

Proportional actuator

RGBL-K

V1.0

PROGRAMMING MANUAL



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1 GENERAL DESCRIPTION

The RGL-K is an electronic constant-voltage 3 channel dimmer that allows to control and regulate general or RGB Leds modules.

It has been designed to obtain a precise digital regulation receiving orders trough the KNX bus. including the possibility to control each channel individually or the three channels simultaneously. Digital regulation control based on microcontroller with more than 200 regulation points.

The regulating ramp speed (the progressive on/off lighting) can be configured by programming.



Characteristics:

- 3 Regulation channels that can be controlled individually or simultaneously via KNX.
- Maximum operating output current: 3A per channel.
- Output power - 3x30W (10Vdc).
 - 3x78W (24Vdc).
- 8 Programmable scenes that can be executed from bus commands.
- Remote enable / disable of bus control.
- PWM dimming method.
- Overload circuit protection.
- Digital regulation control based on microcontroller with more than 200 regulation points.

2 TECHNICAL INFORMATION

Input voltage - 10 - 24 Vdc.

Output power - 3x30W (10Vdc).

- 3x78W (24Vdc).

KNX Supply - 29 Vdc from KNX/EIB BUS.

BUS current consumption - 5 mA.

Connections - BUS connection terminal KNX.

Mounting - Luminaire or ceiling integration.

Size - 77x35x17 mm.

Environment temperature range - Running: -10°C a 55°C / Storage: -30°C a 60°C / Transport: -30°C a 60°C.

Regulation - According to the directives of electro magnetic compatibility and low voltage: EN 50090-2-2 / UNE-EN 61000-6-3:2007 / UNE-EN 61000-6-1:2007 / UNE-EN 61010-1.

3 PROGRAMMING

3.1 COMMUNICATION OBJECTS

Number of communication objects: 23.

Number of assignments: 25.

Object	Name / Function	Length	DPT	Flags				
				C	R	W	T	U
0	CH1 - On/Off	1 bit	1.001	•		•	•	
1	CH1 - Dimmer	4 bit	3.007	•		•	•	
2	CH1 - Value	1 byte	5.001	•		•	•	
3	CH1 - On/Off status	1 bit	1.001	•	•	•	•	•
4	CH1 – Value status	1 byte	5.001	•	•		•	•
5	CH2 - On/Off	1 bit	1.001	•		•	•	
6	CH2 - Dimmer	4 bit	3.007	•		•	•	
7	CH2 - Value	1 byte	5.001	•		•	•	
8	CH2 - On/Off status	1 bit	1.001	•	•	•	•	•
9	CH2 – Value status	1 byte	5.001	•	•		•	•
10	CH3 - On/Off	1 bit	1.001	•		•	•	
11	CH3 - Dimmer	4 bit	3.007	•		•	•	
12	CH3 - Value	1 byte	5.001	•		•	•	
13	CH3 - On/Off status	1 bit	1.001	•	•	•	•	•
14	CH3 – Value status	1 byte	5.001	•	•		•	•
15	RGB - On/Off	1 bit	1.001	•		•	•	
16	RGB - Dimmer	4 bit	3.007	•		•	•	
17	RGB - Value	1 byte	5.001	•		•	•	
18	RGB - Bright	1 byte	5.001	•		•	•	
19	RGB - On/Off state	1 bit	1.001	•	•		•	•
20	RGB - Value state	1 byte	5.001	•	•		•	•
21	RGBL-K - Enable	1 bit	1.001	•	•	•	•	
22	Scene	1 byte	5.001	•		•	•	

3.2 OBJECTS DESCRIPTION

Object 0: CH1 - On/Off
1 bit communication object to switch on and off the regulation channel 1. When a "1" is received through this object the dimmer is switched on and the brightness level goes up to the last regulation value. When a "0" is received the dimmer is switched off.
Object 1: CH1 - Dimmer
4 bits communication object for dimming control with pushbuttons. Depending on the dimming steps set in the pushbutton, telegrams will make the brightness level go up or down according to the ramp speed configured. Breaks telegrams to this object will stop the brightness at the current level.
Object 2: CH1 - Value
1 byte communication object for precise control by setting a new brightness level directly. The brightness level will go up or down slowly according to the ramp speed configured.
Object 3: CH1 - On/Off state
1bit communication object for feedback signalling of the on / off state of the dimmer. When the dimmer is off and receives a switch on telegram or a brightness value, a "1" is sent through this object. When the dimmer is on and it receives a switch off telegram or a brightness value of 0% a "0" is sent through this object.
Object 4: CH1 - Value state
1byte communication object for feedback signalling of the current brightness level of the dimmer. When it receives a new brightness value or an increase/decrease telegram the final brightness value is sent through this object.
Object 5: CH2 - On/Off
1 bit communication object to switch on and off the regulation channel 2. When a "1" is received through this object the dimmer is switched on and the brightness level goes up to the last regulation value. When a "0" is received the dimmer is switched off.
Object 6: CH2 - Dimmer
4 bits communication object for dimming control with pushbuttons. Depending on the dimming steps set in the pushbutton, telegrams will make the brightness level go up or down according to the ramp speed configured. Breaks telegrams to this object will stop the brightness at the current level.
Object 7: CH2 - Value
1 byte communication object for precise control by setting a new brightness level directly. The brightness level will go up or down slowly according to the ramp speed configured.
Object 8: CH2 - On/Off state
1bit communication object for feedback signalling of the on / off state of the dimmer. When the dimmer is off and receives a switch on telegram or a brightness value, a "1" is sent through this object. When the dimmer is on and it receives a switch off telegram or a brightness value of 0% a "0" is sent through this object.

Object 9: CH2 - Value state
1byte communication object for feedback signalling of the current brightness level of the dimmer. When it receives a new brightness value or an increase/decrease telegram the final brightness value is sent through this object.
Object 10: CH3 - On/Off
1 bit communication object to switch on and off the regulation channel 3. When a “1” is received through this object the dimmer is switched on and the brightness level goes up to the last regulation value. When a “0” is received the dimmer is switched off.
Object 11: CH3 - Dimmer
4 bits communication object for dimming control with pushbuttons. Depending on the dimming steps set in the pushbutton, telegrams will make the brightness level go up or down according to the ramp speed configured. Breaks telegrams to this object will stop the brightness at the current level.
Object 12: CH3 - Value
1 byte communication object for precise control by setting a new brightness level directly. The brightness level will go up or down slowly according to the ramp speed configured.
Object 13: CH3 - On/Off state
1bit communication object for feedback signalling of the on / off state of the dimmer. When the dimmer is off and receives a switch on telegram or a brightness value, a “1” is sent through this object. When the dimmer is on and it receives a switch off telegram or a brightness value of 0% a “0” is sent through this object.
Object 14: CH3 - Value state
1byte communication object for feedback signalling of the current brightness level of the dimmer. When it receives a new brightness value or an increase/decrease telegram the final brightness value is sent through this object.
Object 15: RGB – On/Off
1 bit communication object to switch on and off the 3 regulation channels at the same time. When a “1” is received through this object the dimmer is switched on and the brightness levels of the channels go up to the last regulation value. When a “0” is received all channels of the dimmer are switched off simultaneously.
Object 16: RGB - Dimmer
4 bits communication object for dimming control with pushbuttons. Depending on the dimming steps set in the pushbutton, telegrams will make the color change according to the ramp speed configured and going over the whole color palette: Off-Red-Green-Blue-White. Breaks telegrams to this object will stop at the current color.
Object 17: RGB - Value
1 byte communication object for precise control by setting a new color value directly. The color level will go up or down slowly according to the ramp speed configured.

Object 18: RGB - Bright

1 byte communication object for setting a new bright value directly. The color selected does not change, only the bright (or intensity of the light) will go up or down.

Object 19: RGB - On/Off state

1bit communication object for feedback signalling of the on / off state of the RGB mode. When the dimmer is off and receives a switch on telegram or a RGB value, a “1” is sent through this object. When the dimmer is on and it receives a switch off telegram or a RGB value of 0% a “0” is sent through this object.

Object 20: RGB - Value state

1byte communication object for feedback signalling of the current color value of the dimmer. When it receives a new RGB value or an increase/decrease telegram the final RGB color value is sent through this object.

Object 21: RK3x300 - Enable

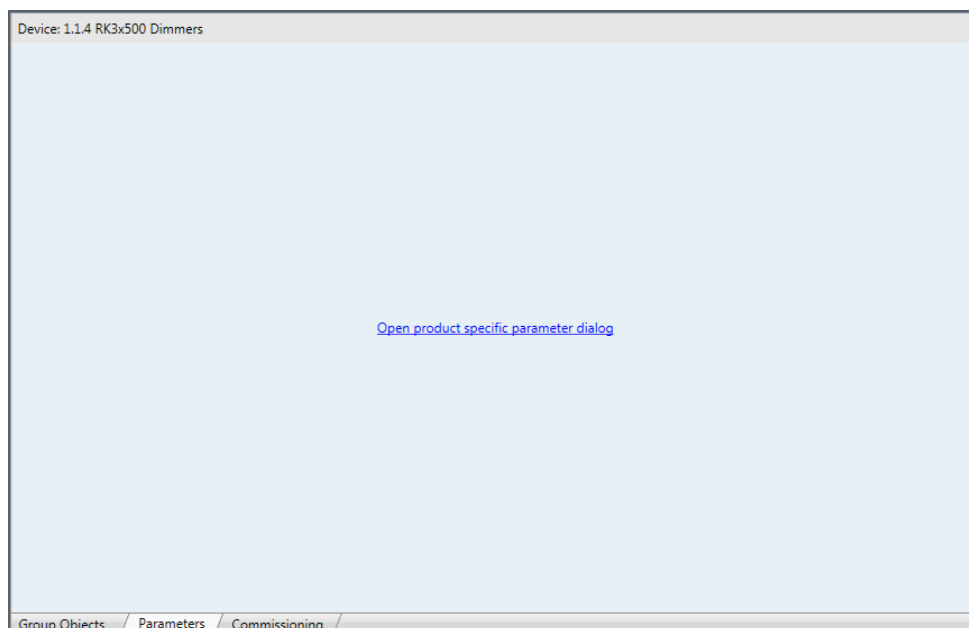
1 bit communication object to enable or disable the device control through the KNX BUS. When a “0” is received through this object the device cannot be controlled by BUS telegrams (inputs are not disabled). When a “1” is received the device is enabled.

Object 22: RGB - Scene

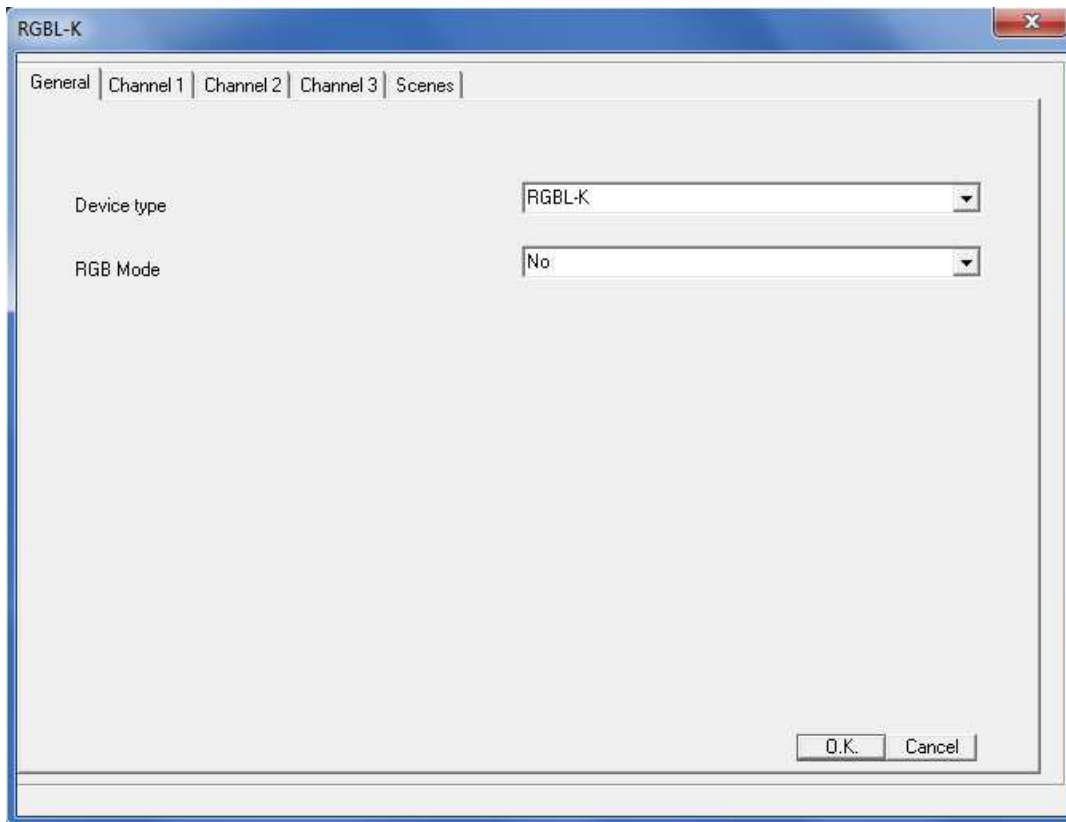
1byte communication object for internal scenes execution. Scenes can be programmed in the parameters window of the device. There are up to 8 scenes available.

3.3 PARAMETERS

The parameters of the device are configured with a specific parameter dialog; do click on “open” from the parameters menu in the ETS to run it.



There are several tabs to configure different parameters depending on the type of the device selected; in this case the device that must be selected is RGLB-K.



Some parameters can be hidden depending on the device selected or the previous configuration. The description of every parameter is shown next:

3.3.1 GENERAL

Device type	
Values	RK1000/2000, RK2x500, RK3x500, RGLB-K, DALI_virtual_dimmer, DMX_virtual_dimmer
Description	Allows to select the corresponding device that will be programmed by the application. The ETS will show or hide communications objects and parameters according to this parameter. In this case the device that must be selected is RGLB-K.

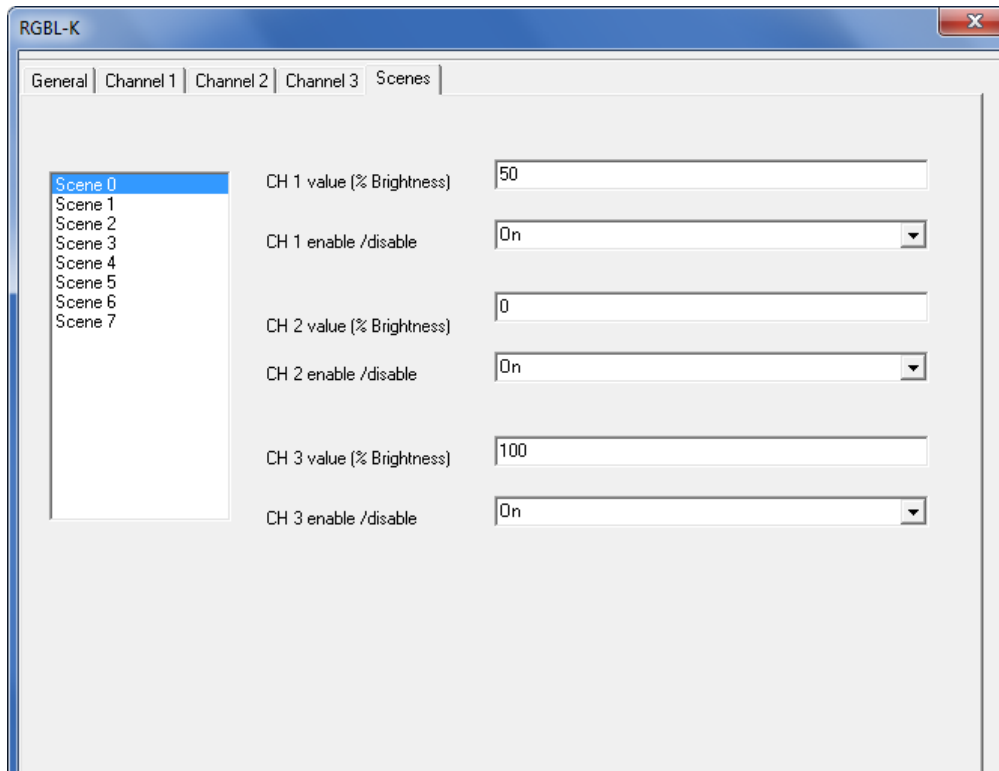
RGB mode	
Values	Yes/No
Description	Select if the RGB mode is enabled or not. In case of being enabled the RGB specific communication objects will be shown. These objects allow set a color directly by controlling the three channels simultaneously among other things.
RGB ramp speed (sec)	
Values	From 0 to 255
Description	Hidden if RGB mode = No. It is the color change speed measured in seconds in RGB mode when using RGB value or RGB dimmer communication objects. Typical value = 10 (seconds).

3.3.2 CHANNEL 1/2/3

Ramp speed (sec)	
Values	From 0 to 255
Description	It is the brightness change rate measured in seconds. The brightness changes gradually when using Channel X value or dimming communication objects. Typical value = 10 (seconds).

3.3.3 SCENES 0 TO 7

The RGBL-K allows to configure up to 8 scenes that can be executed from bus commands with the corresponding communication object (number 22). The presets of the three channels when calling a scene are configured in the following parameters tab:



Channel 1/2/3 Value	
Values	From 0 to 100
Description	Is the value memorized in the scene for the brightness level of the channel. The brightness level will go up or down slowly according to the ramp speed configured if the scene is executed.
Channel 1/2/3 Enable	
Values	Yes/No
Description	Select if the channel is enabled (included in the scene) or not. In case of being enabled the channel will set the brightness configured in the value parameter when the scene is called.

4 APPLICATION NOTES

4.1 INDIVIDUAL CHANNEL CONTROL WITH SCENES

4.1.1 DEVICES

RGL-K: Three channel proportional actuator.

KNX 3 gang pushbutton

KNX 1 gang switch.















4.1.2 DESCRIPTION

The RGL-K regulates 3 light circuits of the room that are connected to the output 1 (L1), output 2 (L2) and the output 3 (L3) and these lights should be controlled from different pushbuttons situated in two zones of the room.

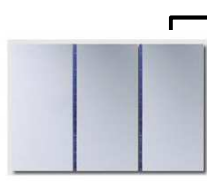
The lights can be controlled at the same time from any KNX 3 gang pushbutton connected to the EIB/KNX BUS anywhere.

Another KNX switch will also call two scenes of the dimmer for “All Off” and “All On” of the three channels simultaneously.

4.1.3 OBJECTS LINKS

RGL-K	–	 Object 0	->	 Object X Short press – KNX pushbutton gang 1
RGL-K	–	 Object 1	->	 Object Y Long press – KNX pushbutton gang 1
RGL-K	–	 Object 5	->	 Object X Short press – KNX pushbutton gang 2
RGL-K	–	 Object 6	->	 Object Y Long press – KNX pushbutton gang 2
RGL-K	–	 Object 10	->	 Object X Short press – KNX pushbutton gang 3
RGL-K	–	 Object 11	->	 Object Y Long press – KNX pushbutton gang 3
RGL-K	–	 Object 22	->	 Object X Switch – KNX 1 gang switch

3 gang pushbutton



Short press → Object 0

Long press → Object 1

Short press → Object 5

Long press → Object 6

Short press → Object 10

Long press → Object 11

1 gang switch



Rising edge → Object 22

Falling edge → Object 22



4.1.4 PARAMETER SETTINGS

The following parameter setting is generally recommended for this example. The ideal parameters may change depending on the application or installation.

Parameter name		Recommended setting
General	Device type	RGBL-K
	RGB Mode	No
Channel 1	Ramp time (seconds)	10
Channel 2	Ramp time (seconds)	10
Channel 3	Ramp time (seconds)	10
Scenes - Scene 0 (All off)	Ch1 Value (% Brightness)	0
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	0
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	0
	Ch3 Enable/Disable	Yes

Scenes – Scene 1 (All on)	Ch1 Value (% Brightness)	100
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	100
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	100
	Ch3 Enable/Disable	Yes
KNX Pushbutton	Gang 1 Short press	Switch - 0/1
	Gang 1 Long press	Increase/Decrease - 100%
	Gang 2 Short press	Switch - 0/1
	Gang 2 Long press	Increase/Decrease - 100%
	Gang 3 Short press	Switch - 0/1
	Gang 3 Long press	Increase/Decrease - 100%
KNX Switch	Gang 1 rising edge	Byte value sent = 0
	Gang 1 falling edge	Byte value sent = 1

The 3xgang KNX pushbutton to control the three channels individually behavior is the typical short-press/long-press working principle: a short press switches on and off the light at the last dimming level meanwhile long press makes the RGBL-K increase or decrease the brightness level according to the ramp speed and interval configured. Take into account that the ramp speed must be a high value, if not; it will be difficult to stop the dimming at the brightness desired.

The 1xgang KNX Switch will work sending bytes values to recall the scenes memorized in the RGBL-K in order to change the three channels directly and instantly.

4.2 RGB CONTROL WITH COLOR SCENES

4.2.1 DEVICES

RGLB-K: Three channel proportional actuator.








KNX 1 gang pushbutton: For three-channel color control

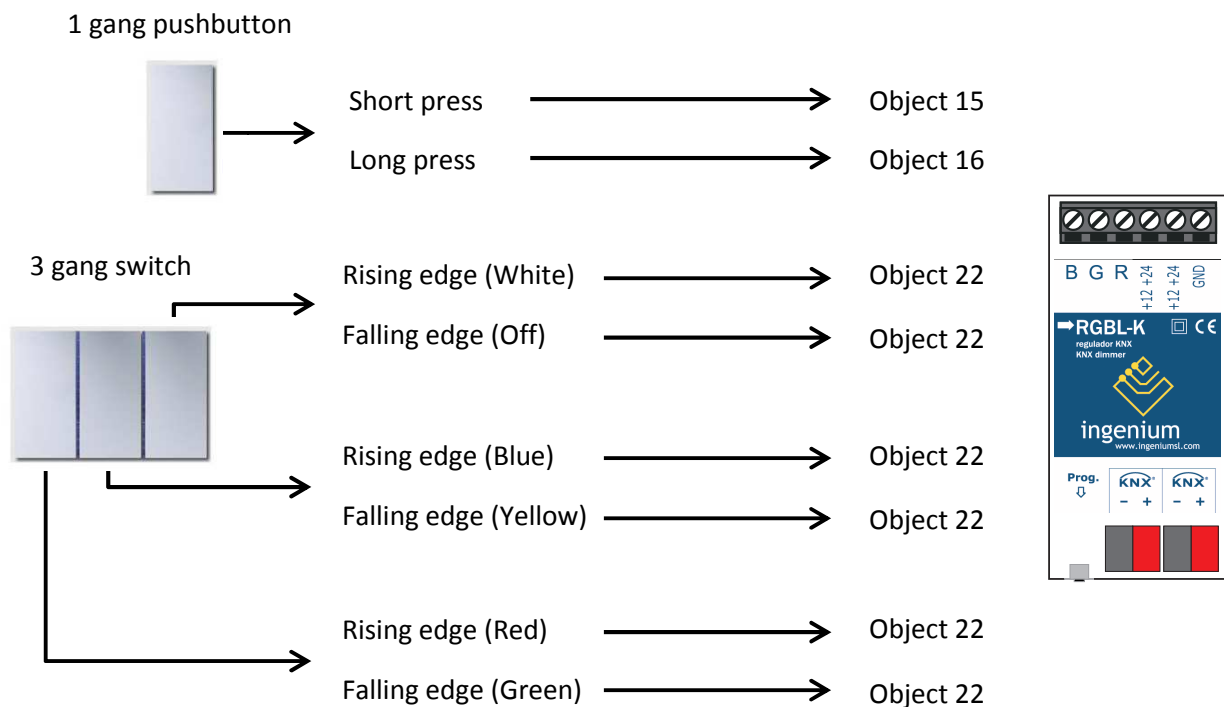
KNX 3 gang switch: For scenes recalling.

4.2.2 DESCRIPTION

The RGLB-K regulates 3 color Led lights (Red, Green and Blue) of the room. The three lights should be controlled from one pushbuttons simultaneously (going over the whole color palette) and also from another three switches to recall color scenes directly (Red, Green, Blue, Yellow, White and Off).

4.2.3 OBJECTS LINKS

RGLB-K	-	 Object 15	->	 Object X Short press – KNX pushbutton
RGLB-K	-	 Object 16	->	 Object Y Long press – KNX pushbutton
RGLB-K	-	 Object 22	->	 Object X Rising edge – KNX Switch gang 1
RGLB-K	-	 Object 22	->	 Object Y Falling edge – KNX Switch gang 1
RGLB-K	-	 Object 22	->	 Object X Rising edge – KNX Switch gang 2
RGLB-K	-	 Object 22	->	 Object Y Falling edge – KNX Switch gang 2
RGLB-K	-	 Object 22	->	 Object X Rising edge – KNX Switch gang 3
RGLB-K	-	 Object 22	->	 Object Y Falling edge – KNX Switch gang 3



4.2.4 PARAMETER SETTINGS

The following parameter setting is generally recommended for this example. The ideal parameters may change depending on the application or installation.

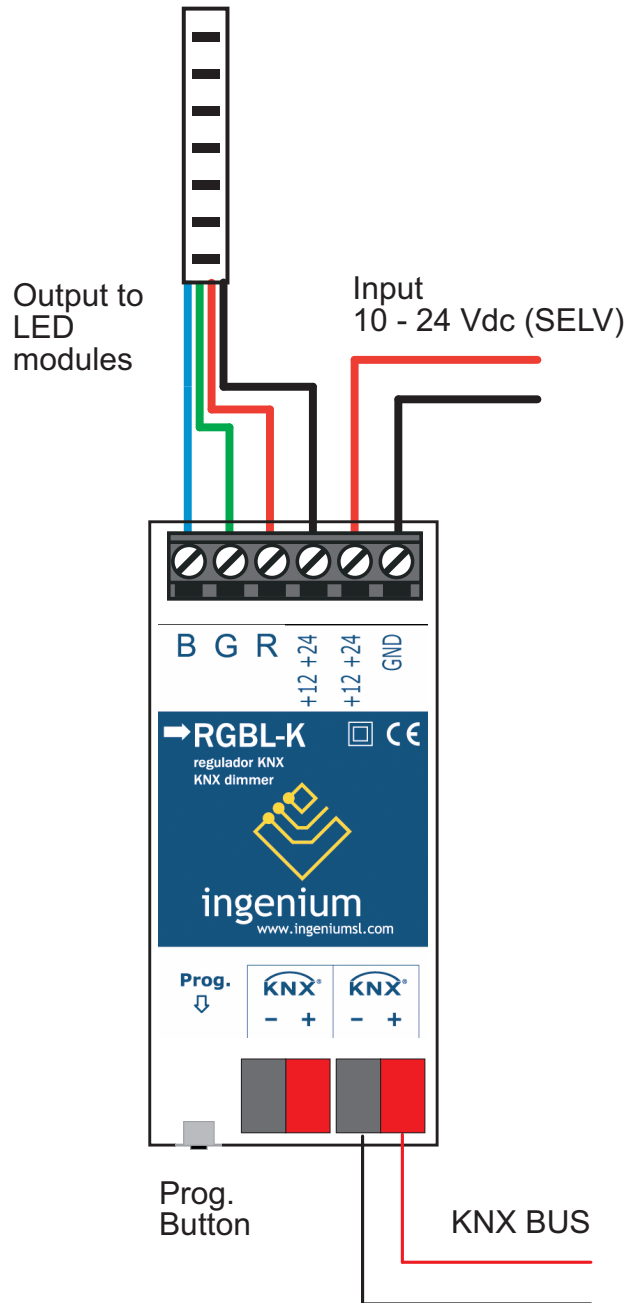
Parameter name	Recommended setting	
General	Device type	RGBL-K
	RGB Mode	Yes
	RGB Ramp time (seconds)	15
Scenes - Scene 0 (White)	Ch1 Value (% Brightness)	100
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	100
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	100
	Ch3 Enable/Disable	Yes
Scenes – Scene 1 (Off)	Ch1 Value (% Brightness)	0
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	0
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	0
	Ch3 Enable/Disable	Yes

Scenes - Scene 2 (Blue)	Ch1 Value (% Brightness)	0
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	0
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	100
	Ch3 Enable/Disable	Yes
Scenes – Scene 3 (Yellow)	Ch1 Value (% Brightness)	100
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	50
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	0
	Ch3 Enable/Disable	Yes
Scenes - Scene 4 (Red)	Ch1 Value (% Brightness)	100
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	0
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	0
	Ch3 Enable/Disable	Yes
Scenes – Scene 5 (Green)	Ch1 Value (% Brightness)	0
	Ch1 Enable/Disable	Yes
	Ch2 Value (% Brightness)	100
	Ch2 Enable/Disable	Yes
	Ch3 Value (% Brightness)	0
	Ch3 Enable/Disable	Yes
KNX Pushbutton	Short press	Switch - 0/1
	Long press	Increase/Decrease - 100%
KNX Switch	Gang 2 rising edge	Byte value sent = 4
	Gang 2 falling edge	Byte value sent = 5
	Gang 3 rising edge	Byte value sent = 2
	Gang 3 falling edge	Byte value sent = 3
	Gang 4 rising edge	Byte value sent = 0
	Gang 4 falling edge	Byte value sent = 1

The 1xgang KNX pushbutton to control the three colors simultaneously behavior is the typical short-press/long-press working principle: a short press switches on and off the three lights at the last dimming level meanwhile long press makes the RGBL-K go over the whole color palette: off-red-green-blue-white (changing direction with increases or decreases orders). Take into account that the ramp speed must be a high value, if not; it will be difficult to stop the dimming at the color desired.

The 3xgang KNX Switch will work sending bytes values to recall the scenes memorized in the RGBL-K in order to change to a color directly and instantly.

5 INSTALLATION





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