Technical Manual

Switch actuator, 4-gang, MDRC

free@
home

Switch actuator

SA-M-0.4.1 (6251/0.4)

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1   Notes on the instruction manual

Please read this manual through carefully and adhere to the information contained therein. This will assist you in preventing damage to persons and property and ensure reliable operation and long service life of the device.

Please keep this manual in a safe place.

If you pass the device on, also include this manual.

If you require additional information or have questions about the device, please contact ABB STOTZ-KONTAKT GmbH 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 such hazards.

ABB STOTZ-KONTAKT GmbH accepts no liability for failure to observe the safety instructions.

2.1   Used symbols

The following symbols point to particular dangers involved in the use of the device and provide practical instructions.

Note
A note indicates information or references to additional useful topics. This is not a signal word for a dangerous situation.

Examples
Examples for application, installation and programming

Important
This safety notice is used as soon as there is the danger of malfunction without the risk of damage to property or risk of injury.

Caution
This safety notice is used as soon as there is the danger of malfunction without the risk of damage to property or risk of injury.

⚠ **Danger**
This safety notice is used as soon as there is a threat to life and limb due to improper handling.

⚠⚡ **Danger**
This safety notice is used as soon as there is a serious threat to life due to improper handling.

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 modules 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. The connection to the free@home is made at the front via a bus connection terminal. The switch actuator does not require AUX voltage.

Note
The device must only be installed in flush-mounted boxes in dry indoor rooms. The currently valid regulations must be adhered to.

2.3 Improper use

The device is dangerous if used improperly. Any non-intended use is deemed improper use. The manufacturer is not liable for damages resulting from such improper use. The associated risk is borne exclusively by the user/operator.

The device must never be used outdoors or in bathroom areas. Do not push objects through the openings in the device. Only the available options for connection are to be used in accordance with the technical data.

2.4 Target group / qualification of personnel

Installation, commissioning and maintenance of the product 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 operator must adhere to the valid national regulations in his country governing the installation, functional test, repair and maintenance of electrical products.

2.5 Liability and warranty

Improper use, non-observance of this manual, the use of inadequately qualified personnel, as well as unauthorized modification excludes the liability of the manufacturer for the damages caused. It voids the warranty of the manufacturer.

3   Environment

Always dispose of the packaging material and electric devices and their compo-
nents via the authorized collecting depots and disposal companies.

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

(EU Directive 2006/96/EC, 2004/108/EC and 2011/65/EC RoHS)

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

4   Product description

The device is a switch actuator for installing on a mounting rail. The device has four switching channels and can switch four connected electric circuits (230 V, max. 16 A-AC1).

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:

»   Four switching channels in one device

»   Manual switching option on the device for each of the four channels

»   Variable wiring via 6 mm terminals with combi-head screw

»   Usual manner of wiring of the 230 V line

Note

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

4.1   Scope of supply

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

4.2   Overview of types

Type	Product name	Actuator channels	Device
SA-M-0.4.1	Switch actuator, 4gang	4	

Table 1: Overview of types

4.3   Function overview

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

Icon of the operating surface	Information
 Light	**Name:** Light **Function:** Switches connected electric light circuits
 Switch actuator	**Name:** Switch actuator **Function:** Switches connected electric load circuits
 Socket Outlet	**Name:** Socket outlet **Function:** Switches connected electric light circuits

Table 2: Function overview

4.4　Description of functions

4.4.1　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 free@home binary inputs, and also other free@home participants. Depending on the configuration of the binary inputs connected to the switch actuator, the switch actuator supports the following functions:

Force-position

The 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 free@home devices. 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 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. They can be configured in menu "Linking" in the main menu of the System Access Point.

4.4.2　Scene function

Each of the four channels can be integrated in up to ten scenes.

4.5   Device overview of switch actuator SA-M-0.4.1

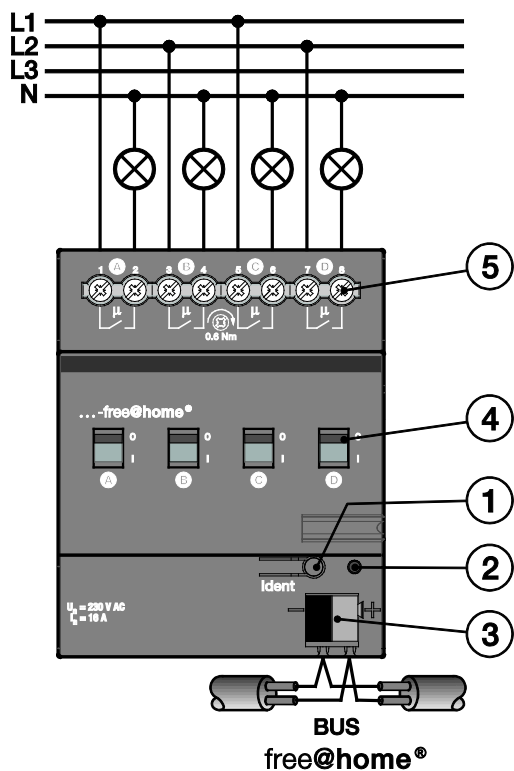*Fig. 1: View of switch actuator, 4-gang, MDRC*

[1] Device identification during commissioning

[2] Identification LED

[3] Bus connection terminal

[4] Actuation ON/OFF

[5] Connecting terminals

5   Technical data

5.1   Overview of SA-M-0.4.1

Parameters	Value	
Power supply	24 V DC (via the bus)	
Bus subscribers	1 (12 mA)	
Connection (free@home)	Bus connection terminal: 0.4 - 0.8 mm	
Line type	J-Y(St)Y, 2 x 2 x 0.8 mm	
Maximum load	16 AX	
Switched load line	127 V~ – 230 V~, 50 / 60 Hz	
	Electric load circuits (1 terminal per contact)	
Switching capacity	AC1 operation (cos φ = 0.8) according to DIN EN 60 947-4-1	16 A/230 V AC
	Fluorescent lamp according to DIN EN 60 669-1	16 AX/230 V AC (70 μF)[1]
	Minimum switching capacity	100 mA/12 V AC 100 mA/24 V AC 7 mA/24 V AC
	Direct current switching capacity (resistive load)	16 A/24 V DC
Output of life expectancy	Mechanical service life	> 3 x 10^6
	Electrical service life according to DIN IEC 60 947-4-1	
	AC1 (240 V/cos φ = 0.8)	> 10^5
	AC3 (240 V/cos φ = 0.45)	> 3 x 10^4
	AC5a (240 V/cos φ = 0.45)	> 3 x 10^4
Connecting terminals	Combi-head screw-type terminal (PZ 1)	Connection cross section: 0.2 - 4.0 mm² fine-wire, 2 x 0.2…2.5 mm² 0.2 - 6.0 mm² single-wire, 2 x 0.2…4.0 mm²
	Tightening torque	0.6 Nm
Ambient temperature	Operation	-5°C to +45°C
	Storage	-25°C to +55°C
	Transport	-25°C to +70°C
Environmental conditions	Maximum humidity	93%, no dew permissible

Protection type	IP20	Acc. to DIN EN 60 529
Protection class	II	Acc. to DIN EN 61 140
Insulation category	Over voltage category	III acc. to DIN EN 60 664-1
	Degree of contamination	2 acc. to DIN EN 60 664-1
Mounting	On 35 mm mounting rail	Acc. to DIN EN 60 715
Built-in position	Any	
Design	Rail mounting device (MDRC)	Modular installation device, Pro *M*
	Installation width	4 modules à 18 mm
	Installation depth	64.5 mm
	Housing, colour	Plastic, basalt grey (RAL 7012)
Dimensions	72 x 90 x 64.5 mm (W x H x D)	
Weight	0.25 kg	
CE marking	According to EMC and low-voltage guidelines	

Table 3: Technical data

[1] The maximum switch-on current must not be exceeded.

5.2   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 I_P (150 μs)	400 A
	Maximum switch-on current I_P (250 μs)	320 A
	Maximum switch-on current I_P (600 μs)	200 A
Number of ballasts (T5/T8, single-light)[1]	18 W (ABB EVG 1 x 18 SF)	23
	24 W (ABB EVG-T5 1 x 24 CY)	23
	36 W (ABB EVG 1 x 36 CF)	14
	58 W (ABB EVG 1 x 58 CF)	11
	80 W (Helvar EL 1 x 80 SC)	10

Table 4: Types of load

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

5.3   Dimensions

Note
All dimensions are in mm.

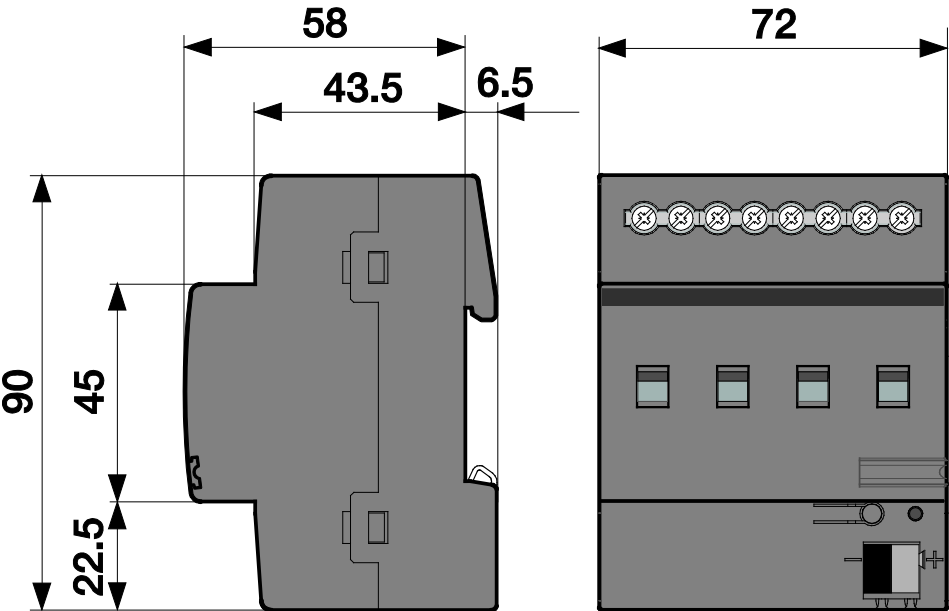**Switch actuator SA-M-0.4.1**

Fig. 2: Dimensions

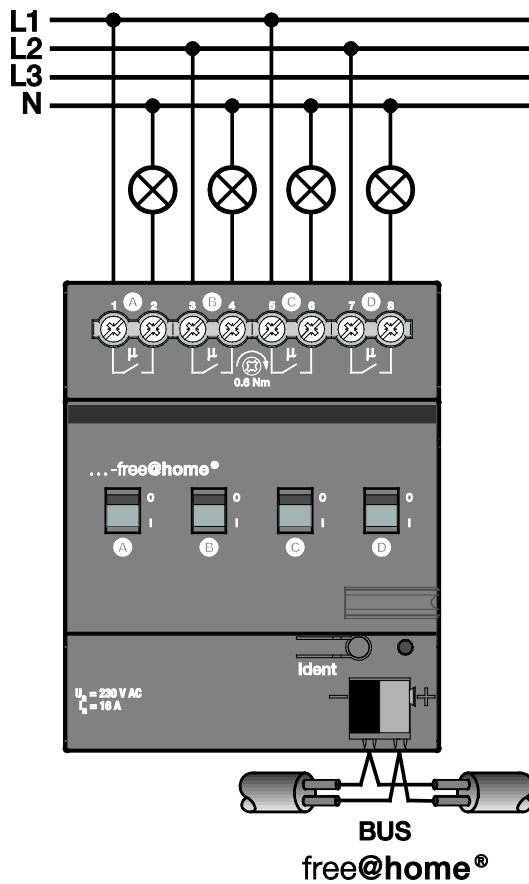## 5.4   Connection diagram

Switch actuator SA-M-0.4.1

Fig. 3: Electrical connection

6   Mounting

6.1   Safety instructions for mounting

> ⚠️ ⚡   **Danger**
>
> **Risk of death due to electrical voltage**
>
> Dangerous currents flow through the body when coming into direct or indirect contact with live components. This results in electric shock, burns or even death.
>
> Work improperly carried out on electrical systems is a hazard to one's own life and that of the user. Also fires and serious damage to property can result.
>
> » Observe the relevant standards.
>
> » Apply at least the "five safety rules" (DIN VDE 0105, EN 50 110):
>
> 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
>
> » Install the device only if you have the necessary electrical engineering knowledge and experience (see chapter 2.4).
>
> » Use suitable personal protective clothing.
>
> » Use suitable tools and measuring devices.
>
> » Check the supply network type (TN system, IT system, TT system) to secure the following power supply conditions (classic connection to ground, protective earthing, necessary additional measures, etc.).

⚠ ⚡	**Danger**

Risk of death due to short-circuit

Risk of death due to electrical voltage of 230 V during short-circuit in the low-voltage line.

» During mounting observe the spatial division (> 10 mm) of SELV electric circuits to other electric circuits.

» Observe the spatial division of SELV electric circuits and other electric circuits. Otherwise short-circuits can occur.
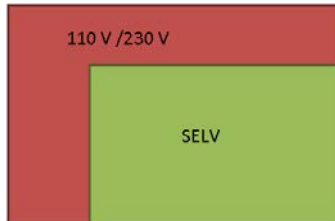
» If the minimum distance is insufficient, use electronic boxes or insulating tubes.

» Observe the correct polarity.

6.2   Installation/mounting

The device is a rail mounting device for the installation in distributors for the easy installation on mounting rails according to DIN EN 60 715.

The device can be mounted in any position.

The stick-on 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 found on the housing.

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

6.3   Electrical connection

» The electrical connection is made via screw terminals with combi-head screws. The bus connection is established by means of the enclosed bus connection terminal. The terminal designation is located on the housing.

- The device is ready for operation after the bus voltage has been applied.

Mounting and commissioning must only be carried out by qualified electrical installers. When planning and setting up electrical systems and security-related systems for the detection of intrusion and of fires, the relevant standards, guidelines, rules and regulations of the respective country are to be observed.

» Protect the device against humidity, dirt and damage during transport, storage and operation!

» Operate the device only within the specified technical data!

» Operate the device only in a closed housing (distributor)!

» Prior to performing installation work the device is to be deactivated.

⚠⚡ **Danger**
Danger to life
To prevent dangerous contact currents due to feedback from different external conductors, an all-pole deactivation is to be carried out when extending or changing the electric connection.

6.4   Dismantling

Dismantling is carried out in the reverse order.

7   Commissioning

Commissioning is always carried out via the Web-based surface of the System Access Point.

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

Devices which are physically connected to the free@home bus, log themselves automatically into the System Access Point. They transmit information about their type and supported functions (see Table 2: Function overview, chapter 4.3).

During initial commissioning all devices are given a generic name (e.g. switch actuator 1, etc.). The user must change this name to a name practical for the system (Example: "Living room light") for an actuator in the living room.

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

Commissioning of the switch actuator is described in the following chapters. Here it is assumed that the basic commissioning steps of the overall system have already been carried out. General knowledge about the Web-based commissioning software of the System Access Point is assumed.

Note
General information about commissioning and parameterization is available in the system manual and the online Help of the "System Access Point" (www.abb.com/freeathome).

7.1   Allocation of devices and specifying 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 descriptive name.
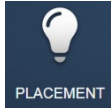
The allocation is made via the allocation function of the Web-based user interface of the System Access Point.
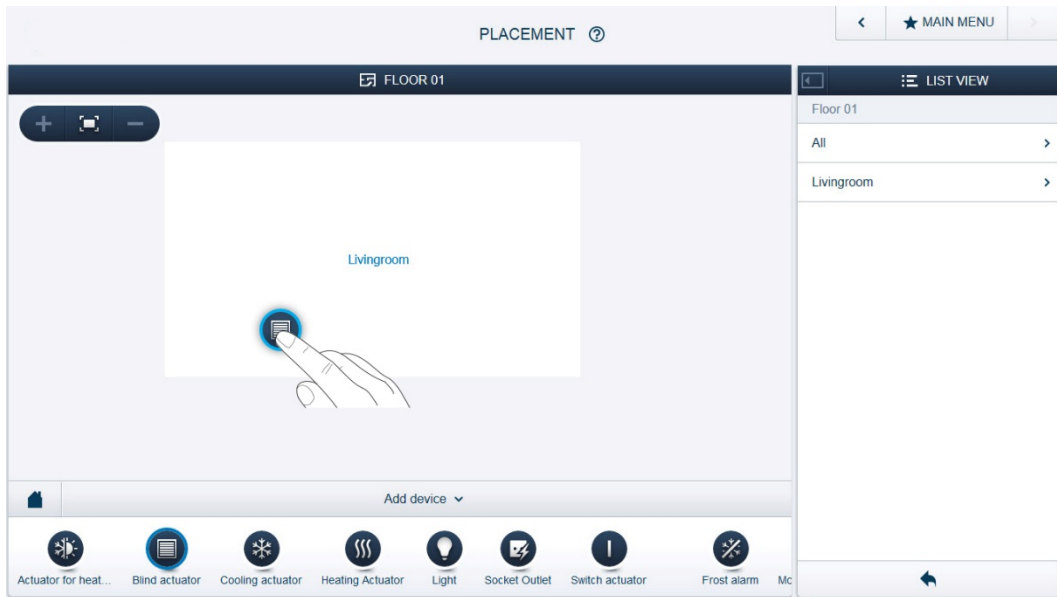
Device selection

Fig. 4: Allocating devices

» In the "Add device" bar select the desired application and pull it via drag-and-drop onto the floor plan in the working area.
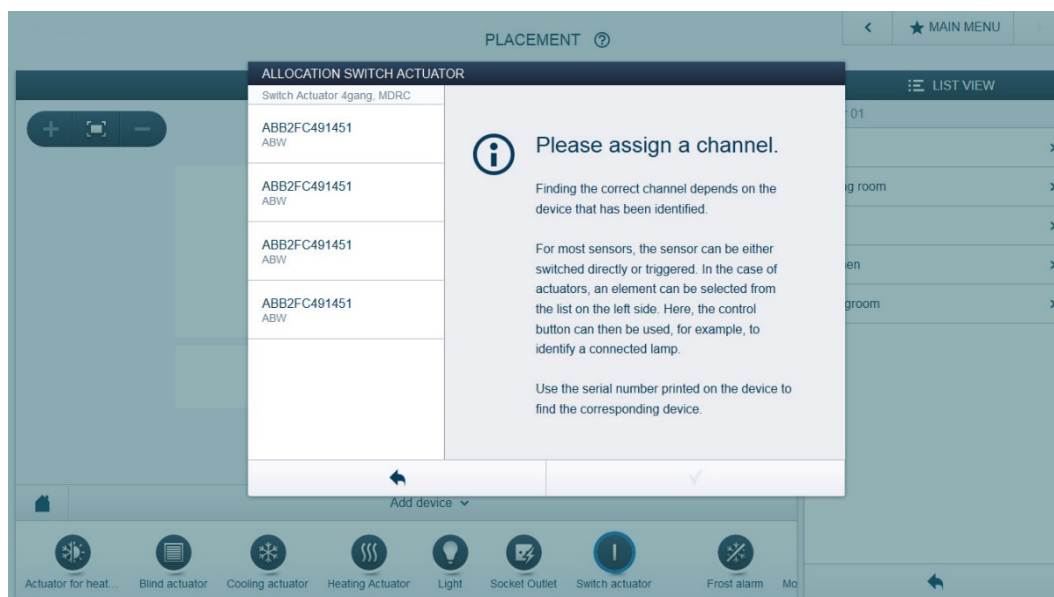
Fig. 5: Allocation

- A pop-up window opens automatically which lists all the devices suitable for the application selected.

The desired device can be identified in two ways.

Identification via serial number

Fig. 6 Identification via serial number

»   Compare the short 3-digit number of the identification label with the numbers in the list and in this way identify the device you are searching for and, if necessary, also the channel.

Identification by pressing the "Identification button"

»   Press the identification button on the device which you wish to add.

-     The desired device is faded in automatically.

»   Select the desired channel.

Assigning a name

Fig. 7: Assigning a name

» Enter a name that is easy to understand and under which the application is to be displayed later (e.g. "Ceiling light").

» Press the tick at the bottom right to take over the entry.

Note
The settings of the device can be adjusted via the Web-based user interface of the System Access Point.
For pre-programmed devices the default settings can be adjusted. This allows the channel selection to be influenced.
These settings, however, can only be made with a fitter access (see online Help of the System Access Point). The parameter settings remain as described above.

7.2   Setting options per channel

General settings and parameter settings can be made for each channel.
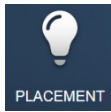
> [PLACEMENT] The settings are made via the allocation function of the Web-based user interface of the System Access Point.
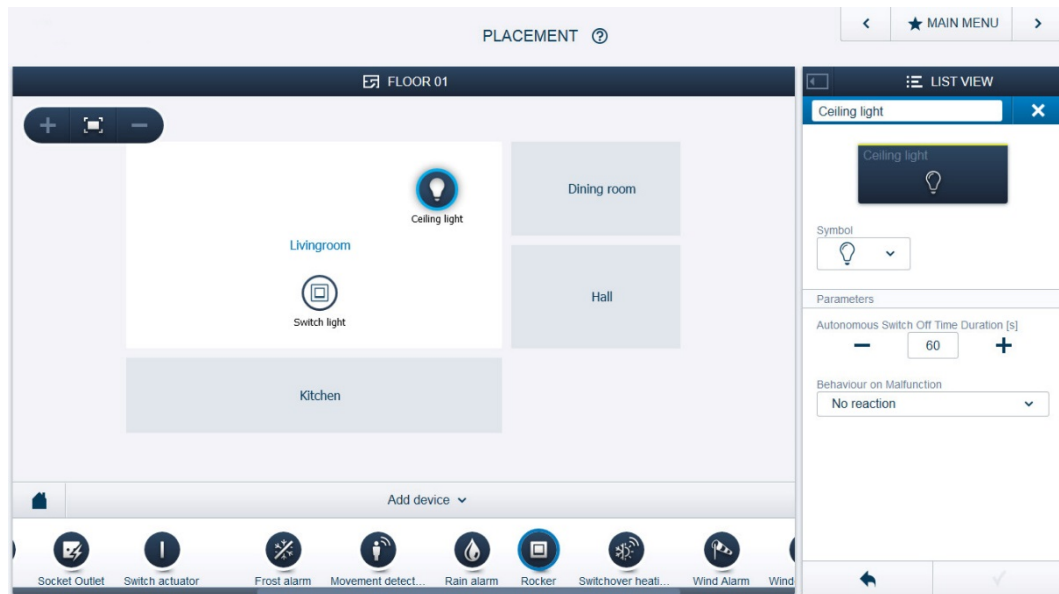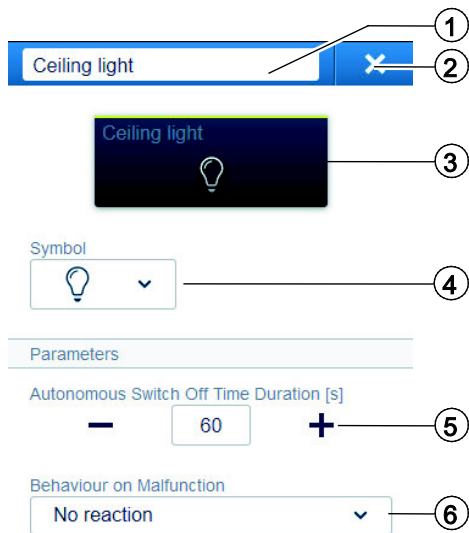
Device selection

Fig. 8: Device selection

» Select the device icon in the floor plan of the working area view.
- All setting options for the respective channel are displayed in the list view.

The following settings are available.

7.2.1   Settings for switch actuator

[1]   Changing the name

[2]   Deleting the channel via "X"

[3]   Switching of the actuator via the button

[4]   Selection of a different icon

[5]   Setting the switch-off delay in seconds
The -/+ buttons can be used to specify, for example, how long the light remains on after the actuator has received the switch-off command via the binary input.

[6]   Behaviour during faults:
Selection of how the device is to respond in case of a fault.

7.3 Linking

The switch actuator units created via the allocation function can now be linked with a second device, e.g. binary input. This allows simple ON/OFF circuits or two-way circuits to be implemented.
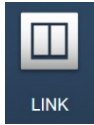
The linking in the list view is then made via the linking function of the Web-based user interface of the System Access Point.
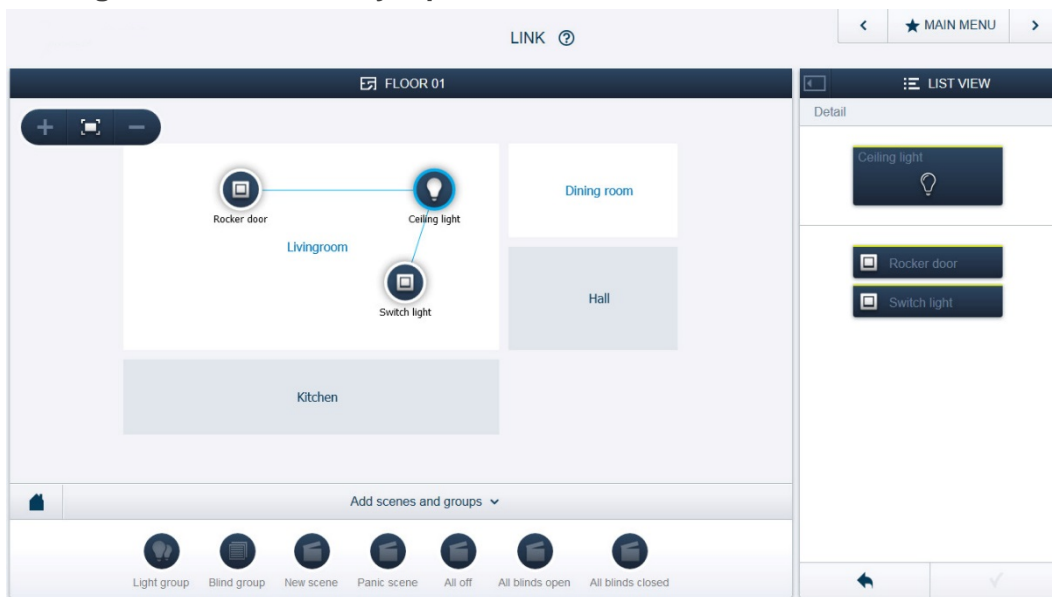
Linking actuator and binary input

Fig. 9: Linking actuator and binary input

» To link an actuator with a binary input, first click on the desired binary input and then on the actuator which is to be operated via the binary input (button).

- 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.

» To link the actuator with a further sensor, first click the sensor and then the actuator to link the associated channels of both devices.

- After the transmission has been completed the switch actuator can be operated directly locally.

Note
The links can be changed manually at all times.

8 Updating options

A firmware update is carried out via the Web-based user interface of the System Access Point. For this, visit the free@home website www.abb.com/freeathome.

9 Maintenance

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

Dirty devices can be cleaned with a dry cloth. If this is not sufficient, a cloth slightly moistened with a soap solution can be used. Caustic cleaning agents or solvents must not be used.

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