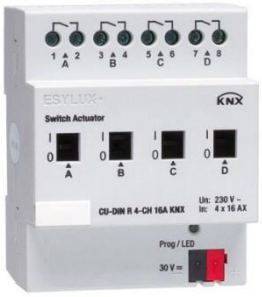
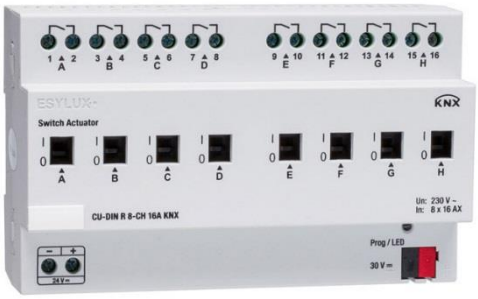
MA00629501
06/2015

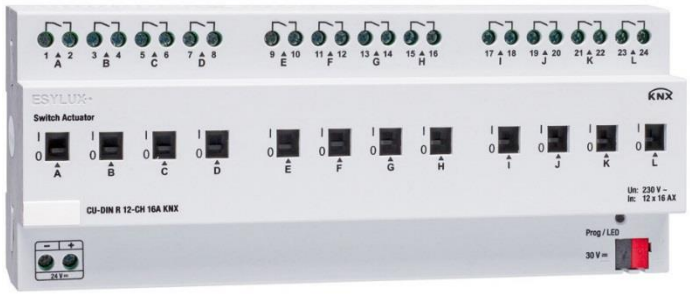
User manual



CU-DIN R 4-CH 16 A KNX
EC10430282



CU-DIN R 8-CH 16 A KNX
EC10430299



CU-DIN R 12-CH 16 A KNX
EC10430305

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1 Description

The ESYLUX KNX/EIB series-switching actuator output modules are developed by ESYLUX. KNX/EIB BUS is used to communicate with other KNX devices. The database needs to be downloaded to the switch actuator by using ETS 3.0F/ETS4/ETS5; the document describes how to use the products. Our products are manufactured according to EMC, electrical safety and environmental standards.
The switch actuators are used to control switched loads, such as:

- **Lighting**
- **Motor**
- **Blinds**
- **Heating**
- **Other equipment**

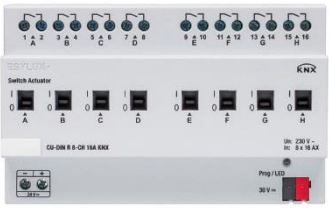
Note: Use this product only as intended (as described in the user instructions). Do not make any changes or alterations as this will render any warrantees null and void. You should check the device for damage immediately after unpacking it. If there is any damage, you should not install the device under any circumstances.
If you suspect that safe operation of the device cannot be guaranteed, you should turn the device off immediately and make sure that it cannot be operated unintentionally.

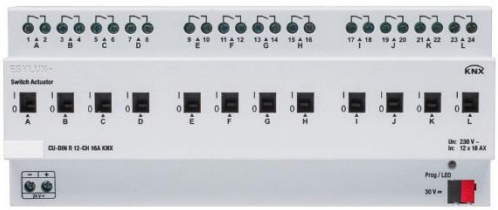
2 Safety instructions

- **Work on the 230 V power system must be carried out by authorized personnel only, with due regard to the applicable installation regulations.**
- **Switch off the power supply before installing the system.**
- **The 21–30 V KNX bus voltage cannot be used as 24 V operating or auxiliary voltage.**
- **Max. relay output: 16 A**

3 Product function

The switch actuators can be used for 4, 8 and 12 channels independent AC/DC loads. The outputs for MAX 16 A can be switched ON or OFF on every output channel and can be switched manually too. The CU-DIN R 4-CH does not require an additional power supply. The CU-DIN R 8-CH and CU-DIN R 12-CH require an additional 24 V DC power supply if all of the channels are frequently operated at the same time, but normal operation is also possible if there is no additional power supply. The following functions can be set individually for each output channel:





- **Channel state response**
- **Channel state after bus voltage failure and recovery**
- **Time function**

Flashing
Staircase light
Delay

- **Scene**

Scene number: 1-64

- **Threshold**

Two threshold values

- **Curtain**

Top/left<->bottom/right

- **Logic**

AND/OR/XOR/GATE

- **Heating control**

PWM

4 Hardware

The technical properties of the ESYLUX KNX/EIB switch actuators are described in the following sections.

4.1 Technical data

Power supply	
• Operating voltage (supplied by the bus)	21–30 V⎓
• Current consumption EIB/KNX (operation)	< 15 mA
• Current consumption EIB/KNX (standby)	< 5 mA
• Power consumption EIB/KNX (operation)	< 450 mW
• Power consumption EIB/KNX (standby)	< 150 mW

Output nominal values			
• Type of device M/R	R 4-CH	R 8-CH	R 12-CH
• Number of contacts	**4**	**8**	**12**
• Rated current	**16A**	**16A**	**16A**
• Power loss per device at max. load	2.7 W	5.4 W	8 W
• Rated voltage	**230V ~**	**230V ~**	**230V ~**

Output switching currents	
• AC operation (cos1 = 0.8) • Fluorescent lighting load • Minimum switching capability	12 A / 230 V 16 A / 230V (300 µF) 0.1 mA / 1 V

DC current switching capability (ohmic load) output life expectancy • Mechanical life • Electrical life (230 V/cos phi = 0.8)	16 A / 12 V DC > 1,000,000 > 100,000		
Output switching delay without additional DC power • Max. delay time of relay per position change (charge time of the capacity)	R 4-CH 400 ms	R 8-CH 400 ms	R 12-CH 400 ms

Note: Note: The device has a voltage (capacity of relay driver) detect function. It remains active and stores the state of the relays in the memory of the device when the voltage goes down to stop level. This function is thereby able to successfully prevent the relay from becoming inactive. When the voltage (capacity of relay driver) goes back up to active level, the state of the relays are recovered from the memory, thereby enabling the relays to become active again. This function is very useful when there is no additional DC power application in the system, and the delay time is approx. 0.4 s on switch state change when the charge of the capacity is not enough.

Output switching delay with additional DC power		
Max. delay time of relay per position change (charge time of the capacity)	R 8-CH 100 ms	R 12-CH 100 ms

Note: in some applications, the relay needs to be switched ON/OFF frequently, and does not allow too much delay time. In such cases it can be connected to an additional 24 V power supply. The max. current required are 24 mA when the relay is actived, and required the standby current is 4 mA. The delay time is approx. 400 ms on switch state change when the applied power is not sufficient.

Connections	
• EIB/KNX	Bus Connection Terminal 0.8 mm Ø, single core
• Load circuits	Screw terminal with slotted head 0.2–4 mm² multi-core 0.4–6 mm² single-core

• Cable shoe	12 mm
• Tightening torque	Max. 0.8 Nm

Operation and display	
• Red LED and EIB/KNX push button all in one	For assignment of the physical address
• Contact position indication	Relay lever

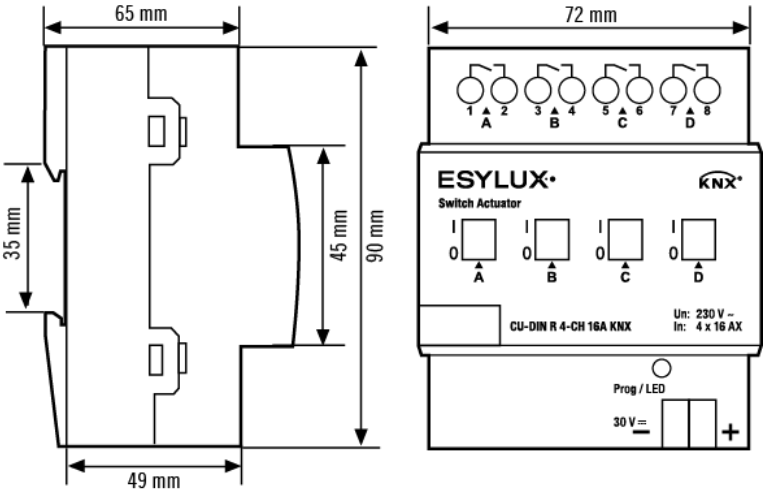
Temperature range	
• Operation • Storage • Transport	0°C – +45°C -40°C – +55°C -25°C – +70°C
Environmental conditions	
• Humidity	Max. 93%, non-condensing

Appearance design			
• Modular	DIN-Rail modular installation		
• Type (M/R)	R 4-CH	R 8-CH	R 12-CH
• Dimensions	90 x W x 65		
• Width W (unit mm)	72	144	216
• Mounting width (1SU=18 mm)	4SU	8SU	12SU
• Mounting depth (unit mm)	65	65	65
• Weight (unit kg)	0.26	0.49	0.72
• Installation	Use 35 mm mounting rail		
• Mounting position	Electric switch box		
• Material and colour	Plastic, white		

CE Mark in accordance with	
• EMC Standard	2004/1008/EC
• LVD Standard	2006/95/EC
• RoHS	2011/65/EU

Note: All loads, at 230 V AC	
Motors	3 KW
Lamps • Incandescent lamp load	 3500 W
Low-volt halogen lamps • Inductive transformer • Electronic transformer • Halogen lamp 230V	 1800 W 2000 W 3500 W
• Mercury-vapour lamp • Uncompensated luminaire • Parallel compensated	2800 W 2800 W
Fluorescent lamp T5/T8 • Uncompensated luminaire • Parallel compensated • DUO lamp	 3500 W 2000 W 2000 W
Dulux lamp • Uncompensated luminaire • Parallel compensated	 1500 W 1500 W
Switching performance (contact) • Max. peak inrush current IP (120 µs) • Max. peak inrush current IP (240 µs) • Max. peak inrush current IP (480 µs) • Max. peak inrush current IP (1000 µs)	 600 A 480 A 300 A 170 A

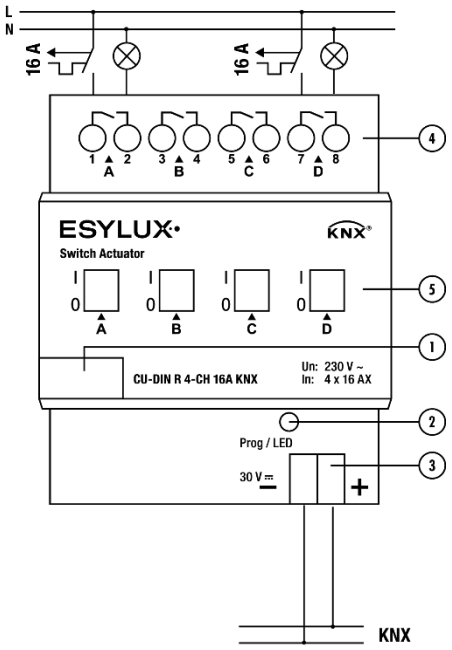
4.2 Dimension drawings



4-CH	8-CH	12-CH
72 mm	144 mm	216 mm

4.3 Wiring diagram

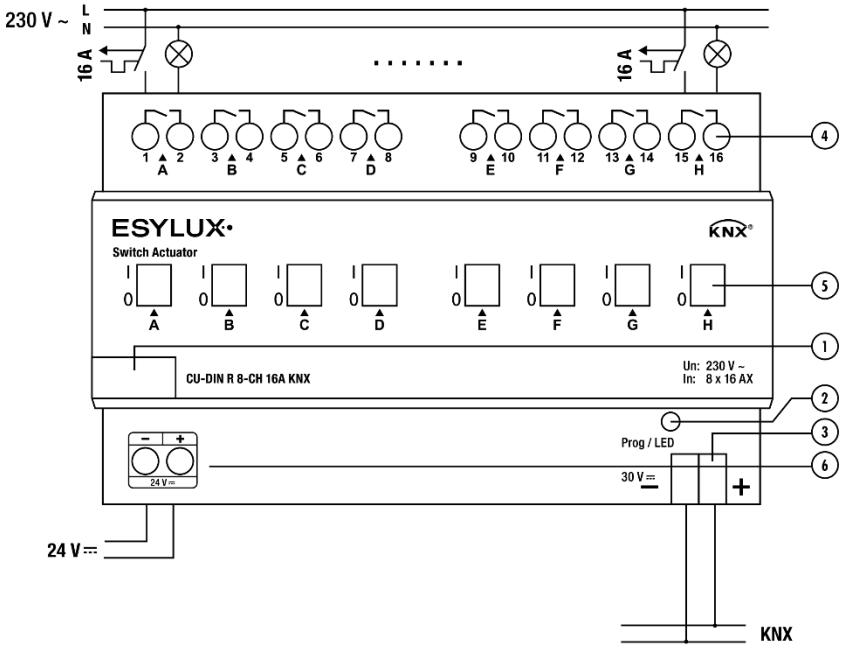
Note: On the input side, the device is to be protected against short circuits with a 16 A circuit breaker.



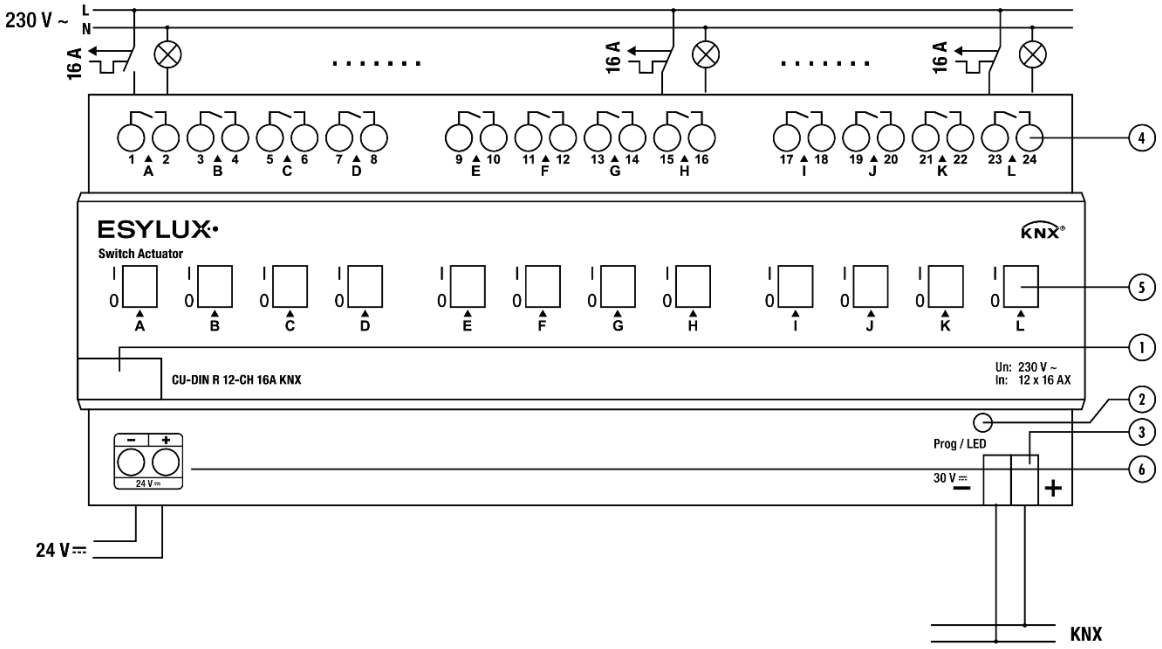
1. Label area
2. Programming button & programming LED
3. KNX/EIB bus connector
4. Terminal for load connection
5. Contact position indication and manual operation

6 Additional power 24 V (max. 24 mA in operation, min. 4 mA in standby).

CU-DIN R 4-CH 16A KNX



CU-DIN R 8-CH 16A KNX



CU-DIN R 12-CH 16A KNX

Note: a) Dimensions of the space to be provided for each switch
b) Dimensions and position of the means for supporting and fixing the switch within this space
c) Minimum clearance between the various parts of the switch and the surrounding parts where fitted
d) Minimum dimensions of ventilation opening, if needed, and their correct arrangement.
e) Protective devices (e.g. fuses, automatic protective devices, etc.) to be connected to the load to avoid overloading

4.4 Maintenance and cautions

- Please read this user manual carefully before operation.
- Do not operate close to interfering devices.
- The site should be ventilated with good cooling environment.
- Take care to damp-proof, quake-proof and dust-proof.
- Avoid rain, other liquids or caustic gas.
- Please contact professional maintenance staff or ESYLUX service centre for repair or fix.
- Remove the dust regularly and do not wipe the unit with volatile liquids like alcohol, gasoline, etc.
- If damaged by damp or liquid, turn off immediately.

- Regularly check the wiring and other related circuits and cables, and replace faulty circuitry when necessary.
- For security, each wiring should be connected to an MCB or fuse
- Installation location should be well-ventilated; pay attention to moisture, shock and dust.

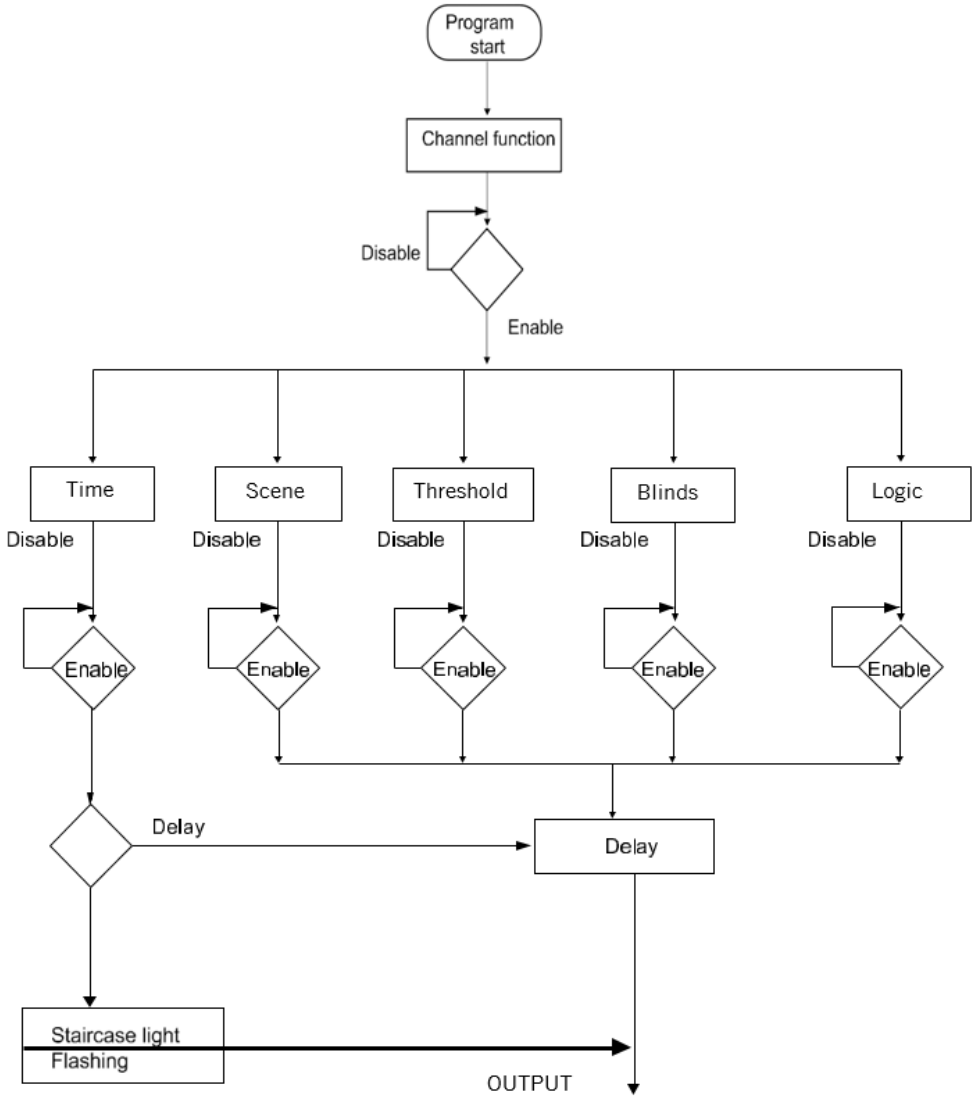
5 Software

The ESYLUX KNX/EIB switch actuator database can be used with ETS3.0F, ETS4 and ETS5 for the programmation. The device types are CU-DIN R 4-CH, CU-DIN R 8-CH and CU-DIN R 12-CH and the database names are:
EC10430282_ CU-DIN R 4-CH 16 A KNX.VD5
EC10430299_ CU-DIN R 8-CH 16 A KNX.VD5
EC10430305_ CU-DIN R 12-CH 16 A KNX.VD5

All parameters and interfaces are described in the following paragraph.

Each channel output of the switch actuators is independent and equal. So, understanding of only one channel output is sufficient. The following paragraph will describe the first channel output in detail.

5.1 Program functions diagram



5.2 Defining object/association/group address

The following table shows the max. number of communication objects, associations and group addresses. The object is assigned to certain functions of the channel output pages. If the functions are activated, the corresponding objects will be available. One or more group addresses can be assigned to an object. The association will connect group addresses to the object.

Type VD5	Max. number of communication objects	Max. number of associations	Max. number of group addresses
CU-DIN R 4-CH 16 A	90	254	254
CU-DIN R 8-CH 16 A	170	254	254
CU-DIN R 12-CH 16 A	250	254	254

Table 1: Overview of the max. number of objects, max. number of associations and max. number of group addresses.

Note: ETS3.0F-> Import “VD3” to “VD5”.
ETS4-> Import “.KNXPROD”.
ETS5

5.3 Function parameter “General”

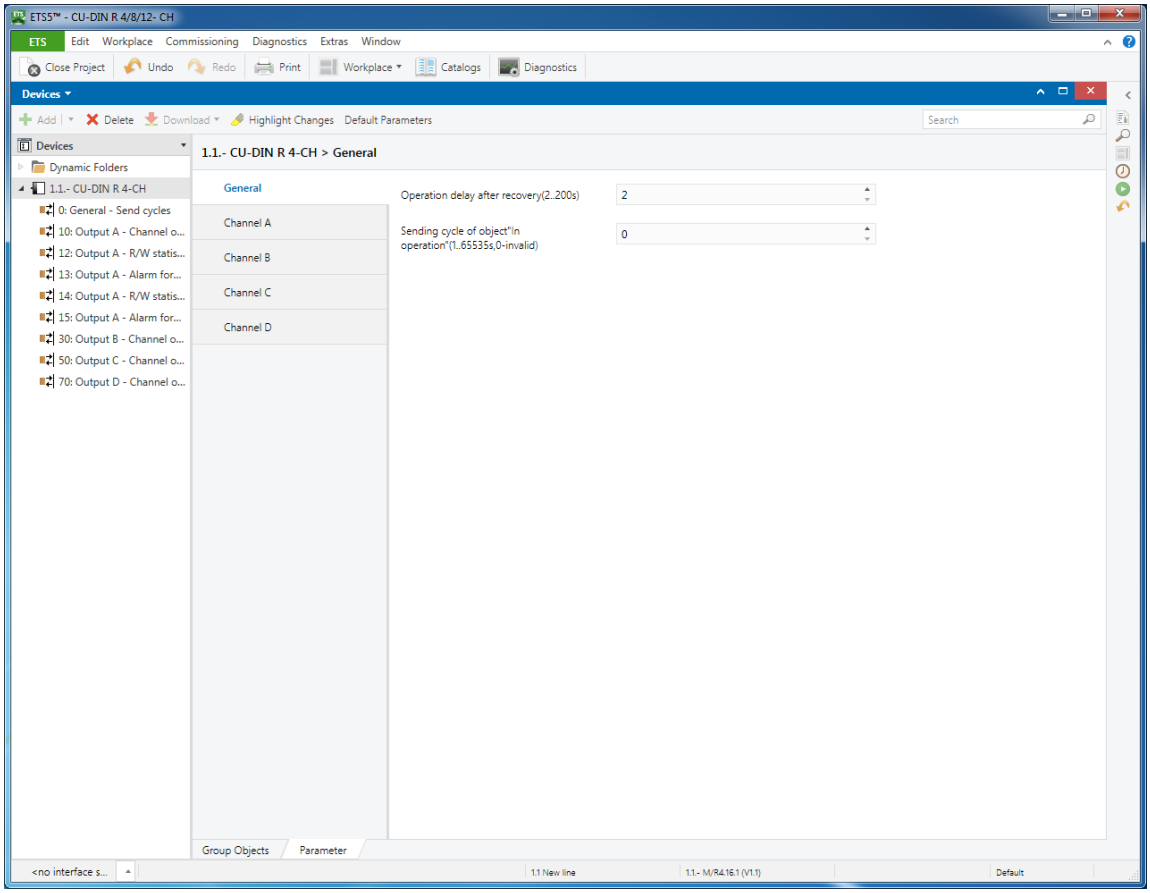


Fig 1: “General” parameters window

In the General parameters window, two parameters can be set:“Switching delay after recovery ” and “Cycle send general telegram”.

- **Operation delay after recovery (2–200 s)**

Can be used for a delay time of 2–200 s after the power is available again. The default value is 2 seconds. The min. value is 2 seconds and the max. value is 200 seconds.
Options: **2-200 s**
After voltage recovery and the adjusted delay-time (2–200 s) is counted down the switch is ready for use. This function is selected by the user.

- **Sending cycle of object “In operation”(1–65,535 s, 0 - invalid)**

The range of the parameter is 0 to 65,535 s. A zero parameter disables the function, other parameters enable this function
Options: **1–65,535 s**

When the parameter is set to non-zero, the device will send telegram data cyclically on timeout. Send the value alternately between 0 and 1.

5.4 Function parameter “Channel A”

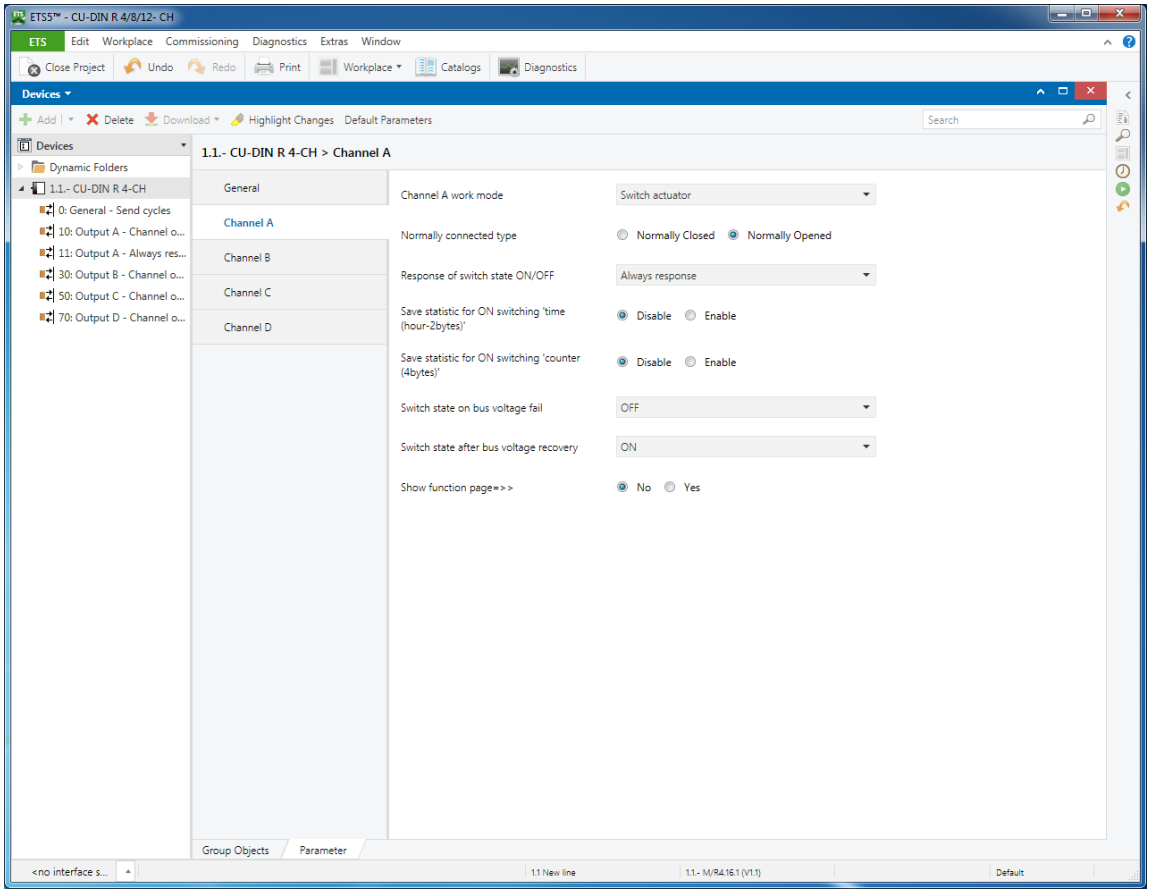


Fig 2: “Channel A” window

In the “Channel A” parameter window, some common functions can be set up. After selecting a function and downloading the database to the device, the device will work in accordance with the selected function.

Note: take channel A as an example; other channels are the same as A.

- **Channel A work mode:**

The functions of Channel A work mode output can be selected with three parameters.

Options: **Switch actuator**
Heating actuator
Inactivated

If **“Inactivated”** is selected, channel A function will be invalid, but it will work in the other two modes.

5.5 Channel mode “Switch actuator”

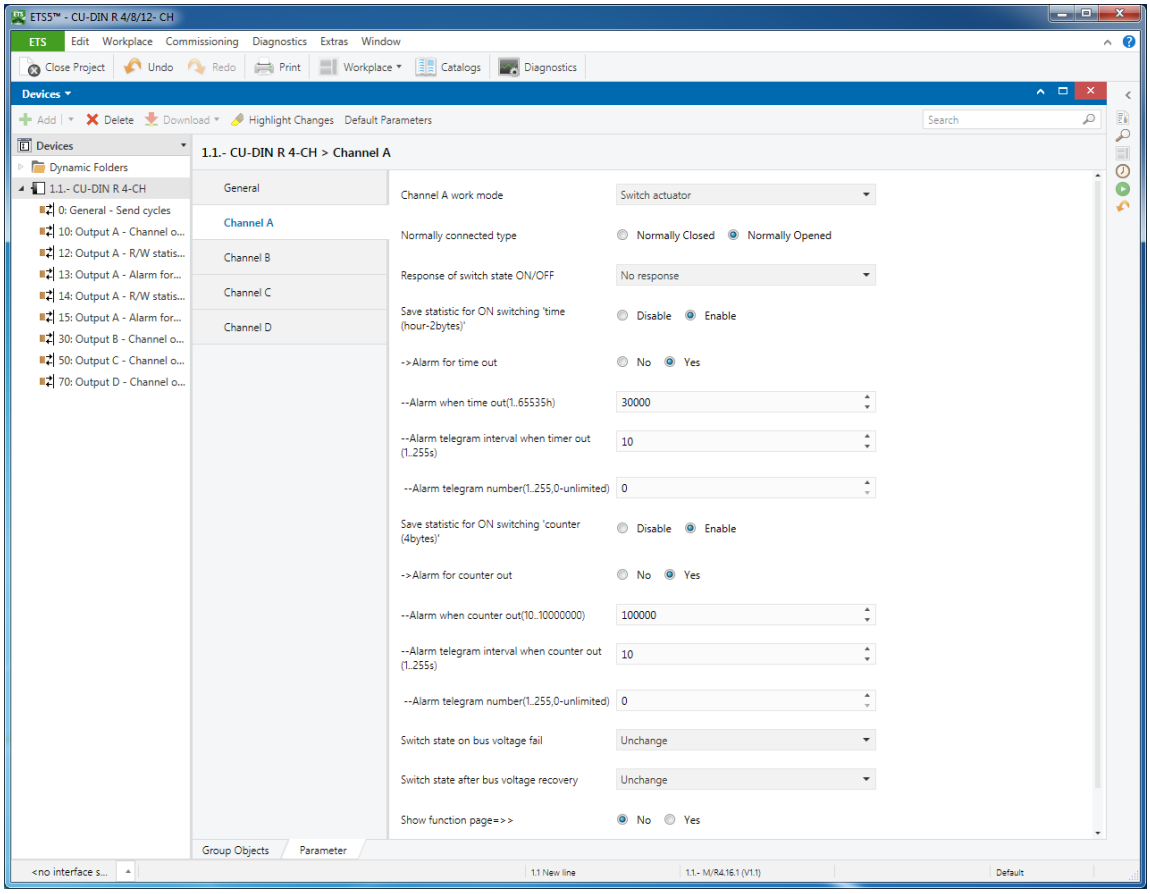


Fig 3: Switch actuator window.
More functions can be set up in this mode; the following section provides a detailed description of the Switch Actuator mode.

- **Normally connected type**

This parameter is the choice of the type of access load
Options: **Normally closed**
Normally opened
Normally closed: Contact in de-energised state is closed.
Normally Opened: Contact in de-energised state is open.

- **Response of switch state ON/OFF**

This parameter provides a choice of the switching state feedback.
Options: **No response**
Always respond
Only after change
No response: No response of the switch state.

Always respond: Always receive a response of the switch state when a channel telegram data is received.
Only after change: Only receive a response of the switch state when channel stateis changed.

- **Save statistic for ON switching "time(hour-2bytes)"**

Statistics for channel ON time, useful for management and monitoring.
Options: **Disable**
Enable
Disable: Disable statistics.
Enable: Enable statistics only for the ON time.

- **Alarm for time out**

Options: **No**
Yes
No: No alarm when time out.
Yes: Alarm.

- **Alarm when time out (1–65,535 h)**

This parameter sets the ON time alarm overflow time.
Options: **1–65,535 h**

- **Alarm telegram interval when time out (1–255 s)**

This parameter sets the ON time overflow alarm interval.
Options: **1–255 s**

- **Alarm telegram number (1–255, 0 – unlimited)**

This parameter sets the number of telegram repetitions for the alarm.
Options: **0–unlimited**
1–255

- **Save statistic for ON switching "counter (4bytes)"**

Statistic channel switch ON counter
Options: **Disable**
Enable
Disable: Disable Statistic ON counter
Enable: Enable Statistic ON counter

- **Alarm for counter out**

Options: **No**
Yes
No: No alarm
Yes: Alarm

- **Alarm when counter out (10–10,000,000)**

This parameter sets the value for the counter (out) alarm.
Options: **10–10,000,000**

- **Alarm telegram interval when counter out (1–255 s)**

This parameter sets the ON-counter overflow interval between alarm telegrams.
Options: **1–255 s**

- **Alarm telegram number (1–255, 0 – unlimited)**

This parameter sets the ON counter overflow alarm number.
Options: **0–unlimited**
1–255

- **The switch state on bus voltage failure**

When the bus voltage fails, this function will give a reaction. Three choices will be available as follows:
Options: **Unchange**
ON
OFF
Unchange: The channels switch position will be unchanged after bus voltage failure.
ON: The channel will switch ON after bus voltage failure
OFF: The channel will switch OFF after bus voltage failure

- **The Operation of switch after bus voltage recovery**

When power is on during bus voltage recovery, this function will be executed. Four choices will be available as follows:
Options: **Unchange**
Recovery
ON
OFF
Unchange: The channel switch position will be unchanged after bus voltage recovery.
Recovery: After bus voltage recovery, the channel switch position will revert to its state at the previous power-down.
ON: The channel position will switch ON after bus voltage recovery.
OFF: The channel position will switch OFF after bus voltage recovery.

- **Show the function page**

If this parameter is activated, the channel function page will be shown. The function page offers Time, Scene, Threshold, Blinds and Logic. For details see the following sections.

5.5.1 Channel function

The following will describe the parameters for setup of the channel.

5.5.2 Channel function parameters

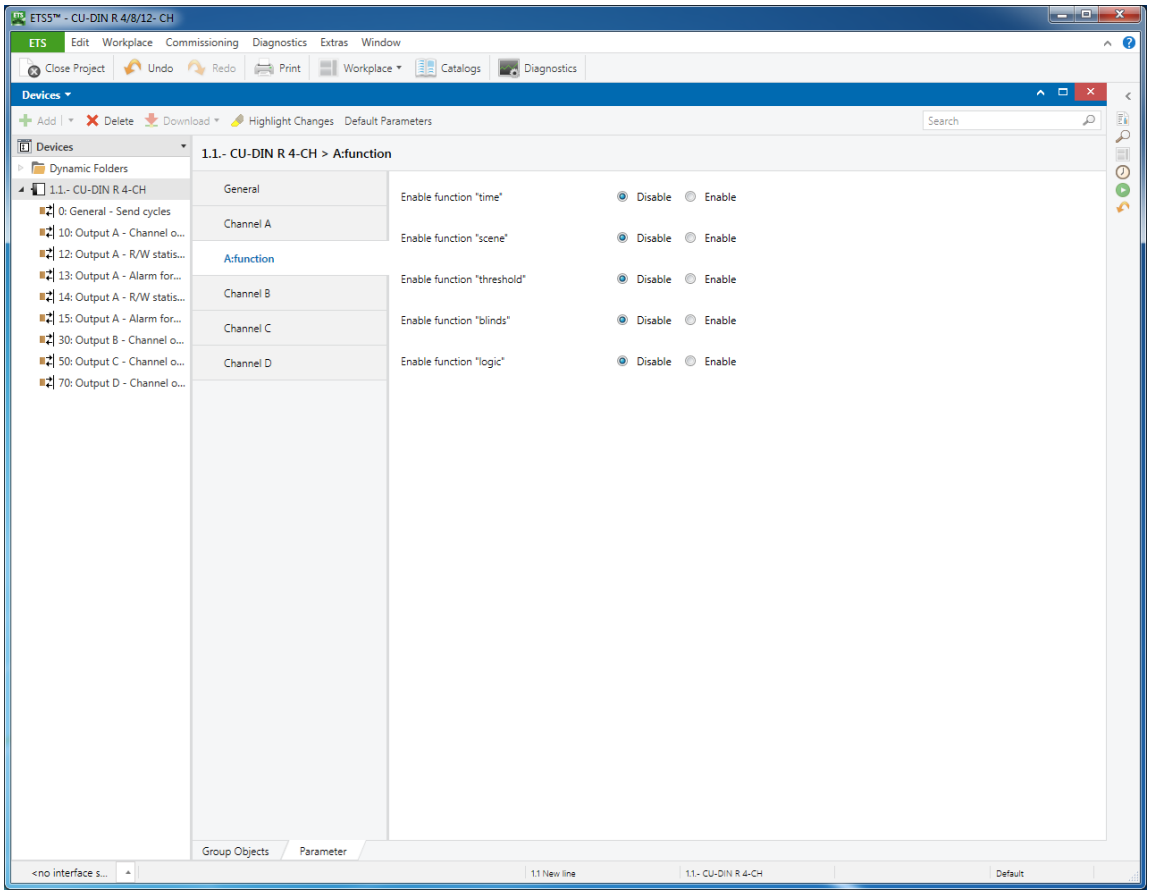


Fig 4: Channel function window

In the factory-defaults each channel function is disabled. When enabled, the channel function will be available.

- **Enable function “time”**

If set to Enable, the time function will be enabled.

Options: **Disable**
Enable

Disable: The time function is disabled.

Enable: The time function is enabled.

- **Enable function "scene"**

If set to Enable, the scene function will be enabled.
Options: **Disable**
Enable
Disable: The scene function is disabled.
Enable: The scene function is enabled.

- **Enable function "threshold"**

If set to Enable, the threshold function will be enabled.
Options: **Disable**
Enable
Disable: The threshold function is disabled.
Enable: The threshold function is enabled.

- **Enable function "blinds"**

If set to Enable, the blinds function will be enabled.
Options: **Disable**
Enable
Disable: The blinds function is disabled.
Enable: The blinds function is enabled.

- **Enable function "logic"**

If set to Enable, the logic function will be enabled.
Options: **Disable**
Enable
Disable: The Logic function is disabled.
Enable: The Logic function is disabled.

5.5.3 Channel function “time”

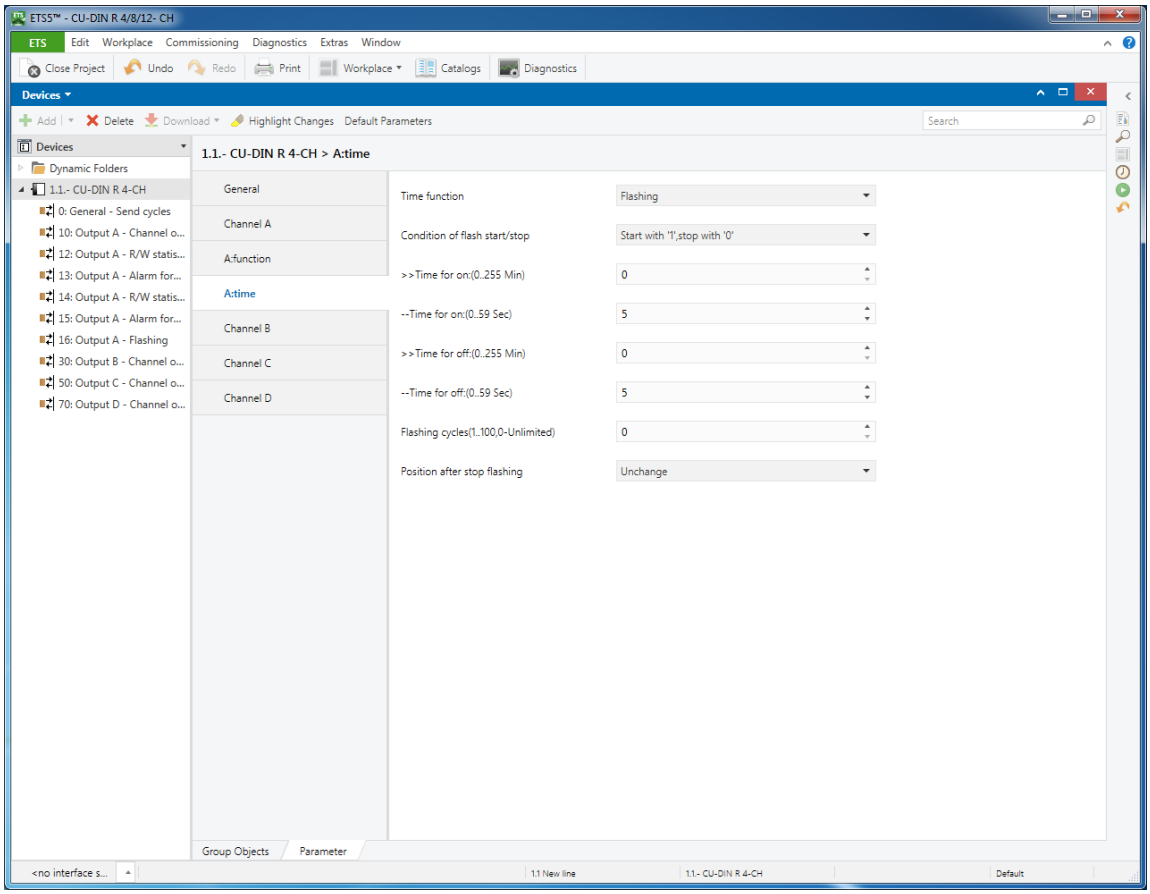


Fig 5: Time function window

The time function includes three work modes as follows:

Options: **Flashing**
Staircase lighting
ON/OFF delay

5.5.3.1 Channel function “Time-flashing”

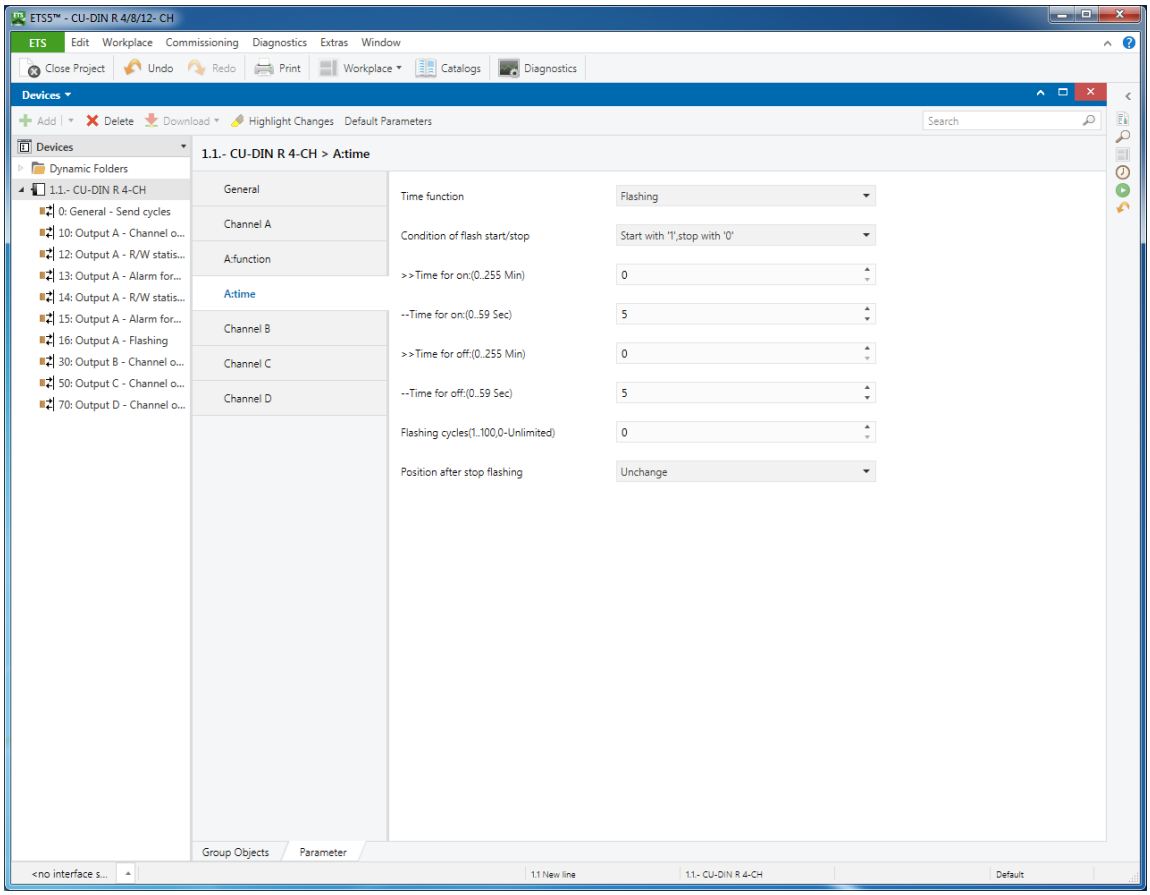


Fig 6: Time-flashing function window

Channel will switch between ON and OFF in this mode.

- **Conditions of flash start/stop**

There are three control modes for this function.

Options: **Start with ON, stop with OFF**
Start with OFF, stop with ON
Always flash, start with ON/OFF

Start with ON, stop with OFF: Start flashing with ON and stop flashing with OFF.
Start with OFF, stop with ON: Start flashing with OFF and stop flashing with ON.
Always flash, start with ON/OFF: Start flashing with ON or OFF.

- **Time for on: (0–255 min)**

Duration in minutes in the ON state.

- **Time for on: (0–59 sec)**

Duration in seconds in the ON state.

- **Time for off: (0–255 min)**

Duration in minutes in the OFF state.

- **Time for off: (0–59 sec)**

Duration in seconds in the OFF state

- **Flashing cycles (1–100, 0 – Unlimited)**

The number of flashing cycles, range between 0 and 100. 0 is unlimited.

- **Position after flashing stops**

There are three options for the switch position after the flashing is stopped by the overflow counter.

Options: **Unchange**
ON
OFF

Unchange: The switch state position is set to Unchange, after the flashing is stopped by the overflow counter.
ON: The switch state position is set to ON, after the flashing is stopped by the overflow counter.
OFF: The switch state position is set to OFF, after the flashing is stopped by the overflow counter.

5.5.3.2 Channel function “Time-staircase lighting”

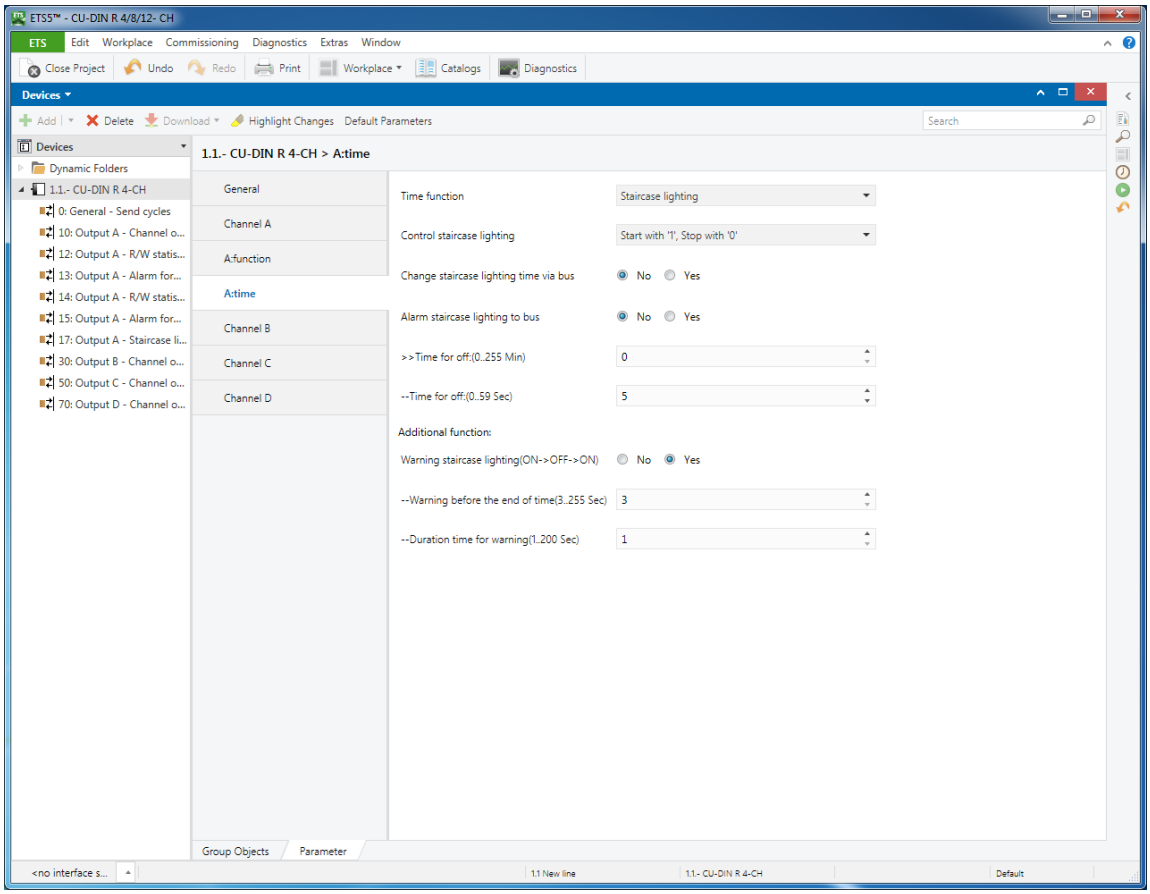


Fig 7: Time-staircase lighting function window

For the staircase application.

- **Control staircase lighting**

Control staircase lighting with three modes.
Options: **Start with ‘1’, stop with ‘0’**
Start with ‘1’, invalid with ‘0’;
Start with ‘1’/‘0’, can't stop

Start with ‘1’, stop with ‘0’: When the received telegram value is ‘1’, the staircase light is switched ON. When the received telegram value is ‘0’ or time out, the staircase light is switched off.
Start with ‘1’, invalid with ‘0’: When the received telegram value is ‘1’, the staircase light is switched ON. Invalid when the telegram value is ‘0’.
Start with ‘1’/‘0’, can't stop: When received telegram value is ‘1’ or ’0’, the staircase light is switched ON.

- **Change staircase lighting time via bus**

Options: **NO**
YES

NO: Can't change staircase lighting delay off time via bus, it can only be set by ETS.
YES: Allow user to change staircase lighting delay off time via bus.

- **Alarm staircase lighting to bus**

Options: **NO**
YES

NO: No alarm.
YES: Alarm staircase light.

- **Time for off: (0–255 min)**

Duration in minutes of the staircase lighting delay off time.

- **Time for off: (0–59 sec)**

Duration in seconds of the staircase lighting delay off time.

- **Warning staircase lighting (ON->OFF->ON)**

Options: **NO**
YES

NO: Do not allow alarm.
YES: Allow alarm.

- **Warning before the end of time (3–255 sec)**

Options: **2–255 seconds**

Note: If the time of the timeout is the same as the staircase light time, the warning function is invalid.

- **Duration time for warning (1–200 sec)**

Options: **1–200 seconds**

Note: If the value of the timeout is the same as the value of the staircase light time, the warning function is invalid.

5.5.3.3 Channel function “Time-ON/OFF delay”

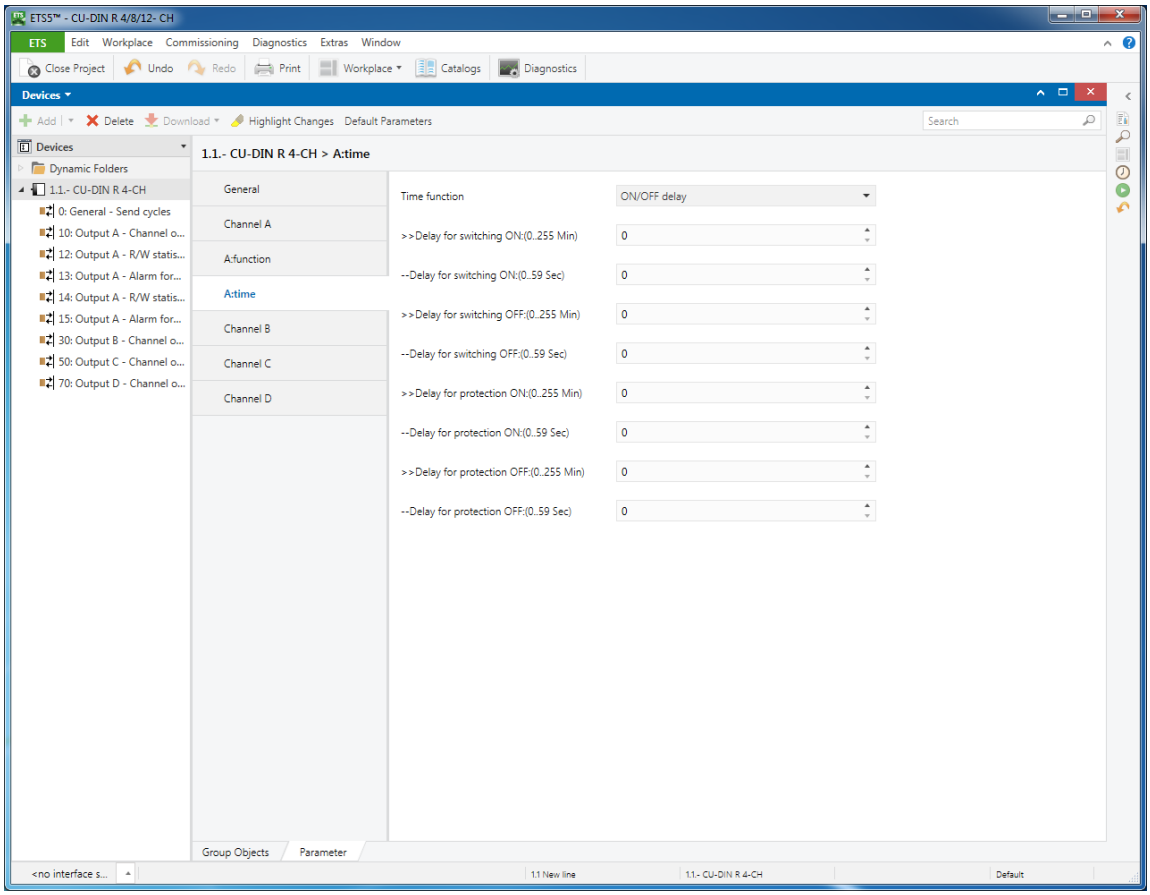


Fig 8: Time-ON/OFF delay function window

This function is including switch ON delay, switch OFF delay, protect ON delay and protect OFF delay. Some special devices are used in a protective operation mode for ON or OFF.

- **Delay for switching ON: (0–255 min)**

Duration in minutes of the ON delay

- **Delay for switching ON: (0–59 sec)**

Duration in seconds of the ON delay.

- **Delay for switching OFF: (0–255 min)**

Duration in minutes of the OFF delay.

- **Delay for switching OFF: (0–59 sec)**

Duration in seconds of the OFF delay.

- **Delay for protection ON: (0–255 min)**

Duration in minutes of the protected ON delay.

- **Delay for protection ON: (0–59 sec)**

Duration in seconds of the protected ON delay.

- **Delay for protection OFF: (0–255 min)**

Duration in minutes of the protected OFF delay.

- **Delay for protection OFF: (0–59 sec)**

Duration in seconds of the protected OFF delay.

Note:

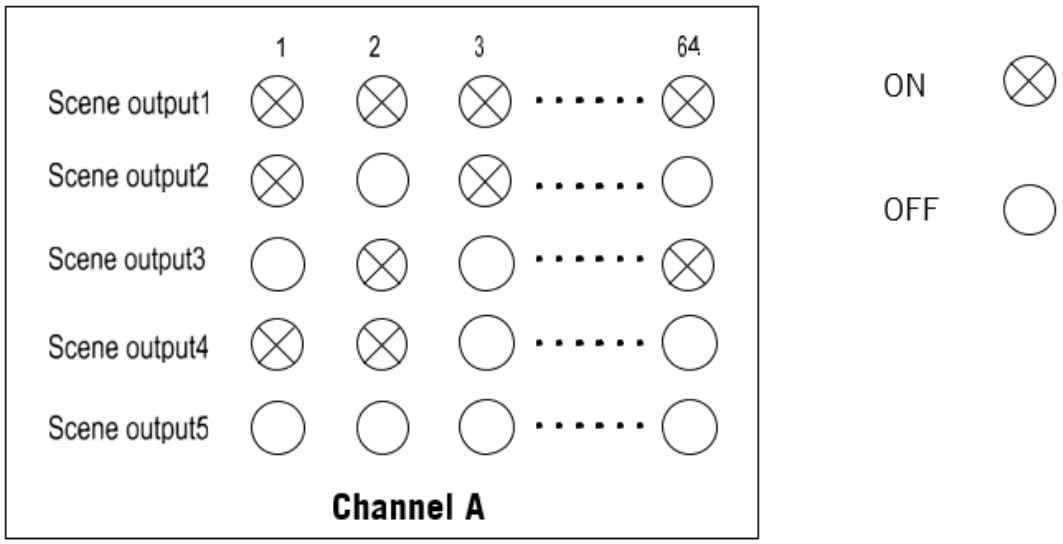
1-Protection ON delay

If the light is turned off and then turned on again immediately, the protection ON delay time will be valid/active.

2-Protection OFF delay

If the light is turned on and then turned off again immediately, the protection OFF delay time will be valid/active.

5.5.4 Channel function “Scene”



10 scenes per channel can be stored in the device.
The number of scenes can be selected between 1 and 64.
Channel B, C and on are the same as channel A.

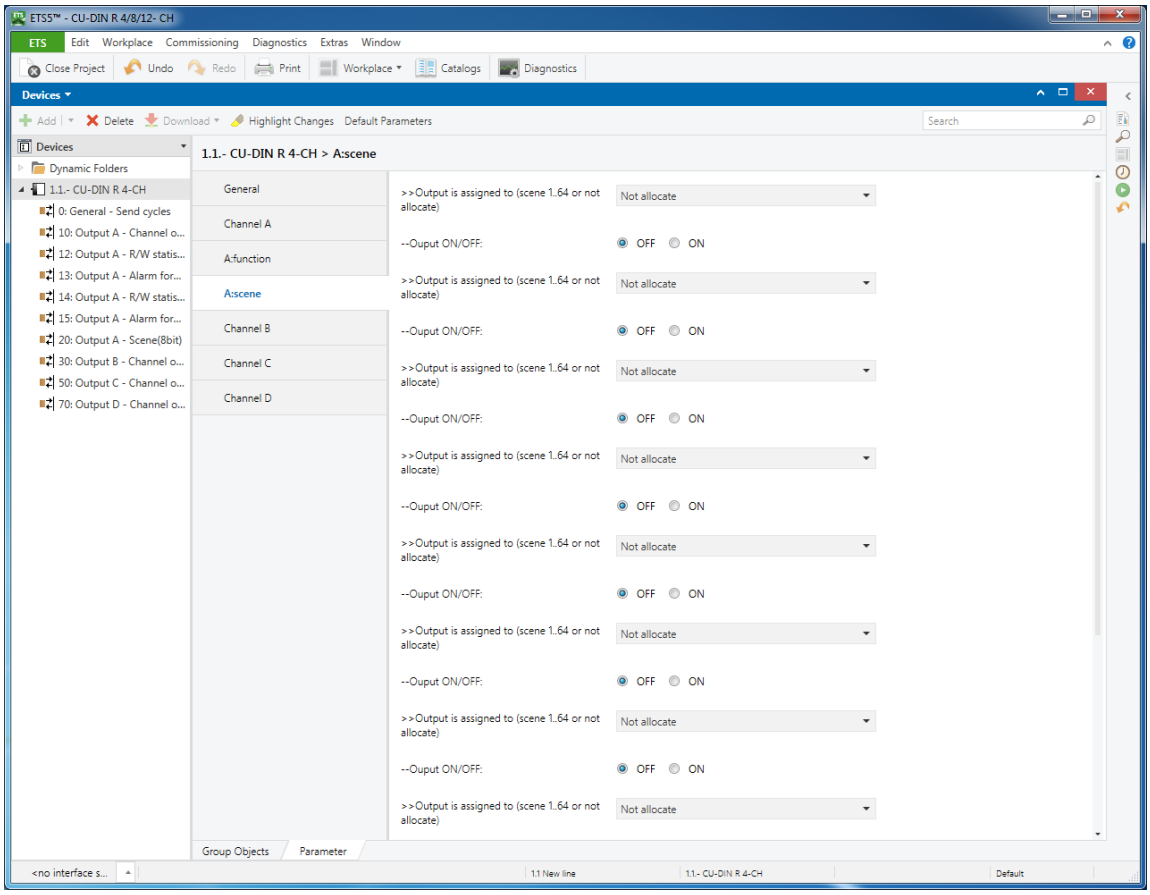


Fig 9: Scene function window

10 scenes can be configured for each channel. Each scene can be set to ON or OFF.

The scene will be activated by receiving a telegram value from the bus. The value of the telegram (bit 0–6) is equal to a scene number. The seventh bit of the telegram must be 0 to start the scene.

The scene is stored by receiving a telegram value from the bus. The value of the telegram (bit 0–6) is equal to a scene number. The scene state is the current switch state. The bit seven value of the telegram must be 1 to store the scene.

- **Output is assigned to scene 1–64 or not allocated**

Options: **Not allocated**
Scene No. 01
Scene No. 02
.....
Scene No. 64

The scene number is between 1 and 64, the value is between 0 and 63 or not allocated.

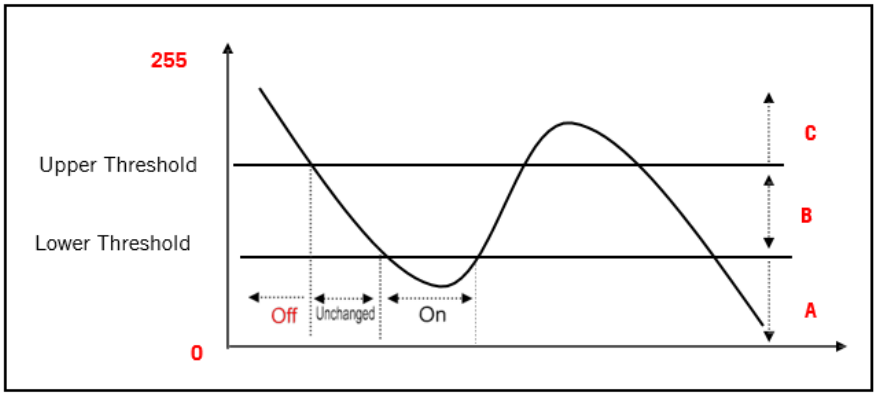
- **Output ON/OFF:**

Channel switch ON or OFF
Options: **ON**
OFF
ON: Channel is switched ON.
OFF: Channel is switched OFF.

5.5.5 Channel function “Threshold”

5.5.5.1 Channel function “1 byte threshold”

There are two threshold values: the upper threshold and lower threshold. They can be set between 0 and 255.



The upper and lower threshold values and the state of ON and OFF can be set by using ETS software.
For example: ETS set A=ON, B=Unchanged, C=OFF.

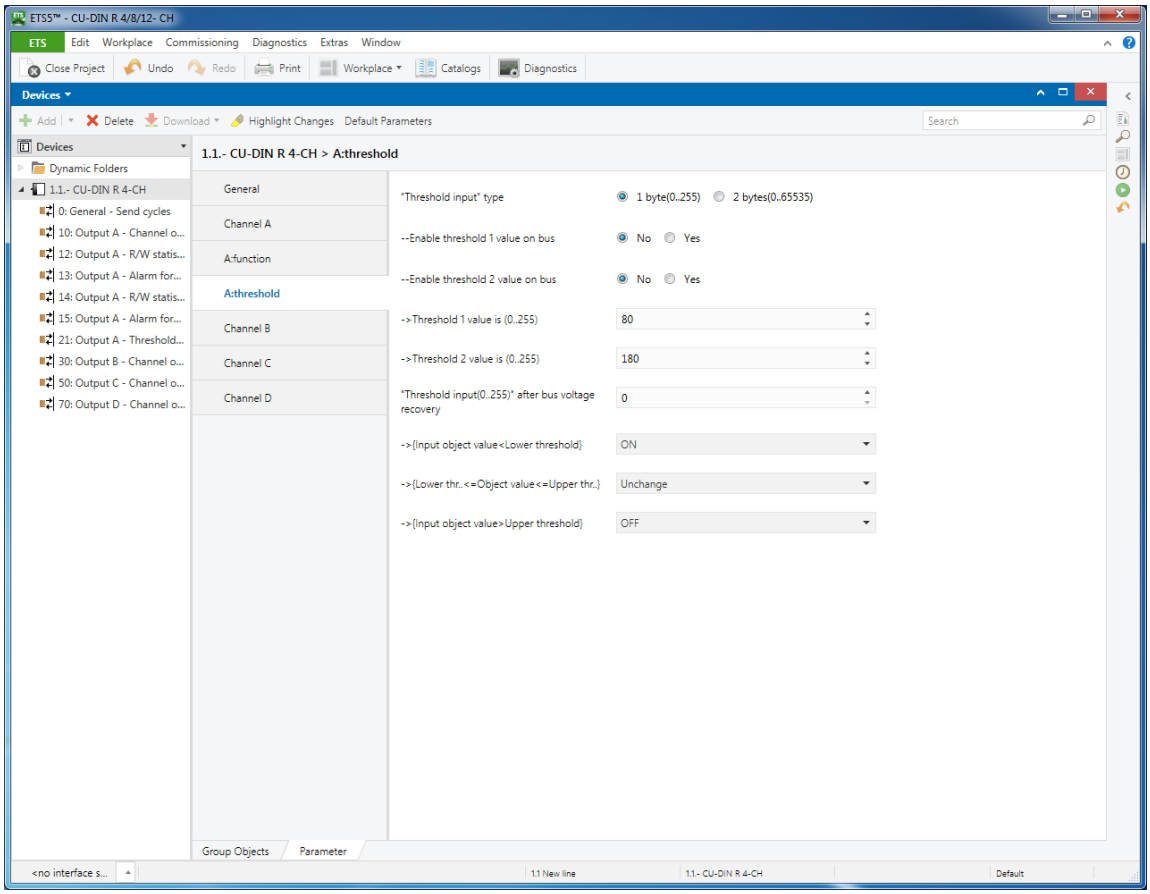


Fig 10: 1 byte threshold type function window

There are two threshold values: threshold 1 and threshold 2. The threshold 1 and threshold 2 can be set between 0 and 255. The switch state can change according to the input threshold value. It has three ways to compare with the value of threshold.

- **Enable changes to threshold 1 over bus:**

Options: **YES**
NO

NO: Do not allow changes to threshold 1 via bus.
YES: Allow changes to threshold 1 via bus.

- **Enable changes to threshold 2 over bus:**

Options: **YES**
NO

NO: Do not allow changes to threshold 2 via bus.
YES: Allow changes to threshold 2 via bus.

- **Threshold 1 value is 0–255**

Set threshold 1 value between 0 and 255. Default is 80
Options: **0–255**

- **Threshold 2 value is 0–255**

Set threshold 2 value between 0 and 255. Default is 180.
Options: **0–255**

- **“Threshold input (0–255)” after bus voltage recovery**

After a bus voltage recovery, the threshold value is set to the set value.
Options: **0–255**

- **{Input object value<lower threshold}**

If the value of the receiving telegram from the bus is lower than the minimum threshold value, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position does not change.
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF.

- **{Lower threshold<=Object value<=Upper threshold}**

If the value of the receiving telegram from the bus is between the lower threshold and upper threshold, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position is not changed.
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF

- **{Input object value>upper threshold}**

If the value of the receiving telegram from the bus is more than the upper threshold value, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position is not changed.
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF

5.5.5.2 Channel function “2 bytes threshold”

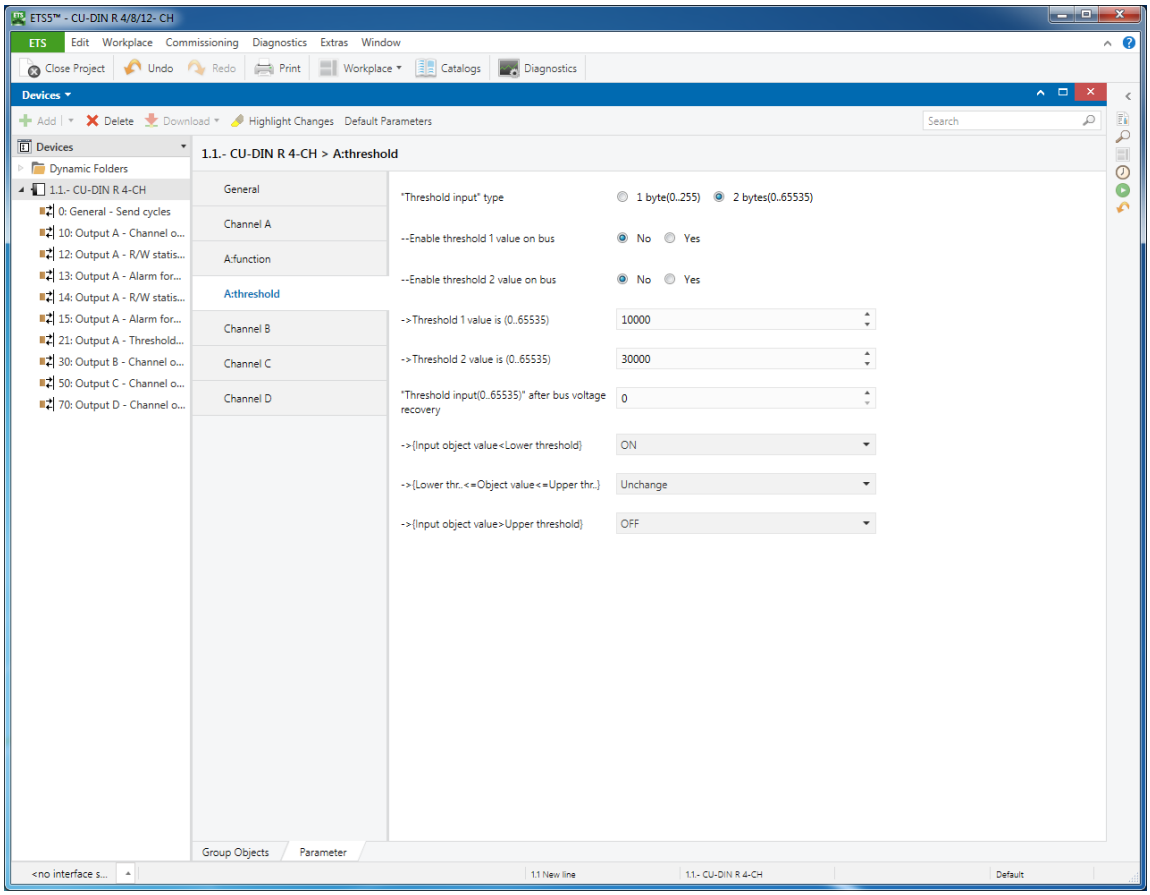


Fig 11: 2 byte threshold type function window

The 2 bytes threshold function is the same as the 1 byte threshold function.

- **Enable changes to threshold 1 over bus:**

Options: **YES**
NO

NO: Do not allow changes to threshold 1 via bus.
YES: Allow changes to threshold 1 via bus.

- **Enable changes to threshold 2 over bus:**

Options: **YES**
NO

NO: Do not allow changes to threshold 2 via bus.
YES: Allow changes to threshold 2 via bus.

- **Threshold 1 value is 0–65,535**

Set threshold 1 value between 0 and 65,535. Default is 80
Options: **0– 65,535**

- **Threshold 2 value is (0–65,535)**

Set threshold 2 value between 0 and 65,535. Default is 180.
Options: **0– 65,535**

- **“Threshold input (0– 65,535)” after bus voltage recovery**

The default input threshold value is set after power on recovery
Options: **0– 65,535**

- **{Input object value<lower threshold}**

If the value of the receiving telegram from the bus is lower than the minimum threshold value, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position does not change
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF.

- **{Lower threshold<=Object value<=Upper threshold}**

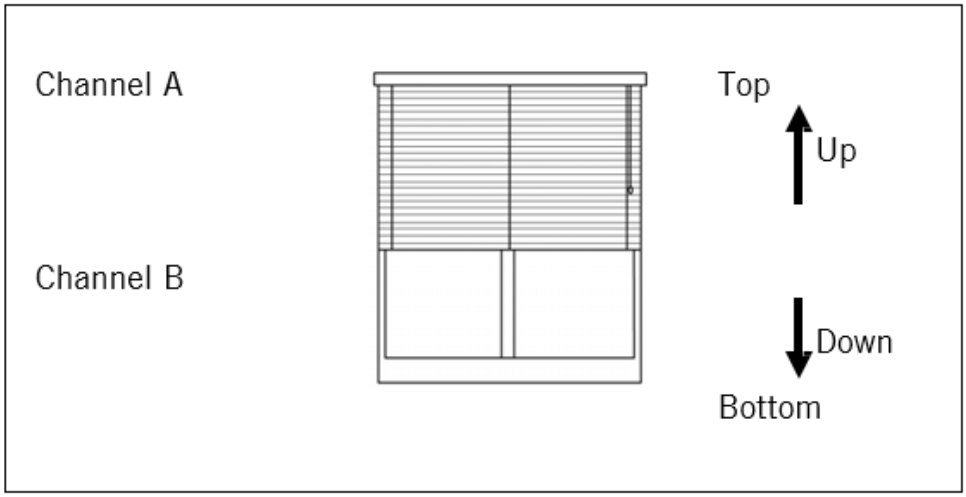
If the value of the receiving telegram from the bus is between the lower threshold and upper threshold, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position is not changed.
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF

- **{Input object value>upper threshold}**

If the value of the receiving telegram from the bus is more than the upper threshold value, the switch will be activated according to the below options (ON or OFF or no action)
Options: **Unchange**
ON
OFF
Unchange: The channel switch position is not changed.
ON: The channel switch position is set to ON.
OFF: The channel switch position is set to OFF

5.5.6 Channel function “Blinds”

The blinds function needs two channels for the driver; the first channel controls blinds UP, and the second channel controls blinds DOWN.



In the above combination. If blinds shall start going up, then channel A switches ON and channel B switches OFF.

If blinds shall start going DOWN, then channel B switches ON and channel A switches OFF.

Upon timeout, channel A and channel B will switch OFF together.

UP/Adjustment:	A→ON
	B→OFF
DOWN/Adjustment:	A→OFF
	B→ON
Stop:	A→OFF
	B→OFF

Other combinations are similar to these.

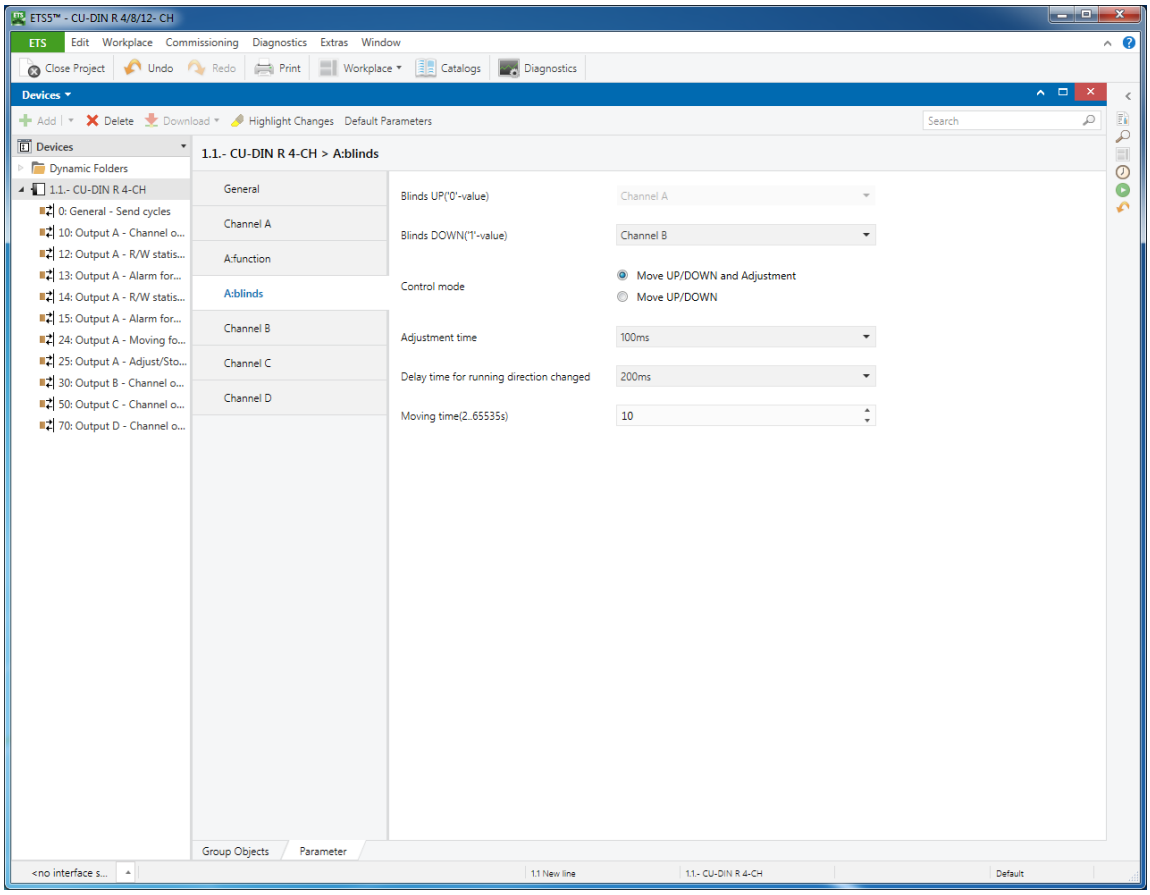


Fig 12: Blinds function window

The blinds function needs the combination of two channels working together. The first channel controls UP/Adjust/Stop of the blinds and the second channel controls DOWN/Adjust/Stop of the blinds. It runs by receiving telegram value '0'/'1' from the bus and stops on timeout or receiving adjustment object telegram value.

- **Blinds UP ('0'-value)**

The first channel for blinds UP or adjustment.
Options: **Channel A (A=current channel)**
This channel output control blinds UP or adjustment.

- **Blinds DOWN ('1'-value)**

Another channel can be selected as a second channel for blinds DOWN. Options: **Channel M (M=another channel)**

For example. If the first channel is channel A and the maximum channel number of the device is 4, only channel B, C or D can be selected for the second channel.

- **Control mode**

Options: **Move UP/DOWN and Adjustment**
Move UP/DOWN

Move UP/DOWN and Adjustment: This selection can control the blinds UP or DOWN and can adjust the blinds too.
Move UP/DOWN: This selection can only control the blinds UP or DOWN

- **Adjustment time**

This parameter sets the blind adjustment time. The maximum time is 5 s, the minimum time is 50 ms

- **Delay time for running direction changed**

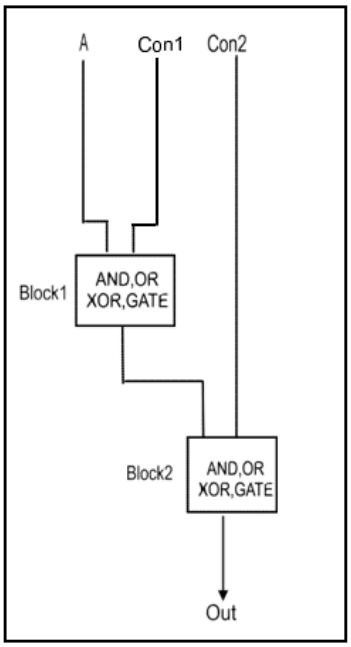
When the running direction changes, there is a delay time of 50–5000 ms. The maximum time is 5 s, the minimum time is 50 ms

- **Moving time (2–65,535 s):**

This parameter sets the total time for the blinds to move. Options: 0– 65,535 s

5.5.7 Channel function “Logic”

Logic function contains two logic blocks. Both logic block 1 and 2 allow selection of “AND”, “OR”, “XOR” or “GATE” logic by user



Note: A=Channel A

Con1=Logic connection 1 **Con2**=Logic connection 2

AND

A	L	R
0	0	0
0	1	0
1	0	0
1	1	1

GATE

A	L	R	
0	1	0	
1	1	1	
1	0	1	Lock
0	0	1	
0	1	0	Unlock
0	0	0	Lock
1	0	0	
1	1	1	Unlock

OR

N	L	R
0	0	0
0	1	1
1	0	1
1	1	1

XOR

N	L	R
0	0	0
0	1	1
1	0	1
1	1	1

Note: A=channel A; L=Logic connection; R=result

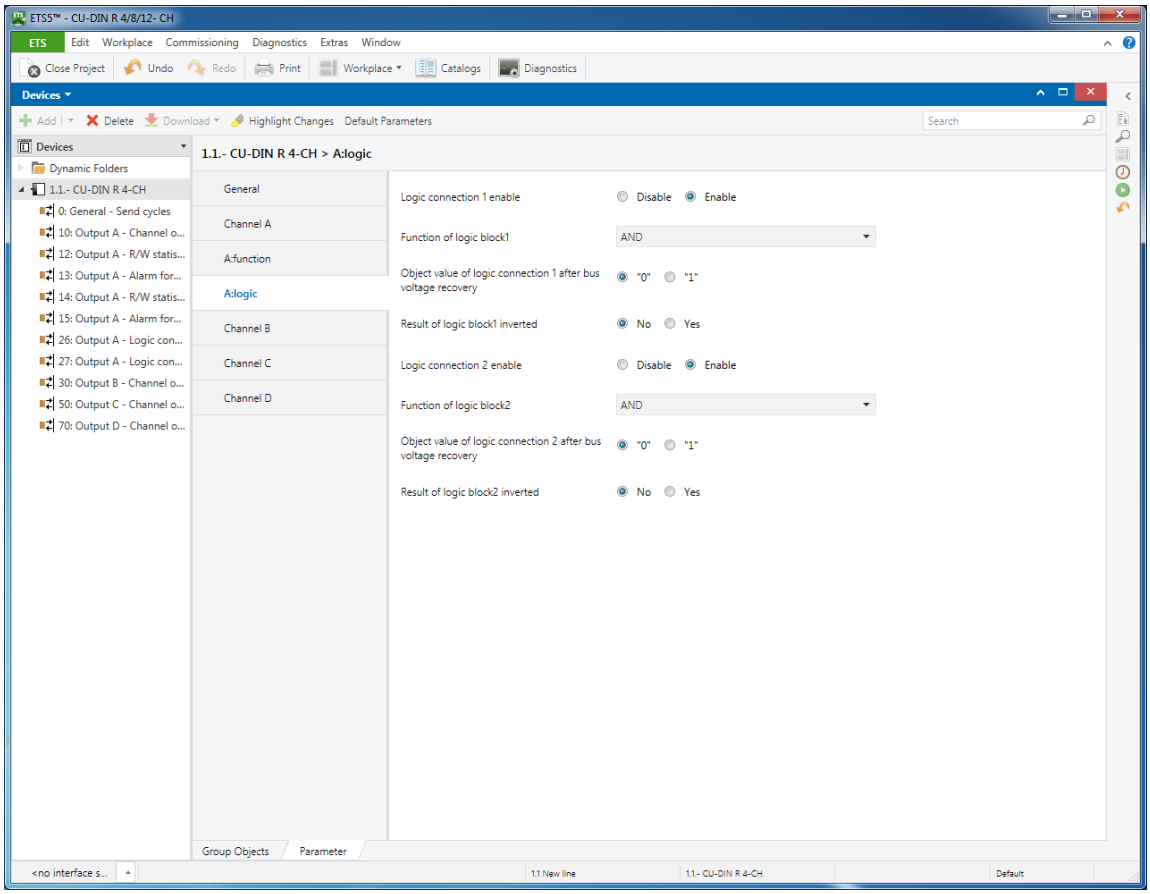
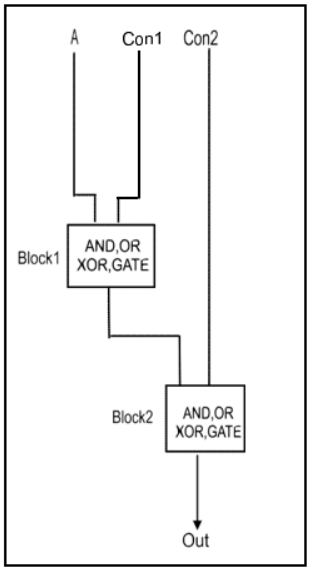


Fig 13: Logic function window

The graphic on the right side describes two logic blocks; logic block 1 has two inputs which are “A” and connect 1 (“Con1”). The output of logic block 1 is connected to the input of logic block 2. Logic block 2 has two inputs which are connect 2 (“Con2”) and output of logic block 1. The output of logic block 2 is “Out”.

The communication objects are “Logic connection 1” and “Logic connection 2”. Both logic block 1 and 2 allow selection of “AND”, “OR”, “XOR” or “GATE” logic by user.



- **Logic connection 1 enable**

When enabling this parameter, the logic connection 1 will be in active state. The logic block 1 will be bypassed when connect 1 (“Con1”) is disabled. That means channel A will connect directly to logic block 2.

Options: **Disable**
Enable

Disable: Disable logic connection 1
Enable: Enable logic connection 1

- **Function of logic block 1**

This logic block allows selection of “AND” or “OR” or “XOR” or “GATE” for Boolean calculation by user.

Options: **AND**
OR
XOR
GATE

AND: Boolean calculation according to “AND” rule.
OR: Boolean calculation according to “OR” rule.
XOR: Boolean calculation according to “XOR” rule.
GATE: “A” passes through logic block 1 to logic block 2 by the value of “Con1” set to 1.
“A” cannot pass through logic block 1 to logic block 2 until the value of “Con1” is set to 1, the output of logic block 1 keeps the same state as before

- **Object value of logic connection 1 after bus voltage recovery**

Set the value of logic connection 1 after bus voltage recovery.

Options: **0**
1

0: Initialisation logic connection 1 value is 0.
1: Initialisation logic connection 1 value is 1.

- **Result of logic block 1 inverted**

When setting this parameter to YES, the output of connection 1 will be inverted.

Options: **NO**
YES

NO: Result of block not inverted.
YES: Result of block inverted.

- **Enable logic connection 2**

Enable this parameter, the logic connection 2 is now in an active state. The logic block 2 will not function by disabling connection 2 (“Con2”); this means the output of logic block 1 passes through “Out” directly.

Options: **Disable**
Enable

Disable: Disable logic connection 2
Enable: Enable logic connection 2

- **Function of logic block 2**

This logic block allows selection of “AND” or “OR” or “XOR” or “GATE” for Boolean calculation by user.
Options: **AND**
OR
XOR
GATE
AND: Boolean calculation according to “AND” rule.
OR: Boolean calculation according to “OR” rule.
XOR: Boolean calculation according to “XOR” rule.
GATE: “Out” Keep state same as before when value of “Con2” set to 0. Output of logic block 1 passes through to “Out” of logic block when value of “Con2” set to 1.

- **Object value of logic connection 2 after bus voltage recovery**

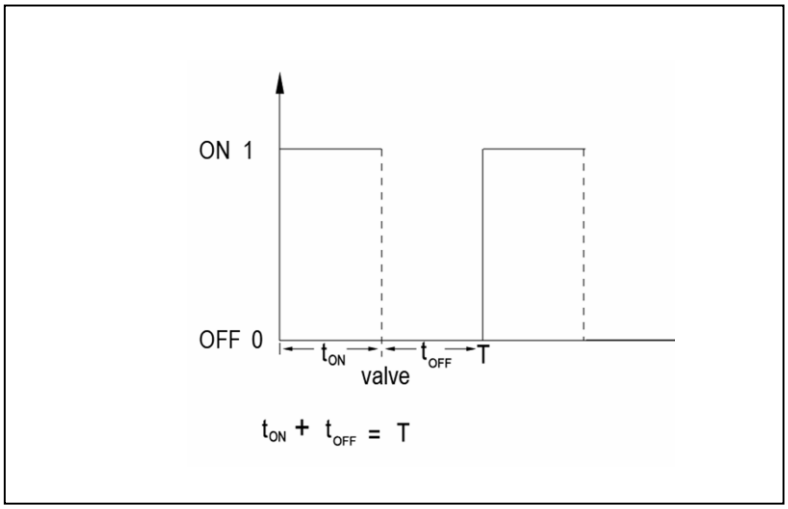
Set the value of logic connection 2 after bus voltage recovery.
Options: **0**
1
0: Initialisation logic connection 2 value is 0.
1: Initialisation logic connection 2 value is 1.

- **Result of logic block 2 inverted**

When setting this parameter to YES, the output of connection 2 will be inverted.
Options: **NO**
YES
NO: Result of block not inverted.
YES: Result of block inverted.

5.6 Channel “Heating actuator”

PWM control
Type of control can be 1 bit or 1 byte.
1 bit PWM (1-start/0-stop): The PWM is switched ON by receiving then telegram value “1”, and stopped by “0”.
1 byte (255-ON/0-OFF/other valve): Always switched ON by the receiving telegram value of “255”, and switched OFF by the receiving telegram value “0”. The PWM runs and pulse width of PWM is set according to the value of the receiving telegram (1 to 254)



1 bit PWM control: **valve=0% (OFF)**
10% (26)
20% (51)
30% (77)
40% (102)
50% (128)
60% (153)
70% (179)
80% (204)
90% (230)
100% (ON)

1 byte PWM control: **valve=x (x: 0–255)**
X=0 (OFF)
1–25 (0%)
26–50 (10%)
51–76 (20%)
77–101 (30%)
102–127 (40%)
128–152 (50%)
153–178 (60%)
179–203 (70%)
204–229 (80%)
230–254 (90%)
255 (ON)

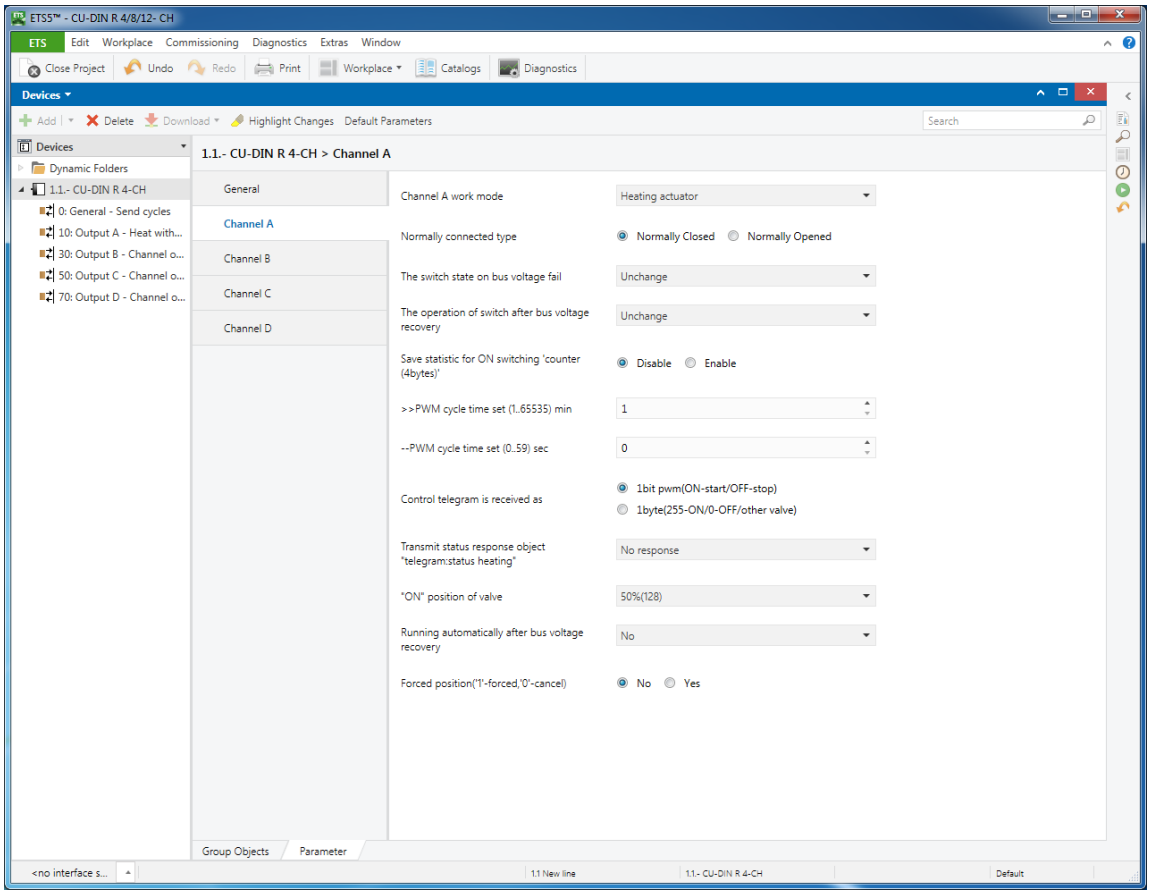


Fig. 14: Heating actuator window

The channel will work in PWM mode. The PWM is controlled by 1 bit or 1 byte.

- **Normally connected type**

Options: **Normally closed**
Normally opened

Normally closed: Normally closed heating.
Normally opened: Normally opened heating.

- **Switch state on bus voltage failure:**

Three options can be set by the user

Options: **Unchange**
ON
OFF

Unchange: The channel switch position is not changed after bus voltage failure.
ON: The channel position will switch ON after bus voltage failure.
OFF: The channel position will switch OFF after bus voltage failure.

- **Operation of switch after bus voltage recovery**

There are four options for bus voltage recovery as below.
Options: **Unchange**
Recovery
ON
OFF
Unchange: The channel switch position will be unchanged after bus voltage recovery.
Recovery: After bus voltage recovery, the channel switch position will revert its state previous to the power-down.
ON: The channel switch position will be set to ON after bus voltage recovery.
OFF: The channel switch position will be set to OFF after bus voltage recovery.

- **Save statistic for ON switching `counter (4bytes)`**

Statistical channel switch ON counter.
Options: **Disable**
Enable
Disable: Disable statistics ON counter.
Enable: Enable statistics ON counter.

- **PWM cycle time set (1–65,535 min)**

Options: **1–65 535 min**
The minimum cycle time is 1 minute.

- **PWM cycle time set (0–59 sec)**

Options: **0–59 s**
This cycle time is set in seconds.

- **Control telegram is received as**

Type of control can be 1 bit or 1 byte.
Options: **1 bit PWM (1-start/0-stop)**
1 byte (255-switch ON/0-switch OFF/0ther valve)
1 bit PWM (1-start/0-stop): The PWM is switched ON when the receiving telegram value is “1”, and stopped by “0”.
1 byte (255-ON/0-OFF/0ther valve): Always switched ON by receiving telegram value “255”, and switched OFF by receiving telegram value “0”. The PWM runs and pulse width of PWM is set according to the value of receiving telegram (1 to 254).

- **Transmit status response object "Telegram: status heating"**

There are three options for the channel state response setting.
Options: **No response**
Always respond
Only after changed

No response: No response of switch state.
Always respond: Always receives a response of the switch state when the channel telegram data is received.
Only after change: Only receives a response of the switch state when the channel state is changed.

- **"ON" position of value**

This parameter will set the valve of the PWM (pulse width).
Options: **0% (OFF)**
10% (26)
20% (51)
30% (77)
40% (102)
50% (128)
60% (153)
70% (179)
80% (204)
90% (230)
100% (ON)

- **Running automatically after bus voltage recovery**

Options: **No**
Defined value
Recovery
No: PWM not running automatic power on.
Defined value: PWM running by set valve.
Recovery: PWM automatic running by last save value.

- **Forced position ('1'-forced,'0'-cancel)**

Options: **No**
Yes
No: No need to force run.
Yes: Forced run needed.

- **Valve of PWM**

The value of PWM for forced position.

- **Forced cancel operation**

Options: **Stop heating**
Return to normally heating value
Stop heating: When forced operation is cancelled, stop heating.
Return to normally heating value: When forced operation is cancelled, return to normal heating value.

6 Communication objects description

This section will introduce the communication objects, the objects will show by enabling the function.

Note: take channel A as an example; other channels are the same as A.

6.1 Objects “General” and “Output A”

Number	Name	Object Function	Descript...	Group Addresses	Length	C	R	W	T	U
0	General	Send cycles			1 bit	C	R	-	T	-
10	Ouput A	Channel output			1 bit	C	-	W	-	U
30	Ouput B	Channel output			1 bit	C	-	W	-	U
50	Ouput C	Channel output			1 bit	C	-	W	-	U
70	Ouput D	Channel output			1 bit	C	-	W	-	U

NO.	Object name	Function	Flags	Data type
0	General	Send cycles	C R T	EIS1 DPT 1.003 1 bit
This communication object is always active and valid. Invert the value and send telegram to bus in next frame. e.g. last telegram value is “1”, next telegram value is “0”				

Table 2. General object

NO	Object name	Function	Flags	Data type
10	Output A	Channel output	C W U	EIS1 DPT 1.001 1 bit
This communication object of the channel output used for switching a channel ON/OFF; the switch output is ON when the object receives the value “1”. The switch output is OFF when the object receives the value “0”.				

Table 3. Output objects

6.2 All objects with channel A

Number	Name	Object Function	Descrip...	Group Add...	Length	C	R	W	T	U
0	General	Send cycles			1 bit	C	R	-	T	-
10	Output A	Channel output			1 bit	C	-	W	-	U
11	Output A	Always response switch status			1 bit	C	R	-	T	-
12	Output A	R/W statistic for time			2 Byte	C	R	W	T	U
13	Output A	Alarm for ON time out			1 bit	C	R	-	T	-
14	Output A	R/W statistic for counter			4 Byte	C	R	W	T	U
15	Output A	Alarm for counter out			1 bit	C	R	-	T	-
17	Output A	Staircase light			1 bit	C	-	W	-	U
18	Output A	Change staircase lighting time			2 Byte	C	-	W	-	U
19	Output A	Alarm staircase lighting			1 bit	C	R	-	T	-
20	Output A	Scene(8bit)			1 Byte	C	-	W	-	U
21	Output A	Threshold input			1 Byte	C	-	W	-	U
22	Output A	Change threshold 1			1 Byte	C	-	W	-	U
23	Output A	Change threshold 2			1 Byte	C	-	W	-	U
24	Output A	Moving for Blinds(0-UP,1-DOWN)			1 bit	C	-	W	-	U
25	Output A	Adjust/Stop for Blinds			1 bit	C	-	W	-	U
26	Output A	Logic connection 1			1 bit	C	-	W	-	U
27	Output A	Logic connection 2			1 bit	C	-	W	-	U

6.2.1 Objects “Response”

NO	Object name	Function	Flags	Data type
11	Output A	No response /Always respond /Only after change	C R T	EIS1 DPT 1.001 1 bit
This communication object uses the channel A response status, if channel status is ON, then the response status value is “1”, otherwise the status value is “0”.				

Table 4. Response

6.2.2 Objects “R/W statistics for time”

NO	Object name	Function	Flags	Data type
12	Output A	Read/write statistics for time	C R W T U	EIS10 DPT 7.007 2 bytes
This communication object is used for statistics ON-time of the channel “A”. This communication object is used for alarm when ON-time out set range.				

Table 5. Read/write statistics ON time (2 byte)

6.2.3 Objects “Alarm for ON timeout”

NO	Object name	Function	Flags	Data type
13	Output A	Alarm for ON time out	C R T	EIS1 DPT 1.005 1 bit
This communication object is used for alarm when ON-time out set range.				

Table 6. Alarm statistics ON time (1 bit)

6.2.4 Objects “R/W statistics counter”

NO	Object name	Function	Flags	Data type
14	Output A	Read/write statistics for counter	C R W T U	DPT 12.001 4 bytes
This communication object is used for statistics ON-time of the channel “A”. It can be read/write via bus by setting this function active.				

Table 7. Read/write statistics ON-counter (4 bytes)

6.2.5 Objects “Alarm for ON counter out”

NO	Object name	Function	Flags	Data type
15	Output A	Alarm for ON counter out	C R T	EIS1 DPT 1.005 1 bit
This communication object is used for alarm when ON counter out of set range.				

Table 8 . Alarm statistics ON counter (1 bit)

6.2.6 Objects “Flashing”

NO	Object name	Function	Flags	Data type
16	Output A	Flashing	C W U	EIS1 DPT 1.001 1 bit
This communication object is used to start or stop the switch flashing.				

Table 9. Flashing

6.2.7 Objects “Staircase light”

NO	Object name	Function	Flags	Data type
17	Output A	Staircase light	C W U	EIS1 DPT 1.001 1 bit
This communication object is used to start or stop the staircase light.				

Table 10. Staircase light

6.2.8 Objects “Change staircase lighting time”

NO	Object name	Function	Flags	Data type
18	Output A	Change staircase lighting time	C W U	EIS10 DPT 7.005 2 byte
This communication object is used to modify the staircase lighting running time. Allow modification to staircase lighting time via bus by setting this function activity.				

Table 11. Change staircase light running time (2 byte)

6.2.9 Objects “Alarm for staircase lighting”

NO	Object name	Function	Flags	Data type
19	Output A	Alarm staircase lighting	C R T	EIS1 DPT 1.005 1 bit
This communication object is used to alarm the staircase lighting. If the function is activated, the staircase lighting will start or stop, the communication object will alarm via bus. Channel “A” is ON alarm “1”, Otherwise alarm is “0’.				

Table 12. Alarm staircase light

6.2.10 Objects “Scene”

NO	Object name	Function	Flags	Data type
20	Output A	Scene (8 bit)	C W U	EIS14 DPT 18.001 1 byte

This communication object is used to control the scene. For scene control see the following explanation:

Telegram value:

C	R	N	N	N	N	N	N

C: 0-Call scene
1-Store scene (If the scene is allocated and the scene is the current switch state)
R: Reserved
N: Scene No. (bin: 000000–111111=No. 1–64)

Example: Hexadecimal

00h------call scene 1 (If scene is allocated)
01h------call scene 2 (If scene is allocated)
3Fh------call scene 64 (If scene is allocated)

80h------store scene 1 (If scene is allocated)
81h------store scene 2 (If scene is allocated) BFh------store scene 64 (If scene is allocated).

Table 13. Scene (8 bits)

6.2.11 Objects “Threshold”

NO	Object name	Function	Flags	Data type
21	Output A	Threshold input	C W U	EIS14 DPT 5.004 1 byte EIS10 DPT 7.001 2 bytes

If this communication object is activated, compare the threshold input value from bus with threshold 1 and threshold 2, and calculate the status of the switch according to the setting of database.

22	Output A	Change threshold 1	C W U	EIS14 DPT 5.004 1 byte EIS10 DPT 7.001 2 bytes
Change threshold 1 value via bus.				
23	Output A	Change threshold 2	C W U	EIS14 DPT 5.004 1 byte EIS10 DPT 7.001 2 bytes
Change threshold 2 value via bus.				

Table 14. Threshold.

6.2.12 Objects “Blinds”

NO	Object name	Function	Flags	Data type
24	Output A	Moving for Blinds (0-UP,1-DOWN)	C W U	EIS1 DPT 1.008 1 bit
This communication object controls blind movement UP/DOWN. The blinds move UP/DOWN. The blinds move UP/DOWN or stop by the value of the bus telegram received or stop until timeout.				
25	Output A	Adjust/Stop for Blinds	C W U	EIS1 DPT 1.007 1 bit
This communication object controls blind adjustment or stopping. If the blinds are moving, then receiving ‘1’ or ‘0’ will stop them moving. Otherwise adjust the blinds.				

Table 15. Blinds

6.2.13 Objects “Logic”

NO	Object name	Function	Flags	Data type
26	Output A	Logic connection 1	C W U	EIS1 DPT 1.002 1 bit
If this function has been activated, this communication object will show and the logic function is valid. The logic functions include: AND, OR, XOR and GATE.				
27	Output A	Logic connection 2	C W U	EIS1 DPT 1.002 1 bit
If this function has been activated, this communication object will show and the logic function is valid. The logic functions include: AND, OR, XOR and GATE.				

Table 16. Logic

6.2.14 Objects “Heating”

Number	Name	Object Function	Descrip...	Group Addr...	Length	C	R	W	T	U
0	General	Send cycles			1 bit	C	R	-	T	-
10	Output A	Heat with 1bit control			1 bit	C	-	W	-	U
11	Output A	Always response switch status			1 bit	C	R	-	T	-
12	Output A	Forced position			1 bit	C	-	W	-	U
14	Output A	R/W statistic for counter			4 Byte	C	R	W	T	U
15	Output A	Alarm for counter out			1 bit	C	R	-	T	-

NO	Object name	Function	Flags	Data type
10	Output A	Heat with 1 bit control	C W U	EIS1 DPT 1.001 1 bit
If the heating actuator is selected this communication object is available. Start PWM by receiving telegram “1”, stop PWM by receiving telegram “0” , start running automatically when power on, and set by ETS.				
10	Output A	Heat with 1 byte control	C W U	EIS14 DPT 5.004 1 byte
If “heat with byte control” is selected, this communication object is valid. Can change value of PWM by receiving 1 byte data. Output ON if receiving value is 255, output OFF if receiving value is 0, otherwise output PWM according to the receiving value of telegram from bus.				

Table 17. Heating actuator

6.2.15 Objects “Forced position”

NO	Object name	Function	Flags	Data type
12	Output A	Forced position	C R T	EIS1 DPT 1.001 1 bit
This communication object is used to force PWM operation. The value of PWM can set in ETS.				

Table 18. Forced position

7 Product disposal

This device must not be disposed of as unsorted household waste. Used devices must be disposed of correctly. Contact your local town council for more information.

8 ESYLUX manufacturer´s guarantee

ESYLUX products are tested in accordance with applicable regulations and manufactured with the utmost care. The guarantor, ESYLUX Deutschland GmbH, Postfach 1840, D-22908 Ahrensburg, Germany (for Germany) or the relevant ESYLUX distributor in your country (visit www.esylux.com for a complete overview) provides a guarantee against manufacturing/material defects in ESYLUX devices for a period of three years from the date of manufacture. This guarantee is independent of your legal rights with respect to the seller of the device.
The guarantee does not apply to natural wear and tear, changes/interference caused by environmental factors or damage in transit, nor to damage caused as a result of failure to follow the user or maintenance instructions and/or as a result of improper installation. Any illuminants or batteries supplied with the device are not covered by the guarantee.
The guarantee can only be honoured if the device is sent back with the invoice/receipt, unchanged, packed and with sufficient postage to the guarantor, along with a brief description of the fault, as soon as a defect has been identified. If the guarantee claim proves justified, the guarantor will, within a reasonable period, either repair the device or replace it. The guarantee does not cover further claims; in particular, the guarantor will not be liable for damages resulting from the device’s defectiveness. If the claim is unfounded (e.g.

because the guarantee has expired or the fault is not covered by the guarantee), then the guarantor may attempt to repair the device for you for a fee, keeping costs to a minimum.