Product manual | 01.08.2023

ABB-free@home®

SA-M-x.16.2.2

Switch Actuator, 4-, 8-, 12-fold, MDRC

Table of contents

1 Notes on the instruction manual

Please read through 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 include 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:

https://new.abb.com/en

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

The device must only be operated within the specified technical data.

The device is a rail mounting device with a module width of 4, 8 or 12 module widths for the installation in distributors. The switch actuator can be used for switching electric circuits (up to 16 A). The integrated bus coupler makes possible the connection to the free@home Bus bus. The connection to the ABB-free@home® is made at the front via a bus connection terminal. The switch actuator does not require auxiliary voltage.

2.3 Improper use

Each use not listed in 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
- inserting of objects through device openings
- Use of available connection options contrary to technical data.

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.

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

The device is a switch actuator for installing on a mounting rail. The device has, depending on the selected version, 4, 8 or 12 switching channels and can switch the corresponding number of connected electric circuits.

After activating the bus voltage the channels can be switched independent of each other in dependence of other sensors connected to the bus (e.g. via buttons coupled to binary inputs). The individual channels can also be switched manually on the device.

Advantages:

- 4, 8 or 12 switching channels in one device
- Manual switching option on the device for each individual channel
- Variable wiring via 4 mm^2 clamps with combi-head screw
- Usual manner of wiring of the 230 V lines

Notice
Basic information about system integration is contained in the system manual. It is available for downloading at www.abb.com/freeathome.

3.1 Scope of supply

The scope of supply contains the switch actuator including bus terminal for coupling to the free@home Bus.

3.2 Overview of types

Article no.	Product name	Actuator channels	
SA-M-4.16.2.2	Switch Actuator, 4-fold, MDRC	4	
SA-M-8.16.2.2	Switch Actuator, 8-fold, MDRC	8	
SA-M-12.16.2.2	Switch Actuator, 12-fold, MDRC	12	

Table 1: Overview of types

3.3 Functions

3.3.1 Function overview

The following table provides an overview of the possible functions of the device.

For a detailed description of functions, see “Actuator parameter function“ on page 32.

Icon of the user interface	Information
	Switch actuator
	Additional heating stage
	Additional cooling stage
	Push-button
	Central heating actuator
	Central cooling actuator
	Heating mode
	Cooling mode
	Heating/cooling operation
	Two-point heating controller
	Two-point cooling controller
	Two-point controller for heating/cooling
	Light
	Socket outlet

Table 2: Overview of functions

3.3.2 Description of functions

Light, switch actuator, socket outlet

These functions are not different physically. They merely serve for the visual differentiation of connected loads in the graphic surface of the System Access Point. The functions are to be configured for the respective channel of the switch actuator that is being used. The loads can, for example, be switched via buttons coupled to ABB-free@home® binary inputs, but also by other ABB-free@home® participants. Depending on the configuration the switch actuator supports the following functions:

Force-position

The ABB-free@home® sensors which support this function (e.g. binary inputs), make possible the acceptance of a pre-defined switching state (configurable in the sensor) of one or several channels (depending on the configuration of the sensors) of the switch actuator and the simultaneous blockage of the switch actuator against the operation of other ABB-free@home® devices. The actuator is switched on or off and disabled in dependence of the configuration. When disabling is active, the actuator cannot be switched via an additional sensor or time program.

The force-position can be used for protective applications.

Staircase lighting

The switch actuator supports a staircase lighting function and makes it possible to limit the ON period of a channel via the "switch-off delay" parameter. This guarantees that the staircase lighting is switched off automatically after a specific period. With a renewed press of the associated staircase lighting button the switch actuator extends the switch-off delay by the actual switch-off delay (retrigger), and so extends the ON period of the staircase lighting.

Light scenes and group switching

The switch actuator supports light scenes and group switching.

The scenes and groups can be configured in two ways in the System Access Point.

- Via the floor plan
- Via the automation function (clock icon) under menu item "Groups".

Scene function

In dependence of the number of channels in the device, up to 16 scenes can be allocated.

3.4 Device overview

SA-M-4.16.2.2

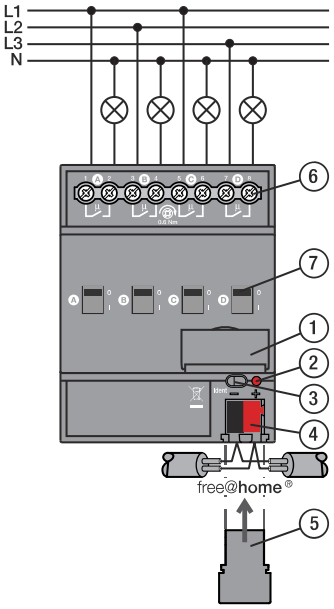


Fig.1: Device overview of switch actuator 4gang MDRC

[1] Label holder

[2] Identification LED

[3] Device identification during commissioning

[4] Bus connection terminal

[5] Cover cap

[6] Load current circuit, per two screw-type terminals

[7] Switch-position indicator and manual operation

SA-M-8.16.2.2

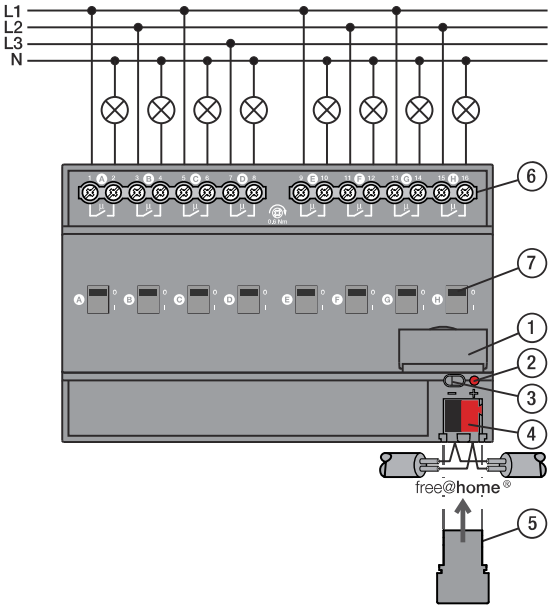


Fig.2: Device overview of switch actuator 8gang MDRC

[1] Label holder

[2] Identification LED
[3] Device identification during commissioning
[4] Bus connection terminal
[5] Cover cap
[6] Load current circuit, per two screw-type terminals
[7] Switch-position indicator and manual operation

SA-M-12.16.2.2

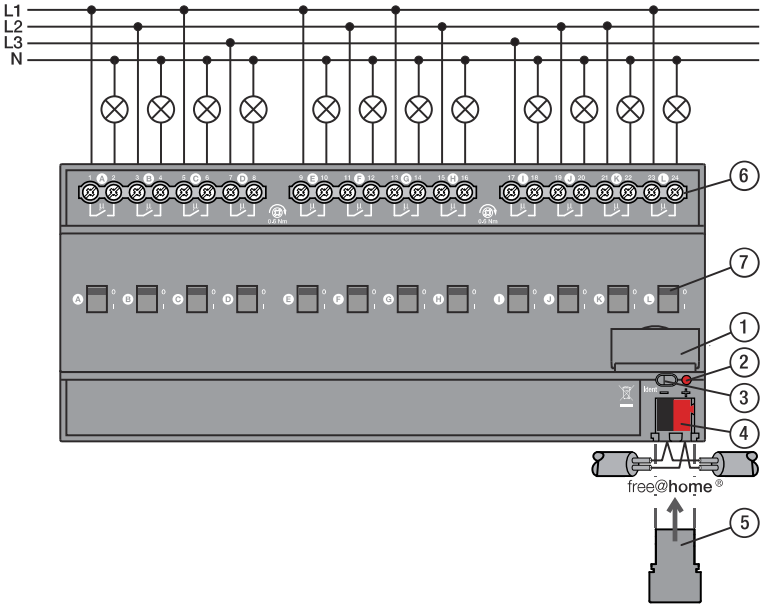


Fig.3: Device overview of switch actuator 12gang MDRC

[1] Label holder
[2] Identification LED
[3] Device identification during commissioning
[4] Bus connection terminal
[5] Cover cap
[6] Load current circuit, per two screw-type terminals
[7] Switch-position indicator and manual operation

4 Technical data

Designation	Value
Power	21 - 31 VDC
Bus subscribers	1 (12 mA)
Power loss P_{16A} [A] SA-M-4.16.2.2 [B] SA-M-8.16.2.2 [C] SA-M-12.16.2.2	 4 W 8 W 12 W
Module widths [A] SA-M-4.16.2.2 [B] SA-M-8.16.2.2 [C] SA-M-12.16.2.2	 4 MW (70 mm) 8 MW (140 mm) 12 MW (210 mm)
Bus connection	Bus connecting terminal, screwless
Switching voltage	230 V AC, 50/60 Hz
Switching capacity	16 A (AC1)
Wiring terminal Output	 Combi-head screw-type terminal (PZ 1) 0.2 - 6 mm^2 fine-wire 0.2 - 6 mm^2 fine-wire
Protection type	IP 20
Protection class	II
Overvoltage category	III
Pollution degree	2
Air pressure	≥ 80 kPa (corresponds to air pressure at 2,000 m above NN)
Ambient temperature	-5 °C - +45 °C
Storage temperature	-20 °C - +70 °C

Table 3: Technical data

4.1 Types of load

Lamps	Incandescent lamp load	2500 W
Fluorescent lamps T5/T8	Uncompensated	2500 W
	Parallel compensated	1500 W
	DUO circuit	1500 W
LV halogen lamps	Inductive transformer	1200 W
	Electronic transformer	1500 W
	Halogen lamp 230 V	2500 W
Dulux lamp	Uncompensated	1100 W
	Parallel compensated	1100 W
Mercury-vapour lamp	Uncompensated	2000 W
	Parallel compensated	2000 W
Switching capacity (switching contact)	Maximum switch-on current Ip (150 µs)	400 A
	Maximum switch-on current Ip (250 µs)	320 A
	Maximum switch-on current Ip (600 µs)	200 A
Number of ballasts (T5/T8, single-light)[1)]	18 W (ABB ballasts 1 x 18 SF)	23
	24 W (ABB ballasts-T5 1 x 24 CY)	23
	36 W (ABB ballasts 1 x 36 CF)	14
	58 W (ABB ballasts 1 x 58 CF)	11
	80 W (Helvar EL 1 x 80 SC)	10

Table 4: Types of load

[1)] For multi-flame lamps or other types the number of electronic ballasts is to be determined via the switch-on current of the ballasts.

4.2 Dimensional drawings

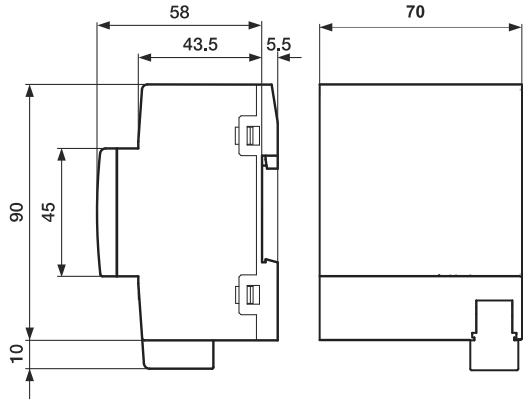


Fig. 4: Dimensions of 4gang switch actuator MDRC (specifications in mm)

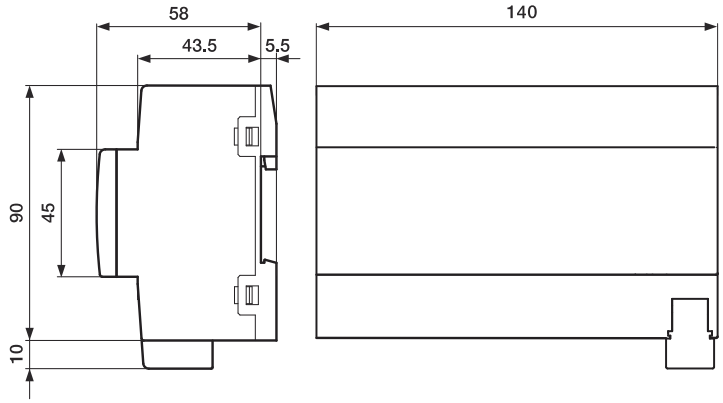


Fig. 5: Dimensions of 8gang switch actuator MDRC (specifications in mm)

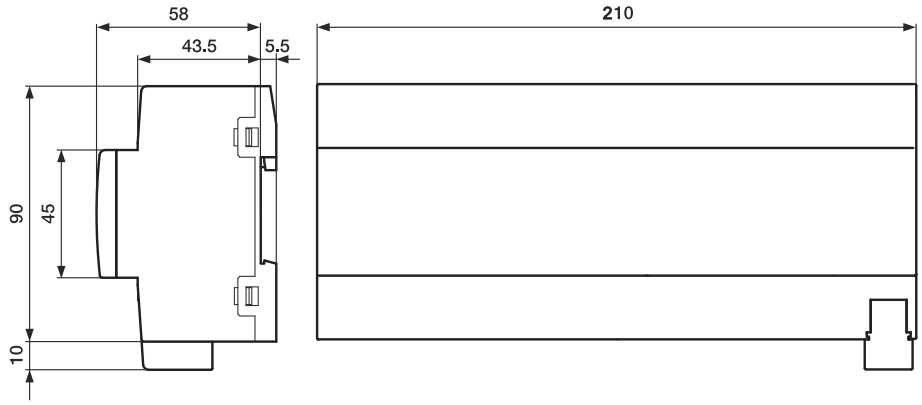


Fig. 6: Dimensions of 12gang switch actuator MDRC (specifications in mm)

5 Connection, installation / mounting

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.

5.2 Safety instructions

Danger - Electric shock due to short-circuit!

Risk of death due to electrical voltage of 100 to 240 V during short-circuit in the low-voltage line.

– Low-voltage and 100 - 240 V lines must not be installed together in a flush-mounted box!
– Observe the spatial division during installation (> 10 mm) of SELV electric circuits to other electric circuits.
– If the minimum distance is insufficient, use electronic boxes and insulating tubes.
– Observe the correct polarity.
– Observe the relevant standards.

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

SA-M-4.16.2.2

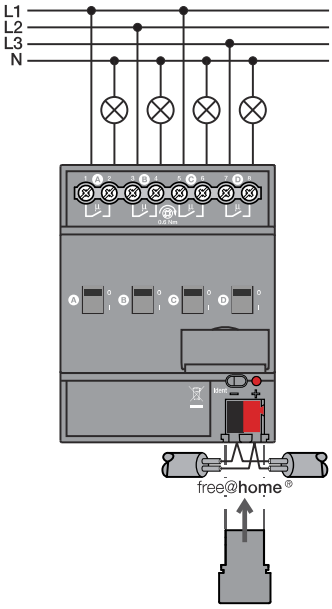
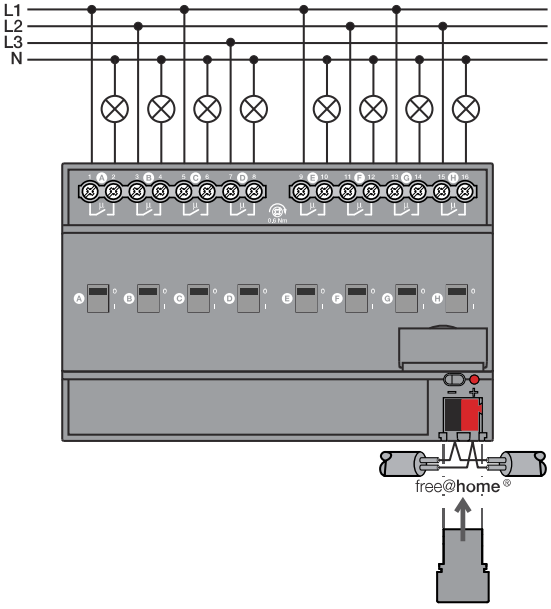


Fig. 7: Electrical connection of 4gang switch actuator MDRC



SA-M-8.16.2.2

Fig. 8: Electrical connection of 8gang switch actuator MDRC

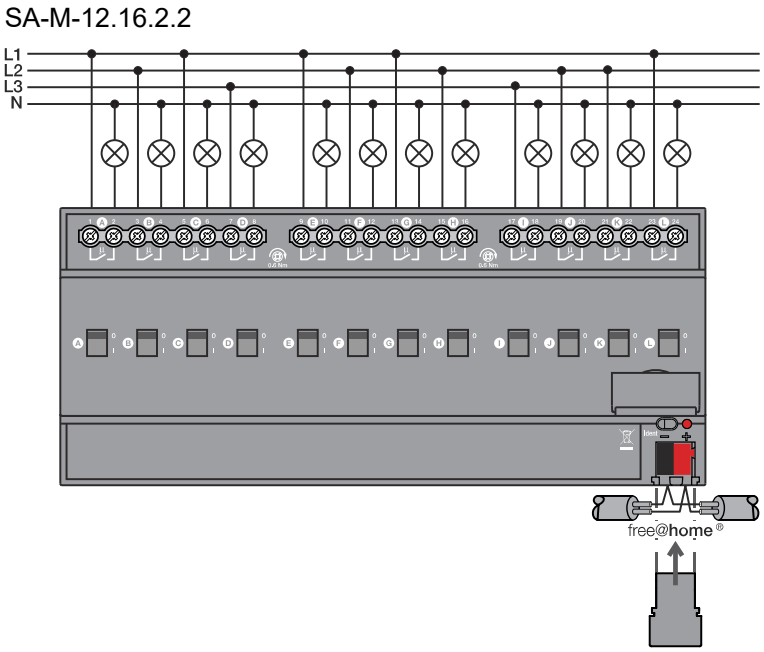


Fig. 9: Electrical connection of 12gang switch actuator MDRC

5.4 Mounting / dismantling

- The device is a rail mounting device for installing in distributors for easy installation on 35 mm mounting rails according to DIN EN 60 715.
- The device can be mounted in any position.
- The adhesive label is to be removed and glued into the list (see system manual System Access Point).
- The bus connection is established by means of the enclosed bus connection terminal.
- The device is ready for operation after the bus voltage has been applied.
- The description of the terminals is located on the housing.
- Access to the device must be guaranteed for operation, testing, inspection, for maintenance and repairs according to DIN VDE 0100-520.

Installation

To install the device, perform the following steps:

– Latch the modular DIN rail component onto the mounting rail.

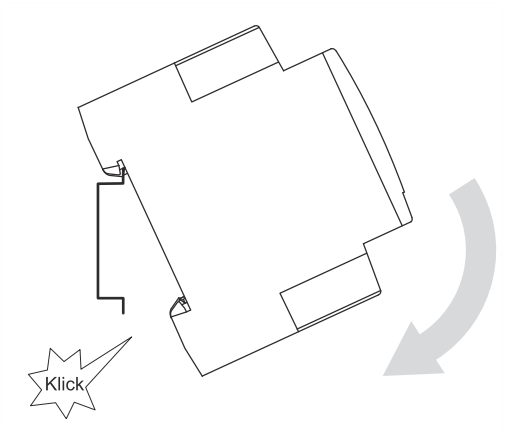


Fig. 10: Installation on mounting rails

Dismantling

To dismantle the device, perform the following steps:

– Press the device down [1] and then fold it toward the front [2].

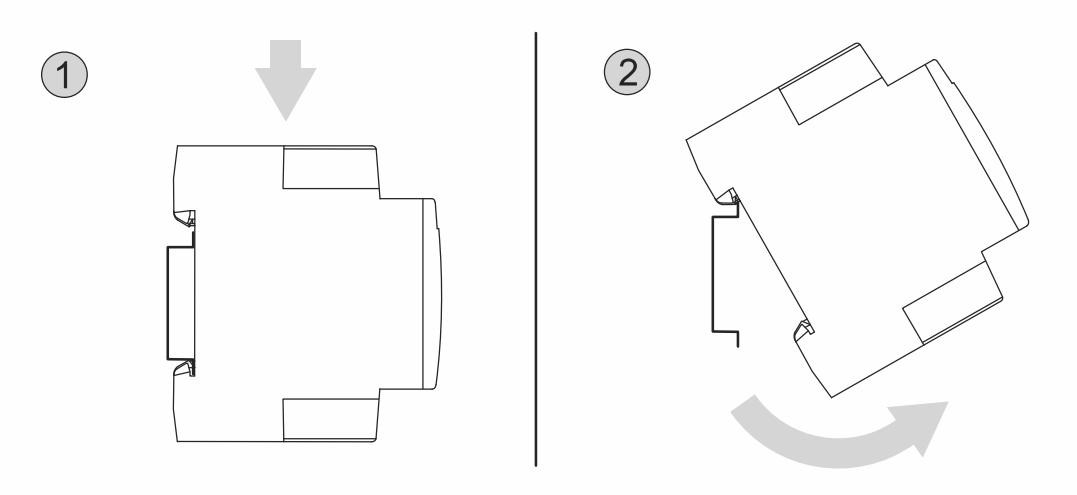


Fig. 11: Removal from the mounting rails

6 Commissioning

Commissioning of the device is carried out via the web-based surface of the System Access Point ABB-free@home® App Next. It is assumed that the basic commissioning steps of the overall system have already been carried out. Knowledge about the basic functions of the commissioning software of the System Access Point is assumed.

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

Devices which are physically connected to the free@home Bus- bus, log themselves automatically into the System Access Point. They transmit information about their type and supported functions (See “Function overview“ on page 10).

During initial commissioning all devices are given a universal name, e.g. "Sensor/switch actuator 1/1gang". The installer should assign names that are practical and specific for the system, e.g. "Living room ceiling light".

Notice

General information about commissioning and parameterization is available in the ABB-free@home® system manual.

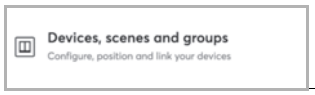
6.1 Allocation of devices and definition of channels

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

The allocation is carried out via the web-based user interface of the System Access Point or the ABB-free@home® App Next.

6.1.1 Add device

Configuring, positioning and linking of the devices is carried out via button "Devices, scenes and groups" (switch icon) in the user interface of the System Access Point.



If you do not enter via the main menu, the switch icon may only be visible on the left (see arrow).

1. Tap on button "Devices, scenes & groups" (or switch icon).
   – The "Building plan" view opens.

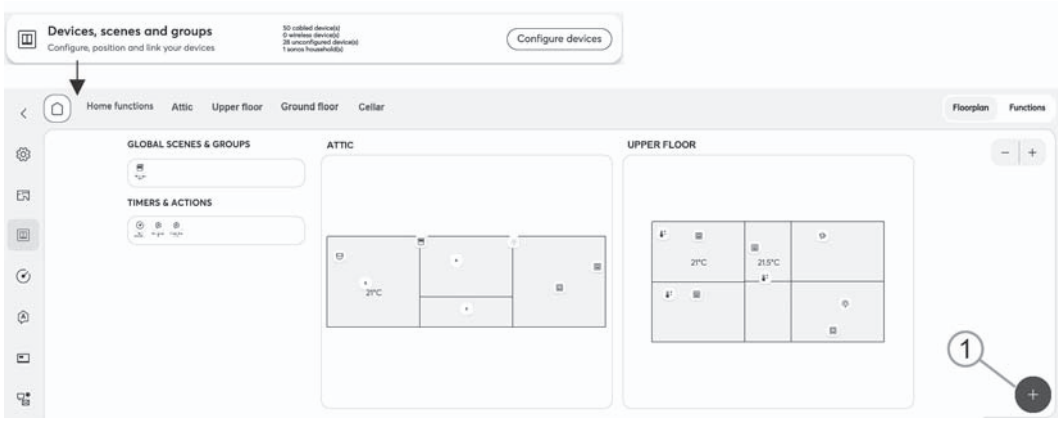


Fig. 12: Opening the building plan and list of components (example illustration)

2. Tap on the round plus icon [1] at the bottom right.
   – Menu "Select component" opens.
3. Tap on the desired characteristic in the list of components.

– The menu with the available devices, functions and actuators opens.

4. Select the desired device and pull it into the building plan via drag-and-drop.

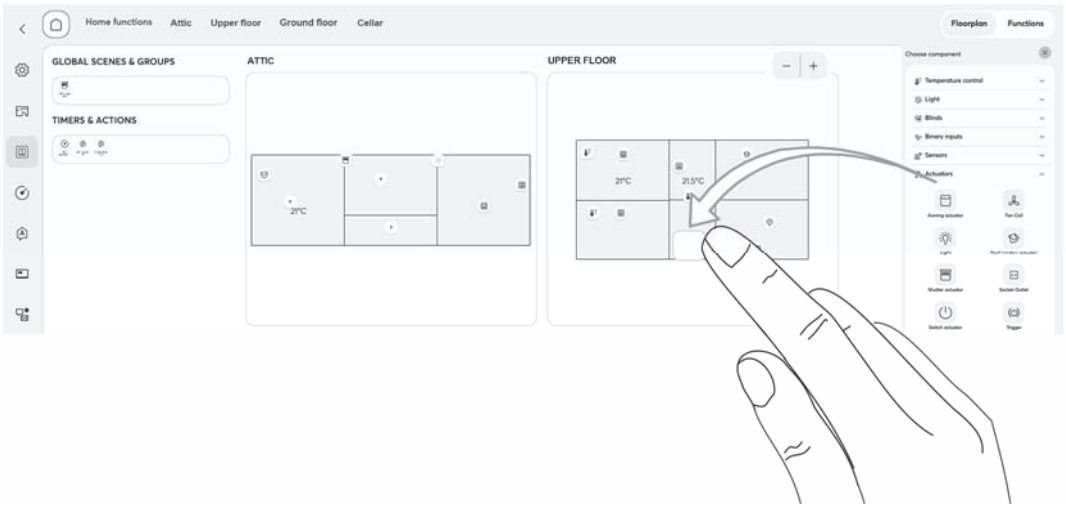


Fig. 13: Pulling the device out of the menu bar (example illustration)

Notice for operation via a mobile phone

The building plan/floor plan is not available in the app for mobile phones.

– Use the list view of the device configuration here for the location of the device (“Open overview of devices “ on page 28).

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

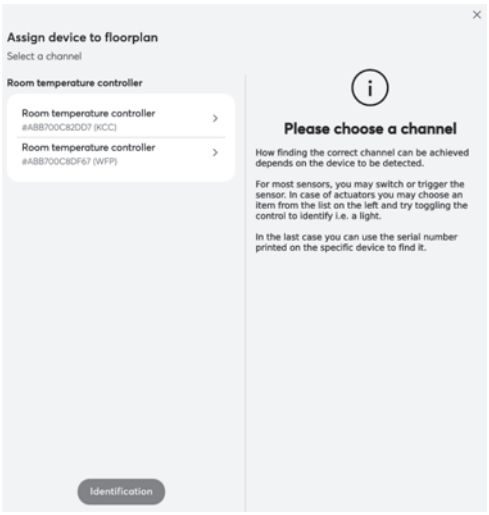


Fig. 14: Allocation of devices

A window opens which lists all the devices suitable for the application selected.

Identification via serial number

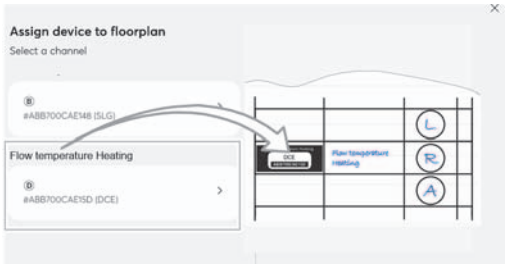


Fig. 15: Identification via serial number

5. Compare the serial number and the short ID of the identification label printed on the device with the numbers and IDs in the list. This is how the searched for device and possibly the searched for channel are identified.
   The specifications of the identification label should also be transmitted to the device plan.

Identification via switching

If several devices are listed in the device list, you can identify them by switching the actual device.

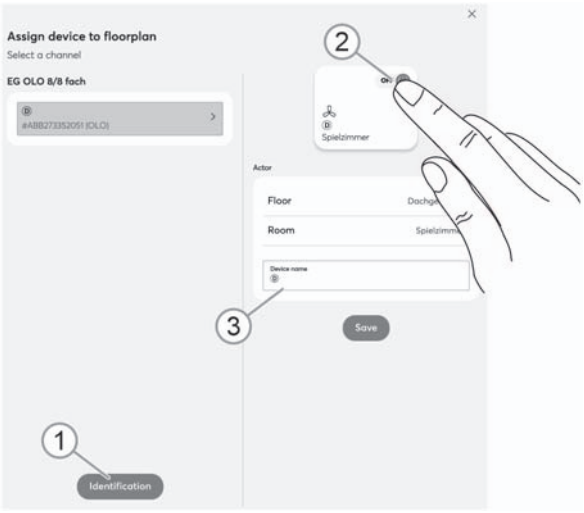


Fig. 16: Identification via switching (example illustration)

1. Open the device list.
2. Press the "Identification" button [1] and then switch the actual device.

   Or, as alternative, press only button [2] in the web interface.

   – The connected load is switched.
   – The device is then selected automatically in the device list.

Assigning a name

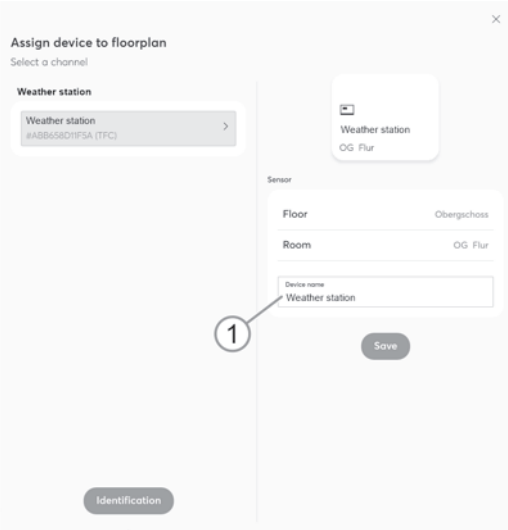


Fig. 17: Assigning a name (example illustration)

3. Enter a name that is easy to understand and under which the application is to be displayed later, e.g. "South-wall weather station".
4. Tap the "Save" button to take over the adjustments.
   – This takes over the entry.

6.2 Setting options per channel

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

The settings are made via the web-based user interface of the System Access Point or the ABB-free@home® App Next.

Select device

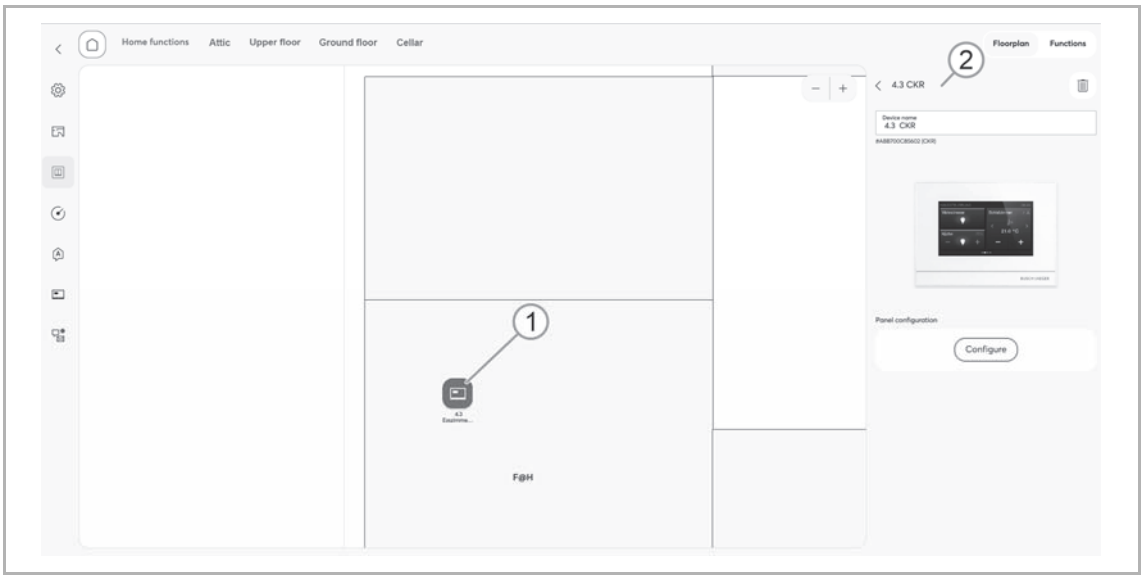


Fig. 18: Selecting device

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].

Open overview of devices

1. In the main menu select "Devices, scenes & groups" (toothed-wheel icon) [1].
   If you do not enter via the main menu, click on the icon [2].

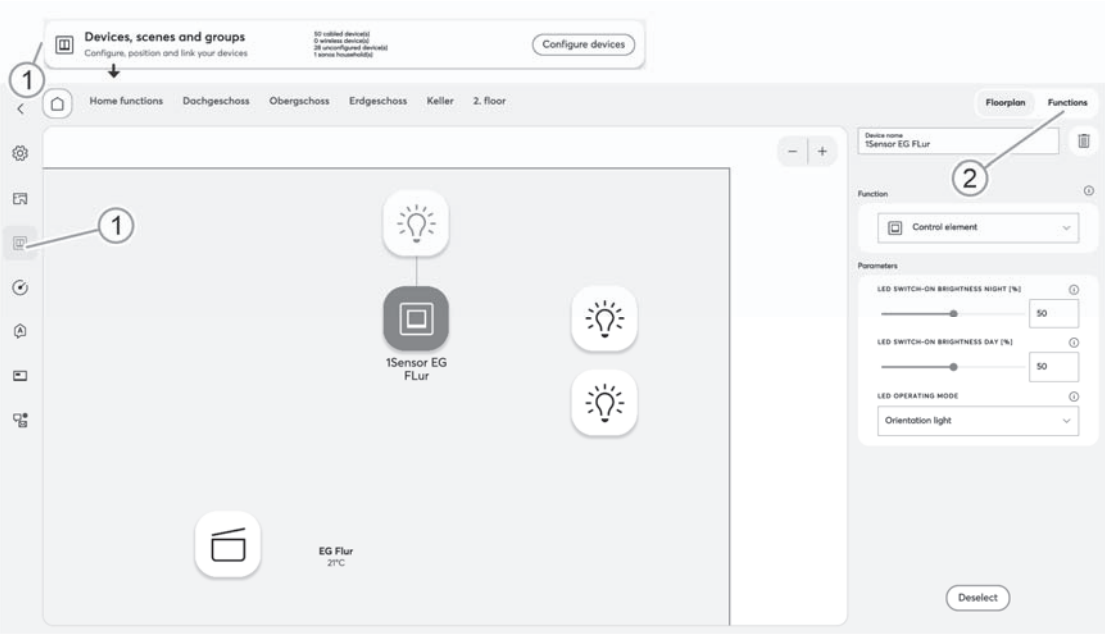


Fig. 19: Open overview of devices (example illustration)

2. Select the "Functions" button [3].
   – The overview of devices opens.
   – Here you can view all devices that are located in the free@home system. The overview page displays information about the device name and the position of the respective device.

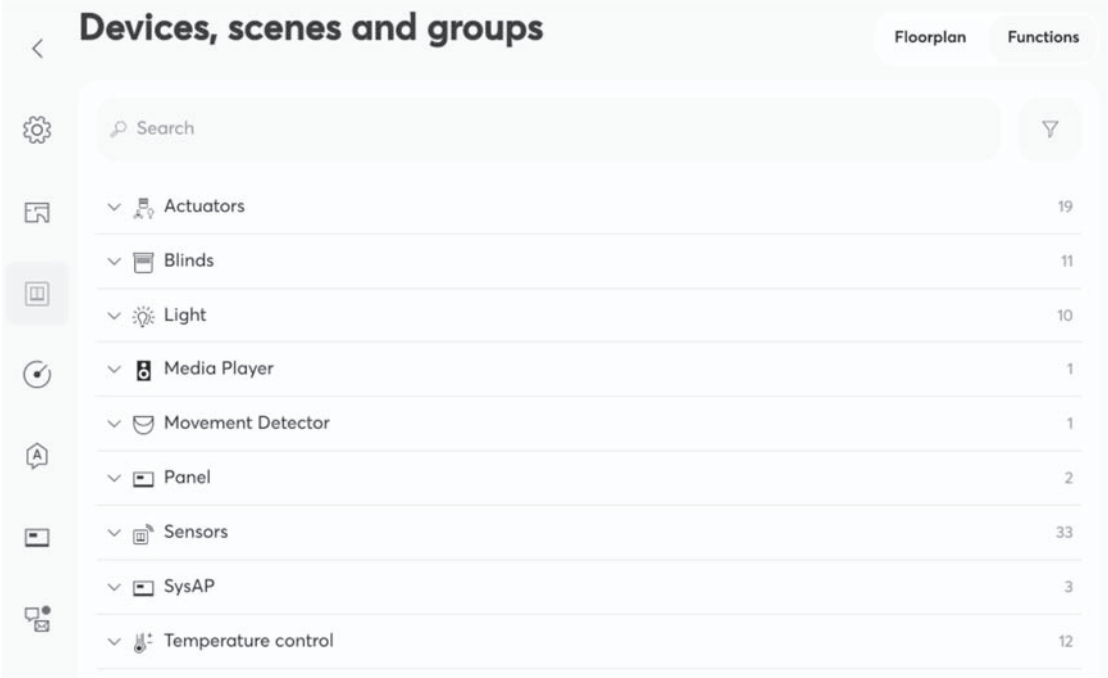


Fig. 20: Overview of devices (example illustration)

3. Tap on a device category.
   – The list of available devices opens.
4. Tap on the device whose information you want to edit.
   – A new window with information about the respective device opens.

6.3 Parameters

6.3.1 Switching

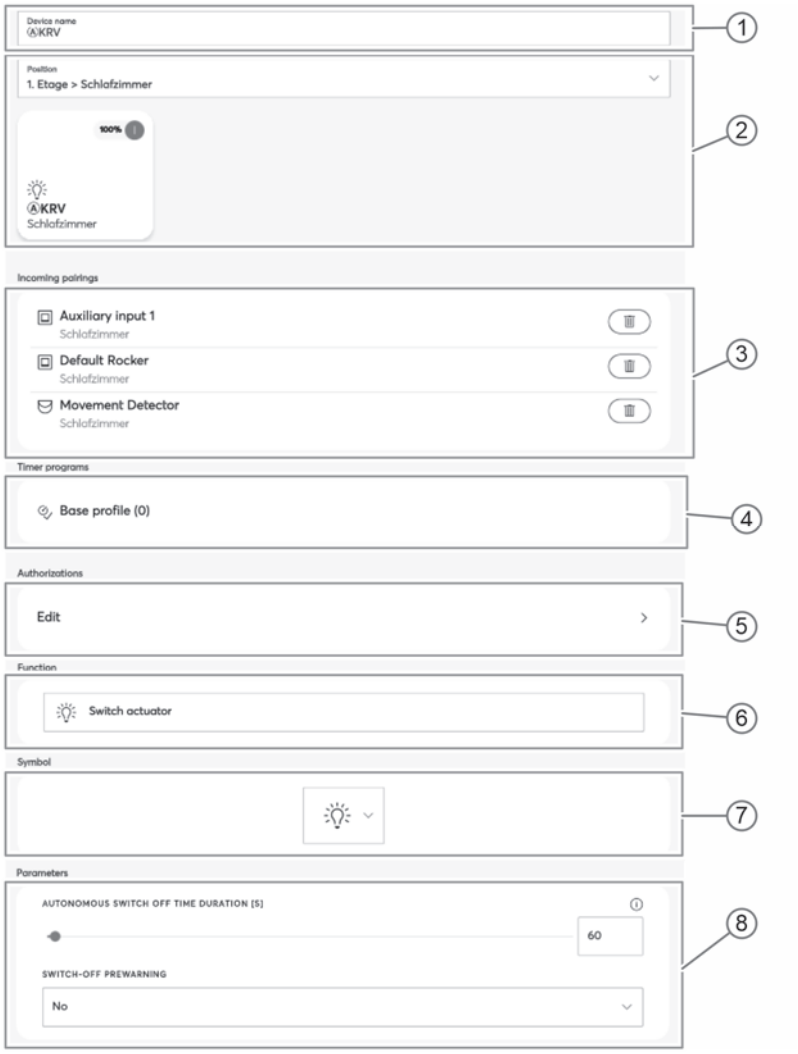


Fig. 21: Actuator parameters

Under the actuator settings you can configure the settings described in the following.

Pos.	Description
[1]	**Device name** An independent designation for the device can be allocated via the text field.
[2]	**Position** By tapping on the drop-down menu you can assign a position to the device in the building structure you defined (e.g. assignment to a room on a certain floor).
[3]	**Links** Via this function you can also see for which devices a link has been created. ▪ The pairing can be deleted again by tapping on the dustbin icon.
[4]	**Time programs** This overview displays all previously created time programs. The number after a time program indicates how often the actuator is used in this time profile. Select a time program for adding it to the actuator.
[5]	**Authorizations** Menu item "Authorizations" is used to specify whether a user with installer authorization is required for the configuration of the actuator. In addition, you can nevertheless assign users with read rights the authorization to switch this actuator.
[6]	**Function** The current function of the actuator is displayed via menu item "Function". You can change the function if necessary. ▪ Switch actuator The following functions are available: ▪ Heating mode ▪ Cooling mode ▪ Additional heating stage ▪ Additional cooling stage ▪ Push-button ▪ Central heating actuator ▪ Central cooling actuator ▪ Two-point heating controller ▪ Two-point cooling controller ▪ Automatic heating/cooling operation ▪ Two-point heating/cooling controller
[7]	**Icon** The icon menu item can be used to specify an icon with which the actuator is portrayed.
[8]	**Parameters** **Switch-off delay (s)** The time after which the actuator switches off again can be specified via the sliding controller or by entry in the text field after it was switched on by a movement detector or via the staircase lighting function.
	Switch-off pre-warning Application for corridor light in stairwells of multifamily houses. – The light goes out briefly and on again when the set switch-off delay is 30 seconds before the switch-off. – After 10 seconds the light goes off briefly and on again. This takes place for around 30 seconds. This indicates that the light is about to go off. – If the light switch is pressed within this period of 30 seconds, the switch-off delay starts anew.

Actuator parameter function

- Heating mode

  The control is made via the linked room temperature controller which determines a control value between 0 and 100%. The heating actuator converts this control value via PMW. Then the values are rounded < 20 to 0, > 80 to 100, to reduce the number of times the relay is switched.

- Cooling mode

  The control is made via the linked room temperature controller which determines a control value between 0 and 100%. The cooling actuator converts this control value via PMW. Then the values are rounded < 20 to 0, > 80 to 100, to reduce the number of times the relay is switched.

- Additional heating stage

  In connection with a room temperature controller, an additional heating circuit can be controlled.

  – This type of additional stage is used, for example, to quickly heat up a bathroom with floor heating via a heated towel rack.

- Additional cooling stage

  In connection with a room temperature controller, an additional cooling circuit can be controlled.

  – This type of additional stage is used, for example, to quickly cool a room via an added cooling device.

- Push-button

  When actuated, the contact is closed for a set time (0.1 to 5 seconds) and is then opened again. This can, for example, be used for the activation of a garage door drive.

- Central heating actuator

  Several room temperature controllers can be linked with the central heating actuator. Then a threshold value can be defined for the central heating actuator. Depending on the heating requirement, the linked room temperature controller (see threshold value) switches the central heating actuator on or off. The central heating actuator can, for example, be used to switch the circulation pump on or off.

- Central cooling actuator

  Several room temperature controllers can be linked with the central cooling actuator. Then a threshold value can be defined for the central cooling actuator. Depending on the cooling requirement, the linked room temperature controller (see threshold value) switches the central cooling actuator on or off. The central cooling actuator can, for example, be used to switch the cooling device on or off.

- Two-point heating controller

  The controller switches on when the control value of the room temperature exceeds the preconfigured threshold value and remains active until the heating requirement drops below the preconfigured bottom threshold value again.

- Two-point cooling controller

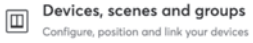
  The controller switches on when the control value of the room temperature exceeds the preconfigured threshold value and remains active until the cooling requirement drops below the preconfigured bottom threshold value again.

- Two-point heating/cooling controller

  A switchover between heating and cooling mode of the device can be made automatically over the whole system via a linked binary input. The controller switches on when the control value of the linked room temperature controller exceeds or drops below the preconfigured threshold value and remains active until the cooling/heating requirement exceeds/drops below drops below the preconfigured bottom threshold value again.

6.4 Links

The weather stations and actuators created via the allocation function can now be linked with each other. This links the individual sensors of the weather station with one or several corresponding actuators. For example, the wind sensor can be linked with blind actuators. This causes the blinds to be moved up when the set wind force is reached.

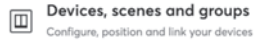


Configuring, positioning and linking of the devices is carried out via menu "Devices, scenes and groups".

The link is made via the configuration mode in the building plan of the Web-based user interface of the System Access Point.

1. Open the building plan
   - Via menu "Devices, scenes and groups" on the main page
   - Via the switch icon in the menu bar on the left side
   - From the list of functions, via the "Floor plan" button

6.4.1 Linking sensor and actuator



Configuring, positioning and linking of the devices is carried out via menu "Devices, scenes and groups".

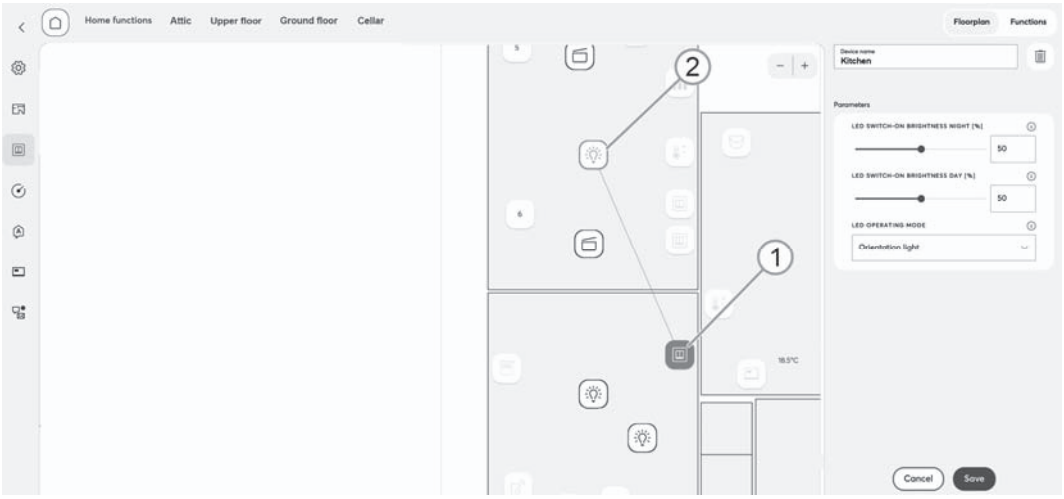


Fig. 22: Linking sensor and actuator (example illustration)

1. Select the sensor [1] in the building plan that is to be linked with the actuator (detailed information is available in the system manual).
2. Select the actuator [2] that is to be switched by the sensor.
3. If necessary, make changes to the parameter settings.
4. Tap on "Save" to take over the settings.
   – A blue connecting line indicates the link between the two devices.
   – The selection can be cancelled via the "Deselect" button.

Notice
A sensor can be linked with several actuators.
A sensor can additionally be linked with scenes.

7 Update

A firmware update is made available via the System Access Point

8 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).

8.1 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.

9 Notes

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