RK0104C

DM460400

Programming manual

ingenium

www.besknx.com

Index

1 General description

The device RK104C is a controller for KNX BUS control by 0-10 V signal with 4 triac outputs that allows lighting control, as well as electrovalves and other elements controlled by 0-10 V signal.

Designed to obtain a precise digital regulation receiving orders through the KNX bus or from any conventional pushbutton connected to the KNX bus by using long/short pulsations method in the case of lighting control. The

The ramp speed, staircase timer, scenes and other control features can be configured by simple and functional parameterization.

The device allows to program scenes and it incorporates an advanced logic unit with 8 blocks of comparison, logic and arithmetic operations and also timers and counters blocks.

2 Technical information

KNX supply	29 Vdc from KNX BUS
Consumption	10 mA from KNX BUS (equivalent to 2 Bus devices)
Mounting / size	DIN rail / 4 modules
Connections	Bus connection terminal KNX. Screw block for outputs.
Outputs	4 regulation cannel.
Limit per channel	35 mA
Environment temperatura range	Operation: from -10ºC to 55ºC
	Storage: from -30ºC to 60ºC
	Transportation: from -30ºC to 60ºC
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

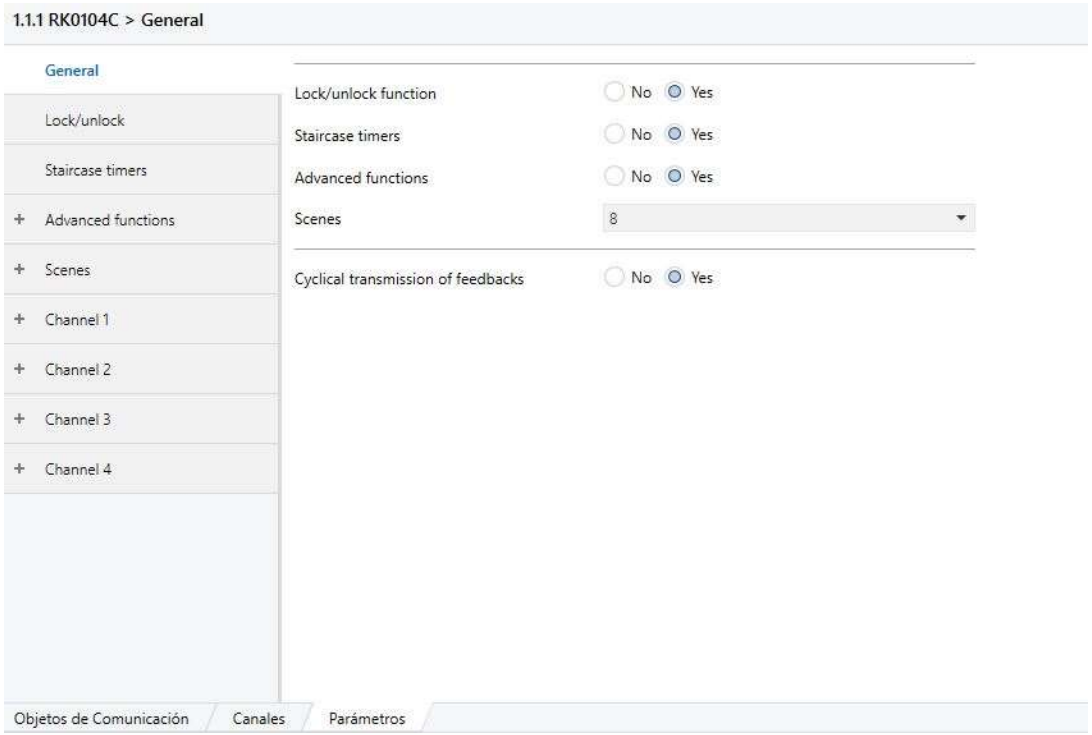
3.1 Application program information

Application program: : Ingenium / RK0104C (manufacturer / program name).

Catalogue version: v1.0

Maximum number of communication objects: 104.

Maximum number of assignments: 254.



3.2 Individual address assignment

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

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

Next, the communication objects of the first channel are listed. The other channels have the same communication objects.

Object	Name | Function	Length	DPT	Flags				
				C	R	W	T	U
0	Channel 1 | On/Off	1 bit	1.001	●		●		
1	Channel 1 | On/Off status	1 bit	1.001	●	●		●	
2	Channel 1 | Dimming	4 bits	3.007	●		●		
3	Channel 1 | Brightness value	1 byte	5.001	●		●		
4	Channel 1 | Brightness value status	1 byte	5.001	●	●		●	
29	General | Lock / Unlock	1 bit	1.001	●	●	●		
248	General | Scene activate / learn	1 byte	18.001	●		●		

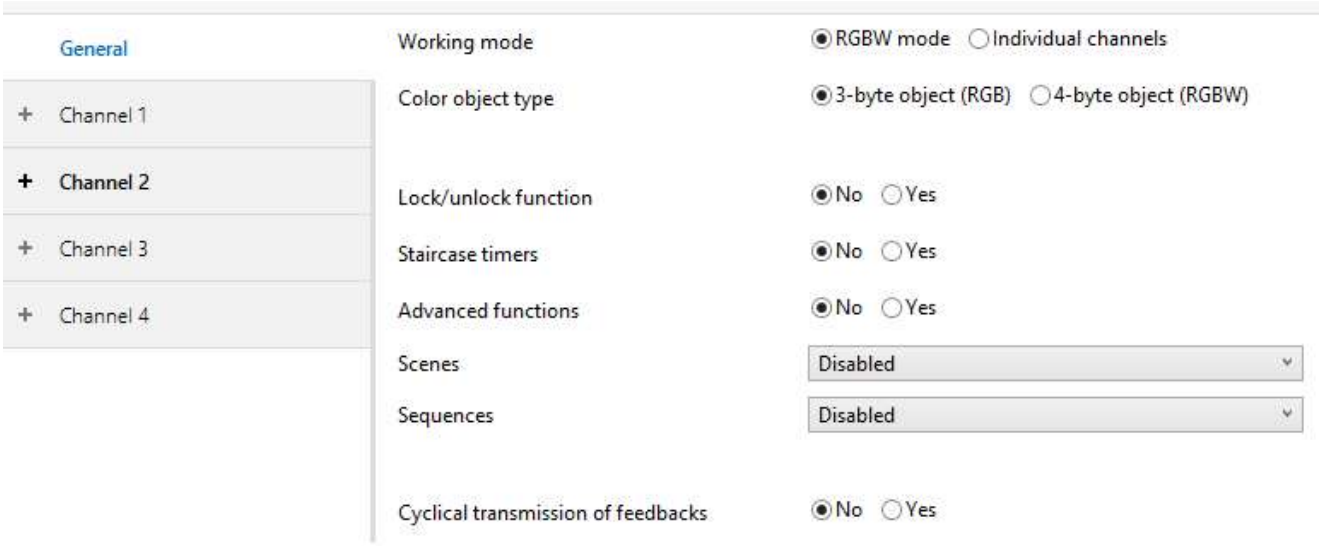
3.4 Communication object description

Next, the communication objects of the first channel are described. The same description can be applied to the other channels.

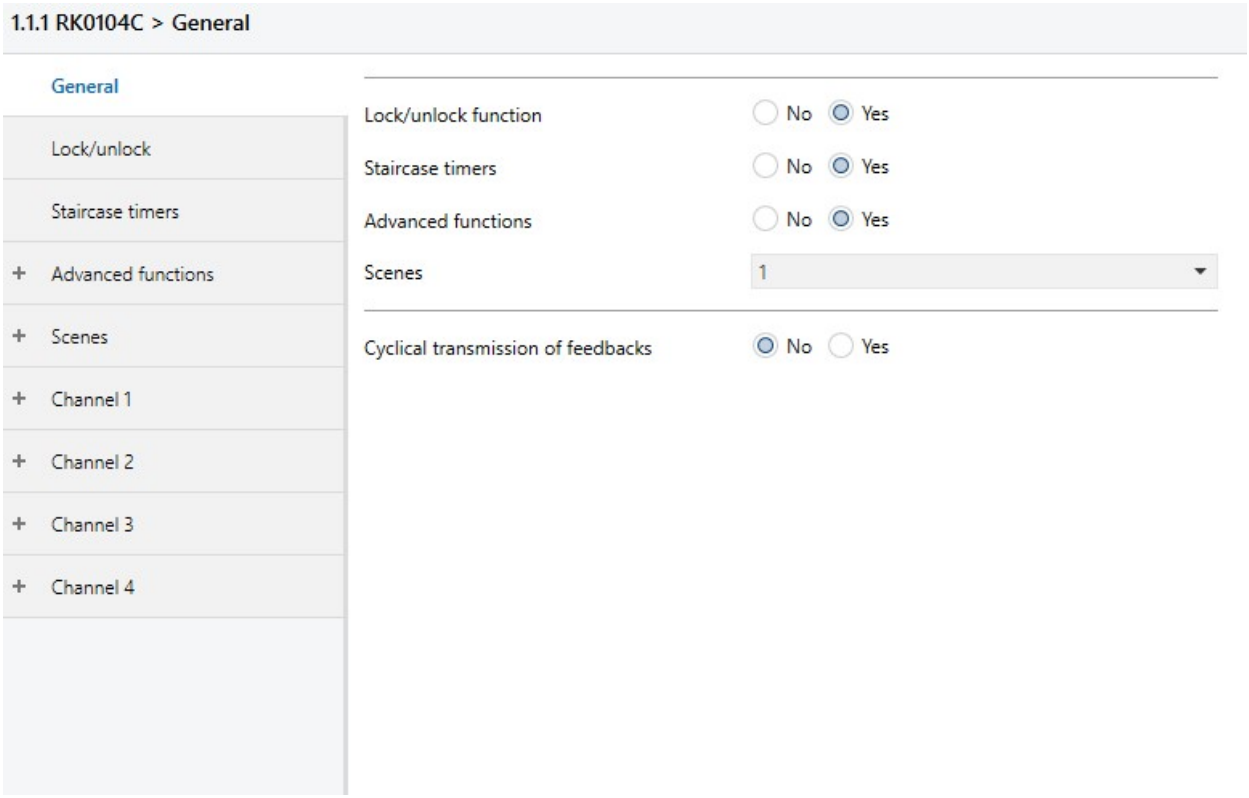
Name	Object 0: Channel 1 | On/Off
Function	1-bit communication object to switch on and off the channel.
Description	When a “1” is received through this object the channel is switched on and the brightness level goes up to the last one memorized (different from “0”) or to a fixed value according to the parameters configured. When a “0” is received through this object the channel is switched off. By default, the behaviour of the channel when it is switched on through this object is jump to last (see parameter “switch on value”).
Name	**Object 1: Channel 1 - On/Off status**
Function	1-bit communication object for feedback signalling of the on / off state of the channel.
Description	When the channel is off and receives a switch on telegram or a brightness value, a “1” is sent through this object. When the channel is on and it receives a switch off telegram or a brightness value of 0% a “0” is sent through this object.
Name	**Object 2: Channel 1 - Dimming**
Function	4-bits communication object for dimming control with pushbuttons.
Description	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.

	Break telegrams to this object will stop the brightness at the current level. By default, the behaviour of the channel when it is off and it receives an increase telegram through this object is switching on and dimming. The channel cannot be switched off by decrease telegrams.
Name	**Object 3: Channel 1 - Brightness value**
Function	1 byte communication object for precise control by setting a new brightness level directly.
Description	The brightness level will go up or down slowly according to the channel ramp speed configured. By default, the behaviour of the channel 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 channel can be switched off with 0% telegrams too.
Name	**Object 4: Channel 1 - Brightness value status**
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.
Name	**Object 29: Lock / unlock**
Function	1 bit communication object to lock / unlock the device.
Description	The device can be locked / unlocked by writing “1” / “0” in this object (see parameter “lock/unlock polarity”). When the device is locked the channels values cannot be changed.
Name	**Object 248: Scenes: activate / learn**
Function	1 byte communication object for internal scenes control.
Description	There are up to 8 scenes available. When a value from 1 to 64 (0x00 to 0x40) is sent to this object the channel will recall its memorized value if it is included in the scene. When a value from 128 to 192 (0x80 to 0xC0) is sent to this object the channel will save its current value in the scene if it is included in it.

3.5 Parameters



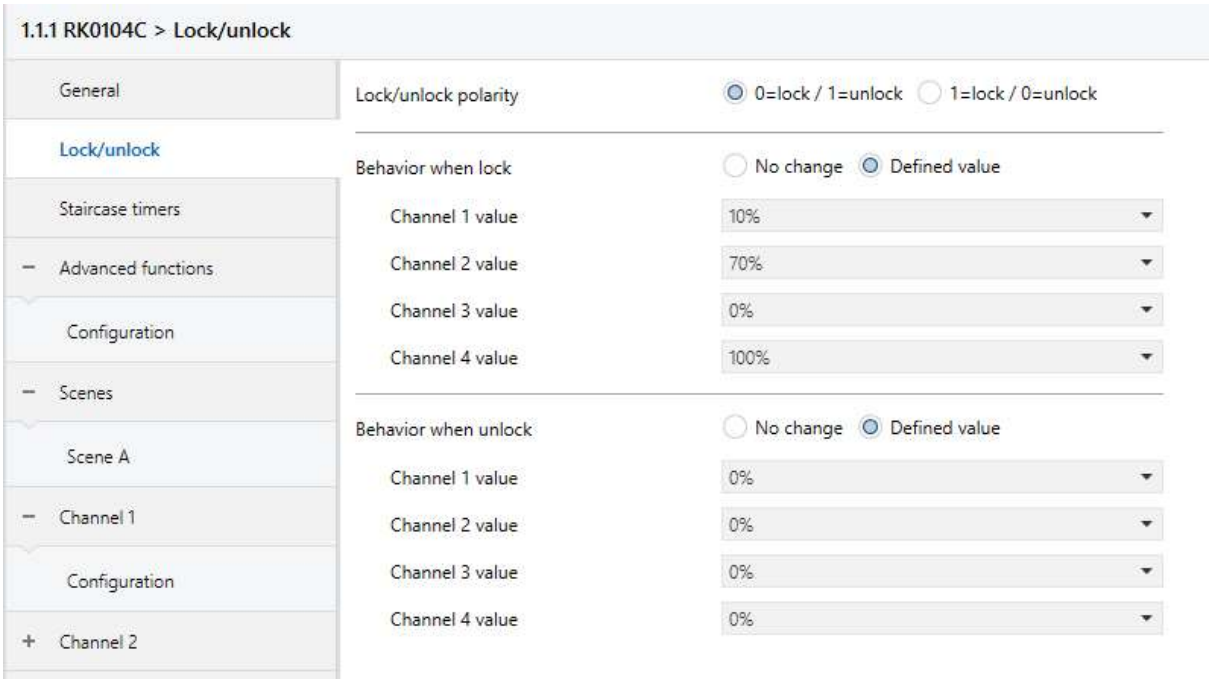
3.5.1 General



Name	Lock/unlock function
Values	No / Yes
Description	This parameter enables the device lock/unlock functionalities
Name	**Staircase timers**
Values	Yes / No
Description	This parameter enables the device staircase timers functionalities

Name	Advanced functions
Values	No / Yes
Description	This parameter enables the device advanced functions functionalities
Name	**Scenes**
Values	Disabled / 1 … 8
Description	This parameter allows to select the number of scenes (up to 8) which you would want to configure in the gateway and which will be saved in the device memory.
Name	**Cyclical transmission of feedbacks**
Values	Disabled / 1 … 8
Description	Through this parameter you can choose to notify cyclicaly the brightness value of the different channels while thet are changing

3.5.2 Lock / Unlock function

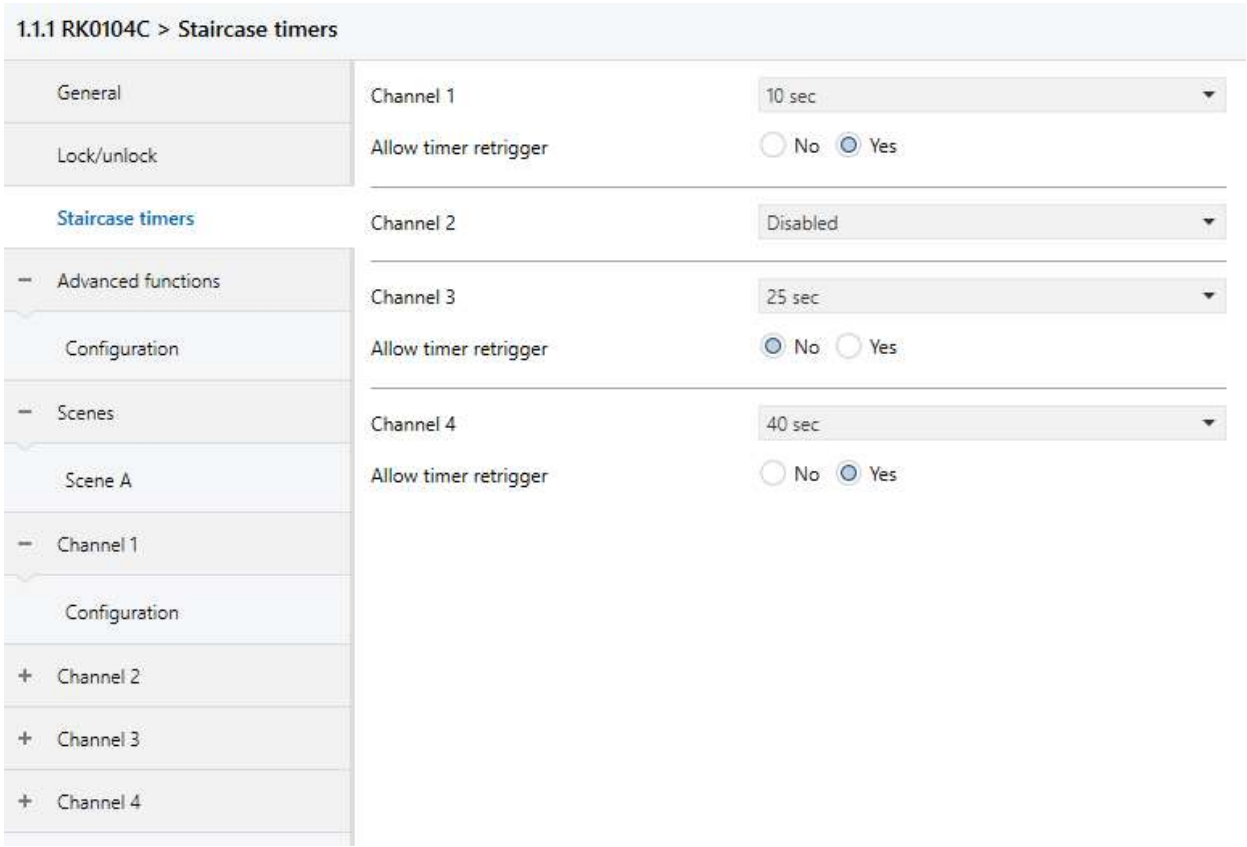


Name	Lock/unlock polarity
Values	0=lock 1=unlock / 1=lock 0=unlock
Description	This parameter allows to select the value with which the device is locked and unlocked.
Name	**Behavior when lock**
Values	No change / Defined value
Description	These parameters allow to select what the device do when it is locked. It can be set to keep the actual value (no change) or setting a defined brightness value.
	When "Defined value" is chosen you can set a different brightness value for each channel

Name	Behavior when unlock
Values	No change / Defined value
Description	These parameters allow to select what the device do when it is unlocked. It can be set to keep the actual value (no change) or setting a defined brightness value.
	When "Defined value" is chosen you can set a different brightness value for each channel

3.5.3 Staircase timers

The following parameters menu is enabled in the General tab.

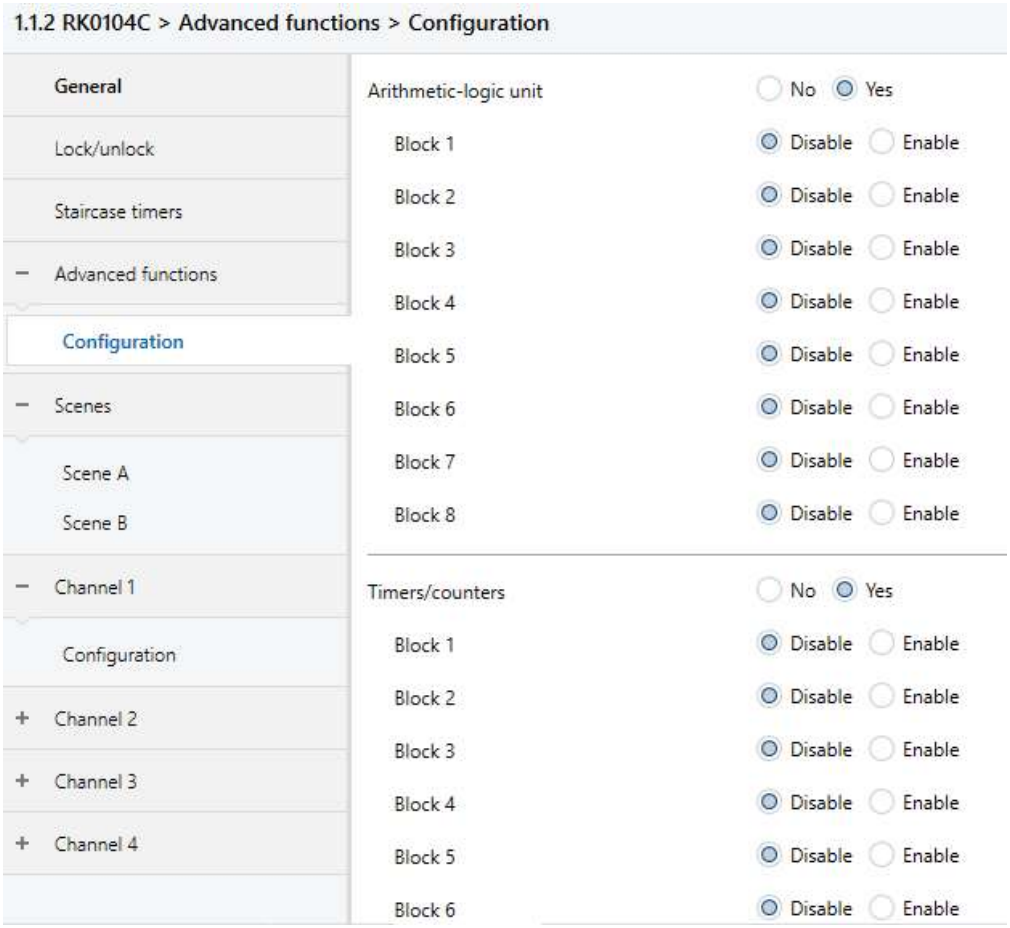


Name	Channel 1/2/3/4
Values	Disabled / From 5 seconds to 790 minutes
Description	A staircase lighting function can be configured for each channel with this parameter. If enabled, the channel will be switched off automatically after the time configured. During the staircase function, take into account 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 20, 21, 22 and 23).
Name	**Allow tiger retrigger**
Values	No / Yes

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.

3.5.4 Advanced functions

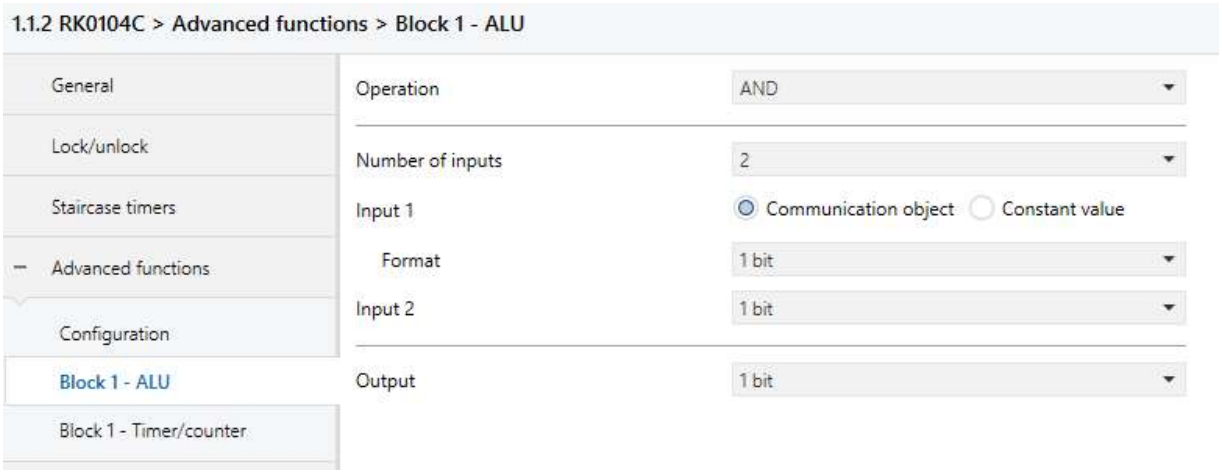
If the advanced functions are enabled in the General menu, a new submenu appears on the left.



In this configuration menu it is possible to select what Arithmetic and logic or timers / counters blocks are enabled.

Name	Arithmetic-logic block X
Values	Enable / Disable
Description	Allows to enable or disable each arithmetic and logic block.
Name	**Timer / counter block**
Values	Enable / Disable
Description	Allows to enable or disable the each timer / counter blocks.

3.5.5 Arithmetic and Logic block (ALU)



Name	Operation
Values	AND, NAND, OR, NOR, XOR, XNOR, NOT, BUFFER, == , != , <, > , <= , >= , + , - , *, / .
Description	It allows to select the arithmetic or logic operation of the block: Logic operations: - AND: Logic product - NAND: Negative logic product - OR: Logic addition - NOR: Negative logic addition - XOR: Exclusive logic addition - XNOR: Negative exclusive logic addition - NOT: Negation - BUFFER: Saves the input value in the output. Comparison operation: - == : equality - != : inequality - < : smaller than - > : greater than - <= : smaller or equal than - >= : greater or equal than Arithmetic operations: - + : addition - - : subtraction - * : multiplication - / : division

Name	Number of inputs
Values	From 2 to 4
Description	This parameter defines the number of inputs of the block. Depending on the type of operation it is allowed two or more inputs.

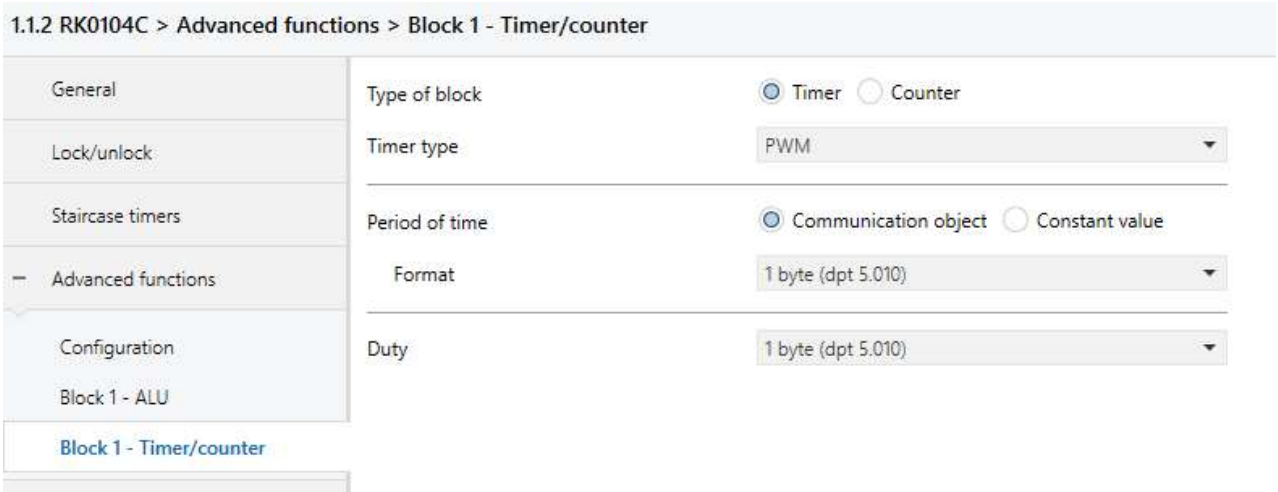
Name	Input 1
Values	Communication object / Constant value
Description	This parameter allows to select the type of the input 1, that can be a constant value or a value received from a communication object.

Name	Format
Values	1 bit, 1 byte unsigned (dpt 5.001), 1 byte unsigned (dpt 5.010), 1 byte signed (6.*), 2 bytes unsigned (dpt 7,*), 2 bytes unsigned (dpt 8,*), 2 bytes float (dpt 9,*).
Description	This parameter allows to select the size and format of the input 1. Depending on the type of operation different formats are allowed.

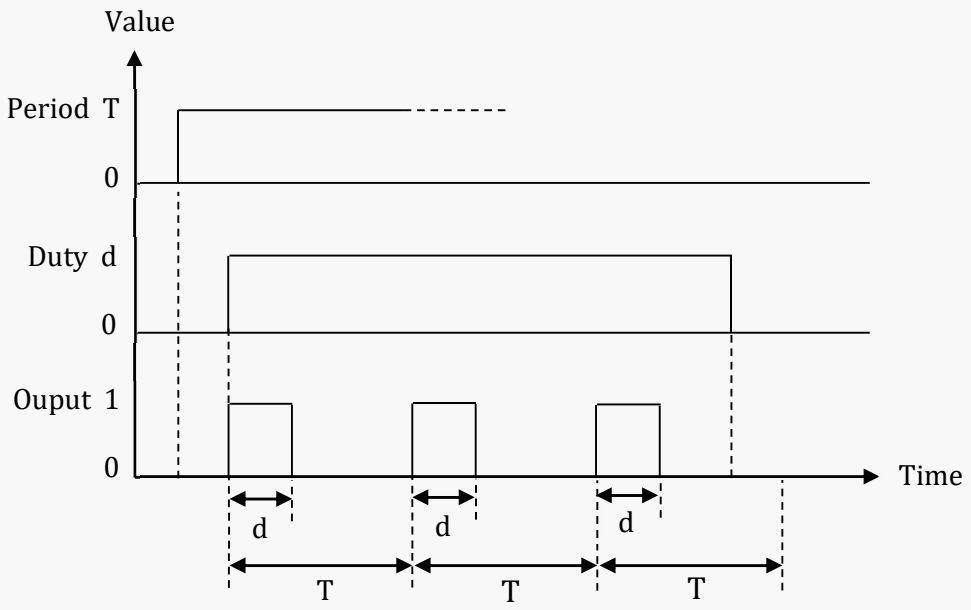
Name	Input 2/3/4
Values	1 bit, 1 byte unsigned (dpt 5.001), 1 byte unsigned (dpt 5.010), 1 byte signed (6.*), 2 bytes unsigned (dpt 7,*), 2 bytes unsigned (dpt 8,*), 2 bytes float (dpt 9,*).
Description	This parameter allows to select the size and format of the other inputs communication objects. Depending on the type of operation different formats are allowed.

Name	Output
Values	1 bit, 1 byte unsigned (dpt 5.001), 1 byte unsigned (dpt 5.010), 1 byte signed (6.*), 2 bytes unsigned (dpt 7,*), 2 bytes unsigned (dpt 8,*), 2 bytes float (dpt 9,*).
Description	This parameter allows to select the size and format of the output communication object. Depending on the type of operation different formats are allowed.

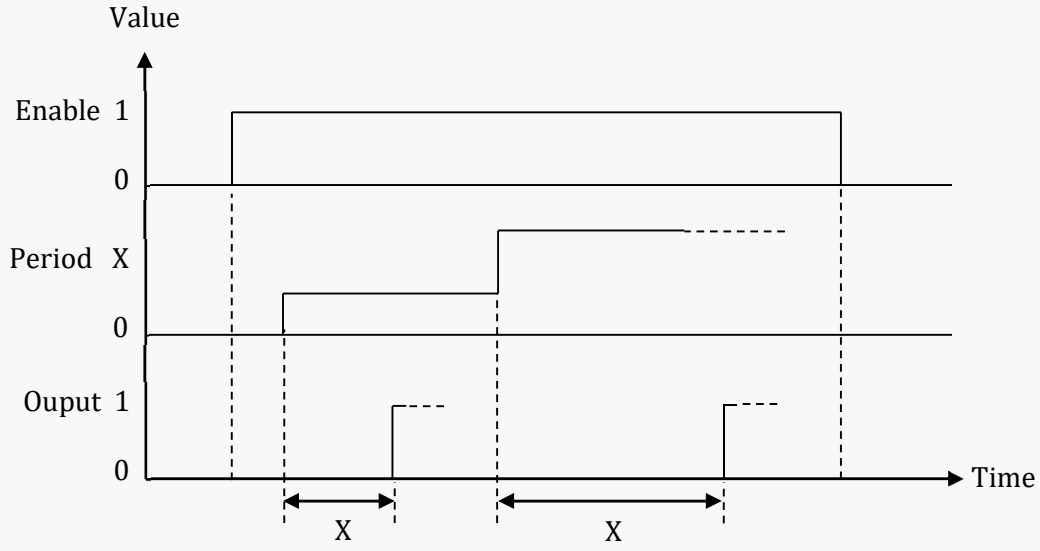
3.5.6 Timer / counter block



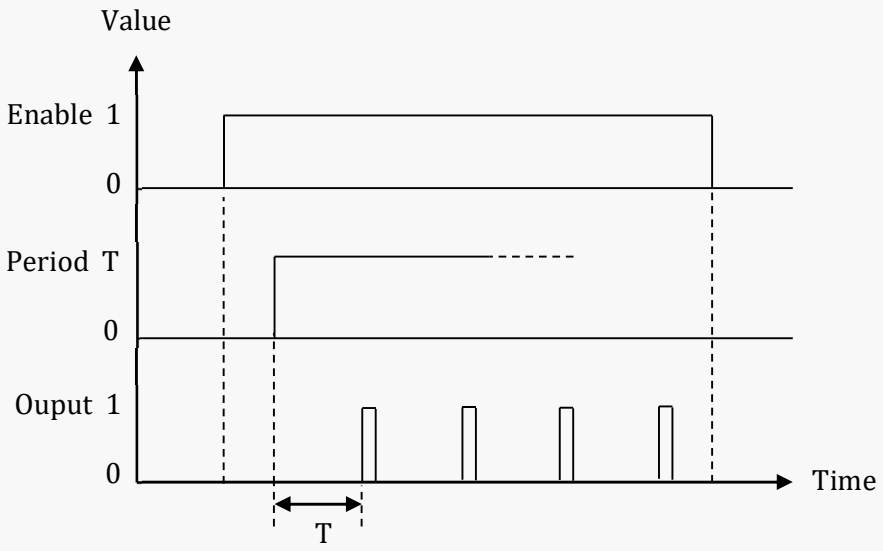
Name	Timer type
Values	PWM, Limit, Cyclic
Description	PWM: It generates a pulse width modulated output according to the period of time and a duty.



Limit: It sends a bit telegram '1' to the bus when a limit value is exceeded.

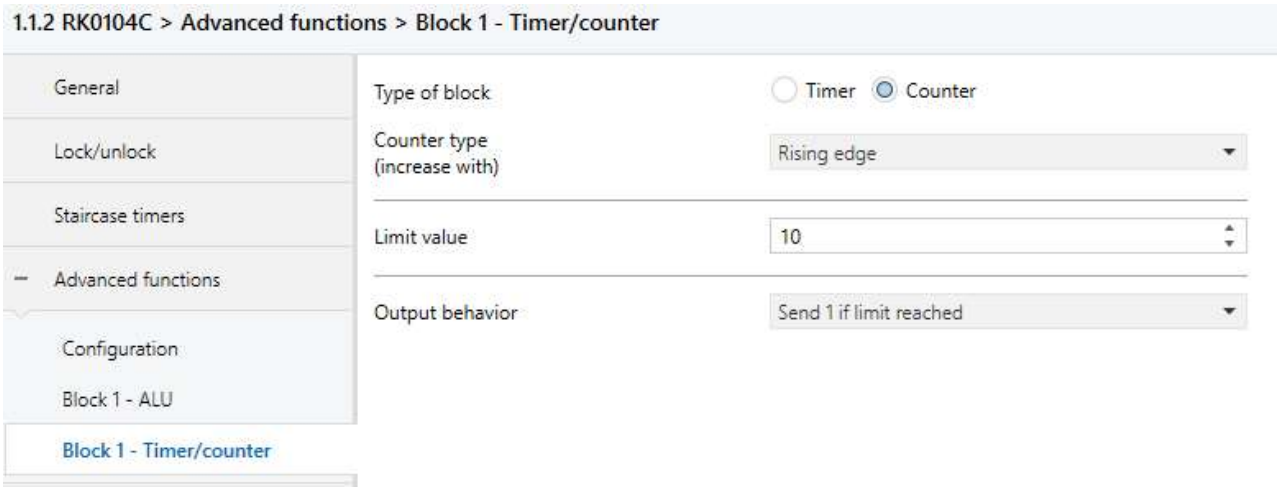


Cyclic: It sends a bit telegram '1' to the bus each time the limit value is exceeded cyclically.



Name	Period of time
Values	Communication object / Constant value
Description	It is the count time of the timer. It can be configured as a constant value or a value received through the bus with one of the following communication object formats: 1 byte (dpt 5.010): Value from 0 to 255 (x 100 ms) 2 bytes (7.004): Value from 0 to 6553500 ms 2 bytes float (9.010): Value from 0 to 670760 s

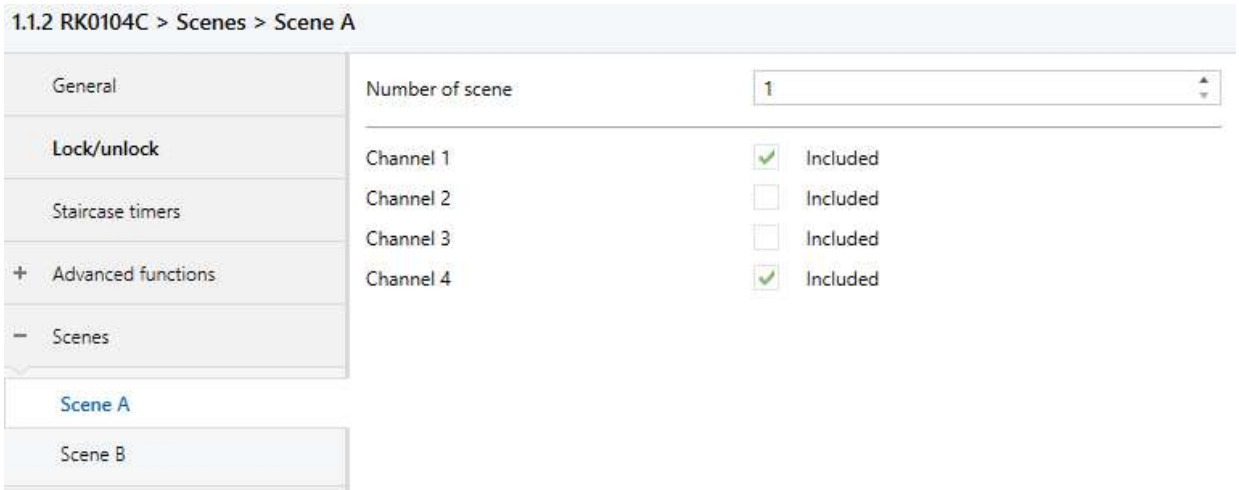
Name	Duty
Values	1 byte (dpt 5.010), 2 bytes (7.004) or 2 bytes float (9.010)
Description	Only visible if timer type PWM is selected. It is the time that the output signal is at high level (“1”) within the period of time. Its value can be received through the bus with one of the following communication object formats: 1 byte (dpt 5.010): Value from 0 to 255 (x 100 ms) 2 bytes (7.004): Value from 0 to 6553500 ms 2 bytes float (9.010): Value from 0 to 670760 s



Name	Counter type
Values	Rising edge, falling edge, 1 or 0
Description	It is the change that the counter may detect in its “event” object to increase the count.
Name	**Limit value**
Values	From 0 to 65535
Description	It is the number of events over which the counter sends the finish telegram.
Name	**Output behaviour**
Values	Send 1 when limit reached, Send counter value (5.010), Send counter value (7.001)
Description	This parameter allows to select the format and behaviour of the counter output. It can be send a 1 when the count limit is reached or it can send the count value each time an event is detected.

3.5.7 Scenes

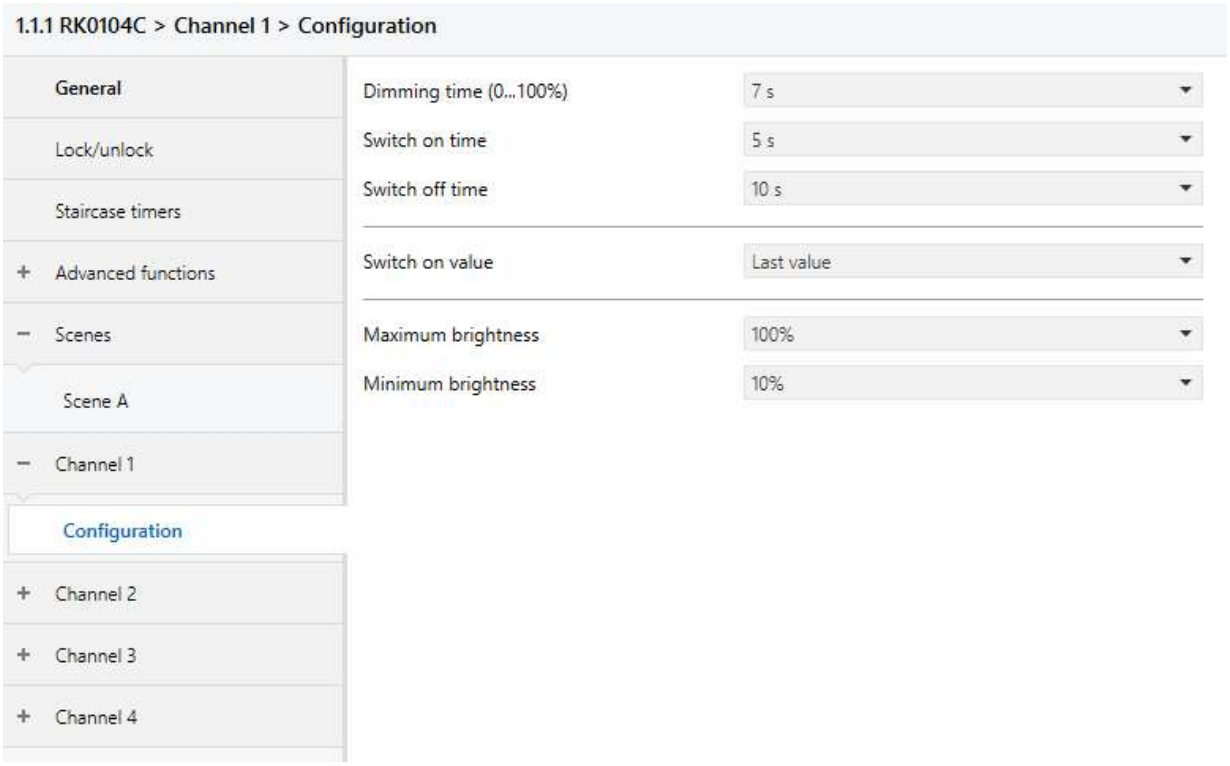
The dimmer allows to configure up to 8 scenes. The enabled scenes appear in the left menu with the name from A to H.



Name	Number of scene
Values	1 - 64
Description	This parameter is the value number that will execute the scene (there should never be two scenes with the same number).
Name	**Channel 1/2/3/4**
Values	Included / Not included
Description	With this parameter it can be selected if the channel is included in the scene or not.

3.5.8 Channel 1/2/3/4

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

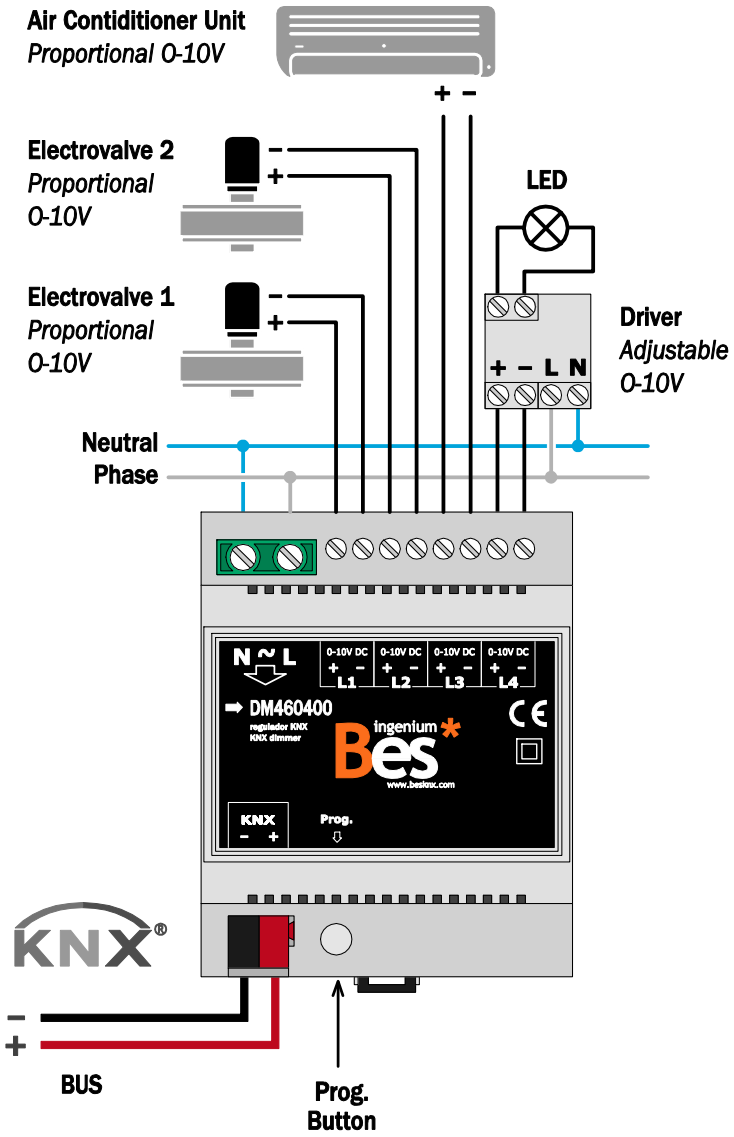


Name	Dimming time (0…100%)
Values	From 0 seconds to 5 minutes
Description	It is the brightness change time measured in seconds/minutes when using brightness value or dimming communication objects.
Name	**Switch on time**
Values	From 0 seconds to 5 minutes
Description	It is the brightness change time measured in seconds/minutes when the channel is switched on from 0% to 100% through the on/off communication object.

Name	Switch off time
Values	From 0 seconds to 5 minutes
Description	It is the brightness change time measured in seconds/minutes when the channel is switched off from 100% to 0% through the on/off communication object.
Name	**Switch on value**
Values	Last value / fixed value from 1% to 100%
Description	This parameter defines the channel behaviour when receiving a switch on bit telegram. The channel will be dimmed to the last value (different from 0%) or to defined and fixed value in % from the list.
Name	**Maximum brightness**
Values	From 0% to 100%
Description	This is the maximum brightness value allowed for the channel. The dimming will stop when reached this value. The user can dim any value from 0 to 100% but the real brightness value is internally adjusted according to the minimum and maximum limitation span.
Name	**Minimum brightness**
Values	From 0% to 100%
Description	This is the minimum brightness value allowed for the channel. The dimming will stop when reached this value. The user can dim any value from 0 to 100% but the real brightness value is internally adjusted according to the minimum and maximum limitation span.

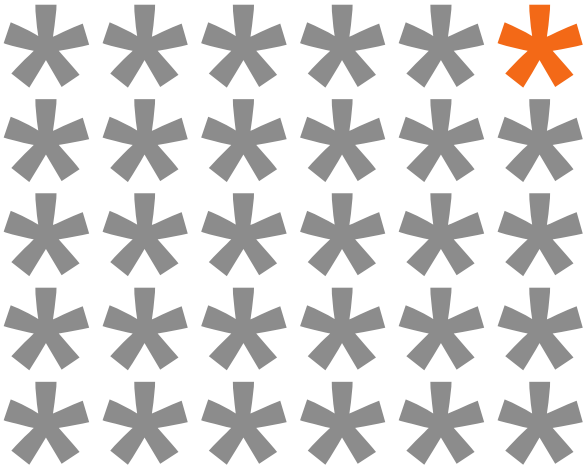
The maximum and minimum limits are parameters which depend on the lamp model and technology. In order to adjust them correctly, firstly select a 0% value for the lower limit and 100% for the upper limit. Then check the operation of the lamp in order CHx << - Value >>. Finally choose the values which best fit the behavior of the lamp.

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.



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