SAUTER EQJW246F003 Heating and District Heating Controller with Graphics Display Instruction Manual

Contents

SAUTER

SAUTER EQJW246F003 Heating and District Heating Controller with Graphics Display

Specifications

- Product Name: Heating and District Heating Controller
- Model Number: EQJW246F003
- Firmware Version: 3.02.01
- Display: Graphics Display

Product Usage Instructions

Safety Instructions
The device should only be mounted, started up, or operated by trained personnel familiar with the product. Ensure proper shipping and storage. Adhere to relevant safety regulations for wiring and maintenance.

Structure and Mode of Action
The controller features an M-Bus interface for connecting up to three meters for data transmission. It allows for different settings for heating control, DHW heating, and weather-compensated volume flow or output limitation.

Dimensions
Panel Cutout: 138 x 92

Installation
The controller can be installed through panel mounting, wall mounting, or rail mounting.

Electrical Connection

Danger: To prevent electric shock, adhere to VDE regulations when wiring the controller. Implement overvoltage protection measures for signalling cables laid outside buildings or over long distances.

FAQ

- **Q: Who should operate the device?**
  A: Only trained and experienced personnel familiar with the product should operate the device.
- **Q: How many meters can be connected for data transmission?**
  A: Up to three meters can be connected via the M-Bus interface.
- **Q: What are the different operating states for control circuit HK1?**
  A: Different limit values can be set for heating control only, heating control with simultaneous DHW heating, and DHW heating only.

Note on these mounting and operating instructions
These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAUTER devices.
A manual with further information can be found at **www.sauter-controls.com**

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.

Definition of signal words

DANGER
Hazardous situations which, if not avoided, will result in death or serious injury

WARNING
Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE
Property damage message or malfunction

Note
Additional information

Tip
Recommended action

Liability
We are constantly developing our products and therefore, reserve the right to change the product at any time without notice. We assume no liability for the correctness or completeness of this quick guide. No liability is accepted for the purchaser being able to use the products for a specific purpose. Claims by the purchaser, in particular claims for damages including loss of profit or other financial losses, are excluded. This does not apply if the cause of the damage is based on intent or gross negligence. If an essential contractual obligation is negligently breached, our liability shall be limited to the foreseeable damage.

Safety instructions
The device must be mounted, started up or operated only by trained and experienced personnel familiar with the product. Proper shipping and storage are assumed.
The device has been designed for use in electrical power systems. For wiring and maintenance, you are required to observe the relevant safety regulations. This quick guide is intended to provide the necessary information for operating the device.

Structure and mode of action

The EQJW246F003 heating and district heating controller is used to control up to three control circuits.

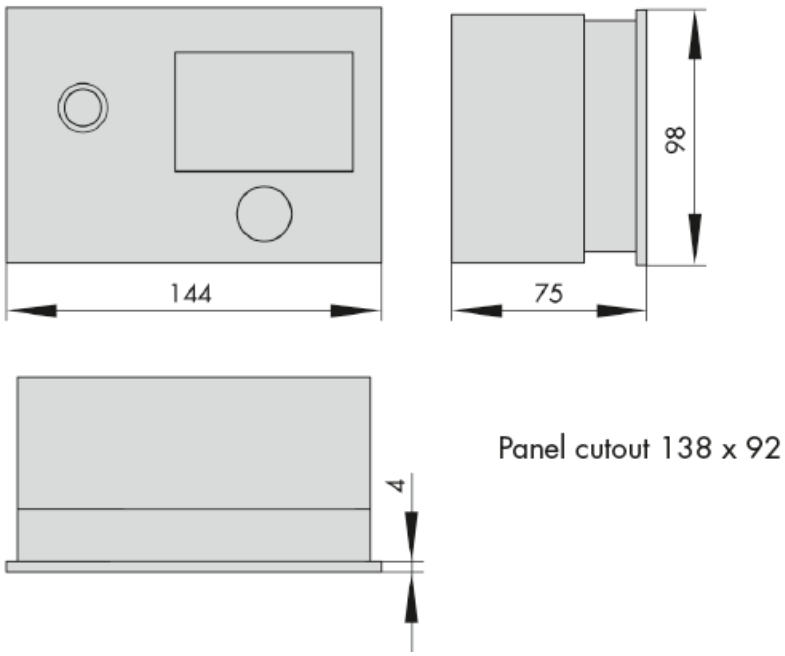
- Control of a primary heat exchanger or boiler with up to two mixed and one unmixed heating circuit (each weather-compensated) and control of DHW heating on the se-condary side
- Weather-compensated buffer cylinder control with up to two mixed heating circuits and fresh water module

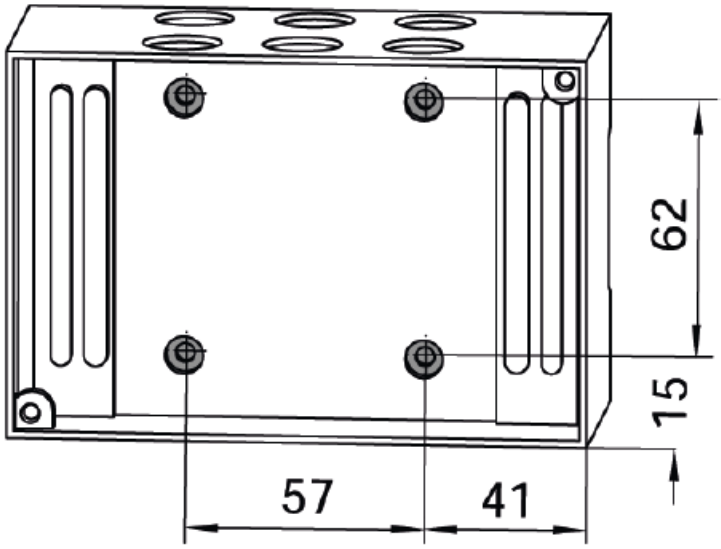
- Control of two weather-compensated heating circuits and a DHW heating system with three valves on the primary side
- Control of three weather-compensated heating circuits with three valves on the primary side
- Applications with up to six control loops possible via optional extension modules (0440210014) (coupled via device bus)
- Systems with a larger number of control loops can be realized by interconnecting controllers via a device bus.

The EQJW246F003 heating and district heating controller is customized to the specific system by setting a system code number. Additional sensors and/or functions not included in the basic system configuration are then selected by defining function blocks. The corresponding levels are accessed by selecting the switch position and then entering the code number. For the specialist personnel, configuration levels for defining function blocks are labelled „CO" and parameter levels are labelled „PA". Data is entered and queried on the heating and district heating controller using a rotary and push button. It is supported by symbol overlays and plain text on the LC display. The rotary switch is used to set the operating modes and the main parameters of the individual circuits.

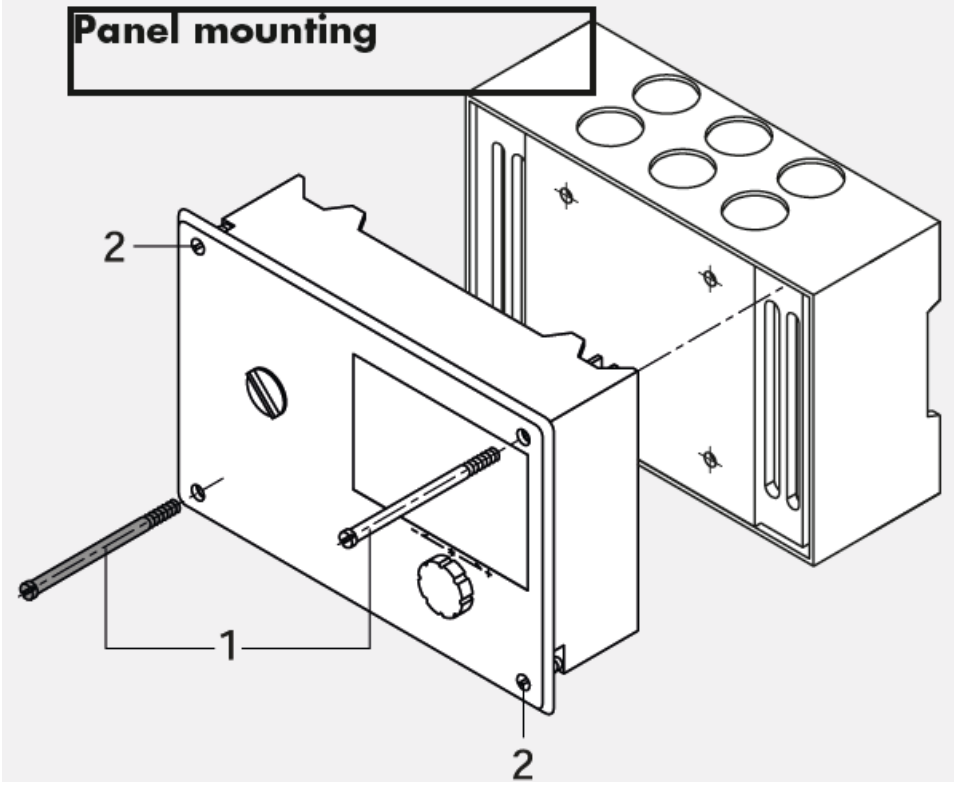
M-Bus interface
Up to three meters in accordance with EN 1434-3 can be connected for data transmission. In addition, heat meters for volume flow and/or output limitation are available for each control circuit. For control circuit HK1, different limit values can be set for the different operating states „heating control only", „heating control with simultaneous DHW heating" and „DHW heating only". Weather-compensated volume flow or output limitation can also be realized.

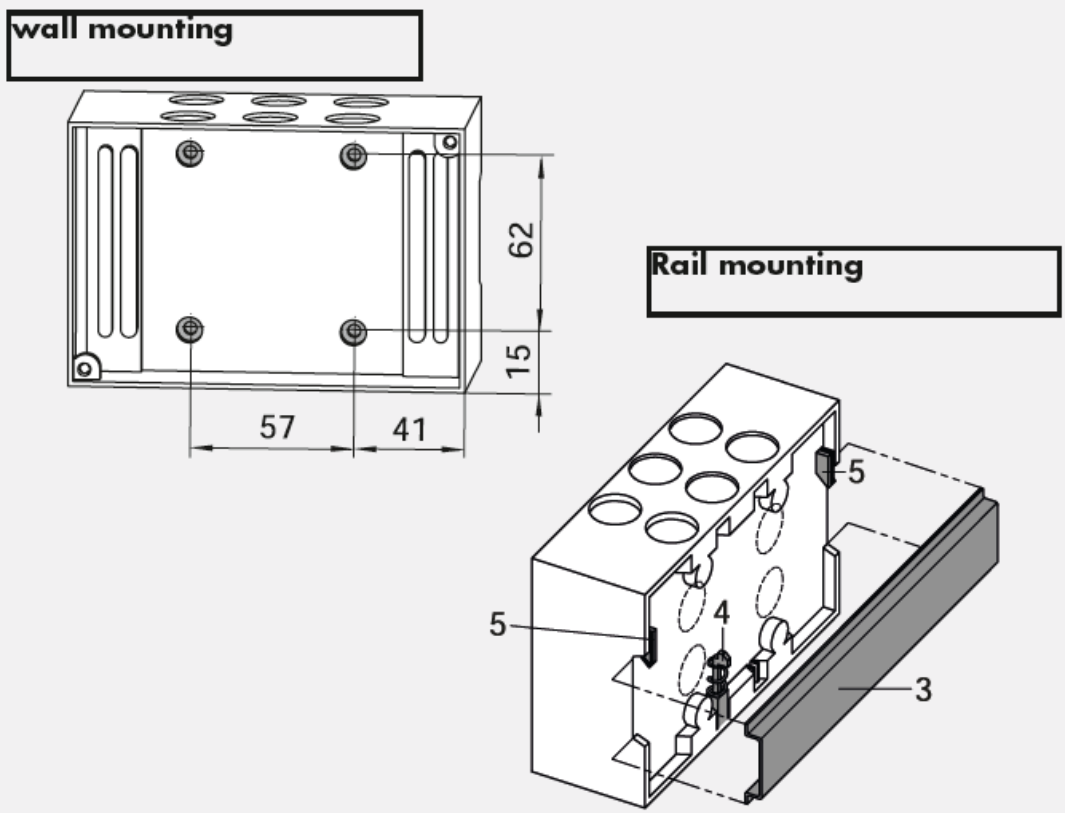
Dimensions





Installation





Electrical connection

DANGER
Danger to life from electric shock!

- When wiring and connecting the heating and district heating controller, the VDE regulations and the regulations of the local energy supply companies must always be observed. This work must therefore be carried out by a specialist!
- Terminals 33, 39, 42 and 45 allow the targeted integration of safety devices with a direct effect on the individual motor drives and pumps. If this is not required, connect a jumper from terminal 31 to terminals 33, 39, 42 and 45.
- Do not connect cables carrying extra-low voltage in accordance with VDE 0100 directly.
- De-energize the heating and district heating controller before working on the connections.

Instructions for laying the electrical cables

- Lay 230 V supply lines and signalling lines separately and at a distance.
- To increase interference immunity, maintain a minimum distance of 10 cm between the cables. This spatial separation must also be observed within an electrical enclosure.
- Also lay the cables for digital signals (bus cables) and analogue signal cables (sensor cables, analogue outputs) separately and at a distance.
- Use shielded cables for the analogue signals in systems with a high electromagnetic interference level.
- Earth the shield on one side at the inlet or outlet of the switch cabinet, making contact over a large area. Connect the central earthing point to the PE protective conductor by the shortest route (conductor cross-section at least 10 mm^2).
- Equip inductivities in the switch cabinet, e.g. contactor coils, with suitable interference suppression circuits (RC

elements).

- Shield switch cabinet parts with high field strengths, e.g. transformers or frequency converters, with separators that have a good connection to the PE protective conductor.
- Use cables with wire cross-sections according to Table 5-1 for the terminal connections.

Overvoltage protection

- If signalling cables are laid outside buildings or over long distances, take suitable overvoltage protection measures. Such measures are essential for bus cables.
- The shielding of signalling cables that are laid outside buildings must be current-carrying and earthed on both sides.
- The surge arresters must be installed at the entry to the switch cabinet.

Connection of the heating and district heating controller

- If the controller housing and rear part of the housing are not already separated: To connect the cables, open the housing by loosening the front screws at the bottom left and top right.
- Break through the openings marked for the cable entry at the top, bottom or rear of the rear part of the housing and fit the enclosed grommets or suitable screw connections.
- For wall mounting: Before inserting the cables into the base, support them with suitable measures, e.g. a cable duct, so that there is no strain or bending on the cables.

Connecting the drives

- 0-bis-10-V-control output:
  Use cables with a wire cross-section of at least 0.5 mm².
- Three-point/two-point control outputs:
  Run cables as damp-proof cables with a core cross-section of at least 1.5 mm² to the terminals of the controller output. It is advisable to check the running direction during commissioning.

Connecting the pumps
Route all cables with a core cross-section of at least 1.5 mm² to the terminals of the heating and district heating controller in accordance with the wiring diagram.

Note
The motor drives and pumps are not automatically supplied with power by the heating and district heating controller. They can be connected to an external power supply via terminals 33, 39, 42 and 45. If the electrical supply is to be internal, a jumper must be connected from terminal 31 to terminals 33, 39, 42 and 45.

Electrical connection

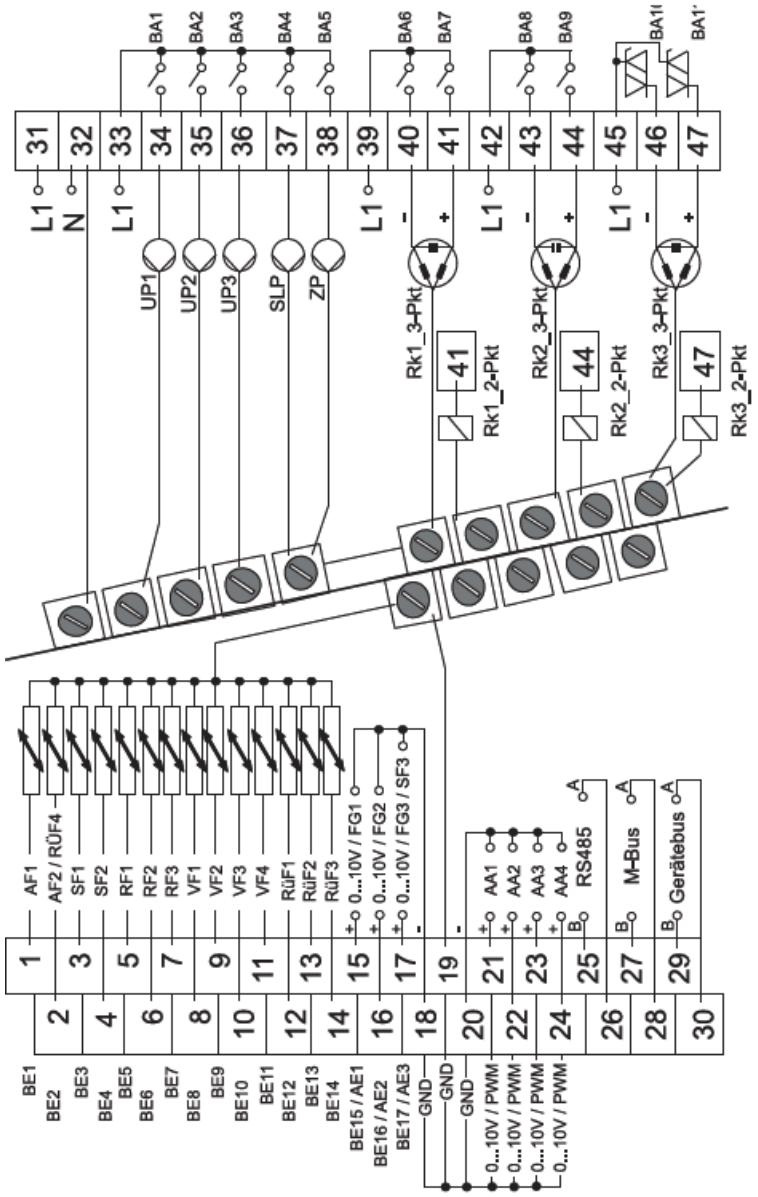


Bild 1: Connection of SAUTER EQJW246F003 Controller with standard base

Legend to picture 1:

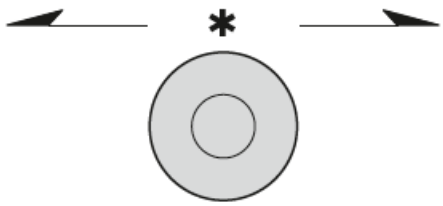
- AA Analog output
- AE Analog input
- AF Outdoor sensor
- BA Binary output
- BE Binary input
- FG Remote sensor
- PWM Puls width modulation
- RF Room sensor
- RK Heating circuit
- RüF Return flow sensor
- SF Storage sensor
- SLP Storage tank charging pump
- UP Circulation pump
- VF Flow sensor

- ZP Circulation pump

Operating controls

The heating controller is operated on site using the operating controls on the front. They are located in the front panel of the controller.

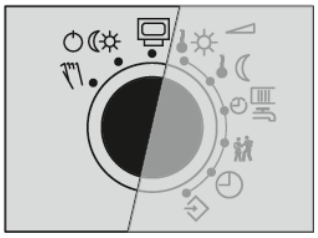
Rotary pushbutton



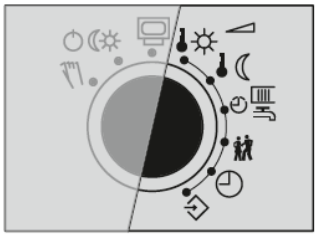
Turn [ ]:
Select readings, parameters and function blocks

Press [ ]:
Confirm adjusted selection or setting

Rotary switch
The rotary switch is used to set the operating mode and the relevant parameters for each control circuit.



Operating level
Operating modes
Manual level



Day set point (rated room temperature)
Night set point (reduced room temperature)
Times-of-use for heating/DHW
Special time-of-use
Time/date
Settings

Operation

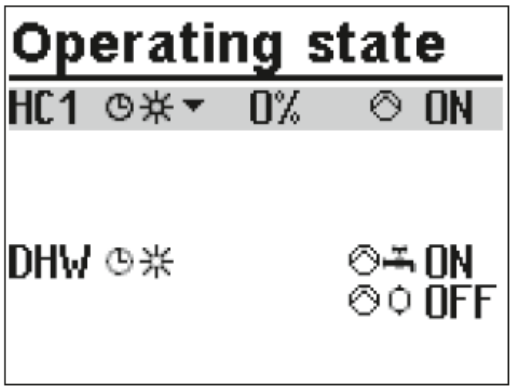
Selecting the operating mode

The controller can be operated in the following modes:

- Day mode (rated operation): regardless of the programmed times-of-use and summer mode, the set points

relevant to rated operation are used by the controller. Icon:

- Night mode (reduced operation): regardless of the programmed times-of-use, the set points relevant to reduced operation are used by the controller. Icon:
- Control operation deactivated: regardless of the programmed times-of-use, control operation of the heating circuits and DHW heating remains deactivated. The frost protection is activated, if need be. Icon:
- Icons when the frost protection is activated: HC , DHW
- Automatic mode: During the programmed times-of-use, the controller works in day mode. Outside these times-of-use, the controller is in night mode, unless control operation is deactivated depending on the outdoor temperature. The controller switches automatically between both operating modes. Icon within the times-of-use:, icon outside the times-of-use:
- Manual mode: valves and pumps can be controlled manually. For further details, see section 8.6.

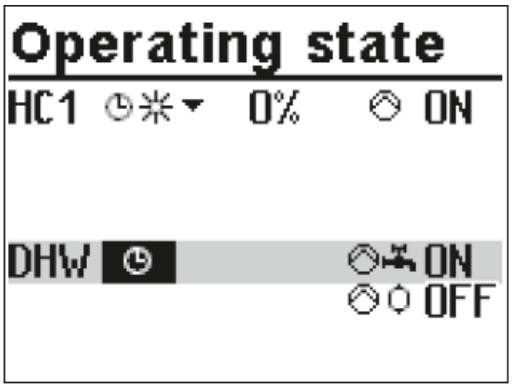


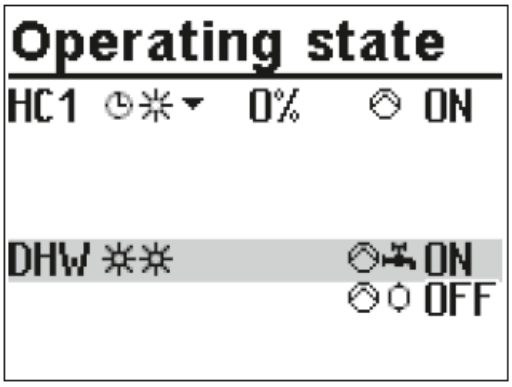
Turn the rotary switch to (operating modes).

The operating states of all system control circuits are displayed:

- Heating circuit HC1
- Heating circuit HC2
- Heating circuit HC3
- Heating circuit HC11
- Heating circuit HC12
- Heating circuit HC13
- DHW heating
- Only those control circuits are available for selection which can be controlled by the selected system.
- Select the control circuit.

Operation





- Activate editing mode for the control circuit. The operating mode is shown inverted on the display.
  - Select the operating mode:

    Automatic mode

    Day mode

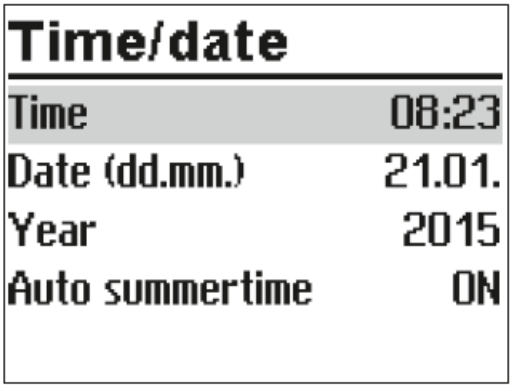
    Night mode

    System deactivated
- Confirm the operating mode.

The controller is usually in automatic mode.

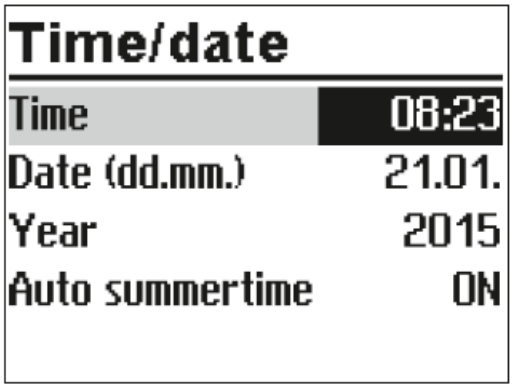
Schedules
The controller operates according to the schedules in automatic mode.

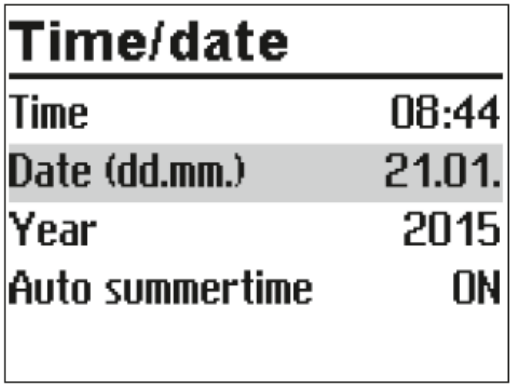
Setting the time and date
The current time and date need to be set immediately after start-up and after a power failure lasting more than 24 hours. This is the case when the time blinks on the display.



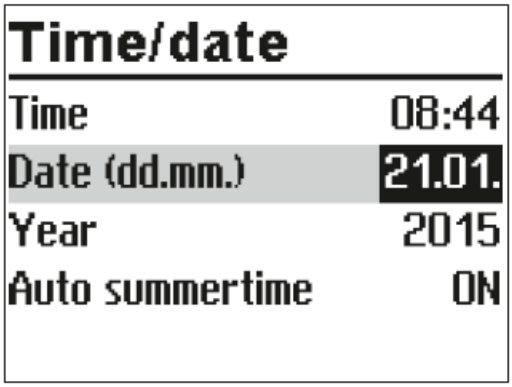
Turn the rotary switch to (time/date). The current time is selected (gray background).

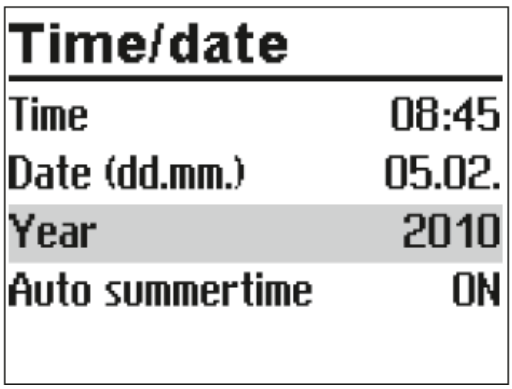
- Activate editing mode for the time. The time reading is inverted.
- Change the time.
- Confirm the time setting.



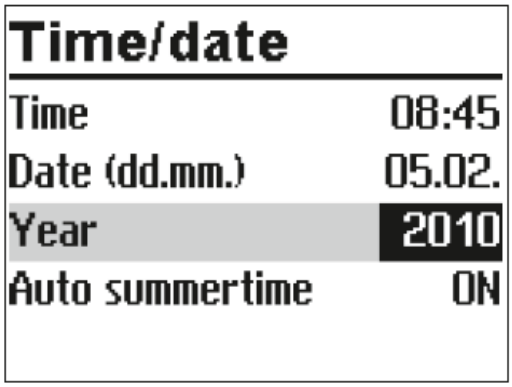


- Select ‘Date’ (dd.mm) [].
- Activate editing mode for the date. The date reading is inverted.
- Change date (day. month).
- Confirm the date setting.





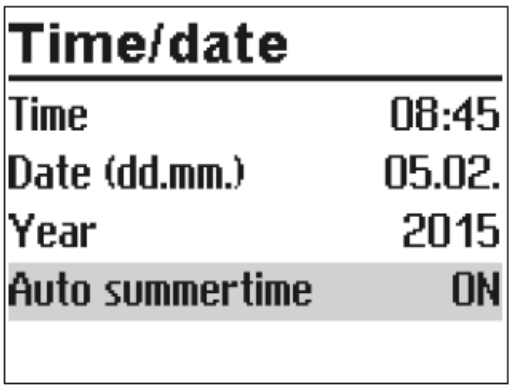
- Select ‘Year’.

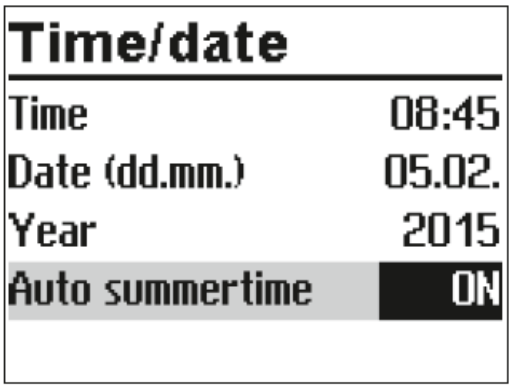


- Activate editing mode for the year. The year reading is inverted.
- Change the year.
- Confirm the year setting.

Deactivate or activate the automatic summer/standard time switchover as required.

- Select ‘Auto summertime’.





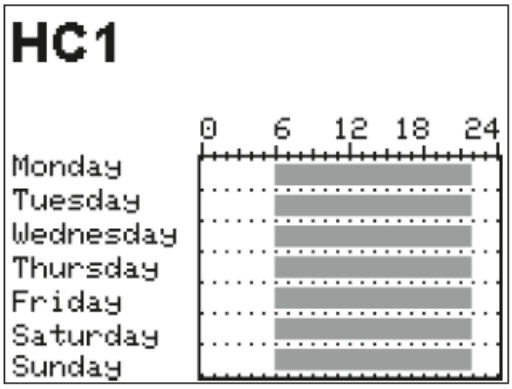
- Activate the editing mode for automatic summer/standard time switchover.
  The current setting is shown inverted on the display:
  ON = Summer/standard time switchover active
  OFF = Summer/standard time switchover not active
- Deactivate or activate the automatic summer/standard time switchover.
- Confirm deactivation/activation.

Turn the rotary switch back to (operating level).

Note
The correct time is guaranteed after a power failure of 24 hours. Normally, the correct time is still retained at least 48 hours after a power failure.

Setting the times-of-use
Three times-of-use can be set for each day of the week.

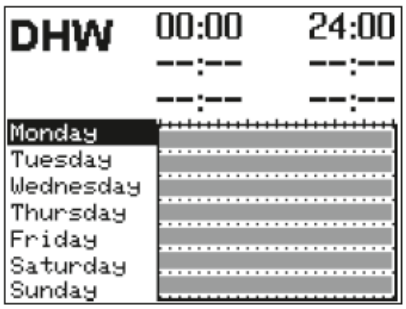
Param	eters	WE		Value	range
Start Stop Start Stop Start Stop	first time-of-use first time-of-use second time-of-use second time-of-use third time-of-use third time-of-use	HC1, HC2, HC3, HC11, HC12, HC13 06:00 22:00 –:– –:– –:– –:–	DHW, CP 00:00 24:00 –:– –:– –:– –:–	00:00 to 24:00 h in steps of 15 minutes	

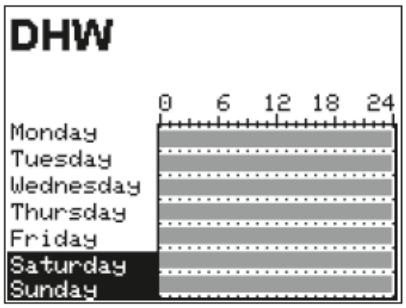


Turn the rotary switch to (times-of-use). The first control circuit is displayed together with its programmed times-of-use.

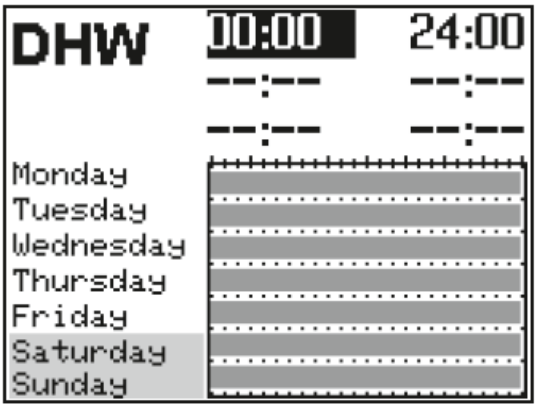
Program the times-of-use of another control circuit, if required:

- Heating circuit HC2
- Heating circuit HC3
- Heating circuit HC11
- Heating circuit HC12
- Heating circuit HC13
- DHW heating
- Circulation pump (DHW) CP
- Only those control circuits are available for selection which can be controlled by the selected system.
- Activate editing mode for the control circuit. The times-of-use for Monday are displayed.



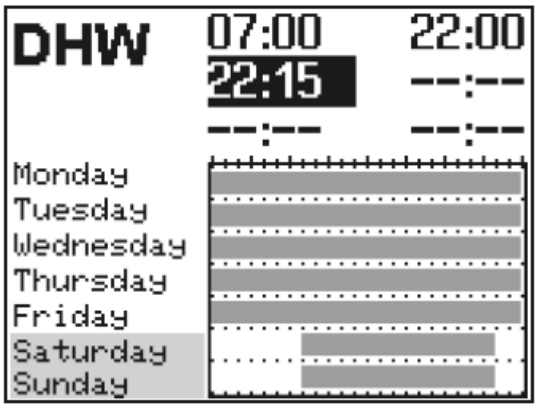


- Select period/day for which the times-of-use are to be valid. The times-of-use can be programmed for individual days or for a block of days, e.g. Monday to Fri-day, Saturday and Sunday or Monday to Sunday. The selected days are shown inverted on the display.

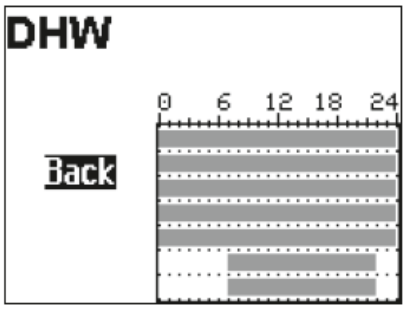


Activate editing mode for the period/day.
The start time of the first time-of-use period can now be edited (inverted reading).

- Change start time.
  (in steps of 15 minutes)
- Confirm the start time.
  The stop time of the first time-of-use period can now be edited.
- End stop time.
  (in steps of 15 minutes)
- Confirm the stop time.
  The start time of the second time-of-use period can now be edited.



To set the second and third times-of-use periods, repeat steps with gray background. If no further times-of-use are to be programmed for the selected time period/day, exit the menu by confirming the indicated start time twice (2x ✳).
Proceed in the same manner to program further periods/days.



After setting all times-of-use:

- Select ‘Back’.
- Exit the times-of-use setting.

Turn the rotary switch back to ⧉ (operating level).

Entering day and night set points
The day set points apply during day mode (rated operation) and during times-of-use programmed for automatic mode. The night set points apply during night mode (reduced operation) and outside the times-of-use programmed for automatic mode. The desired room temperature for the day and night set points can be programmed.

Switch position 🌡☼

Parameters	WE	Value range
HC1 room temperature	20.0 °C	0.0 to 40.0 °C
HC2 room temperature	20.0 °C	0.0 to 40.0 °C
HC3 room temperature	20.0 °C	0.0 to 40.0 °C
HC11 room temperature	20.0 °C	0.0 to 40.0 °C
HC12 room temperature	20.0 °C	0.0 to 40.0 °C
HC13 room temperature	20.0 °C	0.0 to 40.0 °C
DHW temperature	60.0 °C	Min. to max. DHW temperature
HC1 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC2 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC3 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC11 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC12 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC13 OT deactivation value	22.0 °C	0.0 to 50.0 °C

Switch position 

Parameters	WE	Value range
HC1 room temperature	15.0 °C	0.0 to 40.0 °C
HC2 room temperature	15.0 °C	0.0 to 40.0 °C
HC3 room temperature	15.0 °C	0.0 to 40.0 °C
HC11 room temperature	15.0 °C	0.0 to 40.0 °C
HC12 room temperature	15.0 °C	0.0 to 40.0 °C
HC13 room temperature	15.0 °C	0.0 to 40.0 °C
DHW temperature	40.0 °C	Min. to max. DHW temperature

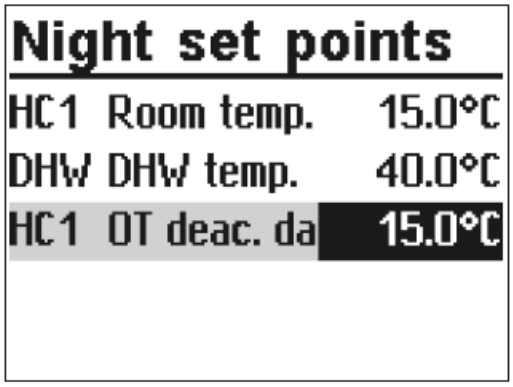
Switch position 

Parameters	WE	Value range
HC1 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC2 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC3 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC11 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC12 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC13 OT deactivation value	15.0 °C	–50.0 to 50.0 °C

Turn the rotary switch to (day set point) or (night set point). The day and night set points appear on the display one after the other.

- Only those day and night set points are available for selection which can be controlled by the selected system.

Note
The deactivation values are located in a separate menu (deactivation values) for systems with three control circuits.



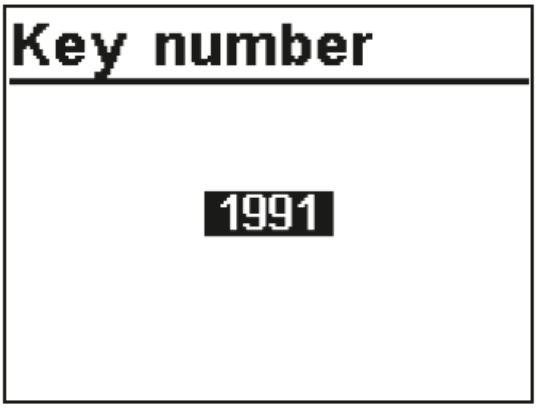
- Select the set point.
- Activate editing mode for set point.
- Adjust the set point.
- Confirm setting.

Proceed in the same manner to adjust further set points.

After adjusting all the set points:

Turn the rotary switch back to (operating level).

Reset to default settings
All parameters set over the rotary switch as well as parameters in the PA1, PA2, PA3, PA11, PA12 and PA13 parameter levels can be reset to their default settings (WE). This does not apply to the maximum flow temperature and the return flow temperature limits in PA1 and PA2.



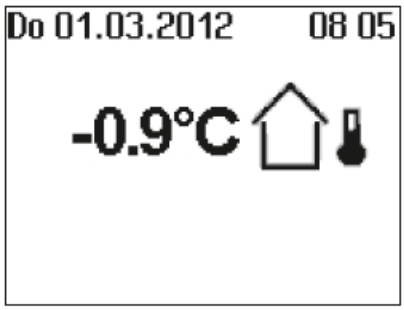
Turn the rotary switch to (settings).

- Enter key number 1991.
- Confirm key number.

The settings are reset to default when the following icon appears on the controller display:

Reading information
Different kinds of information can read off the controller display during operation. The controller display usually shows the date, time and an actual temperature when the rotary switch is switched to the ‘Operating level’ position.

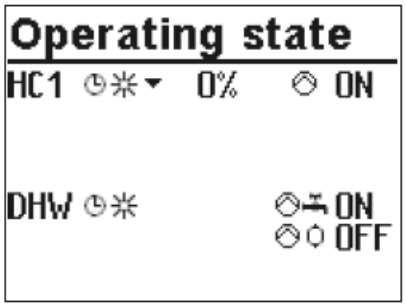
Outdoor-temperature-compensated control · Current temperature = out-door temperature



- Deactivation depending on outdoor temperature active)
- Vacations active

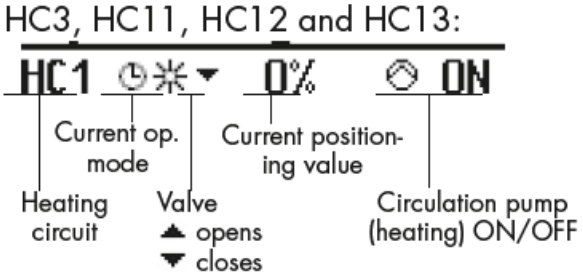
Fixed set point control · Current temperature = Flow temperature

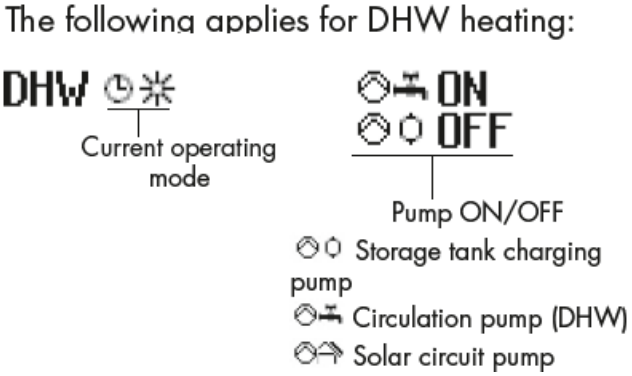
Further information can be obtained by turning the rotary pushbutton:

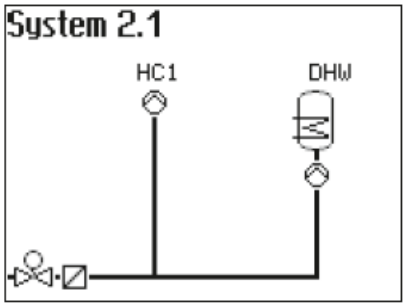


- Operating state

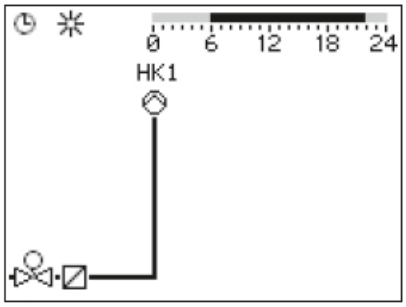
  The following applies for heating circuits HC1, HC2, HC3, HC11, HC12 and HC13:





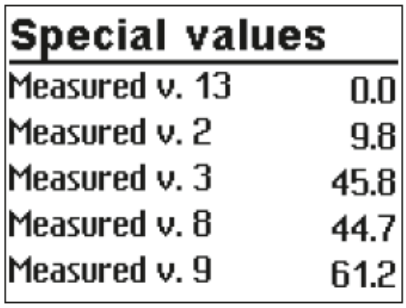


- Selected system code number
- Key measured values for the entire system, e.g. measured values and limits of a flow rate or capacity limitation, if activated.



- Times-of-use (depending on the system code number)
  - Heating circuit HC1
  - Heating circuit HC2
  - Heating circuit HC3
  - Heating circuit HC11
  - Heating circuit HC12
  - Heating circuit HC13
  - DHW heating

The day mode times is highlighted in black on the time chart.
Night mode and deactivation times are highlighted in gray on the time chart.

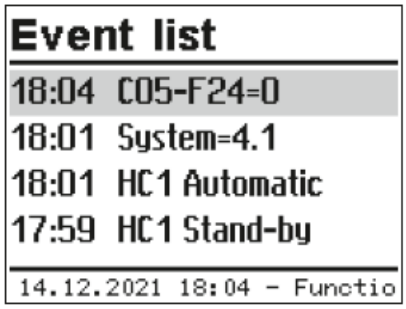


- q Special values

  Measured values from additional sensor inputs (not relevant to closed-loop control) or from the 0 to 10 V inputs are displayed.\
- Alarm list

  The last four alarm entries are listed.
- Open the alarm list and select further alarm entries ( ). Further information on an alarm (including time and

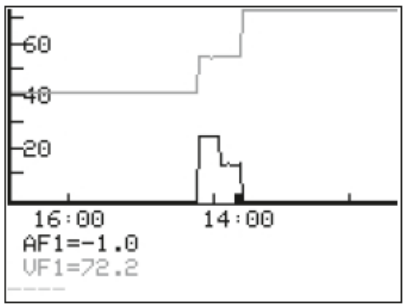
date when it occurred) runs across the display.



- Event list

  The last four event entries are listed.
- Open the event list and select further event entries ( ).

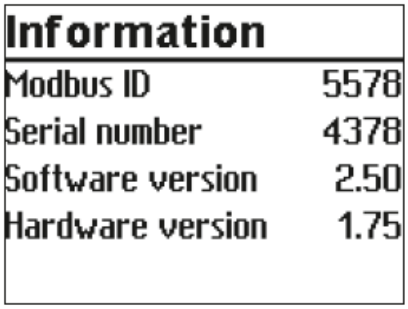
  Further information on an event (including time and date when it occurred) runs across the display.

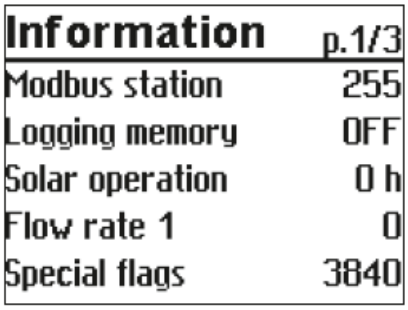


- Trend-Viewer

  The standard graph shows the data measured at the outdoor sensor AF1 and flow sensor VF1 plotted over time.

Extended operating level





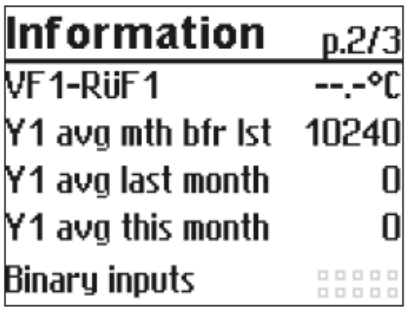
The following details on the controller version (device identification, serial number, software and hardware versions) and meter bus are displayed in the extended operating level.

Turn the rotary switch to (settings).

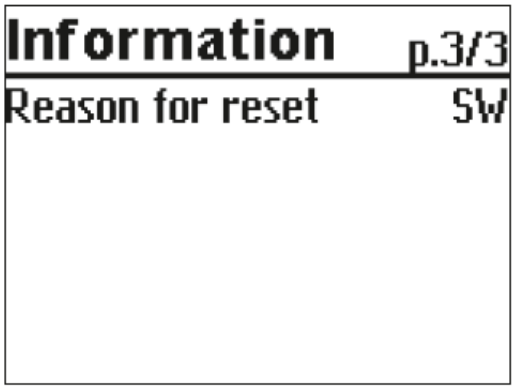
- Enter code number 1999.
- Confirm key number.

Turn the rotary switch to (operating level).

- Select ‘Information’.



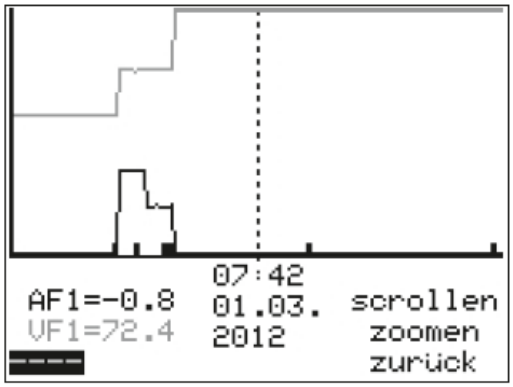
The additional “meter” page is displayed with connection status and further meter data for meters 1 to 3 in the “extended operating level” mode when the meter bus is activated (see Annex A). In addition, the respective measuring and limit values are displayed after confirming the plant scheme when the flow rate and/or capacity limitation is active.



Note

- The additional information is hidden when the key number 1999 is entered again.
- The key number 1999 cannot be used to change the controller configuration and parameterization. A separate key number exists for configuration and parameterization (see the ‘Start-up’ section).

Adapting the Trend-Viewer
The standard graph shows the data measured at the outdoor sensor AF1 and flow sensor VF1 plotted over time.



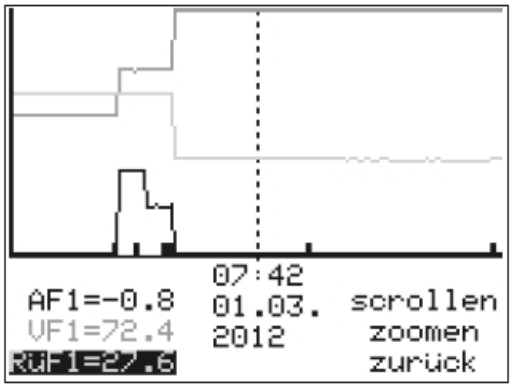
- Open the Trend-Viewer.

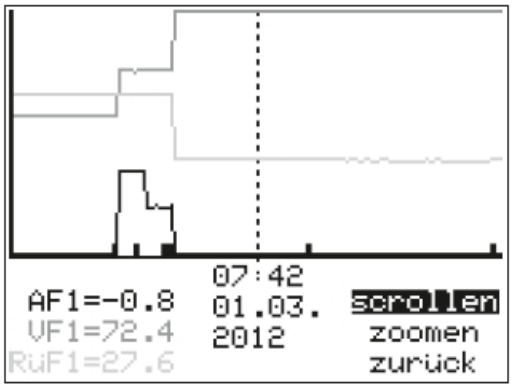
Adding measuring data

- Select – – – – on the display.
- Activate editing mode for sensor selection.
- Select sensor.
- ¼ Confirm setting.

Deleting measured data:

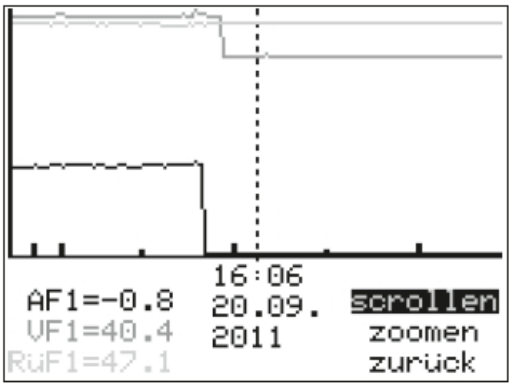
- Select the sensor whose measured data are no longer to be displayed.
- Activate editing mode for sensor.
- Select – – – – on the display.
- Confirm deletion.

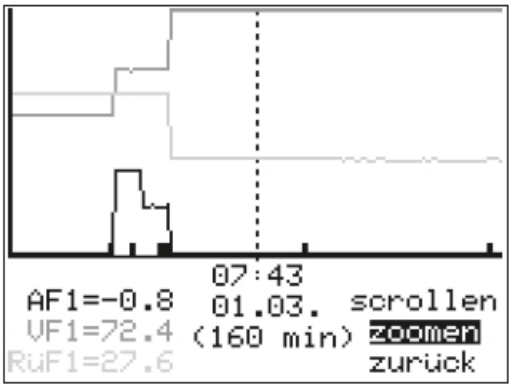




Shifting the time line:

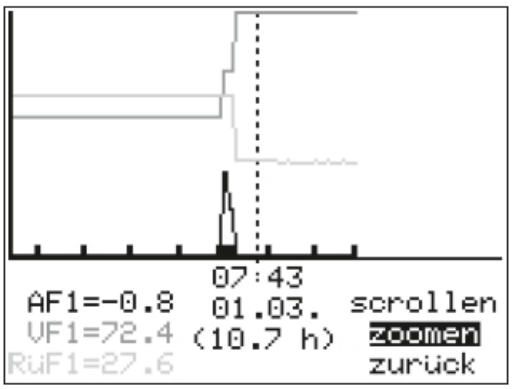
- Select ‘Scroll’.
- Activate editing mode for scroll function.
- Shift the time line.
- Confirm time display.





Zooming in/out

- Select ‘Zoom’.
- Open zoom function.
- Zoom in or out.



- Confirm display.

Closing the Trend-Viewer

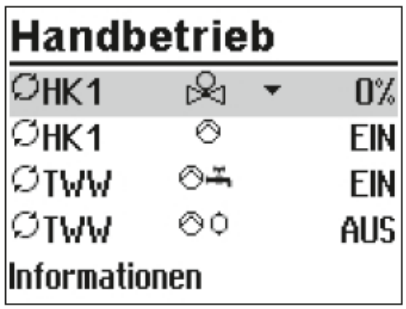
- Select ‘Back’.
- Close the Trend-Viewer

Operating the controller in manual mode
Switch to manual mode to configure all controller outputs.

NOTICE
System damage caused by frost when manual operating mode is active!The frost protection function is deactivated in the manual operating mode.

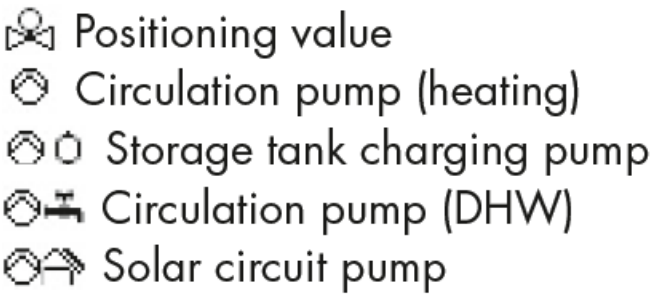
- Do not run the heating during cold weather in the manual mode for long periods of time.

Manually changing the positioning value/switching state:



Turn the rotary switch to (manual mode). The outputs of the configured system are listed on the display.

- Select the output



- Activate editing mode for the output.
- Change the positioning value/switching state.
- Confirm the positioning value/switching state.

The modified values remain active as long as the controller is in manual mode. Turn the rotary switch to (operating level). The manual mode is deactivated.

Note
The outputs of the controller are not affected by merely turning the rotary switch to (manual mode). The outputs are only changed by entering or changing the positioning values or switching states.

Error list

- Sensor failure = Sensor failure (see the ‘Malfunctions’ section in the Mounting and Operating Instructions EQJW246F003)

- Disinfection = Disinfection temperature not reached. See ‘Thermal disinfection of DHW storage tank’ function in Annex A (configuration instructions) of the Mounting and Operating Instructions EQJW246F003.
- Max. charging temp. = Max. charging temperature reached. See ‘DHW heating in the storage tank charging system’ function in Annex A (configuration instructions) of the Mounting and Operating Instructions EQJW246F003.
- External = Error message from device bus
- Temp. monitoring = Temperature monitor alarm
- Unauthorized access = Unauthorized access occurred (see the ‘Malfunctions’ section in the Mounting and Operating Instructions EQJW246F003)
- Binary alarm = Error message of a binary input
- Meter bus = Meter bus communication error

Technical data

Inputs	14x sensor inputs Pt 1000, PTC or Ni 1000, alternatively configurable for binary signals 3x inputs for 0 to 10 V Input 17 for a 3 to 800 Imp/h pulse signal from a heat meter meter for power limitation in HC1 configurable
Outputs	3x three-point signal, alternatively 3x two-point signal: HC1, HC2: Relay outputs, max. load 250 V AC, 2 A; HC3: Triac output, load capacity max. 250 V AC, 0.12 A 5x pump output: relay outputs, max. load 250 V AC, 2 A All relay outputs with varistor suppression 4x 0 to 10 V or PWM signal, configurable, for control signal output or speed control of pumps, load >5 kΩ
Interfaces	Ethernet interface for Modbus TCP/IP communication and connection to building automation via Internet router. Alternative access options via optional external gateways M-Bus interface for up to three M-Bus devices, protocol in accordance with EN 1434-3
	Galvanically isolated RS-485 interface for Modbus RTU and device bus communication. Modbus RTU data format: 8N1 Bluetooth®- interface 4.1
Ambient temperature	0 to 40 °C (operation), –10 to 60 °C (storage and transport)
Degree of protection	IP 40 according to IEC 529
Class of protection	II according to VDE 0106
Degree of contamination	2 according to VDE 0110
Overvoltage category	II according to EN 60664
Noise immunity	According to EN 61000-6-1
Noise emission	According to EN 61000-6-3
Compliance	CE EAC
Weight	Approx. 0.5 kg

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Documents / Resources

	SAUTER EQJW246F003 Heating and District Heating Controller with Graphics Display [pdf] Instruction Manual EQJW246F003 Heating and District Heating Controller with Graphics Display, EQJW246F003, Heating and District Heating Controller with Graphics Display, Heating Controller with Graphics Display, Controller with Graphics Display, Graphics Display, Display

References

- SAUTER | Produkte & Software für Gebäudeautomation
- Gebäude/- Raumautomation / Energiemanagement | SAUTER
- User Manual