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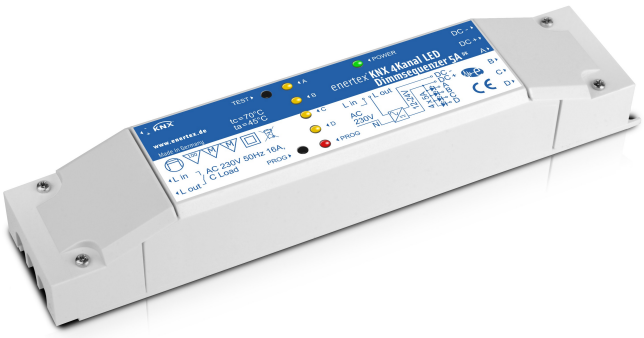
Manual and Configuration

Enertex®
KNX 4 channel LED dim sequencer 5A
Manual



for version DK and REG

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Notes

- Installation and mounting of electrical equipment must be carried out by qualified electricians.
- When connecting KNX/EIB devices specialist skills provided by KNX™ trainings are required.
- Ignoring the instructions can damage the device, as well a fire or other hazards can arise.
- These instructions are part of the product and must be left with the end user.
- The manufacturer is not liable for costs or damages incurred by the user or third parties through the use of the device, misuse or malfunction of the connection, malfunction of the device or user equipment.
- Opening the housing, other unauthorized alterations and or modifications to the device will invalidate the warranty!
- The manufacturer is not liable for improper use.

Function

Versions

The Enertex® KNX 4 channel LED dim sequencer 5A is a pulse wide modeling dimmer for LED modules with constant input voltage as it is currently the case in many LED-strips.

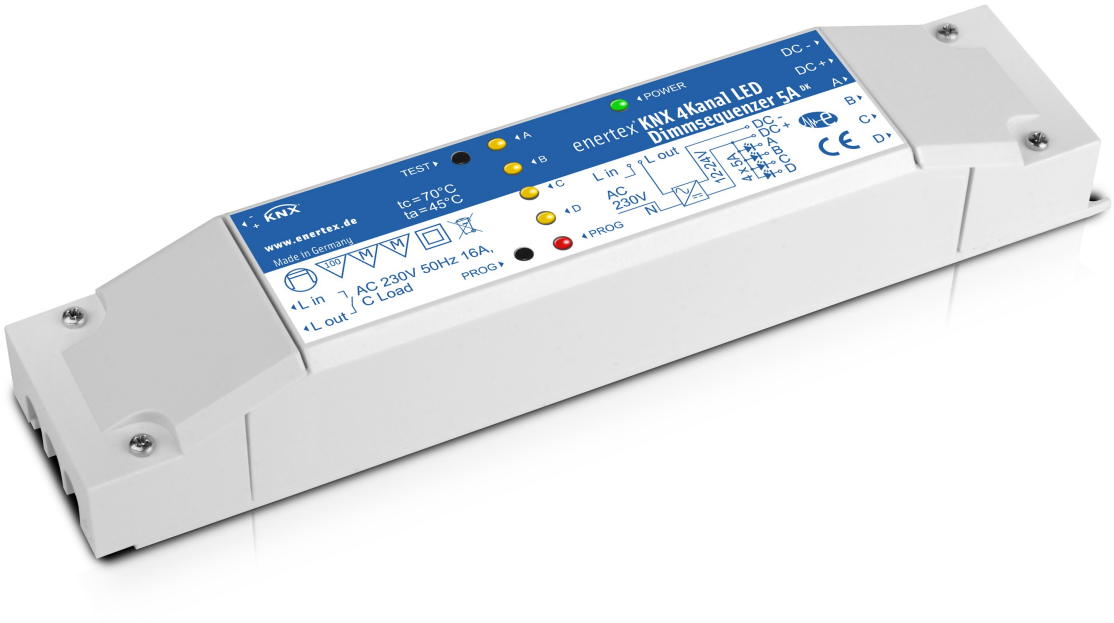

Figure 1: Enertex® KNX 4 channel LED dim sequencer 5A DK

Figure 2: Enertex® KNX 4 channel LED dim sequencer 5A REG

The dimmer is available in two versions: For installation for ceiling mounting (Enertex® KNX 4 channel LED dim sequencer 5A DK) or as REG device with 4 TE (Enertex® KNX 4 channel LED dim sequencer 5A REG). Both versions are technically and software based identical.

Brief description

Up to four LED channels can be switched and dimmed via the KNX bus. An LED current of 5A per channel can be dimmed. This corresponds to a power of 120W or in the sum of 480W. The total load of the four channels is optimally distributed over the complete switching cycle by the dimming sequencer, which considerably reduces stress on the integrated circuit and the components of the additional LED power supply, thus increasing the expected lifetime of the components.

Light scenes can be preconfigured, saved and played back, even with the help of 1-bit group addresses to realize for example a lighting control with a simple motion sensor: Then the scene triggers a certain color mixing e.g. of RGBW-lamps

Sequences are processes of color controls in the range of seconds to hours. Thus, the lighting is changed with gentle color changes over a given period. The Enertex® KNX 4 dim sequencer 5A has predefined color sequences. Thus, the use of this “mood light” in the commissioning is very easy. In addition, the parametrization of own color sequences is possible using the ETS.

The Enertex® KNX 4 channel dim sequencer 5A can be adjusted to one of the following tasks:

- 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 / white), one independent channel

The control of the colors may be carried out optionally via the primary colors red, green and blue (RGB color mode) or via hue, saturation and value (HSV color mode).[1]

The device has a power relay, to which a suitable LED voltage can be connected on the network side. Thus, if needed, the LED power supply is switched on or off by the actuator to minimize the standby losses of the power supply. To avoid a permanent switching of the power supply in scenarios such as at twilight the deactivation is locked in these times using the parametrization of the timers. Thus, the aging of the network equipment, effected by the activation, and concurrently the standby loss can be kept small.

Via group objects under voltage, over current and over temperature can be detected. These protection functions, which were “poured in hardware” of each channel, are an important feature of Enertex® KNX 4 channel LED dim sequencer 5A. The protection function deactivates the connected LED modules automatically in these cases until the error condition is cleared. Thereafter, the dimmer restarts.

Furthermore the Enertex® KNX 4 channel LED dim sequencer 5A has an integrated reverse polarity protection, so that during start-up possible damages caused by reverse polarity are excluded. In this regard the output (connection of LED modules) is not critical for the Enertex® KNX 4 channel LED dim sequencer 5A.

The technical hardware data are as follows (overview):

- 4 dimming channels pulse wide modulated with max. 5A per channel
- Variable voltage input and output 12..24V
- Integrated bistable relay 230VAC 16A, Inrush 165A@20ms, 800A@200ms
- Integrated protection with an integrated display against
  - over current
  - under voltage
  - over temperature
  - reverse polarity
- Startup button for quick testing of the wiring
- Double furniture label (only version Enertex® KNX 4 channel LED dim sequencer 5A DK)

The main features of the software

- Dimmer in RGB or HSV color space mode approachable
- four different selectable dimming characteristics with integrated soft dimming function
- Automatic on/off of the relay with two configurable blocking times
- PWM switchable 488 and 600 Hz
- Integrated scenes and bit scenes
- Diagnostics / message of the protective functions via KNX group addresses
- 5 free-defined sequences and 12 preset default sequences
- Free configuration of channels

The Enertex® KNX 4 channel LED dim sequencer 5A has the following controls and indicators:

1 For the color representation RGB and HSV see e.g. the color picker in the drawing program “Windows Paint”.

Button *PROG*	KNX programming button
LED *PROG*	Display of KNX programming state
Button *TEST*	switch test mode (s. Commissioning)
LED *A*	Display of test mode channel A or active protection
LED *B*	Display of test mode channel B or active protection
LED *C*	Display of test mode channel C or active protection
LED *D*	Display of test mode channel D or active protection
LED *POWER*	Operating voltage of power supply for LED modules

Table 1: Displays & Controls

The LEDs are used both for the display of the test mode and for the integrated protection functions (see Table 2).

Overcurrent protection and lamps

The overcurrent protection ensures secure operation of your lighting system. It will take effect from a current of 7..8A and a duration of 7..10µs. As a first approximation: At half of the duration the response threshold for the pulse current is doubled, i.e. at approx. 14..16A.

Sometimes lamps (mostly LED spots) are internally designed to cause pulsed currents. This was especially observed with lamps from the Far East.

A pulsed current means for a certain switching time a short circuit for the power supply, as well as for the electronic switch in the dimmer. Measurements in our laboratory showed that the pulse for e.g. a 6W LED spot is already over 8A and 10µs. If several spots are switched in parallel, the pulse height increases correspondingly, e.g. at ten spots up to 80A.

A power supply unit whose short-circuit detection usually gets effective from a short-circuit lasting for longer than 1ms, therefore provides the maximum possible pulse for the pulse duration - the larger the max. power of the power supply is, the greater the pulse. The possible pulse current depends on the design of the power supply itself, but in the case of a 600W power supply it is quite up to 60A.

The impulse load can occur up to the level of the selected dimming frequency, e.g. 600 times a second. This produces enormous stress on both, the power supply and the dimmer, and will shorten the life-time if overcurrent shutdown becomes inactive. In addition, the product, which can also be used in furniture installation according to the specification, has to meet high security standards.

Lamps, such as e.g. the LED Spot RGBW (Loxone item no.: led-spot-rgbw-global) are not suitable for operation with the Enertex Dimmer according to our measurements.

Commissioning

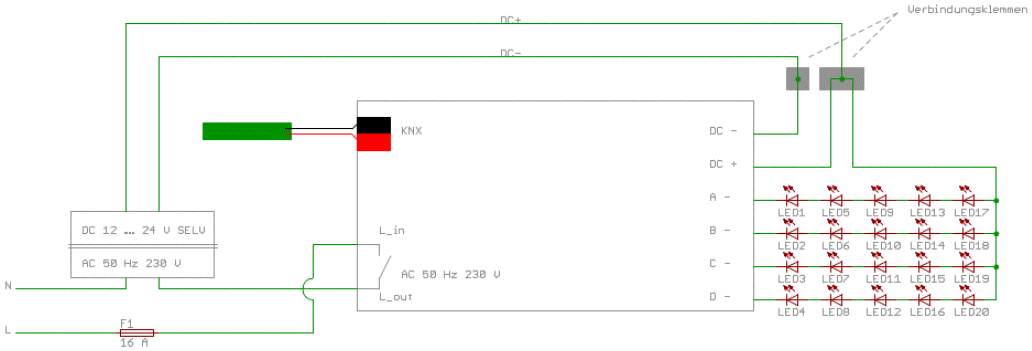

Figure 3: Connection diagram

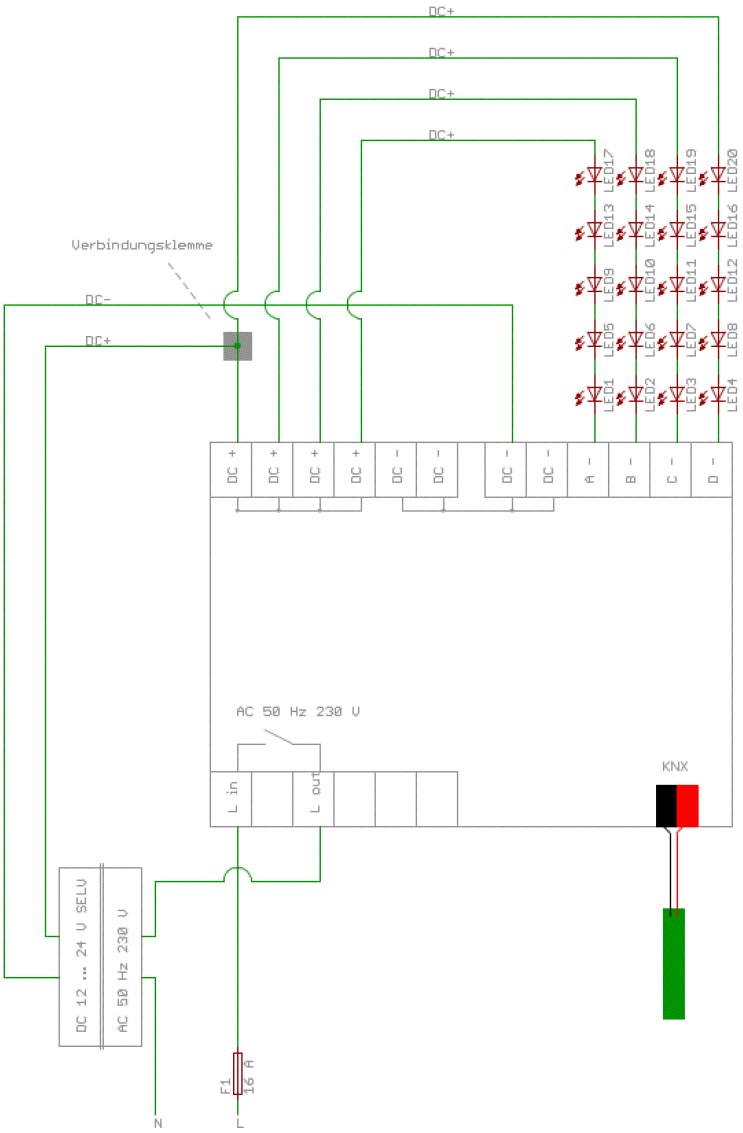

Abbildung 4: Connection diagram for version REG

Attention Danger!

Electrical shock on contact with live parts. Electrical shock can result in death. Disconnect the mains before working on device and cover up live parts in the vicinity!

KNX bus, LED power supply and LED modules are to connect **in accordance with the Specification** on Enertex® KNX 4 channel LED dim sequencer 5A. Figure 3 shows the connection diagram for the DK version where external connection terminals can be helpful shown in Figure 5. In REG version enough terminals for DC+ and DC- are available, so that external connection terminals are not needed here.

The assignment of colors to the outputs is as follows:

Red = A

Green=B

Blue=C

White=D

The assignment of cold / warm white to the outputs is as follows:

Cold white 1 = A

Warm white 1 = B

Cold white 2 = C

Warm white 2 = D

The supply DC 12 ... 24 V SELV must be protected by 20A.

Summarized LED modules such as LED strip RGB must have a common anode. The anode of the LED modules is to be connected to the anode of the LED power supply via a right sized lead.

The outputs of the LED channels may not be connected together. The combining of LED channels is not possible.

The specified conductor cross sections must be attended!

If the power connection of the LED power supply should be switched with the power relay, the corresponding conductors must be protected with 16A!

Before activating the connection cables the insulating covers / strain reliefs must be put on and screwed on both sides of the housing.

For commissioning the Enertex® KNX 4 channel LED dim sequencer 5A can be set in a test mode when delivered. For this purpose the connected KNX bus must be in operating condition. By repeatedly pressing the button TEST the LED outputs of the device are switched on separately. By the LEDs A, B, C and D possible errors can be identified:

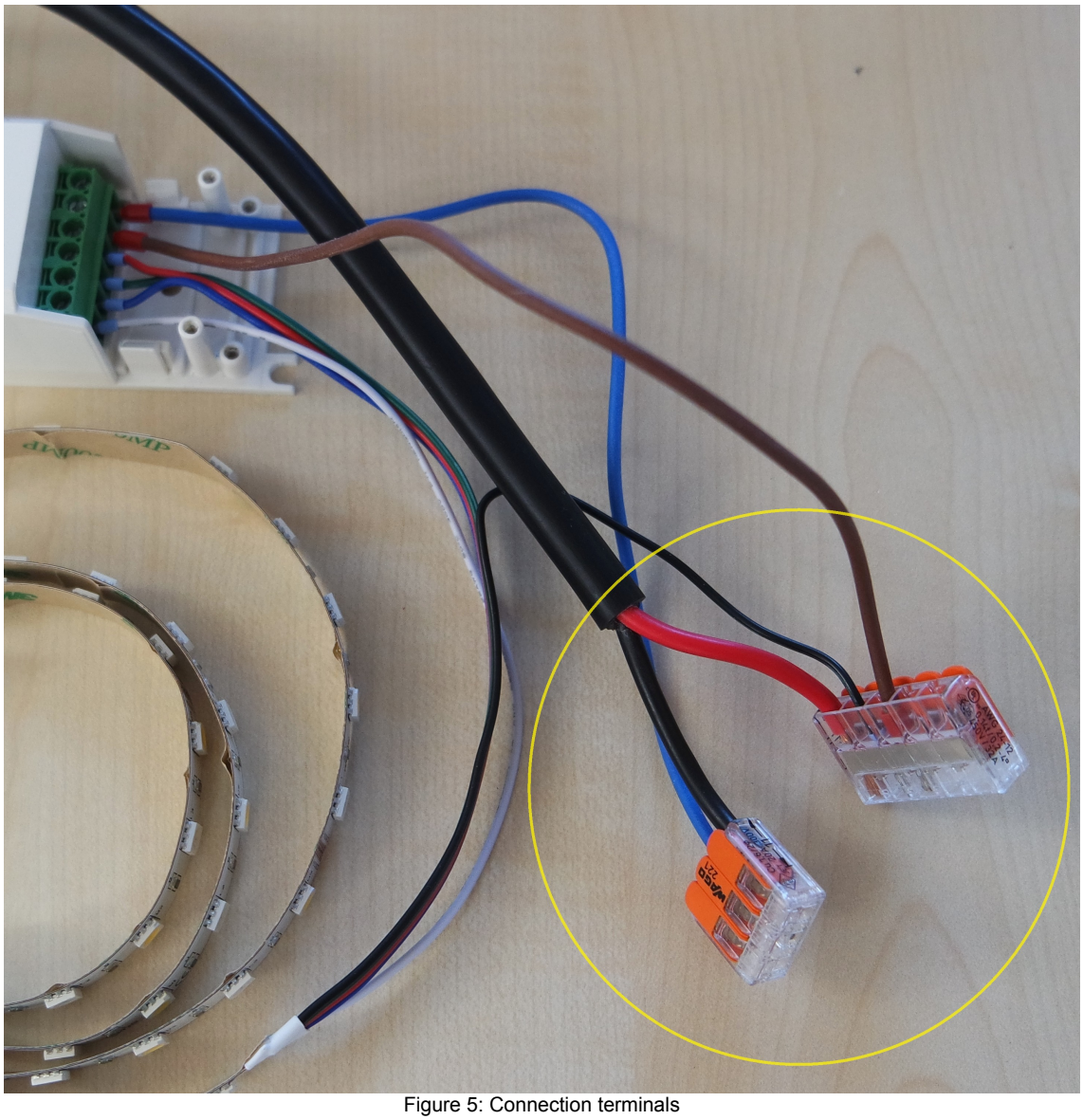

Figure 5: Connection terminals

LED A	LED B	LED C	LED D	Fehler
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.
FLASHES	FLASHES			Under voltage lockout
FLASHES		FLASHES		Over current lockout
FLASHES			FLASHES	Over temperature lockout

Table 2: LED Code for protection circuit and test mode

Application notes

Dimming characteristics

The Enertex® KNX 4 channel LED dim sequencer 5A offers four different dimming curves. These are

- Linear,
- Exponential,
- Power function,
- Enertex.

Basically the human eye perceives brightness values logarithmic which means that at twice the intensity the human eye perceives brightness not twice, but much smaller. Although additional effects as pupil opening and the light-dark adaption of the rods and cones in the retina play a major role, the visual sensitivity is modeled often logarithmically. It is assumed that e.g. at twice the lighting, the “perceived” brightness is increased only by a factor of 1.4.

A control via KNX compliant % values is carried out in a total of 255 steps. Therefore, controlling the LEDs occurs in 255 discrete steps. These control points (= brightness of LED) shall be allocated by Enertex® KNX 4 channel LED dim sequencer 5A over the possible dimming range (see Figure 9).The setting of the dimming characteristic of the dimmer can be found in the ETS application under “General” in the parameter “Dimming curve”.

Dimming curve

Note

The following statements about the perception are partly subjective and in individual cases may vary from human to human. The actual perception is also dependent on other factors, such as the LEDs, whose driver IC, whose chraracteristics etc. Nevertheless the tendency of the differences shall be clarified.

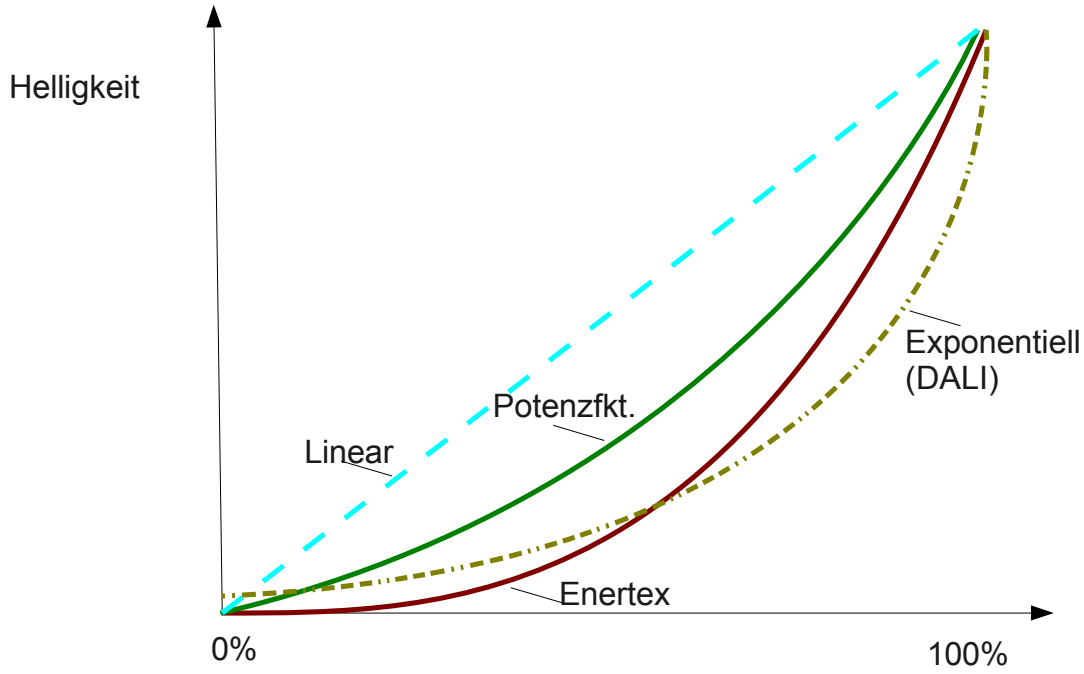

Figure 6: Dimming curves

Linear

For the human[2] an increase in the upper region of the control (>80% to 100%) is perceived

2 assuming a logarithmic perception characteristic

mostly low by using this characteristic. In the lower range (<10%), however, a small increase of the control value will have a major effect to the human eye. In the area of 40 to 60%, the subjective perception of brightness change is often quite good.

Note: If the KW component is shifted in cold/warm white operating mode with the corresponding objects, this will result in a slight "dent" in the overall brightness during the dimming process if a dimming curve other than the linear one is selected. If this behaviour is not acceptable, the linear curve must be selected in this case. At the end of the dimming process, the total brightness for each curve is then equal to the initial brightness again.

Exponential

Based on the assumption that the perception is logarithmic, e.g. in DALI bulbs an exponential control is implemented (inverse function). This control is provided with an offset in the lower region, that is when turning on the LEDs a significant jump in brightness will be noticeable once. Therefore, the LEDs often can not be dimmed to the lower limit. In the area up to 40% the dimming behavior is very soft and largely corresponds to the perception. From about 50% the grading is relatively large so that the increase by a few percentage steps of perception can pretend a significantly higher increase. Overall this dimming curve of Enertex® KNX 4 channel LED dim sequencer 5A is imitating the DALI standard.

Power function

In the upper dimming range (60% and beyond) this dimming curve mostly describes the perception in brightness very well. In the area to 10% the scaling is better adapted to the eye than in the case with the linear curve, but subjectively less well than the exponential dimming curve. The dimming curve itself is derived as a mathematical power function.

Enertex

This dimming curve is a mixture of the three previously mentioned linear, exponential and power dimming curves. It can be dimmed far into the bottom area and is adapted in all other areas as uniformly as possible to the perception of the human eye. This curve has been adapted at Enertex® Bayern GmbH specifically to the dimming of the dim sequencer and to the connected LEDs and is very recommended in the living area.

Dimming behavior

In addition to these effects for human perception, resulting from this splitting of dimming curves in 255 indvidual points, an important unique feature of the Enertex® KNX 4 channel LED dim sequencer 5A is the “soft” dimming at the transition from a given starting point to an end point.

By a special control of the dimmer no gradation, i.e. sudden change in brightness of lamps is perceptible even with slow dimming and the dimming is done continuously at any time.

In short dimming times over a larger area this control ensures that no flickering occurs to the human eye.

At the bottom of the brightness (<5%) the control enables the activation of a continuous down-regulation of the brightness of the bulbs, so that the turn off or on of the LEDs is done without noticeable brightness jump for the human eye.

With Enertex® KNX 4 channel LED dim sequencer 5A a flicker is avoided regardless of the choice of the dimming curve, the transitions are smooth or appear smoothly in any case.

Lock objects

The application provides for the use of two lock objects. By using these objects the dim sequencer can in each case pass through a 1-bit group address into a locked and an unlocked state. Basically, in the locked state, the dim sequencer ignores all objects but the lock objects.

The following settings can be applied to adjust the behavior of the dim sequencer in case of locking or unlocking.

- “No change”: The brightness will not be changed if the dim sequencer is on. If the dim sequencer is off, it will be switched on and recalls the last brightness that has been present before switching off.

- “Value”: The dim sequencer assumes the parameterized brightness.
- “Off”: The dim sequencer stores the last brightness (see “No change”) and switches off.

If the dimmer has been divided into independent channels (RGB, Cold White/ Warm White etc.), two separate locking objects exist in the ETS application for each of the channels. Locking objects are therefore available separately for each channel (RGB(W), single channel, WW/CW).

Power relay

With the built-in power relay the LED power supply of the lighting can be easily turned on and off. For this purpose (see Figure 12) the parameter “Switch relay automatically” in “Power relay” is selected “Yes”. The power supply must be connected so that the built-in actuator can interrupt the 230V circuit. In this context automatic switching means that the built-in actuator if and only if trips the power supply when all channels of the dimmer are set to 0%. As soon as a channel has a value other than 0% the actuator is switched on again.

A special feature of Enertex® KNX 4 channel LED dim sequencer 5A is that in addition this automatic tripping can be provided with two timeouts. This means that the actuator still does not turn off when all dimmer channels are at 0%. Thus, the switch lock can be active in the morning hours from 5am to 8am and prevent a motion sensor, which controls the LED lighting, from switching the 24V supply ON or OFF with every move. With the second switch lock this is also equally possible for the evening range e.g. from 16pm to 23pm, so that a frequent switching of the 24V supply can be avoided. Nevertheless, it is ensured through the automatic switching that standby losses of the 24V power supply are minimized. Using switch lock the service life of the power supply is increased because the integrated switching power supplies react sensitively to turn on and off the 230V voltage.

Increased safety during installation in furniture

If you operate the version “DK” of the dimmer in the built-in furniture, it is highly recommended to use the setting “Shutdown relay in error case”. This allows the dimmer at a fault detection (e.g. short circuit) to turn off the power supply completely.; when the error has disappeared, the dimmer / the relay has to be switched on again. Additionally for diagnostic purposes the integrated error detection with KNX messages should be configured with the ETS. Using the corresponding communication objects an error can be more easily localized and detected by a visualization and alarm center as the Enertex® EibPC.

This additional security provided by the shutdown does not mean that 230V power supplies which do not have the furniture mark may be installed into the furniture. The devices which are built-in in furniture must all have these mark.

Color sequences

The Enertex® KNX 4 channel LED dim sequencer 5A provides the ability to adjust the color control via RGB objects or HSV objects. Furthermore the dimmer calculates in each case the other state objects and outputs them after each change of state on the bus.

Technically, the RGB-LED lamps are composed of the three colors red, green and blue. Therefore , the control via an RGB object, reporting an intensity of 0 to 100% for each of the three colors, is technically easy to implement. The resulting light color is composed of the three color channels, but it is considerably more complex for the user to set a color value CYAN. This is different with the use of HSV objects. Here, the H-value is the hue. It is specified as a so-called color angle which corresponds to a color in the color circle. Every angle value represents a different color, for example 0° for red, 30° for orange, 60° for yellow etc. The color transitions are smooth, see Figure 7.

Bildquelle: Wikipedia; gemeinfrei.

Figure 7: Hue

With room controller Enertex® SynOhr® MultiSense KNX (www.enertex.de/d-synohr.html) with integrated voice control a H-value can, by using voice command _COLOR(YELLOW, BLUE...), be directly transmitted to the bus via a corresponding message and the light color can be changed without the need for additional logic.

The S-value (saturation) indicates the color saturation. S=0% means white light and S=100% complete lighting only in the set color. “White” is to be understood within the means of the light source, because only by mixing the three colors, a white light is produced (see Section White Balance). However, this white light is not always pleasant for the human perception or sufficient white, therefore RGBW lamps offer an additional white LED channel, which is adjusted by the manufacturer to a corresponding white light. When working with RGBW bulbs, this additional white channel is available in the application, which can be specified in the sequence as well. The saturation values S and white channel are distinct.

The V-value (light value) sets the brightness of the lighting. 0% means OFF and 100% maximum brightness.

If own sequences are to be defined, it is therefore recommended to adjust the colors with the H-value, then the proportion of white light with the S-value and finally the brightness with the V-value.

White Balance

Using the white balance (object 11), the whiteness of the light source can be equalized. The white light is determined by mixing the control of the individual color channels. Depending on the LED lamps the resulting white light can not be perceived as optimal by the user, so that a balance of white light must be made. Thereby, with the Enertex® KNX 4 channel LED dim sequencer 5A the mixing ratio of the three individual channels can be set .

If the white balance (object 11) is set to ON via a message, the setting is done via RGB or HSV values which hits the desired white light in the best way at maximum brightness. Then the object is set to OFF. Then the values are stored. For example, when the lamp has a little too high proportion of blue for a pleasant white light, so during white balance R=100%, G=100%, B=80% is determined. After completing the white balance the dimmer is relatively controlled for this, that is the blue component from 0 to 80% will be scaled to the range 0 to 100%.

In RGBW bulbs and corresponding parametrization an independent white light channel (W) is integrated in addition to the RGB color channels. The dim sequencer treats also this channel completely separately via corresponding communication objects.

Scenes and bit scenes

The Enertex® KNX 4 channel LED dim sequencer 5A has a scene function. Using the 8-bit scene address up to eight different scenes can be stored. The scene is to be understood as a certain illumination setting.

In order that the lighting can also be switched with simple 1-bit messages, two additional 1-bit scenes are available. Thereby a certain illumination setting can be specified directly with any single switch. If using bit scenes the parametrized illumination will be dimmed with the speed of absolute dimming parameter, 8 Bit scenes will be changed without dimming.

If the dimmer has been divided into independent channels (RGB, Cold White/ Warm White, etc.) separate 8-bit scenes and two 1-bit scenes are available in the ETS for each of the channels.

Warm white and Cold white

The warm white light color (2700-3200K) is often perceived by human as pleasant calm. The cold white light color (5000-6500K) describes a white color spectrum with an increased proportion of blue. This increased amount of blue makes the viewer for increased wakefulness, because the release of the sleep hormone melatonin is artificially suppressed. Therefore, for example it could be beneficial in offices to increase more cold white portions in the morning and increase rather warm white portions in the evening.

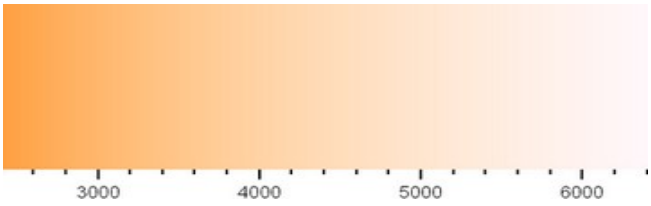

Figure 8: Color temperature (in K), Source Wikipedia

In addition a very good color rendering quality can be produced by a mixture of hot and cold white.

For this there are LED bulbs with warm white and cold white LEDs. These lamps require a 2-channel control. The Enertex® KNX 4 channel LED dim sequencer 5A has this control integrated configurable. The dimmer can change the mixing ratio of the two channels via a group address (0..100%) even during operation at any time dynamically.

ETS Application

Specification

ETS: from Version 3.0d, Patch A

Database file

Under http://www.enertex.de/d-downloads01.html see the current ETS database file and the current product description.

Parameter

Note: Depending on the configuration, some settings may not be available. They are not shown in the ETS in these cases.

General

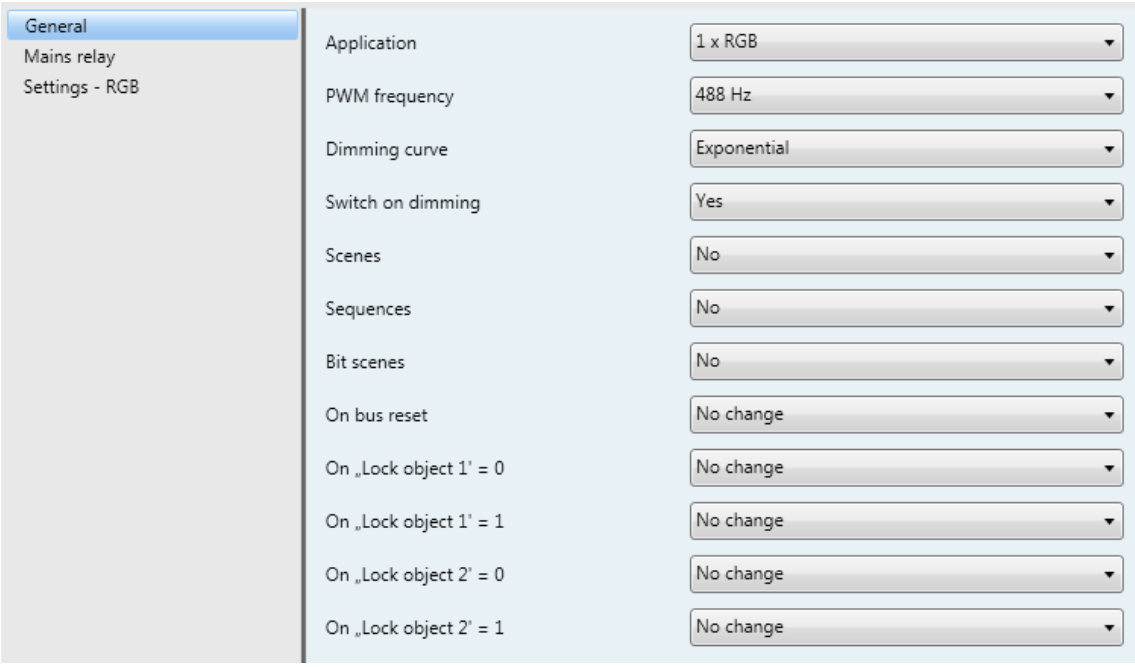

Figure 9: General

Parameter	Options	Description
Application	1 x RGB 1 x RGB and 1 x individually 1 x RGBW 2 x cold/warm white 1 x cold/warm white and 2 x individually 4 x separate	Selection of the 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 on the LED outputs 488 Hz for video recording (shutter speed) and higher resolution of PWM 600 Hz for smoother dimming
Dimming curve	Linear Exponential Power function combined	Adjusting the dimming behavior to the lamp
Switch at dimming	No Yes	Optional switching by dimming objects
Scenes	No Yes	Release of the scene functionality
Sequences	No Yes	Release of the sequence functionality. Only possible when using RGB and RGBW.
Bit scenes	No Yes	Release of bit scene functionality
At bus voltage recovery	As previously Value Off	Reaction at bus voltage recovery. If a special color or brightness value is desired, this is to be specified in the Settings menu.
At “lock object 1” = 0	As previously Value Off	Reaction after unlocking the lock object[3] 1. If a special color or brightness value is desired, this is to be specified in the Settings menu.
At “lock object 1” = 1	As previously Value Off	Reaction after unlocking the lock object[3] 2. If a special color or brightness value is desired, this is to be specified in the Settings menu.
At “lock object 2” = 0	As previously Value Off	Reaction after unlocking the lock object[3] 2. If a special color or brightness value is desired, this is to be specified in the Settings menu.
At “lock object 2” = 1	As previously Value Off	Reaction after unlocking the lock object[3] 2. If a special color or brightness value is desired, this is to be specified in the Settings menu.

3 When locked, the Enertex® KNX 4 channel LED dim sequencer 5A does not respond to dimming and switching messages from the KNX bus.

Power relay

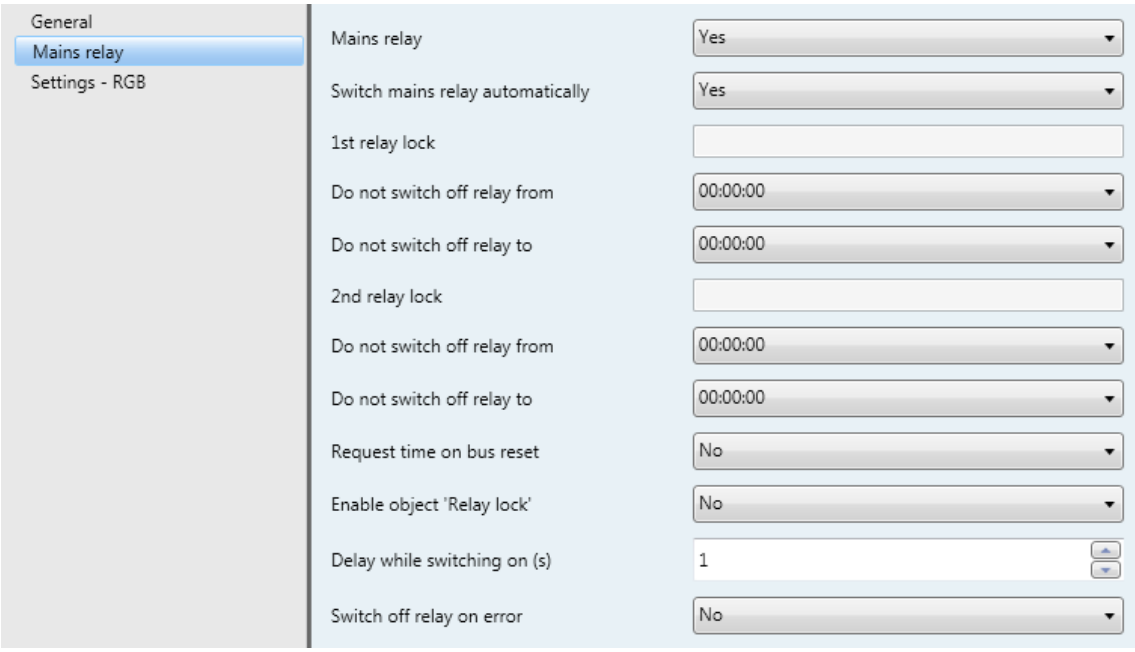

Figure 10: Power relay

Parameter	Options	Description
Power relay	No Yes	Release the power relay functionality. The power relay can switch a LED power supply on network side. For technical reasons switching is only possible after a pause of a few seconds
Switch relay automatically	No Yes	The power relay can be switched either by an object or automatically if needed.
1. Switch lock		
Do not switch off relay from	00:00, 00:30, ..., 23:30	The power relay is not switched off during the configured time here.
Do not switch off relay to	00:00, 00:30, ..., 23:30	
2. Switch lock		
Do not switch off relay from	00:00, 00:30, ..., 23:30	The power relay is not switched off during the configured time here.
Do not switch off relay to	00:00, 00:30, ..., 23:30	
Request time at bus voltage recovery	No Yes	The power relay does not switch automatically until the device has received the time. With this setting an object is transmitted to request the time at bus voltage recovery.
Value of object “Request time”	0 1	Here, the value of the object is set to request the time.
Release object “Power relay Lock-in”	No Yes	With the object “Power relay Lock-in” a state can be set, in which the device is not switched off automatically.
Switch on time (s)	0 ... 15	The activation of the LED light outputs are delayed after the activation of the power relay with the specified time period. Thus, it can be considered that the supply voltage for the LEDs is not applied immediately after the activation of the LED power supply. If the relay is used for switching an LED power supply on the mains side, at least 1s should be parameterized here.
Switch off relay on error	No Yes	The mains relay can be switched off when an error activates the undervoltage shutdown, the overcurrent shutdown or the overtemperature shutdown. If the relay switches off shortly after switching on and an undervoltage error is present, the switch on time (see above) should be increased. When the error has disappeared, the dimmer / the relay has to be switched on again.

Table 3: Power relay

Settings

The settings shown below may be available in common depending on the type of the application. Thus, in the application “1x RGB and 1x Individual” both the settings for RGB exist as well as the settings for the individual channel D. In the application “1x Warm / Cold white and 2x individual” the settings are indicated for warm /cold white and for the individual channels C and D.

Settings – RGB

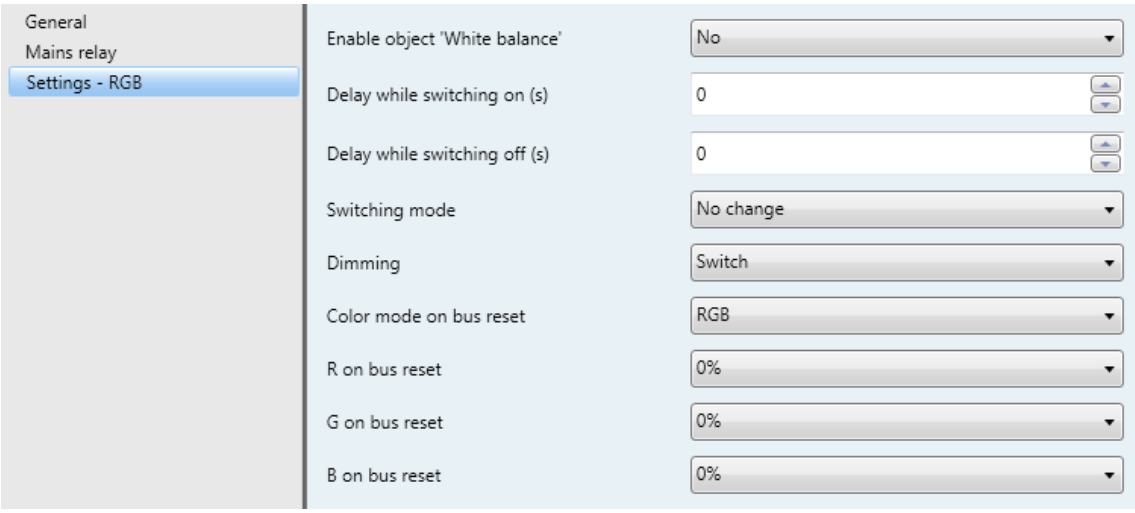

Figure 11: Settings – RGB

Parameter	Options	Description
Release object “white balance”	No Yes	The object of the white balance can be released. After the white balance has been started with this object, the color channels R, G, and B are to be adjusted via the dimming objects so that the LED modules emit white light. The brightness should be maximized. By stopping the white balance, the adjusted values are stored permanently in Enertex® KNX 4 channel LED dim sequencer 5A.
On delay	0 ... 65535	Switching on the LED-outputs can be delayed.
Off delay	0 ... 65535	Switching off the LED-outputs can be delayed.
Switching-on	As previously Value	The behavior after switching can be set. If desired a color or brightness can be specified.
Color mode	RGB HSV	Here, the color mode for the specification of the color or brightness value after switching is selected.
R when switching on	0%, 1%, 2%, ..., 99%, 100%	Specifying the brightness of the red LED channel when switching. Only in RGB color mode.
G when switching on	0%, 1%, 2%, ..., 99%, 100%	Specifying the brightness of the green LED channel when switching. Only in RGB color mode.
B when switching on	0%, 1%, 2%, ..., 99%, 100%	Specifying the brightness of the blue LED channel when switching. Only in RGB color mode.
H when switching on	0°, 3°, 6°, 9°, ..., 357°	Color when switching, indicated as angle on the color wheel. Only in color mode HSV.
S when switching on	0%, 1%, 2%, ..., 99%, 100%	Saturation when switching. Only in color mode HSV.
V when switching on	0%, 1%, 2%, ..., 99%, 100%	Brightness when switching. Only in color mode HSV.
Dimming	Jump to Dimming	A dimming value can be set to either immediately or dimmed slowly. This setting also refers to the behavior when switching on/off using the switching object.
Dimming velocity for absolute dimming (s)	0 ... 65535	Time that should be required for the absolute dimming from 0 to 100%
Dimming velocity for rel. dimming (s)	0 ... 65535	Time that should be required for the relative dimming from 0 to 100%
Color mode at bus voltage recovery	RGB HSV	Here the color mode for the specification of the color or brightness value at bus voltage recovery is to be selected. For further settings, see Switching-on
Color mode at “Lock object 1” = 0	RGB HSV	Here the color mode for the specification of the color or brightness value is to be selected when unlocking the lock object 1. For further settings, see Switching-on
Color mode at “Lock object 1” = 1	RGB HSV	Here the color mode for the specification of the color or brightness value is to be selected when unlocking the lock object 1. For further settings, see Switching-on
Color mode at “Lock object 2” = 0	RGB HSV	Here the color mode for the specification of the color or brightness value is to be selected when unlocking the lock object 2. For further settings, see Switching-on
Color mode at “Lock object 2” = 1	RGB HSV	Here the color mode for the specification of the color or brightness value is to be selected when unlocking the lock object 2. For further settings, see Switching-on

Table 4: Settings – RGB

Settings – RGBW

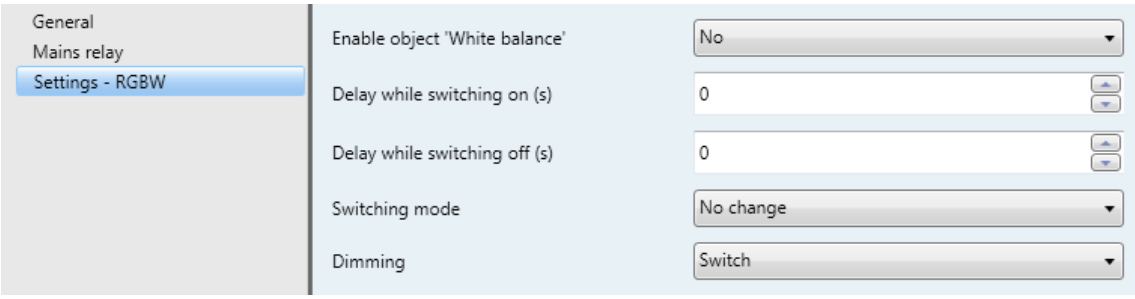

Figure 12: Settings – RGBW

The settings of the application RGBW correspond essentially to those of the application RGB supplemented by settings for the white channel.

Settings – Warm-/Cold white

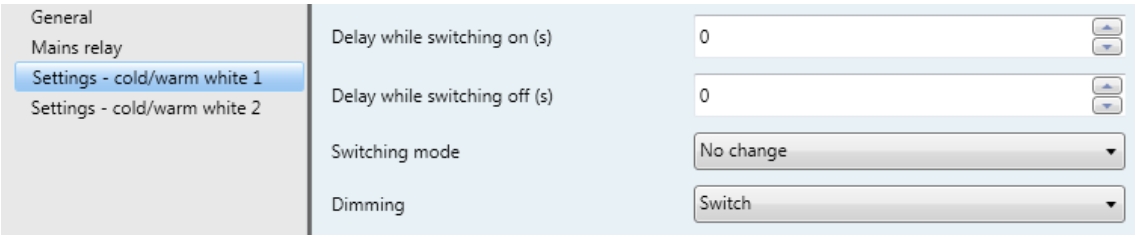

Figure 13: Settings – Warm-/Cold white

The settings of the application cold-/warm white correspond to those of the application RGB in many ways. However, the specification at switch-on, at bus voltage recovery, at unlock or lock is to make as follows (shown here for the switching process):

Parameter	Options	Description
Switch-on	As before Value	The behavior after switching can be set. If desired, white light with a certain color temperature can be set.
Cold white content when switching	0%, 1%, 2%, ..., 99%, 100%	Specifying the cold white content when switching
Brightness when switching	0%, 1%, 2%, ..., 99%, 100%	Brightness when switching

Table 5: Settings – Cold-/Warm white

Settings Single channel

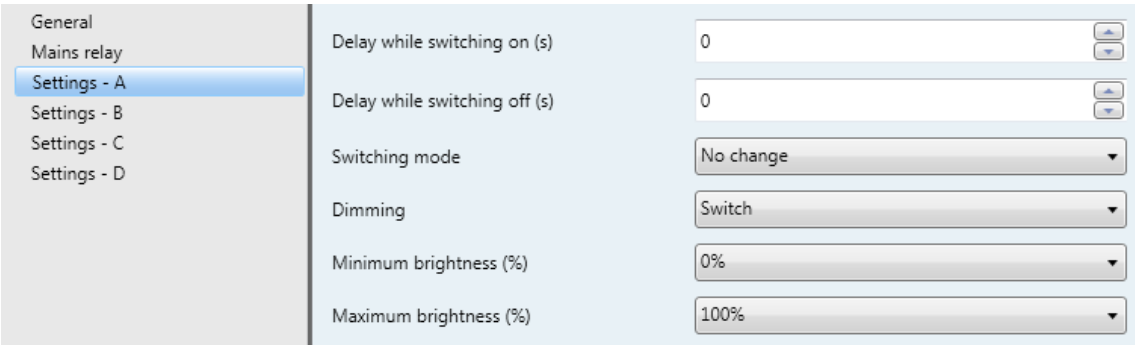

Figure 14: Settings – Single channel

In the settings for the single channels A, B, C and D a brightness range can also be specified, which will not be left when receiving a dim object. The specification at switch-on, at bus voltage recovery at unlock or lock is simplified to a brightness value (shown here for the switching process):

Parameter	Options	Description
Switch-on	As before Value	The behavior after switching can be set. If desired, the brightness of the single channel can be preset.
Brightness at switch-on	0%, 1%, 2%, ..., 99%, 100%	Default brightness when switching
Minimum brightness (%)	0%, 1%, 2%, ..., 99%, 100%	Lower limit of the brightness range, which is not left when receiving a dimming object
Maximum brightness (%)	0%, 1%, 2%, ..., 99%, 100%	Upper limit of the brightness range, which is not left when receiving a dimming object

Table 6: Settings - Single channel

Scenes

For each channel, up to eight KNX scenes can be defined in Enertex® KNX 4 channel LED dim sequencer 5A. To each scene a scene number (1...64) can be assigned.

Note: For the applications 2 x cold-warm white and 4 x single the scenes are in the menu “Settings”.

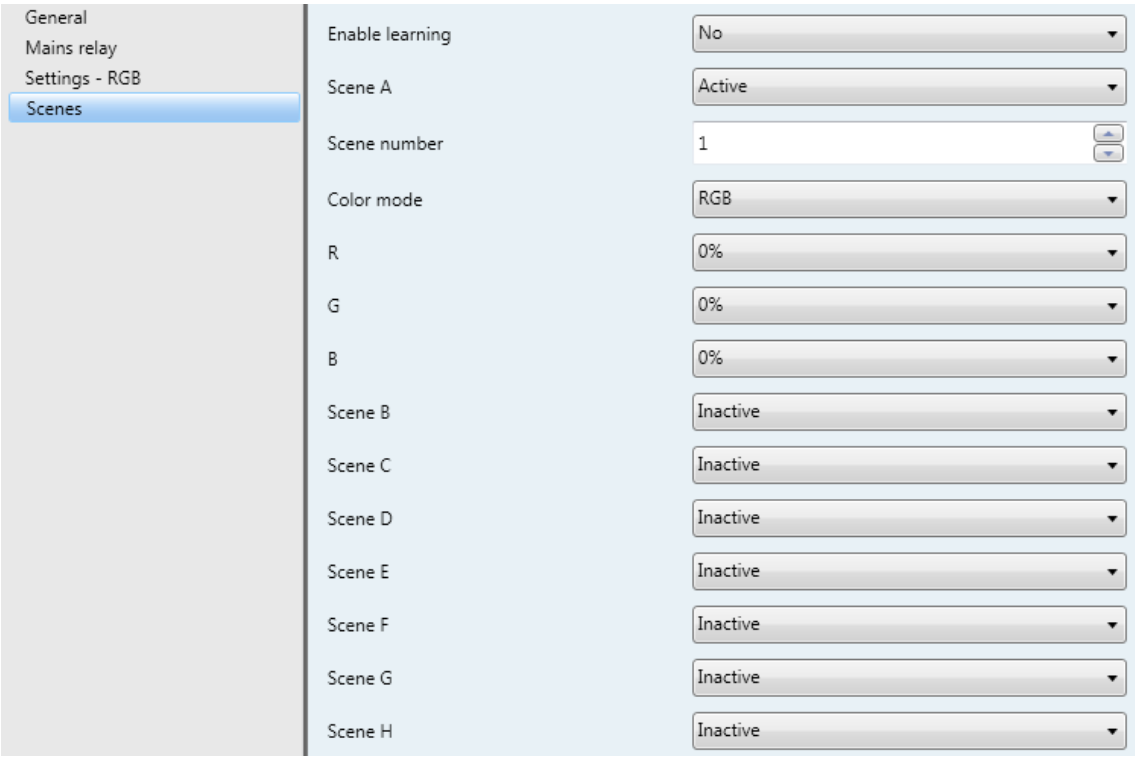

Figure 15: Scenes

Parameter	Options	Descriptions
Release saving	No Yes	It can be set, whether the dimming state can be saved by means of a storage message to the scene object as KNX scene.
Scene A	Not active Active	Enabling the scene A. The following shall apply in the same way for the other scenes B, C, D, E, F, G and H
Scene number	1, 2, 3, ..., 64	Number of KNX scene A. An own scene number must be specified for each scene.
Color mode	RGB HSV	Preferred default value of scene A. The setting differs in applications other than 1 x RGB accordingly.
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 1 x RGB and 1 x RGBW can be started or stopped on sequence objects in the applications. There are predefined and own sequences possible.

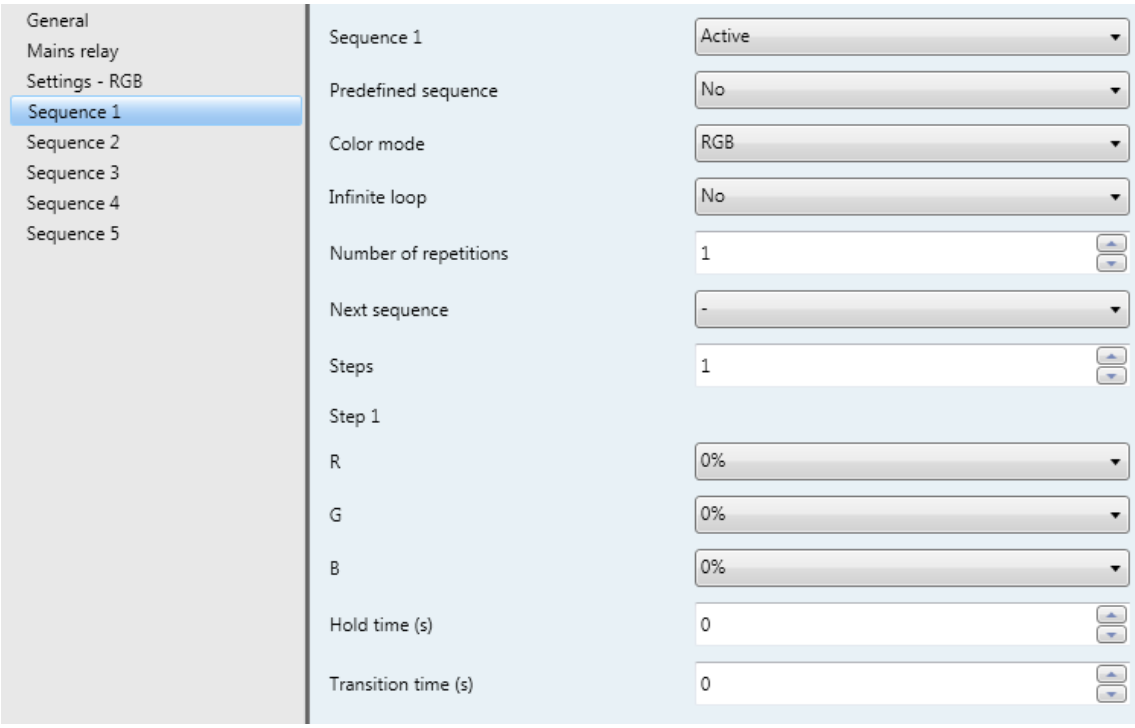

Figure 16: Sequences

Parameter	Options	Description
Sequence 1	Not active active	Enabling the sequence 1. For the other scenes 2, 3, 4 and 5 the following applies in the same way.
Predefined Sequence	No Yes	Selection between own and predefined sequence. Subsequent selection only for predefined sequence
Predefined Sequence	Amber room	Amber color change. Endless loop.
	Warm colors	On the color wheel only sweep the warm colors. Endless loop.
	Cold colors	On the color wheel only sweep the cold colors. Endless loop.
	TV	Random color change to presence simulation. Endless loop.
	Rainbow colors	Sweep the complete color wheel. Endless loop.
	Sunset	From daylight dimming off to red. Single loop.
	Warp effect	Switch between blue and a green injection. Endless loop.
	Strobe	White flashlight. Endless loop
	Good Morning	Sweep low intense red to green to warm white. Single loop.
	Glow	Extreme low intense red to orange. Endless loop. (optimal performance with dimming curve “Enertex”)
	Cozy	Sweep orange to red with half intensity.
	Red	Red color change. Endless loop.
	Green	Green color change. Endless loop.
	Railroad Station	White with color change in light blue and light green. Endless loop.
	Night light	White with color change in light yellow and red with low intensity. Endless loop.
	Green and yellow	Green to yellow sweep. Endless loop.
Total duration (s)	0, 1, 2,..., 65535	Seconds for the single playback of the predefined sequence. For example at predefined sequence = set TV to 1

Table 8: Predefined sequences

Parameter	Options	Description
Sequence 1	Not active active	Enabling the sequence 1. For the other scenes 2, 3, 4 and 5 the following applies in the same way.
Predefined sequence	No Yes	Selection between own and predefined sequence. Subsequent selection only for own sequence.
Color mode	RGB or RGBW HSV	Color mode of the sequence.
Endless loop	No Yes	One can select whether the scene is to be repeated endlessly
Number of repetitions	1, 2, 3, ..., 255	The sequence can be played up to 255 times. Not with endless loop.
Subsequent sequence	-, 1, 2, 3, 4, 5	After all repetitions of the sequence the Enertex® KNX 4 channel LED dim sequencer 5A can keep the last dimming value or start another 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 other steps. The description refers only to the RGB color mode.
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.
Hold time (s)	0, 1, 2,..., 65535	Seconds, which the step 1 holds the specified dimming value.
Transition time (s)	0, 1, 2,..., 65535	Dimming duration at transition to the dimming value of step 2.

Table 9: Own sequences

Bit Scenes

For each channel the Enertex® KNX 4 channel LED dim sequencer 5A has 2 bit scene objects. With each of these objects two bit scenes can be loaded. The bit scenes must be parametrized prior to this.

Note: For applications 2 x cold-warm white and 4 x single the bit scenes are in the Settings menu.

If using bit scenes the parametrized illumination will be dimmed with the speed of absolute dimming parameter, 8 Bit scenes will be changed without dimming.

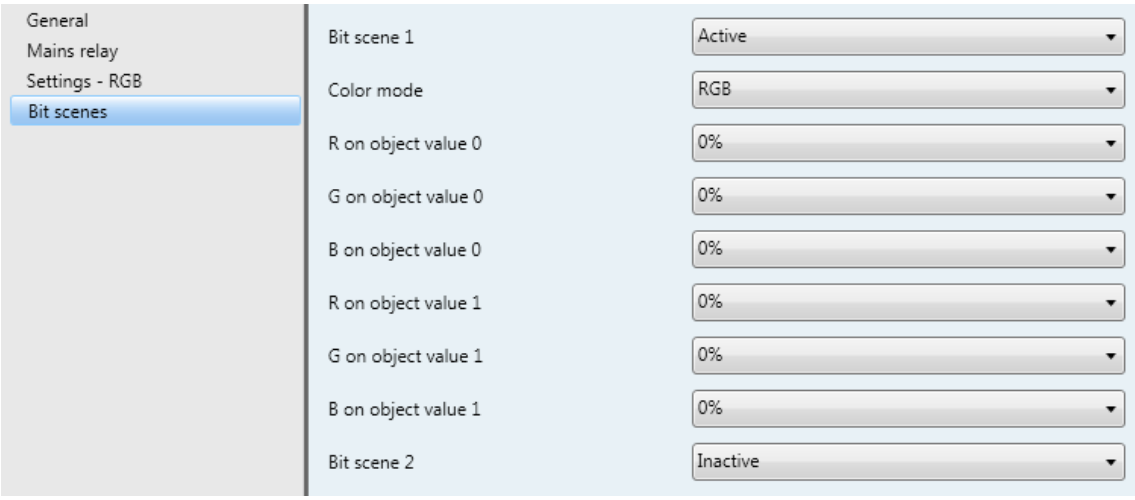

Figure 17: Bit Scenes

Parameter	Options	Description
Bit scene 1	Not Active Active	Release of bit scene 1. The same applies to the bit scene 2
Color mode	RGB HSV	Color mode setting. In other applications there are corresponding choices.
R for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 0 for the red color channel.
G for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 0 for the green color channel.
B for object value 0	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 0 for the blue color channel.
R for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 1 for the red color channel.
G for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 1 for the green color channel.
B for object value 1	0%, 1%, 2%, ..., 99%, 100%	Brightness value, which is set at bit scene object 1 with a value of 1 for the blue color channel.

Table 10: Bit Scenes

Group objects

Note: Depending on the configuration, some objects may not be available.

ID	Name	Object function	Length	Type	Flags
0	Test mode	Switch	1 Bit	[1.8] DPT_UpDown	C-W---
The test mode can be switched with this group object. (analogous to the test button).					

ID	Name	Object function	Length	Type	Flags
1	Test mode	Status	1 Byte	[5.10] DPT_Value_1_Ucount	C--T--
Output of the test mode state: 0 = no test mode; 1 = test mode output A; 2 = test mode output B; 3 = test mode output C; 4 = test mode output D					

ID	Name	Object function	Length	Type	Flags
3	Error	Under voltage	1 Bit	[1.2] DPT_Bool	C--T--
The object is transmitted when the error state under voltage switch off changes. 0=LED power supply has valid voltage, dimming sequencer is ready for operation, 1=LED power supply has low voltage or has failed or is not connected, so that the dimming sequencer is off.					

ID	Name	Object function	Length	Type	Flags
4	Error	Over current	1 Bit	[1.2] DPT_Bool	C--T--
The object is transmitted when the error state over current switch off changes. 0=current at all outputs in permissible range, dimming sequencer is ready for operation; 1=current is over the permissible range at at least one output, so that the dimming sequencer is off.					

ID	Name	Object function	Length	Type	Flags
5	Error	Over temperature	1 Bit	[1.2] DPT_Bool	C--T--
The object is transmitted when the error state over temperature switch off changes. 0=temperature at all outputs and at reverse polarity protection at the input is not too high, dimming sequencer is ready for operation; 1=temperature is too high at at least one output or at reverse polarity protection at input, so that the dimming sequencer is off.					

ID	Name	Object function	Length	Type	Flags
6	Power relay	Time	3 Bytes	[10.1] DPT_TimeOfDay	C-W---
With this object the time for time-controlled shift-lock for the power relay is updated.					

ID	Name	Object function	Length	Type	Flags
7	Power relay	Request time	1 Bit	[1.2] DPT_Bool	C--T--
Request the time from the time module. The value can be parametrized.					

ID	Name	Object function	Length	Type	Flags
8	Power relay	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Object for switching the power relay via the KNX™ Bus. 0=switch-off; 1=switch-on.					

ID	Name	Object function	Length	Type	Flags
9	Power 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	Power relay	Lock-in	1 Bit	[1.3] DPT_Enable	C-W---
Setting of power relay lock-in: 0=lock-in off; 1=lock-in on					

ID	Name	Object function	Length	Type	Flags
11	White balance	Starting and stopping	1 Bit	[1.10] DPT_Start	C-W---
Start and stop white balance: 0 = stop; 1 = start					

ID	Name	Object function	Length	Type	Flags
12	Channel A	Brightness status	1 Byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the single channel A or the output A. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
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 at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
12	Cold-/warm white 1	Status absolute cold white content	1 Byte	[5.1] DPT_Scaling	C-W---
Status object for the cold white content of the channel cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
13	Channel B	Brightness status	1 Byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the single channel B or the output B. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
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 at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
13	Cold-/warm white 1	Brightness status	1 Byte	[5.1] DPT_Scaling	C-W---
Status object for the brightness of the channel cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
14	Channel C	Brightness status	1 Byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the single channel C or the output C. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
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 at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
14	Cold-/warm white 2	Status absolute cold white content	1 Byte	[5.1] DPT_Scaling	C-W---
Status object for the cold white content of the channel cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
15	Channel D	Brightness status	1 Byte	[5.1] DPT_Scaling	C--T--
Status of the brightness of the single channel D or the output D. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
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 at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
15	Cold-/warm white 2	Brightness status	1 Byte	[5.1] DPT_Scaling	C-W---
Status object for the brightness of the channel cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
16	RGBW	Status RGB	3 Bytes	[232.600] DPT_Colour_RGB	C--T--
Status of the RGB brightness in the application 1 x RGBW. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
16	RGB	Status RGB	3 Bytes	[232.600] DPT_Colour_RGB	C--T--
Status of the RGB brightness in the application 1 x RGB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
17	RGBW	Status HSV	3 Bytes	[232.600] DPT_Colour_RGB	C--T--
Status of the values HSV in the application 1 x RGBW. byte order: H in the MSB; V in the LSB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
17	RGB	Status HSV	3 Bytes	[232.600] DPT_Colour_RGB	C--T--
Status of the values HSV in the application 1 x RGB. byte order: H in the MSB; V in the LSB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
18	RGBW	Status H	1 Byte	[5.3] DPT_Angle	C--T--
Status of the color value as an angle on the color wheel in the application RGBW. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
18	RGB	Status H	1 Byte	[5.3] DPT_Angle	C--T--
Status of the color value as an angle on the color wheel in the application RGB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
19	RGBW	Status S	1 Byte	[5.1] DPT_Scaling	C--T--
Status of saturation in the application RGBW. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
19	RGB	Status S	1 Byte	[5.1] DPT_Scaling	C--T--
Status of saturation in the application RGB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
20	RGB	Status V	1 Byte	[5.1] DPT_Scaling	C--T--
Status of brightness in the application RGBW. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
20	RGBW	Status V	1 Byte	[5.1] DPT_Scaling	C--T--
Status of brightness in the application RGB. The object is transmitted at: Absolutely dimming / Relatively dimming / Scene / Bit scene / Unlock / Switch-on					

ID	Name	Object function	Length	Type	Flags
21	Cold-/warm white 1	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
21	Channel A	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
22	Channel B	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
23	Cold-/warm white 2	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
23	Channel C	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
24	Channel D	Status on / off	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 at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
25	RGBW	Status on / off	1 Bit	[1.1] DPT_Switch	C--T--
Switching status in the application RGBW. 0 = switched off; 1 = switched on. The object is transmitted at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
25	RGB	Status on / off	1 Bit	[1.1] DPT_Switch	C--T--
Switching status in the application RGB. 0 = switched off; 1 = switched on. The object is transmitted at: Scene / Bit scene / Unlock / Switch-on / Switch off					

ID	Name	Object function	Length	Type	Flags
26	R	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the red color channel.					

ID	Name	Object function	Length	Type	Flags
26	Channel A	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the single channel A.					

ID	Name	Object function	Length	Type	Flags
27	G	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the green color channel.					

ID	Name	Object function	Length	Type	Flags
27	Channel B	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the single channel B					

ID	Name	Object function	Length	Type	Flags
28	B	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the blue color channel.					

ID	Name	Object function	Length	Type	Flags
28	Channel C	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the single channel C.					

ID	Name	Object function	Length	Type	Flags
29	Channel D	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the single channel D					

ID	Name	Object function	Length	Type	Flags
29	W	Dim absolute	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the white color channel.					

ID	Name	Object function	Length	Type	Flags
30	RGB	Dim absolute RGB	3 Bytes	[232.600] DPT_Colour_RGB	C-W---
Absolute RGB dimming object in the application RGB.					

ID	Name	Object function	Length	Type	Flags
30	RGBW	Dim absolute RGB	3 Bytes	[232.600] DPT_Colour_RGB	C-W---
Absolute RGB dimming object in the application RGBW					

ID	Name	Object function	Length	Type	Flags
31	RGB	Dim absolute HSV	3 Bytes	[232.600] DPT_Colour_RGB	C-W---
Absolute HSV dimming object in the application RGB. Byte order: H in the MSB; V in the LSB.					

ID	Name	Object function	Length	Type	Flags
31	RGBW	Dim absolute HSV	3 Bytes	[232.600] DPT_Colour_RGB	C-W---
Absolute HSV dimming object in the application RGB. Byte order: H in the MSB; V in the LSB.					

ID	Name	Object function	Length	Type	Flags
32	RGB	Dim absolute H	1 Byte	[5.3] DPT_Angle	C-W---
Absolute dimming object for the hue as an angle on the color wheel in the RGB application.					

ID	Name	Object function	Length	Type	Flags
32	RGBW	Dim absolute H	1 Byte	[5.3] DPT_Angle	C-W---
Absolute dimming object for the hue as an angle on the color wheel in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
33	RGB	Dim absolute S	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the saturation in the RGB application.					

ID	Name	Object function	Length	Type	Flags
33	RGBW	Dim absolute S	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the saturation in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
34	RGBW	Dim absolute V	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
34	RGB	Dim absolute V	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the saturation in the RGB application.					

ID	Name	Object function	Length	Type	Flags
35	Cold-/warm white 1	Dim absolute cold white content	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the cold white content of the channel cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
36	Cold-/warm white 2	Dim absolute cold white content	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the cold white content of the channel cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
37	Cold-/warm white 1	Dim absolute brightness	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness of the channel cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
38	Cold-/warm white 2	Dim absolute brightness	1 Byte	[5.1] DPT_Scaling	C-W---
Absolute dimming object for the brightness of the channel cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
39	Channel A	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the single channel A					

ID	Name	Object function	Length	Type	Flags
39	R	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the red color channel.					

ID	Name	Object function	Length	Type	Flags
40	Channel B	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the single channel B					

ID	Name	Object function	Length	Type	Flags
40	G	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the green color channel.					

ID	Name	Object function	Length	Type	Flags
41	Channel C	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the single channel C					

ID	Name	Object function	Length	Type	Flags
41	B	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the blue color channel.					

ID	Name	Object function	Length	Type	Flags
42	Channel D	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the single channel D					

ID	Name	Object function	Length	Type	Flags
42	W	Dim relative	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the white color channel.					

ID	Name	Object function	Length	Type	Flags
43	RGBW	Dim relative H	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the hue as an angle on the color wheel in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
43	RGB	Dim relative H	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the hue as an angle on the color wheel in the RGB application.					

ID	Name	Object function	Length	Type	Flags
44	RGBW	Dim relative S	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for saturation in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
44	RGB	Dim relative S	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for saturation in the RGB application.					

ID	Name	Object function	Length	Type	Flags
45	RGBW	Dim relative V	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness in the RGBW application.					

ID	Name	Object function	Length	Type	Flags
45	RGB	Dim relative 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	Dim relative cold white content	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the cold white content of the channel cold / warm white 1.					

ID	Name	Object function	Length	Type	Flags
47	Cold-/warm white 2	Dim relative cold white content	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the cold white content of the channel cold / warm white 2.					

ID	Name	Object function	Length	Type	Flags
48	Cold-/warm white 1	Dim relative brightness	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness of the channel cold /warm white 1.					

ID	Name	Object function	Length	Type	Flags
49	Cold-/warm white 2	Dim relative brightness	4 Bit	[3.7] DPT_Control_Dimming	C-W---
Relative dimming object for the brightness of the channel cold /warm white 2.					

ID	Name	Object function	Length	Type	Flags
50	Channel A	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for single channel A.					

ID	Name	Object function	Length	Type	Flags
51	Channel B	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for single channel B.					

ID	Name	Object function	Length	Type	Flags
52	Channel C	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for single channel C.					

ID	Name	Object function	Length	Type	Flags
53	Channel D	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for single channel D.					

ID	Name	Object function	Length	Type	Flags
54	RGBW	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for the application RGBW.					

ID	Name	Object function	Length	Type	Flags
54	RGB	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for the application RGB.					

ID	Name	Object function	Length	Type	Flags
55	Cold-/warm white 1	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for the application cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
56	Cold /warm white 2	Switch	1 Bit	[1.1] DPT_Switch	C-W---
Switching object for the application cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
57	Cold-/warm white 1	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the application cold-/warm white 1.					

ID	Name	Object function	Length	Type	Flags
57	Channel A	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the single channel A.					

ID	Name	Object function	Length	Type	Flags
58	Cold-/warm white 2	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the application cold-/warm white 2.					

ID	Name	Object function	Length	Type	Flags
58	Channel B	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the single channel B.					

ID	Name	Object function	Length	Type	Flags
59	Channel C	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the single channel C.					

ID	Name	Object function	Length	Type	Flags
60	ChannelD	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the single 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 application RGBW					

ID	Name	Object function	Length	Type	Flags
61	RGB	Scene	1 Byte	[18.1] DPT_SceneControl	C-W---
KNX/EIB scene object for the application RGB					

ID	Name	Object function	Length	Type	Flags
62	Cold-/warm white 1	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the application cold/-warm white 1					

ID	Name	Object function	Length	Type	Flags
62	RGBW	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the application RGBW					

ID	Name	Object function	Length	Type	Flags
62	RGB	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the application RGB					

ID	Name	Object function	Length	Type	Flags
62	Channel A	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the single channel A					

ID	Name	Object function	Length	Type	Flags
63	Cold-/warm white 1	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the application cold/-warm white 1					

ID	Name	Object function	Length	Type	Flags
63	RGBW	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the application RGBW					

ID	Name	Object function	Length	Type	Flags
63	RGB	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the application RGB.					

ID	Name	Object function	Length	Type	Flags
63	Channel A	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the single channel A					

ID	Name	Object function	Length	Type	Flags
64	Channel B	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the single channel B					

ID	Name	Object function	Length	Type	Flags
65	Channel B	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the single channel B					

ID	Name	Object function	Length	Type	Flags
66	Channel C	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the single channel C					

ID	Name	Object function	Length	Type	Flags
66	Cold-/warm white 2	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the application cold/-warm white 2					

ID	Name	Object function	Length	Type	Flags
67	Channel C	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the single channel C					

ID	Name	Object function	Length	Type	Flags
67	Cold-/warm white 2	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the application cold/-warm white 2					

ID	Name	Object function	Length	Type	Flags
68	Channel D	Bit scene 1	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 1 for the single channel D					

ID	Name	Object function	Length	Type	Flags
69	Channel D	Bit scene 2	1 Bit	[1.22] DPT_Scene_AB	C-W---
Bit scene object 2 for the single channel D					

ID	Name	Object function	Length	Type	Flags
70	Channel A	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the single channel A. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
71	Channel B	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the single channel B. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
72	Channel C	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the single channel C. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
73	Channel D	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the single channel D. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
74	RGBW	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the application RGBW. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
74	RGB	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the application RGB. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
75	Channel A	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the single channel A. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
76	Channel B	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the single channel B. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
77	Channel C	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the single channel C. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
78	Channel D	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the single channel D. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
79	RGBW	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the application RGBW. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
79	RGB	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the application RGB. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
80	Cold-/warm white 1	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the application cold-/warm white 1. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
81	Cold-/warm white 2	Lock 1	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 1 for the application cold-/warm white 2. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
82	Cold-/warm white 1	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the application cold-/warm white 1. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
83	Cold-/warm white 2	Lock 2	1 Bit	[1.1] DPT_Switch	C-W---
Locking object 2 for the application cold-/warm white 2. 0 = unlock; 1 = lock. In locked state no response to dimming and switching messages.					

ID	Name	Object function	Length	Type	Flags
84	RGBW	Sequence 1	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 1 for the application RGBW. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
84	RGB	Sequence 1	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 1 for the application RGB. 0 = stop; 1 = start of 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 application RGBW. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
85	RGB	Sequence 2	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 2 for the application RGB. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
86	RGBW	Sequence 3	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 3 for the application RGBW. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
86	RGB	Sequence 3	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 3 for the application RGB. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
87	RGBW	Sequence 4	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 4 for the application RGBW. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
87	RGB	Sequence 4	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 4 for the application RGB. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
88	RGBW	Sequence 5	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 5 for the application RGBW. 0 = stop; 1 = start of sequence					

ID	Name	Object function	Length	Type	Flags
88	RGB	Sequence 5	1 Bit	[1.10] DPT_Start	C-W---
Sequence object 5 for the application RGB. 0 = stop; 1 = start of sequence					

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

- R = Read : allows to read a value from group object
- W = Write : allows to write a value to the group object
- C = Communication : bus communication possible
- T = Transmit : allows a transfer of a value (usually this flag shows the transmitting GA)
- U = Update : allows updating a group object value on any feedback (“listen and synchronize”- functionality)

Specification

Enertex® KNX 4 channel LED dim sequencer 5A DK

Symbols	 Protection class II  Device for lamp  Unit with integrated safety device against over heating: limit temperature of the device housing  Furniture light  Must not be disposed of with other household garbage
KNX	DC 21 ... 32 V SELV Current consumption < 18.9 mA Connector type 5.1
LED	DC 12 ... 24 V SELV / < 20A from work equipment by DIN EN 61347-2-13 for LED-modules with constant output voltage Current consumption 20 mA Terminals: 4.0 mm^2 rigid or flexible without ferrule. The cables must not be tinned. Leads: Leads with adequate current capacity are to be selected. Because of the voltage drop and the heating of the cables a cross section of 4.0mm² is recommended. Temperature range of the lines to 90°C or higher.
	Four outputs with 5A for LED modules with constant input voltage in accordance with DIN EN 62031 LED modules with common anode Maximum cable length depends on the cable resistance (voltage drop) Terminals: 2.5 ... 4.0 mm^2 rigid or flexible without ferrule. The cables must not be tinned. 2.5 mm² flexible with ferrule Leads: Leads with adequate current capacity are to be selected. Because of the voltage drop and the heating of the cables a cross section of 4.0mm² is recommended. At least the cross-section should be 2.5mm². Temperature range of the lines to 90°C or higher.
	PWM frequency 488 Hz / 600 Hz
	Over temperature shutdown
	Over current shutdown
	Under voltage shutdown
Power relay	AC 230V / 16 A / 50 Hz Cat. II Terminals: 2.5 ... 4.0 mm^2 rigid or flexible without ferrule. The cables must not be tinned. 2.5 mm² flexible with ferrule Leads: Leads with adequate current capacity are to be selected. The power consumption of the device to be switched has to be considered.
Ambient temperature	-5 ... +45° C
Installation	Only for use in dry rooms. IP20 protection Class II
Dimensions	196 mm x 40 mm x 32 mm (L x W x H)

Enertex® KNX 4 channel LED dim sequencer 5A REG

Symbols	 Protection class II  Device for lamp  Unit with integrated safety device against over heating: limit temperature of the device housing  Must not be disposed of with other household garbage
KNX	DC 21 ... 32 V SELV Current consumption < 18.9 mA Connector type 5.1
LED	DC 12 ... 24 V SELV / < 20A from work equipment by DIN EN 61347-2-13 for LED-modules with constant output voltage Current consumption 20 mA Terminals: 4.0 mm² rigid or 2.5 mm² flexible without ferrule or 2.5 mm² flexible with ferrule without plastic sleeve. Total cross-section of connection if necessary over several terminals at least 4.0 mm² The cables must not be tinned. Leads: Leads with adequate current capacity are to be selected. Because of the voltage drop and the heating of the cables a cross section of 4.0mm² is recommended. Temperature range of the lines to 90°C or higher.
	Four outputs with 5A for LED modules with constant input voltage in accordance with DIN EN 62031. LED modules with common anode Maximum cable length depends on the cable resistance (voltage drop) Terminals: 4.0 mm² rigid or 2.5 mm² flexible without ferrule or 2.5 mm² flexible with ferrule without plastic sleeve The cables must not be tinned. Leads: Leads with adequate current capacity are to be selected. Because of the voltage drop and the heating of the cables a cross section of 4.0mm² is recommended. At least the cross-section should be 2.5mm². Temperature range of the lines to 90°C or higher.
	PWM frequency 488 Hz / 600 Hz
	Over temperature shutdown
	Over current shutdown
	Under voltage shutdown
Power relay	AC 230V / 16 A / 50 Hz Cat. III Terminals: 4.0 mm² rigid or 2.5 mm² flexible without ferrule or 2.5 mm² flexible with ferrule without plastic sleeve The cables must not be tinned. Leads: Leads with adequate current capacity are to be selected. The power consumption of the device to be switched has to be considered.
Ambient temperature	-5 ... +45° C
Installation	Only for use in dry rooms. Only for installation in distribution according to DIN 43880 on 35mm cap rail according to EN 50022. IP20 protection Class II

Dimensions	70.0 mm x 89.6 mm x 62.9 mm (L x B x H)