Product documentation

KNX LED dimming actuator, built-in

3904 EB LED

KNX LED dimming actuator, for rail mounting

3904 REG LED

ALBRECHT JUNG GMBH & CO. KG
Volmestrasse 1
58579 Schalksmühle
GERMANY
Telephone: +49 2355 806-0
Fax: +49 2355 806-204
kundencenter@jung.de
www.jung.de

Table of Contents

Notes

- Electrical equipment must only be installed and mounted by qualified electricians.
- When connecting KNX/EIB interfaces, detailed knowledge through KNX™ training is required.
- Damage to the device, fire or other hazards may arise if the instructions are not followed.
- These instructions are a component part of the product and must remain with the end user.
- The manufacturer shall not be liable for any costs or damage incurred by the user or third party through the use this device, misuse or disturbances of the device or user equipment.
- Opening the housing, other unauthorized changes and modifications to the equipment will render the warranty null and void!
- The manufacturer shall not be liable for damage arising from improper use.

Function

Variants

The LED dimmer actuator is a pulse width-modulating dimmer for LED modules with constant input voltage.

The dimmer is available in two variants:

- KNX LED dimmer actuator EB (installation)
  3904 EB LED
- KNX LED dimmer actuator REG (series installation device)
  3904 REG LED

Short description

Up to four LED channels can be switched and dimmed via the KNX bus. The device can dim 5 A per channel. At a 24 V constant voltage, this corresponds to an output of 120 W or, in total, 480 W.

Light scenes can be preconfigured, saved and played back, also with the help of 1-bit group addresses, e.g. to implement lighting control with a simple motion detector. The scene then recalls a specific color mixture, e.g. of the RGBW light.

Sequences are sequences of color controls in a range of seconds to hours. This changes the lighting over a specific period of time, e.g. with soft color changes. The device possesses predefined color sequences. This makes the use of this "mood light" very simple during commissioning. In addition, the configuration of proprietary color sequences is possible using the ETS application.

The devices can be adjusted to one of the following channels:

- Four independent channels
- Two channels white (cold white / warm white)
- One channel white (cold white / warm white), two independent channels
- One channel color (red / green / blue / white)
- One channel color (red / green / blue)
- One channel color (red / green / blue), one independent channel

The activation of the colors can either take place via the basic colors red, green and blue (RGB color mode) or using hue, saturation and brightness (HSV).[1]

The device possesses a network relay, using which a suitable LED power supply can be switched on the mains side. This means that the actuator switches the LED power supply on and off as required to minimize standby losses in the power supply. To ensure that the switching of the power supply is not carried out permanently in scenes such as Twilight, switch-off is disabled in these times through the configuration of the timer switches. This allows the minimization of the ageing of the mains devices caused by the switch-on operation and also the standby loss.

Undervoltage, overcurrent and overtemperature can be detected using communication objects. These protection functions represent key characteristics of the device. In these cases, the protection function switches the connected LED modules off automatically until the error state has been eliminated. The device then switches back to the original status.

In addition, the device possesses integrated reverse polarity protection, meaning that any damage due to the reverse polarity of the input during commissioning can be excluded. In this regard, the output (connection of the LED modules) is uncritical for the LED dimmer actuator.

Overview of the technical hardware data:

- 4 dimming channels, pulse width-modulated with max. 5 A per channel
- Variable voltage input and output 12 ... 24 V
- Integrated bistable 230 VAC relay 16 A, Inrush 165A@20ms, 800A@200µs
- Integrated protection with integrated display against
  - Overcurrent
  - Undervoltage
  - Overtemperature
  - Reverse polarity
- Commissioning push-button for rapid wiring testing
- Double furniture code (only variant 3904EBLED)

1 For more on the RGB and HSV color depictions, refer to the color selection in the "Windows Paint" drawing program.

The key characteristics of the software

- Dimmer contactable in RGB mode or HSV spatial color mode
- Choice of four different dimming characteristics with integrated soft dimming function
- Automatic switch on/off of the relay with two configurable disabling times
- PWM switchable between 488 and 600 Hz
- Integrated scenes and bit scenes
- Diagnostics/signal of the protection functions via KNX group addresses
- Five freely-definable sequences or 12 preset default sequences
- Free channel configuration

The device possesses the following display and operating elements:

PROG push-button	KNX programming push-button
LED *PROG*	Display of the KNX programming status
TEST push-button	Toggle test mode (see Inbetriebnahme)
LED *A*	Display of test mode, channel A, or active protection function
LED *B*	Display of test mode, channel B, or active protection function
LED *C*	Display of test mode, channel C, or active protection function
LED *D*	Display of test mode, channel D, or active protection function
LED *POWER*	Operating voltage display of the power supply for the LED modules

Table 1: Display and operating elements

The LEDs are used both for the display of Test mode and for the integrated protection function (cf. Table 2).

Commissioning

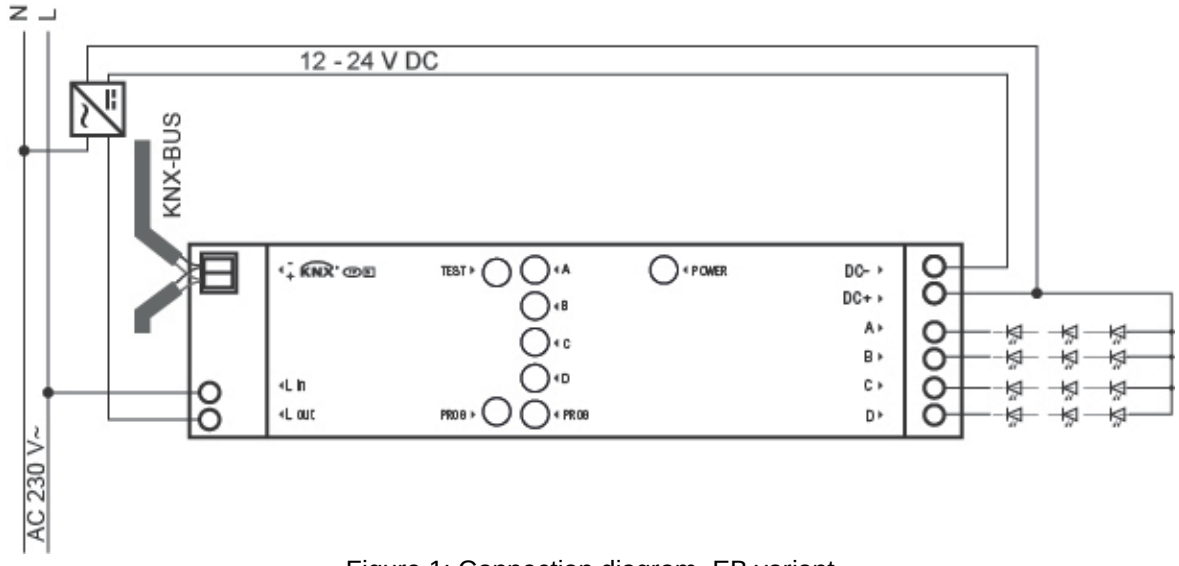

Figure 1: Connection diagram, EB variant

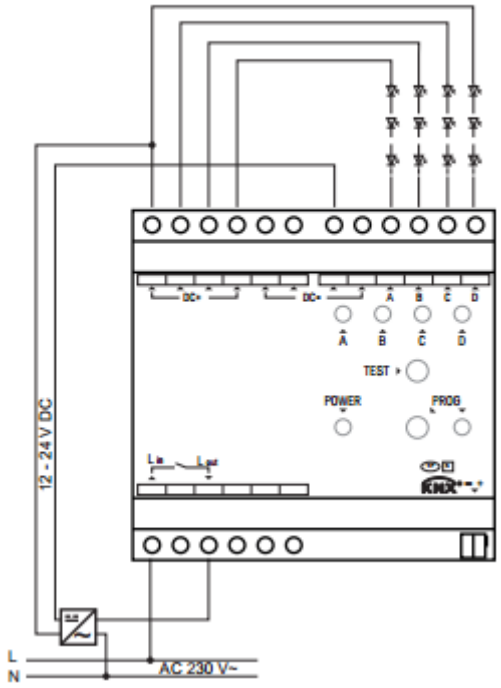

Figure 2: Connection diagram, REG variant

CAUTION! DANGER!

Touching live parts can result in an electric shock. An electric shock can be fatal. Before working on the device, disconnect the connecting lines and cover the surrounding live parts!

Connect the KNX bus, LED power supply and LED modules to the LED dimmer actuator **according to the specification**

Technical data. Figure 3 shows the connection diagram for the installation variant, for which external connection terminals could be helpful, as shown in Figure 5. With the REG variant, sufficient terminals are available for DC+ and DC-, meaning that there is no need for external connection terminals.

The following applies when assigning the colors to the outputs:

Red = A

Green=B

Blue=C

White=D

The following applies when assigning cold/warm white to the outputs:

Cold white 1 = A

Warm white 1 = B

Cold white 2 = C

Warm white 2 = D

Protect the DC 12 ... 24 V SELV supply line with 20 A.

Summarized LED modules, such as the RGB LED strip, must have a shared anode. Connect the anode of the LED modules the the anode of the LED power supply using an appropriate dimensioned supply cable.

The outputs of the LED channels may not be interconnected. It is not possible to summarize LED channels.

Always comply with the specified conductor cross-sections.

If the mains connection of the LED power supply is to be switched with the network relay, secure the appropriate conductor with a maximum of 16 A!

Before switching on the connection cables, the insulating covers / strain reliefs must be attached and screwed on on both sides of the housing.

For commissioning, the LED dimmer actuator in the as-delivered state can be switched to a test mode. For this, the connected KNX bus must be in the ready status. Repeated pressing of the TEST push-button switches on the LED outputs of the device individually. Possible errors can be detected using the LEDs A, B, C and D:

LED A	LED B	LED C	LED D	Meaning
ON	OFF	OFF	OFF	Test mode - Output A switched on.
OFF	ON	OFF	OFF	Test mode - Output B switched on.
OFF	OFF	ON	OFF	Test mode - Output C switched on.
OFF	OFF	OFF	ON	Test mode - Output D switched on.
FLASHING	FLASHING			Undervoltage switch-off
FLASHING		FLASHING		Overcurrent switch-off
FLASHING			FLASHING	Overtemperature switch-off

Table 2: LED code for protection circuit and test mode

Application information

Dimming characteristics

The LED dimmer actuator offers a choice of four different dimming curves:

- Linear,
- exponential,
- potency function,
- JUNG.

The human eye always perceives brightness values in a logarithmic fashion, i.e. at double the light intensity, people do not feel the brightness to be double the amount but actually considerably lower. Although effects such pupil opening and the bright-dark adaptation of the rods and cones play a significant role, sight is frequently modeled in logarithmic fashion. It is assumed, for example, that double the lighting increases the "felt" brightness by only a factor of 1.4.

Activation via KNX-conformant percentage values is performed in a total of 255 steps. For this reason, the activation of the LEDs takes place in 255 discreet steps. The activation points (= brightness of the LED) must be distributed over the possible dimming range by the LED dimming actuator (cf. Figure 6). The setting option for the dimming characteristic of the dimmer is located in the Dimming curve parameter under General in the ETS application.

Dimming curves

Note

The following statements about perception are partially subjective and may differ between people in individual cases. In addition, actual perception is dependent on further factors, such as the LEDs, their integrated activation circuit, their characteristics, etc. Nonetheless, the tendency of the distinctions needs to be clarified.

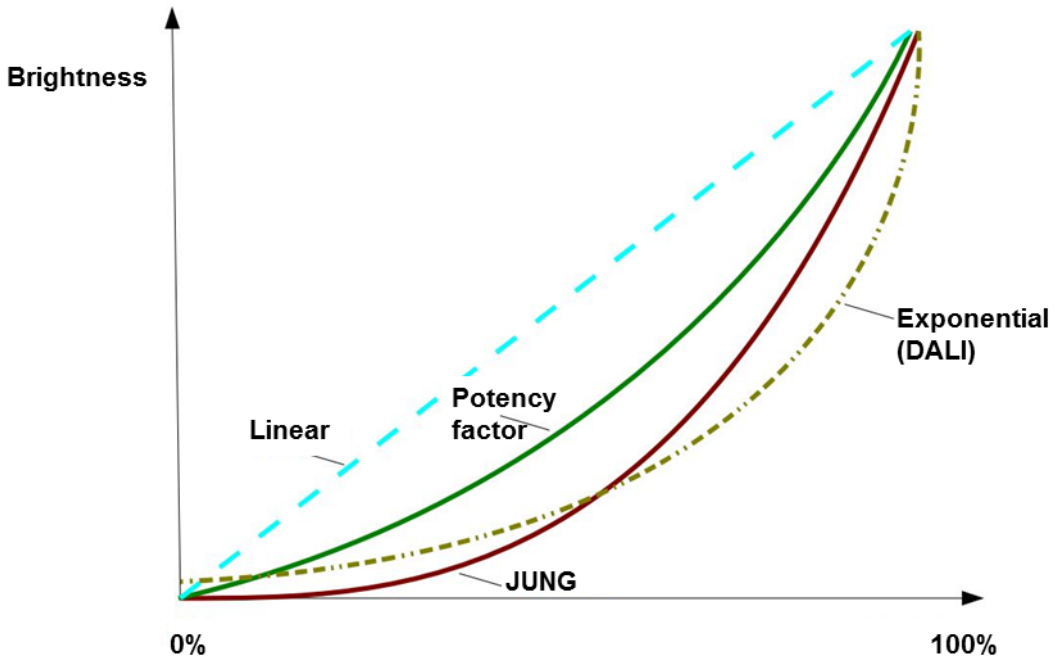

Figure 3: Dimming curves

Linear

For people[2], an increase in the upper activation range of this characteristic (> 80% to 100 %) is generally perceived less. By contrast, in the lower area (<10%), a small increase in the activation value has a great effect for the human eye. In the 40 to 60% range, the subjective perception of the brightness change is often very good.

Exponential

Using the assumption that the perception is logarithmic, with DALI lights, for example, exponential activation is implemented (inversion function). In the lower range, this possesses an offset, i.e. on switching on the LEDs, a noticeable single brightness jump can be perceived. Often, with this characteristic, the LEDs cannot be dimmed down to the lower limit. In the range to 40%, the dimming behavior is very soft and generally corresponds to the perception. From around 50%, the steps are relatively large, meaning that an increase by a few percentage points can create a considerably greater increase in perception. Overall, this dimming curve of the LED dimmer actuator is modeled on the DALI standard.

Potency function

In the upper dimming range (from 60%), this dimming curve generally matches brightness perception very well. In the range up to 10%, the steps are matched better to the eye than is the case with the linear curve, but subjectively less well than the exponential dimming curve. The dimming curve itself is derived as a mathematical potency function.

JUNG

This dimming curve is a mixture of the three above-mentioned linear, exponential and potential dimming curves. It can be dimmed down a very long way in the lower range and, in all the other ranges, is as evenly matched as possible to the perception of the eye. This curve has been specially adapted to the dimming behavior of the device and connected LEDs and is highly recommended for housing.

Dimming behavior

Besides the above effects for human perception, which are the result of this splitting of the dimming curves into 255 individual points, a key distinguishing feature of the device is the "soft" dimming on transitioning from a specific starting point to an end point.

The special activation of the dimmer also means that no steps, i.e. sudden brightness change of the lights, can be perceived, even with slow dimming, and dimming is continuous at all times.

With short dimming times over a wide range, this activation ensures that no flickering can be noticed by the human eye.

In the lower brightness range (<5%), the activation allows continuous regulation of the brightness of the lights, meaning that the switch-on and off of the LEDs occurs with no noticeable brightness jump for the human eye.

With the LED dimmer actuator, flickering is avoided completely independently of the selection of the dimming curve. The transitions are always smooth and never appear jerky.

2 Assuming a logarithmic perception characteristic

Lock objects

The application provides for the use of two lock robots. The LED dimming actuator can go over these objects into a locked or unlocked state via a 1-bit group address. In the locked state, all objects except the lock objects are ignored.

- The following settings can be made for the behavior of the LED dimming actuator during locking and unlocking:
- "As before": The brightness remains unchanged at the current value if the LED dimming actuator is switched on. When switched off, the LED dimming actuator switches on and recalls the last value before switching off.
- "Value": The LED dimming actuator takes the parameterized brightness.
- "Off": The LED dimming actuator saves the last set brightness (see "As before") and turns off.

If the dimmer has been divided into independent channels (RGB, cold white / warm white, etc.), two separate blocking objects are provided for each channel in the ETS application. Blocking objects are thus separately available for each channel (RGB (W), single channel, WW / KW).

Network relay

With the integrated network relay, the LED power supply of the lighting can be switched on and off easily. For this, (cf. Figure 10) the network relay on `Switch network relay automatically` is set to ON. The power supply must be connected in such a way that the integrated actuator can interrupt its 230 V circuit. In this context, automatic switching means that the integrated actuator switches off the power supply when all the channels of the dimmer are at 0%. As soon as a channel has a value not equal to 0%, the actuator switches back on.

A special feature of the LED dimmer actuator is that this automatic switch-off can be assigned to time blocks. This means that the actuator does not switch off, even if all the dimmer channels are at 0%. This means that, for example, in the early morning, a switch-off block can be active between 5:00 and 8:00, stopping, for example, a motion detector, which controls the LED lighting, from switching the 24 V power supply ON and OFF on each movement. With the second switch-off block, this can be performed in the same way for evenings, e.g. between 16:00 and 23:00, meaning that frequent switch-on and off of the 24 V power supply can be avoided. Nonetheless, the automatic switching ensures that standby losses of the 24 V power supply can be minimized. The switch-off block increases the lifespan of the power supply, as the integrated switching components usually react sensitively to a switch-on and off of the 230 V voltage.

Increased safety when mounting in furniture

If the "EB" variant of the dimmer is operated in furniture, then it is essential that the `Switch-off relay on error` setting is used. This allows the dimmer to switch off the power supply completely when it detects an error (e.g. short-circuit). In addition, for diagnostic purposes, the integrated error detection with KNX telegrams should be configured with the ETS. An error from a visualization and alarm centre can be more easily localized and detected using the appropriate communication objects.

This additional protection through the switch-off does not though mean that 230 V power supplies may be built in furniture without the furniture symbols. The devices installed in furniture must all have this symbol.

Color sequences

The device offers the option of setting color activation via RGB objects or HSV objects. In addition, the dimmer calculates the other status objects and outputs them to the but after each status change.

Technically, the RGB LED lights are comprised of the three colors red, green and blue. This means that activation via an RGB object, which outputs an intensity of 0 to 100% for each of the three colors, is technically simple to implement. The resulting light colors are made up of all three color channels, although it is considerably more complex for the user to set a color value of cyan, for example. This is different when HSV objects are used. Here, the H value (color angle) specifies the shade. This is specified as a so-called color angle, which corresponds to a color in the color circle. Each angle value indicates a different color, e.g. 0° for red, 30° for orange, 60° for yellow and so on. The color transitions are flowing, cf. Figure 7.

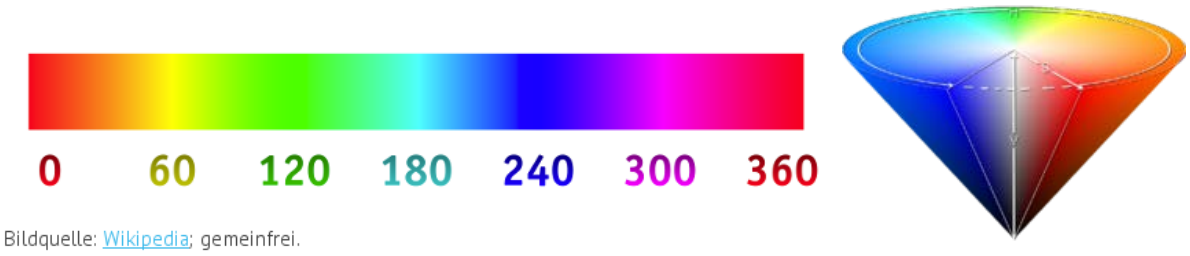

Figure 4: Color angle

The S value (saturation) states the color saturation. S = 0° means white light and S = 100% means complete lighting only in the set shade. "White" should be understood in the context of the light, as only the mixture of the three colors can create white light (cf. White calibration section). However, this white light is not always pleasant or sufficiently white for human perception. For this reason, RGBW lamps offer an additional white LED channel, which is calibrated to an appropriate white light by the manufacturer. If RGBW lamps are used, then this additional white channel is available in the application, which can also be stated in the sequence. The saturation value S is not directly influenced by the white channel and the two values S and White channel should be viewed separately.

The V value (bright value) specifies the brightness of the lighting. 0 % means OFF and 100% maximum brightness.

If proprietary sequences are to be defined, it is thus recommended to set the hues with the H value, then the white light component with the S value and then the brightness with the V value.

White calibration

Using the white calibration (object 11), it is possible to adjust the white tone of the light. The white light is specified through mixing of the activation of the individual color channels. Depending on the LED light, the user may not find the resulting white light ideal, meaning that calibration of the white light must be performed. In so doing, the LED dimmer actuator can be used to specify the mixing ratio of the three individual channels.

If the white calibration (object 11) is set to ON by telegram, then the RGB or HSV values are used to specify the setting which is closest to the desired white light at maximum brightness. Then, then object is set to OFF. The values are then saved. If, for example, the light has a blue component which is slightly too high for pleasant white light, then R=100%, G=100%, B=80% is determined during the white calibration. After completion of the white calibration, the dimmer is activated relatively, i.e. the blue component from 0 to 80% is scaled to the white range 0 to 100%.

With RBGW lights and appropriate configuration, an independent white light channel (W) is integrated in addition to the RGB color channels. The device also treats this channel completely separately using appropriate communication objects.

Scenes and bit scenes

The LED possesses a scene function. The 8-bit scene address can be used to save up to eight different scenes. The scene should be understood as a specific lighting setting.

So that the lighting can also be switched with simple 1-bit telegrams, an additional two 1-bit scenes are available. This means that any single push-button can be used to specify a specific lighting setting directly. When activating the bit scenes, the brightness value is changed with the speed of the absolute dimming, while, in the 8-bit scenes, the configured value is set directly.

If the dimmer was divided up into independent channels (RGB, cold white / warm white, etc.), then separate 8-bit scenes are available for each of the channels in the ETS application, along with two 1-bit scenes for each.

Warm white and cold white

People frequently find the warm white light color (2700 to 3200 K) pleasantly calming. The cold white light color (5000-6500 K) describes a spectrum of white with an increased blue component. This increased blue component creates an increased waking state, as the release of the sleep hormone melatonin is artificially suppressed. For example, in offices it can be beneficial to use more cold white in the morning and more warm white components in the evening.

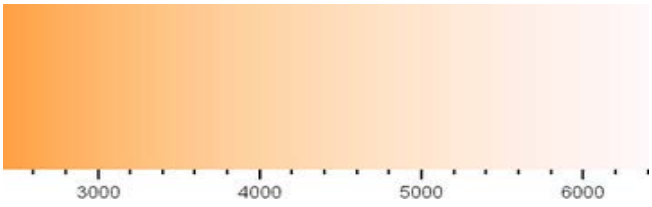

Figure 5: Color temperature (in K), source: Wikipedia

In addition, a mixture of warm and cold white can create a very good color reproduction quality.

For this, there are LED lights with warm white and cold white LEDs. These lights require 2-channel activation. This controller is integrated in the device for configuration. The dimmer can change the mixing ratio of the two channels dynamically at any time via a group address (0 ... 100%), even during operation.

ETS application

Specification

ETS: Version 3.0d, Patch A, or higher

Database file

You can find the current database on our website.

Parameter

Note: Some setting options may not be available, depending on the configuration. In these cases, they are not shown in the ETS.

General

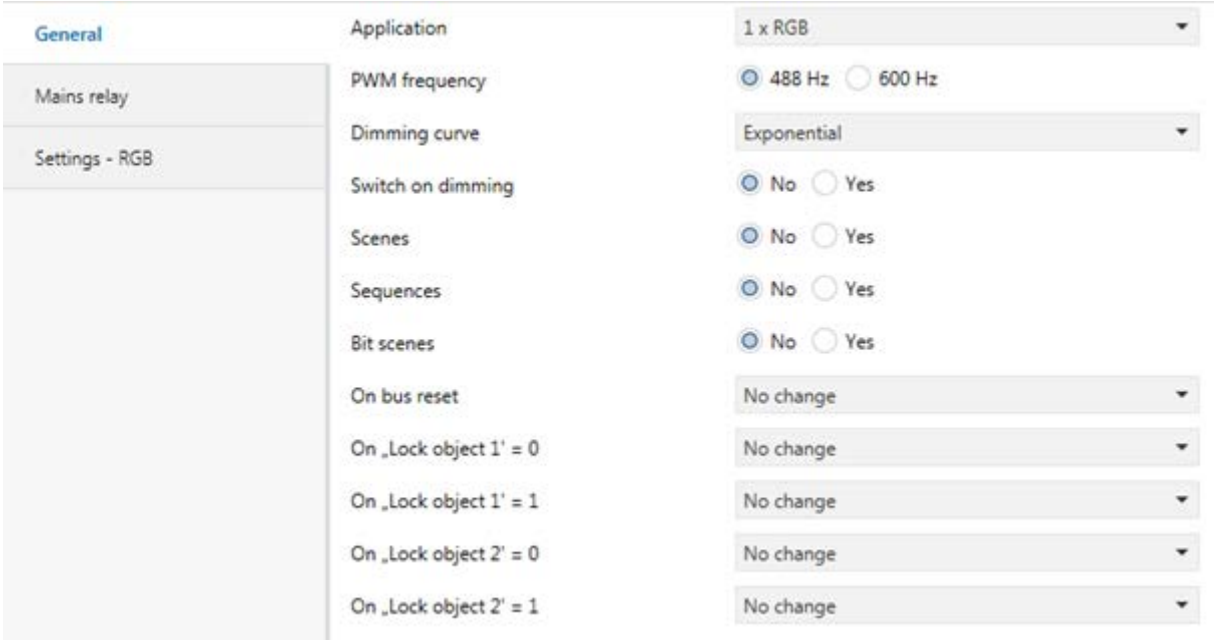

Figure 6: General

Parameter	Selection	Description
Application	1 x RGB 1 x RGB and 1 x individual 1 x RGBW 2 x cold/warm white 1 x cold/warm white and 2 x individual 4 x individual	Selection of application. The LED outputs are assigned as follows: Red → A / Green → B / Blue → C Red → A / Green → B / Blue → C / White → D Cold white 1 → A / Warm white 1 → B / Cold white 2 →C / Warm white 2 → D A → A / B → B / C → C / D → D
PWM frequency	488 Hz 600 Hz	Frequency of the pulse-width modulation at the LED outputs 488 Hz for video recordings (shutter times) and higher PWM resolution 600 Hz for quieter dimming
Dimming curve	Linear Exponential Potency function Combined	Adaptation of the dimming behavior to the light

Parameter	Selection	Description
Switch on dimming	No Yes	Optional switching through dimming objects
Scenes	No Yes	Enabling of the scene functionality
Sequences	No Yes	Enabling of the sequence functionality. Only for RGB and RGBW application.
Bit scenes	No Yes	Enabling of the bit scene functionality.
On bus voltage return	As before Value Off	Behavior on bus voltage return. If a specific color or brightness value is required, then this should be specified in the Settings menu.
On 'Disable object 1' = 0	As before Value Off	Behavior after enabling with the disabling object[3] 1. If a specific color or brightness value is required, then this should be specified in the Settings menu.
On 'Disable object 1' = 1	As before Value Off	Behavior after enabling with the disabling object 1. If a specific color or brightness value is required, then this should be specified in the Settings menu.
On 'Disable object 2' = 0	As before Value Off	Behavior after enabling with the disabling object 2. If a specific color or brightness value is required, then this should be specified in the Settings menu.
On 'Disable object 2' = 1	As before Value Off	Behavior after enabling with the disabling object 2. If a specific color or brightness value is required, then this should be specified in the Settings menu.

3 In the disabled state, the LED dimmer actuator does not react to dimming and switching telegrams from the KNX bus.

Network relay

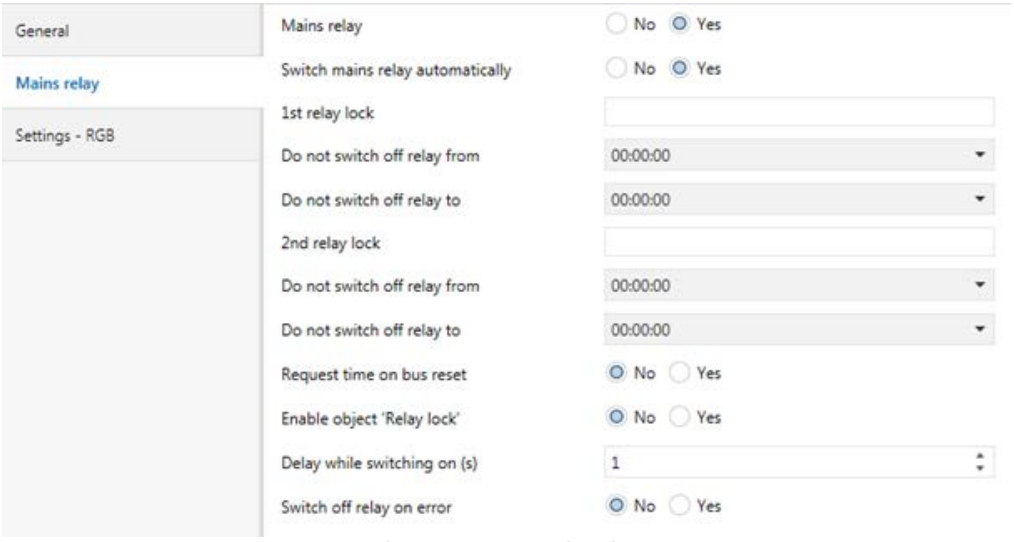

Figure 7: Network relay

Parameter	Selection	Description
Network relay	No Yes	Enabling of the network relay functionality. The network relay can switch a mains-side LED power supply. For technical reasons, toggling is only possible after a pause of a few seconds.
Switch relay automatically	No Yes	The network relay can either be switched with an object or automatically as required.
1st switch-off block		
Do not switch off relay from	00:00, 00:30, ..., 23:30	The network relay is not switched off during the time configured here.
Do not switch off relay until	00:00, 00:30, ..., 23:30	
2nd switch-off block		
Do not switch off relay from	00:00, 00:30, ..., 23:30	The network relay is not switched off during the time configured here.
Do not switch off relay until	00:00, 00:30, ..., 23:30	
Request time on bus voltage return	No Yes	The network relay only switches automatically when the device has received the time. This setting sends an object to request the time on bus voltage return.
Value of 'Request time' object	0 1	The value of the object for requesting the time should be set here.
Enable 'Network relay switch-off block' object	No Yes	The "Network relay switch-off block" object can be used to set a status, in which the device is not switched off automatically.
Switch-on time (s)	0 ... 15	Switching on the LED outputs is delayed by the stated period of time after switching on the network relay. This means it is possible to take the fact into account that the supply voltage for the LEDs is not necessarily pending immediately after switching on the LED power supply.

Table 3: Network relay

Settings

The settings displayed below can be available jointly, depending on the type of application. Thus, in the "1 x RGB and 1 x Individual" application, both the settings for RGB and the settings for the individual channel D are available. In the "1 x Warm/cold white and 2 x Individual" application, the settings for warm/cold white are given, along with those for the individual channels C and D.

Settings - RGB

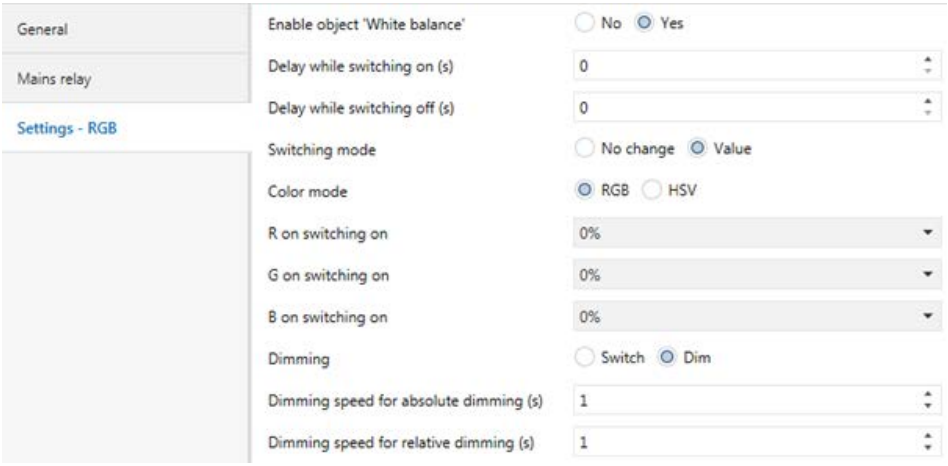

Figure 8: Settings - RGB

Parameter	Selection	Description
Enable 'White calibration' object	No Yes	The object for white calibration can be enabled. After the white calibration has been started with this object, the color channels R, G and B should be set using the dimming object so that the LED modules output white light. The brightness should be as high as possible. Stopping the white calibration saves the calibration values permanently in the device.
Switch-on delay	0 ... 65535	The switch-on of the LED outputs can be delayed.
Switch-off delay	0 ... 65535	The switch-off of the LED outputs can be delayed.
Switch-on behavior	As before Value	The behavior after switch-on can be set. If required, a color or brightness value can be specified.
Color mode	RGB HSV	Here, the color mode for the specification of the color or brightness value after switch-on should be selected.
R on switch-on	0%, 1%, 2%, ..., 99%, 100%	Specification of the brightness of the red LED channel on switch-on. Only in RGB color mode.
G on switch-on	0%, 1%, 2%, ..., 99%, 100%	Specification of the brightness of the green LED channel on switch-on. Only in RGB color mode.
B on switch-on	0%, 1%, 2%, ..., 99%, 100%	Specification of the brightness of the blue LED channel on switch-on. Only in RGB color mode.
H on switch-on	0°, 3°, 6°, 9°, ..., 357°	Hue on switch-on, specified as an angle on the color circle. Only in HSV color mode.
S on switch-on	0%, 1%, 2%, ..., 99%, 100%	Saturation on switch-on. Only in HSV color mode.
V on switch-on	0%, 1%, 2%, ..., 99%, 100%	Brightness on switch-on. Only in HSV color mode.
Dim	Jump Dim	A dimming value can either be set immediately or slowly dimmed to.
Dimming speed for abs. dimming (s)	0 ... 65535	Time required for the absolute dimming from 0 to 100 %
Dimming speed for rel. dimming (s)	0 ... 65535	Time required for the relative dimming from 0 to 100 %

Parameter	Selection	Description
Color mode on bus voltage return	RGB HSV	Here, the color mode for the specification of the color or brightness value on bus voltage return should be selected. For more information on setting, see Switch-on behavior.
Color mode on 'Disable object 1' = 0	RGB HSV	Here, the color mode for the specification of the color or brightness value on enabling with the disabling object 1 should be selected. For more information on setting, see Switch-on behavior.
Color mode on 'Disable object 1' = 1	RGB HSV	Here, the color mode for the specification of the color or brightness value on disabling with the disabling object 1 should be selected. For more information on setting, see Switch-on behavior.
Color mode on 'Disable object 2' = 0	RGB HSV	Here, the color mode for the specification of the color or brightness value on enabling with the disabling object 2 should be selected. For more information on setting, see Switch-on behavior.
Color mode on 'Disable object 2' = 1	RGB HSV	Here, the color mode for the specification of the color or brightness value on disabling with the disabling object 2 should be selected. For more information on setting, see Switch-on behavior.

Table 4: Settings – RGB

Settings - RGBW

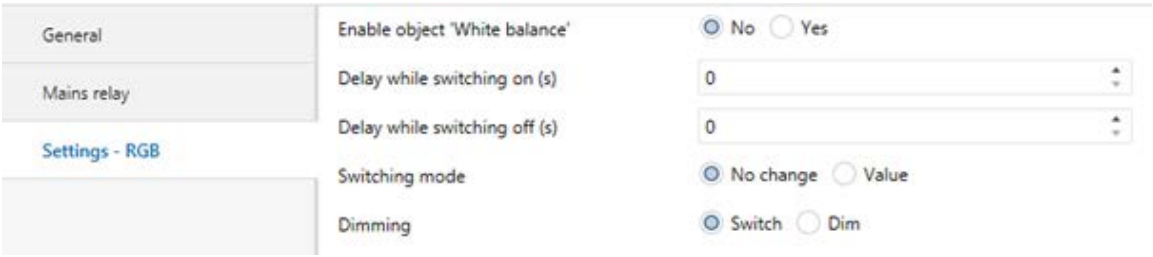

Figure 9: Settings - RGBW

The settings in the RGBW application primarily correspond to those of the RGB application, but with the addition of the settings for the white channel.

Settings - Warm/cold white

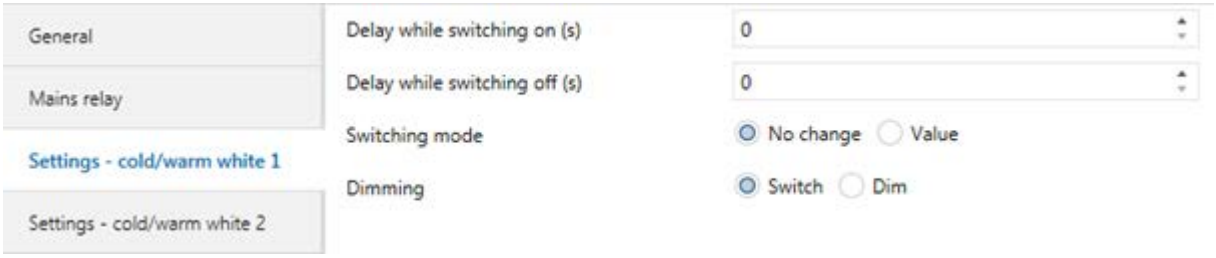

Figure 10: Settings - Warm/cold white

The settings in the Cold/warm white application correspond in many aspects to those of the RGB application. By contrast, the specification of values on switching on, on bus voltage return, on enabling or disabling is to be performed as follows (shown here for the switch-on behavior):

Parameter	Selection	Description
Switch-on behavior	As before Value	The behavior after switch-on can be set. If required, white light with a specific color temperature can be specified.
Cold white component on switch-on	0%, 1%, 2%, ..., 99%, 100%	Specification of the cold white light component on switch-on
Brightness on switch-on	0%, 1%, 2%, ..., 99%, 100%	Brightness on switch-on

Table 5: Settings - Cold/warm white

Settings - Individual channel

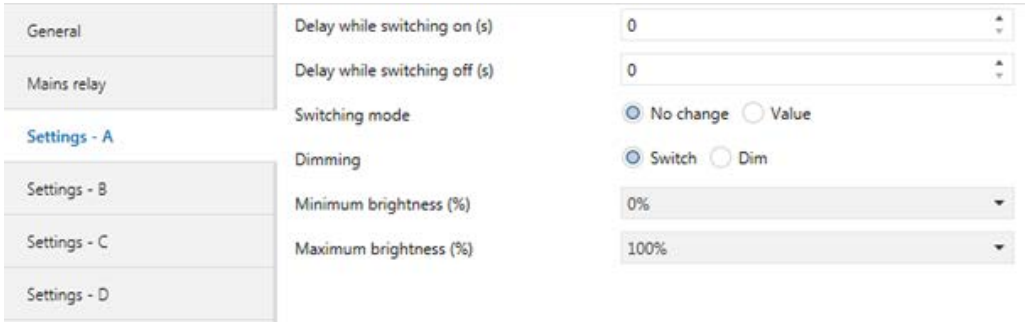

Figure 11: Settings - Individual channel

In the settings for the individual channels A, B, C and D, it is also possible to specify a brightness range, which is not left on receiving a dimming object. The specification of values on switching on, on bus voltage return, on enabling or disabling reduces itself to a brightness value (shown here for the switch-on behavior):

Parameter	Selection	Description
Switch-on behavior	As before Value	The behavior after switch-on can be set. If required, the brightness of the individual channel can be specified.
Brightness on switch-on	0%, 1%, 2%, ..., 99%, 100%	Specification of the brightness on switch-on
Minimum brightness (%)	0%, 1%, 2%, ..., 99%, 100%	Lower limit of the brightness range, which is not left on receiving a dimming object
Maximum brightness (%)	0%, 1%, 2%, ..., 99%, 100%	Upper limit of the brightness range, which is not left on receiving a dimming object

Table 6: Settings - Individual channel

Scenes

Up to eight KNX scenes can be defined for each channel in the device. A scene number (1 ... 64) can be assigned to each scene.

Note: In the 2x Cold/warm white and 4x Individual applications, the scenes are in the Settings menu.

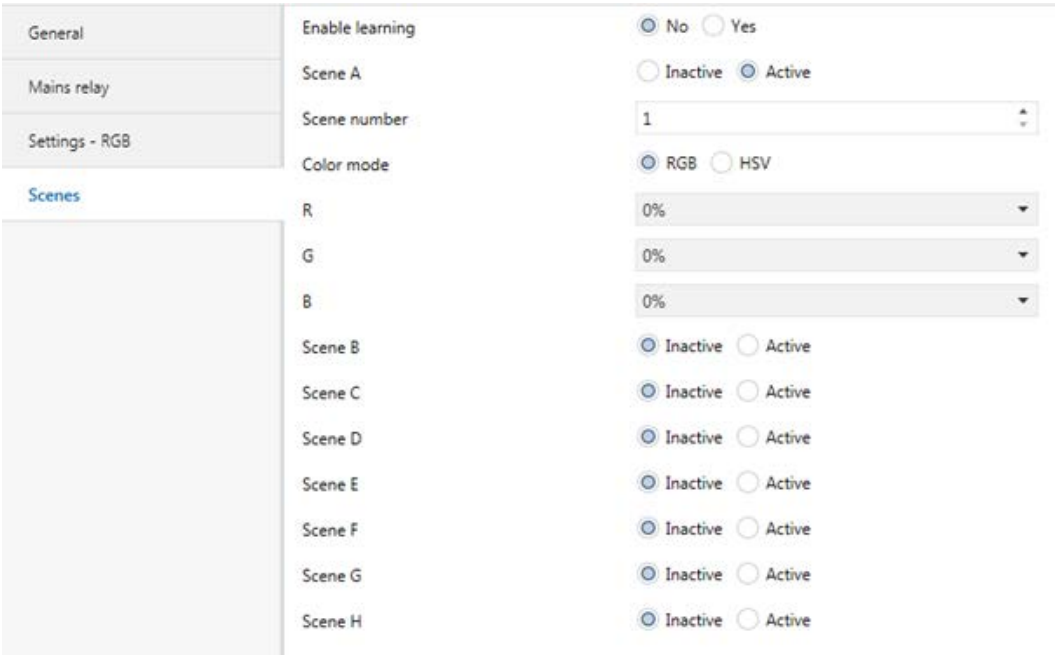

figure 12: Scenes

Parameter	Selection	Description
Enable saving	No Yes	It is possible to set whether the dimming status can be saved as a KNX scene using a save telegram to the scene object.
Scene A	Not active Active	Allow scene A. The following applies in the same manner for the other scenes B, C, D, E, F, G, and H.
Scene number	1, 2, 3, ..., 64	Number of KNX scene A. A different scene number must be specified for each scene.
Color mode	RGB HSV	Desired specification value of scene A. The setting option deviates appropriately in other applications than 1 x RGB.
R	0%, 1%, 2%, ..., 99%, 100%	
G	0%, 1%, 2%, ..., 99%, 100%	
B	0%, 1%, 2%, ..., 99%, 100%	

Table 7: Scenes

Sequences

Up to 5 sequences can be started or stopped using sequence objects in the 1 x RGB and 1 x RGBW applications. Predefined and proprietary sequences are possible.

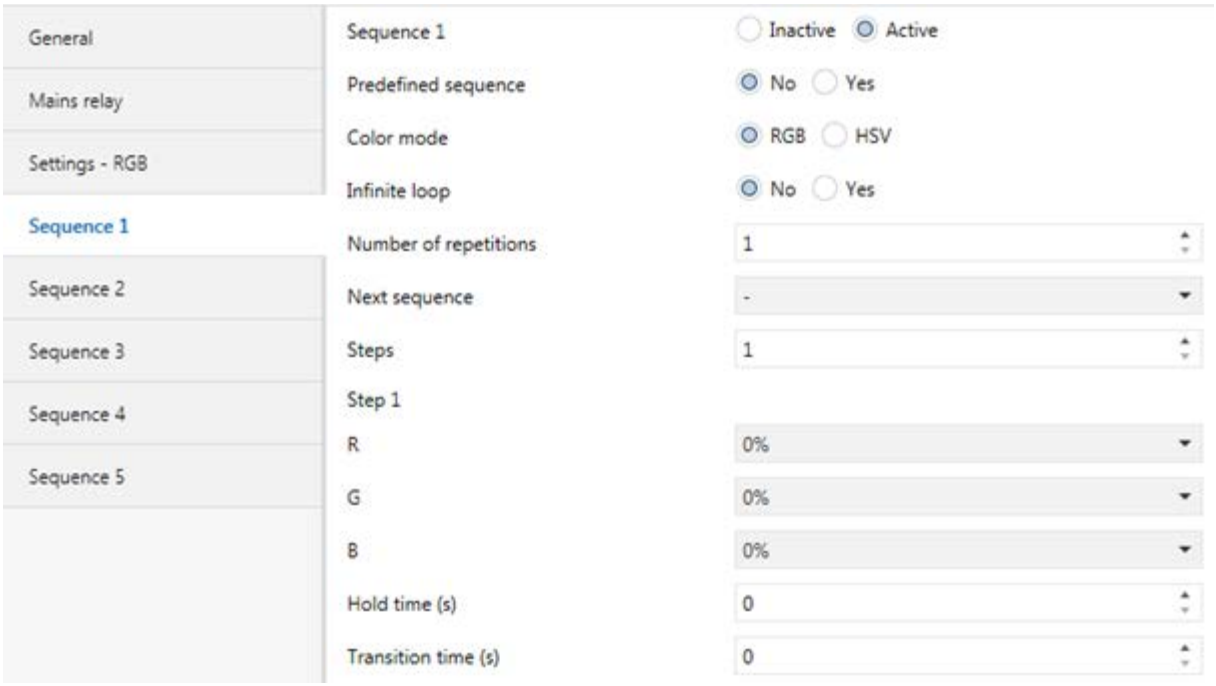

Figure 13: Sequences

Parameter	Selection	Description
Sequence 1	Not active Active	Allow sequence 1. The following applies in the same manner for the other scenes 2, 3, 4 and 5.
Predefined sequence	No Yes	Selection between proprietary and predefined sequence. Subsequent selection only for predefined sequence.

Parameter	Selection	Description
Predefined sequence	Amber room	Amber color change. Endless loop.
	Warm colors	Only paint over the warm colors (no blue components) on the color circle. Endless loop.
	Cold colors	Only paint over the cold colors on the color circle. Endless loop.
	Rainbow colors	Paint over the entire color circle. Endless loop.
	TV	Random color change for presence simulation. Endless loop.
	Sunset	Dim from daylight to red. Single loop.
	Warp	Switch blue with show green components. Endless loop.
	Stroboscope	White flashlight. Endless loop.
	Good morning	Dim up from red light through green components to warm white light. Single loop
	Glimmer	Extremely low dimming in the red-orange range. Endless loop. Optimum result with the "JUNG" dimming curve.
	Cozy	Orange-red change at medium brightness. Endless loop
	Red	Red = Red color change. Endless loop.
	Green	Green = Green color change. Endless loop
	Station	White with color change in blue and green tones. Endless loop
	Night light	Yellow-white, orange-white color change with low brightness. Endless loop.
	Green and yellow	Green - yellow color change. Endless loop.
Total length (s)	0, 1, 2,..., 65535	Seconds for the 1x playback of the predefined sequence. e.g. With predefined sequence = Set *TV* to 1.

Table 8: Predefined sequences

Parameter	Selection	Description
Sequence 1	Not active Active	Allow sequence 1. The following applies in the same manner for the other scenes 2, 3, 4 and 5.
Predefined sequence	No Yes	Selection between proprietary and predefined sequence. Subsequent selection only for proprietary sequence.
Color mode	RGB or RGBW HSV	Color mode of the sequence.
Endless loop	No Yes	You can select whether the scene is repeated endlessly.
Number of repetitions	1, 2, 3, ..., 255	The sequence can be played back up to 255 times. Not on endless loop.
Subsequent sequence	-, 1, 2, 3, 4, 5	After expiry of all the repeats of the sequence, the device can hold the last dimming value or start a further sequence.
Steps	1, 2, 3, 4, 5	The sequence can consist of up to 5 steps. These are dimmed at the speed specified for the step.
Step 1		The following specifications apply to the first step. The same applies to further steps. The depiction only refers to the RGB color mode here.
R	0%, 1%, 2%, ..., 99%, 100%	Brightness of the red color channel.
G	0%, 1%, 2%, ..., 99%, 100%	Brightness of the green color channel.
B	0%, 1%, 2%, ..., 99%, 100%	Brightness of the blue color channel.
Holding time (s)	0, 1, 2,..., 65535	Seconds for which Step 1 holds the specified dimming value.

Parameter	Selection	Description
Transition time (s)	0, 1, 2,..., 65535	Dimming time during transition to dimming value of Step 2.

Table 9: Proprietary sequences

Bit scenes

The device has 2 bit scene objects for each channel. Two bit scenes can be loaded with each of these objects. The bit scenes must be configured in advance.

When activating the bit scenes, the brightness value is changed with the speed of the absolute dimming.

Note: In the 2x Cold/warm white and 4x Individual applications, the bit scenes are in the Settings menu.

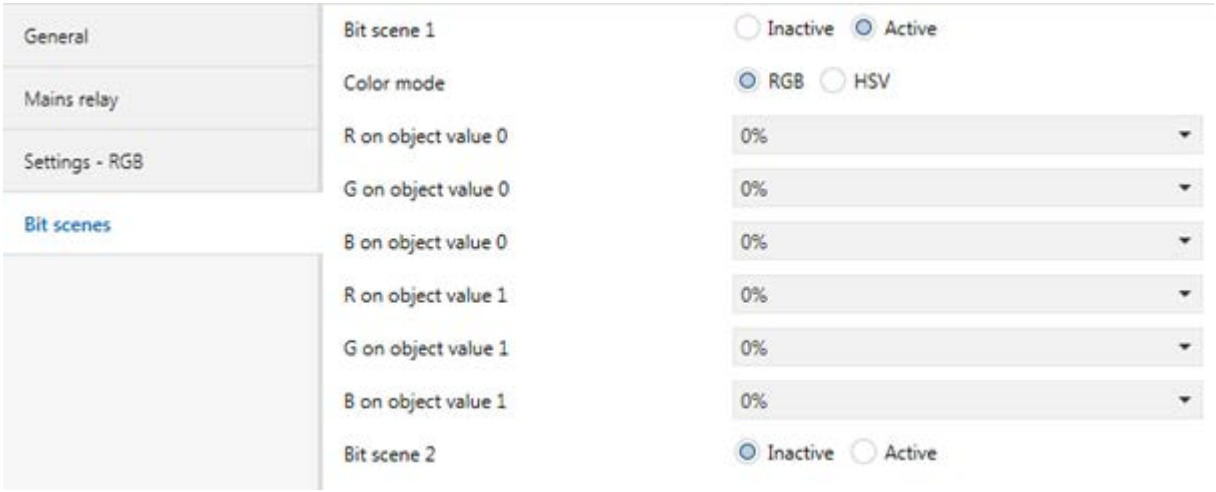

Figure 14: Bit scenes

Parameter	Selection	Description
Bit scene 1	Not active Active	Enable of bit scene 1. The same applies to bit scene 2.
Color mode	RGB HSV	Color mode setting. Other applications have the appropriate selection options.
R for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 0 for the red color channel.
G for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 0 for the green color channel.
B for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 1 for the blue color channel.
R for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 1 for the red color channel.
G for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 1 for the green color channel.
B for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, set on bit scene object 1 with the value 1 for the blue color channel.

Table 10: Bit scenes

Communication objects

Note: Some objects may not be available, depending on the configuration.

ID	Name	Object function	Length	Type	Flags
0	Test mode	Toggle	1-bit	[1.8] DPT_UpDown	C-W---
Test mode can be connected with this group object (analogue to the test push-button).					
1	Test mode	Status	1-byte	[5.10] DPT_Value_1_Ucount	C--T--
Output of the test mode status: 0 = No test mode; 1 = Test mode, output A; 2 = Test mode, output B; 3 = Test mode, output C; 4 = Test mode, output D					
3	Error	Undervoltage	1-bit	[1.2] DPT_Bool	C--T--
The object is sent when the Undervoltage switch-off error status changes. 0 = LED power supply has approved voltage, device is ready for operation; 1= LED power supply has insufficient voltage or has failed or is not connected, which is why the device is switched off					
4	Error	Overcurrent	1-bit	[1.2] DPT_Bool	C--T--
The object is sent when the Overcurrent switch-off error status changes. 0 = Current in permitted range at all outputs, device is ready for operation; 1 = Current above the permitted range at at least one output, which is why the device is switched off					
5	Error	Overtemperature	1-bit	[1.2] DPT_Bool	C--T--
The object is sent when the Overtemperature switch-off error status changes. 0 = Temperature at all outputs and reverse polarity protection at the input not too high, device is ready for operation; 1 = Temperature at at least one output and reverse polarity protection at the input too high, which is why the device is switched off					
6	Network relay	Time	3-byte	[10.1] DPT_TimeOfDay	C-W---
This object updates the time for the time-controlled toggle disabling for the network relay.					
7	Network relay	Request time	1-bit	[1.2] DPT_Bool	C--T--
Requires time from the time module. The value can be configured.					
8	Network relay	Switch	1-bit	[1.1] DPT_Switch	C-W---
Object to switch the network relay via the KNX™ bus. 0 = Switch off; 1 = Switch on					
9	Network relay	Switching status	1-bit	[1.1] DPT_Switch	C--T--
Switching status: 0 = Switched off; 1 = Switched on					

ID	Name	Object function	Length	Type	Flags
10	Network relay	Switch-off block	1-bit	[1.3] DPT_Enable	C-W---
Set network relay switch-off block. 0 = Switch-off block off; 1 = Switch-off block on					
11	White calibration	Start and finish	1-bit	[1.10] DPT_Start	C-W---
Start and finish white calibration: 0 = Finish; 1 = Start					
12	Channel A	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Brightness status of the single channel A or the output A. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
12	R	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the red color channel. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
13	Channel B	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Brightness status of the single channel B or the output B. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
13	G	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the green color channel. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
14	Channel C	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Brightness status of the single channel C or the output C. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
14	B	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the blue color channel. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
15	Channel D	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Brightness status of the single channel D or the output D. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
15	W	Brightness status	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the white color channel. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
16	RGBW	Status RGB	3-byte	[232.600] DPT_Color_RGB	C--T--
Status of the RGB brightness in the application 1 x RGBW. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					

ID	Name	Object function	Length	Type	Flags
16	RGB	Status RGB	3-byte	[232.600] DPT_Color_RGB	C--T--
Status of the RGB brightness in the application 1 x RGB. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
17	RGBW	Status HSV	3-byte	[232.600] DPT_Color_RGB	C--T--
Status of the HSV values in the application 1 x RGBW. Byte arrangement: H in the MSB; V in the LSB. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
17	RGB	Status HSV	3-byte	[232.600] DPT_Color_RGB	C--T--
Status of the HSV values in the application 1 x RGB. Byte arrangement: H in the MSB; V in the LSB. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
18	RGBW	Status H	1-byte	[5.3] DPT_Angle	C--T--
Status of the color angle as an angle on the color circle in the RGBW application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
18	RGB	Status H	1-byte	[5.3] DPT_Angle	C--T--
Status of the color angle as an angle on the color circle in the RGB application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
19	RGBW	Status S	1-byte	[5.1] DPT_Scaling	C--T--
Status of the saturation in the RGBW application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
19	RGB	Status S	1-byte	[5.1] DPT_Scaling	C--T--
Status of the saturation in the RGB application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
20	RGB	Status V	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness in the RGBW application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
20	RGBW	Status V	1-byte	[5.1] DPT_Scaling	C--T--
Status of the brightness in the RGB application. The object is transmitted on: Absolute dimming / Relative dimming / Scene / Bit scene / Enable / Switch on					
21	Cold/warm white 1	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the warm/cold white channel 1. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
21	Channel A	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the single channel A. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
22	Channel B	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the single channel B. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
23	Cold/warm white 2	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the warm/cold white channel 2. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
23	Channel C	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the single channel C. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
24	Channel D	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status of the single channel D. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
25	RGBW	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status in the RGBW application. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					

ID	Name	Object function	Length	Type	Flags
25	RGB	On/Off status	1-bit	[1.1] DPT_Switch	C--T--
Switching status in the RGBW application. 0 = Switched off, 1 = Switched on. The object is transmitted on: Scene / Bit scene / Enable / Switch on / Switch off					
26	R	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the red color channel.					
26	Channel A	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the individual channel A.					
27	G	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the green color channel.					
27	Channel B	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the individual channel A.					
28	B	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the blue color channel.					
28	Channel C	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the individual channel C.					
29	Channel D	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the individual channel D.					
29	W	Absolute dimming	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the white color channel.					
30	RGB	Absolute dimming RGB	3-byte	[232.600] DPT_Color_RGB	C-W---
Absolute RGB dimming object in the RGB application					
30	RGBW	Absolute dimming RGB	3-byte	[232.600] DPT_Color_RGB	C-W---
Absolute RGB dimming object in the RGBW application					
31	RGB	Absolute dimming HSV	3-byte	[232.600] DPT_Color_RGB	C-W---
Absolute HSV dimming object in the RGB application. Byte arrangement: H in the MSB; V in the LSB.					
31	RGBW	Absolute dimming HSV	3-byte	[232.600] DPT_Color_RGB	C-W---
Absolute HSV dimming object in the RGB application. Byte arrangement: H in the MSB; V in the LSB.					
32	RGB	Absolute dimming H	1-byte	[5.3] DPT_Angle	C-W---
Absolute dimming object for the color shade as an angle of the color circle in the RGB application					
32	RGBW	Absolute dimming H	1-byte	[5.3] DPT_Angle	C-W---
Absolute dimming object for the color shade as an angle on the color circle in the RGBW application					
33	RGB	Absolute dimming S	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the saturation in the RGB application					
33	RGBW	Absolute dimming S	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the saturation in the RGBW application					
34	RGBW	Absolute dimming V	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness in the RGBW application					
34	RGB	Absolute dimming V	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness in the RGB application					

ID	Name	Object function	Length	Type	Flags
35	Cold/warm white 1	Abs. dimming, cold white compt	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the cold white component of the channel Cold/warm white 1.					
36	Cold/warm white 2	Abs. dimming, cold white compt	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the cold white component of the channel Cold/warm white 2.					
37	Cold/warm white 1	Absolute dimming, brightness	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness value of the channel Cold/warm white 1					
38	Cold/warm white 2	Absolute dimming, brightness	1-byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness value of the channel Cold/warm white 2.					
39	Channel A	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the individual channel A.					
39	R	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the red color channel.					
40	Channel B	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the individual channel B					
40	G	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the green color channel.					
41	Channel C	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the individual channel C					
41	B	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the blue color channel.					
42	Channel D	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the individual channel D					
42	W	Relative dimming	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the white color channel.					
43	RGBW	Relative dimming H	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the color shade as an angle of the color circle in the RGBW application					
43	RGB	Relative dimming H	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the color shade as an angle of the color circle in the RGB application					
44	RGBW	Relative dimming S	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the saturation in the RGBW application					
44	RGB	Relative dimming S	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the saturation in the RGB application					
45	RGBW	Relative dimming V	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness in the RGBW application					
45	RGB	Relative dimming V	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness in the RGB application					

ID	Name	Object function	Length	Type	Flags
46	Cold/warm white 1	Rel. dimming, cold white compt	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the cold white component of the channel Cold/warm white 1.					
47	Cold/warm white 2	Rel. dimming, cold white compt	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the cold white component of the channel Cold/warm white 2.					
48	Cold/warm white 1	Relative dimming, brightness	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness of the channel Cold/warm white 1.					
49	Cold/warm white 2	Relative dimming, brightness	4-bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness of the channel Cold/warm white 2.					
50	Channel A	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the individual channel A.					
51	Channel B	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the individual channel B.					
52	Channel C	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the individual channel C.					
53	Channel D	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the individual channel D.					
54	RGBW	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the RGBW application					
54	RGB	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the RGB application					
55	Cold/warm white 1	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the Cold/warm white 1 application					
56	Cold/warm white 2	Switch	1-bit	[1.1] DPT_Switch	C-W---
Switching object for the Cold/warm white 2 application					
57	Cold/warm white 1	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the Cold/warm white 1 application					
57	Channel A	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the individual channel A					
58	Cold/warm white 2	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the Cold/warm white 2 application					
58	Channel B	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the individual channel B					
59	Channel C	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the individual channel C					
60	Channel D	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the individual channel D					

ID	Name	Object function	Length	Type	Flags
61	RGBW	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the RGBW application					
61	RGB	Scene	1-byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the RGB application					
62	Cold/warm white 1	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the Cold/warm white 1 application					
62	RGBW	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the RGBW application					
62	RGB	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the RGB application					
62	Channel A	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the individual channel A					
63	Cold/warm white 1	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the Cold/warm white 1 application					
63	RGBW	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the RGBW application					
63	RGB	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the RGB application					
63	Channel A	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the individual channel A					
64	Channel B	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the individual channel B					
65	Channel B	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the individual channel B					
66	Channel C	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the individual channel C					
66	Cold/warm white 2	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the Cold/warm white 2 application					
67	Channel C	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the individual channel C					
67	Cold/warm white 2	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the Cold/warm white 2 application					
68	Channel D	Bit scene 1	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the individual channel D					
69	Channel D	Bit scene 2	1-bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the individual channel D					
70	Channel A	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the individual channel A. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
71	Channel B	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the individual channel B. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
72	Channel C	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the individual channel C. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					

ID	Name	Object function	Length	Type	Flags
73	Channel D	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the individual channel D. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
74	RGBW	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the RGBW application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
74	RGB	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the RGB application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
75	Channel A	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the individual channel A. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
ID	Name	Object function	Length	Type	Flags
76	Channel B	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the individual channel B. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
77	Channel C	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the individual channel C. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
78	Channel D	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the individual channel D. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
79	RGBW	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the RGBW application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
79	RGB	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the RGB application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
80	Cold/warm white 1	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the Cold/warm white 1 application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
81	Cold/warm white 2	Disable 1	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the Cold/warm white 1 application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
82	Cold/warm white 1	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 1 for the Cold/warm white 2 application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
83	Cold/warm white 2	Disable 2	1-bit	[1.1] DPT_Switch	C-W---
Disabling object 2 for the Cold/warm white 2 application. 0 = Enable; 1 = Disable. In the disabled state, no reaction to dimming and switching telegrams.					
84	RGBW	Sequence 1	1-bit	[1.10] DPT_Start	C-W---
Sequence object 1 for the RGBW application. 0 = Stop; 1 = Start the sequence					
84	RGB	Sequence 1	1-bit	[1.10] DPT_Start	C-W---
Sequence object 1 for the RGB application. 0 = Stop; 1 = Start the sequence					

ID	Name	Object function	Length	Type	Flags
85	RGBW	Sequence 2	1-bit	[1.10] DPT_Start	C-W---
Sequence object 2 for the RGBW application. 0 = Stop; 1 = Start the sequence					
85	RGB	Sequence 2	1-bit	[1.10] DPT_Start	C-W---
Sequence object 2 for the RGB application. 0 = Stop; 1 = Start the sequence					
86	RGBW	Sequence 3	1-bit	[1.10] DPT_Start	C-W---
Sequence object 3 for the RGBW application. 0 = Stop; 1 = Start the sequence					
86	RGB	Sequence 3	1-bit	[1.10] DPT_Start	C-W---
Sequence object 3 for the RGB application. 0 = Stop; 1 = Start the sequence					
87	RGBW	Sequence 4	1-bit	[1.10] DPT_Start	C-W---
Sequence object 4 for the RGBW application. 0 = Stop; 1 = Start the sequence					
87	RGB	Sequence 4	1-bit	[1.10] DPT_Start	C-W---
Sequence object 4 for the RGB application. 0 = Stop; 1 = Start the sequence					
88	RGBW	Sequence 5	1-bit	[1.10] DPT_Start	C-W---
Sequence object 5 for the RGBW application. 0 = Stop; 1 = Start the sequence					
88	RGB	Sequence 5	1-bit	[1.10] DPT_Start	C-W---
Sequence object 5 for the RGB application. 0 = Stop; 1 = Start the sequence					

Communication flags according to the KNX specification with the following functions:

- R = Read: Allows the reading of a value of the communication object
- W = Write: Allows the writing of a value to the communication object
- C = Communication: Bus communication possible
- T = Transmit: Allows the transmission of a value (normally, this flag shows the transmitting GA)
- U = Update: Allows the update of a communication object value on any feedback ("listen and synchronize" functionality)

Technical data

LED dimming actuator built-in (3904REGLED)

Symbols	 Protection class II  Device for lamp  Device with integrated protection unit against overheating: Limit temperature of the device housing  Furniture luminaire  May not be disposed of in household waste.
KNX	DC 21 ... 32 V SELV Current consumption < 18.9 mA Connection plug, type 5.1
LED	DC 12 ... 24 V SELV / < 20A from device acc. to DIN EN 61347-2-13 for LED modules with constant output voltage Current consumption 20 mA Connection terminals: 4.0 mm^2 rigid or flexible without wire end sleeve. The cables may not be tin-plated. Supply lines: Select supply cables with the appropriate current carrying capacity. Due to the voltage drop and the warming up of the cables, a cross-section of 4.0 mm^2 is recommended. Temperature range of the cables up to 90°C or higher.
	Four outputs with 5 A for LED modules with constant input voltage to DIN EN 62031 LED modules with shared anode Maximum cable length dependent on the cable resistance (voltage drop) Connection terminals: 2.5 ... 4.0 mm^2 rigid or flexible without wire end sleeve. The cables may not be tin-plated. 2.5 mm^2 flexible with wire end sleeve Supply lines: Select supply cables with the appropriate current carrying capacity. Due to the voltage drop, a cross-section of 4.0 mm^2 is recommended. The cross-section should be at least 2.5 mm^2. Temperature range of the cables up to 90°C or higher.
	PWM frequency 488 Hz / 600 Hz
	Overtemperature switch-off
	Overcurrent switch-off
	Undervoltage switch-off
Network relay	AC 230V / 16 A / 50 Hz Cat. II Connection terminals: 2.5 ... 4.0 mm^2 rigid or flexible without wire end sleeve. The cables may not be tin-plated. 2.5 mm^2 flexible with wire end sleeve Supply lines: Select supply cables with the appropriate current carrying capacity. Observe the current consumption of the device to be switched.
Ambient temperature	-5 ... +45° C
Installation	Only use in dry interior rooms. Protection class IP20 Protection class II

Dimensions	196 mm x 40 mm x 32 mm (L x W x H)

LED dimming actuator for rail mounting (3904REGLED)

Symbols	 Protection class II  Device for lamp  Device with integrated protection unit against overheating: Limit temperature of the device housing  May not be disposed of in household waste.
KNX	DC 21 ... 32 V SELV Current consumption < 18.9 mA Connection plug, type 5.1
LED	DC 12 ... 24 V SELV / < 20A from device acc. to DIN EN 61347-2-13 for LED modules with constant output voltage Current consumption 20 mA Connection terminals: 4.0 mm^2 rigid or 2.5 mm^2 rigid or flexible without wire end sleeve or 2.5 mm^2 flexible with wire end sleeve without plastic sleeve. Total connection cross-section, possibly over multiple terminals, at least 4.0 mm^2. The cables may not be tin-plated. Supply lines: Select supply cables with the appropriate current carrying capacity. Due to the voltage drop and the warming up of the cables, a cross-section of 4.0 mm^2 is recommended. Temperature range of the cables up to 90°C or higher.
	Four outputs with 5 A for LED modules with constant input voltage to DIN EN 62031 LED modules with shared anode Maximum cable length dependent on the cable resistance (voltage drop) Connection terminals: 4.0 mm^2 rigid or 2.5 mm^2 rigid or flexible without wire end sleeve or 2.5 mm^2 flexible with wire end sleeve without plastic sleeve. The cables may not be tin-plated. Supply lines: Select supply cables with the appropriate current carrying capacity. Due to the voltage drop, a cross-section of 4.0 mm^2 is recommended. The cross-section should be at least 2.5 mm^2. Temperature range of the cables up to 90°C or higher.
	PWM frequency 488 Hz / 600 Hz
	Overtemperature switch-off
	Overcurrent switch-off
	Undervoltage switch-off
Network relay	AC 230V / 16 A / 50 Hz Cat. III Connection terminals: 4.0 mm^2 rigid or 2.5 mm^2 rigid or flexible without wire end sleeve or 2.5 mm^2 flexible with wire end sleeve without plastic sleeve. The cables may not be tin-plated. Supply lines: Select supply cables with the appropriate current carrying capacity. Observe the current consumption of the device to be switched.
Ambient temperature	-5 ... +45° C

Installation	Only use in dry interior rooms. Only for installation in distributors to DIN 43880 on DIN rail 35 mm according to EN 50022. Protection class IP20 Protection class II
Dimensions	70.0 mm x 89.6 mm x 62.9 mm (L x W x H)