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# Product manual

## Busch-free@home®

# DALI Gateway, REG

DG-M-1.16.11




BUSCH-JAEGER

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# 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 pass on this manual along with it.

Busch-Jaeger 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 Busch-Jaeger or visit our Internet site at:

www.BUSCH-JAEGER.de

# 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.

Busch-Jaeger 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 is a DALI Gateway, REG which establishes the connection between Busch-free@home® and a DALI bus.

The device is intended for the following:

- Operation according to the listed technical data
- Installation in dry interior rooms on a mounting rail
- 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 6 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
- The use in bathroom areas
- Outdoor use
- inserting of objects through device openings
- Use of available connection options contrary to technical data.

## 2.4 Target group / Qualifications of personnel

### 2.4.1 Operation

No special qualifications are needed to operate the device.

### 2.4.2 Installation, commissioning and maintenance

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 / 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.



**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 user 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.).



**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.



**Notes on the documentation**

Observe also the associated operating manual of the connected devices.

# 3 Information on protection of the environment

## 3.1 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).

# 4 Setup and function

## 4.1 Introduction

The DALI Gateway, REG forms the interface between the Busch-free@home® system and a DALI bus. The device converts the Busch-free@home® telegrams and transmits them to the DALI bus. A maximum of 16 DALI participants can be connected to the DALI Gateway, REG.

DALI (Digital Addressable Lighting Interface) has established itself as a neutral company standard in the lighting technology. The range of ballasts, transformers, dimmers and relays with DALI interface characterizes the modern lighting technology. DALI increasingly replaces the traditional 1-10 V technology and additionally offers many other functions such as flexibility, comfort, ambience, functionality and energy savings.

DALI-2 is the ongoing development of the DALI standard (DIN EN 62 386), which improves the compatibility between manufacturers and also guarantees a downward compatibility to DALI.

Supported are all DALI participants of type 0 (DALI Device Type 0, DT0).

The DALI-Gateway offers the following functions

- Switch-on / switch-off
- Dimming of brightness
- Setting of switch-on brightness



**Notice**
DALI ballasts that are not certified according to DALI-2, can be operated on the DALI Gateway, REG.



**Notice**
The DALI Gateway, REG can be operated and parameterized only with the connected auxiliary voltage.



**Notice**
The DALI Gateway, REG provides the DALI operating voltage.

## 4.2 Device overview

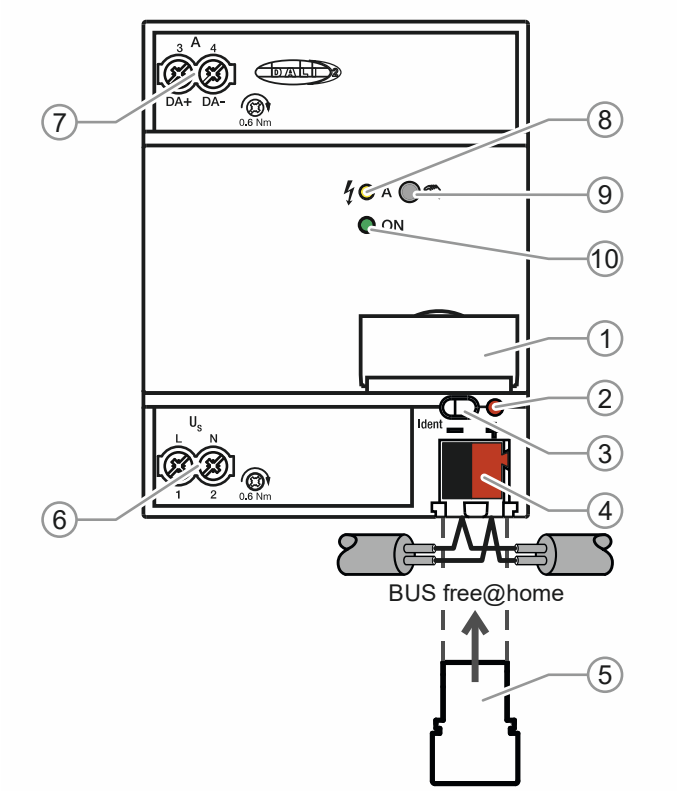



*Fig. 1: Overview of devices*

[1] Label holder
[2] Identification LED
[3] Device identification during commissioning
[4] Bus connection terminal
[5] Cover cap
[6] Operating voltage
[7] DALI output
[8] DALI status LED (yellow) [1)]
[9] DALI push-button [2)]
[10] Operating LED (green) [3)]

1) LED yellow
On: DALI error
Flashing fast (5 Hz): Initialization/address assignment
Status during manual operation (On/Off)

2) Push-button
Long operation (>2 sec): Activation/deactivation of manual operation
Brief operation: Switching all electronic ballasts on/off during manual operation (Broadcast)

3) LED green
On: 230 V and free@home connected
Flashes fast (5 Hz): Only free@home is connected
Flashes slowly (1 Hz): Manual operation

## 4.3 Functions

- Programming of the DALI Gateway, REG is only possible with the 230 V voltage applied.
- Wide–range voltage input 110 - 230 V AC ±10%
- Switching DALI participants on/off
- Dimming of brightness (linear dimming curve)

### Options for parameterization

- Parameter setting of minimum brightness
- Parameter setting of switch-on brightness during the day (in %)
- Parameter setting of maximum switch-on brightness during the night (in %)
- Switch-off delay in seconds
- Brightness during bus voltage failure (in %) ("System Failure Level“)
- Brightness during return of electronic ballast voltage (in %) ("System Failure Level“)

# 5 Technical data

## 5.1 Technical data

| General technical data | | |
|---|---|---|
| **Power supply** | Gateway operating voltage | 100 - 240 V AC<br>110 - 240 V DC |
| | Voltage range | 85 - 265 V AC, 50/60 Hz<br>110 - 240 V DC |
| | Total power input from the mains network *) | 6 W max. |
| | Total power consumption from the mains network *) | Max. 25 mA |
| | Total power loss of device *) | 2 W max. |
| | Power consumption of free@home | Max. 10 mA |
| | Power consumption via free@home | max. 210 mW |
| | *) at 230 V AC and max. load | |
| **DALI outputs (channels)** | Number of outputs | 1 |
| | Voltage-proof, short-circuit-proof | 230 V AC |
| | Number of DALI operating equipment | Maximum of 16 per output |
| | Distance of gateway to the last DALI device for cable cross section | |
| | ▪ 0.5 mm²<br>▪ 0.75 mm²<br>▪ 1.0 mm²<br>▪ 1.5 mm² | 100 m[1)]<br>150 m[1)]<br>200 m[1)]<br>300 m[1)] |
| **Connectors** | free@home | free@home connecting terminal,<br>0.8 mm Ø, single-wire |
| | DALI outputs and mains voltage | Screw-type terminal, combi-head<br>0.5 - 4 mm² fine-wire<br>0.5 - 4 mm², single-wire |
| | Tightening torque | Max. 0.6 Nm |
| **Protection rating** | IP 20 | According to DIN EN 60 529 |
| **Protection class** | II | According to DIN EN 61 140 |
| **Insulation category** | Overvoltage category | III according to DIN EN 60 664-1 |
| | Pollution degree | 2 according to DIN EN 60 664-1 |
| **Safety Extra Low Voltage** | SELV 24 V DC | |

| | | |
|---|---|---|
| **DALI voltage** | Typical 16 V DC<br>(12 - 20.5 V DC) | According to DIN EN 60 929 and IEC 62 386 |
| | No-load voltage | 18 VDC |
| | Smallest supply current at 12 V DC | 160 mA |
| | Largest supply current | 250 mA |
| **Temperature range** | Operation | -5°C to +45°C |
| | Storage | -25°C to +55°C |
| | Transport | -25°C to +70°C |
| **Environmental factors** | Humidity | Maximum 95%, dew is to be excluded |
| | Air pressure | Atmosphere up to 2,000 m |
| **Design** | Rail mounting device (MDRC) | Modular installation device, pro *M* |
| | Dimensions | 90 x 70 x 63.5 mm (H x W x D) |
| | Installation width | 4 modules à 17.5 mm |
| | Installation depth | 68 mm |
| **Mounting** | On 35 mm mounting rail | According to DIN EN 60 715 |
| **Built-in position** | Any | |
| **Weight** | | 0.13 kg |
| **Housing, colour** | Plastic material, grey | Halogen free<br>Flammability V-0 acc. to UL94 |
| **Licence** | DIN EN 50 491-5-2<br>DALI-2 according to IEC 62 386 | Certificate |
| **CE marking** | According to EMC and low-voltage guidelines | |

1) The length refers to the entire installed DALI control line. The maximum values are rounded and referto the resistance value. EMC influences are not taken into consideration.That is why the values should be viewed as absolute maximum values.

## 5.2 Dimensional drawings

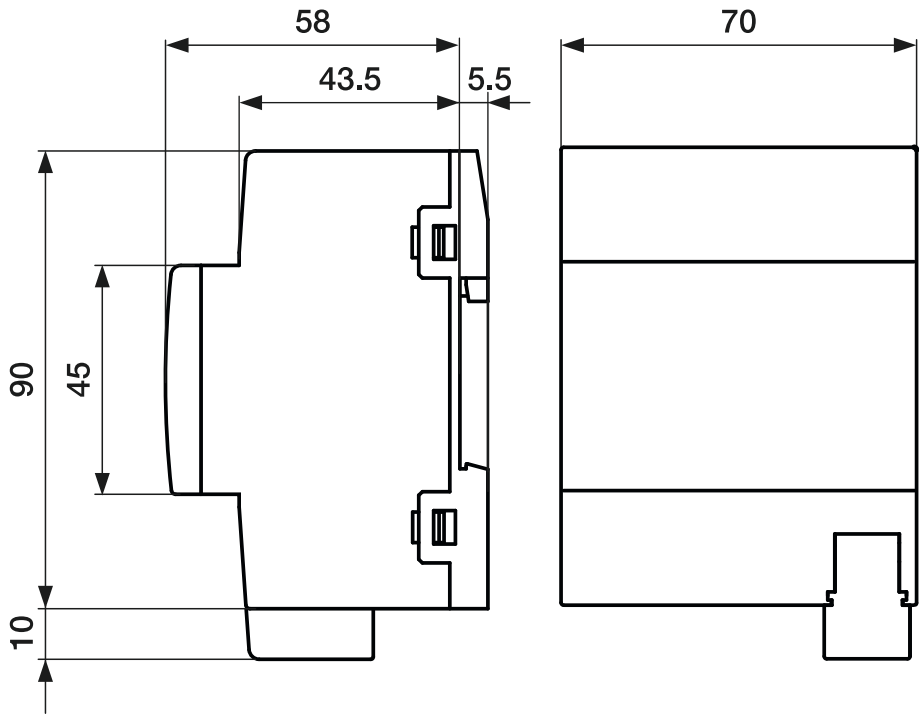



*Fig. 2: Dimensional drawing (all specifications are in mm)*

# 6 Connection, installation / mounting

## 6.1 Requirements for the electrician



**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 user 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.).

## 6.2 Mounting / dismantling

The modular DIN rail component must only be installed on mounting rails according to DIN EN 50022 / DIN 60715 TH 35 (including industrial version).

### Installation

To install the device, perform the following steps:

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

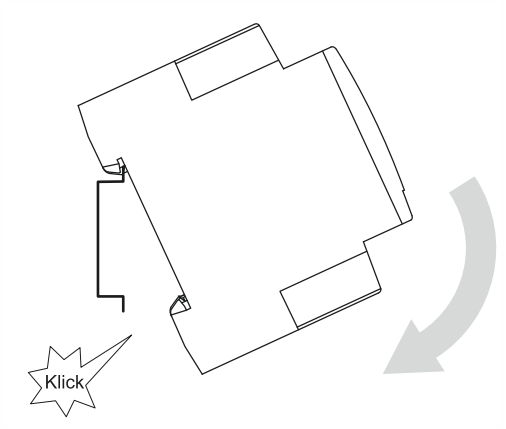



*Fig. 3: Installation on mounting rails*

### Dismantling

To dismantle the device, perform the following steps:

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

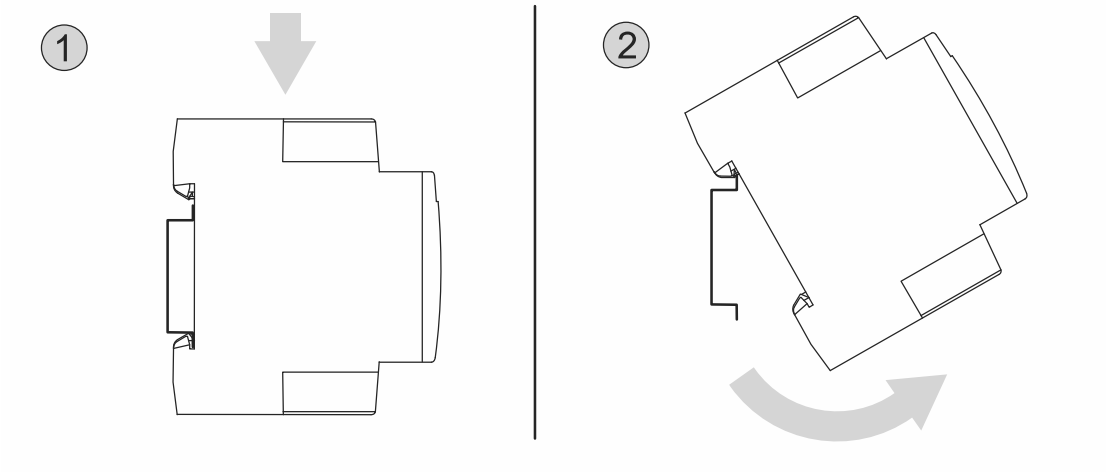



*Fig. 4: Removal from the mounting rails*

## 6.3 Electrical connection

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 is made with the enclosed bus connection terminal. An LS 16 is to be used as circuit breaker.

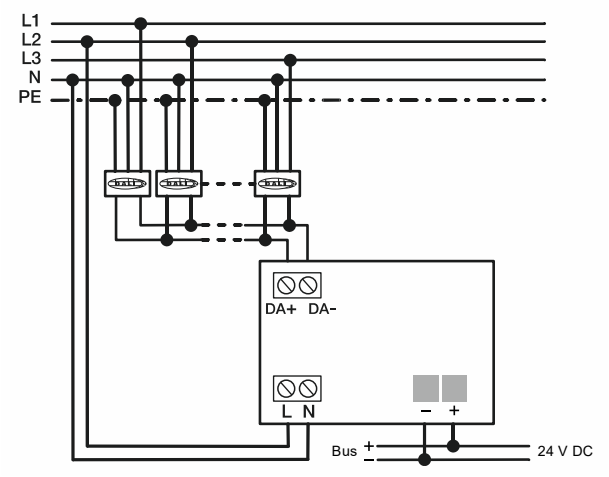



*Fig. 5: Example for connection*

# 7 Commissioning

## 7.1 Requirements for commissioning

A System Access Point is required to make the device operational. The device is ready when the bus voltage is applied. However, programming of the device is possible only with an applied 230 V supply voltage.

Up to 16 participants with a DALI interface (e.g. ballasts) can be connected to the DALI output.

The following points must be observed for commissioning.

- All DALI participants should not yet have received a DALI address before commissioning. This can happen when the ballast has been installed beforehand in a different DALI installation. This can lead to conflicts in addressing. If it is not known whether all participants are not addressed, all participants should be reset. For this the menu has two options available.
  - Reset only the DALI Gateway, REG.
  - Reset DALI Gateway, REG and DALI participants.
- During commissioning all participants must be connected to the DALI Gateway, REG and supplied with voltage (no stepwise commissioning). Otherwise there is the risk that addresses are assigned twice.
- When replacing a defective ballast, the new ballast normally receives the address of the defective ballast automatically. However, if several ballasts are replaced simultaneously, the devices could then be allocated to the wrong room. In this case the participants must be re-allocated via the interface of the System Access Point.
- The automatic assigning of addresses is always active.

## 7.2 Initial commissioning

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

Devices which are physically connected to the Busch-free@home® bus, log themselves automatically into the System Access Point. They transmit information about their type and supported functions (see chapter 4.3 “Functions“ on page 12).

During initial commissioning all devices are given a generic name (e.g. DALI Gateway, REG, etc.). The user can change this name to a name practical for the system (Example: DALI Gateway, REG living room").

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

Commissioning of the DALI Gateway, REG 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.

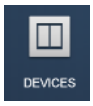


**Notice**

General information about commissioning and parameterization is available in the system manual and in the technical reference manual of the "System Access Point" at .

## 7.3 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 "Devices" allocation function of the Web-based user interface of the System Access Point.

### 7.3.1 Add device

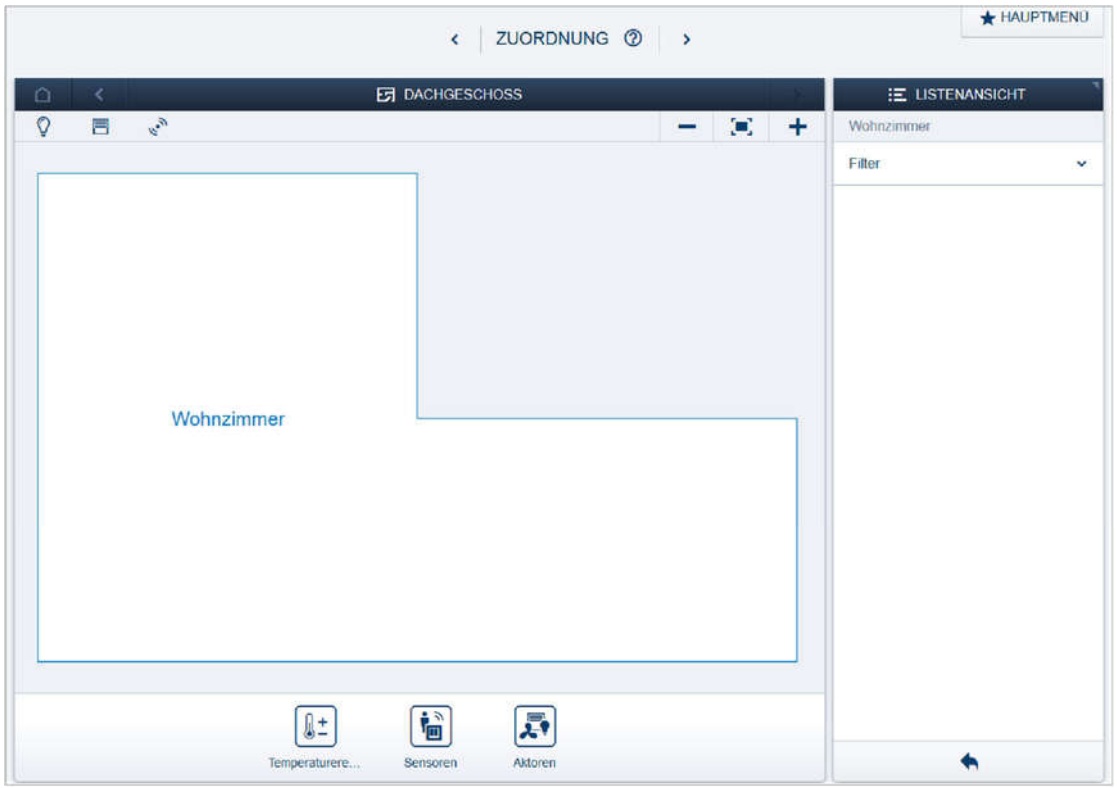



*Fig. 6: Selecting the device group*

1. Select the desired device group in the "Add devices" bar.

**Notice**
Ensure that the correct filter is set, so that the correct device group is displayed.

**Notice**
The DALI Gateway, REG does not appear in the view; instead, the up to 16 connected DALI participants (ballasts) are displayed. These can then be added to the floor plan.

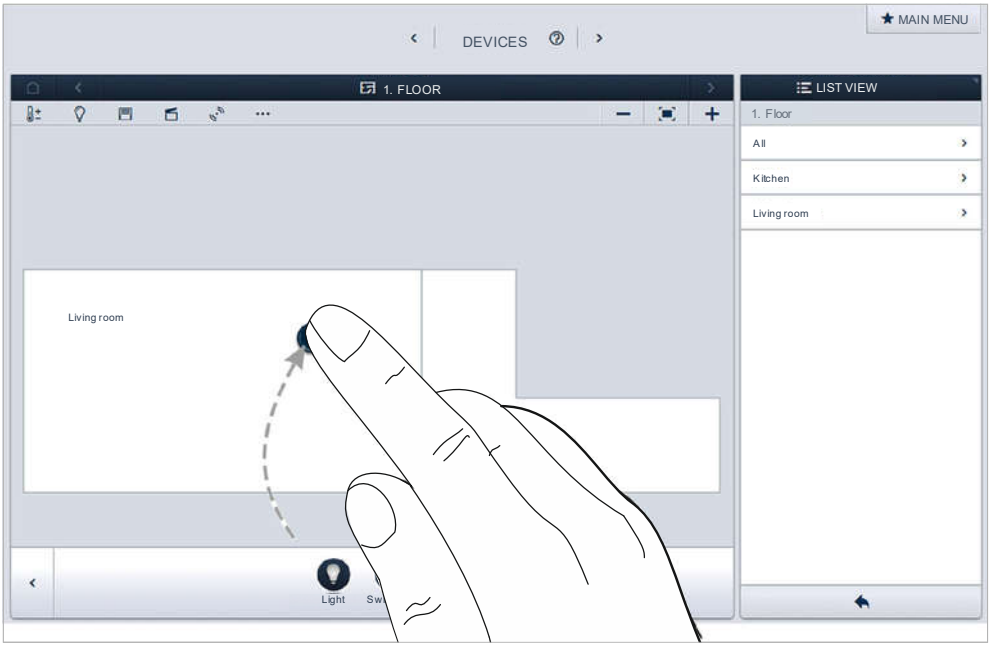



*Fig. 7: Dragging the application from the add bar*

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

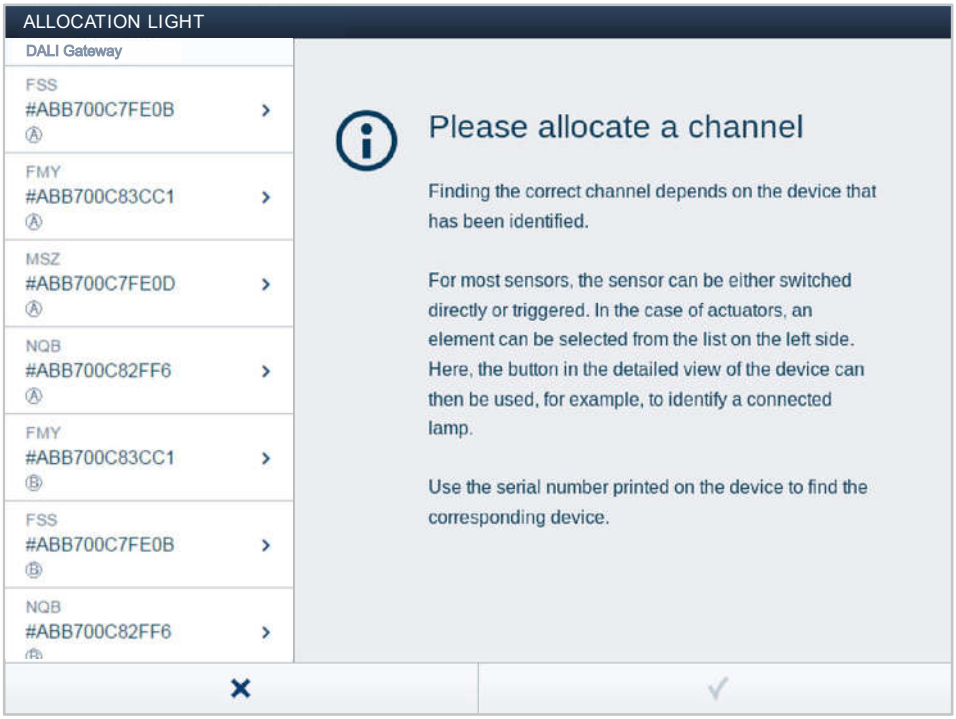



*Fig. 8: Allocation of devices*

- If several devices suitable for the selected application are integrated, a dialogue field with the listed devices is displayed.
- The desired channel can now be identified in three ways.

### Identification via serial number

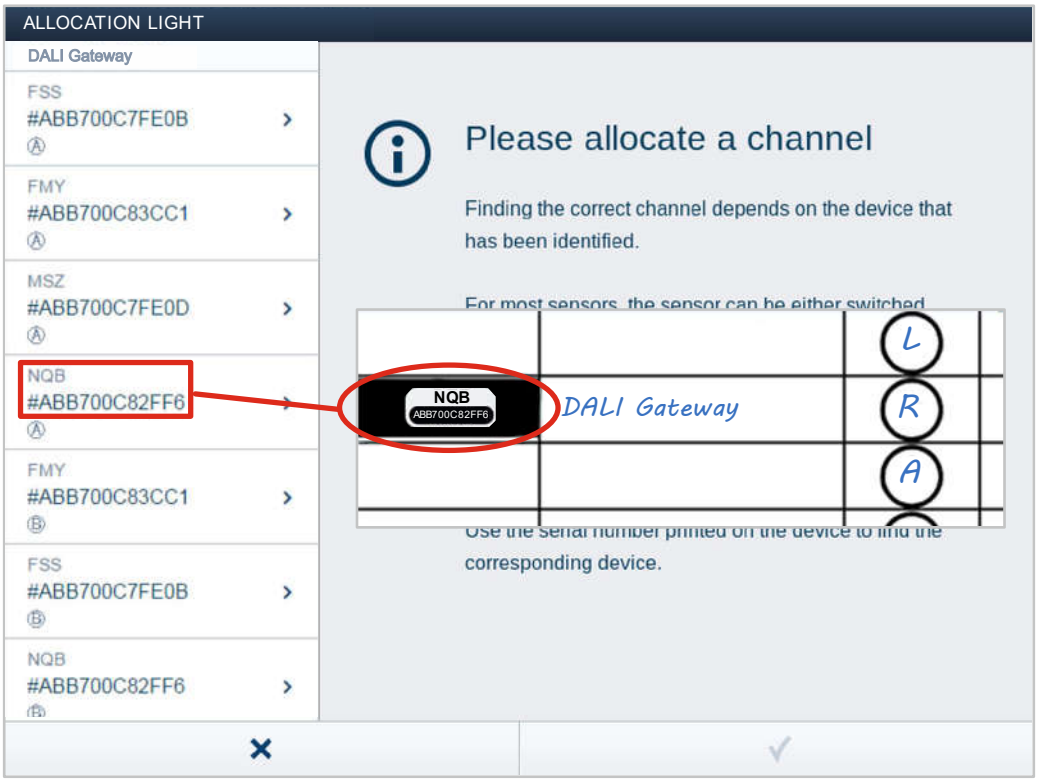



*Fig. 9: Identification via serial number*

1. Compare the serial number and the short ID of the identification label printed on the device with the serial 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 (only suitable for actuators)

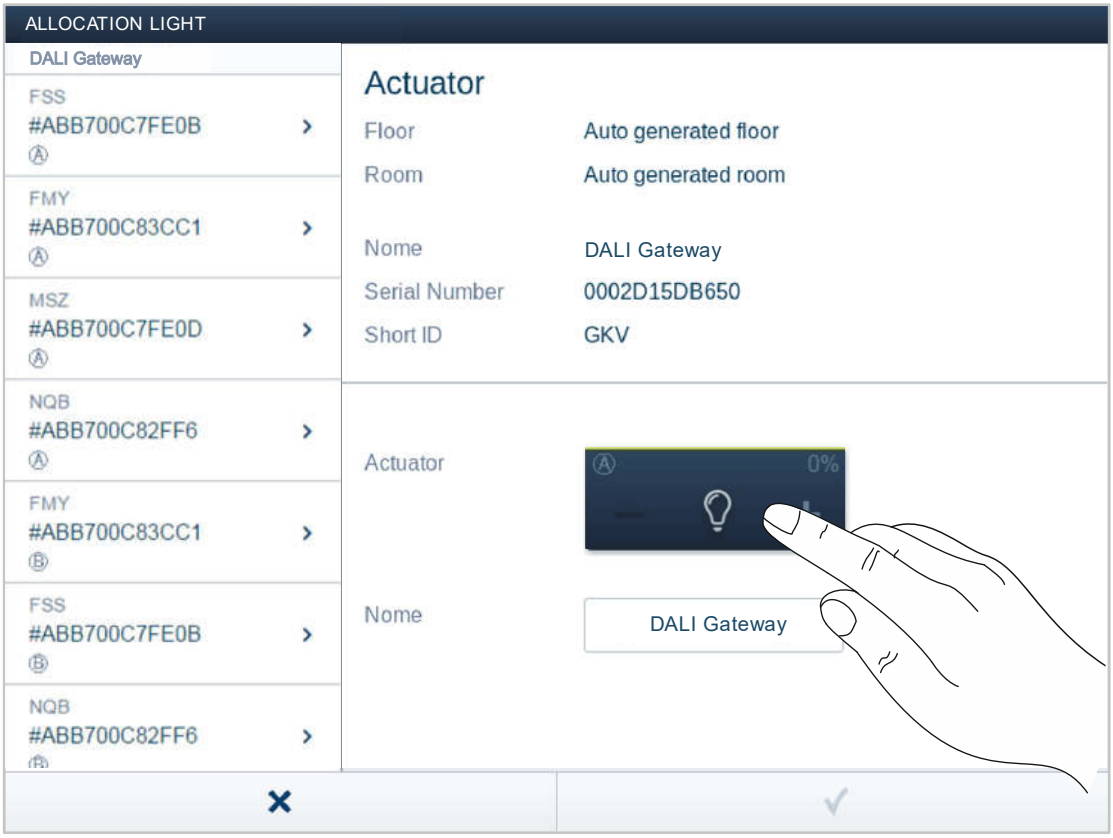



*Fig. 10: Identification via switching*

1. Select a device and a channel from the list.
2. Press the button in the detailed view of the device.
   – The connected loads are switched.
3. Continue until you have found the device you are looking for.

### Identification via local operation




*Fig. 11: Identification via local operation*

1. Go to the device that is to be linked with the selected application.
   – Press the "Ident" button on the device.
2. The first available channel is selected automatically.

### Specifying a name




*Fig. 12: Specifying a name*

1. Enter a name that is easy to understand and under which the application is to be displayed later, e.g. „DALI Gateway, REG living room channel".
   – The name can be changed in the list view of the device later at any time.
2. Press the tick at the bottom right to take over the entry.

## 7.4 Setting options per device (DALI Gateway, REG)

A device setting can be carried out via the device configuration of the Web-based user interface. This is only possible via the '"Fitter" access.

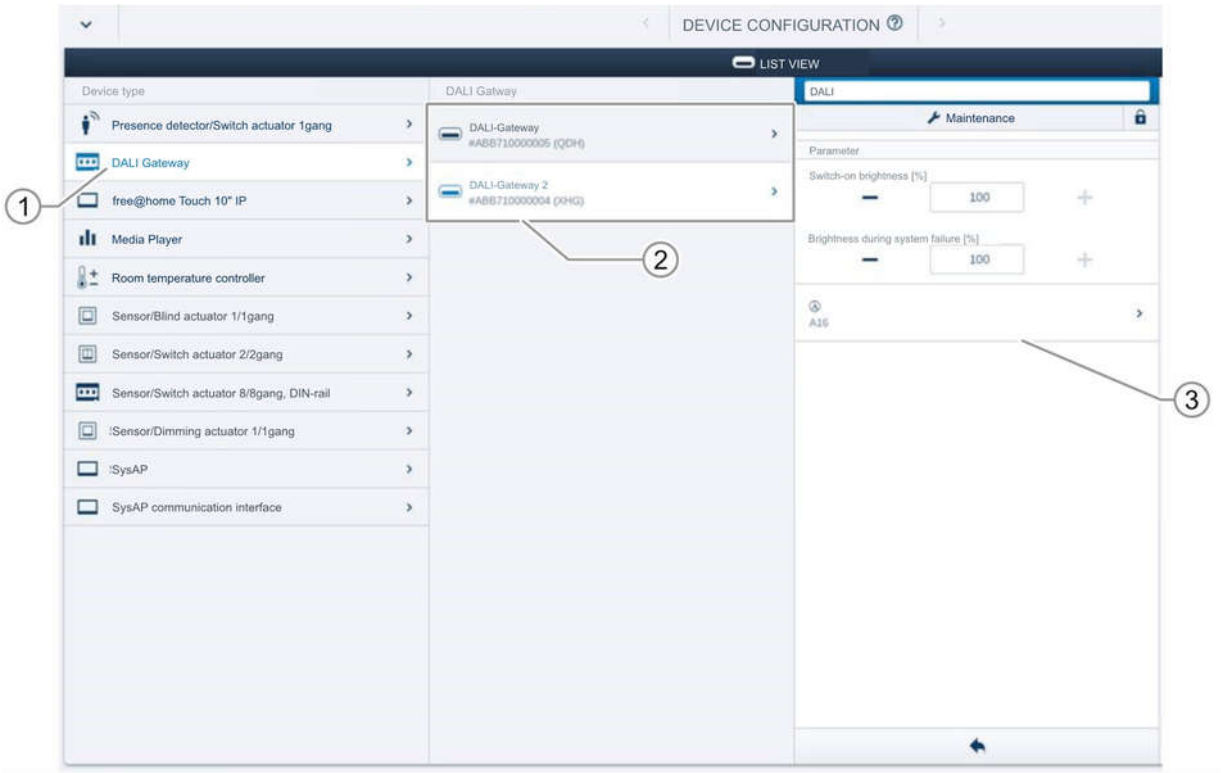



*Fig. 13: Device settings*

1. Open the "Device configuration".
2. Select the device type "DALI Gateway, REG" in the "Device type" list [1]. For several DALI Gateway, REG the corresponding device can then be selected from the list [2].
3. All setting options for the respective device are displayed in the list view [3]. The following settings are available:

   [1] Changing the name

   [2] Maintenance settings:
   This can be used to reset the connected DALI participants. Then a restart can be carried out and the DALI participants can be created anew. This is necessary, for example, when DALI addresses have been assigned twice.

   [3] Setting of the brightness during bus voltage failure ("System Failure Level“) in % via the -/+ buttons.

   [4] Setting of the brightness during return of ballast voltage (Power-On Level) in % via the -/+ buttons.

   [5] Selection of channels (connected DALI participants):
   Each connected DALI participant is allocated to a CHANNEL (DALI addressing) during the initialisation. After the selection, parameter settings can be made for each channel (DALI participants).

## 7.5 Setting options per channel

**Notice**
The DALI participants are connected directly to the DALI output. During commissioning, the gateway checks the system and automatically addresses the newly found DALI participants without DALI address. Each channel represents a DALI participant.

**Notice**
Each DALI participant can also be positioned in the floor plan via the Web-based user interface of the System Access Point. This makes a spatial allocation possible and the parameter settings can be made via the floor plan.

General settings and special parameter settings must be made for each channel (DALI participants).

DEVICES

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

### Select device (DALI participants)

**Notice**
The DALI participants must first be positioned in the floor plan.

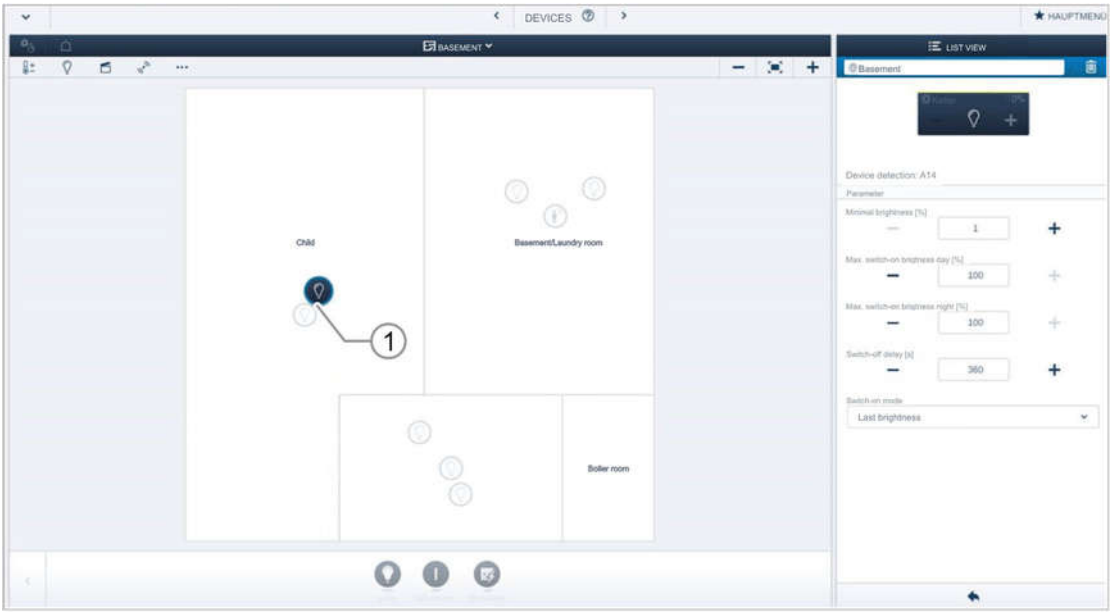



*Fig. 14: Select device*

1. Select the device icon [1] in the floor plan of the working area view.
   – All setting options for the respective channel (DALI participant) are displayed in the list view [2].

The following settings are available.

### 7.5.1 Actuator settings

#### Actuator settings

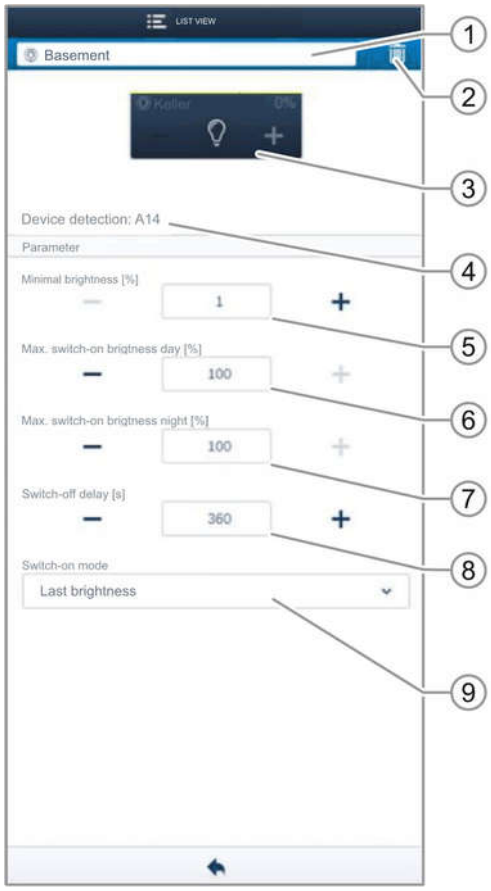



*Fig. 15: Actuator settings*

[1] Changing the name

[2] Deleting the channel

[3] Switching of the actuator via the button.
Dimming the actuator via the −/+ buttons

[4] Display of device identification (channel name or DALI addressing)

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

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

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

[8] Setting the switch-off delay in seconds

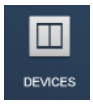
– The -/+ buttons can be used to specify, for example, how long the light remains switched on after the actuator has deactivated the load.

[9] Setting the activation mode

– The parameter specifies whether the lamp switches on with the previously set brightness or always with maximum brightness.

## 7.6 Links

The DALI participants created via the allocation function can now be linked with sensors.




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

### 7.6.1 Linking actuator and sensor

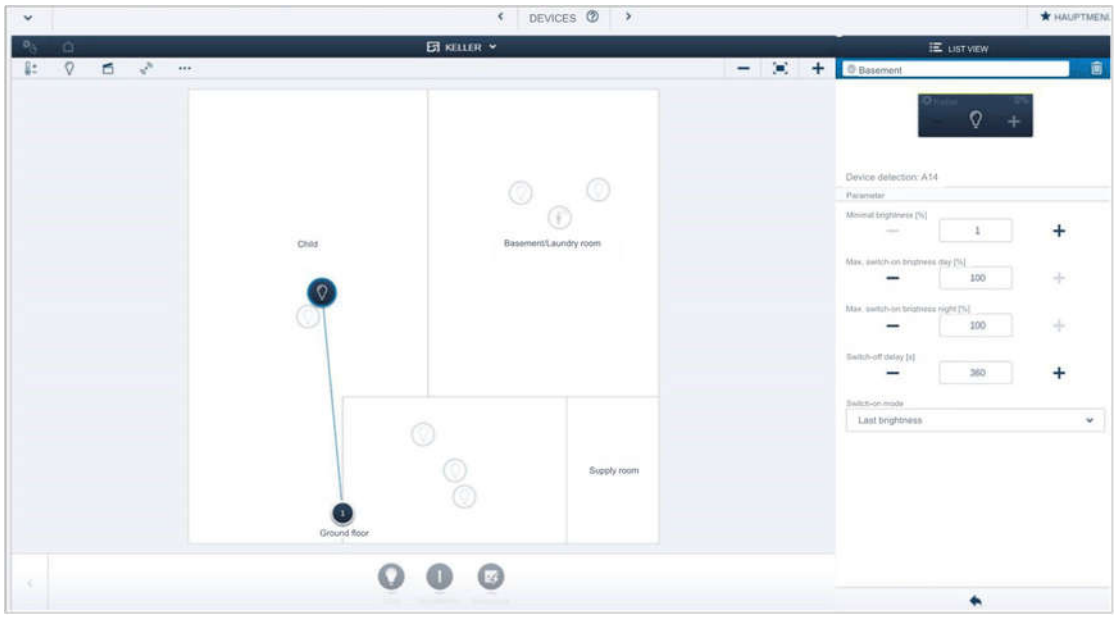



*Fig. 16: Linking actuator and sensor*

1. 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].
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.

### 7.6.2 Linking an actuator with an additional sensor

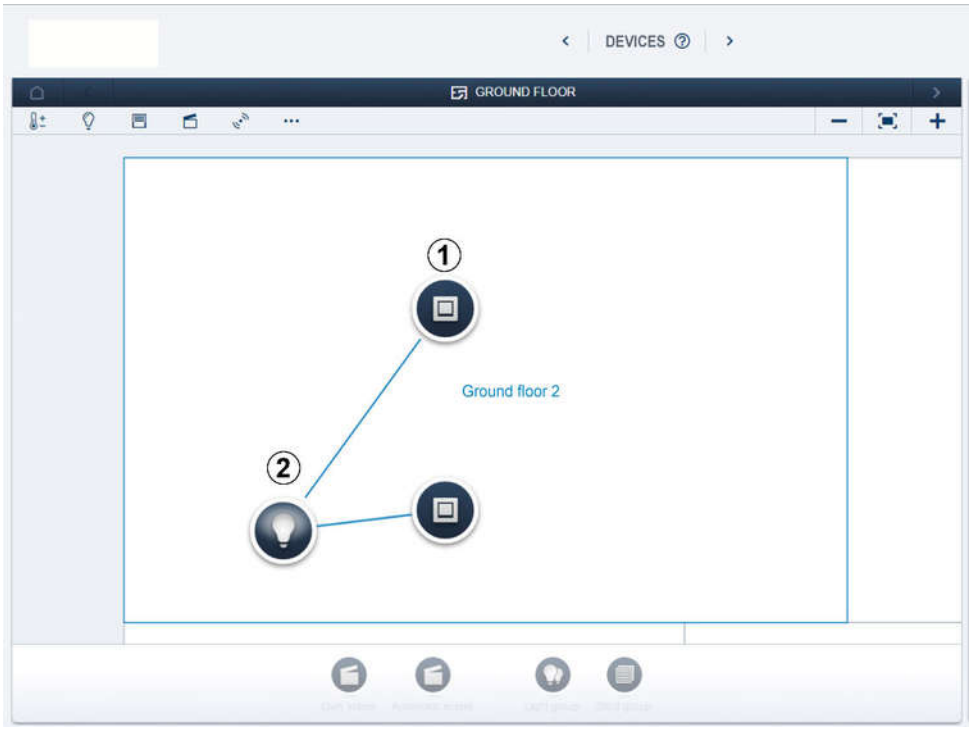



*Fig. 17: Linking an actuator with an additional sensor*

1. 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 Update

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

# 9 Operation

## 9.1 Control elements

### Local operation on the device

- The manual operation on the device is activated with a press of the button longer than 2 seconds.
- The manual operation is exited automatically after 5 minutes. This time is reset with every press of the button during manual operation.
- Telegrams that are received via the bus are not carried out during manual operation. After completion, the last status received via the bus is set.

## 9.2 Status indication




*Fig. 18: Status indication*

| Status indication [1] | Status |
|---|---|
| Green | After activation of the mains voltage and the free@home bus:<br>▪ The LED lights up permanently green.<br>– Flashes fast (5 Hz), if only the free@home bus is connected.<br>– Flashes slowly (1 Hz) during manual operation. |
| Off | The device has no free@home connection. |
| Yellow | ▪ Lights up permanently during an error on the DALI bus.<br>▪ Flashes fast (5 Hz) during initialization and address assignment.<br>▪ Displays the status (On/Off) during manual operation. |

*Table 1: Status indication*

# 10 Maintenance

## 10.1 Maintenance-free device

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).

## 10.2 Cleaning

Clean dirty devices with a soft dry cloth.

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

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