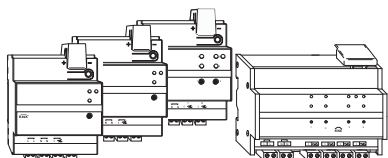


Universal dimming actuator REG-K

Operating instructions



Universal dimming actuator REG-K/230/500 W

Art. no. MTN649350



Universal dimming actuator REG-K/230/1000 W

Art. no. MTN649310



Universal dimming actuator REG-K/2x230/300 W

Art. no. MTN649330



Universal dimming actuator REG-K/4x230/150 W

Art. no. MTN649315



For your safety

DANGER Risk of fatal injury from electrical current.

All work on the device should only be carried out by trained and skilled electricians. Observe the country-specific regulations as well as the valid KNX guidelines.

CAUTION Damage to the device.

- Only operate the device according to the specifications stated in the Technical data.
- All devices that are installed next to the actuator must be equipped with at least basic insulation.

CAUTION Damage to the device.

Do not connect any combination of capacitive and inductive loads to one channel.

CAUTION Danger of device malfunctions.

Each dimming channel requires a minimum load for operation (see technical data). If this is not reached, malfunctions may arise.

i In the case of a mixed load (combination of ohmic and inductive, or ohmic and capacitive loads) on one channel, the ohmic load may not exceed 30 % of the total connected load of this channel. Otherwise, the wrong load might be detected. Different loads may be connected to different channels.

i When using inductive transformers, the load connected to the secondary circuit must be at least half the size of the nominal load of the transformer. If the load is too small, the channel may shut down automatically. Only transformers that are certified for use with electronic switches may be connected.

i Socket-outlets may not be dimmed. The risk of overloading and the risk of unsuitable appliances being connected is too high.

Universal dimming actuator introduction

The universal dimming actuator REG-K (referred to as **actuator** below) allows you to connect the following loads to each channel and then switch and dim them (depending on the type of actuator you have, you will have one or more channels available):

- ohmic loads (e.g. 230 V incandescent lamps)
- inductive loads (e.g. inductive transformers with low-voltage halogen lamps)
- capacitive loads (e.g. electronic transformers with low-voltage halogen lamps)
- a combination of ohmic and inductive loads
- a combination of ohmic and capacitive loads

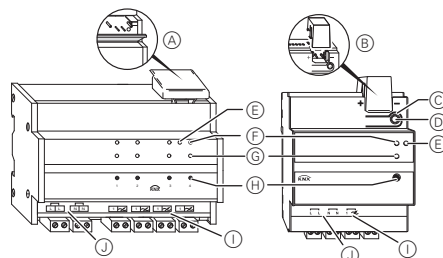
The universal dimming actuator automatically recognises the connected loads.

You can connect up to ten extension TELE inserts (art. no. MTN573998). You can also connect any number of mechanical extensions (conventional push-buttons).

If there is no bus voltage, you can switch and dim the connected luminaires with the channel keys or use the push-buttons connected to the extension inputs. Dimming will be continuous (up or down) for as long as the key is pressed. The settings made via the ETS are not effective.

The actuator has a bus coupler. It is installed on a DIN rail acc. to EN 60715, with the bus connection made via a bus connecting terminal. A data rail is not required.

Connections, displays and operating elements



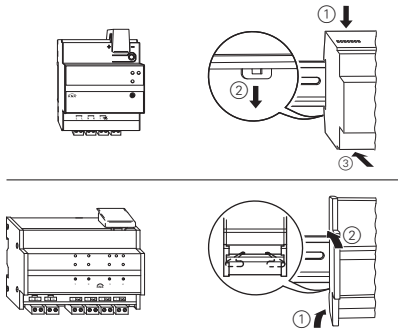
- (A) Under the cable cover: Bus connecting terminal, programming button and programming LED (red)
- (B) Bus connecting terminal
- (C) Programming button
- (D) Programming LED (red)
- (E) Operating LED "RUN" (green)
- (F) Channel status LED (yellow) for the corresponding channel
- (G) Channel error LED (red) for the corresponding channel
- (H) Channel keys for manually controlling the channel in question
- (I) Channel terminals for loads and extension unit
- (J) Supply voltage

Meaning of the displays

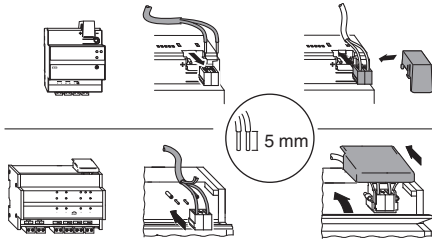
| Operational LED (green) | Channel status LED (yellow) | Channel error LED (red) | |
|-------------------------|-----------------------------|-------------------------|--|
| On | - | - | Universal dimming actuator ready for operation (mains voltage and bus voltage available) and channel switched off |
| On | On | - | Universal dimming actuator ready for operation (mains voltage and bus voltage available), channel switched on (switching object = "1") or load detection |
| On | - | On | Overload or short circuit. The channel has been switched off. Mains and bus voltage available |
| On | On | On | No load at output (idle). The channel has been switched off. Mains and bus voltage available |
| - | - | - | No bus voltage and channel switched off, or no mains voltage |
| - | On | - | No bus voltage and channel switched on |
| - | - | On | Overload or short circuit and no bus voltage. The channel has been switched off. |
| - | On | On | No load at output (idle) and no bus voltage. The channel has been switched off. |
| Flashes | On/Off | All on | Excess temperature. All channels that are switched on are dimmed to minimum power/minimum brightness. Channels which are currently switched off cannot be switched on. See also the section "How to recognise potential faults". |
| On | - | - | Universal dimming actuator ready for operation (mains voltage and bus voltage available) and channel switched off |

Mounting the actuator

- ① Set the actuator onto the DIN rail.



- ② Connect KNX.



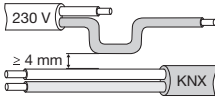
- ③ Connect the bus voltage

DANGER Risk of fatal injury from electrical current.

The outputs may carry an electrical voltage even when the dimmer is switched off. Always disconnect the fuse in the incoming circuit from the supply before working on connected loads.

WARNING Risk of fatal injury from electrical current. The device could become damaged.

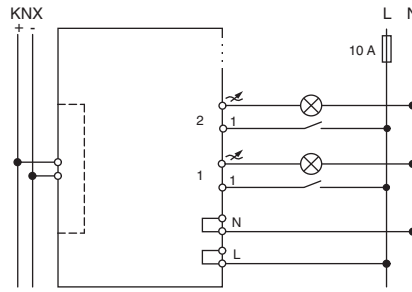
Safety clearance must be guaranteed in accordance with IEC 60664-1. There must be at least 4 mm between the individual cores of the 230 V supply cable and the KNX line.



WARNING The installation site must provide sufficient cooling and unimpeded air circulation through the cooling slots.

CAUTION The extension inputs must be connected to the same phase as the power supply of the dimming actuator.

i The two L and N connections are each bridged internally. When several devices are connected in series, bridges must also be inserted in the connecting terminals so that when the terminals are removed from one device, the next devices in the series are not damaged by power supply surges.



- ④ Connect the load and extension unit.
⑤ Connect the load voltage.

Putting the actuator into operation

- ① Press the programming button.
The programming LED lights up.
② Load the physical address and application into the device from the ETS.
The programming LED goes out.
The operating LED lights up: The application was loaded successfully, the device is ready for operation.

Operating the actuator

Operate the dimmer via one of the following:

- KNX
- mechanical extension units (conventional push-button) and/or electronic extension units
- Channel buttons on the actuator

If bus voltage is available, operation via the extension units and channel keys depends on the parameters of the application (see the separate application description).

If there is no bus voltage, you can do the following with the extension units and channel keys:

- Switch on/off: press the button briefly
- Dim brighter/darker: press the button and hold it down
- Activate/deactivate memory function (switch on at last brightness value): press the button briefly 10 times

Load detection

The first time a channel is switched after the mains voltage is switched on, after a load is connected or after a short circuit or overload at the output has been rectified, load detection will be carried out automatically (to determine whether an inductive, capacitive or ohmic load is connected). When this happens, the channel switches on for approx. 5 seconds at the maximum brightness value, is then extinguished briefly, and then dims up to the maximum brightness or the parameterised brightness.

What should I do if there is a problem?

The brightness of the connected lamps is reduced to a minimum (the lamps might then switch off automatically).

If the temperature in the actuator is too high, all the channels which are switched on will be dimmed to minimum power/brightness. You can now only switch the channels off - you can no longer switch them on, or dim them.

If the temperature decreases again within approx. 15 minutes, the previous values will be re-established. If the temperature increases further, the channels will be switched off automatically.

You can then only switch the channels on again when the temperature has decreased significantly. Any KNX commands received in the intervening period will be lost.

Afterwards, you can use the actuator as normal again.

i Excessive temperature in the universal dimming actuator is normally caused by overloading the outputs, or insufficient heat dissipation from the universal dimming actuator. When several dimming actuators are installed next to one another, they might cause each other to heat up.

! Make sure that an electrician detects and remedies the cause of the increased temperature before putting the device back into operation.

The connected lamps switch off automatically and can no longer be switched or dimmed.

In the case of a short circuit, an overload or open circuit, the corresponding channel switches off and the channel error display lights up.

When using inductive transformers, the load connected to the secondary circuit must be at least half the size of the nominal load of the transformer. If the load is too small, the channel may shut down automatically.

Have an electrician rectify the cause. The first time the channel is switched after the fault is rectified, load detection will be carried out automatically.

Afterwards, you can use the actuator as normal again.

All connected lamps switch off automatically and can no longer be switched or dimmed.

The mains voltage has failed. Once the mains voltage is switched on again, the channels remain switched off. The first time the channel is switched after the mains voltage is switched on, load detection will be carried out automatically.

If there is no bus voltage, the lamp will not be switched to its full brightness if it is switched on via the extension unit or the channel key.

The memory function is switched on. The lamp is switched on at the previous brightness value. To toggle (memory function on/off), press the key briefly ten times.

Technical data

Supply from KNX: DC 24 V, approx. 5 mA
 Insulation voltage: AC 4 kV bus/mains voltage
 Nominal voltage: AC 220 - 230 V, 50/60 Hz
 Fuse: The actuator must be fused using a 10 A automatic circuit breaker.

Minimum nominal power per channel:

ohmic loads > 30 W
 inductive loads > 50 VA
 capacitive loads > 50 VA

Maximum nominal power (ohmic loads/ inductive or capacitive loads):

MTN649310: 1000 W/VA
 MTN649350: 500 W/VA
 MTN649330:
 2 channels Channel 1: 300 W/VA
 Channel 2: 300 W/VA

1 channel Channel 1: 500 W/VA
 Channel 2: -*

MTN649315:
 4 channels Channel 1: 150 W/VA
 Channel 2: 150 W/VA
 Channel 3: 150 W/VA
 Channel 4: 150 W/VA

3 channels Channel 1: 300 W/VA
 Channel 2: -*
 Channel 3: 150 W/VA
 Channel 4: 150 W/VA
 Channel 1: 150 W/VA
 Channel 2: 150 W/VA
 Channel 3: -*
 Channel 4: 300 W/VA

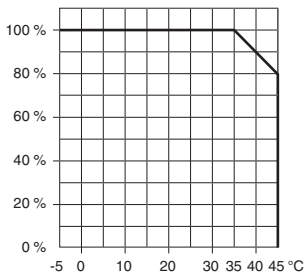
2 channels Channel 1: 300 W/VA
 Channel 2: -*
 Channel 3: -*
 Channel 4: 300 W/VA

1 channel Channel 1: 300 W/VA
 Channel 2: -*
 Channel 3: -*
 Channel 4: -*
 Channel 1: -*
 Channel 2: 300 W/VA
 Channel 3: -*
 Channel 4: -*
 Channel 1: -*
 Channel 2: -*
 Channel 3: 300 W/VA
 Channel 4: -*
 Channel 1: -*
 Channel 2: -*
 Channel 3: -*
 Channel 4: 300 W/VA

* No loads may be connected.

The maximum power values specified presume a mains frequency of 50 Hz and an ambient temperature up to approx. 35°C. When operating with a mains frequency of 60 Hz, the maximum power values are reduced by approx. 15%.

The changes in power relative to the ambient temperature can be seen in the diagram which follows.



Ambient temperature

Operation: -5 °C to +45 °C
 Storage: -25 °C to +55 °C
 Transport: -25 °C to +70 °C
 Max. humidity: 93 % relative humidity, no moisture condensation
 Environment: The device is designed for use at a height up to 2000 m above sea level.
 Type of protection: IP 20
 Connections
 Inputs, outputs: Screw terminals
 Single-core: 1.5 mm² to 2.5 mm²
 finely stranded (with core end sleeve): 1.5 mm² to 2.5 mm²
 KNX: two 1 mm pins for bus connecting terminal

Maximum cable length between extension unit input and extension unit:
 mechanical extension units: 20 m
 electronic extension units: 20 m (max. 10 items with max. total cable length 20 m)

Nominal voltage
 Extension units: AC 220 - 230 V, 50/60 Hz (identical phase to mains connection)
 Protective functions: Electronic load detection, short-circuit, overload and idling detection, excess temperature detection (dimming actuator temperature)
 Guidelines: 73/23/EEC Low-Voltage Directive, 85/336/EEC EMC Directive

Device width:
 MTN649350: 4 modules = approx. 72 mm
 MTN649310: 4 modules = approx. 72 mm
 MTN649330: 4 modules = approx. 72 mm
 MTN649315: 6 modules = approx. 108 mm

Schneider Electric Industries SAS

If you have technical questions, please contact the Customer Care Center in your country.
www.schneider-electric.com

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations. As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.

Universal dimming 3242/1.0

● General information on the application

You can use this software application to program universal dimming actuators from the REG-K range with a manual mode and extension input. The universal dimming actuators control the brightness of the connected luminaire. You can configure the control function separately for each output channel of the dimming actuator.

You can also operate the dimming actuator using the channel keys at the front of the device, or via extension unit push-buttons. For more information, please refer to the section "Manual operation and status displays". Group addresses are managed dynamically. The maximum total for the group addresses and associations is 172.

The limit for the telegram rate of the device is set to 127 telegrams every 17 seconds.

Caution: If you switch back to the preset values in the ETS, then all of the changes that you have made up to then will be reset.

i Note: Due to the fact that some functions depend on other functions, the corresponding tabs and parameters for these functions are only visible and can be selected in the ETS when the respective functions are activated or have been enabled.
If you disable functions or change parameters, group addresses that have already been connected may be deleted again.

i Note: The values of some parameters only become active when those functions which are influenced by these parameters are activated.

i Adjustable times (staircase timer, ON delay, OFF delay etc.) are adjusted via the time base and time factor parameters. The actual time is calculated by multiplying both values; e.g. time base 1 second times time factor 3 gives 3 seconds.
When only one of these parameters is displayed, the time for the selected parameter setting cannot be set. However, if appropriate, other factors in other tabs may influence the times.

● Application functions

With this software application, the universal dimming actuator is capable of executing the following functions:

- Basic functions

Switching (1 bit), relative dimming (4 bit), absolute dimming/value dimming (1 byte)

- Advanced functions

Time functions (ON/OFF delay, staircase timer), scenes, central function

- Higher-level functions

Logic operation or priority control, disable function

The individual functions and the possible parameter settings in ETS are described in the sections below.

● Setting the dimming parameters

Dimming range

The range between the minimum and maximum brightness of a lamp which can be set with the aid of a dimmer is specified by the technical dimming range.

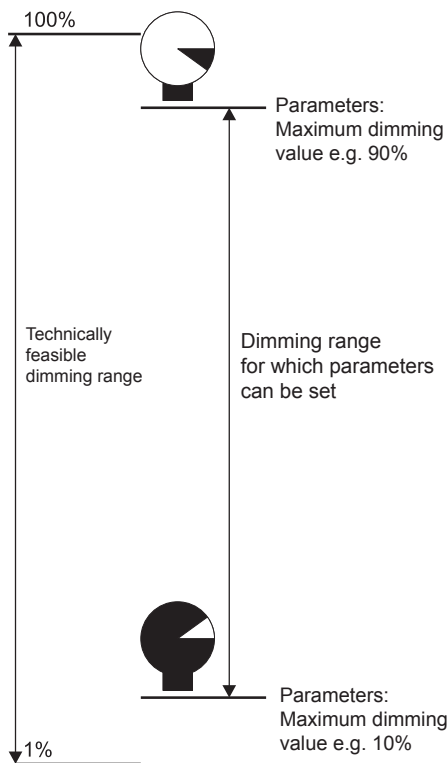
The minimum brightness value which can be set corresponds to the dimming value of 1%.

The maximum brightness value which can be set corresponds to the dimming value of 100%.



Universal dimming 3242/1.0

The dimming range which is technically possible can be limited using the software application to a minimum and a maximum dimming value. This limitation can be set individually for each output channel.



The dimming range which can be parameterised is set using the following parameters:

| Tab | Parameter |
|------------|----------------------------|
| X: General | Minimum dimming value in % |
| | Maximum dimming value in % |

The limits of the parameterised dimming range may not be exceeded or not reached. If, regardless of the function, a telegram is received which demands a lower or a higher value, the respective minimum or maximum value is set (for information on the possible functions, please refer to the section later on in this manual).

Example: minimum dimming value = 10%, maximum dimming value = 90%

Telegram value = 5% => output = 10%

Telegram value = 70% => output = 70%

Telegram value = 95% => output = 90%

● Basic dimming curve

You can use the basic dimming curve to adjust the control behaviour of a channel to the physical characteristics of different luminaires.

Specific basic dimming curves are stored in the software application for incandescent lamps and halogen lamps. You can select the basic dimming curve for each channel via a parameter:

| Tab | Parameter |
|------------|---------------------|
| X: General | Basic dimming curve |

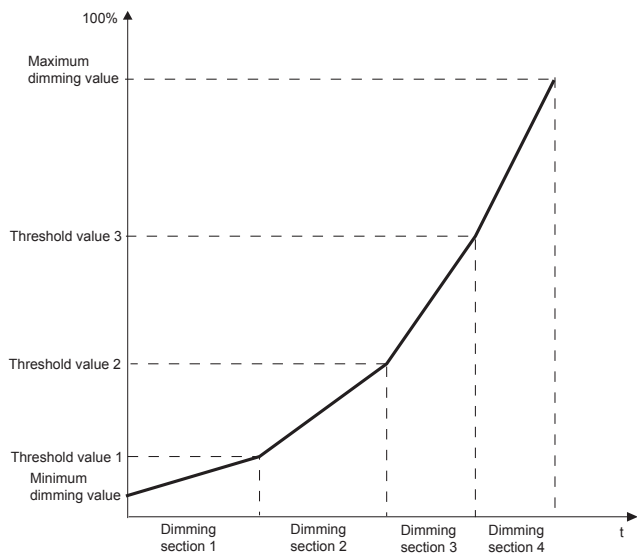
If you wish to set your own dimming curve, select "adjustable". You can then change the setting of the threshold values and the times of the dimming sections in the "Basic dimming curve" tab:

| Tab | Parameter |
|---|---|
| X: Basic dimming curve | 1. threshold value in % |
| | 2. threshold value in % |
| | 3. threshold value in % |
| | Time base for 1st dimming section |
| | Time factor for 1st dimming section (1-255) |
| | Time base for 2nd dimming section |
| | Time factor for 2nd dimming section (2-255) |
| | Time base for 3rd dimming section |
| | Time factor for 3rd dimming section (3-255) |
| | Time base for 4th dimming section |
| Time factor for 4th dimming section (4-255) | |

The basic dimming curve is divided into four dimming sections. You can determine the initial value of the dimming curve via the parameter value "Minimum dimming value in %", and the final value via the "Maximum dimming value in %" parameter value. The interim stages are determined by three threshold values.

With the time base and time factor, you define the length of time until the next threshold value is reached.

This time change to the dimming value gives the dimming speed.



i The dimming hardware requires at least 500 ms to run through the entire dimming range from 0% to 100%. Please observe this limit value when setting the dimming times for the individual dimming sections. Overall dimming times which are shorter than 500 ms cannot be executed by the hardware.

i Note: The dimming curve (the actual voltage curve applied to the output over the time period) is still influenced by the dimming time reductions of the dimming reduction sets, and by the dimming time reduction object; please refer to the section on dimming speed.

When setting your own dimming curves, please observe the following limitations:

- The period for running through an entire dimming curve is limited to 24 hours. Should longer running times result from the settings you have made, the software application will determine a corrective factor itself, which will reduce your settings back down to 24 hours.

- The following conditions apply for the set threshold values: The 1st threshold value must be larger than or equal to the set minimum dimming value. Otherwise, the 1st threshold value will be set equal to the minimum value. The 2nd threshold value must be larger than or equal to the 1st threshold value; otherwise, it will be set as equal to it. The 3rd threshold value must be larger than or equal to the 2nd threshold value; otherwise, it will be set as equal to it. If the 3rd threshold value is larger than the maximum dimming value, this maximum value determines the upper brightness limit.

TIP: Brightness levels which are approximately the same are located between dimming values with the sequence 10, 20, 50, 100 (%).

● Dimming speed

In the basic dimming curve, you define a basic dimming speed.

This basic dimming speed is then further increased by the reductions in dimming time.

The actual dimming speed therefore results from the time factors for the basic dimming curve and the parameters for the reductions in dimming time.

Here, you can set a dimming time reduction once, regardless of the function or telegram type, and you can also activate another dimming time reduction object via which the dimming time can again be reduced.

The reductions in dimming time always uniformly influence all dimming sections in the basic dimming curve.

You can use these parameters or this object to then reduce the dimming speed of the basic dimming curve. When the value for these parameters or for this object is 100% or 225, the dimming speed corresponds to the total of the times of the basic dimming curve. When the value is 50%, the dimming time of the basic dimming curve is halved, for example.

i Since the dimming time can only be reduced with these reductions in dimming time or the dimming time reduction object, it makes sense to parameterise the basic dimming curve to the maximum times required. The speeds can then be adapted to the respective functions using the dimming time reductions in the dimming time reduction sets.

i If the dimming time reduction object is deactivated, or dimming time reduction sets 1 to 3 are blocked, the basic dimming curve is subjected to the dimming time reductions in set 0.

The pre-set values in this set thus always give different dimming speeds for the different functions or incoming telegram types. Only when all dimming time reductions in set 0 are parameterised to 100% or 225 will the dimming speed for all incoming telegrams correspond to the basic dimming curve.

You can define a total of four dimming time reduction sets, which you can then activate using the set object.

You can use the dimming time reduction parameter format to select the input format for this parameter: input as a percentile via a selection list (1% to 100% in defined steps), or numerical input (1 to 225). With the numerical input, the value 225 corresponds to 100%.

| Tab | Parameter |
|----------------------------|---|
| X: Dimming time reductions | Format for dimming time reductions for sets |

Universal dimming 3242/1.0

Adapting the dimming speed in relation to the dimming function

The channel output is triggered differently depending on the incoming telegram type (according to the assigned communication object) and the set parameters.

The universal dimming actuator (or the application) provides different functions to control the outputs. The way in which this dimming function operates will be described in the following chapters.

The dimming speed can be changed according to the dimming function. You can change the dimming speed by reducing the dimming time. The different dimming time reductions for the different dimming functions are compiled as sets. You can define four sets.

You can select which set is to be used via the set object. After initialising, set "0" is always active. The other sets must be enabled beforehand.

| Tab | Parameter |
|----------------------------|------------|
| X: Dimming time reductions | Set 1 to 3 |

If the set object receives a value between "0" and "3", the respective set is activated. Values outside of this range (invalid values) will cause set "0" to be activated.

Each set has six dimming time reductions available, which can influence the dimming curve depending on the dimming function or type of telegram:

- for switching telegrams (switch object and central switch object), switch on the staircase lighting
- for dimming telegrams (dimming object and central dimming object)
- for switching off the staircase lighting
- for value telegrams (value object and central value object)
- for scene telegrams
- for high priority functions (logic operation, priority control or disable function)

| Tab | Parameter |
|----------------------------|---|
| X: Dimming time reductions | Set 0 to 3: Dimming time reduction for switching telegrams and switching on staircase lighting at |
| | Set 0 to 3: Dimming time reduction for dimming telegrams at |
| | Set 0 to 3: Dimming time reduction for switching off staircase lighting at |
| | Set 0 to 3: Dimming time reduction for value telegrams at |
| | Set 0 to 3: Dimming time reduction for scene telegrams at |
| | Set 0 to 3: Dimming time reduction for high priority functions at |

You can use these parameters to modify the dimming speed (based on the basic dimming curve) for a large number of solutions. Some examples:

- faster dimming brighter and darker when switching ON and OFF: dimming time reduction for switching telegrams and switching on staircase lighting at 50%.
- faster dimming up and slower dimming down of the staircase lighting: dimming time reduction for switching telegrams and switching on staircase lighting at 30%, and dimming time reduction for switching off staircase lighting at 70%.
- slower dimming up and down for value dimming: dimming time reduction for value telegrams at 80%.
- faster setting of the scene values: dimming time reduction for scene telegrams at 40.

i With a set value of 100% or 225, the actual dimming curve precisely corresponds to the basic dimming curve.

i The values for "Switching off staircase lighting" only have an influence when no cut-out warning has been parameterised; see the section "Staircase lighting function".

Adapting the dimming speed using the "Dimming time reduction object"

When the dimming time reduction object is activated, the communication object "Dimming time reduction object" appears.

| Tab | Parameter |
|----------------------------|-------------------------------|
| X: Dimming time reductions | Dimming time reduction object |

If the "Dimming time reduction object" receives a valid object value (between 1 and 255), the dimming time results from: (parameterised dimming time to date) x (value of "Dimming time reduction object") / 255.

e.g.

Dimming time parameterised to date = 20 s
 Value of "Dimming time reduction object" = 25
 => Dimming time = 20 x 100 / 255 = 7.8 s

Functional change while a dimming function is being executed

If the application receives a telegram for another dimming function while a dimming function is running, the parameters for the new dimming function are used immediately. The following illustration shows an example of this principle.

Universal dimming 3242/1.0

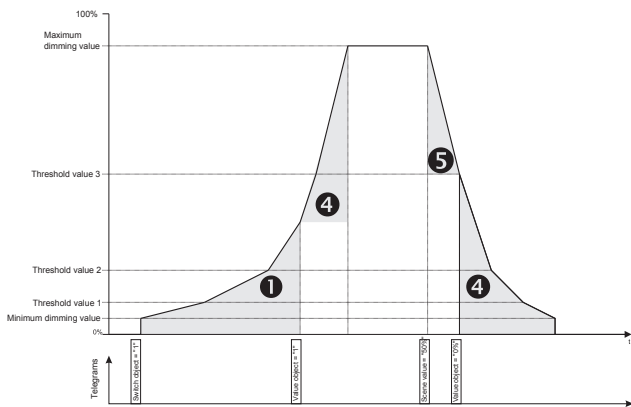


Image legend:

- ①: Dimming time reduction for switching telegrams and switching on staircase lighting.
- ④: Dimming time reduction for value telegrams.
- ⑤: Dimming time reduction for scene telegrams.

Communication objects

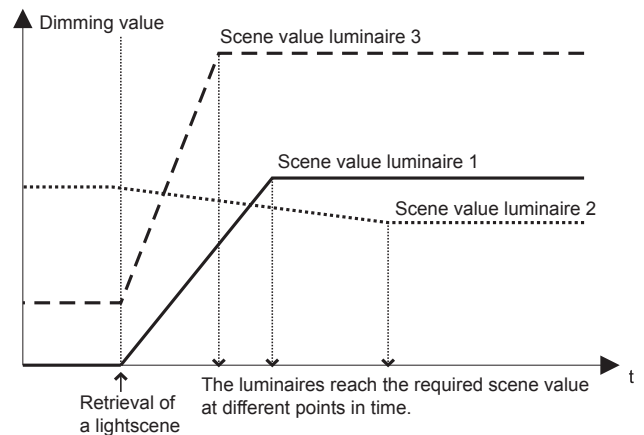
You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|--|-------------------------------|--------|------|-------|------------------|
| Channel X Dimming time reduction object for dimming curve | Dimming time reduction object | 1 byte | Low | WC | Transmit/receive |
| Channel X set 1-3 | Set object | 1 byte | Low | WC | Transmit/receive |

● "Same dimming time" function

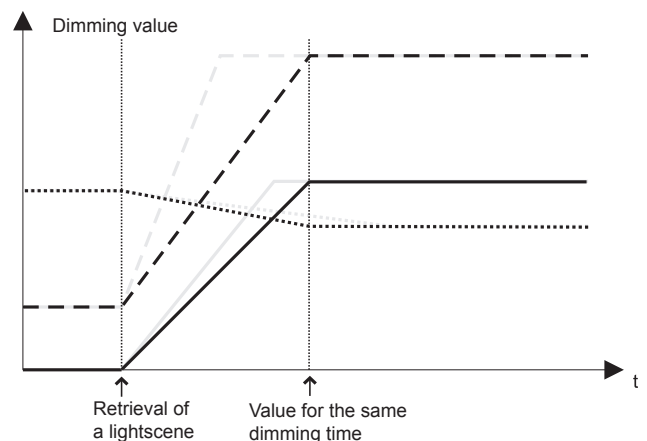
As we have seen earlier in this section, different luminaires can have different dimming curves. The dimming speed is thus also different for these lamps, i.e. the time for running through the dimming range until the required dimming value is reached. Often, different luminaires are combined together in a scene or a central function. If a function of this type is now activated, the entire group of lamps begins to "dim up" to the required value. Depending on the type of luminaire and the scene value, some luminaires will reach the retrieved value earlier, others later. This effect will also be created when the luminaires addressed when a scene is activated have different brightness values.



The "Same dimming time" function can be used to synchronise the different dimming times of the channels in such a way that all channels reach their set value at the same time. Using the "Time factor modifiable via the bus" parameter (via the communication object "Factor same dimming time"), the dimming times can also be synchronised for several dimming actuators.

i The "Same dimming time" function is only used in connection with scenes and the central function. If no scene or central function has been activated, the parameters for the same dimming time have no effect.

For the basic dimming curve, an offset factor is calculated when a scene or central function is retrieved, depending on the current output value and on the required function value. The basic dimming curve is extended or compressed, so that all the assigned luminaires reach the required function value at the same time.



Universal dimming 3242/1.0

You can release the function globally for the device via a parameter, and set the corresponding dimming time after release:

| Tab | Parameter |
|---------|--|
| General | Same dimming time with central function and scenes |

If the "Same dimming time" parameter has been activated, you can set the required dimming time in the "Same dimming time" tab and specify whether the time factor should be modifiable via the bus:

| Tab | Parameter |
|-------------------|---|
| Same dimming time | Time base for same dimming time |
| | Time factor for same dimming time 1-255 |
| | Time factor modifiable via the bus |

If you have activated the parameter "Time factor modifiable via the bus", a new communication object will now appear with the designation "Factor same dimming time". This object is now used to set the required time. In this case, the "Factor for same dimming time" parameter is only used for setting the time after a bus reset or download. As soon as the "Factor same dimming time" object has been described with a value for the first time, this value is used to set the time.

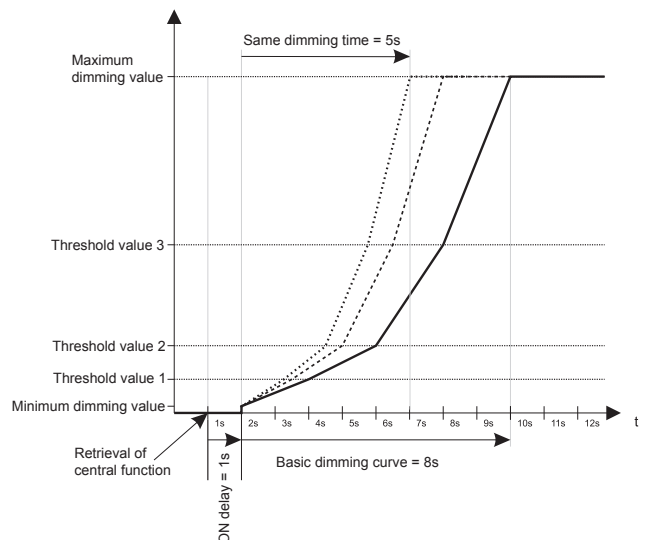
The assignment of the individual channels to the "Same dimming time" function is conducted individually for each channel for the scene function and central function.

i The dimming time reduction object and dimming time reduction sets are not taken into account for scenes and the central function for the duration of the same dimming time!

If ON or OFF delays have been parameterised, these delay times are taken into account when the offset factor is calculated, but are not modified. These delay times retain their set value. Only the gradient of the dimming curve, and thus the dimming speed, is modified.

Example:

Current output status: switched off,
 ON delay = 1s,
 same dimming time = 5s,
 retrieval of central function with output value 100%
 With the basic dimming curve, the output channel requires 8s in order to dim from the OFF status to 100%. Including the ON delay of 1s, this gives 9s.



The ON delay is also retained with an identical dimming time. The dimming curve is compressed or extended in such a way that the dimming value is reached after the same dimming time. In other words, the calculation of the new dimming curve takes into account the pure dimming time (the same dimming time minus ON delay time).

i The set dimming time must be larger than 1 second and may not be smaller than any set ON and OFF delays with the individual output channels. If this is not the case, the same dimming time is ignored and the dimming curves are executed normally with the time factors and dimming time reduction sets.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|-------------------|--------------------------|--------|------|-------|------------------|
| Same dimming time | Factor same dimming time | 1 byte | Low | WC | Transmit/receive |

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● Priorities

The functions of the application comprise different priorities in relation to their processing:

| | |
|---------------|--|
| high priority | |
| 3 | Disable function |
| 2 | Logic operation or priority control |
| 1 | Switching, dimming, value dimming, time functions, scene, central function |
| low priority | |

Priority group 1:

In priority group 1, all functions have an equal status, i.e. they can be overwritten by other functions. A function which is currently active is ended when a new control telegram with the same priority is received. New set values for the scene function, the time functions or the central function act in the same way as an update for the "Switch object" of an output channel in relation to the specification of the priority.

Priority group 2:

When a function from priority group 2 is activated, the dimmer output is triggered according to the now active output value. The function values for priority group 1 are overwritten and are no longer forwarded to the output, as long as the priority function is active. However, all control functions in priority group 1 continue to be calculated and updated in the background.

You can determine the reaction of an output after deactivation of priority control via a parameter (see the chapter in the manual on the priority control function); after a logic operation function has been deactivated, the output is always set to the current output value which the device has calculated in the background.

Priority group 3:

The disable function with the highest priority level 3 overrides all other functions. The functions in priority levels 1 and 2 also continue to be evaluated in the background here, however, so that after the disable function has been deactivated, the dimmer output can be set to the current required value, or can adopt a status for which the parameters have been set. You can also determine this output behaviour via a parameter in the same way as for priority control (for more on this topic, see the chapter in the manual on the disable function).



Please note that any function changes can also lead to changes in the dimming curve and thus the dimming speed (for more on this topic, see also the section on "dimming speed" earlier in this manual).

● Basic functions

The software application provides three basic functions to control the brightness of the connected luminaires: switching, relative dimming and value dimming.

For each output channel which you have activated via parameters, three communication objects appear to control these basic functions:

| Tab | Parameter |
|------------|-----------|
| X: General | Channel X |

If you have set the parameter "Channel X" to the value "activated", the following objects appear:

- for the "Switch" function: "Switch object", length: 1 bit
- for the "Relative dimming" function: "Dimming object", length: 4 bit
- for the "Value dimming" function: "Value object", length: 1 byte

You will also find additional setting parameters on the parameter window for determining the functioning of the dimming output.

Switch function (1 bit)

If the "Switch object" receives a telegram with the value "1", the output is "switched on" and the activated dimming time reduction sets and, where appropriate, the dimming time reduction object, are triggered according to the basic dimming curve and the dimming time reduction "for switching telegrams and switching on staircase lighting". The output is "switched off" with the object value "0". In this case, the dimming curve is run through in reverse (from the maximum value to the minimum value); in other words, it is dimmed down.

You can use parameters to specify the maximum value which is triggered:

| Tab | Parameter |
|------------|--------------------|
| X: General | Starting behaviour |

Settings:

- max. brightness: The output channel is set to the value which you have set in the parameter "Maximum dimming value in %".
- selectable brightness: With this value, an additional setting parameter appears:

| Tab | Parameter |
|------------|-------------------------|
| X: General | Initial brightness in % |

The output is switched on at the set initial brightness value with a "1" telegram. The initial brightness value should not exceed the maximum dimming value, since this always limits the maximum output brightness, and is also set when you select a higher value for the parameter.

-last brightness value (memory): The output is reset to the last brightness value which it had before switching off after a "1" telegram. After a download or bus voltage

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failure, the value is set here which is defined as the maximum dimming value.

Relative dimming function (4 bit)

You can use the "Relative dimming" function to dim the output brighter or darker relative to its current value. The step size of the brightness change and the dimming direction are determined by the telegram value.

Telegrams for the "Relative dimming" function are received via the "Dimming object"

After a relative dimming telegram has been received, a new set value is calculated from the current value, the dimming direction received and the step size received.

Example (minimum dimming value = 10%, maximum dimming value = 90%, current output value = 12%):

Dimming brighter telegram with a step size of 25%
=> New set value: 12% + 25% = 37%

Dimming darker telegram with a step size of 12.5%
=> New set value: 37% - 12,5% = 24,5%

The "Minimum dimming value" and "Maximum dimming value" limit values must be reached, or cannot be exceeded with relative dimming.

You can use a parameter to determine the other functions of an output channel when a relative dimming telegram is received:

| Tab | Parameter |
|------------|---------------------------------|
| X: General | Dimming object switches channel |

Settings:

-not: This parameter setting prevents switching on and off, i.e. the channel remains off, or at the minimum dimming value.

-only on, not off: The output channel can only be switched on by relative dimming telegrams. If it is switched on and the set value fails to reach the minimum dimming value via relative dimming telegrams, the output remains switched on at the minimum dimming value.

-only off, not on: The output channel cannot be switched on by relative dimming telegrams. If it is switched on and the set value fails to reach the minimum dimming value via relative dimming telegrams, the output remains switched off.

-on and off: The output channel can only be switched on by relative dimming telegrams. If it is switched on and the set value fails to reach the minimum dimming value via relative dimming telegrams, the output remains switched off.

Value dimming function (1 byte)

The "Value dimming" function is used when you wish to set the required brightness directly. To do this, send the required brightness value to the "Value object" of the output channel as a percentage between 0% and 100%. The value range is divided into 255 brightness levels. One level has a step width of approximately 0.4%. The telegrams for dimming with absolute values have the 1 byte data format.

The required brightness values must lie within the limits which are specified by the minimum and maximum dimming value. If the brightness value exceeds the maximum dimming value, the maximum dimming value is set as the output value. If the brightness value is lower than the minimum dimming value, this is set as the output value.

You can complete the settings for switching the dimming output on and off via the "Value dimming" function using a parameter:

| Tab | Parameter |
|------------|-------------------------------|
| X: General | Value object switches channel |

Settings:

-not: This parameter setting prevents switching, i.e. the channel remains at the current value.

-only on, not off: The output channel can only be switched on by value telegrams. If it is switched on and the "Value object" receives the value 0%, the output remains switched on at the minimum dimming value.

-only off, not on: The output channel cannot be switched on by value telegrams. If it is switched on and the "Value object" receives the value 0%, the output remains switched off.

-on and off: The output channel can only be switched on by value telegrams. If it is switched on and the "Value object" receives the value 0%, the output remains switched off.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|----------------------|----------------|--------|------|-------|----------------------|
| Channel X General | Switch object | 1 bit | Low | WC | Transmit/ receive |
| Channel X General | Dimming object | 4 bit | Low | WC | Transmit/ receive |
| Channel X General | Value object | 1 byte | Low | WC | Transmit/ receive |

● Advanced functions

The advanced functions are the functions of the software application which share the same priority as the basic functions "switch", "relative dimming" and "value dimming" (for more on this topic, see the section on priorities). The advanced functions are time

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functions (ON/OFF delay, staircase timer), scenes and a central function. Any update of one of the basic functions or an advanced function overrides the current status, and sets the dimming output according to the last function value received.

Time functions

Delay functions

The delay functions delay the switching on or off of an output channel. They are switched upstream or downstream in relation to the actual output functions, i.e. they delay the execution of the requested output command.

The delay functions affect the basic functions and the advanced functions. The priority functions are always effective immediately and without a delay.

The dimming curve with the delay functions follows the basic dimming curve and the current dimming curve reduction of the current dimming curve reduction set and, when appropriate, the dimming curve reduction object (please refer to the earlier section on "Dimming speed").

You can select the delay functions for each channel via a parameter:

| Tab | Parameter |
|------------|-------------|
| X: General | Delay times |

When you have enabled the delay functions for an output channel, a new parameter window will appear for this channel for activation and in order to make detailed settings for the functions.

– ON delay

The ON delay becomes active when the output is currently switched off, and is now set to be switched on via a new telegram for a basic function or an advanced function.

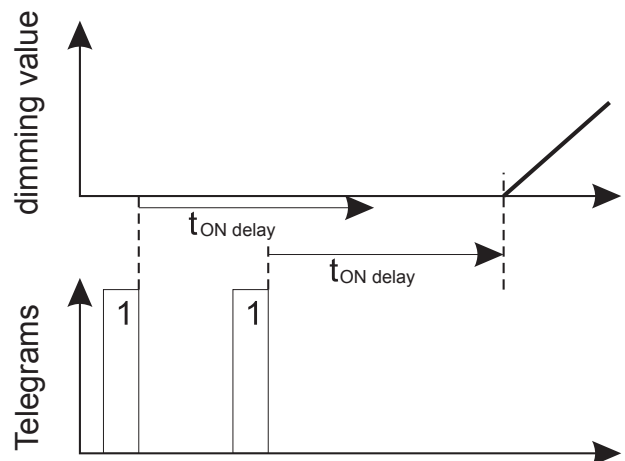
If you wish to use the ON delay, you must activate the function:

| Tab | Parameter |
|----------------|-----------|
| X: Delay times | ON delay |

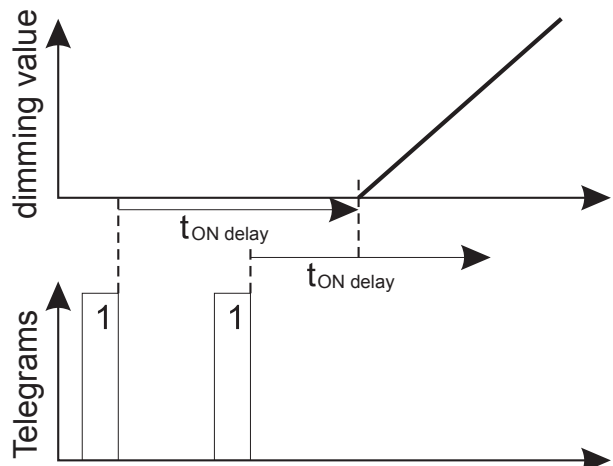
Settings:

-deactivated: The ON delay is not active.

-retriggerable: If the channel receives an ON telegram, the ON delay is started. If a new ON telegram now follows while the delay time is running, the delay time is restarted. The value of the new telegram is set as the new set value, which is activated after the delay period has expired. If the new value is the "STOP dimming" value for relative dimming, the output value is set to the minimum dimming value after the delay period has expired.

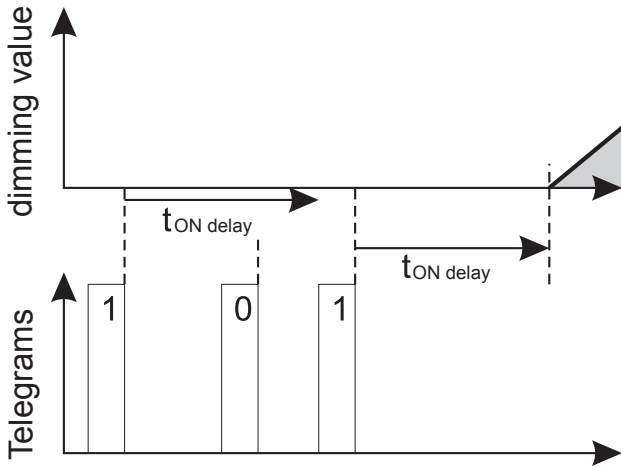


-not retriggerable: If the channel receives an ON telegram, the ON delay is started. If a new ON telegram now follows while the delay time is running, this is ignored and the ON procedure is executed after the delay time initially started has expired. The value of the new telegram is set as the new set value, however, which is activated after the delay period has expired. If the new value is the "STOP dimming" value for relative dimming, the output value is set to the minimum dimming value after the delay period has expired.



If the channel receives an OFF telegram while an ON delay is active, the ON delay is interrupted.

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You can use a parameter to set whether the output channel remains switched off during the ON delay, or whether it is already set to the minimum dimming value.

| Tab | Parameter |
|----------------|----------------------------|
| X: Delay times | Output during the ON delay |

The specific delay time for the ON delay results as a product from the time base and the factor; the standard values result in an ON delay of 3 seconds.

| Tab | Parameter |
|----------------|----------------------------------|
| X: Delay times | Time base for ON delay |
| | Time factor for ON delay (1-255) |

-- OFF delay

The OFF delay becomes active when the output is currently switched on, and is now set to be switched on via a new telegram for a basic function or an advanced function.

Please note: the OFF delay is not effective in a negative dimming direction with relative dimming commands, since these are not specific OFF commands.

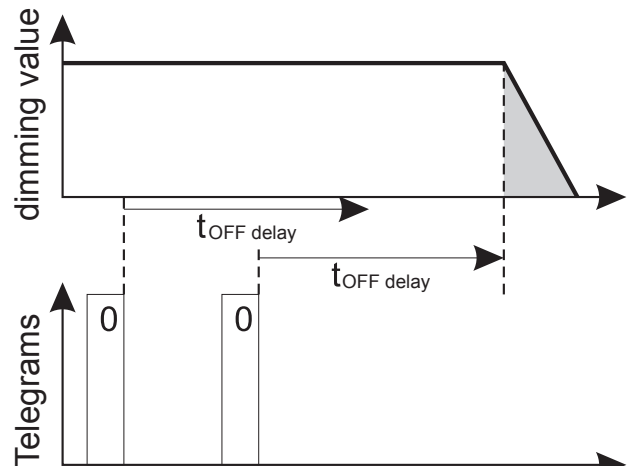
If you wish to use the OFF delay, you must activate the function:

| Tab | Parameter |
|----------------|-----------|
| X: Delay times | OFF delay |

Settings:

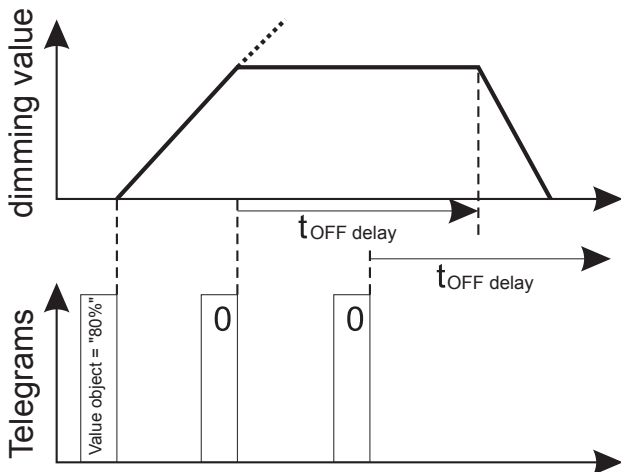
-deactivated: The OFF delay is not active.

-retriggerable: If the channel receives an OFF telegram, the OFF delay is started. If a new OFF telegram now follows while the delay time is running, the delay time is restarted.



-not retriggerable: If the channel receives an OFF telegram, the OFF delay is started. If a new OFF telegram now follows while the delay time is running, this is ignored and the OFF procedure is executed after the delay time initially started has expired.

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If the output receives a new telegram while an OFF delay is active, which creates an ON status, the OFF procedure is halted and the new set value is set.

If the output is currently conducting a dimming procedure when an OFF telegram is received, this dimming procedure is stopped. The output remains in the current dimming value for the duration of the OFF delay, before it switches off after the delay has expired (see the chart for the "not retriggerable" setting).

If a staircase lighting function with manual OFF is active, the output is not switched off immediately by a manual OFF command, but only when the set delay time has expired (please also refer to the following section on the staircase lighting function).

The specific delay period for the OFF delay results from your settings as a product of the time base and the factor:

| Tab | Parameter |
|----------------|-----------------------------------|
| X: Delay times | Time base for OFF delay |
| | Time factor for OFF delay (1-255) |

With the standard values, an OFF delay of 3 seconds is produced.

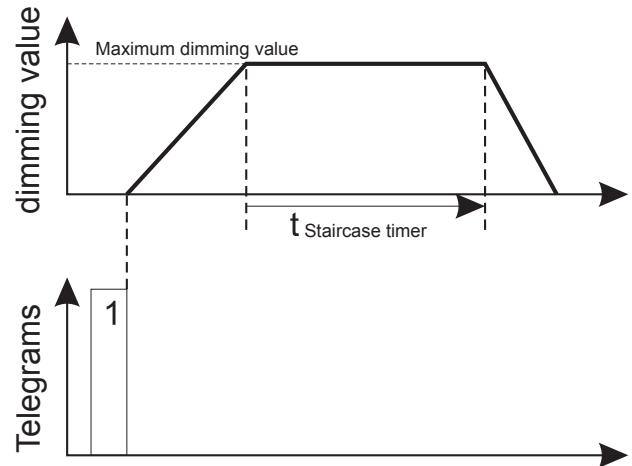
Staircase lighting function

The staircase lighting function offers you the option of switching on a dimmer output with a telegram in such a way that this output switches itself back off automatically after a specified time has expired, and without a new control telegram. Since this function is often used to control the lighting in staircases, it is named accordingly.

The dimming curve with the staircase lighting function follows the current dimming curve reduction of the current dimming curve reduction set and, when appropriate, the dimming curve reduction object (for more information on the dimming time reduction set, please refer to the earlier section on "Dimming speed").

i Please note that different dimming speeds may be present for the ON and OFF procedure.

i The staircase lighting time only begins when the output channel has reached the final dimming value after dimming up. The dimming time is therefore not included in the staircase lighting time. The dimming value during the staircase lighting time is the (parameterised) maximum dimming value.



You can activate the staircase lighting function for each channel via a parameter:

| Tab | Parameter |
|------------|-----------------------------|
| X: General | Staircase lighting function |

When you have activated the staircase lighting function for an output channel, a new parameter window will appear for this channel, together with a new communication object labelled "Staircase lighting object". The "Staircase lighting object" has a 1 bit format. The staircase lighting function is controlled via the received telegram values of the "Staircase lighting object".

i Note: The staircase lighting function can alternatively be switched on via an extension unit push-button if you have specified this function for extension unit operation. It is not possible to switch off the staircase lighting function with extension unit operation.

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The basis for this setting is given in the description of the staircase lighting function below. For more information on the extension unit function, refer to the section "Manual key operation".

You can set the time duration for the staircase lighting time via the time base and time factor:

| Tab | Parameter |
|--------------------|---|
| X: Staircase timer | Time base for staircase timer |
| | Time factor for staircase timer (1-255) |

The time duration results from the product of your settings for the time base and factor. The standard values therefore result in a staircase lighting time of 3 minutes.

If the "Staircase lighting" object receives a telegram with the value "1", or if the staircase timer function is activated by an extension unit push-button which has been parameterised accordingly, the dimmer output is switched on and is dimmed to the max. dimming value, remains at this value for the set "Staircase lighting time", and the output channel then dims automatically to the value 0%.

i Note: During the staircase lighting time, you can modify the output brightness using dimming telegrams via the "Dimming" or "Value object" objects. If the output fails to reach its minimum dimming value due to these dimming telegrams, or if the value object is described with the value "00h", the parameter settings for the OFF behaviour of these functions apply.

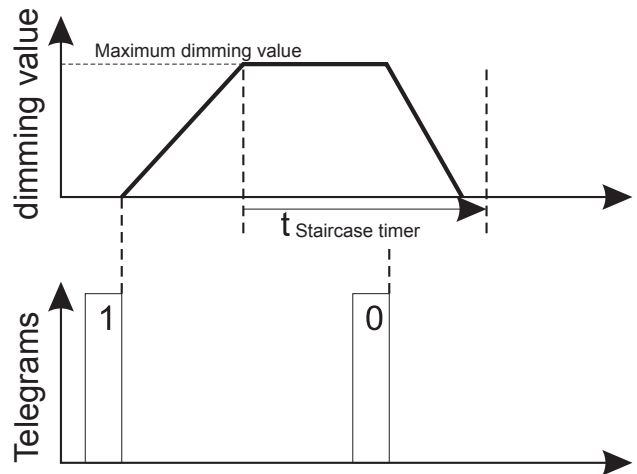
You can use the "Staircase lighting function" parameter to determine whether an active staircase lighting function can be manually interrupted or not:

| Tab | Parameter |
|--------------------|-----------------------------|
| X: Staircase timer | Staircase lighting function |

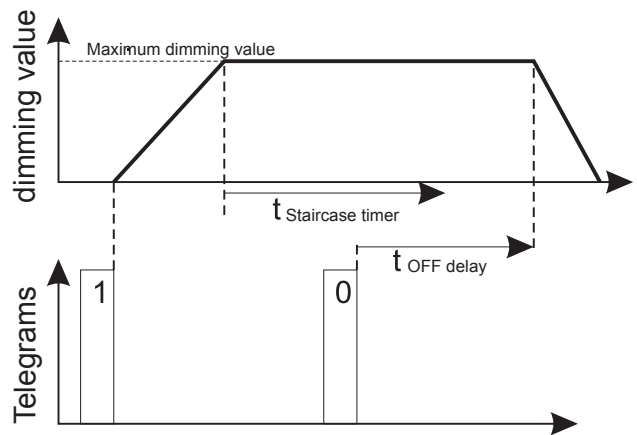
The individual settings have the following meaning:
 - with manual OFF,... / without manual OFF,... : you can initially specify whether an active staircase lighting function can be manually interrupted (= "with manual OFF") or not (= "without manual OFF").

If you have set the parameter to the value "with manual OFF", the output is switched off when the "Staircase lighting" object receives a telegram with the value "0".

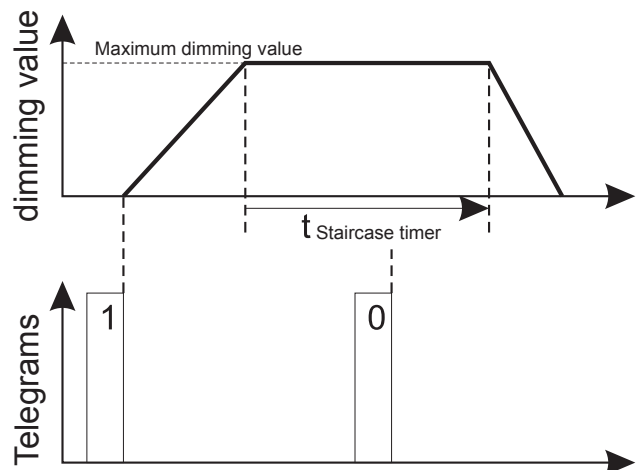
i Note: "Manual OFF" does not refer to switching off the extension units manually, or to the manual keys on the device. "Manual OFF" means switching off via an KNX telegram.



If an OFF delay has been parameterised, this function is now active and the output only switches off after the delay time has expired.

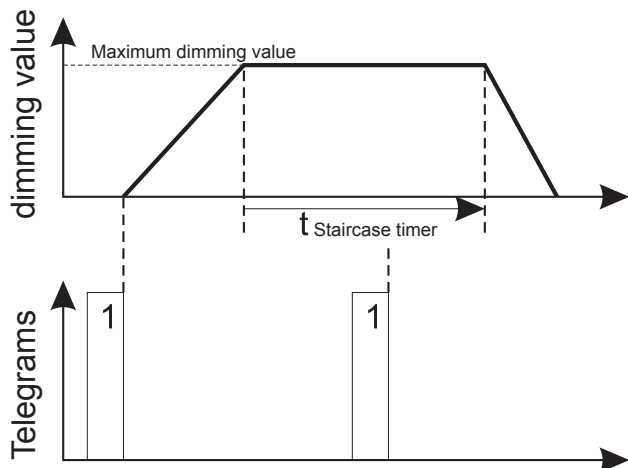


If you have selected the parameter value "without manual OFF", the staircase lighting function is not interrupted when a telegram with the value "0" is received, but continues to run normally until the staircase lighting time has expired.

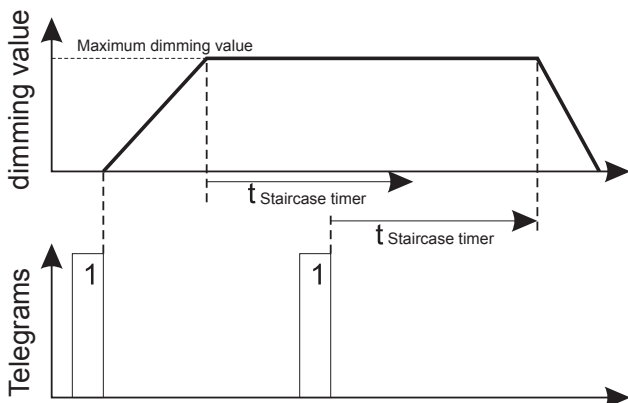


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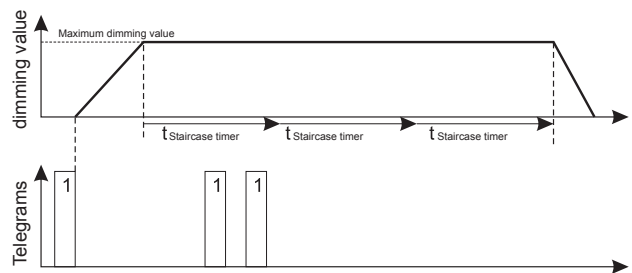
-..., not retriggerable: With this setting, the staircase lighting function which was started initially runs through normally, even when additional "1" telegrams or switch impulses from an extension unit push-button are received during the staircase lighting time.



- ..., retriggerable: If the "Staircase lighting" object receives an additional "1" telegram while a staircase lighting function is active, or if switch impulses are received from an extension unit push-button, the staircase timer is restarted. This occurs when a "1" telegram or an extension unit impulse is received while the function is active.



- ..., totalling time: If the "Staircase lighting" object receives a second start signal (a "1" telegram or switch impulse from an extension unit push-button), while a staircase lighting function is active, the active staircase lighting time is doubled. With a third start signal, the staircase lighting time is tripled, and with the fourth start signal, it is quadrupled. The actual staircase lighting time therefore results from the staircase lighting time being multiplied according to the number of received start signals. The maximum possible running time for this function is 255 hours.



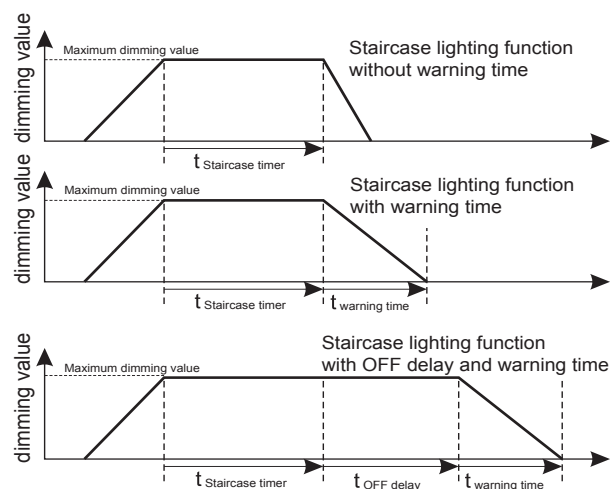
You can limit the potential running time using the "Max. number of time accumulations" parameter.

| Tab | Parameter |
|--------------------|--|
| X: Staircase timer | Max. number of time accumulations (2- 255) |

If the staircase lighting time has expired, the dimming output is dimmed down and switched off according to the settings for the dimming speed and the current speed set. You can however use the function "Cut-out warning" to influence the dimming down behaviour over time at the end of a staircase lighting function:

| Tab | Parameter |
|--------------------|---|
| X: Staircase timer | Cut-out warning for staircase lighting time |
| | Warning time for staircase lighting time in seconds (1-255) |

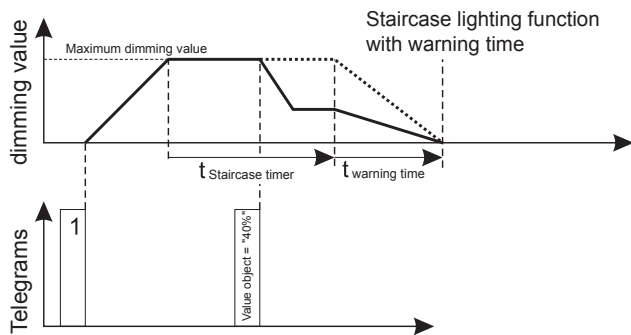
If you have activated the cut-out warning, you can set a "Warning time" as a time period between 1s and 255s (=4min15s). This "Warning time" determines how long the dimming down procedure should last. The active values for the dimming speed and the dimming time reduction sets are no longer taken into account in this case. The dimming curve is extended or compressed to the set warning time while dimming down.



Regardless of which dimming value the output has after the staircase lighting function has expired, the time duration for the dimming down procedure always

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corresponds to the warning time when the cut-out warning is active.

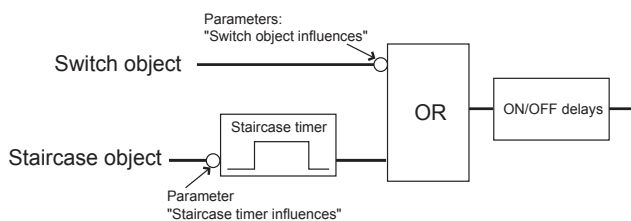


If you have parameterised a cut-out delay for the dimmer output, the warning time begins after the delay period has expired.

Note: After the staircase lighting time has expired, a new staircase lighting function sequence is started when a new "1" telegram is received at the "Staircase lighting" object, or when a new switch impulse is received from an extension unit push-button, even when the output is still dimming down, or when a warning time is active. At this point in time, a "1" telegram or a switch impulse is therefore no longer valid as a trigger signal for restarting the staircase lighting time, or to accumulate the staircase lighting times.

Logic operation between the switch object and the staircase lighting object

In order to control a dimming output, its switch object is connected with its staircase lighting object with a logical OR operation.



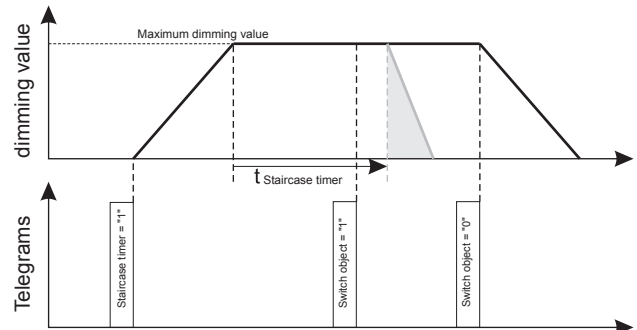
You can invert, or not invert, the effect of the two object values on this logic operation using parameters:

| Tab | Parameter |
|----------------------------|-----------------------------|
| X: General | Switch object influences |
| X: Staircase lighting time | Staircase object influences |

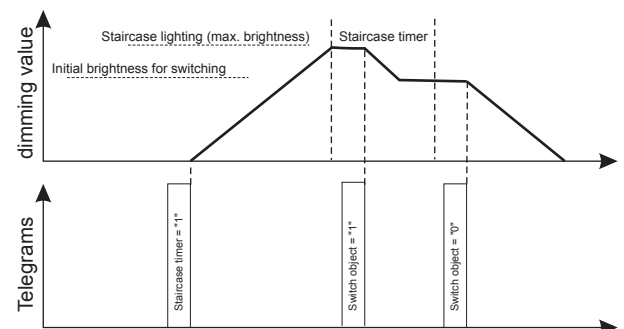
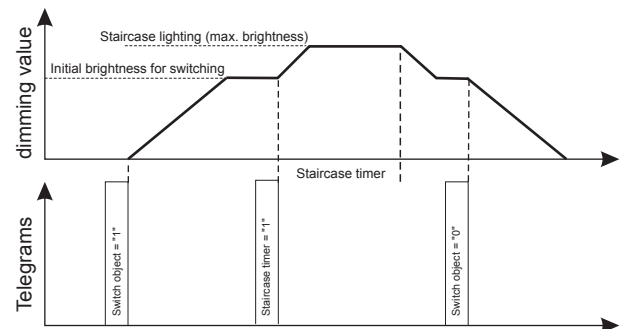
If you set the parameter value to "not inverted", the logic operation is formed with the current object value; the object value "0" remains "0" and the object value "1" remains "1".

If you set the parameter value to "inverted", the logic operation is formed with a value which is opposite to the current object value; Object value "0" becomes "1" and object value "1" becomes "0".

You can overwrite a running staircase lighting function using a telegram for the switch object. In this case, the staircase lighting function continues to run normally in the background.



The brightness of the logic operation result and the dimming speed is defined by the last telegram (see the charts below).



You can use this, for example, for temporary continuous light switching (cleaning lighting). An ON telegram from the switch object causes the light in the staircase lighting function to remain switched on continuously. Value, dimming, scene and central telegrams continue to be influential, however. For an application of this type, an initial brightness of 100% would be suitable when switching on.

Another potential application is a staircase lighting function with a continuous basic brightness (e.g. in hospital corridors). For this purpose, the required basic brightness is parameterised as the initial brightness when switching on, and the staircase lighting function is switched e.g. via a movement detector.

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i Please also refer to the section "Logic operation" in relation to this topic.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|--|---------------|-------|------|-------|----------------------|
| Channel X Staircase lighting object | Switch object | 1 bit | Low | WVC | Transmit/ receive |

● Scenes

You can use the scene functions when you wish to give the user the option of modifying different room functions simultaneously via just one bus telegram. Retrieving a room scene allows you, for example, to dim the room lighting to a desired value, move the blinds into a desired position, set the heating control to daytime operation and switch on the power supply to the socket-outlets in a room. Due to the fact that these functions can have different telegram formats and moreover, the telegram values can have different meanings (e.g. value "0" means OFF for lighting and OPEN for blinds), without the scene function you would have to send a separate telegram to each actuator to achieve the same setting.

The scene function allows you to integrate the dimming actuator into scene control. There are memory slots for up to 8 different scene values for each output channel. Each of these 8 scene memories can be assigned to one of 64 possible scene numbers (0 to 63). You can store the brightness value in % as scene values. If the dimming actuator receives a telegram which retrieves a scene number, the assigned output channel is dimmed to the stored brightness. The brightness values for the individual scenes which you save during commissioning can be replaced later by users if they wish.

i If the learn bit in a telegram has the value "0", the brightness values saved for this scene number are retrieved and the dimmer outputs are set accordingly.
If the learn bit has the value "1", then the current brightness values of the assigned dimming outputs are saved as new scene values for the transmitted scene number.

Activating the scene function:

In order to be able to use the scene function for the individual dimming channels, you first have to priority enable the function for the device once:

| Tab | Parameter |
|---------|-----------|
| General | Scenes |

If you have set the "Scenes" parameter to the activated value, the communication object "Scene object"

appears, via which the scene telegrams can now be received.

Now you can activate the scene function for each channel individually:

| Tab | Parameter |
|------------|-----------|
| X: General | Scenes |

If you have activated the "Scenes" parameter of an output channel, a new parameter window appears for this channel, in which you can set the scene values. You can activate each of the eight scene memories separately:

| Tab | Parameter |
|-----------|--------------------|
| X: Scenes | Scene 1 to scene 8 |

You can assign a scene number (0-63) to each of the activated scenes and set a brightness value:

| Tab | Parameter |
|-----------|---|
| X: Scenes | Scene 1 to scene 8, Scene number (0-63) |
| | Scene 1 to scene 8, Brightness value in % |

When setting the brightness values, please observe the limits set by the minimum and maximum dimming values.

Retrieving scene values:

The "Scene object" allows you to retrieve stored brightness values. After receiving a telegram, the transmitted scene number is evaluated. If one of the eight scene memories has been assigned to this scene number, the stored brightness value is set.

i If several of the scene memories 1 to 8 have been assigned to the same scene number, the first memory value is activated.

Storing scene positions:

When the "Scene object" receives a new telegram in which the learn bit has the value "1", the current dimming value is stored as the new brightness value in the first scene memory which is assigned to the received scene number.

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Example:

Output channel 1

Scene 1 activated at scene number 13
(Scene 1 brightness = 50%)

Scene 2 activated at scene number 7
(Scene 2 brightness = 30%)

Scenes 3 to 8 deactivated

Output channel 2

Scene 1 activated at scene number 7
(Scene 1 brightness = 90%)

Scene 3 activated at scene number 21
(Scene 3 brightness = 50%)

Scenes 2 and 4 to 8 deactivated

Retrieve scene number 13

=> Output channel 1 dims to 50%

=>Output channel 2 does not respond

Retrieve scene number 1

=> Actuator does not respond because scene number 1 is not assigned.

Retrieve scene number 7

=> Output channel 1 dims to 30%

=> Output channel 2 dims to 90%

Retrieve scene number 21

=>Output channel 1 does not respond

=> Output channel 2 dims to 50%

Outputs are manually dimmed to the new values:

Output channel 1: Brightness = 70%

Output channel 2: Brightness = 20%

Program scene number 13

=> Output channel 1: Scene 1 Brightness value = 70%

=> Output channel 2: does not respond, since scene number 13 has not been assigned.

Retrieve scene number 13

=> Output channel 1 dims to 70%

=>Output channel 2 does not respond

Note the difference from the first retrieval of scene number 13 above!

If you activate the parameter "Replace scene values in the actuator on download", then the scene values programmed during operation which are stored in the device for this channel are replaced with your default values on download. If you don't wish to replace the values in the device when downloading, then you must disable this parameter:

| Tab | Parameter |
|-----------|--|
| X: Scenes | Replace scene values in the actuator on download |

Same dimming time for scene function

The general information section in this manual on "Dimming speed" contains an explanation of the "Same dimming time" function. You can assign the scene functions of an output channel to this function via a parameter:

| Tab | Parameter |
|-----------|-------------------|
| X: Scenes | Same dimming time |

Extension unit function for scenes

This function allows you to also activate or re-program the scene values for the scene memories 0 to 3 also using 1-bit telegrams. The extension unit function is activated once for the device:

| Tab | Parameter |
|---------|-----------------------|
| General | Extension unit scenes |

If you have enabled "Extension unit scenes", the additional communication objects appear with the 1-bit data format:

"Retrieve scene 0/1", "Retrieve scene 2/3",

"Set scene 0/1", "Set scene 2/3".

You can also use these objects to retrieve scenes 0 to 3 or to re-program them:

"Retrieve scene 0/1"" = "0": Scene number 0 is activated

"Retrieve scene 0/1"" = "1": Scene number 1 is activated

"Retrieve scene 2/3"" = "0": Scene number 2 is activated

"Retrieve scene 2/3"" = "1": Scene number 3 is activated

"Set scene 0/1" = "0": Scene number 0 is programmed

"Set scene 0/1" = "1": Scene number 1 is programmed

"Set scene 2/3" = "0": Scene number 2 is programmed

"Set scene 2/3" = "1": Scene number 3 is programmed

The actions correspond to a normal retrieval or program command for scene numbers 0, 1, 2 or 3 using the "Scene object". The extension unit function is not available for scene numbers 4 to 63. You can only address these scene numbers using the "Scene object".

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Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|----------|--------------|--------|------|-------|----------------------|
| Scenes | Scene object | 1 byte | Low | WC | Transmit/ receive |

● Central function

You can use the central function to switch or dim several output channels simultaneously with a telegram command. This function is useful, for example, when you switch off all the lights at the press of a button when leaving your house, and when you wish to switch on a certain group of lights at the press of a button when you return home. Another possible application for the central function could be to set the lights to a low dimming value on the way to the bathroom at the press of a button, in order not to wake the other people living in your house.

If you wish to use the central function for one or more output channels, you must priority enable the function for the device once:

| Tab | Parameter |
|---------|------------------|
| General | Central function |

If you have activated the central function for the appliance, three new communication objects will be available, which you can in turn activate or deactivate individually using parameters:

| Tab | Parameter |
|---------|------------------------|
| General | Central switch object |
| | Central dimming object |
| | Central value object |

The activated objects appear as new communication objects "Central switch object", "Central dimming object" and "Central value object" after they have been activated.

Assigning the output channel to the central function:

You can select the assignment of an output channel to the central function individually for each channel when parameterising:

| Tab | Parameter |
|------------|------------------|
| X: General | Central function |

When you have assigned a channel to the central function, the output value of this dimming output cannot be controlled only via the specific switching, dimming or value objects for the channel (see the "Basic functions" section), but also via the enabled objects in the central function. The central function controls the entire assigned group of channels simultaneously.

Switching via a central object:

After the central function for an output channel has been activated, a new parameter window appears for this channel. In this parameter window, you can set how the assigned channel should respond when a new telegram value is received via the "Central switch object":

| Tab | Parameter |
|---------------------|---|
| X: Central function | Function with the central switch object = 0 |
| | Function with the central switch object = 1 |

First select how the output should react when a new object value is received for the central object. If you wish to set a variable brightness, you can specify the required values in further parameters:

| Tab | Parameter |
|---------------------|---|
| X: Central function | Required brightness with central switch object = 0 in % |
| | Required brightness with central switch object = 1 in % |

Please ensure here that the set values lie within the limitation set by the minimum and maximum dimming values respectively.

Relative dimming and value dimming via the central function

The two dimming functions in the central function operate in the same manner as the corresponding basic functions (see also the section "Basic functions").

With these functions, the telegrams also affect the entire group of assigned output channels simultaneously. The "Central dimming object" causes relative dimming operations, while the "Central value object" sets a new absolute dimming value for the group.

Dimming speed of the central function

The dimming speed for operations via the central functions corresponds to the settings for the corresponding basic functions. The dimming time for setting a new brightness value therefore corresponds to the setting for the active dimming reduction set for the switch function, the setting for the active dimming time reduction set for relative dimming and the setting for the active dimming time reduction set for value dimming.

Same dimming time for central function

The software application also offers you the option of activating the "Same dimming time" function for the central switching and value dimming functions. In this way, all dimming outputs in a channel group which are controlled via the central function reach the required dimming value simultaneously. The settings for the dimming speeds are ignored with this function option (for further information, please refer to the section on dimming speed). You can use a parameter to determine whether an output should also be assigned to the "Same dimming time" function in relation to the central function:

| Tab | Parameter |
|---------------------|-------------------|
| X: Central function | Same dimming time |

Higher-level functions

With the logic operation, priority control and disable functions, the software application offers you three prioritised functions (with higher priority). The functions with higher priority are processed before functions with lower priority.

| | |
|---------------|--|
| high priority | |
| 3 | Disable function |
| 2 | Logic operation or priority control |
| 1 | Switching, dimming, value dimming, time functions, scene, central function |

low priority

Alternatively, you can activate the logic operation or priority control functions for an output channel using a parameter:

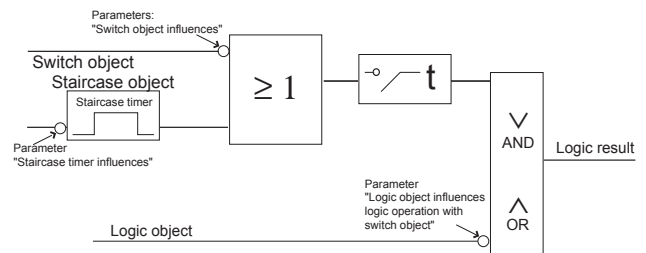
| Tab | Parameter |
|------------|---------------------------|
| X: General | Higher priority functions |

You can also use a parameter to activate a disable function with the highest priority for each output channel:

| Tab | Parameter |
|------------|------------------|
| X: General | Disable function |

Logic operation

A new object with the label "Logic object" (1 bit) is available for each output channel for which you have selected the logic operation as the prioritised function. The value of the "Logic object" is then logically linked both to the value of the "Switch object" and of the "Staircase lighting" object of this output channel.



AND and OR functions are possible as logic operations:

| Tab | Parameter |
|--------------------|-----------------|
| X: Logic operation | Logic operation |

You can use the logic object to "override" the current brightness of a switch or staircase lighting function and to set it to a parameterisable brightness value.

| Tab | Parameter |
|--------------------|--|
| X: Logic operation | Brightness with logic object "0" in % (with AND logic operation) |
| X: Logic operation | Brightness with logic object "1" in % (with OR logic operation) |

With an OR logic operation, the brightness for which the parameters can be set is specified with an object value "1", and with an AND logic operation, with an object value "0".

You can invert, or not invert, the effect of the current object values on this logic operation using parameters:

You can determine the input behaviour for the logic object:

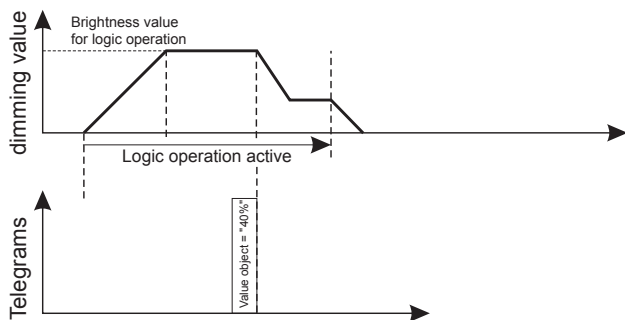
| Tab | Parameter |
|-------------------|-------------------------|
| X: Logic function | Logic object influences |

If you set the parameter value to "not inverted", the logic operation is formed with the current object value; the object value "0" remains "0" and the object value "1" remains "1".

If you set the parameter value to "inverted", the logic operation is formed with a value which is opposite to the current object value; Object value "0" becomes "1" and object value "1" becomes "0".

i The switch object and staircase lighting object are also combined via an OR logic operation when the logic function is inactive - see the "Staircase lighting function" section.

i Please note the following important special feature:
 You can also use telegrams for the "Dimming object" and "Central dimming object" (4 bit) or "Value object" and "Central value object" (1 byte) and scene telegrams to modify the brightness value of the dimming output while a logic function is active. However, the central object cannot be inverted.
 Here, the output can also be switched on or off, even when you have selected a different behaviour when the logic function is active! Otherwise, an active logic function can only be overridden by the disable function with a higher priority.
 Each time a telegram is received via the switch object, the central object or the staircase lighting object (before the warning), the logic function is updated and the logic operation result is re-calculated.



The brightness of the logic operation result and the dimming speed is defined by the last telegram.

If you have activated the logic function, the set value is activated after downloading or after the bus voltage has returned at the input to the logic functions, and is immediately effective.

| Tab | Parameter |
|-------------------|---|
| X: Logic function | Value of the logic object after bus voltage failure and downloading |

Here, please also refer to the section "Startup and failure behaviour".

Priority control

If you have selected priority control for a channel, a new communication object labelled "Priority control" is provided for this channel, together with a new parameter window for further function settings. The "Priority control" object has a length of 2 bits, with the following data format:

| Bit1 | Bit0 | Behaviour of the output |
|------|------|--|
| 1 | 1 | Priority control, dimming output "on" |
| 0 | 1 | End of priority control |
| 1 | 0 | Priority control, dimming output "off" |
| 0 | 0 | End of priority control |

Activating priority control:

The priority control for the output is activated when the value "1" is received at bit1. Depending on bit0 of the received telegram, the assigned dimming output is then set according to your parameter settings:

- For bit0 = "1":

| Tab | Parameter |
|---------------------|---|
| X: Priority control | Behaviour at start of priority control "on" |

If you wish to set a specific brightness, you can set this brightness via an additional parameter:

| Tab | Parameter |
|---------------------|--|
| X: Priority control | Required brightness at start of priority control "on" in % |

- For bit0 = "0":

| Tab | Parameter |
|---------------------|--|
| X: Priority control | Behaviour at start of priority control "off" |

If you wish to set a specific brightness, you can set this brightness via an additional parameter:

| Tab | Parameter |
|---------------------|---|
| X: Priority control | Required brightness at start of priority control "off" in % |

Settings on start of a priority control:

- no response: The dimming output remains at its current brightness value at the start of the priority control. This output value can only be changed while the priority control is active by the disable function which has a higher priority.
- switch off: The dimming output is switched off.
- switch on at variable brightness: The dimming output is set to the defined brightness value.

Deactivating priority control

The priority controlled dimming output remains in the selected status until the priority control is released again by a new telegram with the value "0" to bit1. You can use parameters to set how a dimming output should respond when the priority control has been removed again:

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| Tab | Parameter |
|---------------------|--|
| X: Priority control | Behaviour at the end of priority control |

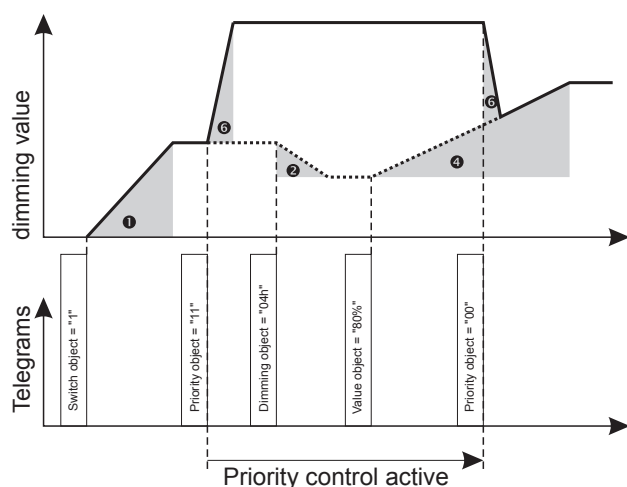
Setting options at the end of priority control:

- no response: The dimming output remains at its current output value until the output receives the next switch or dimming telegram.
- switch off: The dimming output is switched off at the end of priority control.
- switch on to variable brightness: The dimming output sets the brightness value which you have determined via an additional parameter:
- follows subordinate functions: Telegrams for the subordinate functions continue to be processed in the background while a priority control is active, but are not forwarded to the dimming outputs. After the priority control, the output is set to the value which has been calculated in the background.

| Tab | Parameter |
|---------------------|---|
| X: Priority control | Required brightness at end of priority control in % |

Dimming speed of priority control

The dimming speed for changes in brightness during activation, deactivation and priority control is influenced by the dimming time reduction for higher priority functions in the current dimming time reduction set (please also refer to the section on dimming speeds). If a subordinate dimming procedure is currently active when the priority control is released, and you have set the "Behaviour at the end of priority control" to the "follows subordinate functions" value, the lights are dimmed down to the current dimming value with the dimming time reduction for higher priority functions in the current dimming time reduction set. The lights then continue to be dimmed with the dimming speed of the function which is currently active.



Parameter settings for the example in the image:

- Behaviour at start of priority control "on" = "switch on to variable brightness"

- Required brightness at start of priority control "off" in % = 100
- Behaviour at the end of priority control = "follows subordinate functions"

Image legend:

- ①: Dimming time reduction for switching telegrams and switching on staircase lighting.
- ②: Dimming time reduction for dimming telegrams.
- ④: Dimming time reduction for value telegrams.
- ⑤: Dimming time reduction for scene telegrams.
- ⑥: Dimming time reduction for prioritised functions.

Value of priority control after bus voltage failure

The bus voltage may fail while the priority control is active. You can specify the behaviour of the priority control when the bus voltage recovers by setting a parameter:

| Tab | Parameter |
|---------------------|--|
| X: Priority control | Behaviour of priority control after bus voltage recovery |

The settings have the following meaning:

- inactive: After a bus voltage failure, the priority control is not active. It must be activated by a new telegram if necessary.
- active "off": After a bus voltage failure, the priority control is directly active "off". Subordinate functions are not set, but are processed only in the background. In order to deactivate, the actuator must receive an appropriate telegram.
- active "on": After a bus voltage failure, the priority control is directly active "on". Subordinate functions are not set, but are processed only in the background. In order to deactivate, the actuator must receive an appropriate telegram.
- as before bus voltage failure: The priority control is set to the status which was active before the bus voltage failure. If the function was active, it is now switched back to active again; if it was deactivated, it now remains switched off.

Disable function

If you have activated the disable function for a switching channel, a new communication object appears for this channel as a 1-bit object with the label "Disable object" and a new parameter window in which you can make the further function settings.

Activating the disable function

Please first specify the starting behaviour of the disable function.

| Tab | Parameter |
|---------------------|-----------|
| X: Disable function | Lock |

You can use the "Lock" parameter to set the object value at which the function should be activated. If the

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"Disable object" receives a telegram with the object value "0" or "1" for activation, the disable function is started. It remains active until the "Disable object" receives a telegram with the opposite object value. You can use additional setting options to specify the behaviour of the dimming output at the start and the end of a disable function:

| Tab | Parameter |
|---------------------|-------------------------------|
| X: Disable function | Behaviour at start of lockout |

Setting options:

- no response: The dimming output remains at its current value at the start of a disable function. This value can now no longer be changed as long as the disable function is active.
- switch off: The dimming output is switched off and remains in this state until the end of the disable function, or until the disable function receives the first active switching or dimming telegram.
- switch on at variable brightness: The dimming output sets the brightness value which you have determined via a parameter:

| Tab | Parameter |
|---------------------|--|
| X: Disable function | Required brightness at start of lockout in % |

Deactivating the disable function

The disabled dimming output remains in the selected status until the disable function is released again by a new telegram with the value "0" or "1". You can use parameters to set how a dimming output should respond when the disable function has been removed again:

| Tab | Parameter |
|---------------------|-----------------------------|
| X: Disable function | Behaviour at end of lockout |

Settings:

- no response: The disable function is deactivated without the dimming output responding. The output remains at its current brightness value until the next active switching or dimming telegram.
- switch off: The dimming output is switched off at the end of the disable function.
- switch on to variable brightness: In order to set a variable brightness at the end of a disable function, an additional parameter appears:

| Tab | Parameter |
|---------------------|--|
| X: Disable function | Required brightness at end of lockout in % |

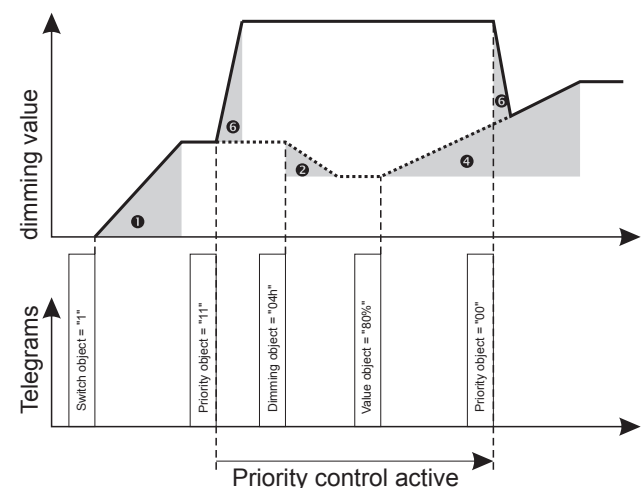
- follows subordinate functions: Telegrams for the subordinate functions continue to be processed in the background while a disable function is active, but are not forwarded to the dimming outputs. After the end of the disable function, the dimming output is set to

the value which has been calculated in the background for the subordinate functions.

Dimming speed of the disable function

The dimming speed for changes in brightness during activation, deactivation and during a disable function is influenced by the setting for the current dimming time reduction set (please also refer to the section on dimming speeds). If a subordinate dimming procedure is currently active at the end of a disable function, and you have set the "Behaviour at end of lockout" to the "follows subordinate functions" value, the lights are dimmed down to the current dimming value with the dimming time reduction for higher priority functions in the dimming time reduction set. The lights then continue to be dimmed with the dimming speed of the function which is currently active.

The dimming speed for changes in brightness during activation, deactivation and during a disable function is influenced by the dimming time reduction for higher priority functions in the current dimming time reduction set (please also refer to the section on dimming speeds). If a subordinate dimming procedure is currently active when the priority control is released, and you have set the "Behaviour at the end of priority control" to the "follows subordinate functions" value, the lights are dimmed down to the current dimming value with the dimming time reduction for higher priority functions in the current dimming time reduction set. The lights then continue to be dimmed with the corresponding dimming speed of the function which is currently active.



Parameter settings for the IMAGE:

- Lock = with object value "1"
- Behaviour at start of lockout = "switch on at variable brightness"
- Required brightness at start of lockout in % = 100
- Behaviour at end of lockout = "follows subordinate functions"

Image legend:

- ①: Dimming time reduction for switching telegrams and switching on staircase lighting.
- ②: Dimming time reduction for dimming telegrams.
- ④: Dimming time reduction for value telegrams.

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- 5: Dimming time reduction for scene telegrams.
- 6: Dimming time reduction for prioritised functions.

Value of disable function after bus voltage failure

The bus voltage may fail while the disable function is active. You can specify the status of the disable function when the bus voltage recovers by setting a parameter:

| Tab | Parameter |
|---------------------|---|
| X: Disable function | Lockout status after bus voltage recovery |

The settings have the following meaning:

- inactive: After a bus voltage failure, the disable function is not active. It must be activated by a new telegram if necessary.
- active: After a bus voltage failure, the disable function is directly active. Subordinate functions are not set, but are processed only in the background. In order to deactivate, the "Disable object" must receive an appropriate telegram.
- as before bus voltage failure: The disable function is set to the status which was active before the bus voltage failure. If the function was active, it is now switched back to active again; if it was deactivated, it now remains switched off.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|---|------------------|-------|------|-------|----------------------|
| Channel X Higher priority function | Logic object | 2 bit | Low | WC | Transmit/ receive |
| Channel X Higher priority function | Priority control | 2 bit | Low | WC | Transmit/ receive |
| Channel X Disable function | Disable object | 1 bit | Low | WC | Transmit/ receive |

● Status messages

The software application provides you with numerous options to report the current device status and the status of the dimming channels via communication objects. Depending on these status messages, you can trigger certain control processes or release and disable functions in the system. In addition, status messages are also suitable for displaying current operating states by means of visualisation software.

The status messages of the output channels are made available through communication objects. You can set the transmission characteristics of these status objects to one of the following values using parameters:

-deactivated:

The status object is not active.

-active status response object

When the status changes, the new status is automatically transmitted.

- passive status object:

The status object does not transmit its values.

However, the current status is available in each case, and can be read out by other bus devices.

Status error (device-specific)

A communication object is provided in order to report error states caused by hardware, which you can priority activate for the appliance via a parameter:

| Tab | Parameter |
|---------|--------------|
| General | Status error |

After activation, the additional communication object appears with the label "Feedback error" or "Status error", depending on the parameters set.

If a short circuit/overload, idle or excess temperature error occurs, this error status is reported. The error message is issued regardless of the output channel in which this error occurs. The object contains the value "1". A fault analysis is possible on site using the LEDs on the device. If the error has been rectified and the appliance again operates correctly, the object will receive the value "0".

If you have selected the value "Active status feedback object" for "Status error", the current status of the object is transmitted when an error occurs after the bus voltage returns.

For further information on the display of the device function, please refer to the following manual section "Manual operation and status displays".

Status of switch object (channel-specific)

The option is provided for each output channel to query or report the current status of the channel using the status feedback object. You can activate the feedback object for each channel individually. When you activate the feedback object, you simultaneously determine its transmission characteristic:

| Tab | Parameter |
|------------|---------------|
| X: General | Status switch |

After you have activated the status feedback for the switch object in a channel, a new communication object appears for this channel. Depending on the transmission characteristic which you have selected, the designation of this object alternates between the "Feedback switch" or "Status switch" values.

The value of the feedback object of a channel always corresponds to the current output status ON or OFF. When dimmed, the setting corresponds to ON. The status of the feedback object corresponds to the status display "On" of the channel (for further

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information, please refer to the section on "Manual operation and status displays"). If you have set the feedback object as the status feedback object, the current object value is transmitted to the bus with each status change from OFF to ON, or vice-versa.

i The value of the switch object may differ from the current channel value (e.g. with parameterised delay times). For this reason, use the status of the channel as the status feedback object.

Status of value object/brightness value (channel-specific)

The option is also provided for each output channel to query or report the current brightness value of the channel using the communication object. You can activate the feedback object for each channel individually. When you activate the feedback object, you simultaneously determine its transmission characteristic:

| Tab | Parameter |
|------------|---|
| X: General | Status of value object/ brightness value |

After you have activated the status feedback for the brightness value of a channel, a new communication object appears for this channel. Depending on the transmission characteristic which you have selected, the designation of this object alternates between the "Feedback value object/brightness value" or "Status value object/brightness value" values.

The value of the feedback object of a channel always corresponds to the current dimming value of the output between 0% and 100% in 255 steps.

If you have set the feedback object as the status feedback object, the current object value is transmitted to the bus, **when the output has reached a stable dimming value**. The object value is therefore transmitted when:

- a dimming procedure is completed
- the minimum or maximum dimming value has been reached
- a dimming procedure has been stopped by manual operation

The object value of the feedback object as a passive status object always corresponds to the current output value.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|-------------------------------|--------------|------------------|------|-------|----------------------|
| Status error | Status error | 1 bit/ | Low | LC | Transmit/ receive |
| Channel X Status AB | Feedback AB | 1 bit/1 byte/ | Low | WCT | Transmit/ receive |

● Manual operation

Manual operation

A channel key for each output channel is located at the front of a dimming actuator. You can use this channel key to manually operate the assigned output (channel key operation). In the same way, each output channel has a connection option for external operating elements (electric extension units or mechanical push-buttons) for operation from another location (extension unit operation). For further information, please refer to the operating instructions for the appliance.

Releasing / disabling channel operation and extension unit operation

You can specify as a priority the operation options for the appliance using channel keys or external extension units by setting the following parameters:

| Tab | Parameter |
|---------|-----------------------|
| General | Channel key operation |
| | Extension input |

You can continuously enable and disable the manual operation options using the parameter values "enabled" and "disabled".

If you have selected the parameter setting "can be switched on and off via object", new communication objects appear which enable you to release the function via bus telegrams, depending on the control. The new communication objects are labelled either "disable channel key operation" or "disable extension unit operation", depending on the function. With this deactivation option, the respective function is disabled when the telegram value "1" is received, and enabled when the telegram value "0" is received.

i In this case, operation is always switched on following initialisation and the application download.

When the extension unit operation is released with reference to the object, you can still activate and deactivate this function separately for each channel:

| Tab | Parameter |
|------------|-----------------|
| X: General | Extension input |

If you have deactivated the release of the extension unit operation via the object value for a channel, the extension unit operation will not be active for this channel.

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Channel operation and extension unit operation

If you have switched on the channel key operation and/or the extension unit operation or have released them via an object, dimming commands (longer push-button action) or switch commands (short push-button action) are generated when operating the corresponding operating elements. Here, both operating options function with the same priority.

The channel operation always affects the "Switch object" and the "Dimming object" of the corresponding channel.

During extension unit operation, you can set the object which you wish to be influenced by the function:

| Tab | Parameter |
|------------|----------------------------|
| X: General | Extension input influences |

Settings:

- "Switch object": Operation via extension units affects the "Switch object" and the "Dimming object" of the corresponding channel.

- "Staircase timer": Operation of the extension units influences the staircase timer object. In this way, you can switch on or retrigger the staircase lighting function. The trigger function depends on your parameter settings for the staircase lighting function (see the manual section on "Staircase lighting function").

Commands from channel key operation and extension unit operation which influence the "Switch object" and "Dimming object" of a channel have the same value as the commands via these objects. The last active command is forwarded to the dimming output. Each push-button action during channel key operation or extension unit operation influences the last output value in the same way as a toggle key. This means that the output is switched off after a short push-button action, when it has previously been switched on, and is switched on when it has previously been switched off. A long push-button action on the channel key or extension unit acts in the same way as a relative dimming command. The output is dimmed up or down for the period of the push-button action, depending on which dimming direction was previously active for a relative dimming command. Relative dimming commands are either issued following a long push-button action during channel key operation, or during the extension unit operation itself, or via the "Dimming object" or "Central dimming object".

The priority of channel key operation and extension unit operation

Channel key operation and extension unit operation function with the same priority level as the switching function and dimming function (please refer to the section on priority) which they influence. This means that a manual operation via these functions is not forwarded to the dimming outputs as long as a higher priority function is active. The corresponding operations are processed in the background by the software, however.

Channel key operation and extension unit operation during emergency operation

When only the operating voltage, but not the bus voltage is applied to the appliance, the device is in the "emergency operation" mode. In emergency operation mode, the channel key operation and extension unit operation are always switched on and function in parallel. In this way, the output channels can also be switched on and off (short push-button action) or dimmed (long push-button action) without bus telegrams.

i In emergency operation mode, the dimming direction changes when the maximum or minimum dimming value is reached. In other words, as long as the key is kept pressed down, the output dims continuously up and down!

i In emergency operation mode, all parameter settings are deactivated! The missing values for the minimum/maximum dimming value and for the dimming curves must be taken into account in particular.

Communication objects

You can select the following communication objects:

Per input:

| Function | Object name | Type | Prio | Flags | Behaviour |
|--------------------------|---------------------------|-------|------|-------|------------------|
| Channel key operation | Disable channel operation | 1 bit | Low | SLK | Transmit/receive |
| Extension unit operation | Disable extension inputs | 1 bit | Low | WRC | Transmit/receive |

● Status displays

The dimming actuator has different LED displays, which show the current status of the appliance hardware (red error LED for each output), the current status of the switch outputs (yellow status LED for each output), and the operation status (green run LED).

Status of the appliance hardware:


A red LED display (error LED) is assigned to each output channel in order to indicate error output states or an excess temperature in the appliance. In normal operating mode, the error LEDs are switched off. Please note that some error states must be acknowledged in order to deactivate them.


The following errors may occur:


- Overload and short circuit
If an overload or a short circuit occurs on an output channel, the channel concerned is switched off. The error LED on the output lights up. The status LED on the output does not light up. After the error state has been rectified, you can acknowledge this error message in two different

ways:

- Acknowledgement via push-button action on the channel key: After acknowledgement, the output channel carries out a load detection. If this is successful, the output is dimmed to the max. brightness.
 - Acknowledgement by switching the operating voltage off and on: In this case, the load detection is only carried out when the first switching or dimming signal is issued on the output (by pressing the channel key, extension unit or KNX). When the load detection is initialised by the channel key or the extension input, the max. dimming value is then set.
- Idle state
- If the appliance hardware detects an idle state at an output channel, the channel is switched off. The error LED on the output lights up. The status LED on the output lights up. This state does not need to be acknowledged. After a load is connected, the actuator carries out a load detection when the first switching or dimming signal is received (by pressing the channel key, the extension unit or the KNX). When the load detection is initialised by the channel key or the extension input, the max. dimming value is then set.
- Excess temperature
- The temperature in the housing of the dimming actuator is constantly monitored. If the measured temperature exceeds a critical value, all the dimming outputs which are switched on are dimmed down to the min. dimming brightness. In this case, the run LED flashes, all error LEDs light up, and your only option is to switch off the dimming channels.
- If the temperature value remains above the critical value within the next 15 minutes, or if it continues to rise, all outputs are switched off. You can only switch the outputs back on when the temperature value has cooled to its normal range.
- If the temperature value falls back to its normal range within 15 minutes following an excess temperature, all dimming outputs are set back to their former dimming value.

 If one of the above error states occurs, this can also be reported as a status via a bus telegram. Please refer to the manual section on "Status reports".

 If a short circuit or idle state occurs on an output channel during operation, no further bus telegrams are evaluated for this channel, and after the error has been reported via the status object, no further bus telegrams are transmitted. If a successful load detection has been completed for this channel after such an error has occurred (the output is switched to the max. brightness), bus operation is again possible.

 If another error is identified during a load detection, or if another error occurs, the load

detection is interrupted. A maximum of 3 load detections can be triggered via bus telegrams. After the third unsuccessful load detection, the load detection can only be triggered via the channel keys or the extension input!

Status of the switch outputs

The yellow status display on a channel indicates the switching or dimming status of an output channel. If the channel is switched off, the status display is also switched off. The status display lights up when the channel is switched on or dimmed.

Operational status

The green run LED lights up when the dimming actuator is functioning correctly, the software application is running and the operating voltage and bus voltage are being applied.

Overview of status displays

| Operating display | Channel status display | Channel error display | |
|-------------------|------------------------|-----------------------|--|
| on | off | off | Universal dimming actuator ready for operation (mains voltage and bus voltage available) and channel switched off |
| on | on | off | Universal dimming actuator ready for operation (mains voltage and bus voltage available), channel switched on (switch object = "1") or load detection |
| on | off | on | Overload or short circuit. The channel has been switched off. Mains and bus voltage available |
| on | on | on | No load at output (idle). The channel has been switched off. Mains and bus voltage available |
| off | off | off | No bus voltage and channel switched off, or no mains voltage |
| off | on | off | No bus voltage and channel switched on |
| off | off | on | Overload or short circuit and no bus voltage. The channel has been switched off. |
| off | on | on | No load at output (idle) and no bus voltage. The channel has been switched off. |
| flashes | on/off | all on | Excess temperature. All channels that are switched on are dimmed to minimum power/minimum brightness. Channels which are currently switched off cannot be switched on. See also the section "How to recognise potential faults". |

● Startup and failure behaviour

Load detection

In order to be able to set the dimming behaviour (phase control or phase alignment) automatically to the connected lamp load, each channel must conduct a "load detection" prior to operation. The load detection can be conducted as soon as the loads are connected and the operating voltage has been switched on. You can trigger the load detection by activating a channel key, or alternatively, an extension unit push-button. If the appliance has already been programmed, you can also activate the load detection via the initial ON or dimming telegram.

A load detection is required when a short circuit or idle state has occurred at an output (see also the section on "Status displays").

During the load detection, the output is switched on at max. brightness for approx. 10s; then it is switched off and dimmed back up to the max. brightness or to the parameterised value. The channel is then ready for operation.



If another error is identified during a load detection, or if another error occurs, the load detection is interrupted. A maximum of 3 load detections can be triggered via bus telegrams. After the third unsuccessful load detection, the load detection can only be triggered via the channel keys or the extension input!

Physical address

When the operating and bus voltage have been applied to the dimming actuator, you can issue the physical address using the ETS software. Press the programming key to put the appliance into programming mode. This is indicated when the red programming LED lights up. Now you can load the physical address. When the load has been successfully completed, the red programming LED goes out.

Behaviour after download

The behaviour after the application has been downloaded corresponds to the behaviour following the recovery of the bus voltage when the operating voltage is present, as described below. You can parameterise whether the priority control and the disable function are active after a download. For the scene function, you can also specify whether the stored brightness values should be overwritten by your settings during a download, or not (please refer to the section "Scene function").

Behaviour on failure of the operating voltage

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No functions are possible when the operating voltage fails. All channels and display elements are switched off. Please note that the appliance must in all cases conduct a load detection when the operating voltage returns.

Behaviour when the operating voltage returns and the bus voltage is absent (emergency operation)

All channels remains switched off. As soon as you wish to switch on a channel by activating the channel key or an extension unit push-button, the appliance conducts a load detection. After the load detection, you can operate the output channels using the channel keys and extension units.

Behaviour when the operating voltage returns and the bus voltage is present

The channels remains switched off. As soon as you wish to switch on a channel by activating the channel key or an extension unit push-button, or via a bus telegram, the appliance conducts a load detection. After the load detection, you can continue to operate the output channels as before.

Behaviour when the bus voltage fails and the operating voltage is present

When the bus voltage fails, the brightness values on the output channels do not change. The appliance is now running in emergency operation mode. You can operate the output via the channel keys or in extension unit operation mode. The operating display (run LED) is switched off.

The current values of the priority control or logic object and the disable object are stored.

Behaviour when the bus voltage returns and the operating voltage is present

You can set the behaviour of the appliance functions individually for each channel of the dimming actuator following a bus voltage failure.

After a bus voltage failure, the speed set "0" is active. The dimming speed is oriented to the active function.

- Value of switch object after bus voltage failure

You can specify the behaviour of the switch object after a bus voltage failure or a download using a parameter:

| Tab | Parameter |
|------------|--|
| X: General | Behaviour during bus voltage recovery and download |

Settings:

- no response: The output channel remains at its current brightness value.

-switch off: The output is switched off.

-switch on with starting behaviour, see the "Starting behaviour" parameters in the tab Channel:X.

The output is switched on at the set initial brightness.

If other advanced or priority functions are active when a bus voltage failure occurs, your settings for the reaction of the switch object may be overwritten.

- Value of logic object after bus voltage failure

| Tab | Parameter |
|--------------------|--|
| X: Logic operation | Value of the logic object after bus voltage failure and download |

If you have activated the logic function, the set value for each output channel is activated after downloading or after the bus voltage has returned at the input of the logic functions.

- Value of priority control after bus voltage failure

Sie können das Verhalten der Zwangsführung bei Wiederkehr der Busspannung durch einen Parameter festlegen:

| Tab | Parameter |
|---------------------|--|
| X: Priority control | Behaviour of priority control after bus voltage recovery |

The settings have the following meaning:

- inactive: After a bus voltage failure, the priority control is not active. It must be activated by a new telegram if necessary.

- active "off": After a bus voltage failure, the priority control is directly active with the behaviour at the start of priority control "off". Subordinate functions are not set, but are processed only in the background. In order to deactivate, the actuator must receive an appropriate telegram.

- active "on": After a bus voltage failure, the priority control is directly active with the behaviour at the start of priority control "on". Subordinate functions are not set, but are processed only in the background. In order to deactivate, the actuator must receive an appropriate telegram.

- as before bus voltage failure: The priority control is set to the status which was active before the bus voltage failure. If the function was active, it is now switched back to active again; if it was deactivated, it now remains switched off.

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- Value of disable function after bus voltage failure

You can specify the status of the disable function when the bus voltage recovers by setting a parameter:

| Tab | Parameter |
|---------------------|--|
| X: Disable function | Lock status after bus voltage recovery |

The settings have the following meaning:

- inactive: After a bus voltage failure, the disable function is not active. It must be activated by a new telegram if necessary.
- active: After a bus voltage failure, the disable function is directly active. Subordinate functions are not set, but are processed only in the background. In order to deactivate, the "disable object" must receive an appropriate telegram.
- as before bus voltage failure: The disable function is set to the status which was active before the bus voltage failure. If the function was active, it is now switched back to active again; if it was deactivated, it now remains switched off.

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Parameters and settings

This section contains all the parameters of the ETS application with their settings. Preset values are printed in bold.

| General | |
|--|---|
| Parameter | Setting |
| Channel X | deactivated |
| | activated |
| Scenes | disabled |
| | enabled |
| Extension unit scenes | disabled |
| | enabled |
| Central function | disabled |
| | enabled |
| Central switch object | deactivated |
| | activated |
| Central dimming object | deactivated |
| | activated |
| Central value object | deactivated |
| | activated |
| Same dimming time with central function and scenes | disabled |
| | enabled |
| Channel operation | enabled |
| | disabled |
| | can be switched on and off via the object |
| | |
| Extension inputs | enabled |
| | disabled |
| | can be switched on and off via the object |
| | |
| Status error | deactivated |
| | active status feedback object |
| | passive status object |

| Same dimming time | |
|--|-------------------------|
| Parameter | Setting |
| Time base for same dimming time | 1s , 1min, 1hour |
| Time factor for same dimming time 1-255 | 1.. 5 ..255 |
| Time factor for same dimming time modifiable via the bus | deactivated |
| | activated |

| X: General | |
|---------------------------------|--------------------------------|
| Parameter | Setting |
| Minimum dimming value in % | 1.. 7 ..100 |
| Maximum dimming value in % | 1.. 100 |
| Starting behaviour | Max. brightness |
| | variable brightness |
| | last brightness value (memory) |
| Basic dimming curve | Incandescent lamps |
| | Halogen lamps |
| | modifiable |
| Dimming object switches channel | not at all |
| | only on, not off |
| | only off, not on |
| | on and off |

| | |
|---|----------------------------------|
| Value object switches channel | not at all |
| | only on, not off |
| | only off, not on |
| | on and off |
| Extension input influences | Switch object |
| | Staircase timer |
| Extension inputs | enabled |
| | selectable via object |
| Delay times | disabled |
| | enabled |
| Staircase lighting function | deactivated |
| | activated |
| Switch object influences logic operation | unchanged |
| | inverted |
| Scenes | disabled |
| | enabled |
| Central function | disabled |
| | enabled |
| Higher priority functions | deactivated |
| | Logic operation |
| | Priority control |
| Disable function | deactivated |
| | activated |
| Behaviour during bus voltage return and downloading | no response |
| | switch off |
| | switch on at variable brightness |
| Required brightness in % when bus voltage recovers | 0..100 |
| Status switch | deactivated |
| | activated |
| Status of value object/brightness value | deactivated |
| | activated |

| X: Basic dimming curve | |
|---|--------------------------------|
| Parameter | Setting |
| 1. threshold value in % | 0.. 25 ..100 |
| 2. threshold value in % | 0.. 50 ..100 |
| 3. threshold value in % | 0.. 75 ..100 |
| Time base for 1st dimming section | 100ms , 1s, 1min, 1hour |
| Time factor for 4th dimming section (1-255) | 1.. 230 ..255 |
| Time base for 2nd dimming section | 100ms , 1s, 1min, 1hour |
| Time factor for 4th dimming section (2-255) | 1.. 180 ..255 |
| Time base for 3rd dimming section | 100ms , 1s, 1min, 1hour |
| Time factor for 4th dimming section (3-255) | 1.. 120 ..255 |
| Time base for 4th dimming section | 100ms , 1s, 1min, 1hour |
| Time factor for 4th dimming section (4-255) | 1.. 70 ..255 |

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X: Dimming time reductions

| Parameter | Setting |
|---|---------------------------------|
| Dimming time reduction object for dimming curve | deactivated activated |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for switching telegrams and switching on staircase lighting | 1..2..100 |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for dimming telegrams | 1..10..100 |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for switching off staircase lighting | 1..50..100 |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for value telegrams | 1..20..100 |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for scene telegrams | 1..32..100 |
| Set 0 to 3: Dimming time reduction (1-100) or (1-255) for higher priority functions | 1..2..100 |
| Set 1 to 3 | disabled enabled |

Delay times

| Parameter | Setting |
|-----------------------------------|--|
| ON delay | deactivated retriggerable not retriggerable |
| Output during the ON delay | switched off at minimum brightness / lower dimming limit |
| Time base for ON delay | 100 ms 1 s 1 min 1hour |
| Time factor for ON delay (1-255) | 1..3..255 |
| OFF delay | deactivated retriggerable not retriggerable |
| Time base for OFF delay | 100 ms 1 s 1 min 1hour |
| Time factor for OFF delay (1-255) | 1..3..255 |

X: Staircase timer

| Parameter | Setting |
|-----------------------------|---|
| Staircase lighting function | with manual OFF, cannot be retriggered with manual OFF, can be retriggered with manual OFF, accumulate time without manual OFF, cannot be retriggered without manual OFF, can be retriggered |

| | |
|---|-------------------------------------|
| | without manual OFF, accumulate time |
| Max. number of time accumulations (2-255) | 2..3..255 |
| Time base for staircase timer | 1 s 1 min 1hour |
| Time factor for staircase timer (1-255) | 1..3..255 |
| Staircase timer influences logic operation | unchanged inverted |
| Cut-out warning for staircase lighting time | deactivated activated |
| Warning time for staircase lighting time in seconds (1-255) | 1..30..255 |

X: Scenes

| Parameter | Setting |
|--|--|
| Replace scene values in the actuator on download | deactivated activated |
| Same dimming time | deactivated activated |
| Scene 1 to scene 8 | deactivated activated (scene 1 activated) |
| Scene 1 to scene 8 scene number (0-63) | 0..63 |
| Scene 1 to scene 8 brightness value in % | 0..15..100% |

X: Central function

| Parameter | Setting |
|---|--|
| Same dimming time | deactivated activated |
| Function with the central switch object = 0 | no response switch off switch on at variable brightness |
| Function with the central switch object = 1 | no response switch off switch on at variable brightness |
| Required brightness with central switch object = 0 in % | 5..100 |
| Required brightness with central switch object = 1 in % | 5..100 |

X: Logic operation

| Parameter | Setting |
|---|------------------------------|
| Logic operation | AND OR |
| Logic object influences | unchanged inverted |
| Value of the logic object after bus voltage failure and downloading | 0 1 |
| Brightness with logic object "0" in % (with AND logic operation) | 5..100 |
| Brightness with logic object "1" in % (with OR logic operation) | 5..100 |

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| X: Priority control | |
|---|---|
| Parameter | Setting |
| Behaviour on start of priority control "on" | no response |
| | switch off |
| | switch on at variable brightness |
| Required brightness on start of priority control "on" in % | 5.. 100 |
| Behaviour on start of priority control "off" | no response |
| | switch off |
| | switch on at variable brightness |
| Required brightness on start of priority control "off" in % | 5..100 |
| Behaviour at the end of priority control | no response |
| | switch off |
| | switch on at variable brightness |
| | follows subordinate functions |
| Required brightness at end of priority control in % | 5.. 100 |
| Behaviour of priority control after bus voltage recovery | inactive |
| | active "off" |
| | active "on" |
| | as before bus voltage failure |

| X: Disable function | |
|--|---|
| Parameter | Setting |
| Lock | for object value "0" |
| | for object value "1" |
| Behaviour at start of lockout | no response |
| | switch off |
| | switch on at variable brightness |
| Required brightness at start of lockout in % | 5.. 100 |
| Behaviour at end of lockout | no response |
| | switch off |
| | switch on at variable brightness |
| | follows subordinate functions |
| Required brightness at end of lockout in % | 5.. 100 |
| Lock status after bus voltage recovery | inactive |
| | active |
| | as before bus voltage failure |