: 1; 2 Factory setting: 1	
<i>Menu 3.00: Operating modes</i>		
3.01	Drives, switching on/off Values: off, on Factory setting: off	
3.02	Operating mode, pump 1 Values: off, Hand, Auto Factory setting: auto	
3.03	Operating mode, pump 2 Values: off, Hand, Auto Factory setting: auto	
3.04	Operating mode, pump 3 Values: off, Hand, Auto Factory setting: auto	
<i>Menu 4.00: Information</i>		
4.02	Current system pressure (only if a pressure sensor is used; see 5.06)	
4.06	Current volume flow (only if a volume flow sensor is used; see 5.08)	




Menu no. /	Description	Display
4.12	Total running time of the switchgear	
4.13	Running time pump 1	
4.14	Running time pump 2	
4.15	Running time pump 3	
4.17	Switching cycles of the switchgear	
4.18	Switching cycles of pump 1	
4.19	Switching cycles of pump 2	
4.20	Switching cycles of pump 3	

Menu no. /	Description	Display
4.22	Serial number of the switchgear (display changes between the first and second 4 digits of the serial number)	
4.23	Switchgear type	
4.24	Software version	
4.25	Default value of the potentiometer for the rated current of pump 1 [in A]	
4.26	Default value of the potentiometer for the rated current of pump 2 [in A]	
4.27	Default value of the potentiometer for the rated current of pump 3 [in A]	
4.29	Actual current of pump 1 [in A]; display changes between L1, L2 and L3	
4.30	Actual current of pump 2 [in A]; display changes between L1, L2 and L3	

Menu no. /	Description	Display
4.31	Actual current of pump 3 [in A]; display changes between L1, L2 and L3	
<i>Menu 5.00: Installation</i>		
5.02	Number of pumps Value range: 1 ... 3 Factory setting: 2	
5.06	Sensor type for pressure detection Values: Senso, digi Factory setting: Senso	
5.08	Sensor type for volume flow detection Values: Senso, digi, none Factory setting: digi	
5.11	Pressure sensor measurement range Value range: 1 ... 16 bar Factory setting: 16 bar	
5.13	Volume flow sensor measurement range Value range: 1 ... 600 m³/h Factory setting: 60 m³/h	
5.19	Zero-flow cut-off Value range: 0 ... 60 m³/h* Factory setting: 3 m³/h	
5.40	Switching pump kick on/off Values: off, on Factory setting: on	

Menu no. /	Description	Display
5.41	Pump kick for "Ext. Off" allowed Values: off, on Factory setting: on	
5.42	Interval between pump kicks Value range: 1 ... 336 h Factory setting: 24 h	
5.43	Running time of pump on pump kick Value range: 0 ... 60 s Factory setting: 5 s	
5.45	Behaviour during sensor fault – number of pumps to be switched on Value range: 0 ... 3* Factory setting: 0	
5.58	Collective run signal (SBM) function Values: on, run Factory setting: run	
5.59	Collective fault signal (SSM) function Values: fall, raise Factory setting: raise	
5.62	Dry run delay time Value range: 0 ... 300 s Factory setting: 15 s	
5.63	Reactivation delay time after dry run Value range: 0 ... 300 s Factory setting: 10 s	

Menu no. /	Description	Display
5.66	Integrated alarm buzzer Values: off, Error, Run Factory setting: Run	
5.67	Output for an external signalling device 24 V DC (e.g. signal lamp) Values: off, Error, Run Factory setting: Run	
5.68	Rotating field monitoring (mains input) Values: off, on Factory setting: on	
5.69	Internal minimum current monitoring Values: off, on Factory setting: on	
<i>Menu 6.00: Fault memory</i>		
6.01	Alarm acknowledgement (Changing of the parameter to Reset acknowledges the alarms)	
6.02 – 6.11	Fault memory spaces (FiFo – latest fault in 6.02) The error code is displayed	
<i>Menu 7.00: Service</i>		
7.01	Parameter changes possible Values: off, on Factory setting: off	

Menu no. /	Description	Display
7.04	Input of serial number (first 4 digits) Value range: 0000 ... 9999 Factory setting: device ID	
7.05	Input of serial number (next 4 digits) Value range: 0000 ... 9999 Factory setting: device ID	
7.06	Using EasyActions Values: off, on Factory setting: on	

* The value range is dependent on the sensor measuring range and other parameters!

6.2.3 Motor protection

Overcurrent

The pumps are protected against overcurrent for versions up to 12 A by an internal current monitor, the trigger current (rated current of the pump) must be set directly on the EC printed circuit board (Fig. 2-8, Item 8). For versions greater than 12 A, the pumps are protected against overcurrent by motor protection switches; the trigger current must be set directly on the motor protection switch (Fig. 2-8, Item 6). An overcurrent will cause the pump to deactivate, display an error message and activate the SSM and ESM (of the affected pump) on the switchgear. After eliminating the cause of the fault, the motor protection switch must be switched on again for versions greater than 12 A and the fault must be acknowledged on the switchgear.

If the potentiometer is set to zero, the internal motor current monitoring is not deactivated. This setting on the potentiometer results in a pump alarm every time the pump starts.

Deactivation of the pumps in case of overcurrent by the internal current monitoring can be deactivated for versions up to 12 A. To do this, cut through the web between the rectangular cut-outs (Fig. 2, 4, 6, Item 13) using side cutting pliers.



NOTICE

The deactivation of the internal current monitoring is final and cannot be reversed

Minimum current

In switchgear up to the 12 A version, an option is provided (which can be activated) for monitoring the minimum current flow of the motors (uninter-

rupted pumping of fluid by the pump). To do this, internal motor current measurement should be activated (menu 5.69 to "on") and the rated motor current set using the potentiometers (Fig. 2 – 8, pos. 8). The adjusted value can also be read via the menu:

- Pump 1: Menu 4.25
- Pump 2: Menu 4.26
- Pump 3: Menu 4.27



RISK OF FATAL INJURY due to dangerous electrical voltage!

The switchgear must be connected and switched on whilst adjusting in order to read the currently set value on the display.

There is a risk of fatal injury due to electric shock!

Adjustment must only be carried out by a qualified electrician using an insulated screwdriver!

If the current falls below the minimum current value, this leads to deactivation of the pump, an error message on the switchgear, and activation of the SSM and ESM (of the affected pump). After the reason for the fault has been rectified, the fault must be acknowledged on the switchgear.

6.2.4 Insulation monitoring (in the CPI version only)

For application in the mains form IT (French: Isolé Terre), the device can be fitted with an insulation monitoring device at the factory. On every pump that is switched on, the insulation between the active conductors and the earth potential is monitored.

If an insulation fault occurs, the affected pump cannot be switched on. An error message is displayed and the SSM and ESM (of the affected pump) are activated. After the reason for the fault has been rectified, the fault must be acknowledged on the switchgear.

7 Installation and electrical connection

In order to prevent damage to the switchgear or serious injury during installation, the following points must be observed:

- Installation work – assembly and installation of the switchgear – may only be carried out by qualified persons. The safety instructions must be followed at all times.
- The switchgear must be inspected for transport damage before carrying out any installation work.



WARNING! Risk of injury!
Existing regulations for accident prevention must be adhered to.

7.1 Installation

The switchgear is attached to a mounting bracket of the fire-extinguishing system at the factory. If fixation of the switchgear is desired as a wall device – separate from the compact unit – it must be attached using 4 x 4 mm diameter screws (plastic housing) or 4 x 8 mm diameter screws (metal housing).

Suitable measures should be used to ensure the protection class. The fixation material must be appropriate to the building structure on-site.

7.2 Electrical connection



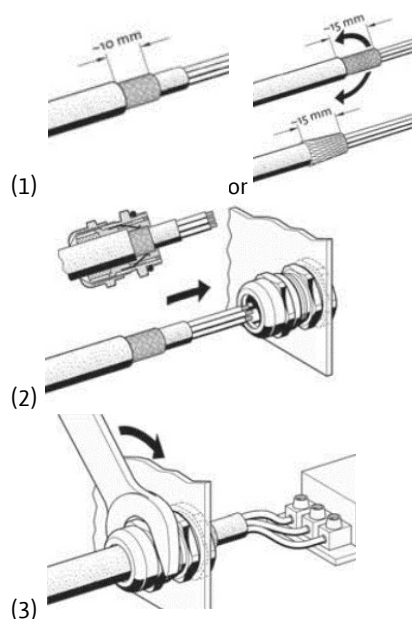
RISK OF FATAL INJURY due to dangerous electrical voltage!
Incorrect electrical connections can result in risk of fatal injury! Electrical connection may only be carried out by a qualified electrician approved by the local energy supply company, in accordance with locally applicable regulations.



NOTICE

- Depending on the system impedance and the max. connections/hour of the connected consumers, voltage fluctuations or voltage drops may occur (see appendix 13.2). Always have an electrician authorised by the local energy supply company carry out the electrical connection.
- Observe the installation and operating instructions for the connected pumps and signal transmitters.
- The mains connection current and voltage must be as stated on the rating plate.
- Fuse protection on the mains side must be in accordance with the information in the circuit diagram.
- A residual-current device (RCD, type A, sinusoidal current) must be installed in the supply line. Observe the local laws and regulations on this too!
- Route the power supply cable in accordance with the valid norms/regulations and according to the connection diagram.
- Earth the system (switchgear and all electric consumers) in accordance with regulations.
- When using shielded cables, the shielding must be attached to the earth rail or EMC threaded cable connection on one side of the switchgear!

Connecting cable shields to the EMC threaded cable connections



7.2.1 Connection diagrams

The connection diagrams for switchgears with a plastic housing can be obtained from Fig. 9 and 10. Additionally, the connection diagrams can be found on the inside of the device cover. The connection diagrams for switchgears with a metal housing can be found in the included circuit diagram. Additionally, the connection diagrams can be found on the inside of the device cover.

7.2.2 Switchgear mains connection



CAUTION! Beware of incorrect voltage selection!

The switchgear control is equipped with a multi-voltage power supply unit. This allows operation at different voltages. The pre-selected voltage is set at 400 V at the factory. For other voltages, the converter bridge must be repositioned accordingly. The power supply unit may be destroyed if the incorrect voltage is selected!

Insert the power supply cable laid by the customer through the threaded cable connections and secure them.

Connect the wires to the terminal strip/main switch according to the connection diagram. The protective earth conductor (PE) is connected to the earth terminal strip.

Mains connection 3~230 V:

- Cable: 4-core
 - Wire: L1, L2, L3, PE
 - Converter bridge pre-selected voltage: 230, COM
- Mains connection 3~380/400 V:
- Cable: 4-core
 - Wire: L1, L2, L3, PE
 - Converter bridge pre-selected voltage:
 - 3~ 380 V: 380, COM
 - 3~ 400 V: 400, COM

**NOTICE**

The switchgear has integrated rotating field monitoring. For this to work correctly, the switchgear must be connected to a clockwise rotating field. If there is no clockwise rotating field, error code "E006" appears on the display.

7.2.3 Pumps mains connection

Insert the power supply cable laid by the customer through the threaded cable connections and secure them.

Connect the wires for each pump as follows.

Mains voltage 3~230/380/400 V:

- Motor protection relay, terminal T1: L1
- Motor protection relay, terminal T2: L2
- Motor protection relay, terminal T3: L3
- Earth terminal strip: PE

**NOTICE**

The rotating field is routed from the mains connection directly to the pump connection. Note the required rotating field of the connected pumps (clockwise or counter-clockwise)! Observe the installation and operating instructions for the connected pumps.

7.2.4 Connection for pressure detection signal transmitter

Pressure detection can be performed using a pressure switch or an analogue pressure sensor (measurement range 4 – 20 mA).

Insert the core into the (EMC) threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram. Connect a shield (if a pressure sensor is used) according to the notes under 7.2.

**CAUTION!**

No external voltage may be applied.

7.2.5 Connection for volume flow detection signal transmitter

Volume flow detection can be performed using a flow switch or an analogue volume flow sensor (measurement range 4 – 20 mA).

Insert the core into the (EMC) threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram. Connect a shield (when a volume flow sensor is used) according to the notes under 7.2.

**CAUTION!**

No external voltage may be applied.

7.2.6 Connection for protection against low water level

The low water level (dry-running protection) can be monitored by means of a potential-free contact. The terminals are fitted with a converter bridge at the factory.

Insert the core into the threaded cable connection and secure it. Remove the converter bridge and connect the wires to the terminals according to the connection diagram.

Protection against low water level

Contact closed	No low water
Contact open	Water shortage

**CAUTION!**

No external voltage may be applied.

7.2.7 Connection of remote deactivation of all pumps (Ext. Off)

Remote deactivation of all pumps can be realised through a potential-free contact. The terminals are fitted with a converter bridge at the factory. Insert the core into the threaded cable connection and secure it. Remove the converter bridge and connect the wires to the terminals according to the connection diagram.

External activation/deactivation

Contact closed	Pumps enabled
Contact open	All pumps off – signal via an icon on the display

**CAUTION!**

No external voltage may be applied.

7.2.8 Connection for actual pressure value display

For external measurement/display of the current actual pressure value, there is a signal of 0 – 10 V. 0 V corresponds to the pressure sensor value "0" and 10 V corresponds to the pressure sensor limit value.

Example:

- Pressure sensor 16 bar (menu 5.11)
 - Display range: 0...16 bar
 - Setting: 1 V = 1.6 bar
- Insert the core into the threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram.

**CAUTION!**

No external voltage may be applied.

**NOTICE**

To be able to use the function, a pressure sensor must be used with the value set to "Senso" in menu 5.06.

7.2.9 Connection for collective run signal (SBM) and collective fault signal (SSM)

Potential-free contacts are available for external collective signals.

Insert the core into the threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram.

- Contact type: changeover contact
- Switching capacity: 250 V, 1 A



DANGER due to electrical voltage!
An external voltage is applied to the terminals for this function. This is also present at the terminals when the main switch is switched off!
There is a risk of fatal injury!
The power supply must be disconnected from its source before commencing any work!

7.2.10 Connection for individual operation (EBM) and individual fault signal (ESM)

Potential-free contacts are available for external individual signals per pump.
 Insert the core into the threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram.

- Contact type, individual run signal: Normally open contact
- Contact type, individual fault signal: Normally closed contact
- Switching capacity: 250 V, 1 A



DANGER due to electrical voltage!
An external voltage is applied to the terminals for this function. This is also present at the terminals when the main switch is switched off!
There is a risk of fatal injury!
The power supply must be disconnected from its source before commencing any work!

7.2.11 Connection of an external signalling unit

A 24 V (DC) output is available for direct connection of an external signalling unit (e.g. signal lamp).
 Insert the core into the threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram.

- Connection load: 24 V (DC), 4 VA



CAUTION!
No external voltage may be applied.



NOTICE
 This output function can be selected in menu 5.67.

7.2.12 Field bus connection "ModBus RTU"

An RS485 interface is available for connecting a building management system via ModBus RTU

Insert the core into the threaded cable connection and secure it. Connect the wires to the terminals according to the connection diagram.



CAUTION!
No external voltage may be applied.



NOTICE
 To be able to use the function, the values must be set in menu 2.01 to 2.05.
 If the switchgear is at the end of the bus core, the switchgear must be terminated. To do this, plug in jumper "J2" (Fig. 2 – 8, pos. 10).
 If the bus requires polarisation, jumpers "J3" and "J4" (Fig. 2 – 8, pos. 10) must be plugged in.

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 is a danger of electric shock from touching the live components.
The work must only be carried out by qualified personnel.

We recommend that the commissioning of the switchgear be performed by Wilo customer service.

Always keep this manual either by the switchgear or in a place specially reserved for it, where it is accessible for all operating personnel at all times. All personnel working on or using the switchgear must have been provided with this manual and have read and understood it.

In order to prevent damage or serious injury when commissioning the switchgear, the on-site wiring must be checked to ensure it has been performed correctly before activating for the first time, in particular the earthing. All unit safety devices and emergency cut-outs must be connected and inspected to ensure that they are working properly.

Tighten all connection terminals prior to commissioning!



NOTICE

In addition to the activities described in these installation and operating instructions, it is necessary to perform the commissioning measures in accordance with the installation and operating instructions of the overall system.

Observe the installation and operating instructions for products connected to the switchgear (sensors, pumps) as well as the system documentation!

8.1 Factory setting

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

8.2 Activating the switchgear

1. Turn main switch to the "ON" position.
 - All LEDs light up for 2 s and the current operating data and the standby icon appear on the LCD display.
2. Check the following operating parameters:
 - Selection of the mode by adjusting the signal transmitter (menus 5.06 and 5.08)
 - If sensors are used: Adjustment of the measurement range (menu 5.11 or 5.13)
 - Pressure thresholds: depending on the signal transmitter; directly on the pressure switch or in menus 1.01, 1.04 and 1.05

- Volume flow threshold: depending on the signal transmitter; directly on the flow switch or in menu 5.19
- Switch-off time delay (menu 1.06)
- Pumps are enabled (menu 3.01)
- Pumps are in automatic mode (menus 3.02 to 3.04)

If corrections are necessary, proceed as in the section "Operation".

3. The switchgear is now ready for operation.

8.3 Checking the motor direction of rotation

At the factory, the switchgear for a clockwise rotating field is checked for correct direction of rotation and set.

Observe the wire designations on the connection diagram when connecting the switchgear and the connected pumps.



NOTICE

If the error code "E006" appears on the display after activation, the mains connection has a phase fault. 2 phases/conductors of the power supply on mains side to the switchgear need to be swapped over.

The rotation control of the connected pumps can be performed using a test run. To do this, manual mode needs to be started for each pump via the menu.

1. Select EasyAction or the relevant menu item for the corresponding pump:
 - Pump 1: Menu 3.02
 - Pump 2: Menu 3.03
 - Pump 3: Menu 3.04
2. Select the value "HAND". The connected pump runs as long as the operating button is pressed.
3. If the direction of rotation is correct and the pump is to be used for automatic mode, select "AUTO".
4. If the direction of rotation is wrong, 2 phases/conductors of the mains supply to the pump supply conductor need to be swapped.

8.4 Adjusting the motor protection

The motor protection is adjusted according to section 6.2.3.

8.5 Signal transmitters and optional modules

Comply with the installation and operating instructions for signal transmitters and optional additional modules.

9 Maintenance



DANGER! Risk of fatal injury!

There is a risk of fatal injury from electric shock when working on electrical devices.

- **The switchgear should be voltage-free and secured against unauthorised switch-on during any maintenance or repair work.**
- **Any damage to the connection cable should only ever be rectified by a qualified electrician.**
- **Have maintenance and repair work carried out by qualified personnel only!**
- The switch cabinet must be kept clean.
- Check the earth contacts for burn-off from time to time, and renew them if there is significant burn-off.

10 Faults, causes and remedies



DANGER due to electrical voltage!

Improper procedures during electrical work may result in fatal injuries caused by electrical voltage! This work may only be performed by a qualified electrician.

Possible faults are shown on the display as an alphanumeric code. According to the fault shown, the connected pumps or signal transmitters must be checked for correct function and replaced if necessary.

Only perform this work if you have suitably qualified personnel. For instance, electrical work must be carried out by a qualified electrician. We recommend always having this work carried out by Wilo customer service.

Any unauthorised modifications to the switchgear are made at the operator's own risk and void the manufacturer's warranty obligations.

10.1 Fault indication

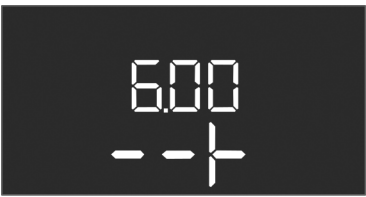


Faults are displayed in various ways:

- When a fault occurs, the red collective fault signal LED lights up and the collective fault signal is activated. If the internal buzzer is activated, there is an additional acoustic alarm signal. The error code is shown on the display, continuously alternating with the main screen. Additionally, the error code can be read from the fault memory.
- The acoustic alarm and the alternation between the main screen and the error message can be suppressed by pressing the operating button once.
- Faults that only lead to switching operations once a set time has elapsed are signalled by a flashing fault signal LED. The error code is shown on the display, continuously alternating with the main screen. Additionally, the error code can be read from the fault memory.

- A fault on one of the connected pumps is indicated on the main screen by a flashing status symbol for the relevant pump.

10.2 Fault acknowledgement

Individual errors are acknowledged using EasyActions (see 6.2.2) or via the menu:

	Select menu 6.00.
	Select menu 6.01 and press the operating button --> the "off" indicator flashes.
	Turn the operating button once to the right. The "Reset" indicator appears. Press the operating button. All faults eliminated are acknowledged and the fault LED goes out.

10.3 Fault memory

The switchgear stores the last 10 errors in the fault memory. The memory uses the FiFo principle (First in/First out).

1. Select menu 6.00.
2. Select menu 6.02 – the last fault is displayed.
3. Turn the operating button to the right. In this way you can scroll through the fault memory (6.03 to 6.11).

10.4 Error codes

Code	Fault description	Causes	Remedy
E006	Rotating field error	Mains connection faulty, incorrect rotating field	Have the mains connection checked and set a clockwise rotating field
E022.x	Insulation fault	The insulation monitoring device has been triggered	Check pump, wiring, earth connection
E040	Pressure/volume flow sensor fault	Sensor defective	Replace sensor
		No electrical connection to the sensor	Repair the electrical connection
E062	Water shortage	Protection against low water level has triggered	Check inlet/break tank; pumps restart automatically
E080.x	Pump fault	Internal current monitoring or motor protection switch has tripped (over-current or short-circuit in the supply line)	Check the pump (in accordance with the installation and user manual for the pump) and the supply line
		Minimum current monitoring has triggered	Check the pump (in accordance with the installation and user manual for the pump) and the supply line
E090	Plausibility error	No volume flow within 10s after pump start detected	Check pump for correct delivery function Check that the flow switch/flow sensor is working correctly

“.x” = info on the relevant pump to which the error shown refers!

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

11 Spare parts

Spare parts or repairs may be ordered from local specialist retailers and/or Wilo customer service. To avoid queries and incorrect orders, all data from the rating plate must be specified with every order.

Subject to change without prior notice!

12 Decommissioning/disposal

12.1 Decommissioning

- All work must be carried out with the greatest care.
- Proper protective clothing is to be worn.
- When working in enclosed spaces, a second person must be present for safety reasons.

12.1.1 Deactivating automatic mode on the unit

1. Select menu item 3.01
2. Select "OFF"

12.1.2 Temporary decommissioning

For temporary deactivation, the control is switched off and the switchgear is switched off via the main switch.

The switchgear and the unit are now ready for operation at any time. The defined settings are stored retentively in the switchgear and are not discarded.

Make sure that the ambient conditions are observed accordingly:

- Ambient/operating temperature: 0 ... +40 °C
- Humidity: max. 90 %, non-condensing.



CAUTION! Beware of moisture!
The ingress of moisture will result in damage to the switchgear. During standstill periods, pay attention to the permissible humidity and ensure the switchgear is stored so that it is overflow-proof.

Switch off the switchgear using the main switch ("OFF" position).

12.1.3 Final shutdown



RISK OF FATAL INJURY due to dangerous electrical voltage!
Incorrect procedures can cause fatal electric shocks.
This work may only be carried out by a qualified electrician in accordance with locally applicable regulations!

1. Switch off the switchgear using the main switch ("OFF" position).
2. Switch off the entire unit so that it is voltage-free and secure it against accidental activation.
3. If the terminals for SBM, SSM, EBM and ESM are occupied, the external voltage source present there must also be switched to a voltage-free

state.

4. Disconnect all power supply cables and pull these out of the threaded cable connections.
5. Connect the ends of the power supply cables so that no moisture can enter into the cable.
6. Remove the switchgear by undoing the screws on the fire-extinguishing system/building structure.

Return delivery/storage

For shipping purposes, the switchgear must be packaged such that it is protected against impact and is waterproof.

Please also refer to the "Transport and temporary storage" section.

12.2 Disposal

Proper disposal of this product will avoid damage to the environment and risks to personal health.

- Use the services of public or private waste disposal companies, or consult them concerning the disposal of the product or parts of it.
- For more information about proper disposal, please contact your local council or waste disposal office or the supplier from which you obtained the product.

NOTICE

Further notes on recycling can be found at www.wilo-recycling.com.



13 Appendix

13.1 Overview of display symbols



There is at least one current (unacknowledged) error message



Operating mode "p-c"



Standby: The switchgear is switched on and ready for operation; no pump is switched on



Pumps have switched off due to opening of the contact at the "Ext. Off" input



The water level has fallen below the dry run level



Pump is available and ready for operation



1. Symbol lights up: pump is in operation
2. Symbol flashes: pump fault



One pump is defined as a standby pump



- Parameter entry not possible:
1. Parameter entry/change blocked
 2. The accessed menu is only a value display



ModBus is activated

13.2 System impedance overview



NOTICE

In accordance with EN / IEC 61000-3-11 (see table below), the switchgear and pump with a motor power of ... kW (column 1) are provided for operation on a mains power supply with a system impedance of Z_{max} at the house connection of max. ... ohm (column 2) for a maximum number of ... switch connections (column 3).

If the mains impedance and the number of switch-

given in the table, the switchgear with the pump may lead to temporary voltage drops and also to spurious voltage fluctuations ("flicker") due to the unfavourable mains conditions.

Therefore, measures may be necessary before the switchgear with the pump can be operated on this connection as intended. The necessary information must be obtained from the local energy supply company and the manufacturer.

	Power [kW] (Column 1)	System impedance [Ω] (Column 2)	Switching operations per hour (Column 3)
3~400/380 V 2-pole	0.37	2.629	6 – 30
	0.55	1.573	6 – 30
Direct starting	0.75	0.950	6 – 18
		0.944	24
		0.850	30
	1.1	0.628	6 – 12
		0.582	18
		0.508	24
		0.458	30
	1.5	0.515	6 – 12
		0.431	18
		0.377	24
		0.339	30
	2.2	0.321	6
		0.257	12
		0.212	18
		0.186	24
		0.167	30
	3.0	0.204	6
		0.148	12
		0.122	18
		0.107	24
	4.0	0.130	6
		0.094	12
		0.077	18
	5.5	0.115	6
		0.083	12
		0.069	18
	7.5	0.059	6
		0.042	12
	11.0	0.037	6
		0.027	12
	15.0	0.024	6
		0.017	12



NOTICE

The maximum number of switching operations per hour specified in the table for each power is determined by the pump motor and must not be exceeded (adjust parameterisation of the controller accordingly; see follow-up times, for example).

13.3 ModBus: Data types

Data type	Description
INT16	Integers in the range from -32768 to 32767. The number range actually used for a data point may be different.
UINT16	Unsigned integers in the range from 0 to 65535. The number range actually used for a data point may be different.
Enum	Is a list. Only values listed in the parameters can be set.
BOOL	Boolean value is a parameter with exactly two states (0 – false and 1 – true). Generally, all values greater than zero are classified as true.
Bitmap	<p>Is an array of 16 Boolean values (bits). Values are indexed from 0 to 15. The number read from or written to the register is the sum of all bits with value 1 multiplied by 2 to the power of index.</p> <ul style="list-style-type: none"> • Bit 0 → $2^0=1$ • Bit 1 → $2^1=2$ • Bit 2 → $2^2=4$ • Bit 3 → $2^3=8$ • Bit 4 → $2^4=16$ • Bit 5 → $2^5=32$ • Bit 6 → $2^6=64$ • Bit 7 → $2^7=128$ • Bit 8 → $2^8=256$ • Bit 9 → $2^9=512$ • Bit 10 → $2^{10}=1024$ • Bit 11 → $2^{11}=2048$ • Bit 12 → $2^{12}=4096$ • Bit 13 → $2^{13}=8192$ • Bit 14 → $2^{14}=16384$ • Bit 15 → $2^{15}=32768$ <p>Example for clarification: Bit 3, 6, 8, 15 are 1 all others are 0. The sum is then $2^3+2^6+2^8+2^{15} = 8+64+256+32768 = 33096$.</p> <p>The other way round is also possible. Based on the bit with the highest index, check whether the read number is greater than/equal to the power of two. If this is the case, bit 1 is set and the power of two is deducted from the number. Then the check with the bit with the next lower index and the recently calculated residual number is repeated until bit 0 is reached or the remainder is zero.</p> <p>Example for clarification: The read number is 1416. Bit 15 will be 0, since $1416 < 32768$. Bit 14 to 11 will also be 0. Bit 10 will be 1, since $1416 > 1024$. The remainder will be $1416 - 1024 = 392$. Bit 9 will be 0, since $392 < 512$. Bit 8 will be 1 since $392 > 256$. The remainder will be $392 - 256 = 136$. Bit 7 will be 1 since $136 > 128$. The remainder will be $136 - 128 = 8$. Bit 6 to 4 will be 0. Bit 3 will be 1 since $8 = 8$. The remainder will be 0. Remaining bits 2 to 0 will thus be 0.</p>
Bitmap32	Is an array of 32 Boolean values (bits). The calculation details can be found in the description for Bitmap.

13.4 Modbus: Parameter overview

Holding register	Name	Data type	Scale & unit	Elements	Access	Added
40001 (0)	Version communication profile	UINT16	0.001		R	31.000
40002 (1)	Wink service	BOOL			RW	31.000
40003 (2)	Switch box type	ENUM		0. SC 1. SC...FC 2. SCe 3. CC 4. CC...FC 5. CCe 6. SCe NWB 7. CCe NWB 8. EC 9. ECe 10. ECe NWB	R	31.000
40014 (13)	Bus command timer	ENUM		0. - 1. Off 2. Set 3. Active 4. Reset 5. Manual	RW	31.000

Holding register	Name	Data type	Scale & unit	Elements	Access	Added
40026 (25)	Current value	INT16	0.1 bar 0.1 m 0.1 K 0.1 °C 1 cm 1 min 0.1 h 0.1 psi		R	31.000
40027 (26)	Active setpoint value	INT16	0.1 bar 0.1 m 0.1 K 0.1 °C 1/day 1/month 0.1 psi		RW R (dp-v) R (dT-v)	31.000
40041 (40)	Pump 1 mode	ENUM		0. Off 1. Hand 2. Auto	RW	31.000
40042 (41)	Pump 2 mode	ENUM		0. Off 1. Hand 2. Auto	RW	31.000
40043 (42)	Pump 3 mode	ENUM		0. Off 1. Hand 2. Auto	RW	31.000
40062 (61)	Switch box state	BITMAP		0: SBM 1: SSM	R	31.000
40139 – 40140 (138 – 139)	Error state	BITMAP32		0: Sensor error 1: P man 2: P min 3: FC 4: TLS 5: Pump 1 Alarm 6: Pump 2 Alarm 7: Pump 3 Alarm 8: Pump 4 Alarm 9: Pump 5 Alarm 10: Pump 6 Alarm 11: – 12: – 13: Frost 14: Battery Low 15: High water 16: Priority off 17: Redundancy 18: Plausibility 19: Slave communication 20: Net supply 21: Leakage	R	31.000
40141 (140)	Acknowledge	BOOL			W	31.000
40142 (141)	Alarm history index	UINT16			RW	31.000
40143 (142)	Alarm history error code	UINT16	0.1		R	31.000

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Local contact at
www.wilo.com/contact

Pioneering for You

WILO SE
Wilopark 1
D-44263 Dortmund
Germany
T +49(0)231 4102-0
F +49(0)231 4102-7363
wilo@wilo.com
www.wilo.com