

Technical Reference Manual

ABB-free@home®

Room temperature controller,
wireless

Room temperature controller/
heating actuator, wireless

RTC-F-1-WL

RTC-F-2.1-1-WL



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1 Information on the manual

Please read this manual carefully and observe the information it contains. This will assist you in preventing injuries and damage to property, and ensure both reliable operation and a long service life for the device.

Please keep this manual in a safe place.

If you pass the device on, also pass on this manual along with it.

ABB accepts no liability for any failure to observe the instructions in this manual.

If you require additional information or have questions about the device, please contact ABB or visit our Internet site at:

www.abb.com/freeathome

2 Safety

The device has been constructed according to the latest valid regulations governing technology and is operationally reliable. It has been tested and left the factory in a technically safe and reliable state.

However, residual hazards remain. Read and adhere to the safety instructions to prevent hazards of this kind.

ABB accepts no liability for any failure to observe the safety instructions.

2.1 Information and symbols used

The following Instructions point to particular hazards involved in the use of the device or provide practical instructions:



Danger

Risk of death / serious damage to health

- The respective warning symbol in connection with the signal word "Danger" indicates an imminently threatening danger which leads to death or serious (irreversible) injuries.



Warning

Serious damage to health

- The respective warning symbol in connection with the signal word "Warning" indicates a threatening danger which can lead to death or serious (irreversible) injuries.



Caution

Damage to health

- The respective warning symbol in connection with the signal word "Caution" indicates a danger which can lead to minor (reversible) injuries.



Attention

Damage to property

- This symbol in connection with the signal word "Attention" indicates a situation which could cause damage to the product itself or to objects in its surroundings.



NOTE

This symbol in connection with the word "Note" indicates useful tips and recommendations for the efficient handling of the product.



This symbol alerts to electric voltage.

2.2 Intended use

This device is a room temperature controller for decentralized flush-mounted installation. The room temperature controller (with bus coupler) is suitable for the control of conventional heating and cooling systems.

The device is intended for the following:

- Operation according to the listed technical data
- Installation in dry interior rooms and suitable flush-mounted boxes
- Use with the connecting options available on the device

The intended use also includes adherence to all specifications in this manual.

2.3 Improper use

Each use not listed in Chapter 2.2 "Intended use" on page 5 is deemed improper use and can lead to personal injury and damage to property.

ABB is not liable for damages caused by use deemed contrary to the intended use of the device. The associated risk is borne exclusively by the user/operator.

The device is not intended for the following:

- Unauthorized structural changes
- Repairs
- Outdoor use
- The use in bathroom areas

2.4 Target group / Qualifications of personnel

Installation, commissioning and maintenance of the device must only be carried out by trained and properly qualified electrical installers.

The electrical installer must have read and understood the manual and follow the instructions provided.

The electrical installer must adhere to the valid national regulations in his/her country governing the installation, functional test, repair and maintenance of electrical products.

The electrical installer must be familiar with and correctly apply the "five safety rules" (DIN VDE 0105, EN 50110):

1. Disconnect
2. Secure against being re-connected
3. Ensure there is no voltage
4. Connect to earth and short-circuit
5. Cover or barricade adjacent live parts

2.5 Safety instructions



Danger - Electric voltage!

Electric voltage! Risk of death and fire due to electric voltage of 100 ... 240 V. Dangerous currents flow through the body when coming into direct or indirect contact with live components. This can result in electric shock, burns or even death.

- Work on the 100 ... 240 V supply system may only be performed by authorised and qualified electricians.
- Disconnect the mains power supply before installation or dismantling.
- Never use the device with damaged connecting cables.
- Do not open covers firmly bolted to the housing of the device.
- Use the device only in a technically faultless state.
- Do not make changes to or perform repairs on the device, on its components or its accessories.



Caution! - Risk of damaging the device due to external factors!

Moisture and contamination can damage the device.

- Protect the device against humidity, dirt and damage during transport, storage and operation.

2.6 Environment



Consider the protection of the environment!

Used electric and electronic devices must not be disposed of with domestic waste.

- The device contains valuable raw materials which can be recycled.
Therefore, dispose of the device at the appropriate collecting depot.

All packaging materials and devices bear the markings and test seals for proper disposal. Always dispose of the packaging material and electric devices and their components via the authorized collecting depots and disposal companies.

The products meet the legal requirements, in particular the laws governing electronic and electrical devices and the REACH ordinance.

(EU Directive 2012/19/EU WEEE and 2011/65/EU RoHS)

(EU REACH ordinance and law for the implementation of the ordinance (EC) No.1907/2006).

3 Setup and function

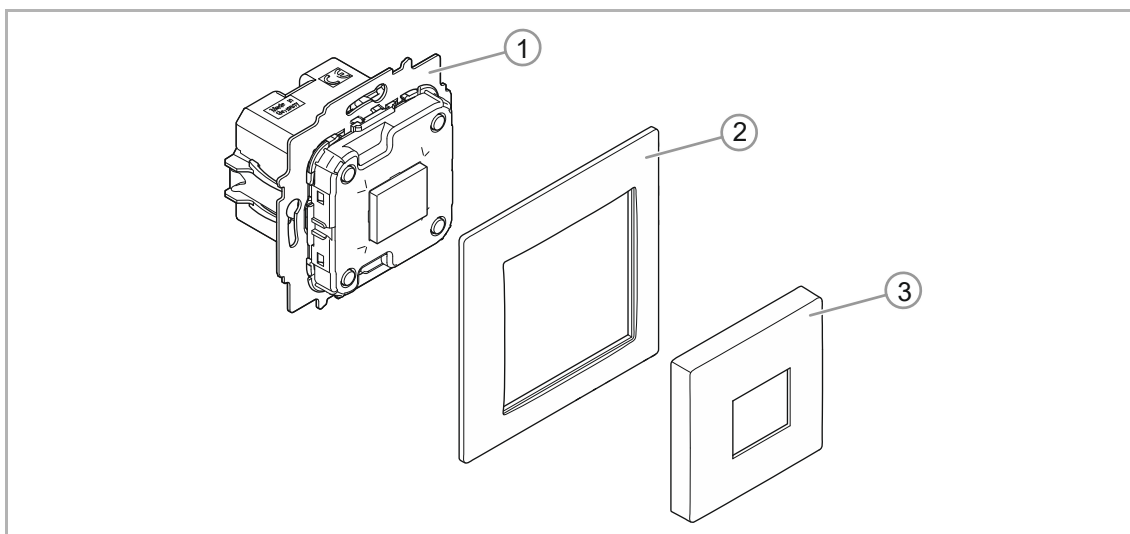


Fig. 1: Product overview

- [1] Flush-mounted insert
- [2] Cover frame (not included in scope of delivery)
- [3] Cover plate (not included in scope of delivery)

This device is a room temperature controller for decentralized flush-mounted installation.

The room temperature controller is suitable for the control of conventional heating and cooling systems.

The devices are preconfigured and must be parameterised for the use of the functions.

At initial commissioning the device should not be used for at least 3 hours. The calibration of the device starts automatically after this rest period.

3.1 Scope of supply

The scope of supply only contains the flush-mounted insert [1]. It must still be completed with a cover frame [2] and a cover plate [3].



Note

Additional information about the switch ranges is available in the electronic catalogue (www.busch-jaeger-catalogue.com).

3.2 Overview of types




Article no.	Product name	Sensor channels	Actuator channels	Switching load
RTC-F-1-WL	Room temperature controller, wireless	1 	0	
RTC-F-2.1-1-WL	Room temperature controller/heating actuator, wireless	1 	1 	1 x 3680 W

Table 1: Overview of types

3.3 Functions

The following table provides an overview of the possible functions and applications of the device:


Icon of the user interface	Information	
	Name:	Room temperature controller
	Type:	Actuator
	Made available by:	Room temperature controller
	Function:	Controls ABB-free@home® heating actuators

Table 2: Overview of functions

3.4 Device overview

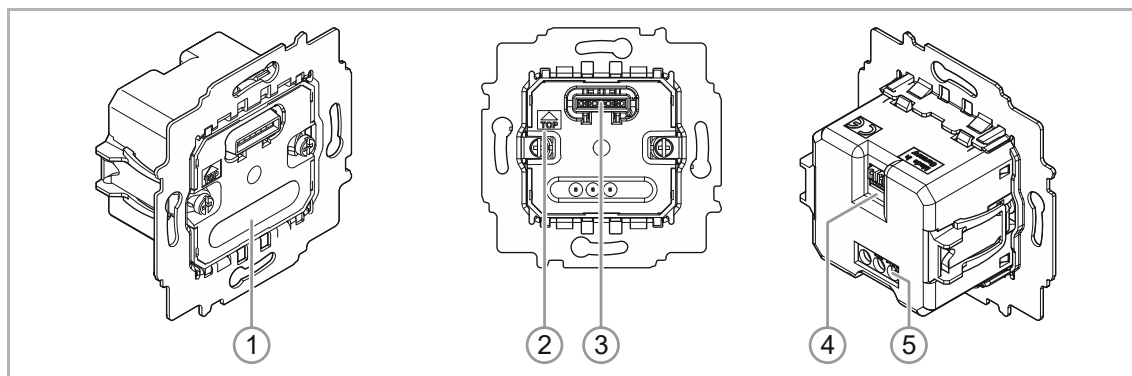


Fig. 2: Device overview of room temperature controller

- [1] Phase sensing L
- [2] Mark TOP
- [3] Multi-point connector for sensor
- [4] Spring plug-in terminal for connecting an external temperature sensor
- [5] Bottom terminal block

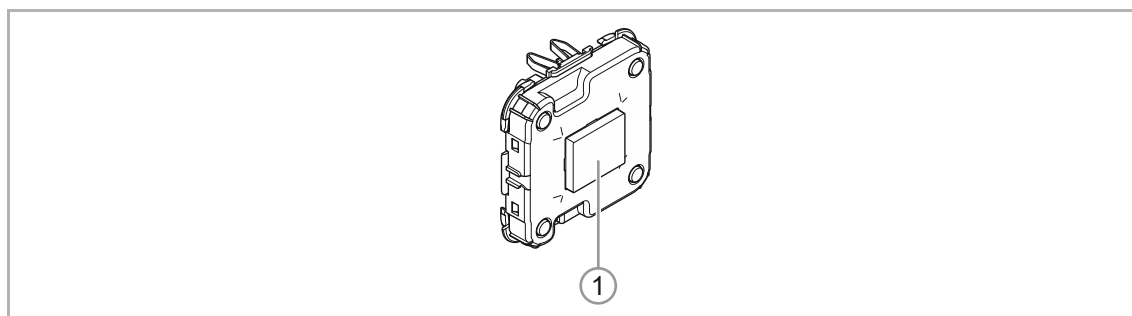


Fig. 3: Sensor

- [1] Sensor with display

4 Technical data

Designation	Value
Operating voltage	230 V AC, 50/60 Hz
Connection	L, N (option), inputs and outputs non-floating Screw-type terminal: 2 x 2.5 mm ² rigid; 2 x 1.5 mm ² flexible
Claw	With protective cover and reset (removable)
Transmission protocol	free@home wireless
Transmission frequency	2.400 - 2.483 GHz
Maximum transmission power WL (wireless)	< 15 dBm
Switching cycles	> 100 000
Power consumption	< 1 W
Maximum load	1gang switch actuator: 1 x 16 A ohmic load
Protection	IP20
Ambient temperature	-5°C to +45°C
Storage temperature	-20°C to +70°C
Temperature sensor of external room temperature controller	DP4-T-1(Optional)

Table 3: Technical data

4.1 Dimensional drawings



Note

All dimensions are specified in mm. All device types listed in this manual have the same dimensions.

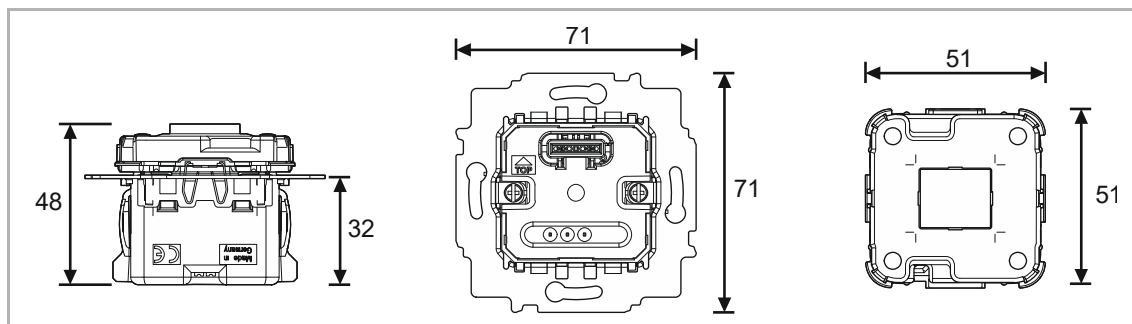


Fig. 4: Dimensions of all described device types (all dimensions in mm)

5 Connection and installation

5.1 Planning instructions



NOTE

Planning and application instructions for the system are available in system manual for ABB-free@home®. This can be downloaded via www.abb.com/freeathome.



NOTE

Transmitter and receiver communicate via radio control. The transmission range depends on the structural conditions. Walls and ceilings, especially steel reinforcements or metal claddings, reduce the transmission range. The distance of components to each other and to other transmitters that also emit high-frequency signals (e.g. computers, audio and video systems) should be at least 1 m.

5.2 Safety instructions



Danger - Electric voltage!

Install the device only if you have the necessary electrical engineering knowledge and experience.

- Incorrect installation endangers your life and that of the users of the electrical system.
- Incorrect installation can cause serious damage to property, e.g. due to fire.

The minimum necessary expert knowledge and requirements for the installation are as follows:

- Apply the "five safety rules" (DIN VDE 0105, EN 50110):
 1. Disconnect
 2. Secure against being re-connected
 3. Ensure there is no voltage
 4. Connect to earth and short-circuit
 5. Cover or barricade adjacent live parts.
- Use suitable personal protective clothing.
- Use only suitable tools and measuring devices.
- Check the type of supply network (TN system, IT system, TT system) to secure the following power supply conditions (classic connection to ground, protective earthing, necessary additional measures, etc.).
- Observe the correct polarity.

5.3 Circuit diagrams

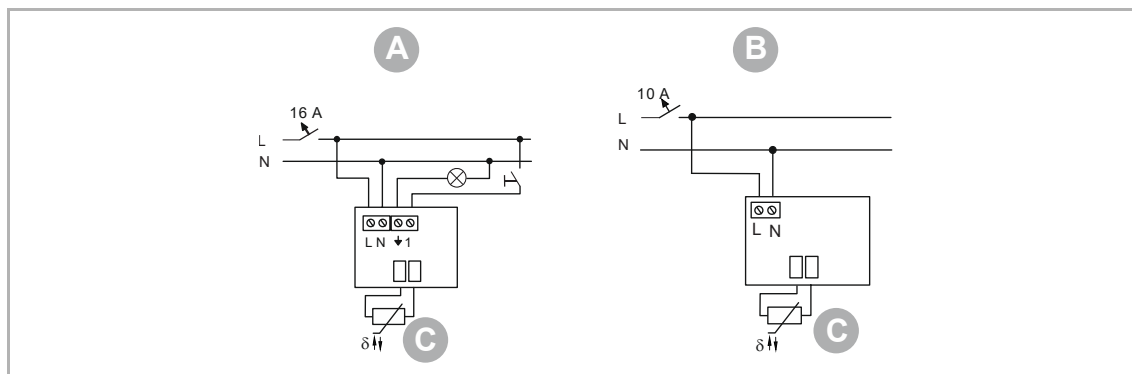


Fig. 5: Electrical connection

[A] RTC-F-2.1-1-WL

[B] RTC-F-1-WL

[C] Temperature sensor DP4-T-1 (optional; setting via parameterization)

5.4 Installation



Note

The devices have been prepared for installing in flush-mounted boxes in connection with the corresponding mounting plate. The device insert has already been inserted in the mounting plate.

To install the device, perform the following steps:

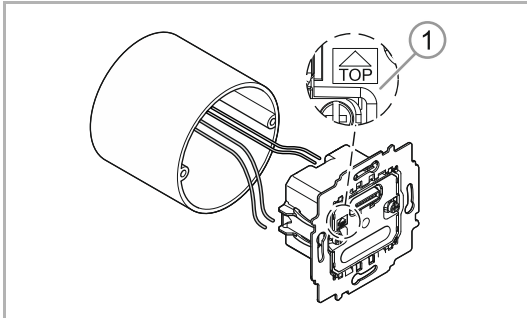


Fig. 6: Installation position

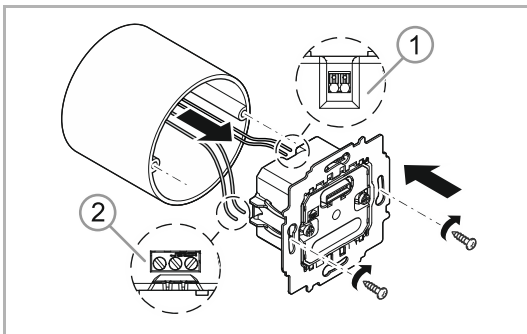


Fig. 7: Connection and installation

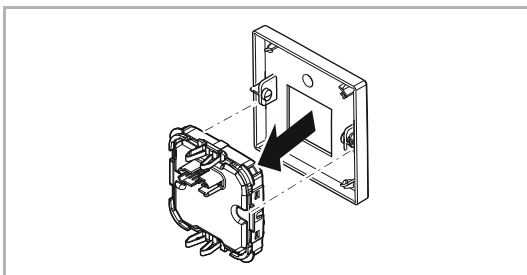


Fig. 8: Mounting the cover



Note

The sensor must be pulled off the flush-mounted insert before mounting!

1. Turn the device into the correct installation position [1].

2. Option: Connect the power cable for external temperature DP4-T-1 to the top terminal block [1].
3. Connect the 230 V power cord to the bottom terminal block [2].



Note

Observe correct wiring!

Observe the Chapter 5.3 “Circuit diagrams” on page 14.

4. Insert the device into the flush-mounted box and screw it on.
5. Attach the cover to the sensor.

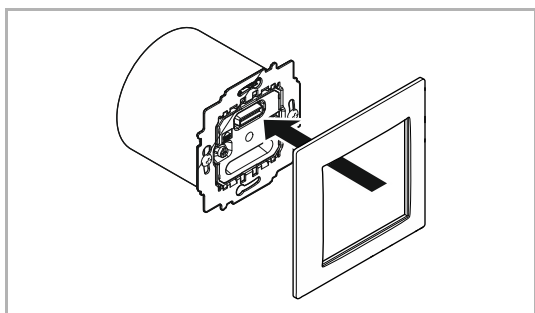


Fig. 9: Mounting the cover frame

6. Mount the cover frame.

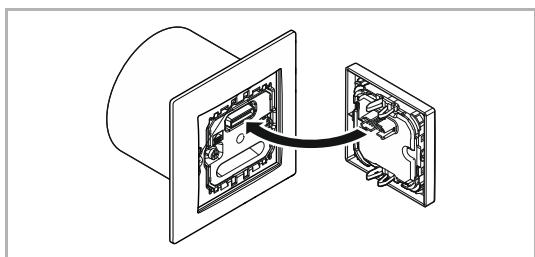


Fig. 10: Mounting the sensor

7. Attach the cover (with mounted sensor) to the flush-mounted insert.

Observe the correct position of the sensor connection [1].

6 Commissioning

Commissioning of the device is always carried out via the Web-based surface of the System Access Point. It is assumed that the basic commissioning steps of the overall system have already been carried out. Knowledge about the Web-based commissioning software of the System Access Point is assumed.

The System Access Point establishes the connection between the free@home participants and the smartphone, tablet or PC. The System Access Point is used to identify and program the participants during commissioning.

When energized, a device that has not been programmed is in programming mode for 30 minutes and can be logged into the system. Programmed devices share information about their type and supported functions with the System Access Point.

During initial commissioning all devices are given a universal name (Sensor/switch actuator 1/1gang, etc.). The installer must change this name within the commissioning process to a name practical and specific for the system (in case of an actuator, e.g. to "Living room ceiling light").

The devices must be parameterised for the use of additional functions.



NOTE

General information about commissioning and parameterization is available in the technical reference manual and the online Help of the System Access Point.

6.1 Coupling of wireless devices with the System Access Point

free@home wireless devices must first be coupled with the System Access Point before they can be used in a project. The devices exchange a security key during the coupling process.

Communication between devices is carried out encrypted after coupling and they are firmly connected with the System Access Point. Coupled devices cannot be connected with a different System Access Point. They must first be reset to the factory settings.

Carry out the following steps to couple one or several devices with the system:

1. Install the free@home wireless device(s).
2. Use your smartphone, tablet or PC to call up the user interface of the System Access Point that is ready for use.
3. Switch on the mains power supply of the free@home wireless devices.

The devices are now in programming mode for 30 minutes.

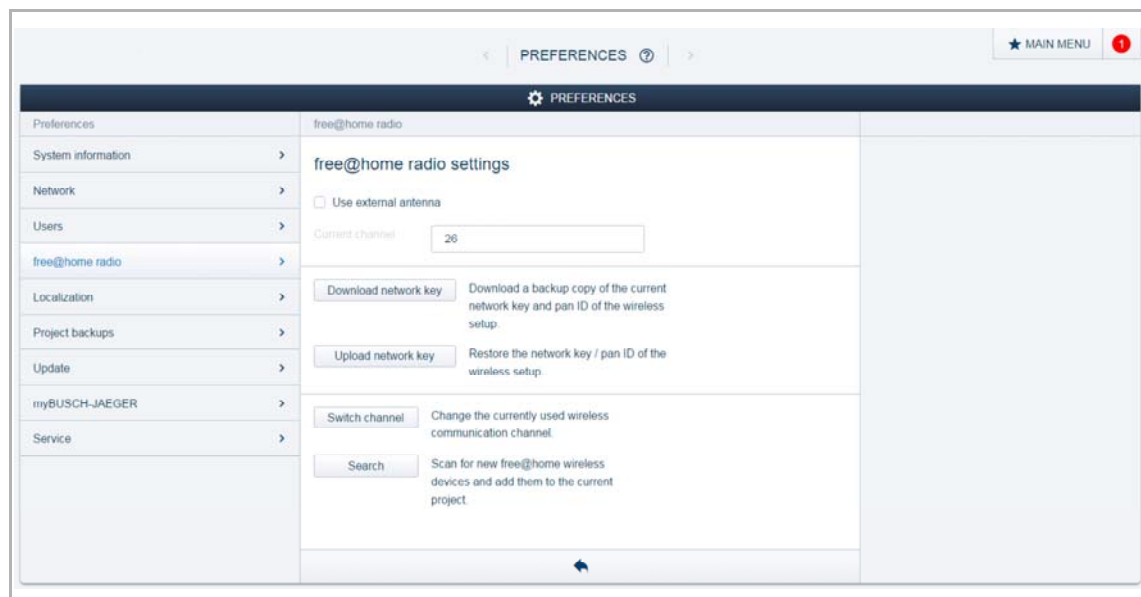


Fig 11: Coupling wireless devices with the System Access Point

4. In the user interface of the System Access Point select "System settings" > "free@home-Wireless settings" > "Search".

The System Access Point consecutively scans all free@home wireless devices. Devices that are in programming mode are integrated automatically into the system. The scanning process ends 10 minutes after the last device has been integrated.

Integrated devices are listed in the "Device list" of the user interface.

5. Use the serial numbers to check whether all installed devices have been found. If a device has not been found, reset it to the factory settings and start a new scanning process.

Possible reasons for not finding devices:

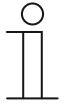
- The device is not in programming mode.
- The 30-minute programming time has expired.
- The device has already been coupled with a different system.

6.1.1 Resetting the wireless device to the factory settings

1. De-energize the free@home wireless device.
2. Keep the button at the bottom left pressed.
3. Re-energize the device.

The LED flashes slowly for 10 seconds, then fast for 5 seconds and then goes out.

The factory settings are restored and the device can now be programmed again.



NOTE

Devices which are already in factory settings are not reset again. The LED remains out in step 3.

6.2 Allocation of devices and definition of channels

The devices connected to the system must be identified, i.e. they are allocated to a room according to their function and are given a practical name.



The allocation is made via the allocation function of the Web-based user interface of the System Access Point.

6.2.1 Add device

1. In the "Add devices" bar select the desired application and pull it via drag-and-drop into the floor plan.

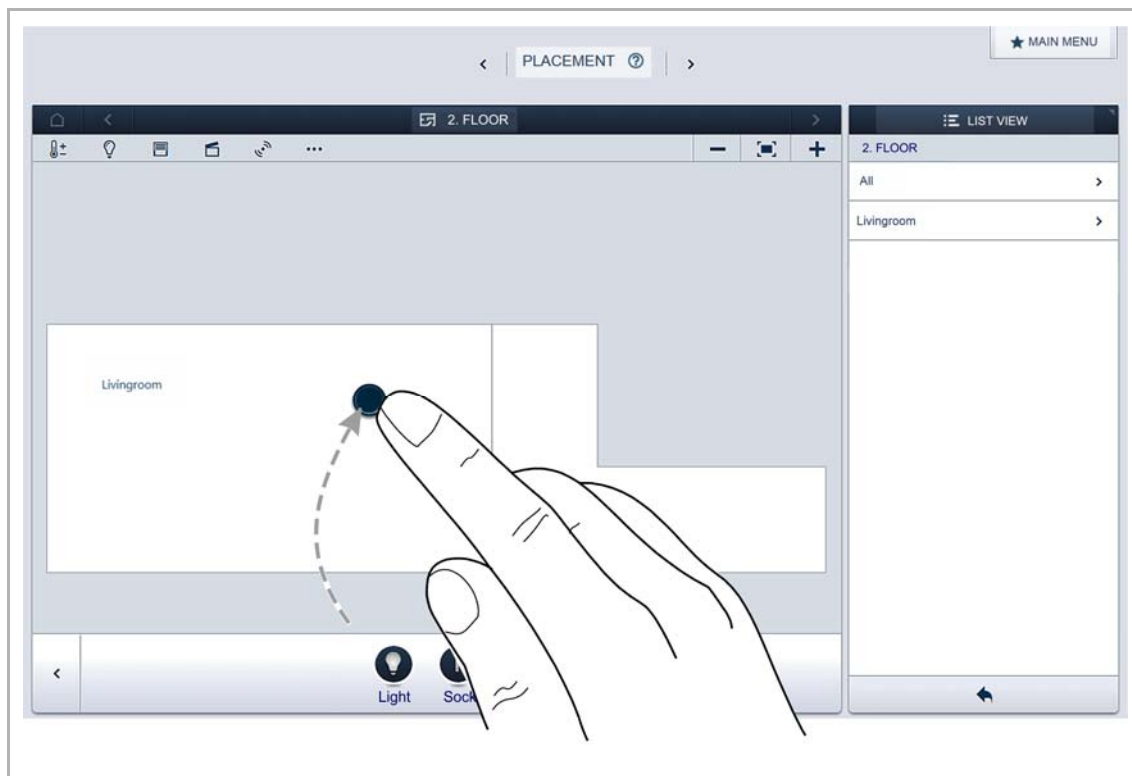


Fig. 12: Dragging the application from the add bar

A pop-up window opens which lists all the devices that are connected to the bus and suitable for the selected application.

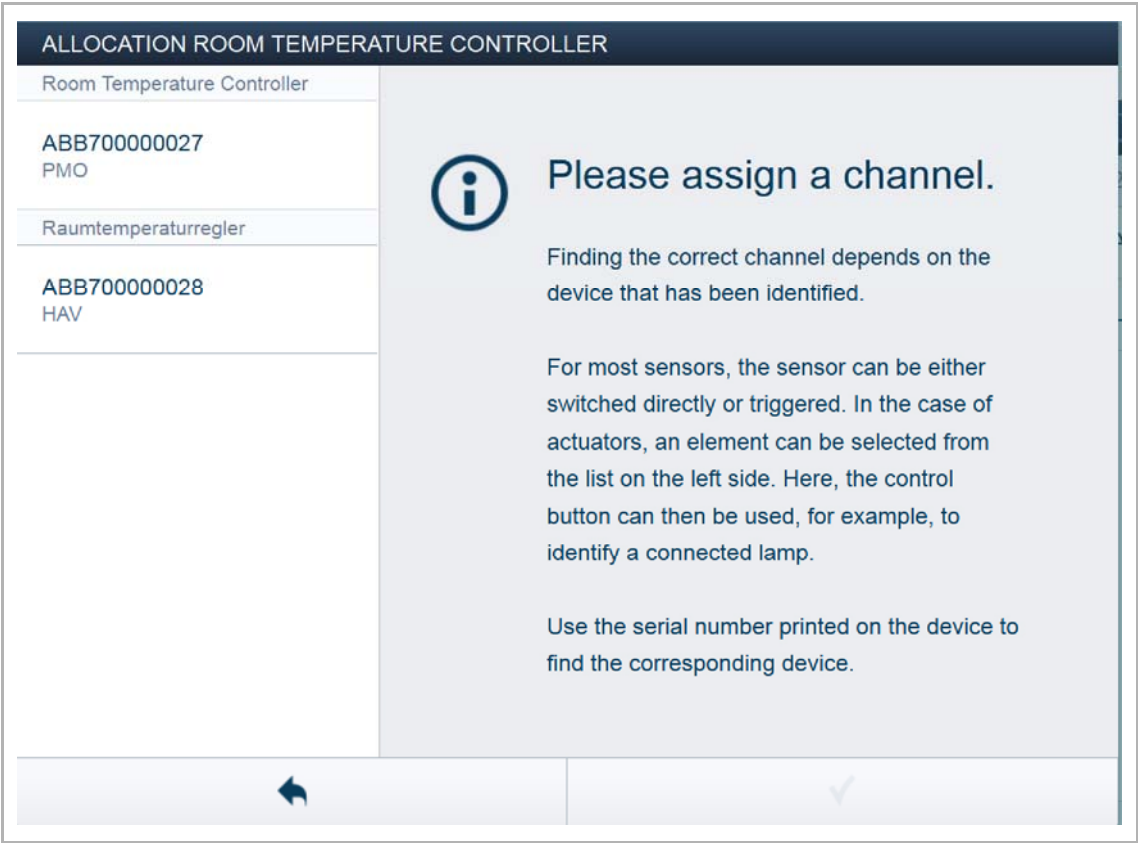


Fig. 13: Pop-up window with the suitable devices

Identification

The device can be identified via the serial number or via switching.

Identification via serial number

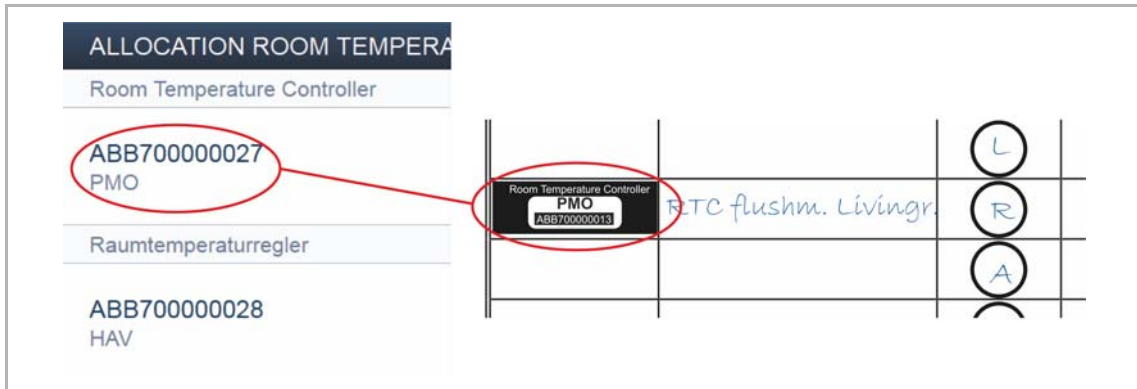


Fig. 14: Identification via serial number

- Compare the serial number and the short ID of the identification label, which is glued on the device plan, with the numbers and IDs in the list. This is how the searched for device and possibly the searched for channel are identified.

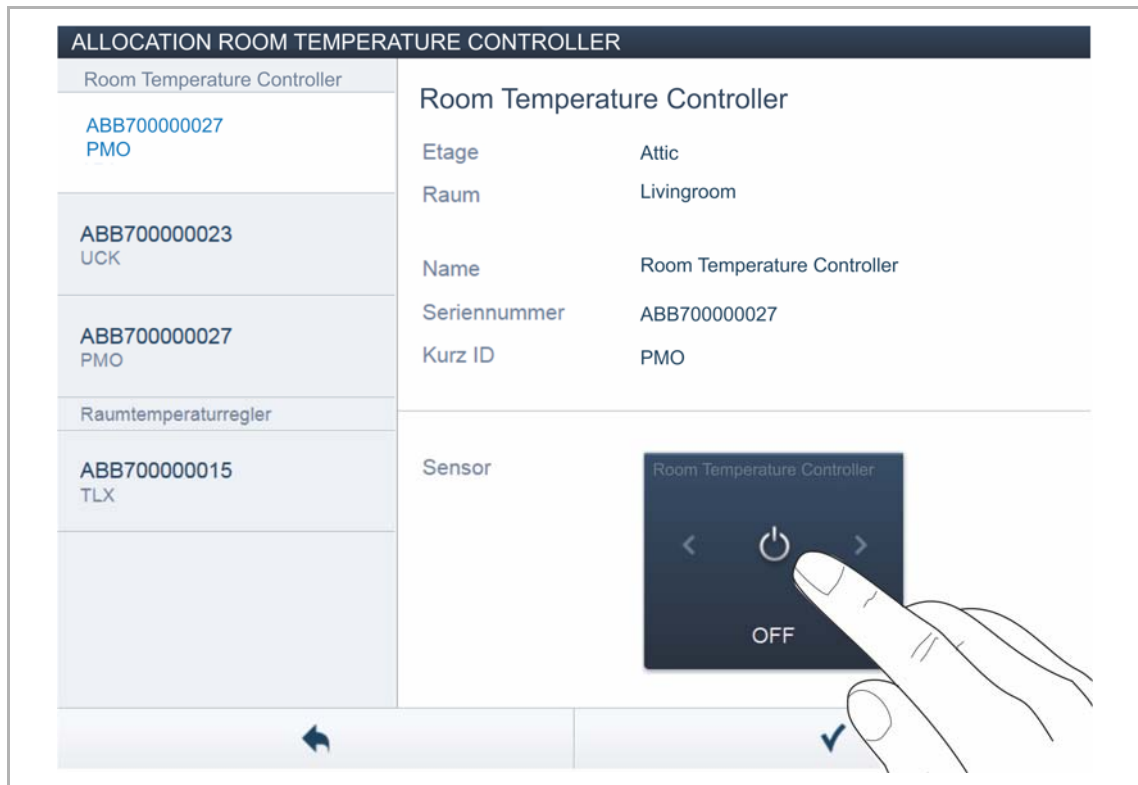
Identification via switching (only suitable for actuators)

Fig. 15: Identification via switching

1. Select a device and a channel from the list.
2. Press the button in the detailed view of the device.
The connected load is switched.
3. Repeat the last two steps until you have located the searched for device.

6.3 Setting options per channel

General settings and special parameter settings must be made for each channel.



The settings are made via the allocation function of the Web-based user interface of the System Access Point.

Select device

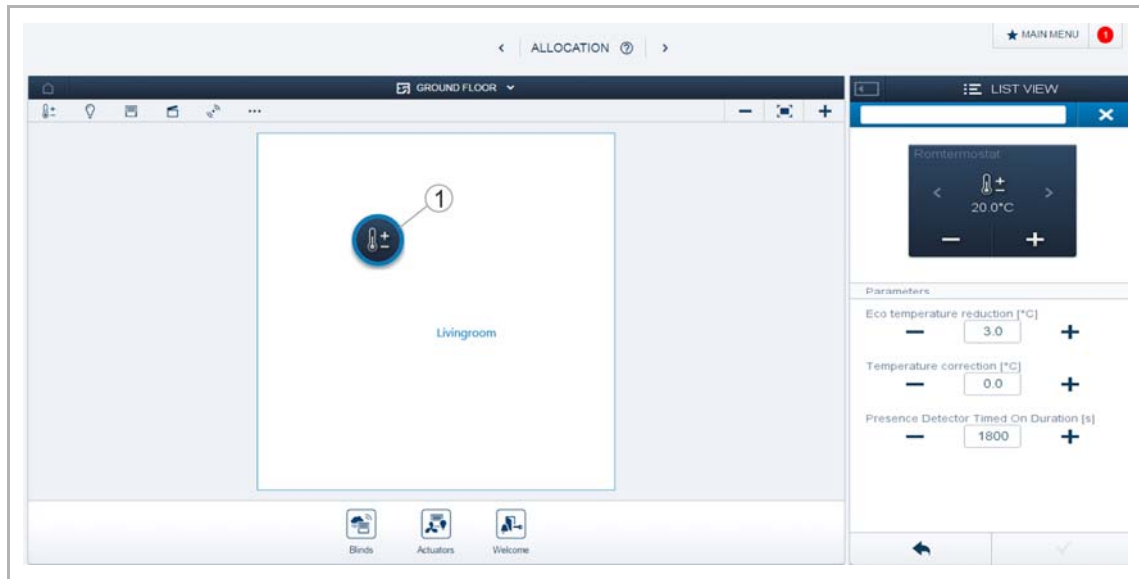


Fig. 16: Select device

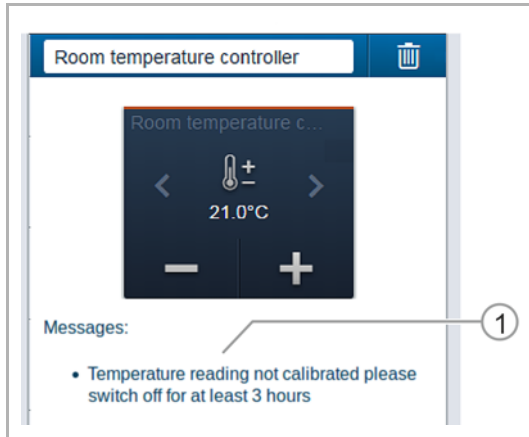
1. Select the device icon [1] in the floor plan of the working area view.
All setting options for the respective channel are displayed in the list view [2].
The following settings are available.

6.3.1 Parameter settings of room temperature controller

Calibration process during initial commissioning

**Note**

At initial commissioning and connection to the system the device should not be used for at least 3 hours.



At initial commissioning and connection to the system the device should not be used for at least 3 hours.

The heating control/switching channel should remain deactivated during this period. After this the calibration process starts automatically since the device has adjusted itself to the ambient temperature.

Before this period expires, the following message is displayed under "Notifications":

The device is not calibrated. The calibration starts automatically after a rest period of 3 hours.

Fig. 17: Calibration process during initial commissioning

Actuator settings

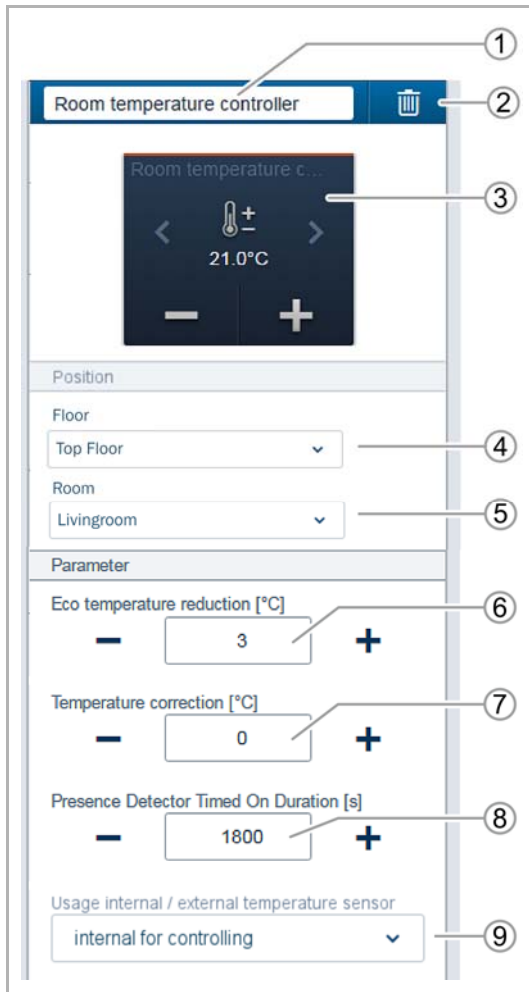


Fig. 18: Actuator settings - RTC

- [1] Changing the name
- [2] Deleting the channel (dustbin icon)
- [3] Switching the actuator via the button
- [4] Selection of the floor
- [5] Selection of the room
- [6] Setting the Eco temperature reduction in °C
 - The -/+ buttons can be used to specify the value the temperature is to be reduced to when ECO mode is activated.
- [7] Setting the temperature correction in °C via the -/+ buttons
 - Manual increase/reduction of the temperature value if the temperature is repeatedly not reached automatically.
- [8] Setting the switch-off delay in seconds during absence via the -/+ buttons
 - If the ECO mode is deactivated by a movement detector, the switch-off delay can be specified here when the ECO mode is to be re-activated after the room is exited.

[9] Use of internal / external temperature reading

This is used to select the sensor for the temperature regulation and, if necessary, the limiting function of the floor temperature.

- Internal for regulation: Use of the internal temperature sensor of the device for reading and regulating the room temperature.
- External for regulation: Use of an external temperature sensor for reading and regulating the floor temperature. For this the external temperature sensor must be layed in the screed.
- i and e for regulation: Use of the internal and an external temperature sensor for reading and regulating the room temperature. Both measured values are used to create an average value. For this the external temperature sensor must be installed behind a ventilated cover plate (e.g. 6541-XX).
- i for regulation: e for limiting: Use of the internal and an external temperature sensor for temperature reading. The temperature is regulated via the internal temperature sensor. The external temperature sensor serves for limiting the temperature, generally the floor temperature (floor heating). As soon as the temperature measured on the external temperature sensor exceeds the set temperature, the relay is switched off.

- Additional settings
 - Extension unit operation: The room temperature controller can be configured in the device settings as extension unit. In this setting only the temperature sensor of the main unit is evaluated, the extension unit serves only for selecting the operating mode, and the set-value temperature.

6.4 Links

The sensors and actuators created via the allocation function can now be linked with each other. This allows simple switch-off circuits or two-way circuits to be implemented.



The linking in the list view is made via the linking function of the Web-based user interface of the System Access Point.



NOTE

For pre-programmed devices (switch actuator units) a link is automatically established between actuator and sensor, since they are combined in the one device.

6.4.1 Linking actuator and sensor

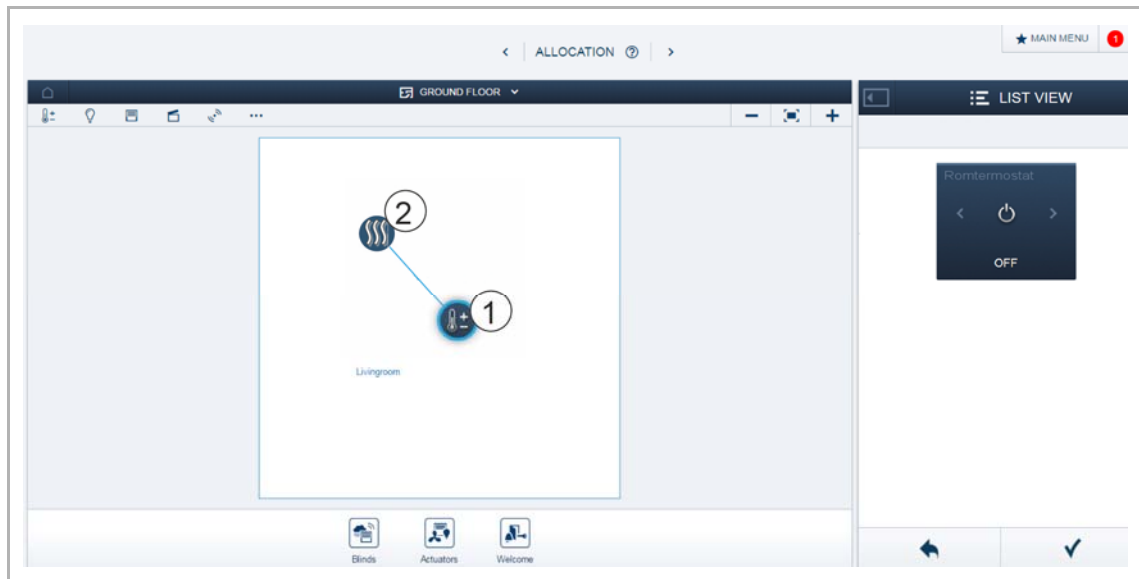


Fig. 19: Linking actuator and sensor

1. On the working area select the sensor [1] that is to be linked with the actuator.
2. Select the actuator [2] that is to be served by the sensor.
3. Press the tick at the bottom right to take over the entries.

A blue connecting line indicates the link between the two devices. The configuration is now transmitted automatically to the devices. The transmission can, depending on the number of affected devices, take a number of seconds. During the transmission a progress bar is displayed around the devices affected.

7 Update

A firmware update is carried out via the Web-based user interface of the System Access Point.

8 Operation



Note

- The scope of delivery contains only the electronic insert. It must still be completed with a suitable cover plate and a cover frame.
- Additional information about the switch ranges is available in the electronic catalogue (www.busch-jaeger-catalogue.com).

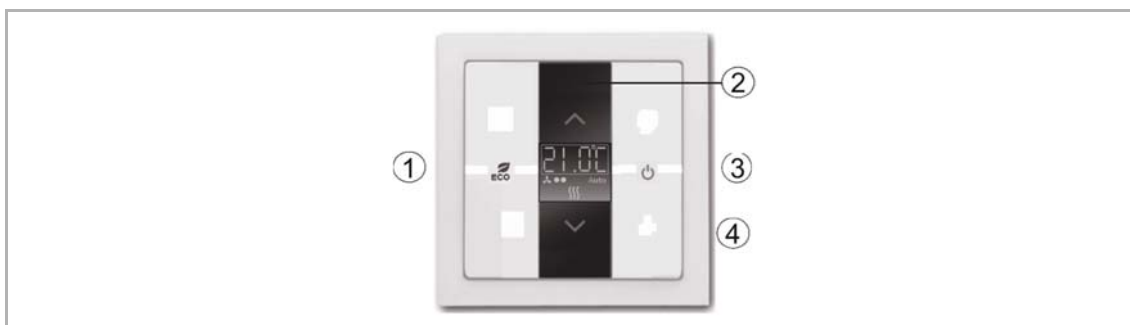


Fig. 20: Operation

- [1] ECO mode; press the button
[2] Increase in temperature reduction; press the button
[3] Temperature On/Off; press the button
[4] Reduce temperature; press the button



Note

The display of the room temperature controller always indicates the set-value temperature. This can be changed via the arrow buttons of the control element.

The room temperature controller has 4 operating modes that can be adjusted locally:

Comfort operation	
Application	You are in the room for a longer period of time; the comfort temperature is to be reached.
Behaviour of the RTC:	The display indicates the set-value temperature that has been set. The controller aims at this temperature.

Table 4: Comfort mode

ECO mode	
Application	You are leaving the room for a few hours; the room temperature is to be reduced to save energy; however, the room is not to cool down completely.
Behaviour of the RTC:	The display shows "ECO". The temperature is reduced by 4°C (the reduction can be adjusted in the user interface).

Table 5: ECO mode

Off mode	
Application	The room is not being used for a longer period of time.
Behaviour of the RTC:	The display shows "OFF". The heating valves are closed (frost protection is active).

Table 6: OFF mode

Antifreeze mode	
Application	Switches on automatically when a window contact has been connected and the window is being opened.
Behaviour of the RTC:	The display indicates antifreeze. The heating valves close. If the room temperature drops below 7°C, the heating is switched on again to prevent damage to the building.

Table 7: Antifreeze mode

Heating/cooling switchover	
The room temperature controller is suitable both for heating and cooling operation. The switchover of the two modes is made via a binary input which has been configured as heating/cooling reverser and is connected with the room temperature controller in the user interface.	

Table : Heating/cooling switchover

8.1 Displays / messages

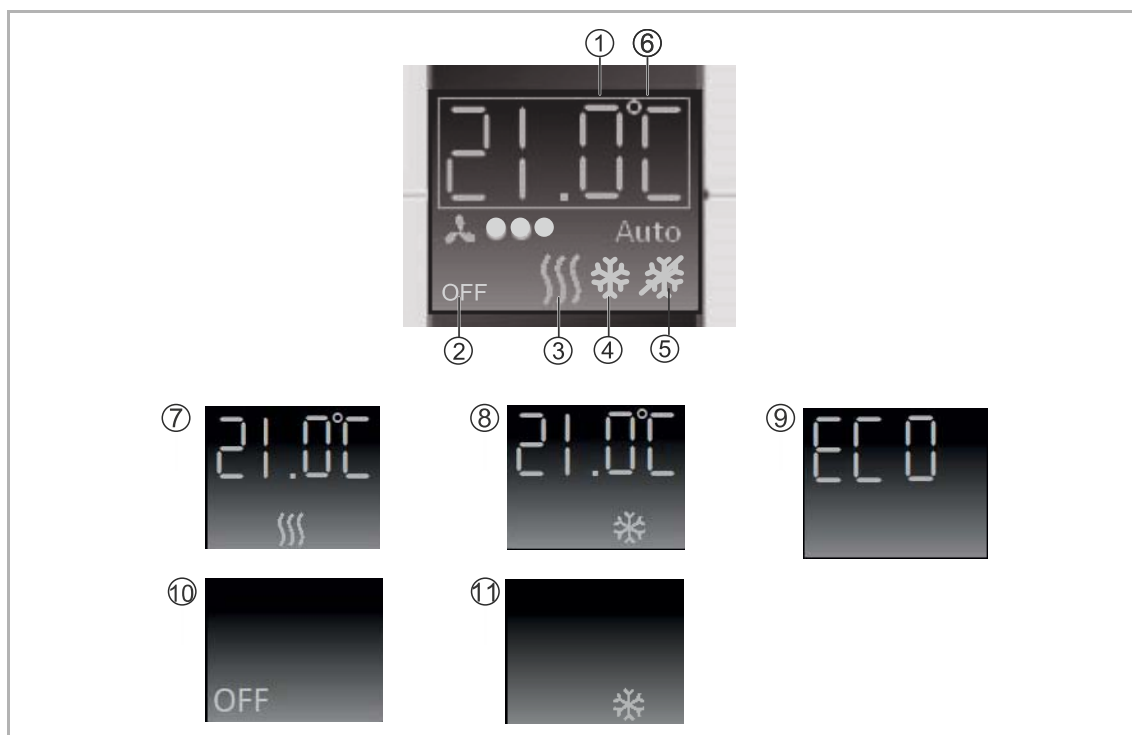


Fig. 21: Displays

- [1] Controller on / indication set-point temperature
- [2] Controller Off
- [3] Heating active
- [4] Cooling active
- [5] Antifreeze mode active
- [6] Eco mode (display "ECO")
- [7] Display of comfort mode heating
- [8] Display of comfort mode cooling
- [9] Display of ECO mode
- [10] Display of OFF mode
- [11] Display of antifreeze mode

9 Maintenance

The device is maintenance-free. In case of damage, e.g. during transport or storage), do not perform repairs. Once the device is opened, the warranty is void.

Access to the device must be guaranteed for operation, testing, inspection, maintenance and repairs (according to DIN VDE 0100-520).

9.1 Cleaning



Caution! - Risk of damaging the device!

- When spraying on cleaning agents, these can enter the device through crevices.
 - Do not spray cleaning agents directly onto the device.
- Aggressive cleaning agents can damage the surface of the device.
 - Never use caustic agents, abrasive agents or solvents.

Clean dirty devices with a soft dry cloth.

- If this is insufficient, the cloth can be moistened slightly with a soap solution.

10 Notes

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