



Dimmer

BES-DM480330

Programming manual



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1 General description

The Bes Ref. DM480330 is an electronic constant-voltage 3 channel dimmer which allows to control and regulate general and RGB Led strip modules or any other low voltage lamp.

It has been designed to obtain a precise digital regulation receiving orders through the KNX bus, including the possibility to control each channel individually or the three channels simultaneously for RGB applications. Digital regulation control based on microcontroller with more than 250 regulation points.

The regulating ramp speed (the progressive on/off lighting) can be configured individually for each channel. The RGB mode allows to select a particular color by dimming with pushbuttons or directly with any color palette and then modify the brightness of the chosen color or individual channels.



General characteristics:

- 3 Regulation channels that can be controlled individually or simultaneously via KNX.
- Maximum operating output current: 3A per channel.
- 64 scenes / 32 sequences that can be controlled 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.
- Last position memory in case of power failure.

2 Technical information

Input power supply	From +12 to +24Vdc
Current consumption	5mA from power supply
KNX Supply	29Vdc from KNX/EIB BUS
Mounting	Luminaire or ceiling integration
Size	77x35x17mm
Connections	BUS connection terminal KNX Screw terminals for input supply and outputs
Outputs	3 regulation channels (triac output)
Environment temperature range	Operation: -10°C/55°C Storage: -30°C/60°C Transportation: -30°C/60°C
Regulation	According to the directives of electromagnetic 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 Application program information

Application program: Ingenium / Dimmers (manufacturer / program name).

Dynamic objects table generation: yes.

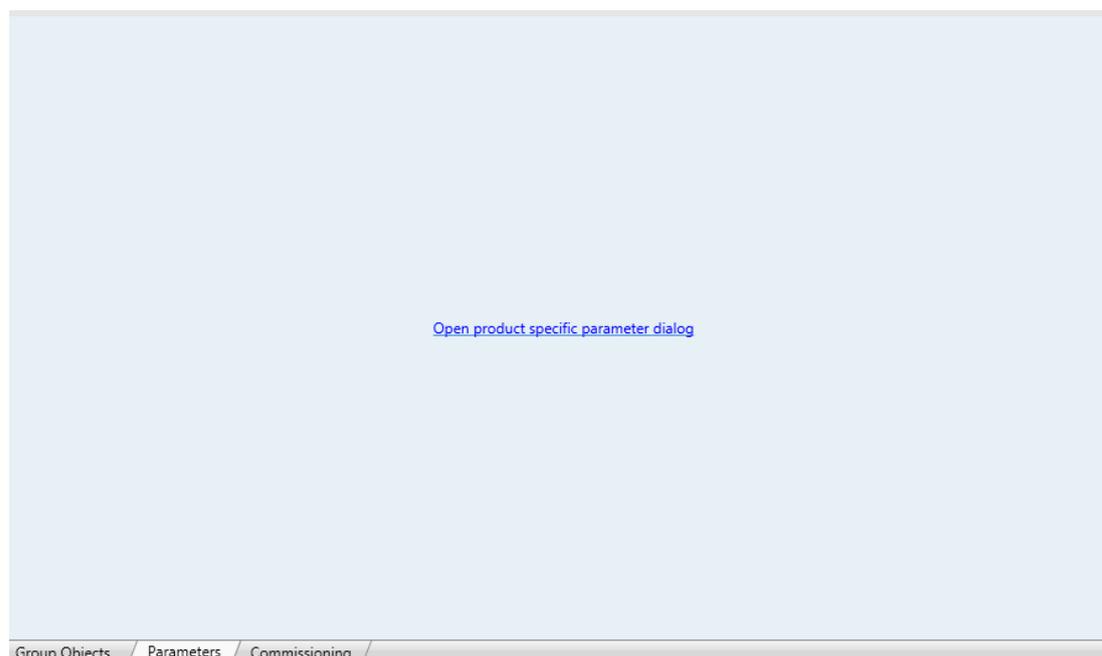
Catalogue version: v2.1.2

Maximum number of communication objects: 24.

Maximum number of assignments: 25.

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

- Plug-in version: Rev 2.1.
- ETS minimum required version: 4.1.8 (build 3614).
- Device manufacturing date: 26-11-2014 and later



3.2 Individual address assignment

The dimmer has a programming button for the KNX individual address assignment which is located on the front of the device.

A red led near the programming button lights up when it is pressed manually or if the device is set remotely to programming mode state.

The led is automatically turned off if the ETS has assigned an individual address correctly or if the programming button is pressed again manually.

3.3 Communication objects table

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	•	•		•	•
22	Scene	1 byte	5.001	•		•	•	

The following communication objects are only available when RGB mode is activated:

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	DM480330 - Enable	1 bit	1.001	•	•	•	•	
23	RGB - Value	3 bytes	232.600	•		•	•	

3.4 Communication object description

3.4.1 Individual channels

Name	Object: CHx On/Off
Function	1-bit communication object to switch on and off the channel.
Description	<p>When a "1" is received through this object the light is switched on and the brightness level goes up to the last one memorized (different from "0") or to a fixed value according to the parameters configured.</p> <p>When a "0" is received through this object the light is switched off.</p> <p>By default, the behaviour of the light when it is switched on through this object is jump to last.</p>
Name	Object: CHx - Dimmer
Function	4-bits communication object for dimming control with pushbuttons.
Description	<p>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.</p> <p>Break telegrams to this object will stop the brightness at the current level.</p> <p>By default, the behaviour of the light when it is off and it receives an increase telegram through this object is switching on and dimming. The light cannot be switched off by decrease telegrams.</p>
Name	Object: CHx - Value
Function	1 byte communication object for precise control by setting a new brightness level directly.
Description	<p>The brightness level will go up or down slowly according to the channel ramp speed configured.</p> <p>By default, the behaviour of the light when it is switched off and it receives a value different from 0% through this object is switching on and dimming to receive value. The light can be switched off with 0% telegrams too.</p>
Name	Object: CHx - On/Off state
Function	1-bit communication object for feedback signalling of the on / off state of the channel.
Description	<p>When the light is off and receives a switch on telegram or a brightness value, a "1" is sent through this object.</p> <p>When the light is on and it receives a switch off telegram or a brightness value of 0% a "0" is sent through this object.</p>
Name	Object: CHx - Value state
Function	1-byte communication object for feedback signalling of the current brightness level of the channel.
Description	When it receives a new brightness value or an increase/decrease telegram the final brightness value is sent through this object.

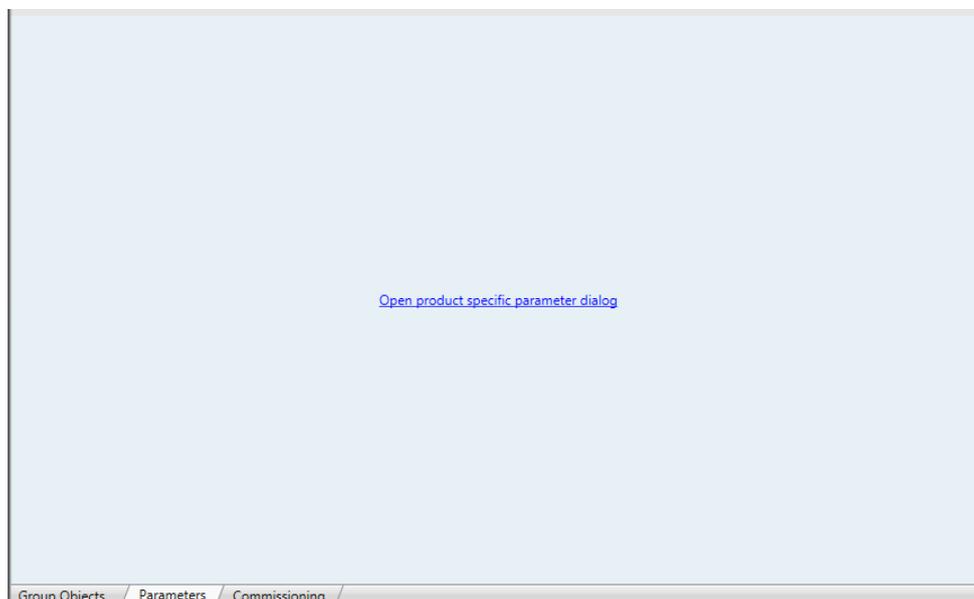
3.4.2 RGB mode

Name	Object 15: RGB – On/Off
Function	1 bit communication object to switch on and off the 3 regulation channels at the same time.
Description	<p>When a “1” is received through this object the three channels are switched on and brightness level goes up to the last one memorized (different from “0”) or to a fixed value according to the parameters configured (see parameter “Behaviour when switching on” pag.12).</p> <p>When a “0” is received through this object the three channels are switched off.</p> <p>By default, the behaviour of the light when it is switched on through this object is jump to last value (see parameters “switch on/off time” pag.12).</p>
Name	Object 16: RGB - Dimmer
Function	4 bits communication object for color or brightness dimming with pushbuttons.
Description	<p>This communication object can have two different functions according to the parameter “RGB Dimming object function” selected:</p> <ul style="list-style-type: none"> - Color dimming function: Depending on the dimming steps set in the pushbutton, telegrams will make the color change according to the RGB ramp speed configured and going over the whole color palette: Off-Red-Green-Blue-White. Break telegrams to this object will stop at the current color. - Brightness dimming function: Depending on the dimming steps set in the pushbutton, telegrams will make the brightness level go up or down according to the individual ramp speed configured without changing the current color. Break telegrams to this object will stop the brightness at the current level.
Name	Object 17: RGB – Value (1byte)
Function	1 byte communication object for precise control by setting a new RGB color value directly.
Description	The color level will go up or down slowly according to the individual ramp speed configured.
Name	Object 18: RGB - Bright
Function	1 byte communication object for setting a new brightness value directly.
Description	The color selected does not change, only the brightness (or intensity of the light) will go up or down.
Name	Object 19: RGB - On/Off state
Function	1bit communication object for feedback signalling of the on / off state of the RGB mode.
Description	<p>When the three channels are off and the device receives a switch on telegram or a brightness value, a “1” is sent through this object.</p> <p>When the three channels are switched off, a “0” is sent through this object.</p>

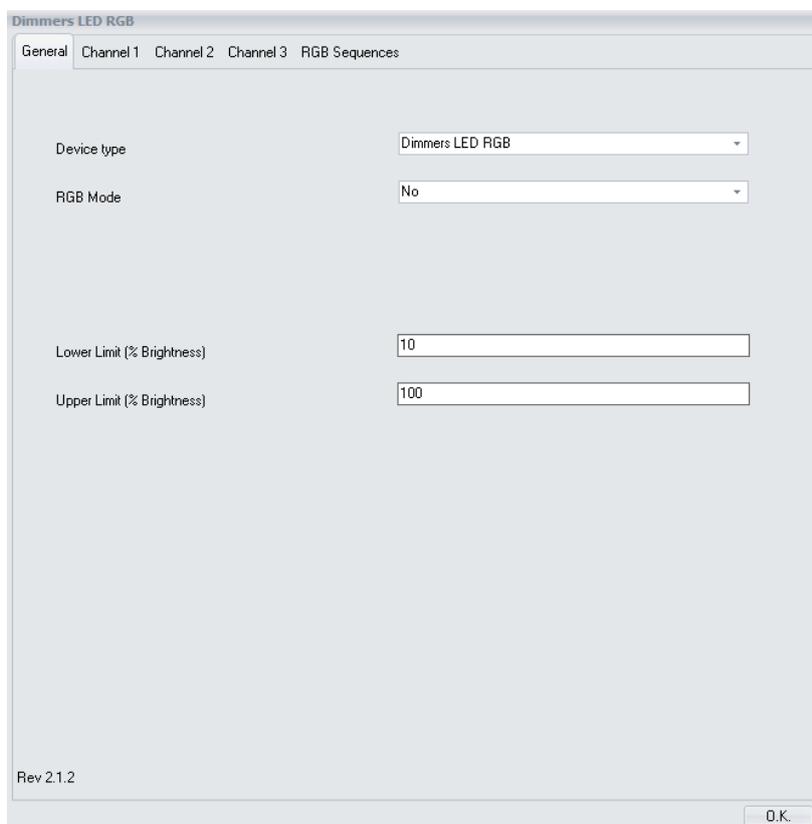
Name	Object 20: RGB - Value state
Function	1byte communication object for feedback signalling of the current color value of the dimmer.
Description	When it receives a new RGB value or an increase/decrease telegram the final RGB color value is sent through this object.
Name	Object 21:483300 - Enable
Function	1-bit communication object to enable or disable the device control through the KNX BUS.
Description	<p>When a “0” is received through this object the device cannot be controlled by BUS telegrams. When a “1” is received the device control is enabled.</p> <p>By default the enable function is activated. It is not necessary to use this object to enable the normal function of the device.</p>
Name	Object 22: RGB - Scene
Function	1byte communication object for internal scenes/sequences control.
Description	<p>There are up to 64 scenes / 32 sequences available. A scene can be used to save/recall the channel level or it can control a programmed sequence.</p> <p>When a value from 1 to 64 (0x00 to 0x40) is sent to this object the channel will recall its internal scene or execute the sequence which number corresponds to the value.</p> <p>When a value from 128 to 192 (0x80 to 0xC0) is sent to this object the channel will save its current brightness in the scene or stop the sequence which number corresponds to the value.</p> <p>If there is not a sequence programmed into the scene, the save/recall function is the standard. On the other hand, if a sequence is programmed into a scene position, the standard save/recall function is disabled and values from 1 to 32 will execute the sequence while values from 128 to 160 will stop it.</p>
Name	Object 23: RGB – Value (3 bytes)
Function	3 bytes communication object for precise control by setting a new RGB color value directly.
Description	<p>The color level will go up or down slowly according to the individual ramp speed configured.</p> <p>When the device receives a new RGB value or an increase/decrease telegram, the result RGB color value is sent through this object for feedback signalling.</p>
Name	Object 24: Enable/disable timer
Function	1-bit communication object to enable or disable the staircase function of the three channels.
Description	When a “0” is received through this object the staircase timers of every channel are disabled. When a “1” is received the staircase timers are enabled again.

3.5 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: Dimmers LED RGB.



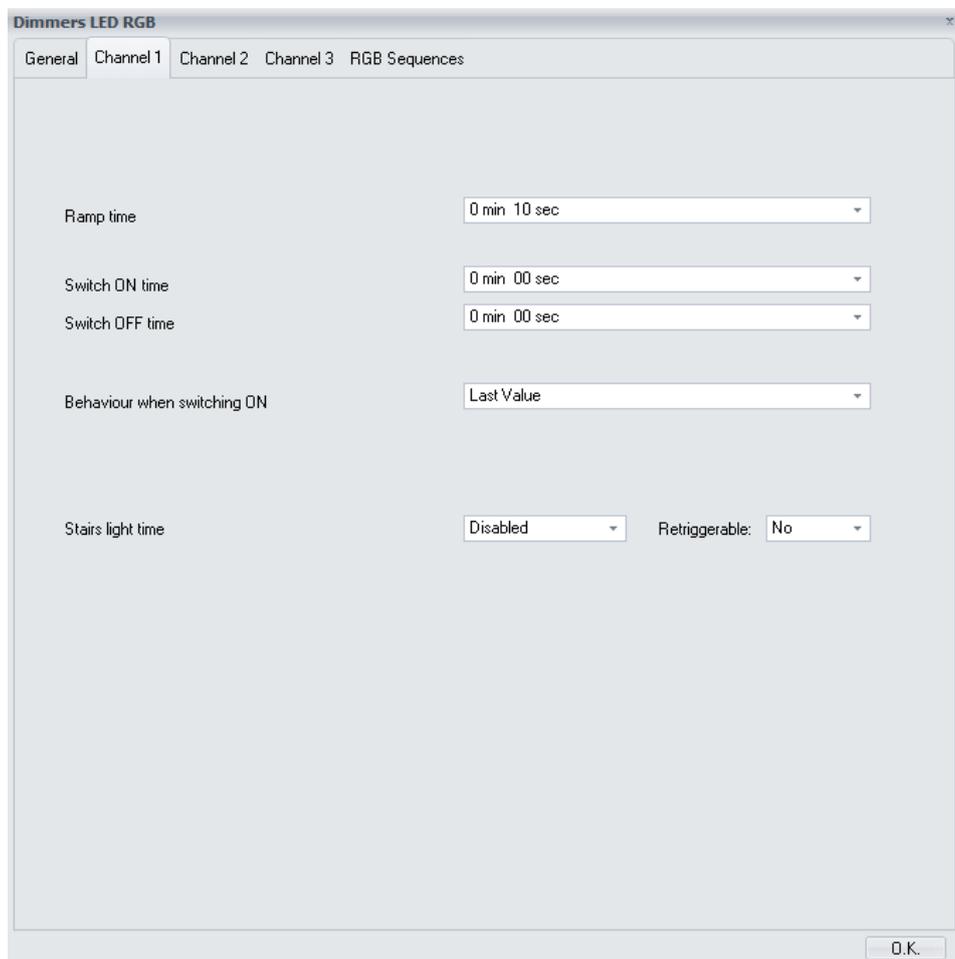
Some parameters can be hidden depending on the device selected or the previous configuration. The description of every parameter is shown next.

3.5.1 General

Name	Device type
Values	Dimmer 1 channel, 2 channels, 3 channels or Dimmer Led RGB.
Description	Allows selecting the type of 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 type that must be selected is: Dimmers LED RGB.
Name	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.
Name	RGB dimming object function
Values	Color / Brightness dimming
Description	Hidden if RGB mode = No. This parameter defines the function of the 4 bits communication object 16-RGB dimmer: - Brightness dimming function: It makes the brightness level go up or down according to the individual ramp speed configured without changing the current color. - Color dimming function: It makes the color change according to the RGB ramp speed configured and going over the whole color palette: Off-Red-Green-Blue-White.
Name	RGB ramp time
Values	From 0min,0sec to 4min,13sec
Description	Hidden if RGB mode = No. It is the color change speed measured in seconds in RGB mode when using RGB color dimming function. Minimum recommended value = 10 seconds.

3.5.2 Channel 1/2/3

The following parameters can be configured independently for each channel of the dimmer.

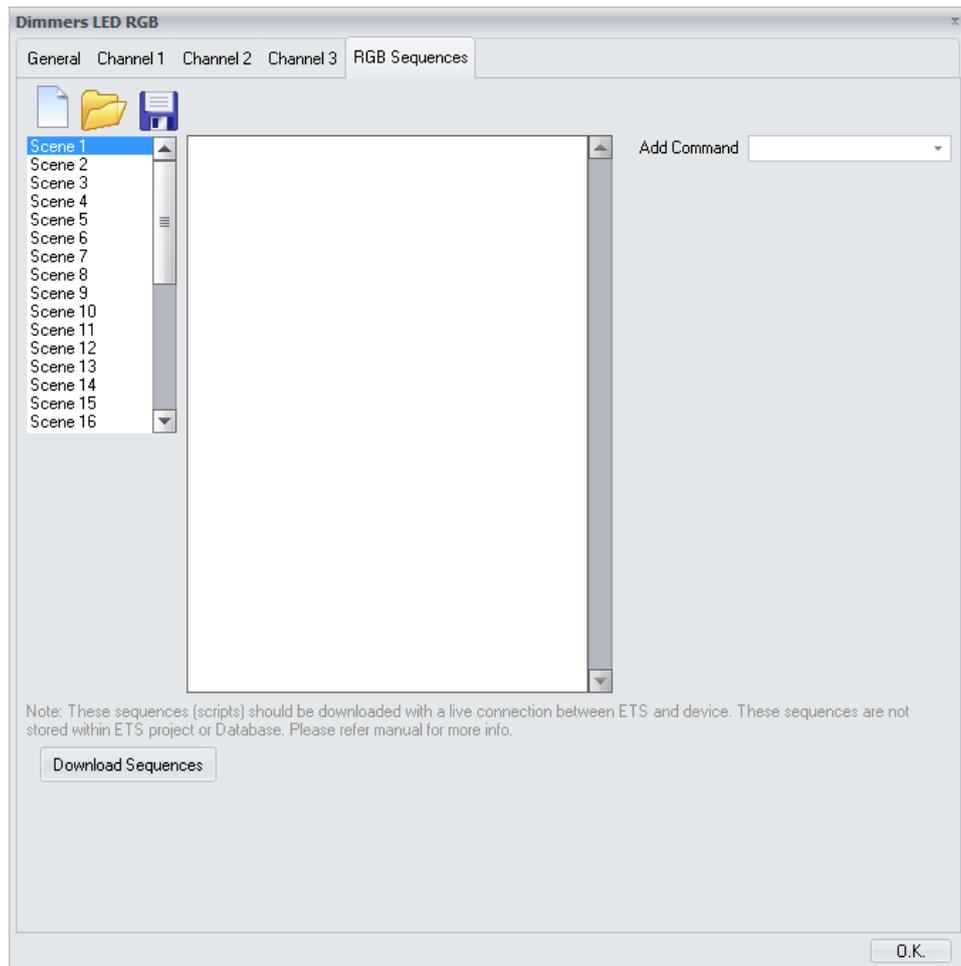


Name	Ramp time
Values	From 0min,0sec to 4min,13sec
Description	It is the brightness change rate measured in seconds/minutes. The brightness changes gradually when using Channel X value or dimming communication objects. Typical value = 0min, 10sec (seconds). Lower values will make difficult to obtain a desired value when dimming (by objects 1, 6, 11).

Name	Switch on time
Values	From 0min,0sec to 4min,13sec
Description	It is the brightness change rate measured in seconds/minutes when the channel is switched on (by objects 0, 5 and 10).
Name	Switch off time
Values	From 0min,0sec to 4min,13sec
Description	It is the brightness change rate measured in seconds/minutes when the channel is switched off (by objects 0, 5 and 10).
Name	Behaviour when switching on
Values	Last value or fixed value from 0,78% to 98,82%
Description	It is the brightness level of the channel when it is switched on (by objects 0, 5 and 10). The channel can be configured to dim up to the last value (different from "0") memorized or dim to a selected fixed value.
Name	Stairs light time
Values	Disabled or fixed value from 5 seconds to 790 minutes
Description	A staircase lighting function can be configured for each channel with this parameter. If enabled, the channel will be switched off automatically after the time configured. During the staircase function, take into account the following behaviour: -The countdown can be retriggerable or not (see next parameter). -The channel can always be switched off manually. It is possible to enable/disable the staircase light timer by sending values 1 and 0 to the corresponding channel communication object (objects 15, 19 and 24).
Name	Retriggerable
Values	Yes/no
Description	Defines if the staircase countdown of the channel can be retriggered or not. If set to yes, it can be retriggered with on, dimming or brightness value telegrams.

3.5.3 RGB Sequences

The DM480330 dimmer allows configuring up to 64 scenes / 32 sequences that can be controlled from bus commands with the corresponding communication object (number 22). A scene can be used to save/recall each channel level or it can control a programmed sequence that can be configured in the following tab:



If there is **not a sequence programmed into the scene**, the save/recall function is the standard:

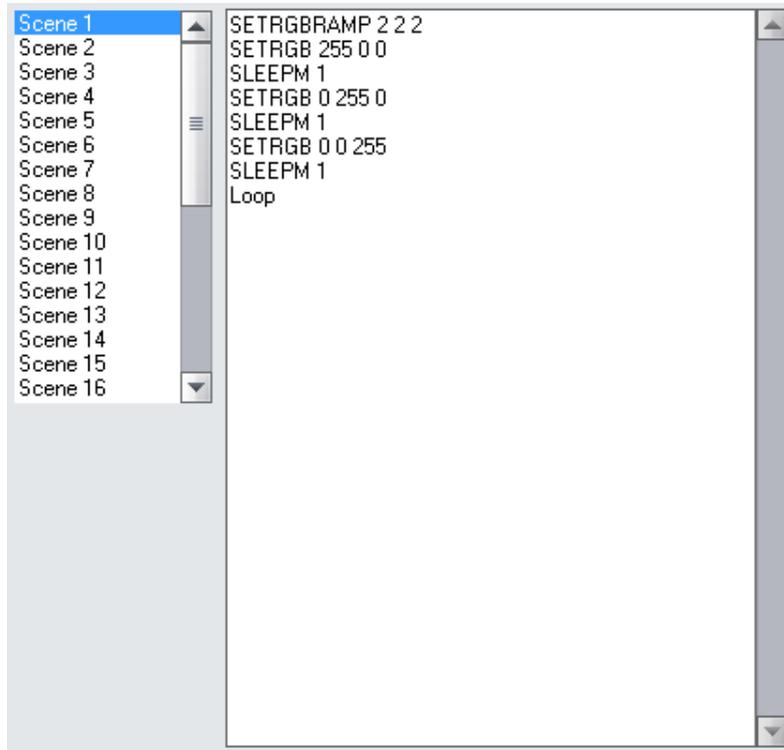
- A value from 1 to 64 (0x00 to 0x40) sent to the object: each channel will recall its internal scene whose number corresponds to the value.
- A value from 128 to 192 (0x80 to 0xC0) sent to the object: each channel will save its current brightness in the scene whose number corresponds to the value.

On the other hand, if a **sequence is programmed** into a scene, the standard save/recall function is disabled and the behaviour is the following:

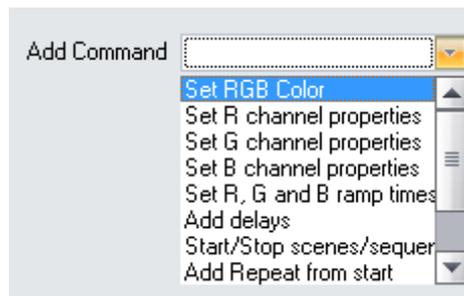
- A value from 1 to 32 (0x00 to 0x20) sent to the object: the sequence whose number corresponds to the value is executed.
- A value from 128 to 160 (0x80 to 0xA0) sent to the object: the sequence whose number corresponds to the value stops.

COMMANDS

A sequence is a list of commands that are executed consecutively. It is possible to program up to 64 commands in each sequence but also a sequence can be executed from any other sequence, so more than one can be executed at the same time.



Firstly, do click on the number of a scene on the left, then use the selector on the right to add commands to the sequence, each command will be included in the sequence list. It is also possible to copy and paste or write the instructions down manually in the sequence window:



Command	Set RGB color
Description	This command sets a RGB color for the three channels directly. Do click on the color palette to add the desired color command.
Instruction	SETRGB X Y Z Being X Y and Z the brightness values from 0 to 255 of the red, green a blue channels.

Command	Set R/G/B channel properties
Description	This window allows adding a command to change the brightness level of one channel individually or a command that sets a new ramp time.
Instructions	SETR X, SETG X or SETB X Being X the brightness value of the channel from 0 to 255. SETRAMP Y, SETGRAMP Y or SETBRAMP Y Being Y the ramp time value from 0 to 99 (0min,0sec to 4min,13sec).
Command	Set R, G and B ramp times
Description	Use this command to change the ramp time of the three channels simultaneously.
Instruction	SETRGBRAMP X Y Z Being X Y and Z the three channels ramp time values from 0 to 99 (0min,0sec to 4min,13sec)..
Command	Add delays
Description	Use this command to include a programmed delay during the execution of the sequence.
Instructions	SLEEPMS X Being X the delay value from 0 to 65535 milliseconds. SLEEP X Being X the delay value from 0 to 65535 seconds. SLEEPM X Being X the delay value from 0 to 65535 minutes.
Command	Start/stop scene/sequences
Description	These commands allow to run/stop another sequence during the execution of the current sequence. If the target sequence is empty it will be processed like a standard save/recall scene command.
Instructions	RUNSEQUENCE X Being X the scene/sequence number from 0 to 63 (0x01 to 0x3F). STOPSEQUENCE X Being X the scene/sequence number from 0 to 63 (0x01 to 0x3F).
Command	Add repeat from start
Description	It includes a loop instruction. When this command is executed, the sequence starts again from the beginning.
Instruction	LOOP

Command	Disable notifications
Description	This command allows avoiding the feedback telegram sendings. Its use is recommended when a sequence includes a lot of commands or status changes. Remember to enable again during the rest of the sequence execution in order to restore the normal behaviour of the device.
Instruction	NOTNOTIFY
Command	Enable notifications
Description	This command includes an instruction to enable the feedback telegrams of the device.
Instruction	NOTIFY
Command	Send notifications
Description	This commands forces the device to send feedbacks of the current brightness value status of the three channels.
Instruction	SENDNOTIFICATIONS

DOWNLOADING SEQUENCES

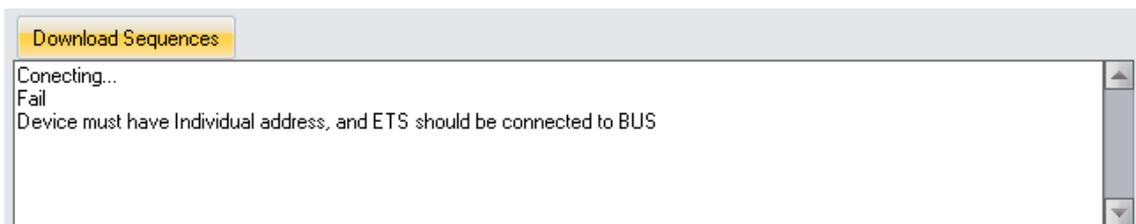
The programmed sequences are not saved in the ETS project or database. Use the new, open and save buttons on the top left of the window to manage the sequences files.



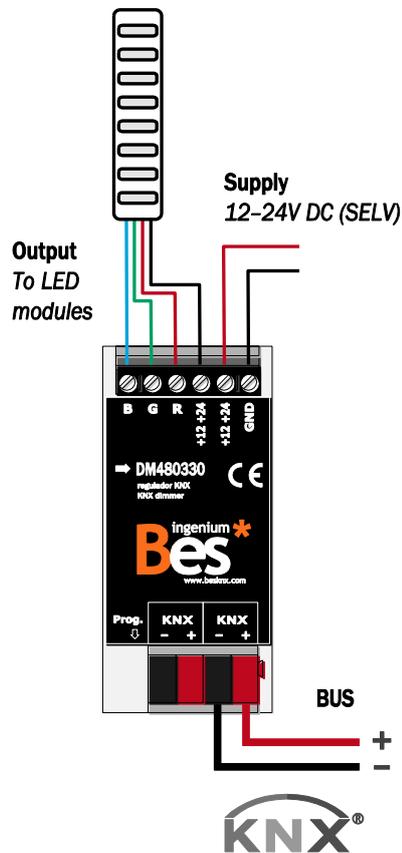
It is also important to know that the sequences are not programmed in the device during the application download procedure, it is necessary to download them from the plug-in window by using the download sequences button from below:



This plug-in download procedure requires a previous individual address assignment to the device. If the DM480330 has a different individual address, has no address assigned or the ETS cannot to it due to any other reason, the plug-in application will show a failure and the sequences will not be downloaded.

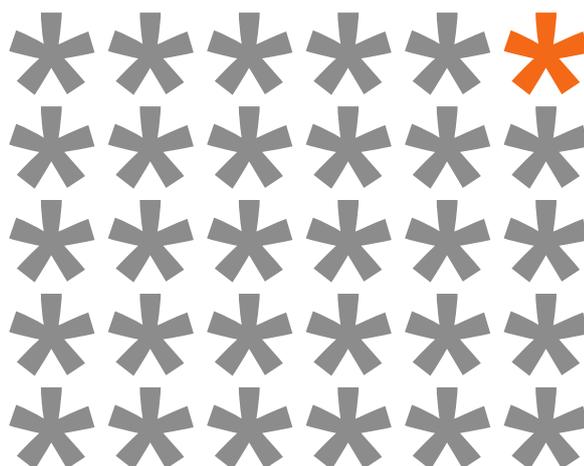


4 Installation



Feed low voltage lines (BUS and inputs) in separate ducting to that of power (230V) and outputs to ensure there is enough insulation and avoid interferences.

Do not connect the main voltages (230V) or any other external voltages to any point of the BUS or inputs.



KNX products by **ingenium**



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INNOVATION

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