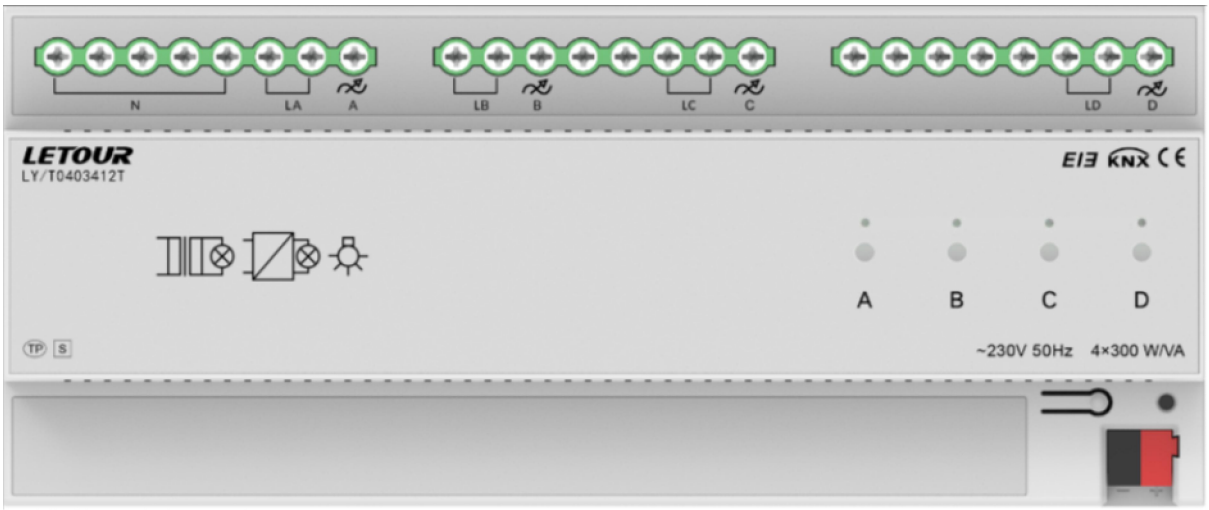
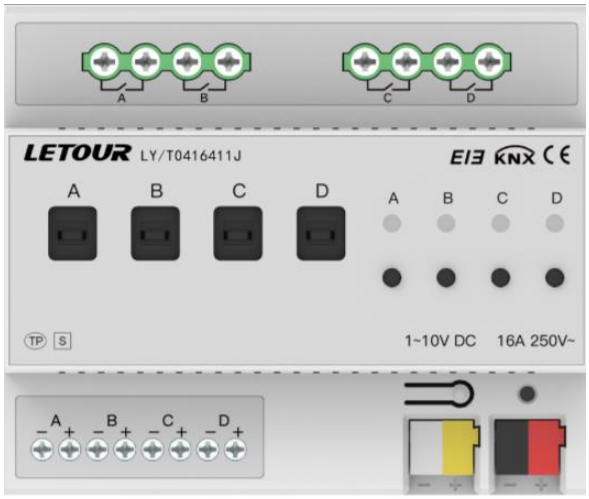
Dimming Actuators - V1.0

User Manual





LY/T0403412T / LY/T0416411J

KNX/EIB Home and Building Control System

Contents

Version	Time	Modifications	Modification location
1.0	2021.06.07	Version 1.0 released	

1. Overview

Dimming actuators (hereinafter referred to as ‘dimmers’) use the data stored in the database to directly control the channel brightness, the brightness data stored in the database is pre-set by the programming software according to the brightness distribution characteristics of the light, and the dimmer's control circuit converts the brightness data value into output voltage or current to achieve brightness control.

Dimmer series products include general-purpose dimmer, 0/1~10VDC dimming actuator, 4A LED dimmer.

Universal dimmer adopts phase adjustment method to dim the light, which can be divided into one fold, two folds and four folds. There is only one channel with maximum power of 300W in one channel dimmer, two channels with maximum power of 300W in two channels, and four channels with maximum power of 300W in four channels. Each channel can be dimmed and switched independently.

The 1~10V DC Dimmer Controller uses a standard DC 1~10V control interface for dimming and has four independent dimmer channels, each of which can be switched on and off independently, and can control up to 23 electronic control gears (ECGs), for example, to drive a 23 ECG/18W, 14 ECG/36W, 11 ECG/58W, or a 23 ECG-T5/24W. No additional supply voltage is required for the inputs. No additional supply voltage is required for the input.

Dimmers are modular devices mounted on 35 mm DIN rails and are programmable scene dimmers that allow you to customise the ambience of a room according to your own needs and to create the atmosphere of the scenes you want to create, such as watching movies, entertaining, dining, lounging, etc. You can set the brightness of each channel to a different level. You can set the brightness of each channel to any value (1~100%), and also set the duration and fade rate to reach the target brightness value, so that there is a process of light change, which not only prolongs the service life of the lamps, but also saves energy. At the same time, you can also use several channels to create any combination of scenes we need.

The assignment of the physical addresses and the setting of the parameters can be done using the engineering tool ETS (version ETS5 or higher), by importing a project file with Knxproj or a Knxprod database file.

This manual describes the range of dimmers, which are suitable for connecting different light types.

The different dimmers are suitable for connecting different types of lights. Although their functions are similar, special attention should be paid to the type of load to be connected in order to choose the right dimmer.

Although their functions are similar, it is necessary to pay special attention to the type of load to be connected in the process of using them, so as to choose the dimmer reasonably, and at the same time to pay attention to the technical performance of the various dimmers, which may cause damage to the dimmer or the load when the type of load or the technical performance of the load is not in accordance with the technical performance of the dimmer.

This manual also provides you with detailed technical information on the various dimmers, including installation and programming details, and explains how to use them in relation to practical examples.

1.1 Universal Dimmer Functional Overview

Universal dimmer adopts phase adjustment method, there are one, two, four dimmers, each output of dimmer can be independently dimmed, can be connected to a number of dimmable lighting equipment, such as incandescent lamps, high-voltage halogen lamps, low-voltage halogen lamps (with the appropriate electronic transformer), energy-saving lamps, LED lamps, etc., through the bus can be dimmed, scene preset, switch on and off the lights and other operations of these lighting equipment.

The unit is short-circuit (fuse) and over-temperature protected.

The device is electrically connected using screw terminals. The bus connection is made directly via the EIB terminals and the input needs to be connected to a 230 VAC supply voltage.

The functions are summarised below:

- On-off lighting function
- Relative dimming function
- Control the brightness of the luminaire
- Status report, error report
- 15 scene settings
- Staircase light function
- Bus reset function
- Preset function, preset saving function
- Manual switching/dimming

The parameterisation and use of the above functions are described in chapter 5.

The electronic manual switching/dimming function is only available in normal mode and requires bus power, not available in staircase light mode. A short press on the manual button on the dimmer switches the output on and off; a long press on the manual button on the dimmer allows relative dimming. Manual operation is not available in case of bus power failure.

1.2 1~10V DC Dimming Controller Function Overview

1~10V DC Dimmer Controller has a standard DC 1~10V control interface, it can be used to control lights with general equipment such as electronic dimming ballasts for fluorescent lamps with 1~10V interface and LED lamps with 1~10V, etc. Through the bus, it can be used to perform operations such as dimming, scene presetting, switching lights on and off, etc.

The 1~10V DC dimmer has 4 independent dimming channels, each of which can control up to 23 electronic control gears (ECGs), e.g. 23 ECG/18W, 14 ECG/36W, 11 ECG/58W or 23 ECG-T5/24W.

ECG-T5/24W.

The device is electrically connected using screw terminals. The bus connection is made directly via the EIB terminal blocks and no additional supply voltage is required for the inputs.\

The functions are summarised below:

- On-off lighting function
- Relative dimming function
- Control of luminaire brightness
- Status report
- 15 scene settings
- Staircase light function
- Preset function, preset saving function
- Bus reset function
- Manual switching/dimming

The parameter configuration and use of the above functions are detailed in Chapter 5.

The electronic manual switching/dimming function is only available in normal mode and requires bus power, not in staircase light mode. A short press on the electronic manual button on the dimmer switches the output on and off; a long press on the electronic manual button on the dimmer allows relative dimming. The mechanical manual switching function can switch the output on or off at any time.

Note: Some luminaires cannot be switched off completely by dimming, in this case they need to be switched on and off by the built-in relay of our dimmers.

2. Technical performance

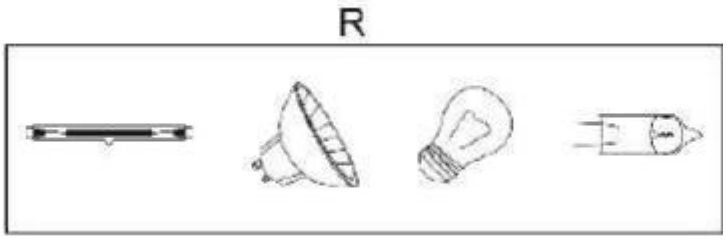
2.1 General dimmer LY/T0403412J

2.1.1 Technical parameters

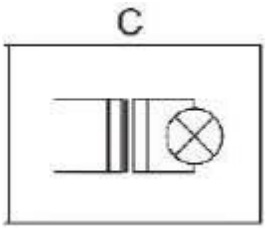
Power supply	KNX bus voltage	21~30VDC，obtained through EIB bus
	Current consumed by the bus	<12mA
	Power consumed by the bus	<360mW
Input	Input voltage	230VAC（50/60Hz）
Output	Number of dimming channels	4 /2 /1 fold
	Output voltage	230VAC（50/60Hz）
	Maximum output power per channel	300W
	Protective measures	Over temperature protection and short circuit protection (fuse)
	Maximum loss per channel	5W
Wiring	EIB/KNX bus	Terminal connection (red/black)
	Output Terminals	0.8mmØ, use screw terminal copper column connection
	Wire diameter	0.5-4mm2
	Torque	0.8N-m
Operation and Instructions	Programming buttons	Used for device programming physical address and diagnosis
	Red indicator light	Instructs the device to enter programming mode
	Green indicator light	Instructs the device to enter operating mode
Protection level	Protection level	IP 20， EN 60 529
Temperature range	Operating temperature	（-5℃……+45℃)
	Storage temperature	（-25℃……+55℃)
	Transport temperature	（-25℃……+70℃)
Environmental conditions	Ambient humidity	Maximum air humidity <93%, excluding condensation
Install	Installation	35mm DIN rail installation
Dimension/ Weight	Dimension	216mm×90mm×64mm
	Weight	Around 0.627KG

2.1.2 Allowed loads

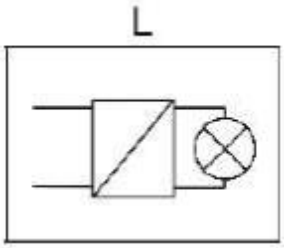
Resistive load



Capacitive load



Inductive load



Note: In the load circuit, the output of the same channel cannot carry capacitive, inductive and resistive loads at the same time, i.e., the output of the same channel can only carry the same type of load.

2.2 LY/T0416411J

2.2.1 Technical parameters

Power supply	KNX bus voltage	21~30VDC， obtained through EIB bus
	Current consumed by the bus	<12mA
	Power consumed by the bus	<360mW
Output	Number of dimming channels	4 fold
	Output voltage	max.100mA1~10VDC (absorption type), each output max.100mA
	Output contact switching current	16A /250V AC， Maximum allowable operating current when fluorescent lamp is loaded10A/250V（140μF）
Wiring	EIB/KNX bus	Terminal connection (red/black)
	Output terminals	16 screw terminals, 8 terminals for 4 channels of 1~10V common ground and 1~10V output, 8 terminals for 4 channels of switch
	Wire diameter	0.5-4mm2
	Torque	0.8N-m
Operation and Instructions	Programming buttons	Used for device programming physical address and diagnosis
	Red indicator light	Instructs the device to enter programming mode
	Green indicator light	Instructs the device to enter operating mode
Protection level	Protection level	IP 20， EN 60 529
Temperature range	Operating temperature	（-5℃……+45℃）
	Storage temperature	（-25℃……+55℃）
	Transport temperature	（-25℃……+70℃）
Environmental conditions	Ambient humidity	Maximum air humidity <93%, excluding condensation
Install	Installation	35mm DIN rail installation
Dimension/ Weight	Dimension	108mm×90mm×64mm
	Weight	Around 0.296KG

3. Product dimensions and wiring diagram

3.1 Product Dimensions

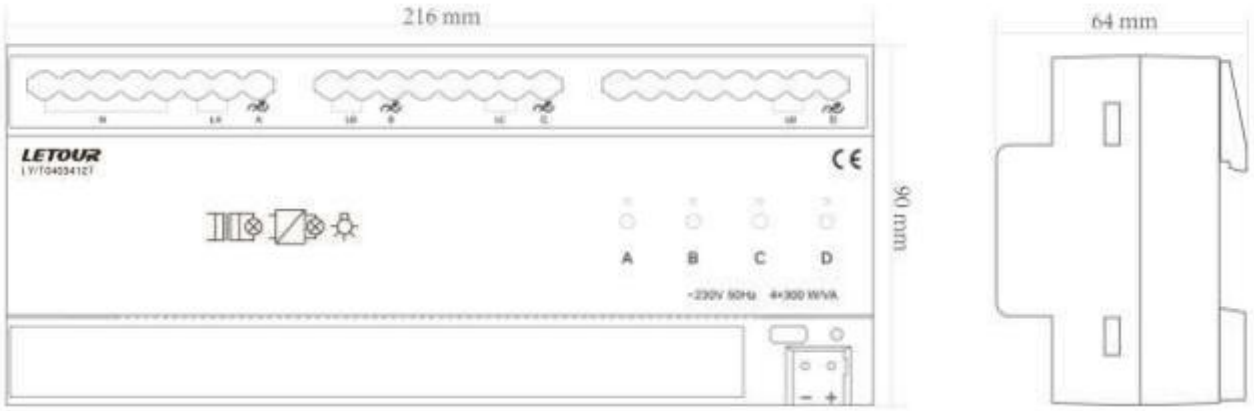


Figure 3.1.1 General dimmer dimensions

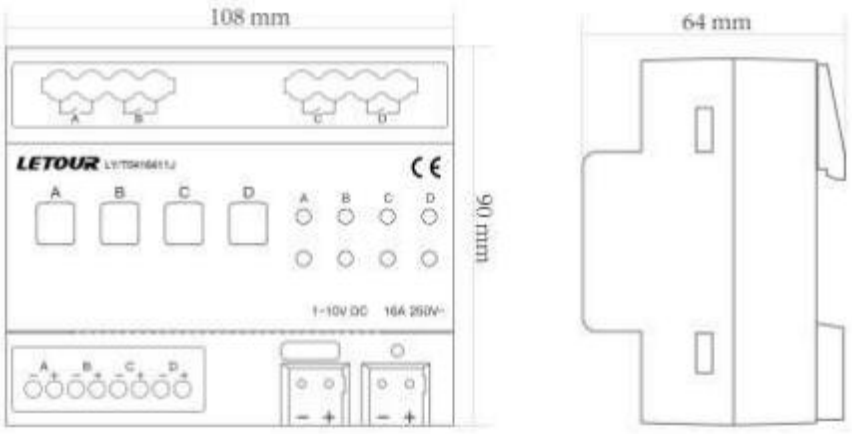


Figure 3.1.2 1~10V DC dimming controller dimensions

3.2 Wiring diagram

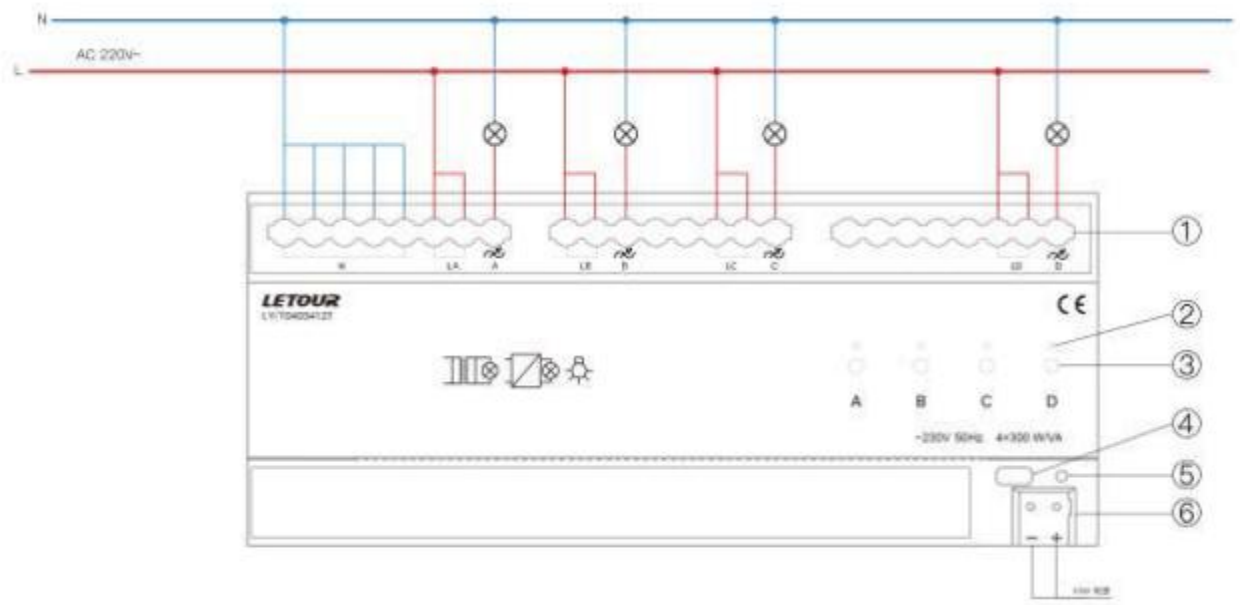


Figure 3.2.1 Universal dimmer wiring diagram

① 220V terminal
② Button indicator light
③ On/off button
④ Programming button
⑤ Programming indicator light
⑥ KNX/EIB connection terminal

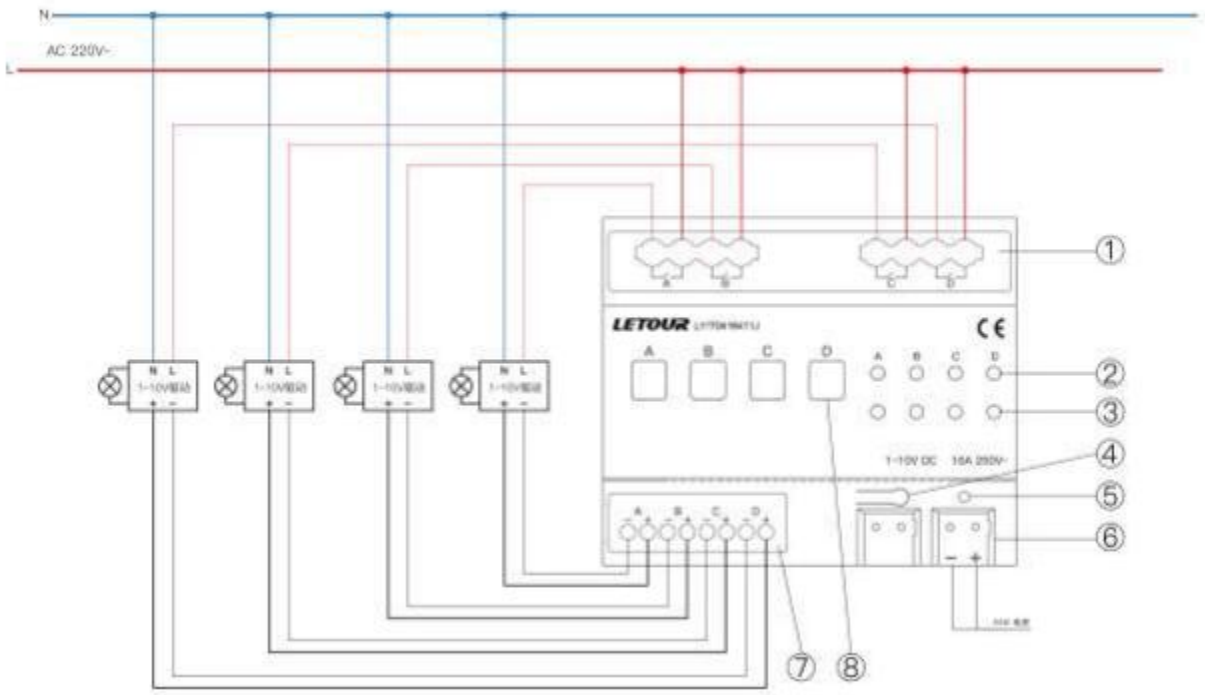


Figure 3.2.2 1~10V DC dimming controller wiring diagram

① 220V channel terminal
② Channel button indicator light
③ Channel switch button
④ Programming button
⑤ Programming indicator light
⑥ KNX/EIB connection terminal
⑦ 1~10V Binding Post
⑧ Relay manual switch

4 . Application Description

The dimmer application can be configured with different parameters for each output channel, controlling different objects by changing the settings of the parameters within the programme.

4.1 Switch

1bit data bit control

The switching state of the luminaire is controlled by 1bit data bits. When the luminaire is switched on, the luminaire brightness value can be set to the brightness value before the power failure, or to a predefined value (1% to 100%). When the dimmer is on, it can be set to brighten gradually in the delay time (change time) or in the default change time; when it receives the off telegram, the dimmer will turn off immediately, or it will dim gradually in the set delay time (change time) or in the default change time.

4.2 Relative dimming

4bit Data Bit Control

Relative dimming means that the dimmer can be adjusted upward or downward within the set dimming threshold to achieve the desired brightness. When the brightness value is lower than the low threshold value, only upward dimming is effective; when the brightness value is higher than the high threshold value, only downward dimming is effective. The dimmer can also be set to turn off the light when the relative dimming is less than or equal to the low threshold or to continue to maintain the brightness of the low threshold, and at the same time, it can be set to turn off the light when the output brightness is lower than or equal to the low threshold.

At the same time, it is possible to set whether the light can be switched on by means of a relative dimming ‘up to a certain luminance value’ telegram when the output luminance is zero.

Relative dimming controls the relative change of brightness by means of 4bit data bits. The lower three bits are control bits, the highest bit is ‘1’ for dimming up, and ‘0’ for dimming down.

The relative dimming settings are as follows: (1 to 7, brightness down; 0, 8 remain unchanged (stop dimming); 9 to 15 up)

Parameter value	0	1	2	3	4	5	6	7
Lower the brightness	without changing/stop dimming	255	128	64	32	16	8	4

Parameter value	8	9	10	11	12	13	14	15
Increase brightness	without changing/stop dimming	255	128	64	32	16	8	4

4.3 Brightness

8bit data bit control

The dimmer achieves the desired brightness value by changing the brightness parameter. The setting of the brightness parameter is similar to the relative dimming, and the brightness range can be set, a low threshold and a high threshold, the brightness can only be changed within the set range, the maximum adjustable range is 0 to 255.

When the dimmer turns on the light through the brightness, it can set the delay time or default time to gradually brighten to the set brightness target; when it turns off, it can set the delay time or default time to gradually darken to the output of 0 state.

The Brightness Level Threshold limits the total output level of the dimmer, and any brightness outside of this threshold will not be output (forced to be within this range).

The dimmer can also be set to turn the fixture off when the brightness is 0, or to maintain a low brightness value by setting the Brightness parameter. It is also possible to set whether or not the fixture can be switched on by receiving a ‘brightness’ telegram when the output brightness is zero.

4.4 Status Report

The 1-bit data bit

Dimmer can be set to report the latest brightness value of the target object to the bus after the output brightness value changes; the switch state change report can also be set to send a frame to the bus after the switch state changes.

4.5 Scenario

The 8-bit data control

Dimmer provides 15 scenes (1 to 15). You can set a brightness value for each scene and the gradient time for each scene. After setting, you can call your favorite scene at any time. When the highest bit of the scene command is 1, it is a storage command, which updates the current brightness to the corresponding scene brightness.

4.6 Preset Values

The dimmer can preset scenes in advance. The object directly calls the preset scene through 1bit data bit. At the same time, the favorite scene can be replaced with the preset scene through 1bit data bit, that is, the new scene is saved in the preset scene. Each dimmer can set 2 preset values, and each preset value has two brightness values that can be called. For example, in a theater, we need a brighter lighting effect when entering the theater, and we achieve this effect by calling the first brightness value; when the movie starts playing, we need a darker lighting effect, and we achieve this effect by calling the second brightness value; when the movie ends, we can return to the previous brightness.

4.7 Stair Lights

Dimmers are used in addition to general lighting, but can also be used for stair lighting.

When the dimmer is used to control a staircase light, the switch is switched on, the output continues for a certain period of time, and then the light is switched off when the brightness gradually decreases to 20%. The brightness of the light, the duration of the light, and the time for the brightness to drop to 20% can all be set separately.

In the case of staircase lighting, the dimming system can set the output of the staircase light to a permanently fixed brightness and control the object directly with 1 bit of data.

The switching control process: If the switching object receives a ‘1’ message, the dimmer drives the staircase light for a continuous period of time (time can be set), if a ‘1’ message is received

during this period, the switch is reactivated and the light is gradually dimmed after this period of time. If a ‘1’ message is received during this time, the switch is reactivated and switched off when this period of time has elapsed and the light is gradually dimmed to 20% of the luminance value (the time for down-regulation can be set), or the staircase light can be switched off directly by the switching object by receiving a ‘0’ message.

The staircase light can also be switched off directly by the switching object by receiving a ‘0’ telegram and only switching off after the ‘0’ telegram has been received when the light gradually dims to 20% of the luminance value (down time can be set).

If the fixed switch object receives a) If the stationary switching object receives a ‘1’ message, the staircase lighting can be kept at a certain luminance value (luminance value can be set) until a ‘0’ message is received, when the light gradually dims to 20% of the luminance value (dimming time as above). By enabling the ‘Switch off when switching object 0 is received’ function in the system, the switch can be used to switch off the output in the fixed brightness state, and the switching operation mode can be converted to the permanent illumination mode in the fixed brightness state. (Message ‘1’ indicates on, and message ‘0’ indicates off.)

4.8 Bus Reset

In the event of a bus power failure, the dimmer shuts down all outputs and the current brightness value is stored in the dimmer's memory. When the bus is powered back up, the current brightness state may be the last brightness value or a predefined brightness value.

When the bus is powered down, the following conditions may occur:

In normal mode, the action after bus reset selects the brightness before power down, or the specified brightness.

In the case of staircase mode, the action after bus reset is either off or on, with no output when off, or the ‘switch=1’ action when on.

4.9 Error Reporting

Used to report the error status of the system. The data type is 1 byte and is distributed as follows:

Data bit	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5
Target	Channel 1	Channel 2	Channel 3	Channel 4	____	____
Function	circuit, Overload	circuit, Overload	circuit, Overload	circuit, Overload	Radiator temperature>70℃	Radiator temperature>90℃

Table 4.1 Generic dimmer error reporting

4.10 Equipment normal operation sign

1 bit data bit

When the dimmer operates normally, this flag will periodically send messages to the bus to report that the dimmer operates normally.

5 Instructions for setting parameters in the ETS system

5.1 Overview

Each dimmer output has two operating modes (main functions):

Normal dimming mode is mainly used to control ordinary lighting systems. You can set the dimming output time and brightness value, dim or brighten the light through the relative dimming function, or call the set light brightness through the scene function until the light brightness is suitable for the required environment atmosphere.

Staircase lighting (staircase light mode) Staircase light mode is mainly used to control staircase lights. When the staircase lights are turned on, the output is delayed for a period of time and then

automatically turned off. It can also be turned on for a long time, in which case the lights need to be turned off manually.

5.2 Setting parameters "Device general"

The parameter settings may vary from device to device. If the parameter settings of this device do not have the parameters described below, then it will not have the function of this parameter.

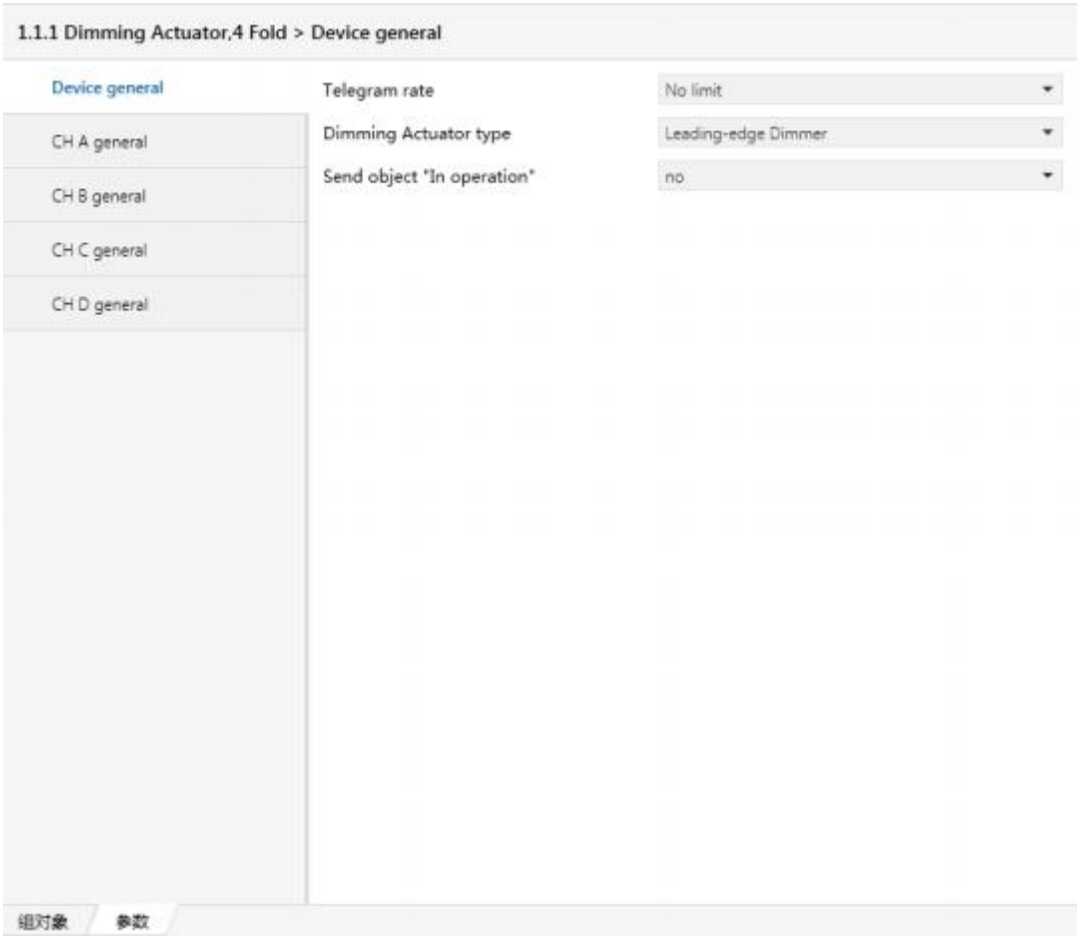


Figure 5.1 Parameter “Device general” setting interface

Parameter“Telegram rate”

This parameter sets the frame rate, options are:

No limit

Delay 100ms

Delay 200ms

””””

Delay 700ms

In this system, the frame rate function is not enabled, please select the "No limit" option

Parameter“Error report ”

This parameter sets whether to report the system error status, 1byte data bit control. Options:

Disable

Enable

When the option is "Disable", the system does not report errors when errors occur.

When the option is "Enable", the system reports errors when errors occur. For example, when the device temperature is too high, overloaded or short-circuited, an alarm will be issued and the device will be automatically shut down. When the output is overloaded or short-circuited, the hardware shuts down the output, the system reports an error, and the output returns to normal after the output is shut down through the bus or the output is normal.

For the general dimmer, the temperature stabilisation time is set to 1min in the application, when the temperature is higher than 70℃ for 1min, the output brightness becomes 30% of the current setting; when the temperature drops to 60℃ for 1min, the output brightness is adjusted back to 50% of the current setting.

When the temperature drops to 60℃ for 1min, the output brightness will be adjusted back to 50% of the current setting. When the temperature is higher than 90℃ for 1min, the output will be turned off and cannot be turned on, and after cooling down, the output must be turned on again. If the temperature fluctuates at the threshold, the stabilisation time is retimed.

For 4A LED dimmer, when the temperature of heat sink is higher than 70℃, every 1℃ rise in temperature, the brightness value of LED lamp will be reduced by 5%, if the temperature continues to rise, the brightness value will continue to fall, and at 80℃, the output will be switched off.

Parameter“Sending cycle time in s[1„65535] ”

When the error report is enabled and is used to set the dimmer to send a message via the bus to report the dimming The time interval during which the device error occurs.

Options: 1…65535s

Parameter “Output voltage type”

Is used to set the output type of the dimming controller. Options:

Leading-edge Dimmer

Leading-edge/Trailing-edge Dimmer

0-10V Dimmer

1-10V Dimmer

Constant-current LED Dimmer

Constant-voltage LED Dimmer

Parameter“send object“in operation ””

This parameter is used to periodically send messages ‘1’ or ‘0’ to the bus to indicate that the device is functioning correctly:

No

send value “0 ” cyclically

send value “ 1 ” cyclically

When the option is "no", no message is sent. When the option is "send value "0" cyclically" or "send value "1" cyclically", the following parameter will appear to set the time interval for sending messages.

Parameter“Sending cycle time in s[1„65535] ”

This parameter sets the time interval at which the dimmer sends a message via the bus to report that the dimmer is operating normally. Restart the time. 0-10V Dimmer Options: 1…65535s

5.3 Setting the parameter “CH X active”

The “CH X active” parameter setting interface is shown in Figure 5.2. This interface sets whether the X-channel output of the dimmer is enabled. In the following description, “CH X” or “X” represents one of the dimmer outputs. Each channel of the dimmer has the same parameter setting interface and object, and one of the channels is used for explanation below.

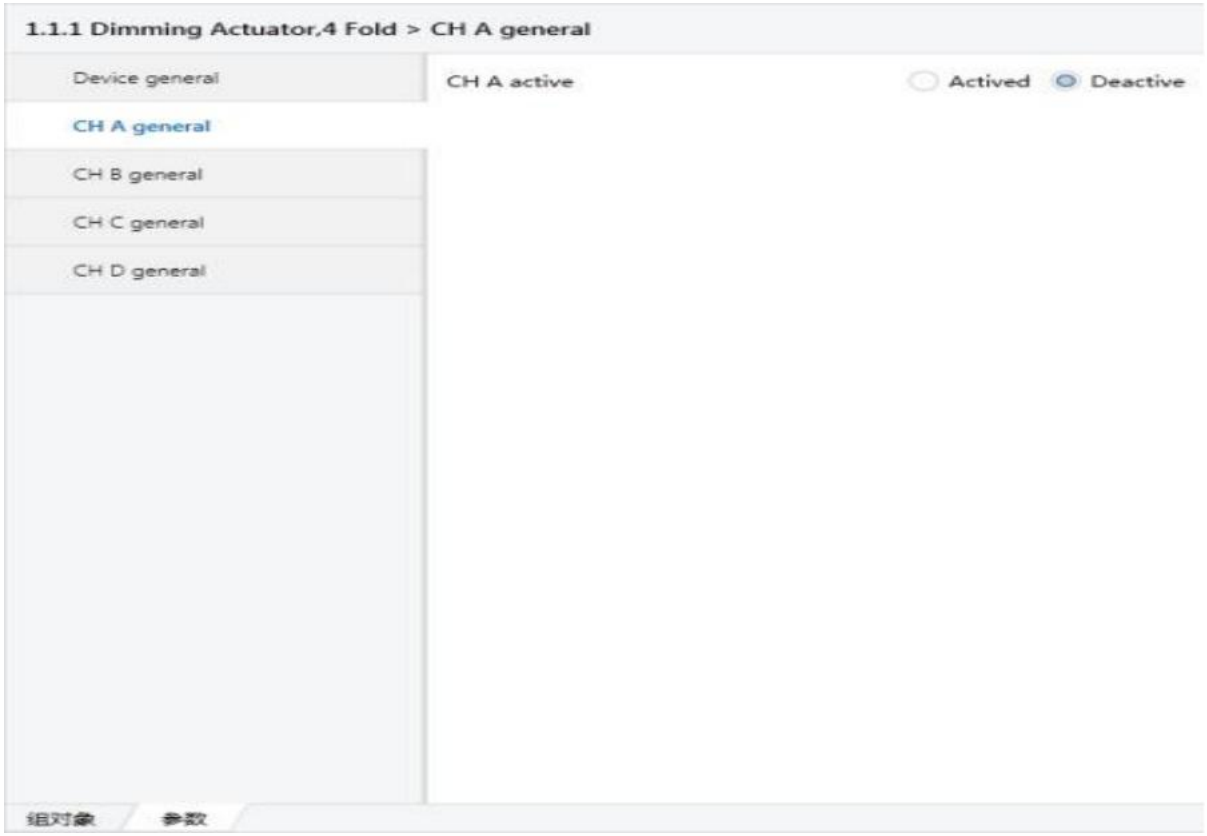


Figure 5.2 Parameter “CH X active” setting interface

Parameter “CH X active” Optional:

Actived

Deactive

Option “actived” means dimmer X is enabled. After selection, the interface shown in Figure 5.3 will pop up. In this interface, you can set the dimmer working mode and current brightness status and switch status report. If this channel is not used, set it to “Deactive”

5.4 Setting the parameter “CH X gernal”

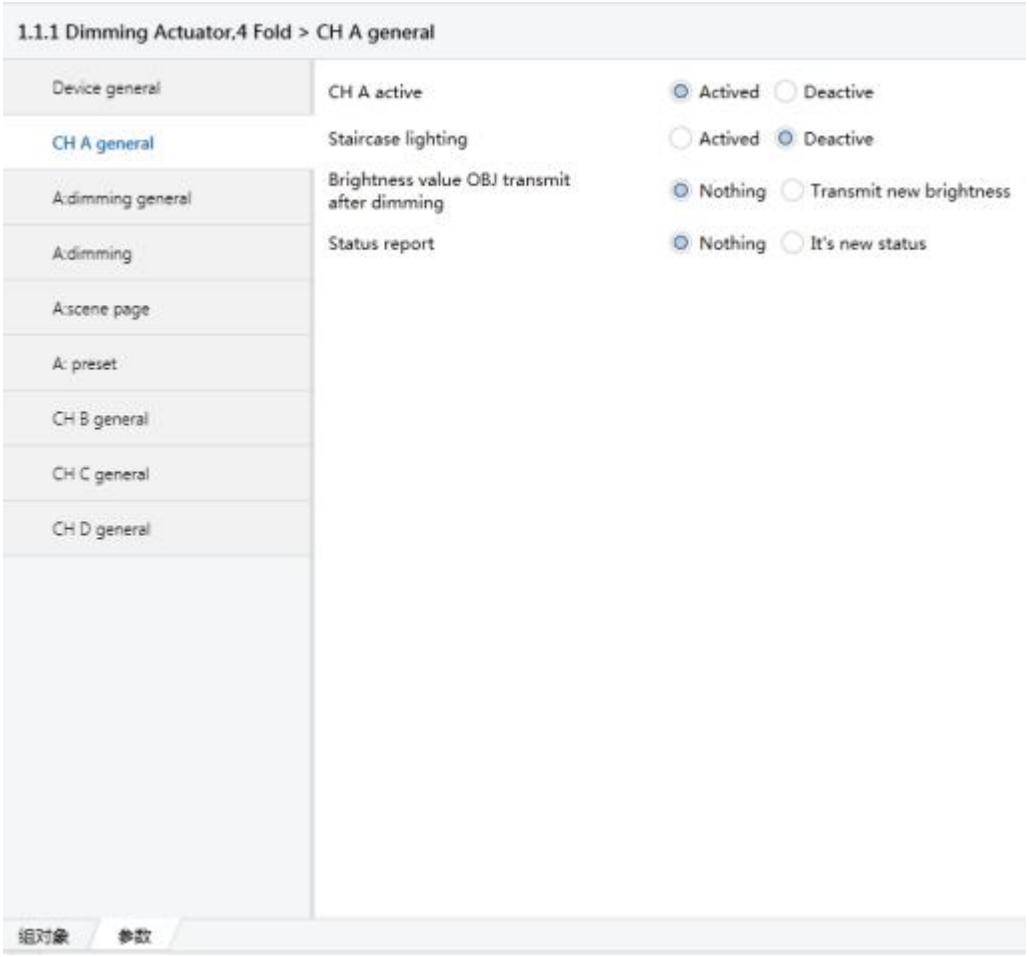


Figure 5.3 Parameter “CH X gernal” setting

Parameter“Staircase lighting”

Option： Actived

Deactive

The option ‘activated’ indicates that the staircase mode function of dimmer X is enabled, and the option ‘deactive’ is the normal dimming mode.

Parameter“brightness value OBJ transmit after dimming ”

This parameter is used to report the latest brightness value. When this parameter is enabled, a frame will be sent to the bus if the brightness value changes for any reason; optional:

Nothing

Transmit new brightness

When the option is ‘nothing’, the current brightness status is not reported; when the option is ‘transmit new brightness’, a frame will be sent to the bus when a brightness adjustment message is received, regardless of whether the brightness value is the same as the original brightness or not. When the option ‘transmit new brightness’ is selected, a frame will be sent to the bus to report the current brightness value regardless of whether the brightness value is the same as the original brightness or not.

Note: When the option ‘transmit new brightness’ is selected, make sure that the object

Note: When the option ‘transmit new brightness’ is selected, make sure that the object ‘Brightness status X’ and the object ‘Brightness X’ do not use the same group address, otherwise the object will send and receive frames and enter a dead loop, which will prevent the whole device from working normally.

Parameter “Status report”

This parameter sets whether to report the current switch status to the bus when the object ‘switch’ is changed.

If the brightness value of the switch is greater than 0, ‘1’ will be sent to the bus; if the current brightness value is 0, ‘0’ will be sent to the bus.

Optional:

Nothing

It’s new status

When the option is ‘nothing’, the current switch status is not sent to the bus. When the option is ‘it “s new status”, the switch status change is reported to the bus.

Note: When the option ‘It “s new status” is selected, make sure that the object ’ Switch status X’ and the object “Switch X” do not use the same group address, otherwise the object will send and receive itself into a dead loop and the whole device will not work properly.

5.5 Normal dimming mode

5.5.1 Setting the parameter “X: dimming general”

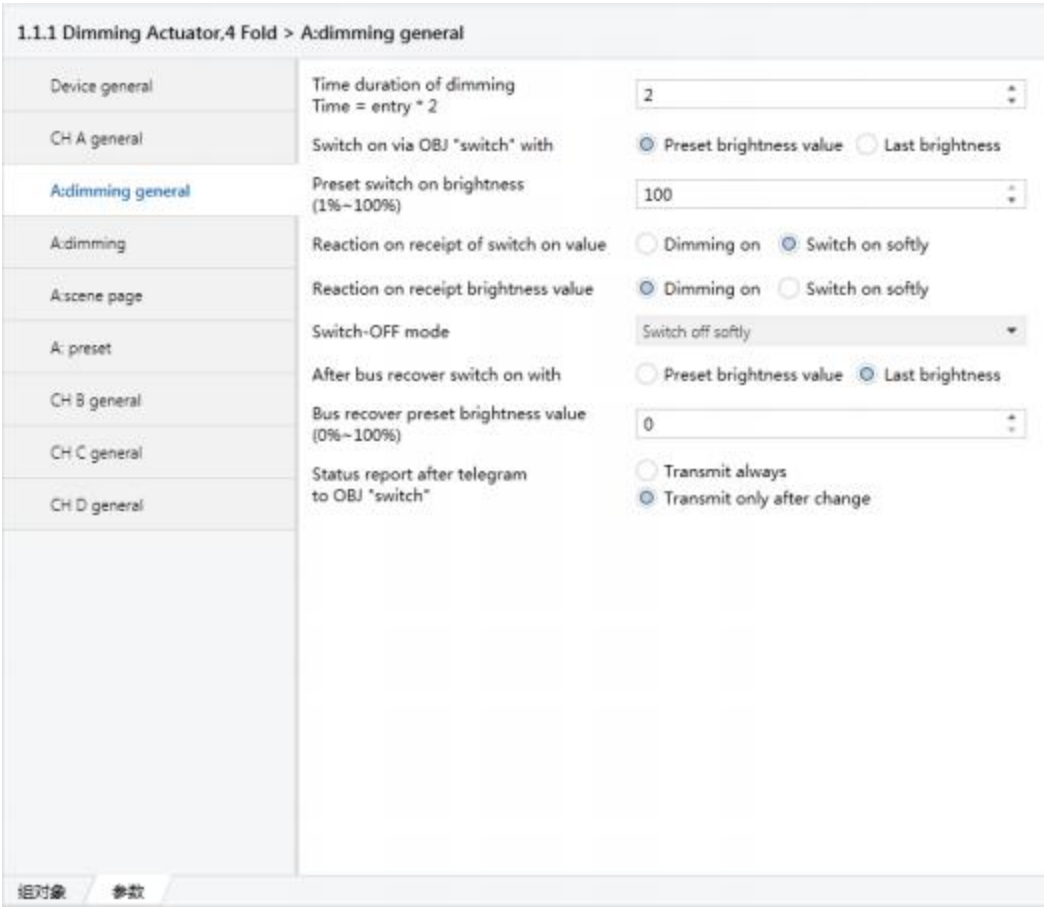


Figure 5.4 Parameter “X: dimming general” setting interface

Parameter“time duration of dimming time=entry*2 ”

This parameter sets the dimming time. Whether it is brightness or switch dimming mode, when Dimming on or Dimming off is selected, the time is selected by multiplying this input value by 2 seconds. The maximum allowed input time is 255s.

Parameter“Switch on via OBJ “switch ”with ”

This parameter indicates whether to use the previous brightness or the preset value when switching the light on. This parameter is optional:

Preset brightness value

Last brightness value

If the option is ‘preset brightness value’, the brightness value when switching on the light is the preset value in the parameter ‘Preset switch on brightness(1%~100%)’. Preset value When the switch preset value is less than the brightness low limit value, the brightness value when the lamp is switched on is the brightness low limit value;

When the switch preset value is greater than the high limit value, the brightness value when the lamp is turned on is the high limit value.

The high and low limit values of the brightness are set in the parameter ‘CHX dimming’ setting screen in Fig. 5.5. This will be explained when setting the ‘CH X dimming’ parameter. If the option is ‘last brightness value’, the brightness value when switching on is the brightness value of the last non-dark state, if the switching on is executed at the first action after bus reset and the light is off after bus reset, the default brightness value when switching on is 128. If the first action is executed after bus reset, and the light is off after bus reset, the default brightness value of switch is 128;

In other cases, the default value of switch on is 128; in other cases, the default value of switch on is the value of the previous state with brightness.

Parameter “Preset switch on brightness(1%~ 100%) ”

This parameter is used to set the brightness value of the light in "switch" mode, the brightness range is 1%~100%.

Parameter “reaction on receipt of switch on value ”

This parameter indicates the time to turn on the light when ‘switch’ dimming mode is selected, optional: Dimming on

Switch on softly

When the option is ‘dimming on’, the dimming time of ‘switch’ is the duration of dimming time=entry*2 entered in the parameter ‘time’ above.

When the option is ‘switch on softly’, the dimming time of ‘switch’ is the default 4s. If the option is ‘switch on softly’, ‘switch’ dimming time is 4s by default.

Parameter “reaction on receipt brightness value ”

This parameter indicates the time selected for the ‘brightness’ dimming mode, optional:

Dimming on

Switch on softly

When the option is ‘dimming on’, the ‘brightness’ dimming time is the time entered in the above parameter ‘time

When the option is ‘switch on softly’, the ‘brightness’ dimming time is the default time entered in the parameter ‘duration of dimming time=entry*2’. If the option is ‘switch on softly ’, the ‘brightness’ dimming time is 4s by default.

Parameter “Switch-off mode ”

This parameter indicates the time to switch off the lamp selection in ‘switch’ dimming mode, optional:

Dimming off

Switch off softly

Switch off instantly

When the option is ‘dimming off’, the dimming time of ‘switch’ is the same as the parameter ‘time’ above.

When the option is ‘switch off softly’, the dimming time of ‘switch’ is the default 4s. When the option is ‘switch off softly’, the ‘switch’ dimming time is 4s by default, when the option is ‘switch offinstantly’, the time is 0, and it will turn off immediately.

Parameter “After bus recover switch on with ”

This parameter is to indicate the action after bus reset in the case of normal, select the brightness before power down, or the specified brightness. Optional:

Preset brightness value

Last brightness value

When the option is ‘preset brightness value’, the brightness value of bus reset is the brightness preset value entered by the parameter ‘bus recover preset brightness value(0%~100%)’. The brightness value at bus power-on reset is the preset brightness value entered with the parameter ‘bus recover preset brightness value (0%~100%)’. When the preset value of the bus reset input is less than the low limit value, the brightness value of the bus reset will be the low limit value; when the preset value of the bus reset input is greater than the high limit value, the brightness value of the bus reset will be the high limit value. The high and low limit values of the brightness are set in the setting screen of parameter ‘CH X dimming’ in Fig. 5.5. The high and low brightness limit values are set in the setting screen of parameter ‘CH X dimming’ in Fig. 5.5, and are explained in the setting of parameter ‘CH X dimming’.

If the option ‘last brightness value’ is selected, the brightness value at bus power-on reset is the brightness value before power-down. When the parameter download is completed, a bus reset operation is also performed.

Parameter“Bus recover preset brightness value(0%~ 100%) ”

This parameter is used to set the brightness value at bus power-on reset, brightness range 0%~100%.

Parameter“status report after telegram to obj “switch ””

This parameter is used as a backup parameter and is ignored during configuration.

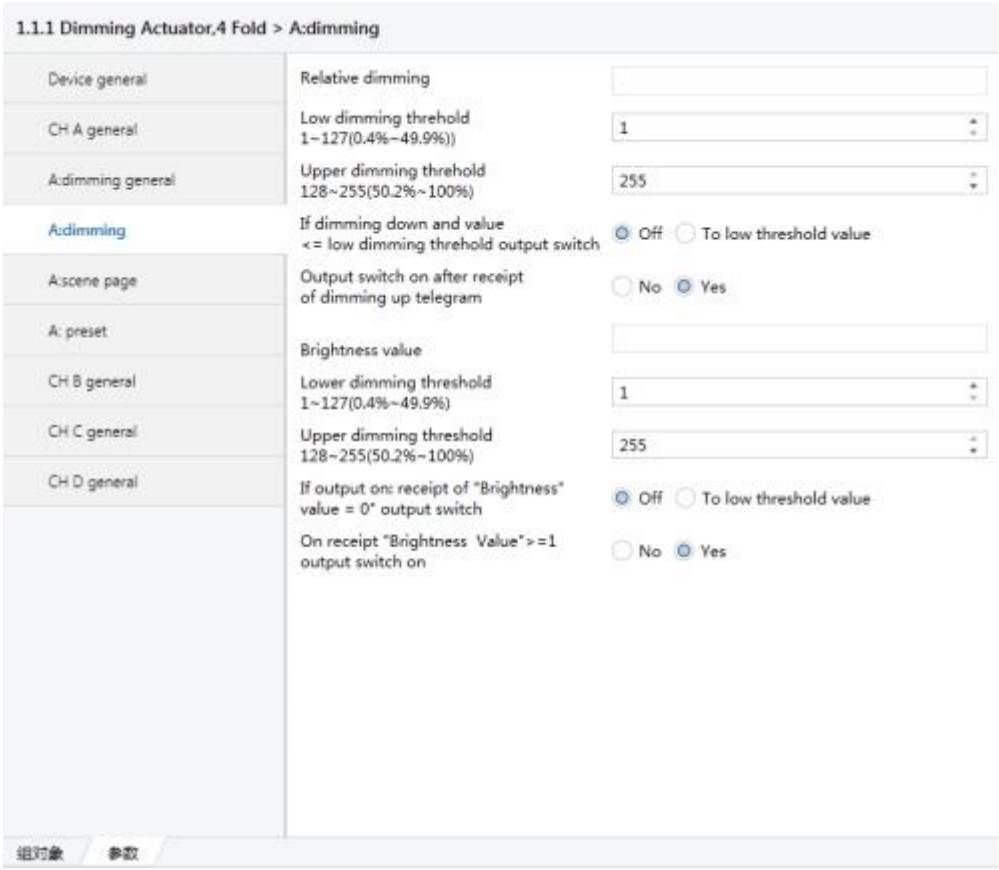


Figure 5.5 Parameter “X: dimming” setting interface

5.5.2 Setting the parameter“X: dimming ”

The “CH X dimming” parameter setting interface is shown in Figure 5.5. This interface sets some parameters for the brightness dimming mode of the dimmer. There are two types of brightness dimming: Relative dimming (relative dimming) and brightness value (brightness dimming). The description is as follows:

Relative dimming

Parameter “low dimming threshold 1~ 127（0.4%~49.9%）”

This parameter sets the lower limit of relative dimming. When the value is lower than the lower limit, the light cannot be dimmed down, but can only be dimmed up. The range is 1~127 (0.4%~49.9%). Assuming the lower limit is 50, if the current brightness is below 50, the light can only be dimmed up, and it can only be dimmed down when it is above 50.

Parameter“upper dimming threshold 128~255（50.2%~ 100%）”

This parameter sets the upper limit of relative dimming. When it is higher than the upper limit, the light cannot be dimmed up, but can only be dimmed down. The range is 128~255 (50.2%~100%). Assuming the upper limit is 200, if the current brightness is above 200, the light can only be dimmed down. It can only be dimmed up when it is below 200.

Parameter “If dimming down and value <=low dimming threshold output switch”

This parameter indicates the action when the relative dimming is less than or equal to the low limit, whether to select Off or keep at the low limit, optional:

Off

To low threshold value

Set the low threshold value as 50, if you select ‘Off’, turn off the light when dimming down to the brightness value of 50; if you select ‘To low threshold value’, when dimming down to the brightness value of 50, the brightness will be maintained. If ‘To low threshold value’ is selected, the brightness will remain unchanged when dimming down to 50. Whether ‘Off’ or ‘To low threshold value’ is selected, if the low threshold value of relative dimming is less than the low threshold value of brightness, the lamp will be turned off when the relative dimming is adjusted downward below the low threshold value of brightness; if the high threshold value of brightness is less than the high threshold value of relative dimming, the lamp will be turned off when the relative dimming is adjusted downward below the low threshold value of brightness. If the low limit value of relative dimming is smaller than the low limit value of brightness, the relative dimming can only be adjusted upward to the high limit value of brightness. (The high and low limits of brightness determine the total brightness output of the dimmer, as explained later in the brightness dimming)

Parameter “Output switch on after receipt of dimming up telegram”

This parameter indicates whether the lamp can be turned on when a ‘dimming up’ telegram is received from relative dimming in the state of output 0, optional:

No

Yes

Assuming the current output is 0, if ‘NO’ is selected, when the target receives the message of dimming up, the output will still be 0; if ‘YES’ is selected, when the target receives the message of dimming up, the output will be the brightness value after dimming up. If ‘YES’ is selected, when the target receives an upward adjusted message, the upward adjusted luminance value will be output. If the upward adjusted luminance value is less than the low limit, the low limit will be output directly. If the upward adjusted brightness value is greater than the high limit value, the high limit value will be output directly.

Brightness value

Dimmer Brightness The brightness limit of the dimming mode limits the total output of the dimmer to the high and low values. Brightness can only be changed within the set high and low limits, and values not within the high and low limits will not be output, for example, the values set to 1~255 in Fig. 5.5 belong to the whole range. Once the low limit is set to 50 and the high limit to 200, the output range will be 50~200. Brightnesses such as 210 are unlikely to occur. On the way up from 0, the brightness goes straight to the low limit and starts dimming. In descending from 255, the brightness is dimmed directly to the high limit.

Parameter “low dimming threshold 1~ 127（0.4%~49.9%）”

This parameter sets the lower limit of brightness dimming, ranging from 1 to 127. Dimming starts directly from the lower limit. Assuming the current brightness is 0, the lower limit is 50, and the upper limit is 200, after receiving the message of the specified brightness of 30, it goes directly to 50 without gradient time; if the specified brightness is 60, the process is to go directly to 50 and then slowly to 60; if the current brightness is 100, the first target is 30, the process is 100 slowly to 50, and the brightness is 50;

Parameter “upper dimming threshold 128~255（50.2%~ 100%）”

This parameter sets the upper limit of brightness dimming, ranging from 128 to 255. Assuming the lower limit is 50 and the upper limit is 200, if the input brightness value is greater than 200, 200 is directly output.

Parameter “If output on: receipt of“brightness value=0”output switch”

This parameter sets whether the output can be turned off by specifying a brightness of 0. The options are:

Off

To low threshold value

If “off” is selected, when the brightness value is 0, the output is 0; if “to low threshold value” is selected, when the brightness value is 0, the output is directly adjusted to the low threshold output.

Parameter“On receipt“brightness value ”>=1 output switch on ”

This parameter is used to set whether the output can be turned on using brightness dimming when the output is 0. The options are:

No

Yes

If ‘NO’, a telegram is received specifying a brightness of 100 when the output is 0. The dimmer channel still maintains a 0 output. If ‘YES’ is selected, when the luminance receives a luminance value greater than or equal to 1, the input luminance value will be output directly, and if the input luminance value is less than the luminance low limit value, the luminance low limit value will be output directly.

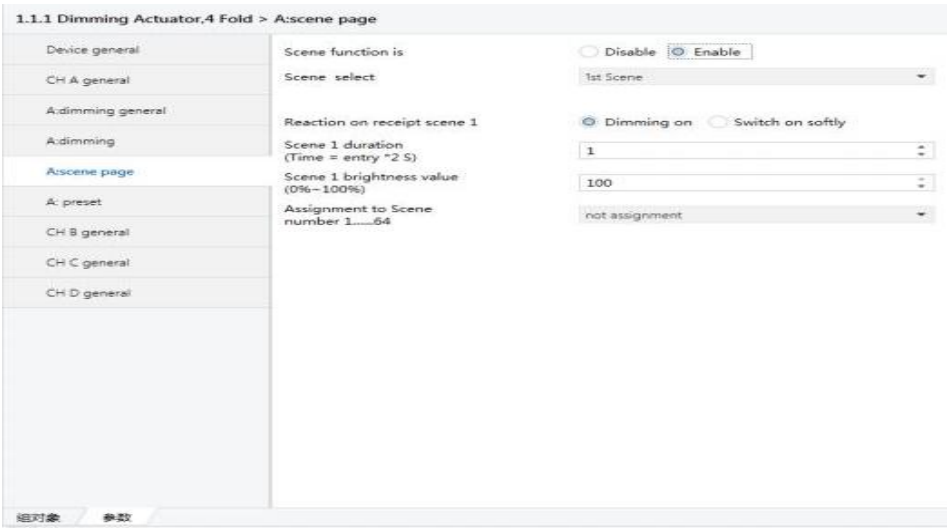


Figure 5.6 Parameter “X:scene page” setting interface

5.5.3 Setting the parameter “X: scene page”

Parameter “X: scene page” setting interface

Setting parameter “CH X scene page” is shown in Figure 5.6. Here, the function of setting scenes is provided, providing 1~15, a total of 15 scenes to choose from. 15 scenes can be set at the same time and called directly through the control panel when needed

Parameter “Scene function is ”

This parameter sets whether the scene function is enabled. The options are:
Enable
Disable
The option "enable" means that the dimmer X-channel scene function is enabled. After selecting, the interface shown in Figure 6.6 will pop up. If the scene function is not used, set it to "disable".

Parameter“Scene select”

This parameter is used to select the scene to be set, so as to set the brightness of each scene and the scene dimming time and dimming method.
Options：
Scene 1
Scene 2
””
Scene 15
The brightness, dimming mode and dimming time of the 15 scenes are set in the following parameters.

Parameter “Reaction on receipt scene Y ”

This parameter is used to set the dimming mode of the set scene. Y represents the set scene (1~15), and the following Y represents the same. Optional items: Dimming on Switch on softly When the option is "Dimming on", the dimming time of the set scene is the time set by the parameter "Scene Y duration (time=entry*2S)" below, and the input time is multiplied by 2. When the option is "switch on softly", the dimming time of the set scene is the default 4s.

Parameter “Scene Y duration（time=entry*2S）”

This parameter sets the dimming time of the set scene. The time is the input value multiplied by 2 seconds. The maximum allowed input time is 255s.

Parameter “Scene Y brightness value（0%~ 100%）”

This parameter is used to set the brightness of the scene, the brightness range is 0%~100%.

Parameter “Assignment to Scene number 1„64 ”

This parameter is used to assign a scene number to the set scene, i.e. the communication object ‘Scene/save X’ calls the scene with the assigned scene number. Optional:

Not assigned

Assignment to scene 1

Assignment to scene 2

‘’

Assignment to scene 64

Note: The parameter setting options are 1~64 scene numbers or not assigned.

5.5.4 Setting the parameter "X:preset"

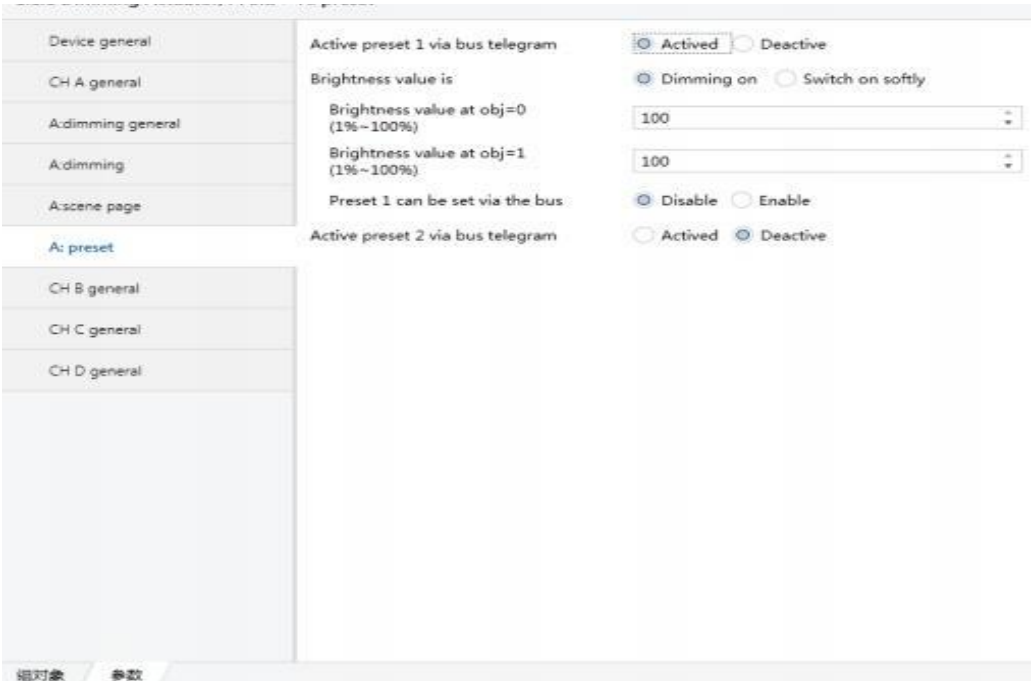


Figure 5.7 Parameter “X: preset” setting interface

The parameter "X preset" setting interface is shown in Figure 5.7. Here, the preset value of the dimmer is set. Two preset values (preset 1 and preset 2) are provided. Each preset value can set two brightness values. The preset value function is used to achieve the preset lighting effect. The preset value set is called through the communication object (X preset 1), and the current brightness state can also be saved as a new preset value through the bus. The parameters of the two preset values are the same. Here, one of the preset values is used as a representative for explanation.

Parameter “Active preset 1 via bus telegram”

This parameter is used to activate preset 1.

Options:

Active

Deactive

If the option is "Deactive", preset 1 is not activated. If the option is "active", preset 1 is enabled, and the following parameters will appear.

Parameter“Brightness value is ”

This parameter indicates the time selected when dimming is switched on for the object ‘preset 1’, which is controlled by 1 bit of data, i.e. ‘0’ and ‘1’, to call up two different brightness values respectively. The object ‘X preset 1’ is controlled by 1bit data, i.e. ‘0’ and ‘1’, which can be used to call up two different brightness values respectively.

Optional:

Dimming on

Switching on softly

With the option ‘dimming on’, the dimming time of object ‘X preset 1’ is the time duration of dimming time entered in the parameter ‘Time duration of dimming Time = entry’ above multiplied by 2; with the option ‘switching on softly’, the dimming time of object ‘X preset1’ is the default 4s.’, the dimming time of object ‘X preset1’ is the time duration of dimming time entered in parameter ‘Time duration of dimming Time = entry’ above multiplied by 2; when the option is ‘switching on softly’, the dimming time of object ‘X preset1’ is 4s by default.

Parameter "Brightness value at obj=0(1%~100%)"

This parameter sets the brightness value of the object "X preset 1" when it receives the "0" message.

Optional value: 1~100%.

Parameter "Brightness value at obj=1(1%~100%)"

This parameter sets the brightness value of the object "X preset 1" when it receives the "1" message.

Optional value: 1~100%.

Parameter“Preset 1 can be set via the bus ”

This parameter sets whether the preset values can be changed via the bus. When ‘enable’ is selected, the preset values can be changed via the bus and the communication pair ‘Set preset 1’ is enabled. The communication pair ‘Set preset 1’ is used to save the current switching state as a new preset value. When it receives the message ‘0 “, it saves the current brightness state in the parameter ” brightness value at obj=0’, i.e. replaces the value set in the parameter; when it receives the message ‘1 “, it saves the current brightness state in the parameter ” brightness value at obj=0’, i.e. replaces the value set in the parameter. When the message ‘1’ is received, the current brightness state is saved in the parameter ‘brightness value at obj=1’, i.e. the value set in the parameter is replaced. Optional: enable Disable

5.6 Stair Light Mode

When the stair light mode is enabled, the parameter settings are as shown in Figure 5.8.

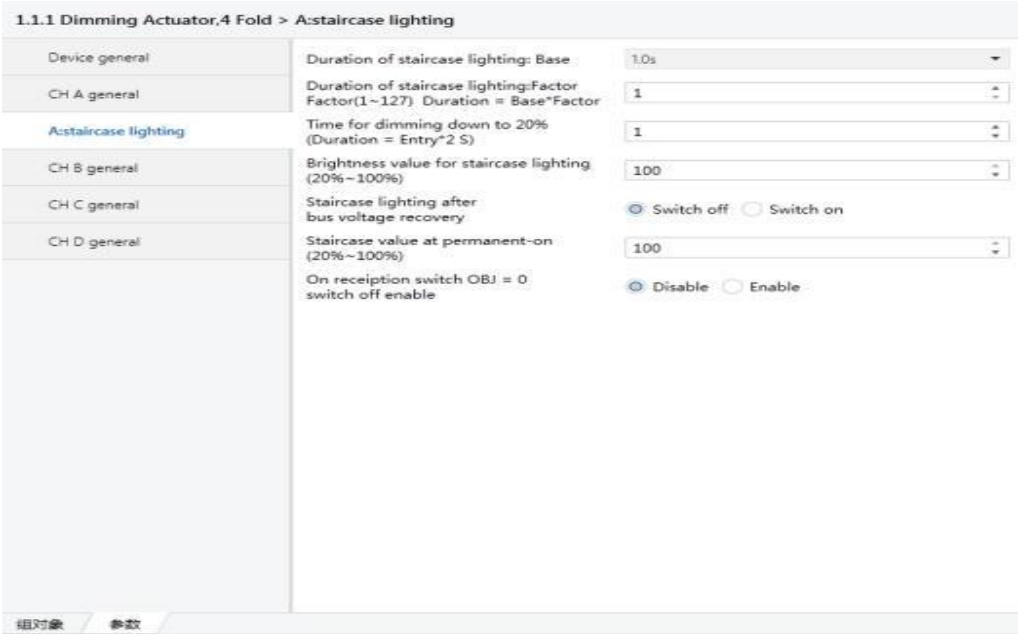


Figure 5.8 Parameter “CH X staircase lighting” setting interface

Parameter “Duration of staircase lighting : Base”

Set base time: 1.0s/2.1s/„/1.1min/„/1.2h

Paramter “Duration of staircase lighting : Factor ”

sets the factor time: 1~127S

When the staircase light is turned on in the "switch" mode, the light duration is: duration = base * factor, After the light is on for a certain period of time, the brightness gradually decreases to 20% and then the light is turned off.

Parameter “Time for dimming down to 20%(Duration=Entry*2) ”

This parameter sets the time for the staircase light brightness to gradually decrease to 20%: the time is the input value multiplied by 2S, allowing Parameter “Duration of staircase lighting : Base” Set base time: 1.0s/2.1s/„/1.1min/„/1.2h When the stair light mode is enabled, the parameter settings are as shown in Figure 5.8. Guangzhou Leyuan Life Technology Co., Ltd. The maximum value allowed to be input is 255s. The staircase light brightness gradually decreases to 20% and then the light is turned off.

Parameter “Brightness value for staircase lighting(20%~100%) ”

This parameter is used to set the brightness of the staircase light in ‘switch’ mode, the range of brightness is 20%~100%.

Parameter“Staircase lighting after bus voltage recovery ”

Determines whether the staircase lighting is turned on or off when the bus is powered on and reset.
Options:

Switch on

Switch off

Option "Switch on" means that the staircase lights are turned on when the bus is powered on and reset, and the "switch" action is executed. The duration is: duration=base*factor, and the falling time is set by the parameter "Time for dimming down to 20% (Duration=Entry*2)". When the option is "Switch off", the staircase lights are turned off when the bus is powered on and reset.

Parameter“Staircase value at permanent-on(20%～100%)”

This parameter sets the output state of the stair light to a fixed brightness value. The stair light will not be turned off if no "permanent on" shutdown message is received. "Permanent on" is another output mode of the stair light. When the shutdown action is executed, the time for the light brightness to decrease is set by the parameter "Time for dimming down to 20% (Duration=Entry*2)". The light is also turned off when the light brightness drops to 20%. The brightness range is 20% to 100%.

Parameter“On receiption switch OBJ=0 switch off enable”

Optional：

Enable

Disable

If the option ‘Enable’ is selected, the output can be switched off by sending a switch command with the communication object ‘switch’ in either switch or permanent on output mode; if the option ‘Disable’ is selected, the output must be stopped by sending a stop command with the communication object ‘Permanent on’ in the ‘Permanent on’ lighting mode. When the option ‘Disable’ is selected, the ‘Permanent on’ output can only be stopped by sending a stop command via the communication object ‘Permanent on’ in the ‘Permanent on’ lighting mode. The ‘Permanent on’ output must be stopped by sending a stop command via the communication object ‘Permanent on’.

Note: The permanent on output mode can be activated when switching the output mode, but the permanent on output mode cannot be deactivated without activating the permanent on output mode.

6 Communication Object Description

A communication object is the medium through which a device communicates with other devices on the bus, i.e. only communication objects can communicate with the bus. The functions of each communication object are described in detail below.（The following is a detailed description of the role of each communication object (see the example of a general-purpose dimmer actuator).

6.1 “Device General”communication object

There are 2 communication objects under ‘Device General’, as shown in Fig. 6.1, and the specific functions are shown in Table 6.1.

Note: Below, in the table properties column, ‘C’ means that the communication function of the communication object is enabled, ‘W’ means that the value of the communication object can be rewritten via the bus, ‘R’ means that the value of the communication object can be read via the bus, ‘T’ means that the value of the communication object has the function of transmission, and ‘U’ means that the value of the communication object can be updated. W’ means that the value of the communication object can be rewritten via the bus, “R” means that the value of the communication object can be read via the bus, “T” means that the communication object has the function of transmission and “U” means that the value of the communication object can be updated.

名称	序号 *	描述	群组地址	长度	C	R	W	T	U	数据类型	优先级	对象功能
In operate	45			1 bit	C	-	-	T	-	boolean	低	In operate

Figure 6.1 Device General Communication Object

No.	Function	Communication object	Data type	Attibute
12	**In operate**	**In operate**	**1bit**	**C,T**
This communication object is used to send telegrams ‘1’ or ‘0’ to the bus periodically to indicate that the device is functioning correctly, and is specified in the parameter ‘Send object The option ‘Send object’ in the parameter ‘in operation’ is ‘send value’ 0 ‘cyclically’ or The communication object is enabled with the parameter ‘Send object “in operation”’ with the option ‘send value’ 0 ‘cyclically’ or ‘send value’ 1 ‘cyclically’, but not with the option ‘no’. The option ‘send value’ 0 ‘cyclically’ sends the message ‘0’, the option ‘send value’ 1 ‘ cyclically’ sends the message ‘0’, the option ‘send value’ 1 ‘ cyclically’ sends the message ‘0’, the option ‘send value’ 1 ‘ cyclically’ sends the message ‘0’. value’ 1 “cyclically” sends the message “1”.				
11	**Report error of device**	**Error report**	**1byte**	**C,R,T**
This communication object is used to report the error status of the system. If the ‘Error report’ option is ‘Disable’, this communication object is not enabled. If the ‘Enable’ option is selected, the communication object reports an error when an error occurs in the system. If the device is over-temperature, overloaded or short-circuited, an alarm is issued and the device is switched off automatically. The following section describes the 8bit Definition of instructions:： Let an 8bit instruction be (message encoding)：76543210 universal dimmer All 8 bits are 0 - system is functioning normally Bit 0 is a 1 - Channel 1 is shorted or overloaded 1 for bit 1 - channel 2 short-circuit or overload 1 for bit 2 - channel 3 short-circuit or overload 1 for bit 3 - Channel 4 short-circuit or overload Bit 4 is 1 - radiator temperature over 70 °C Bit 5 is 1 - radiator temperature over 90 °C Other bits unused				

Table 6.1 Device General communication object table

6.2 “Dimming Actuator” communication object

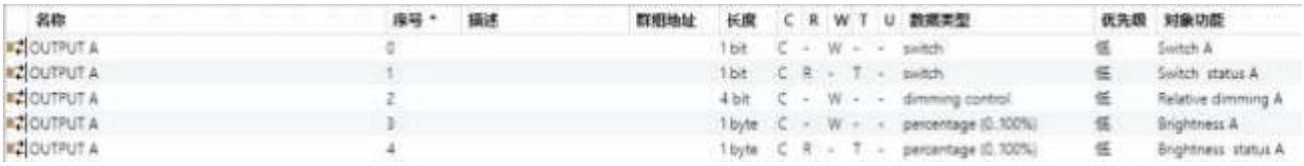


Figure 6.2 Universal communication objects per channel

No	Function	Communication object	Data type	Attibute
1	**Switch status X**	**OUTPUT X**	**1bit**	**C,R, T**
This communication object is used to report the current switch status to the bus. switch status sends ‘1’ to the bus if the brightness value is greater than 0, and ‘0’ to the bus if the brightness value is 0. The communication object is enabled when the parameter ‘Status report’ is set to ‘It “s new status”.				
0	**Switch X**	**OUTPUT X**	**1bit**	**W,C**
This communication object is only used to switch the dimmer on and off. The device receives the switching command via this communication object. If a message with a logic value of ‘1’ is received, the dimmer is switched on, if ‘0’, it is switched off.				
4	**Brightness status X**	**OUTPUT X**	**1byte**	**C,R,T**
This communication object is used to report the current channel output brightness to the bus. When the brightness value changes for whatever reason, the communication object will send data to the bus and report the current brightness value; this communication object is enabled when the parameter ‘Brightness value OBJ transmit after dimming’ is selected as ‘Transmit new brightness’. The communication object is enabled when the parameter ‘Brightness value OBJ transmit after dimming’ is set to ‘Transmit new brightness’.				
3	**Brightness X**	**OUTPUT X**	**1byte**	**W,C**
This communication object switches the dimmer on or off by receiving a brightness value. If the received brightness value is greater than 0, the dimmer is switched on, if a brightness value of ‘0’ is received, the dimmer may be switched off or the brightness is maintained at a low limit value, as determined by the parameter settings in the brightness dimming.				
2	**Relative dimming X**	**OUTPUT X**	**4bit**	**C,W**
When the input value is 1~7, it is downward dimming, the larger the value in this range, the smaller the downward dimming amplitude is, the largest downward dimming amplitude is when it is 1, the smallest is when it is 7, and 0 is to stop downward dimming; when the input value is 9~15, it is upward dimming, the larger the value in this range, the smaller the upward dimming amplitude is, the largest upward dimming amplitude is when it is 9, the smallest is when it is 15, and 8 is to stop upward dimming.				

Table 6.2 Universal communication object table for each channel

6.3“Dimming Actuator” scene function communication object

Figure 6.3 Scene function communication object

No	Function	Communication object	Data type	Attibute
6	**Scene /save X**	**OUTPUT X**	**1Byte**	**W,C**
Scenes can be called up or stored by sending an 8bit command via this communication object. The communication object is enabled only when the Scene function is enabled. The following describes the meaning of the 8bit command in detail. Let an 8bit instruction be (binary code): FXNNNNNNN F: ‘0’ calls the scene; ‘1’ stores the scene; X: not used, does not affect the result; NNNNNNN: scene number (0"63). The parameter setting options are 1~64.				

Table 6.3 Scene function communication object table

6.4“Dimming Actuator” preset value function communication object

OUTPUT A	7	1 bit	C	-	W	-	-	switch	低	A Preset 1
OUTPUT A	8	1 bit	C	-	W	-	-	switch	低	Set preset 1
OUTPUT A	9	1 bit	C	-	W	-	-	switch	低	A Preset 2
OUTPUT A	10	1 bit	C	-	W	-	-	switch	低	Set preset 2

Figure 6.4 Communication object of preset value function

No	Function	Communication object	Data type	Attibute
7	**X preset 1**	**OUTPUT X**	**1bit**	**W,C**
This is a communication object with preset value 1, by means of which the preset values can be called up. When a message with logic value ‘0’ is received, the brightness of the dimmer is determined by the parameter ‘brightness value at obj=0’, when a message with logic value ‘1’ is received, the brightness is determined by the parameter ‘brightness value at obj=0’. When a message with a logic value of ‘0’ is received, the brightness of the dimmer is determined by the parameter ‘brightness value at obj=0’, and when a message with a logic value of ‘1’ is received, the brightness is determined by the parameter ‘brightness value at obj=1’. obj=1’. This communication object is only enabled when preset1 is activated.				
8	**Set preset 1**	**OUTPUT X**	**1bit**	**W,C**
This communication object is used to modify the brightness value of preset 1 and is only enabled if the parameter ‘Preset 1 can be set via the bus’ is set to ‘Enable’. This communication object enables the current brightness value of preset 1 to be modified. With this communication object, the current brightness state can be saved as a new preset value. The logical value ‘0’ saves the current brightness state in the parameter ‘brightness value at obj=0’, i.e. replaces the value set in the parameter. The logical value ‘1’ saves the current brightness state to the parameter ‘brightness value at obj=1’, i.e. replaces the value set in the parameter.				
9	**X preset 2**	**OUTPUT X**	**1bit**	**W,C**
This is a communication object with preset value 2, with which the set preset values can be called up. When a message with logic value ‘0’ is received, the brightness of the dimmer is determined by the parameter ‘brightness value at obj=0’. The brightness of the dimmer is determined by the parameter ‘brightness value at obj=0’ for messages with logic value ‘1’ and by the parameter ‘brightness value at obj=1’ for messages with logic value ‘0’. This communication object is enabled when preset2 is activated.				
10	**Set preset 2**	**OUTPUT X**	**1bit**	**W,C**
This communication object is used to modify the brightness value of preset 2, which is enabled when the parameter ‘Preset 2 can be set via the bus’ is set to ‘Enable’. With this communication object, the current brightness state can be saved as a new preset value. The logical value ‘0’ saves the current brightness state in the parameter ‘brightness value at obj=0’, i.e. replaces the value set in the parameter. The logical value ‘1’ saves the current brightness state to the parameter ‘brightness value at obj=1’, i.e. replaces the value set in the parameter.				

Table 6.4 Communication objects of preset value function

6.5 “Dimming Actuator”staircase light function communication object

名称	序号 ^	描述	群组地址	长度	C	R	W	T	U	数据类型	优先级	对象功能
OUTPUT A	0			1 bit	C	-	W	-	-	switch	低	Switch A
OUTPUT A	5			1 bit	C	-	W	-	-	enable	低	Permanent on A

Figure 6.5 Communication object of stair light function

No	Function	Communication object	Data type	Attibute
0	**Switch X**	**OUTPUT X**	**1bit**	**W,C**
This communication object is used to switch the staircase lighting function of the dimmer on and off. The communication object receives the logic value ‘1’ and switches on the staircase lighting for a certain period of time and then switches it off. The duration of the staircase lighting is determined by the parameter ‘Duration of staircase lighting: Base’ and the parameter ‘Duration of staircase lighting: Factor’, the duration of the staircase lighting is: duration=base*factor, after this time it is switched off automatically. The logic value ‘0’ is received to switch off the staircase lighting.				
5	**Permanent on X**	**OUTPUT X**	**1bit**	**C,W**
The communication object receives the logic value ‘1’ to switch on the staircase light for a longer period of time and the logic value ‘0’ to switch off the staircase light.				

Table 6.5 Staircase light function communication object table