1473-1-8567 | 11.07.2014

Technical Manual

Dimming actuator, 4-gang, MDRC

DA-M-0.4.1

Power and productivity
for a better world™

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.

Busch-Jaeger accepts no liability for failure to observe the instructions in this manual.

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

www.BUSCH-JAEGER.com

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.

Busch-Jaeger accepts no liability for failure to observe the safety instructions.

2.1 Used symbols

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

Warning

This symbol in connection with the signal word "Warning" indicates a dangerous situation which could lead to immediate death or to serious injury.

Attention - damage to property

This symbol indicates a possibly damaging situation for the product. Non-observance can lead to damage or destruction of the product.

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

This symbol indicates information on the protection of the environment.

The following symbols are used in the manual to draw attention to special dangers:

This symbol indicates a dangerous situation due to electric current. If such a sign is ignored, it can lead to serious injuries or even death.

2.2 Intended use

This device is a 4gang universal dimming actuator for rail mounting. It is intended for the activation and dimming of various loads.

The device is intended for the following:

» operation according to the listed technical data and types of load,
» installation in dry interior rooms and on mounting rails according to DIN EN 60715,
» 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 is deemed improper use and can lead to personal injury and damage to property.

Busch-Jaeger 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,
» use outdoors or in bathroom areas.

2.4 Target group / qualification of personnel

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

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

The electrical installers must adhere to the valid national regulations in their country governing the installation, functional test, repair and maintenance of electrical products.

The electrical installers must be familiar with and correctly apply the "Five safety regulations" (DIN VDE 0105, EN 50110):

1. Disconnect from power;
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

Warning

Electric voltage! Risk of death and fire due to electrical voltage of 230 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 230 V supply system may only be performed by authorised and qualified electricians.

» Disconnect the mains power supply before installation / disassembly.

» 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.

» Keep the device away from water and wet surroundings.

Attention - damage to property

Risk of damaging the device due to external factors.

Moisture and contamination can damage or destroy the device.

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

3 Information on protection of the environment

All packaging materials and devices bear the markings and test seals for proper disposal.

The products meet the legal requirements, in particular the laws governing electronic and electrical devices and the REACH ordinance (EU Directive 2002/96/EG WEEE and 2002/95/EG RoHS), (EU-REACH Directive and Law for the Execution of the Directive (EG) No.1907/2006).

The device contains valuable raw materials which can be recycled. Used electric and electronic devices must not be disposed of with domestic waste.

» Always dispose of the packaging material and electric devices and their components via the authorized collecting depots and disposal companies.

4 Product description

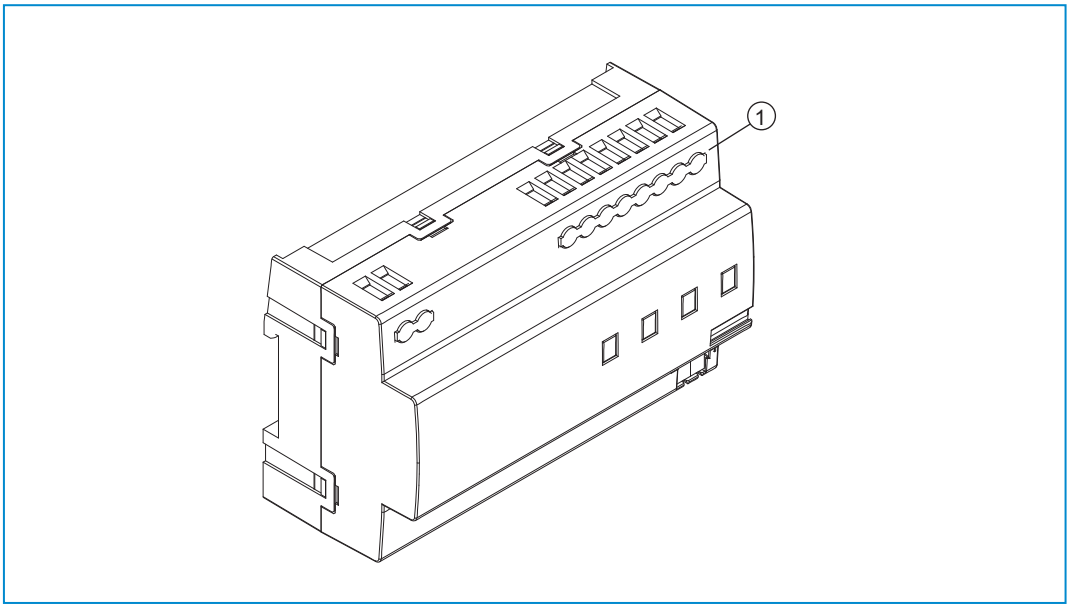


Fig. 1: Product overview

[1] MDRC

The 4gang universal dimming actuator is intended for the activation and dimming of the loads listed in chapter "Types of load".

Multiple consumers can be connected to a channel. The devices must be parameterised for the use of the functions.

This is a MDRC device for installing on mounting rails according to DIN EN 60715.

4.1 Scope of supply

The scope of supply includes only the modular DIN rail component [1].

4.2 Type overview

Article no.	Product name	Construction type	Input channels		Switching channels		Switching load
DA-M-0.4.1	Dimming actuator, 4gang	Series installation	Ø 0		4		4 x 315 W/VA

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
	**Name:** Dimming actuator **Type:** Actuator **Made available by:** Dimming actuator; MDRC **Function:** Dims connected loads

Table 2: Function overview

4.4 Device overview of dimming actuator 4gang, MDRC

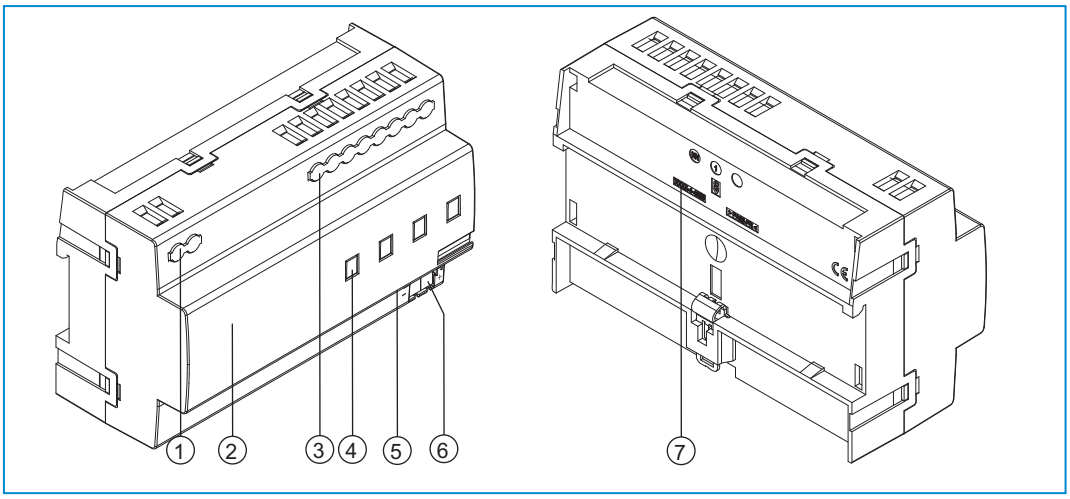


Fig. 2: Device overview of dimming actuator 4gang, MDRC

[1] Screw-type terminals L1 / N
[2] Identification label
[3] Screw-type terminals, channels
[4] Status LEDs, channels
[5] Device identification during commissioning
[6] Bus connection terminal -/+
[7] Designation of type

5 Technical data

5.1 Main overview

Parameters	Value
Power Supply	24 V DC (via bus line)
Bus subscribers	1 (12mA)
Connection	Bus connection terminal: 0.4-0.8 mm
Line type	J-Y(St)Y, 2 x 2x 0.8 mm
Wire stripping	6-7 mm
Nominal load	1 x 40 - 1260 W/VA; 2 x 20 - 630 W/VA; 4 x 10 - 315 W/VA; LEDi + CFL: Typ. 1 x 8 - 160 W/VA; Typ. 2 x 4 - 120 W/VA; Typ. 4 x 2 - 80 W/VA
Mains supply	230 V ~, 50 / 60 Hz; Screw-type terminals: 1-6 mm^2
Protection	IP20
Ambient temperature	-5 °C – +45 °C
Storage T°	-20 °C – +70 °C

Table 3: Technical data

5.2 Types of load

Note...
The device has been optimised for retrofit LED lamps (LEDi).
Extended reference list: www.abb.com/freeathome.


 **230 V**


CFL
LEDi 230 V


Table 4: Types of load

5.3 Dimensions

Note...
All dimensions are in mm.
Module width: 8 MWs.

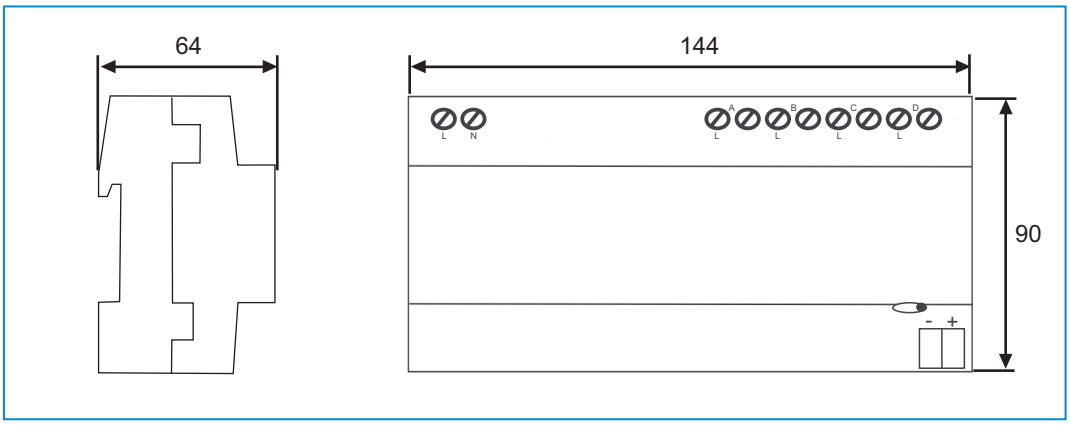


Fig. 3: Dimensions

5.4 Connection

5.4.1 Safety instructions

Attention - damage to property

Risk of damaging the device!

In case of different phases, the dimmer will be destroyed during parallel switching.

» For parallel switching of channels (see * in the circuit diagram), these must be connected to the same phase.
» Operation with isolating transformer networks with a connected load of ≤ 10 kVA is not admissible.
» The dimmers are not to be operated without load.

Note...

» When operating with several single-phase earth leakage circuit breakers there is the risk of voltage displacement between the phases. This can impair the function of the device. That is why the use of an all-pole protective device is recommended.
» The universal dimming actuator is designed for multi-phase operation and in this mode goes beyond the scope of validity of EN 60669-2-1.
» During the operation of conventional transformers, each transformer must be fuse-protected on the primary side according to manufacturer's specifications.
» Take ~20% loss into account when using conventional transformers.
» Observe the instructions of the manufacturer of the lamps with regard to parallel switching. Observe also the details in chapter "Commissioning".
» Bundling of channels does not lead to multiplication of channel loads (max. 160 W/VA for LEDi/CFL)
» Dimmer capacities > 1000 W only for professional use according to EN 61000-3-2.
» Attention! Observe correct polarity.

5.4.2 Connecting options

» The electrical connection is made via screw terminals.
» The description of the terminals is found on the housing.
» The connection to the free@home bus line is made with the enclosed bus connection terminal.
» An LS 10 is to be used as circuit breaker.

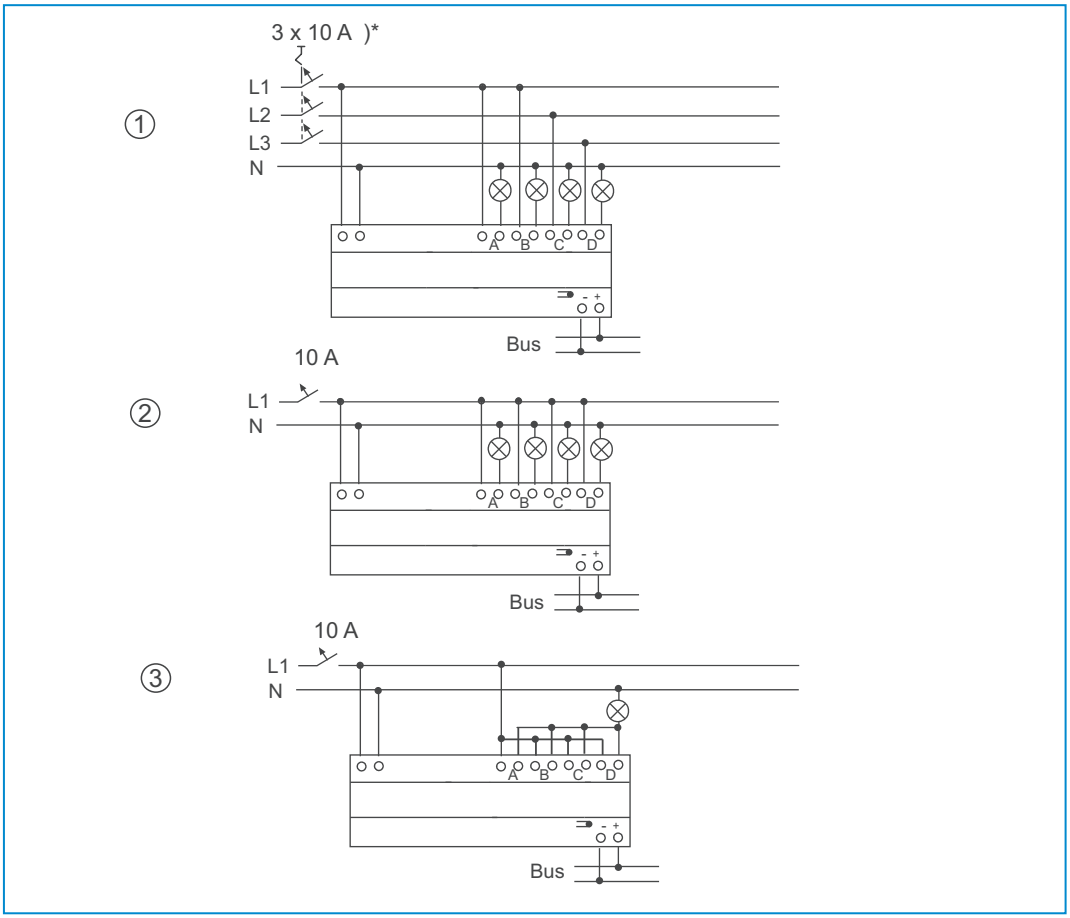


Fig. 4: Options for connecting

[1] Polyphase operation
[2] Single-phase operation, multi-channel dimming actuator
[3] 1-channel operation (all outputs switched in parallel)

5.4.3 Reduction of the connected load

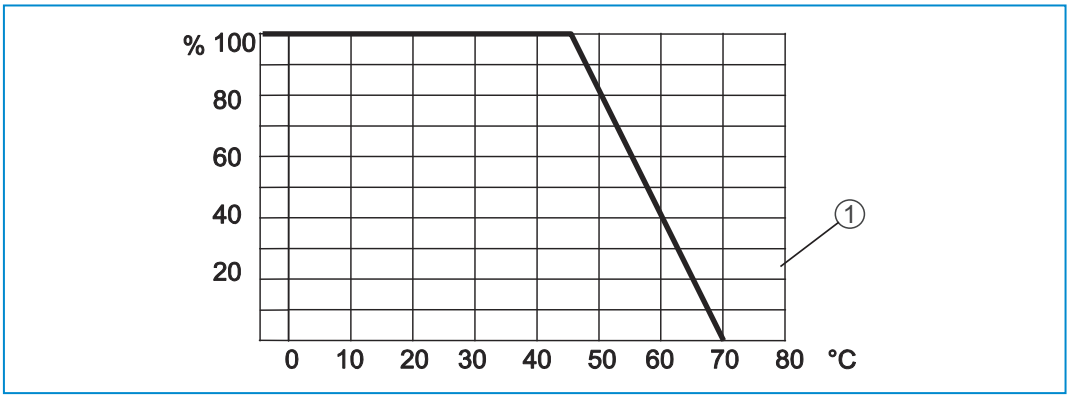


Fig. 5: Maximum connected load in dependence of the ambient temperature

[1] Derating curve

Note...

» The dimming actuator heats up during operation because part of the connected load is lost and converted into heat.

» The specified rated power is designed for dimming actuator installation in a solid masonry wall. When installing the dimming actuator in a wall made of gas concrete, wood, or plasterboard, the maximum connection load must be reduced by 20%.

» The connected load must always be reduced when several dimming actuators are installed one below the other or when other heat sources cause additional heating. In intensely heated-up rooms, the maximum connected load must be reduced according to the derating curve [1].

» Maximum admissible connected load according to the derating curve [1]: 100% = -5°C…45°C operating temperature (% = nominal power; °C = ambient temperature)

» Above a connection load of 25 W/VA, when connecting LEDi according to IEC 61000-3-2, suitable measures must be taken to increase the connection load to a maximum of 80 W/VA (e.g, through the use of harmonic wave filters).

6 Mounting

6.1 Planning instructions

Note...
Planning and application instructions for the system are available in the free@home system manual. They can be downloaded at www.abb.com/freeathome.

6.2 Safety instructions for mounting

Warning - 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.

» 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.).
» Observe the correct polarity!

6.3 Mounting / Installation

» Hang the device into the DIN rail at the top and swivel it downwards.
» Make the electrical connection according to the details in chapter 5.4.

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, chapter 4.3).

During initial commissioning all devices are given a generic name (e.g. dimming actuator 1, etc.). The user must change this name to a name practical for the system (Example: "Staircase lighting" for an actuator in the stairwell).

Load detection

The universal dimming actuator carries out an automatic load test during commissioning. It detects the connected load automatically after the mains voltage is applied. If problems arise, the operating mode can be changed individually for each channel via the commissioning software. After a power failure the dimming actuator returns to the parameterized settings.

Attention - damage to property

Risk of damaging the device!

» A waiting period of 30 seconds is to be observed when reactivating via circuit breakers.

Note...

The channels/groups will not be recognized when commissioning without load.

» Do not operated the dimming actuators without load.

Group formation

Attention - damage to property

Risk of damaging the device!

In case of different phases, the dimming actuator will be destroyed during parallel switching.

» For parallel switching of channels, these must be connected to the same phase.

» Operation with isolating transformer networks with a connected load of ≤ 10 kVA is not admissible.

» A mixture of inductive loads (L) and capacitive loads (C) on the one channel is not admissible.

If the load during initial commissioning is larger than the maximum load of the bridged channels, a group formation of the channels can be used depending on the type used.

The channels can be arbitrarily switched in parallel for increasing the power. The universal dimming actuator detects the parallel connection automatically after the mains voltage is supplied.

If the channels are switched in parallel for the load increase, this must be imaged in the commissioning software. For this, one dimming actuator group is created in the commissioning software for each channel switched in parallel. A dimming actuator group can be made up of several channels or only a single channel.

Commissioning/parameterization

At the point of delivery the universal dimming actuator has 4 individual pre-programmed channels.

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

Commissioning of the dimming actuators 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 technical reference manual and the online Help of the System Access Point.

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.

7.1.1 Adding device

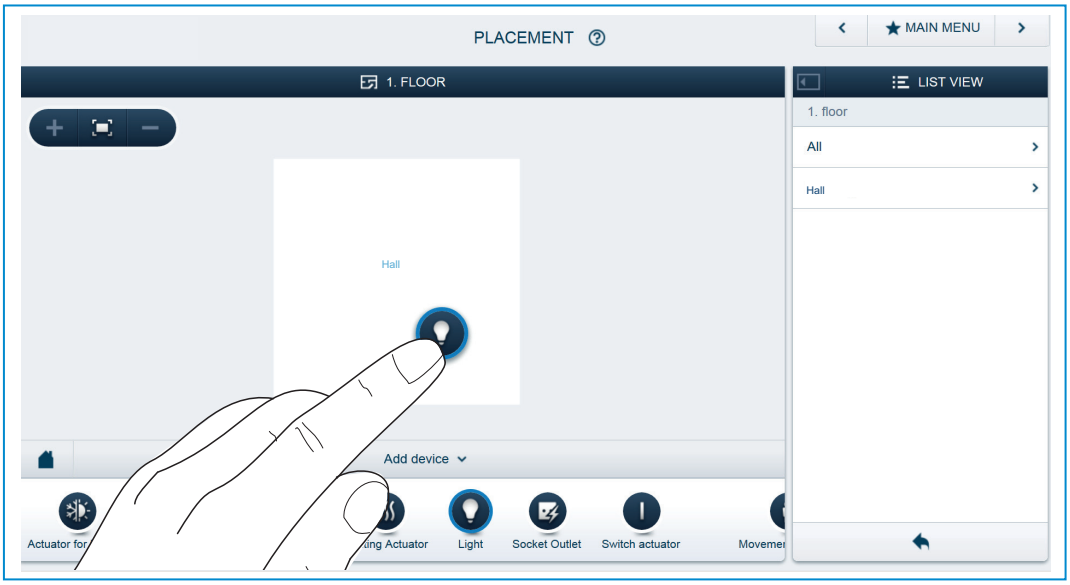


Fig. 6: Adding device

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

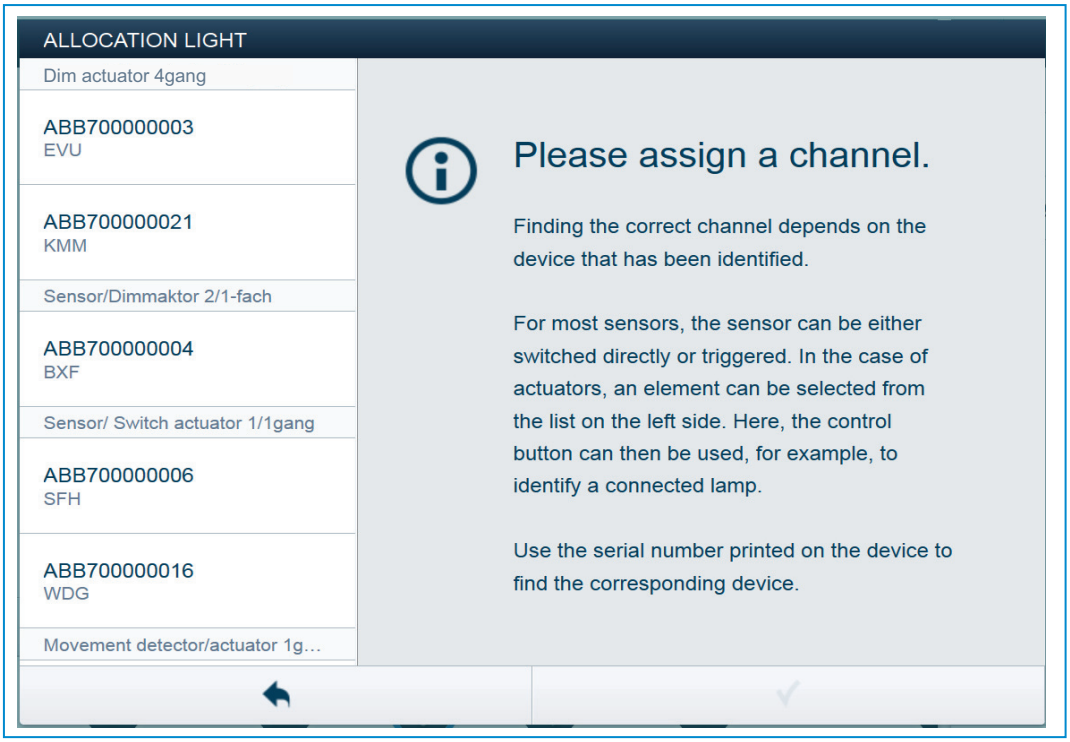


Fig. 7: Allocation

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

The desired device can be identified in 3 ways.

Identification via serial number

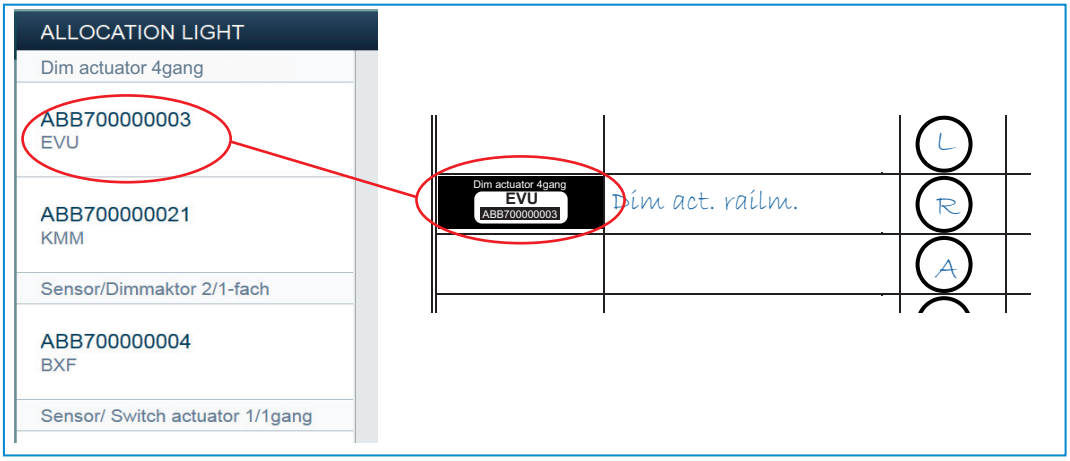


Fig. 8 Identification via serial number

» Compare the short 3-digit number of the identity label, which should be glued to the device plan, with the numbers in the list and in this way identify the device you are searching for and, if necessary, also the channel.

Identification via switching (only suitable for actuators)

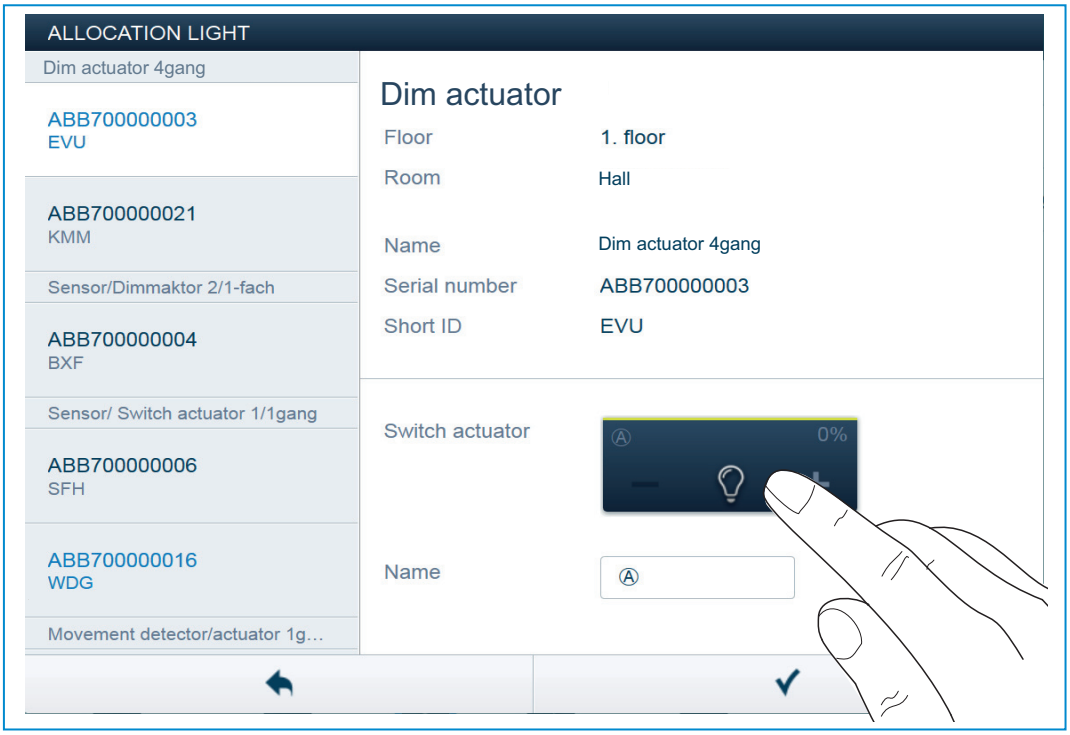


Fig. 9 Identification via switching

» Select a device and a channel from the list.
» Press the button in the detailed view of the device.
- The connected load is switched.
» Continue until you have found the device you are looking for.

Identification via local operation

Fig. 10 Identification via local operation

» Go to the device that is to be linked with the selected application.

» Press the "Ident" button on the device.

- The associated device is selected automatically. In case an actuator has several channels you now need to select the correct channel.

Assigning a name

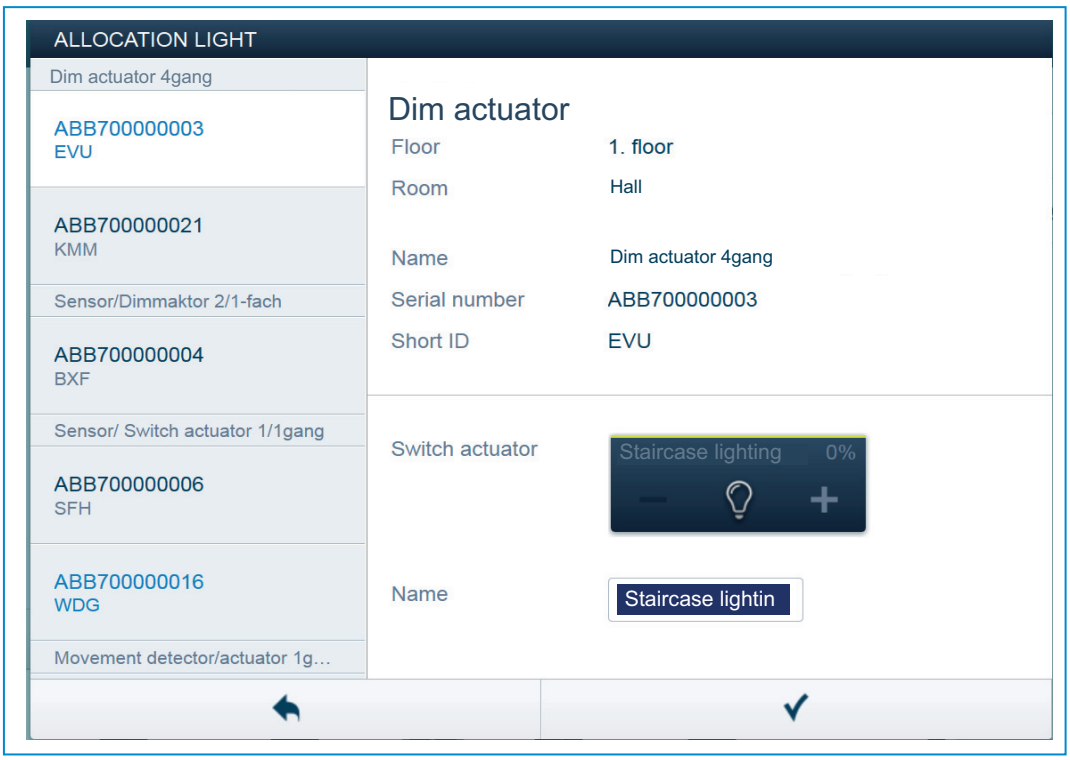


Fig. 11: Assigning a name

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

» 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 (dimming actuator unit) the default settings can be adjusted. This allows the channel selection to be influenced.

However, some of these settings (e.g. channel grouping/bundling) can only be made via the 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 special parameter settings can be made for each channel.

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

Device selection

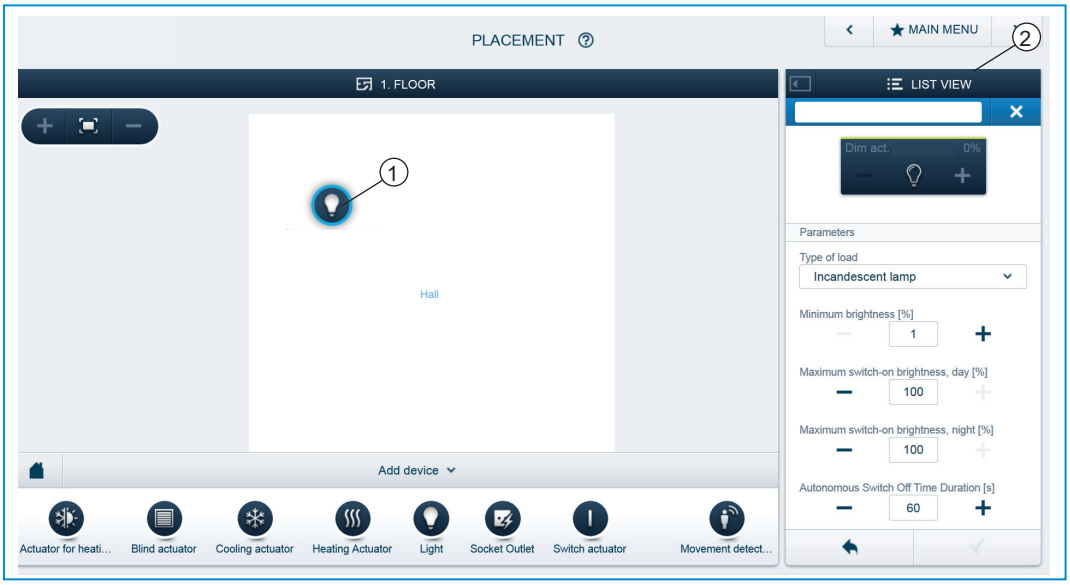


Fig. 12: Device selection

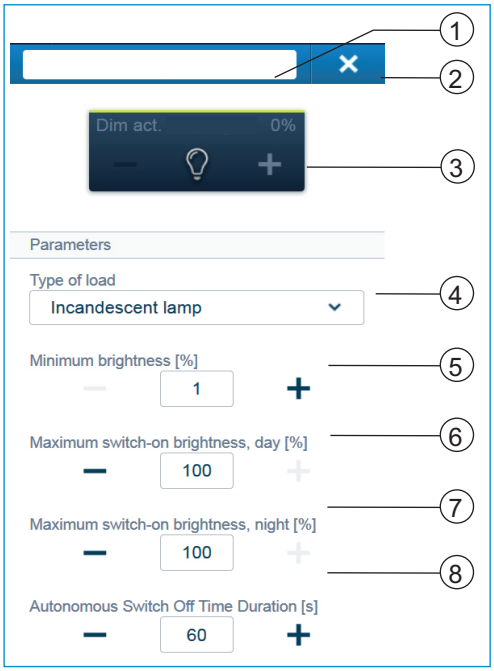
» Select the device icon [1] in the floor plan of the working area view.

- All setting options for the respective channel are displayed in the list view [2].

The following settings are available.

7.2.1 Settings for dimming actuator, MDRC, 4gang

Actuator settings



[1] Changing the name

[2] Deleting the channel via 'X'

[3] Switching the actuator via the button; dimming the actuator via buttons -/+

[4] Setting of the load connected to the actuator. Selection between:
- Automatic load detection
- Inductive load
- Dimmable LED/KLL
- Incandescent lamp

[5] Setting the minimum brightness in % via buttons -/+:

[6] Setting the maximum switch-on brightness during the day in % via buttons -/+

[7] Setting the maximum switch-on brightness during the night in % via buttons -/+:

[8] Setting the switch-off delay in seconds Buttons -/+ can be used to specify, for example, how long the light remains on after the actuator has deactivated the load.

7.2.2 Grouping/bundling of channels

Grouping/bundling of channels can be carried out via the device configuration of the Web-based user interface. This is only possible via the 'fitter' access.

Fig. 13: Grouping/bundling of channels

» Open the device configuration

» Select the desired dimming actuator in the list "Device type" [1].

» Click on channel selection [2] and select one of the groupings.

7.3 Linking

The dimming actuator units created via the allocation function can now be linked with a sensor. The dimmer can be programmed either as individual switch or with a timer or a staircase light function.

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

Connecting actuator and sensor

Fig. 14: Connecting actuator and sensor

» To connect an actuator with a sensor, first click on the desired sensor [1] which is to operate the actuator and then on the actuator [2].

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

- 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.

Connecting an actuator with an additional sensor

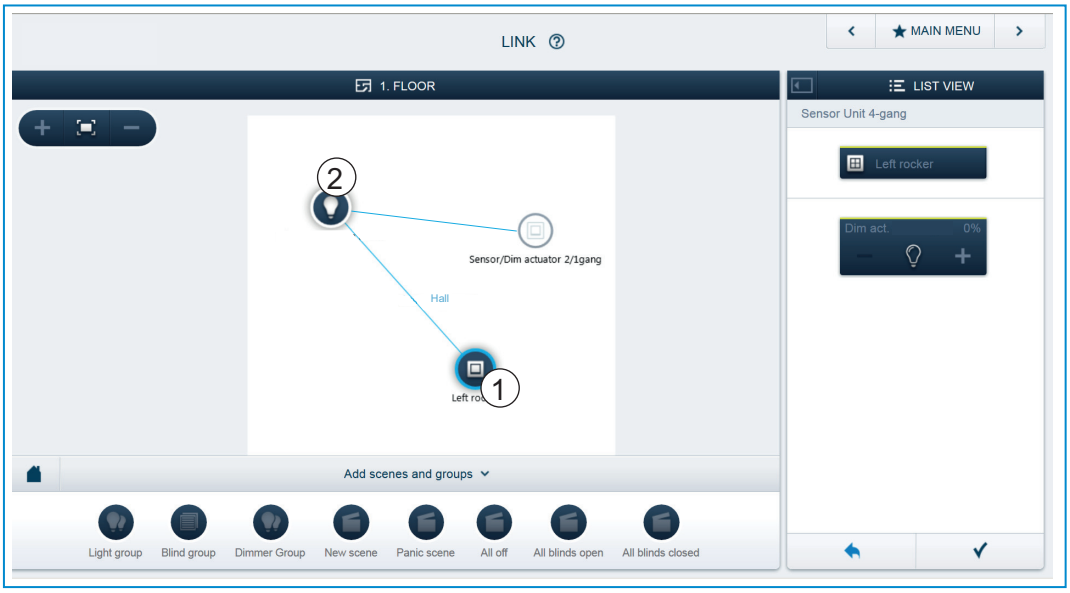


Fig. 15: Connecting actuator and sensor

» To connect the actuator with an additional sensor, first click on the second desired sensor [1] which is to operate the actuator and then on the actuator [2].

- An additional blue connecting line appears between the second sensor and the actuator.
- After the transmission has been completed the sensor can be operated directly locally.

8 Updating options

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

9 Operation

Manual local operation is not possible.

9.1 Status displays (channel status)

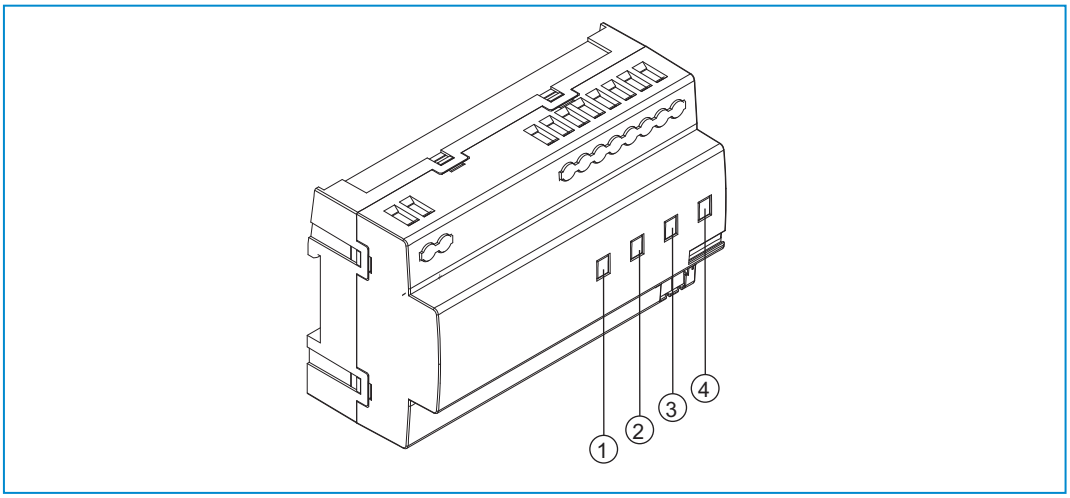


Fig. 16: Status displays

[1] LED for channel 1
[2] LED for channel 2
[3] LED for channel 3
[4] LED for channel 4

Signalling "Channel ON/OFF" is carried out via the green channel LED [1-4]. Each channel has one LED assigned to it.

» Channel OFF: the channel LED goes out.
» Channel ON: the channel LED lights up permanently.

10 Maintenance

The unit 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).

10.1 Cleaning

Dirty units 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.

A member of the ABB Group

Busch-Jaeger Elektro GmbH
PO Box
58505 Lüdenscheid

Freisenbergstraße 2
58513 Lüdenscheid

www.BUSCH-JAEGER.com
info.bje@de.abb.com

Central sales service:
Tel.: +49 2351 956-1600
Fax: +49 2351 956-1700

Note
We reserve the right to at all times make technical changes as well as changes to the contents of this document without prior notice.
The detailed specifications agreed upon apply for orders. ABB accepts no responsibility for possible errors or incompleteness in this document.

1473-1-8567 | 11.07.2014