Art.-No. 9600501000

Operating instructions

OTsmart SC1

Heating circuit controller with boiler control via OpenTherm interface

Issue: 0425
Art. 0450000658

1 Contents

2 General

The SC1 offers the option of extending a boiler system with an OpenTherm interface to include a mixer-controlled heating circuit.

Operation is via WEB browser

Systems with mixed (MK) and unmixed heating circuits (DK) are controlled via the heating circuit control. Depending on the outside temperature, the required heating circuit temperature in the flow is determined and transferred to the boiler control system as request.

The boiler and hot water are controlled via the OpenTherm interface by transmitting the request value.

3 Security

All electrical connections, protective measures and fuses must be carried out by a qualified electrician in accordance with the applicable standards and VDE guidelines as well as local regulations.

The electrical connection must be provided as a fixed connection in accordance with VDE 0100.

3.1 Intended use

The appliance is built in accordance with the state of the art and recognised safety regulations. Nevertheless, use of the appliance may present risks to the operator or third parties or cause damage to the appliance and other property.

The device may only be used as a heating circuit controller.

3.2 Danger symbols in these operating instructions

Warning!

This signal word indicates a potentially imminent danger. If it is not avoided, death or serious injury may result.

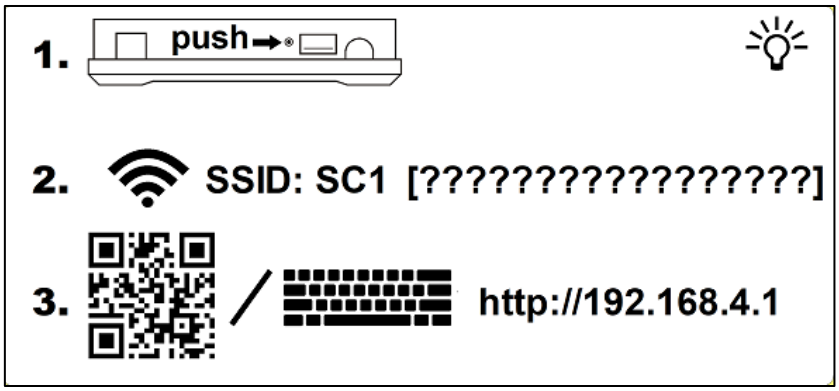
Caution - damage to components!

This signal word indicates a potentially harmful situation. If it is not avoided, the system or something in its vicinity may be damaged.

4 Commissioning

4.1 WEB browser

The procedure for commissioning the device via the WEB browser,
can be found on the sticker on the front of the housing.

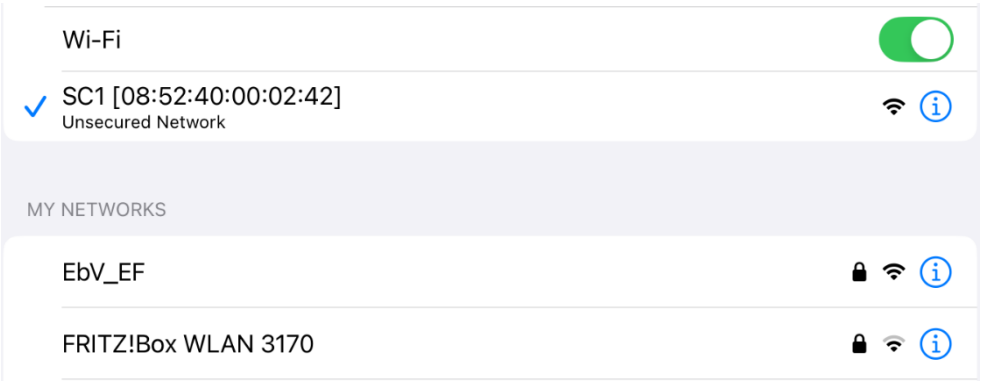


After you have finished connecting the SC1, switch on the mains voltage to activate the device. The LED in the SC1 front starts to flash **BLUE**.

1. Using a biro or paper clip, press the recessed button on the top of the control (step 1 of the quick guide).
2. This activates the hotspot of the controller and is available on your control panel (PC, notebook, tablet or smartphone) under the SSID printed on the controller in the available WLAN networks.

Select this WLAN network.

e.g.



3. Now scan the printed QR code with your QR code scanner on the operating device or enter the address http://192.168.4.1 in the browser, whereupon you can select the WLAN network in which the SC1 is to be integrated.
4. If no connection to a network is available, it is also possible to configure and operate the device via the hotspot controller. Select the following button here, which will be displayed after you enter the browser address http://192.168.4.1:

Use as hotspot without connecting to a network

Please select your WiFi

Scan again

Use as hotspot without connecting to a network

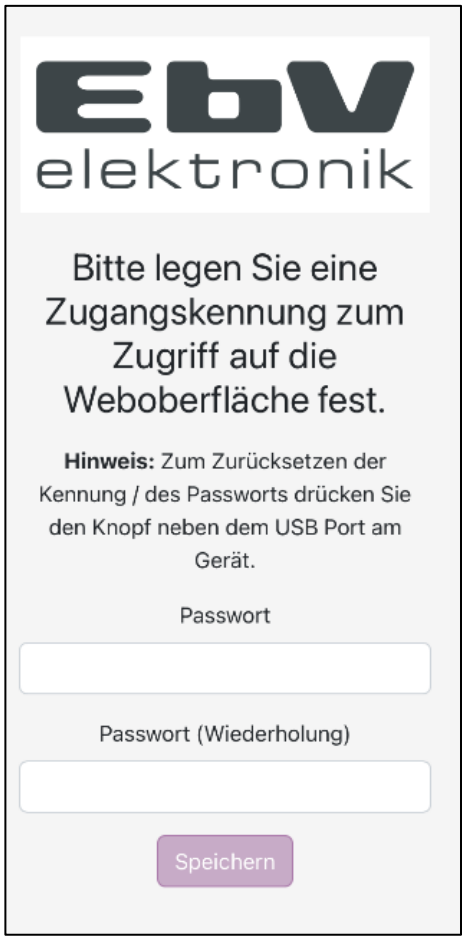
Please select your WiFi

WiFi connection was successful.

next

If the connection is successful, tap the "Weiter" button to continue. The LED on the front now flashes "**GREEN**"; if there is an error, the LED flashes "**RED**". However, this does not need to be taken into account for the rest of the WLAN configuration configuration.

To protect the device from unauthorised access during operation, assign a password. Password length 1 to 6 characters.



Please set an access code to access the web interface.

Note: To reset the access code /password, press the button next to the USB port on the device.

Password

Password (repeat)

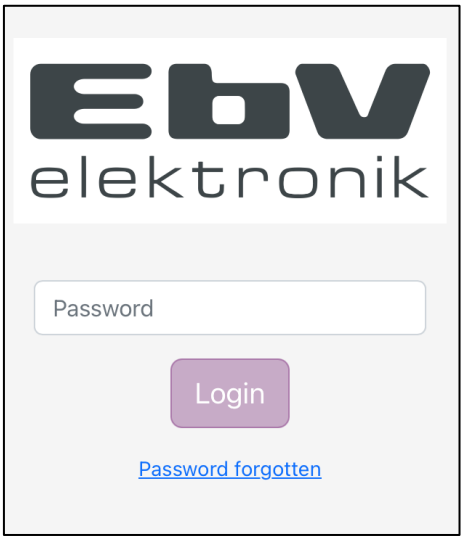
Save

If you want to reset the password at a later date, this is possible. You can enter a new password using the "Forgot password" function. To do this, you must press the button next to the USB port of the device when you are prompted to do so via the web interface.

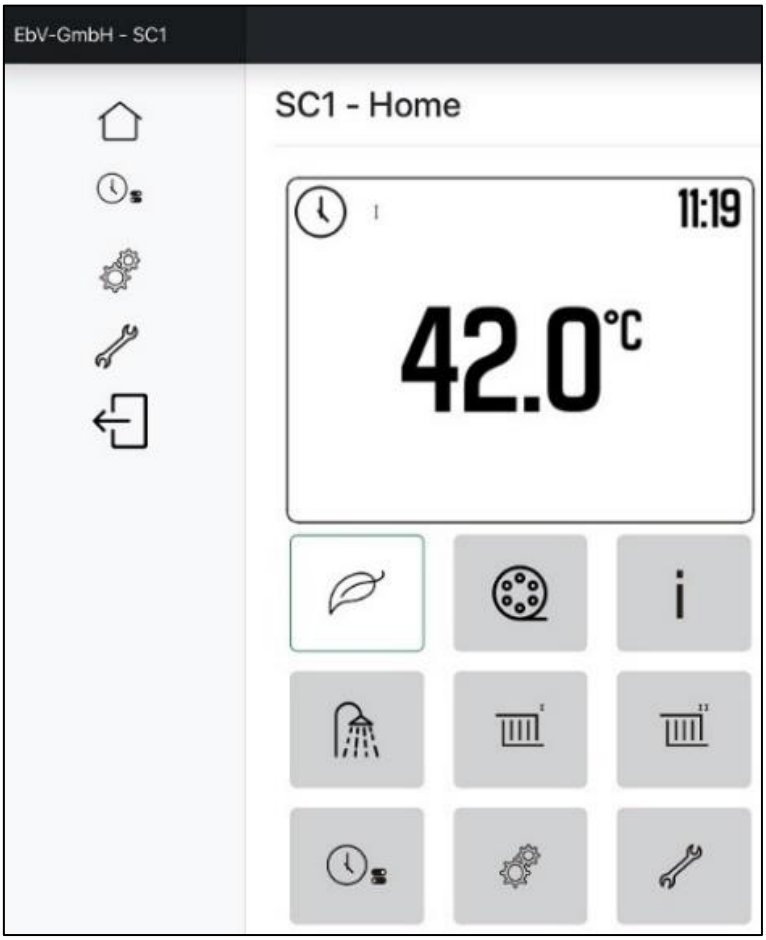
Now use your operating device to switch to the same WLAN network that you previously selected for the SC1 and call up the link that is now displayed.

Please change to your home WiFi and call up the following link:

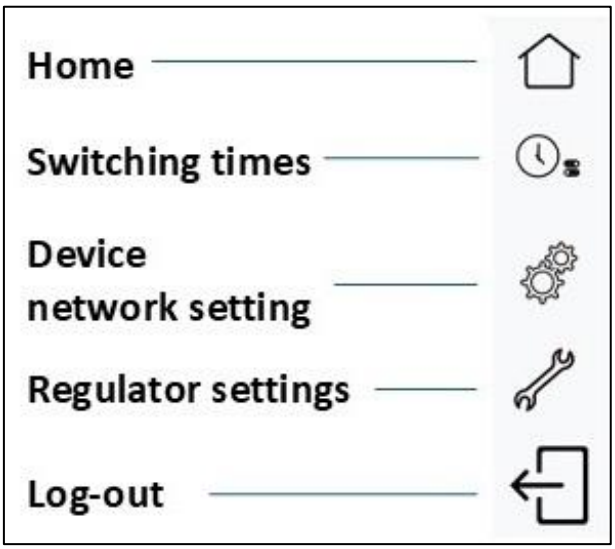
Now enter the previously assigned password to legitimise access.



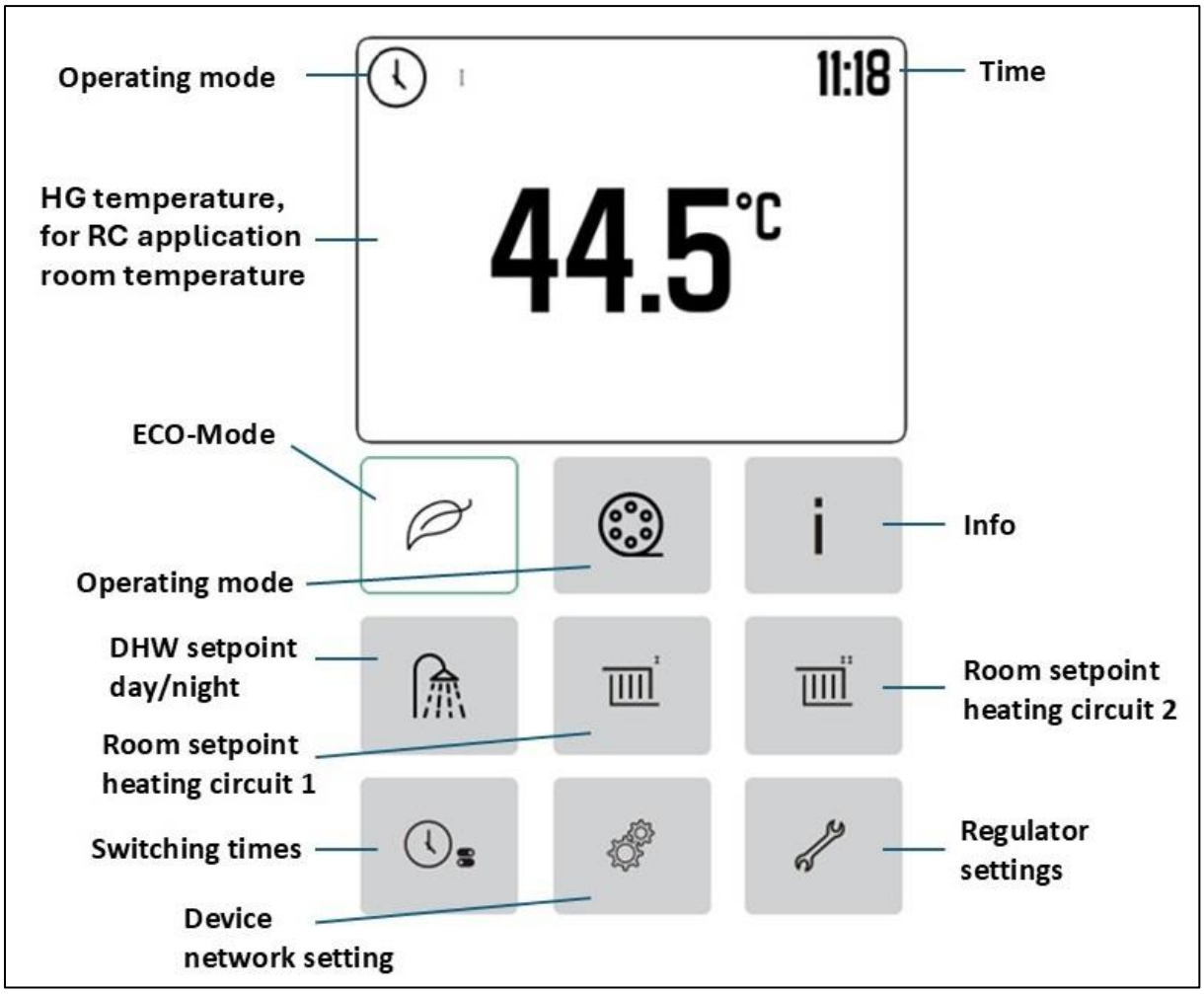
The setup wizard is finished and the basic display is shown.



5 Displays and buttons of the basic display



(Tablet and PC display)



(Smartphone, tablet and PC display)

6 Device setting

The double gearwheel button takes you to the device and network settings. The following areas are available for selection.

- Device settings
- Network settings
- Import/export
- Update
- Reset

Device settings:

The time setting of the device can be customised here. On the one hand, an individual time/date can be entered or the time/date of the operating device can be adopted.

Network settings:

The network settings can also be changed here at a later date. To do this, enter the WLAN network with the access key.

Import/export:

In the "Import/Export" menu, the settings can be backed up as a file by downloading (exporting) them. The settings can be reloaded by uploading (importing) the created file.

Note: Note the set storage location for downloads on your operating device.

Update:

If the SC1 has a connection to the Internet via the network, an update can be requested and executed here. This option is not available in local operation.

Reset:

A complete reset of the SC1 can be called up and executed here.

ATTENTION!

The device is reset to the factory settings and the connection to the local network is lost at the same time. As with initial commissioning, this connection must be re-established using the setup wizard.

7 Information

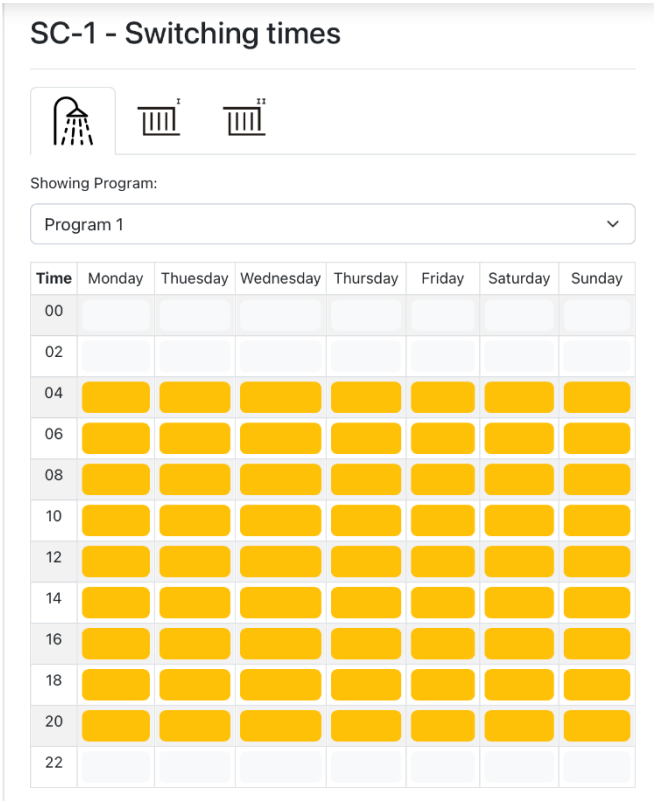
Information on the status and the temperature setpoint/actual values can be called up via the "i" button in the WEB browser.

Designation	Description of the
Outside temperature	Current outside temperature (sensor on SC1)
Outside temperature min.	Minimum outside temperature value (0.00 to 24.00 h)
Outside temperature max.	Maximum outside temperature value (0.00 to 24.00 h)
Outside temperature	Current outside temperature (via BUS OT from FA)
Outside temperature min.	Minimum outside temperature value (0.00 to 24.00 h)
Outside temperature max.	Maximum outside temperature value (0.00 to 24.00 h)
Boiler set temperature	Setpoint temperature for the heat generator
Boiler flow temperature	Actual temperature at the heat generator (via BUS OT)
Boiler return temperature	Actual temperature of the heat generator return flow sensor (via BUS OT)
Boiler operation	Boiler status (OFF/ON)
Burner starts	Counter burner starts
Burner runtime	Burner runtime counter
DHW state	Hot water status (OFF/ON)
DHW setpoint	Setpoint temperature hot water
DHW current temperature	Actual hot water temperature
Heating circuit 1 state	Heating circuit 1 status (OFF/ON)
Room setpoint	Current room setpoint temperature heating circuit 1
Room temperature	Actual temperature of the room at HK1 (with assigned RC)
Flow setpoint	Setpoint temperature of heating circuit 1

Designation	Description of the
Flow temperature	Actual temperature of heating circuit 1 (= actual boiler flow temperature)
Heating circuit 2 state	Heating circuit 2 status (OFF/ON)
Room setpoint	Current room setpoint temperature heating circuit 2
Room temperature	Actual temperature of the room at HK2 (with assigned RC)
Flow setpoint	Setpoint temperature of heating circuit 2
Flow temperature	Actual temperature of heating circuit 2
Software version	Current software version of the SC1

8 Switching times

The switching times are called up in the WEB browser via the Switching times button.



8.1 Standard switching times (factory value)

HEATING CIRCUIT 1

1	P1	--	--	MO	TU	WE	TH	FR	SA	SU	06:00	22:00
2	--	P2	--	MO	TU	WE	TH	FR	--	--	06:00	08:00
3	--	P2	--	MO	TU	WE	TH	--	--	--	16:00	22:00
4	--	P2	--	--	--	--	--	FR	--	--	13:00	22:00
5	--	P2	--	--	--	--	--	--	SA	SU	07:00	23:00
6	--	--	P3	MO	TU	WE	TH	FR	--	--	07:00	18:00

HEATING CIRCUIT 2

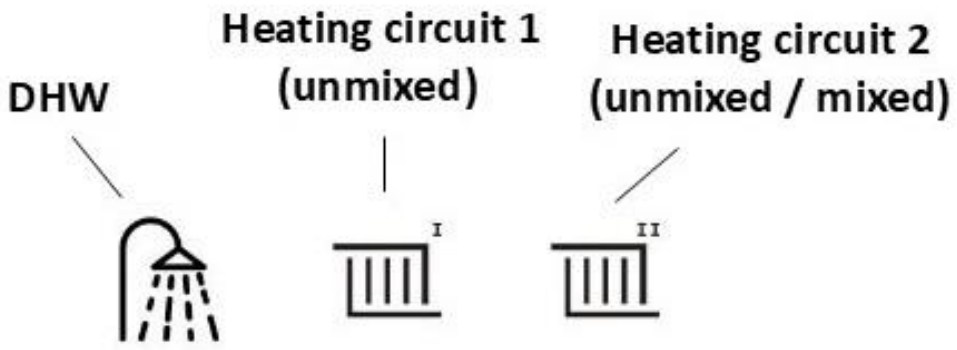
1	P1	--	--	MO	TU	WE	TH	FR	SA	SU	06:00	22:00
2	--	P2	--	MO	TU	WE	TH	FR	--	--	06:00	08:00
3	--	P2	--	MO	TU	WE	TH	--	--	--	16:00	22:00
4	--	P2	--	--	--	--	--	FR	--	--	13:00	22:00
5	--	P2	--	--	--	--	--	--	SA	SU	07:00	23:00
6	--	--	P3	MO	TU	WE	TH	FR	--	--	07:00	18:00

HOT WATER

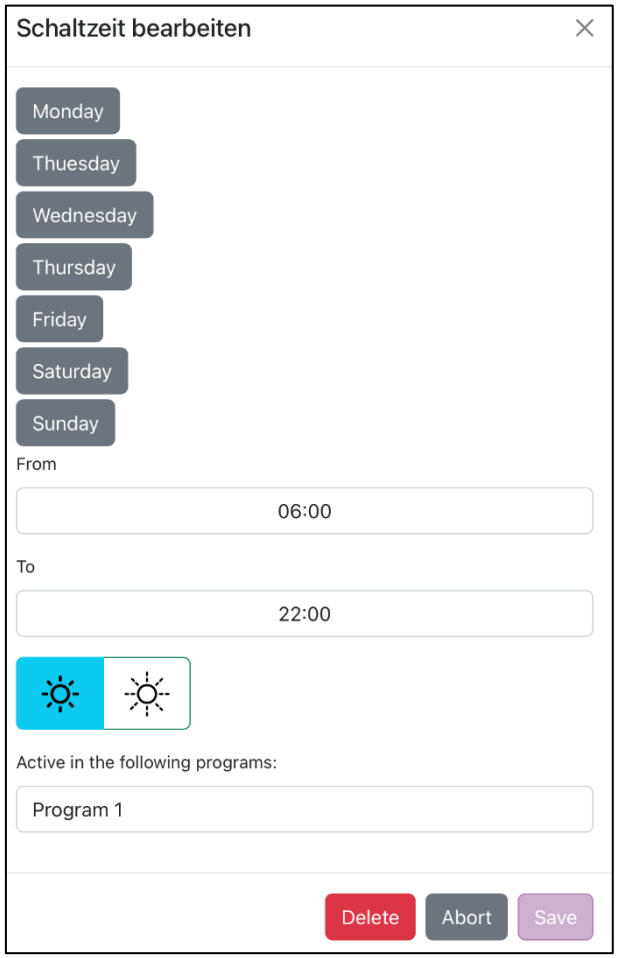
1	P1	--	--	MO	TU	WE	TH	FR	SA	SU	05:00	22:00
2	--	P2	--	MO	TU	WE	TH	FR	--	--	05:00	08:00
3	--	P2	--	MO	TU	WE	TH	--	--	--	15:30	22:00
4	--	P2	--	--	--	--	--	FR	--	--	12:30	22:00
5	--	P2	--	--	--	--	--	--	SA	SU	06:00	23:00
6	--	--	P3	MO	TU	WE	TH	FR	--	--	06:00	18:00

8.2 Changing the standard switching times

1. Select the control circuit:



2. Select the switching programme. A maximum of 3 switching programmes are available
3. Select a switching time field to open the field for editing the switching time.

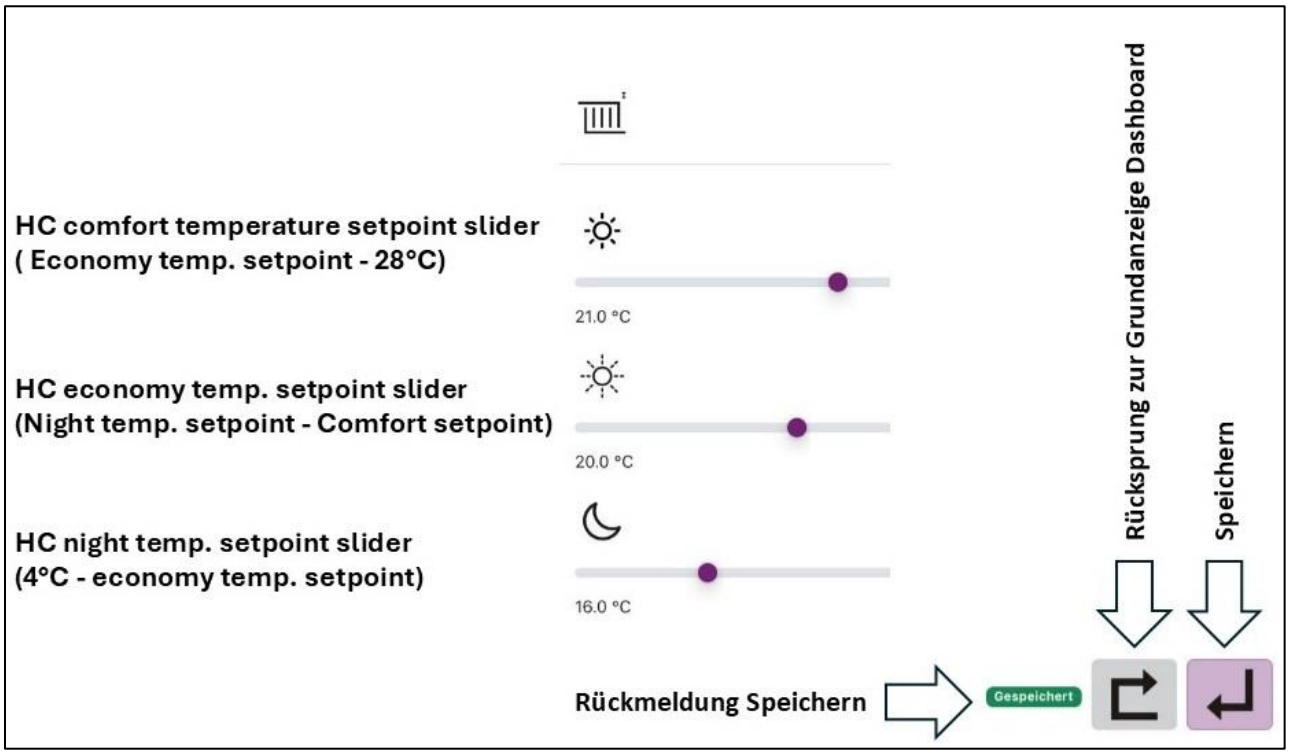


Here you can set the days of the week, the switch-on and switch-off time and the switching programme. For heating circuits 1 and 2, you can also choose between comfort temperature (sun - highlighted in blue) and economy temperature (sun - highlighted in green). You can also delete individual switching times or entire cycles here.

The switching time day is divided into individual 2-hour grids. Only one switching cycle is permitted within a 2-hour grid. This can be between 1 min. and 120 min.

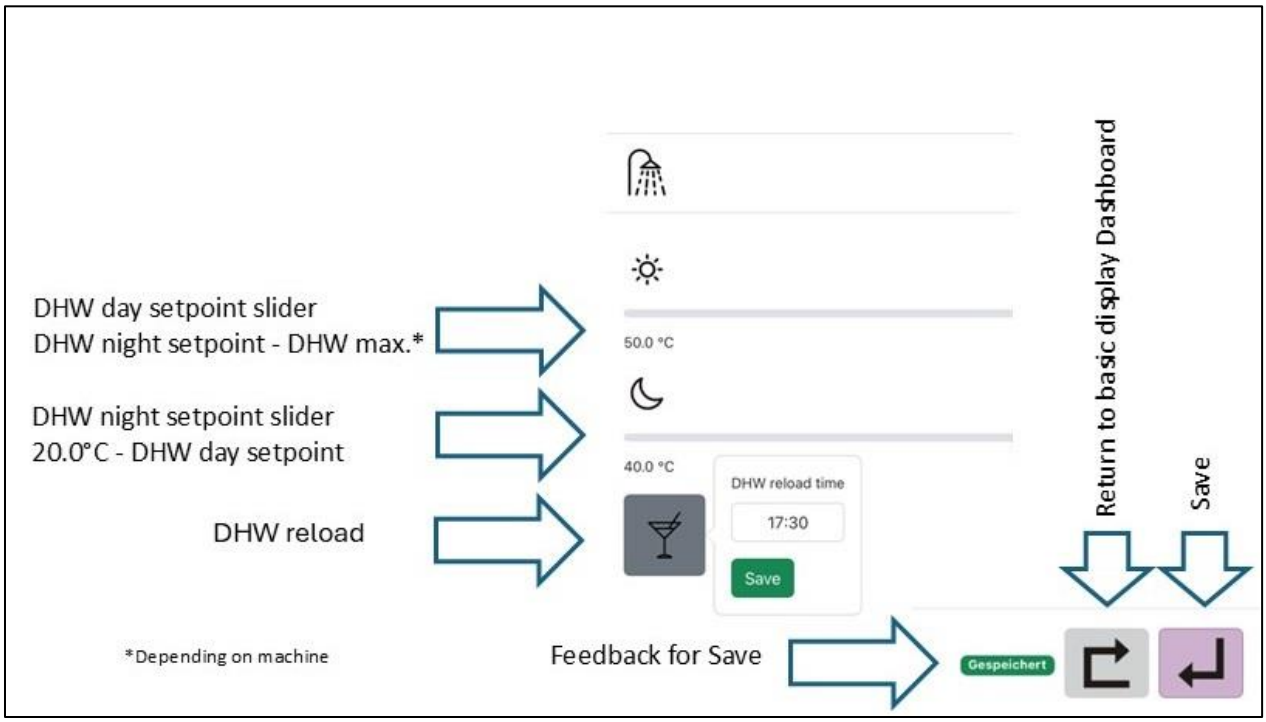
9 Heating circuit Room setpoint

In the WEB browser, it is possible to set the room setpoint temperature using the Heating circuit 1 and Heating circuit 2 buttons.



10 Domestic hot water setpoint

In the WEB browser, you can use the DHW button to set the DHW setpoint temperature and activate a DHW recharge.



11 ECO

In the basic display (home screen), the ECO function can be activated and deactivated using the ECO button. This function can be used to activate preconfigured energy-saving features.

When this ECO function is activated, the setpoint is reduced, which can be set to the hot water setpoint temperature and the room setpoint temperature.

It is possible to select whether the reduction should only take place in heating mode or in heating and reduced mode.

Please refer to chapter 12.7 ECO menu, the parameter level.

12 Parameters

In the WEB browser, it is possible to access the parameter level via the spanner button.

12.1 Hydraulics menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	Boiler (OT-Master)	OFF, ON	ON
2	HF	DHW	OFF, ON	ON
3	HF	Heating circuit 1	OFF, ON	ON
4	HF	Heating circuit 2	OFF, pump, mixing valve	Mixing valve
5	HF	RelayTest	OFF, OPEN, CLOSE, pump, (VA)	OFF

12.2 System menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	BE	Number of switching times Programmes	1 ... 3	3
4	HF	Clima zone	-50 ... 0 °C	-12°C
5	HF	Building	OFF 1 = light construction 2 = medium-heavy construction 3 = heavy construction	OFF
6	HF	Room supply	Heating circuit 1, heating circuit 2	Heating Circuit 1
7	HF	Reset counter	OFF, ON	OFF

12.3 Hot water menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	DHW operating mode	1 (Intern) 2 (Extern) 3 (intern + extern)	3
2	BE	DHW maximum limitation	20 ... 65 °C	60°C
3	HF	DHW priority	OFF, ON	ON
4	HF	Legionella protection day	AUS, Monday ... Sunday, daily	OFF
7	HF	Legionella protection time	OFF, ON	02:00
8	HF	Legionella protection Temperature	OFF, ON	60°C

12.4 Heating circuit 1 menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	Request	1 (Outside control) 2 (room control) 3 (constant control)	1
2	BE	Outside temperature	1 (Intern) 2 (Extern) 3 (intern + extern)	1
3	HF	Antifreeze outside temperature	-20°C ... 30°C	3,0°C
4	HF	Summer operation	-20°C ... 30°C	18,0°C
5	HF	Reduced	Eco, Heating	Eco
6	HF	Heat system	1,00 ... 10,00	1,00
7	BE	Heat curve	0,05 ... 3,50	1,00
8	HF	Room sensor	OFF, ON	OFF
9	HF	Raum factor	OFF, 10 ... 500%	OFF
10	HF	Heat curve adaptation	OFF, ON	OFF
11	BE	Thermostat	OFF, 0.5K ... 5.0K	OFF
12	HF	RC gain	1,0 ... 100,0%/K	8,0%/K
13	BE	RC adjust time	5.0 ... 240.0 min.	15 min.
14	BE	RC scan time	1.0 ... 30.0 min.	20 min.
15	BE	Window blocking time	OFF, 2 ... 60 min.	OFF

No.	Access	Designation	Setting range resp. Setting values	Factory value
16	BE	Windows difference	0,5 ... 10,0K	2K
17	BE	Switch on optimation	OFF, 1 ... 12h	OFF
18	HF	Heat limit	OFF, 5.0 ... 95.0°C	OFF
19	HF	Vacation	Standby, Absent	Standby
20	HF	Minimum temperature	5.0°C ... 75°C	5,0°C
21	HF	Maximum temperature	5.0°C ... 95°C	75,0°C
22	HF	Increase of request	-20.0K ... +20.0K	OFF
23	HF	Screed programme	OFF Functional heating Laying heating Functional heating + Laying heating	OFF

12.5 Heating circuit 2 menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	Request	1 (Outside control) 2 (room control) 3 (constant control)	1
2	BE	Outsidetemperature	1 (Intern) 2 (Extern) 3 (Intern + Extern)	1
3	HF	Antifreeze outside temperature	-20°C ... 30°C	3,0°C
4	HF	Summer operation	-20°C ... 30°C	18,0°C
5	HF	Reduced	Eco, Heating	Eco
6	HF	Heat system	1,00 ... 10,00	1,00
7	BE	Heat curve	0,05 ... 3,50	1,00
8	HF	Room sensor	OFF, ON	OFF
9	HF	Room factor	OFF, 10 ... 500%	OFF
10	HF	Heat curve adaptation	OFF, ON	OFF
11	BE	Thermostat	OFF, 0.5K ... 5.0K	OFF
12	HF	RC gain	1,0 ... 100,0%/K	8,0%/K
13	HF	RC adjust time	5.0 ... 240.0 min.	15 min.
14	HF	RC scan time	1.0 ... 30.0 min.	20 min.
15	BE	Window blocking time	OFF, 2 ... 60 min.	OFF
16	BE	Windows difference	0,5 ... 10,0K	2K
17	BE	Switch on optimation	OFF, 1 ... 12h	OFF
18	HF	Heat limit	OFF, 5.0 ... 95.0°C	OFF
19	HF	Vacation	Standby, Absent	Standby
20	HF	Minimum temperature	5.0°C ... 75°C	5,0°C
21	HF	Maximum temperature	5.0°C ... 95°C	75,0°C

No.	Access	Designation	Setting range resp. Setting values	Factory value
22	HF	Increase of request	-20.0K ... +20.0K	OFF
23	HF	Screed programme	OFF Functional heating Laying heating Functional heating + Laying heating	OFF
24	HF	Lead time	OFF, 0.5 ... 10.0 min	0.5 min.
25	HF	Overrun time	OFF, 0.5 ... 10.0 min	0.5 min.
26	HF	Pump anti-lock system	OFF, 1 ... 300 s	20 s
27	HF	Valve gain	1,0 ... 50,0%/K	2%/K
28	HF	Valve adjust	1 ... 600 s	270 s
29	HF	Valve scann time	1 ... 600 s	20 s
30	HF	Valve runtime	1 ... 600 s	120 s
31	HF	Valve limit stop	OFF, ON	ON
32	HF	Valve anti-lock system	OFF, 1 ... 300 s	20 s
33	HF	Boiler increase of request	OFF, -20.0K ... +20.0K	4,0K

12.6 Boiler menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	Boiler minimum temperature	5.0°C ... 95°C (KTmax)	5,0°C
2	HF	Boiler maximum temperature	(KTmin) 5.0°C ... 95°C	80,0°C

12.7 Eco menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	BE	Eco mode	Heating Heating + absent	Heating
2	BE	Eco DHW (DHW setpoint)	-10.0K ... 0.0K	-5,0K
3	BE	Eco heating circuit 1 (Room setpoint)	-5.0K ... 0.0K	-1,0K
4	BE	Eco heating circuit 2 (Room setpoint)	-5.0K ... 0.0K	-1,0K

12.8 Error stack menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	BE	Error stack 1	--.--.-- --- ... --.--.-- ---	--.--.-- ---
:	:	:	:	:
10	BE	Error stack 10	--.--.-- --- ... --.--.-- ---	--.--.-- ---
11	HF	Fault memory 11	--.--.-- --- ... --.--.-- ---	--.--.-- ---
:	:	:	:	:
20	HF	Error stack 20	--.--.-- --- ... --.--.-- ---	--.--.-- ---
21	HF	Reset error stack	OFF, ON	OFF

12.9 Adjust menu

No.	Access	Designation	Setting range resp. Setting values	Factory value
1	HF	Input EF1	-5.0K ... +5.0K	0,0K
2	HF	Input EF2	-5.0K ... +5.0K	0,0K
3	HF	Input EF3	-5.0K ... +5.0K	0,0K

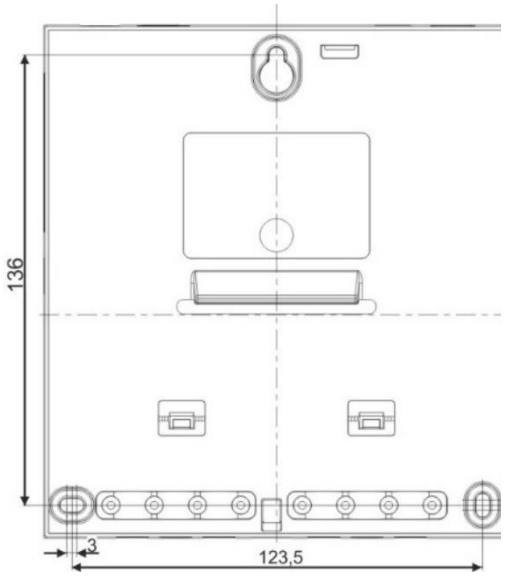
13 Mounting

Warning! - Voltaged parts

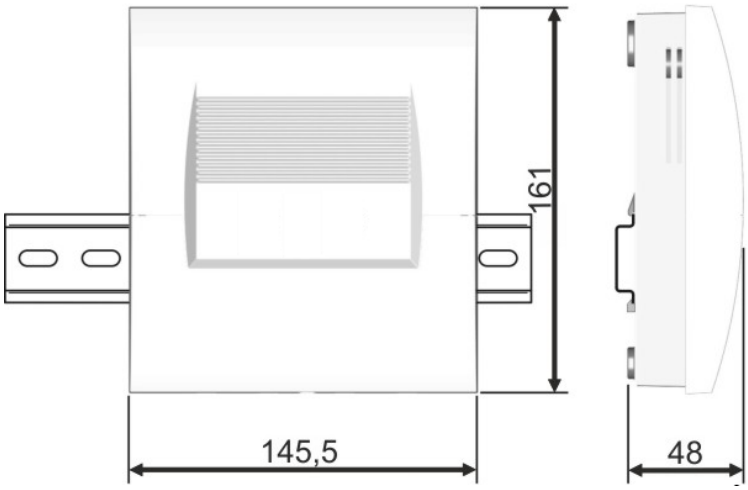
Components are electrically powered.

Touching voltage carrying parts can lead to electric shock, burns or death.

- Work may only be carried out by qualified electricians.
- Before opening the appliance, disconnect it from the power supply, secure it against being switched on again and check that it is de-energized.



Drilling pattern for wall mounting



Top-hat rail mounting

Tools required:

The following tools are required for mounting:

- Cross-recess screwdriver size 1 for opening the terminal compartment cover.
- Slotted screwdriver with a blade width of 2.5 mm for the connection terminals.

Wall mounting:

1. Remove the terminal compartment cover on the housing.
2. To install, first screw a screw into the wall.
3. Suspend the controller from the recess.

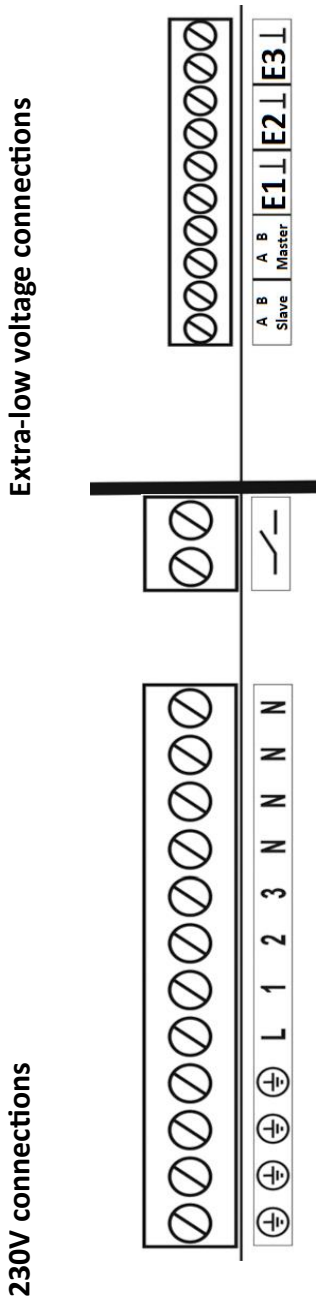
4. Use the regulator as a template for the other mounting holes.

Top-hat rail mounting:

Alternatively, the device can be mounted on a top-hat rail.

1. Insert the mounting feet into the recesses on the top-hat rail mounting.
2. Engage the hook by pressing it down.

13.1 Connection diagram



E3 Connection without function

E2 Flow heating circuit sensor (VF202B)

E1 Outside sensor (AF200)

A/B Connection A/B master OT to Automat

A/B Connection A/B Slave OT (room unit)

Switching output (potential-free)

N Neutral 230V mains

3 L1 (230 V) Mixer CLOSED

2 L1 (230 V) Mixer OPEN

1 L1 (230 V) Mixer heating circuit pump (MKP)

L Phase 230V mains

⏚ Earthing connection

14 Troubleshooting

14.1 Error overview

Error code	Cause	Repair
01-0	Sensor E1 interruption (outside)	Check cable and plug connection, check sensor values in disconnected state, replace if necessary
01-1	Short-circuit sensor E1 (outside)	See 01-0
02-0	Interruption of sensor E2 (flow)	See 01-0
02-1	Short circuit sensor E2 (flow)	See 01-0
03-0	Sensor E3 interruption	See 01-0
03-1	Short circuit sensor E3	See 01-0
50-6	OT operating device (RC) no data connection (terminal slave OT)	Repair fault on the data bus to the operating device
70-6	Data bus OpenTherm no signal (terminal Master OT)	Eliminate the fault on the data bus to the heat generator
71-(0-255)	Automat Error Message Code	Follow the service instructions for the machine
72-1	Automat Error Service	Follow the service instructions for the machine
72-2	Automat error reset	Follow the service instructions for the machine
72-3	Automat error Water pressure too low	Follow the service instructions for the machine
72-4	Automat error flame	Follow the service instructions for the machine
72-5	Automat air pressure error	Follow the service instructions for the machine
72-6	Automat error Overtemperature	Follow the service instructions for the vending machine
73-(0-255)	Automat blower error Message Code	Follow the service instructions for the vending machine
74-1	Automat blower error Service	Follow the service instructions for the machine
74-2	Automat blower error Exhaust gas	Follow the service instructions for the machine
74-3	Automat air inlet fan error	Follow the service instructions for the machine
74-4	Automat blower error Frost protection	Follow the service instructions for the machine

In the event of a fault, the LED in the SC1 front flashes **RED**.

15 System extension

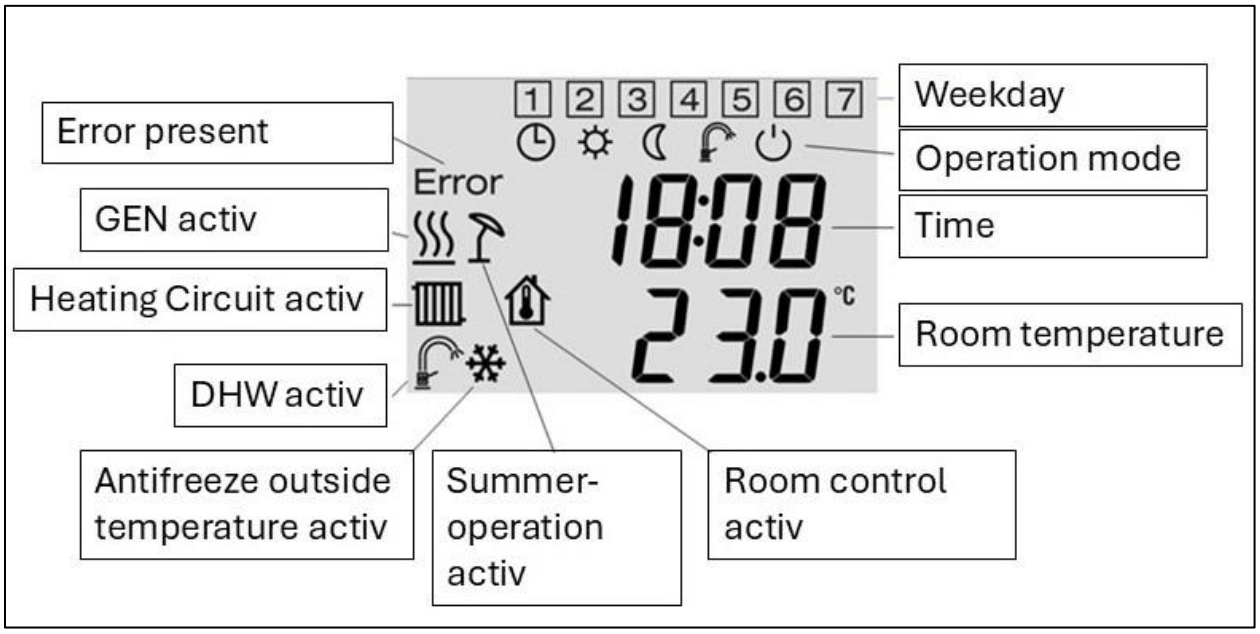
15.1 Connection room unit CETA RC -OT

The SC1 can be extended for the heating circuit with a CETA RC-OT room unit.

The room unit is connected to SC1 at the Slave A/B connection.

Connecting a CETA RC-OT makes it possible to record the room temperature and incorporate it into the control result. It is also possible to set the operating mode, the switching programme and the room setpoint temperature (comfort, economy and night temperature).

A connected CETA RC-OT offers the following display options:



An active "Absent" operating mode is indicated by a flashing "Moon" symbol. An active "Party" operating mode is indicated by a flashing "S“.

15.1.1 Heating circuit assignment

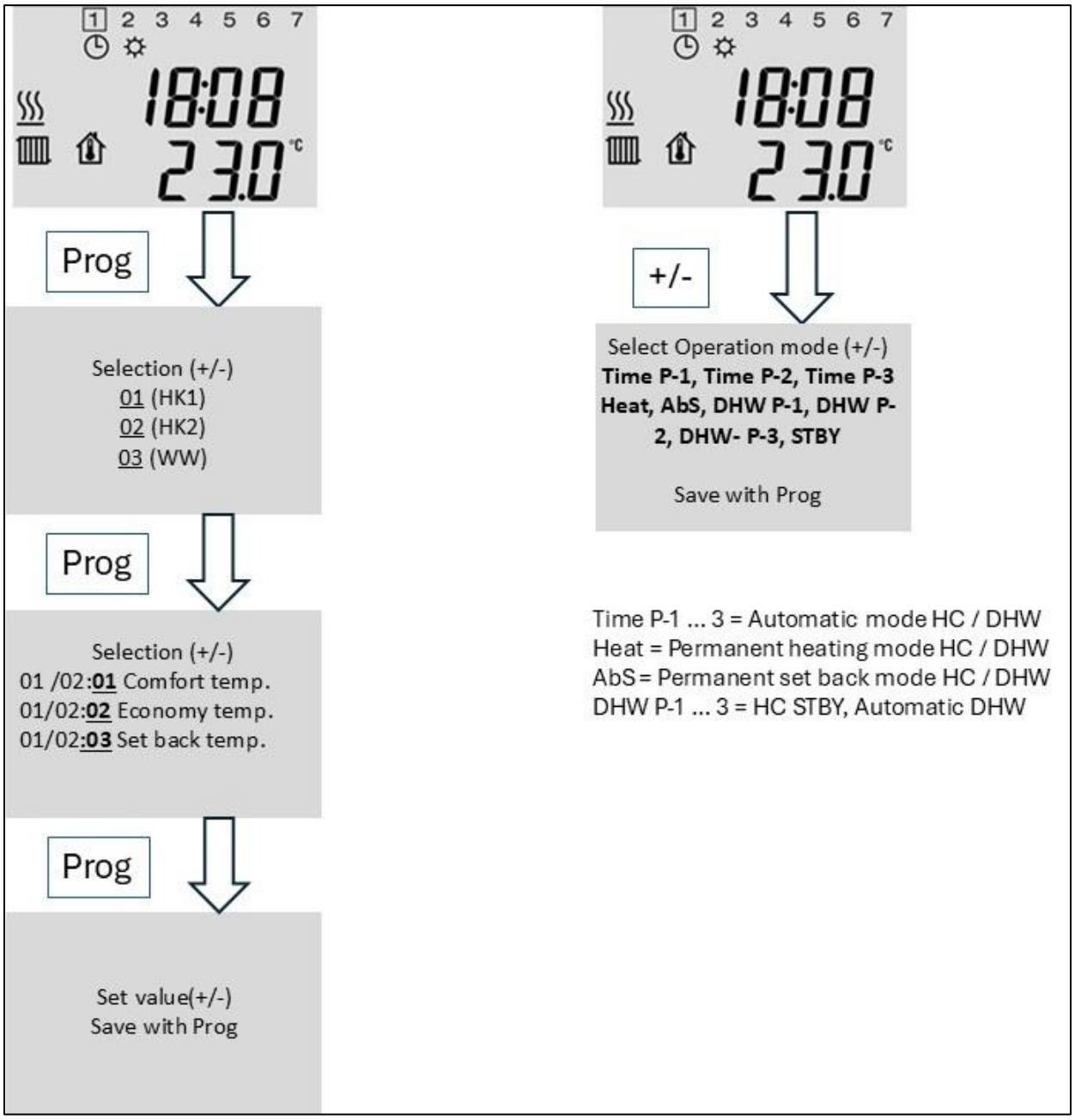
Only one room unit can be connected to an SC1, which means that it is necessary to make an assignment if two heating circuits are possible.

This assignment is made in the System menu:

Designation	Setting range resp. Setting values	Factory value
Room supply	Heating circuit 1, heating circuit 2	Heating circle 1

15.1.2 Operation via CETA RC-OT

Setpointtemperature setting: **Operating mode Setting:**



15.2 THETA RSC-OT room unit connection

The THETA RSC-OT room unit is connected to the Slave A/B connection.

A connected THETA RSC-OT is assigned to heating circuit 1. Assignment to heating circuit 2 is not possible.

The room temperature recorded by the THETA RSC-OT is not displayed in the WEB browser. In this case, the temperature of the heat recovery centre is displayed here.

It is not possible to set the setpoint temperature HK1 and WW via the WEB browser; the setting options remain on the RSC-OT.

The setpoint (HK/WW) generated by the THETA RSC-OT is forwarded to the heat exchanger via the SC1 and controlled accordingly.

16 Technical data

Mains connection voltage:	230V +6%/ -10%
Nominal frequency:	50...60Hz
Power consumption:	max. 2.1VA
Fuse:	6,3A
Contact load of the output relays:	2 (2)A
Ambient temperature:	-10...+50°C
Storage temperature:	-25...+80°C
Protection class:	IP 30
Protection class according to EN60730:	II
Housing dimensions:	145.5 x 161 x 48 mm (W x H x D)
Housing material:	ABS V0
Weight:	420g
Mains connection technology:	Screw terminals 1.5 mm^2
Low voltage connection technology:	Screw terminals 1.0 mm^2

16.1 Resistance values of the sensors

Depending on the temperature:

VF 202(4), AF200			
T (°C)	**R (kOhm)**	**T (°C)**	**R (kOhm)**
0	1,630	45	2,330
5	1,700	50	2,418
7	1,729	55	2,507
10	1,772	60	2,598
12	1,802	65	2,691
14	1,831	70	2,786
16	1,861	75	2,883
18	1,892	80	2,982
20	1,922	85	3,082
25	2,000	90	3,185
30	2,080	95	3,290
35	2,161	100	3,396
40	2,245		

17 Declaration of Conformity

EbV Elektronikbau- und Vertriebs-GmbH assures that the product is produced according to the applicable EU directives. A complete version of the declaration of conformity can be found in the download area at https://ebv-gmbh.eu/en/downloads/ot-smart/.

18 Liability

Our general terms and conditions of delivery and business apply. We exclude all liability claims if these are due to non-compliance with the operating instructions and the safety instructions contained therein. We reserve the right to make technical changes.

19 Waste disposal

Dispose of all replaced components and finally the controller itself in an environmentally friendly manner and in accordance with the current legal regulations of the respective country.