KNX Input Module

Reference Manual

KNX Input Module 20 GANG DRY-CONTACT IO100	WRKT4000E5NC
KNX Input Module 20/8 GANG DRY-CONTACT/230V IO101	WRKT4001E5NC

V 1.0

Panasonic

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1 List of Abbreviations

Abbreviation	Description
AF	Auxiliary function
DPT	Data point type
ETS	Engineering tool software
Object	Object
KNX Communication Flags	
C	Communication
R	Read
W	Write
T	Transmit
U	Update

2 Product Description

2.1 General Information

The KNX Input Module is used to connect the conventional binary sensors (e.g., switches, push buttons, presence detectors, etc.) to the KNX bus. The device can be programmed to control lights, blinds, shutters, HVAC systems etc. according to an input status. The status of an input signal is displayed on the device using LED. The input signals can be overridden manually using the manual operation buttons of the device. Many complex configurations and creative scenarios can be done thanks to the powerful auxiliary functions.
The KNX Input Module has a voltage output port can be used to supply one of the supported devices/sensors (e.g., Panasonic card holder).
The device can be mounted on DIN rail and it is supplied with power via the KNX bus voltage.

2.2 Main Features

- LEDs on the front of the device to indicate the signal status of the inputs.
- Manual operation buttons to simulate and override the status of the inputs.
- 20 x Dry-contact inputs.
- 8 x 10-230V AC/DC inputs (Only in IO101).
- 4 x virtual inputs.
- Vout port can be used to supply an external device with 5V up to 75 mA.
- Switching and dimming lighting with one or two inputs.
- Controlling blinds and shutters with one or two inputs.
- Calling and saving scenes.
- Sending up to 3 values of any type (percentage - HVAC mode – temperature - 1, 2 or 4-byte values etc.).
- Distinction between short and long presses - single and double presses of a connected push button.
- Inputs signals can be monitored, delayed, locked, sent to the bus and simulated via an object.
- 32 auxiliary functions. The type of each function can be selected from 14 different types (Sequencer, Counter, Scene actuator, Filter, Converter, Logic gate, Presence detector controller, Staircase controller …). The inputs of some of these functions can be assigned to be internal inputs or external objects.

2.3 Product Versions

Product Features	WRKT4000E5NC	WRKT4001E5NC
Dry Contact Inputs	20	20
10-230V AC/DC Inputs	-	8
Virtual Inputs	4	4
Auxiliary Functions (v2.0)	32	32

2.4 Technical Information

Power	
Operating voltage	DC 21-32 V (from KNX bus)
Maximum current consumption - Vout disabled	20mA from KNX bus
Maximum current consumption - Vout enabled	40mA from KNX bus
Environmental conditions	
Ambient temperature	-5 C …+45 C
Storage temperature	-10 C … +55 C
Ambient humidity	5…93% (non-condensing)
Housing	
Dimensions (HxWxD)	90mm x 71.8mm x 67.9mm
Mounting (IEC60715)	35 mm top-hat rail (TH35)
Mounting width	DIN rail 72mm (4 modules)
KNX bus connection	KNX connector (243-211 Wago)
Weight	For IO100: 136,75 gr For IO101: 209,45 gr
10-230V input connector (only IO 101)	16 x screw terminals
Dry-contact input connector	5 x 5 pin 3.81mm pluggable terminals
Electrical safety	
Protection type (IEC60529)	IP 20
Pollution degree (IEC60664)	2
Protection class (IEC61140)	II
Overvoltage category (IEC60664)	III
Standards	
EMC, LVD, KNX	TS EN 50428, TS EN 60669-2-1, EN 50090

Dry contact inputs	
Scanning voltage	3.3V
Scanning current	10uA
Scanning current at switch on	400uA
Maximum cable length	100 meters
Minimum cable cross section	1mm2

Vout	
Output voltage	5V ± 10%
Maximum current	75mA
Maximum cable length	100 meters
Minimum cable cross section	1mm2

10-230V AC/DC inputs	
Permissible voltage range	10-230V AC/DC
Maximum input current	1mA
Signal level for 0 signal	0...3 V AC/DC
Signal level for 1 signal	8...230 V AC/DC
Maximum cable length	100 meters
Minimum cable cross section	1mm2

2.5 Dimensional drawings

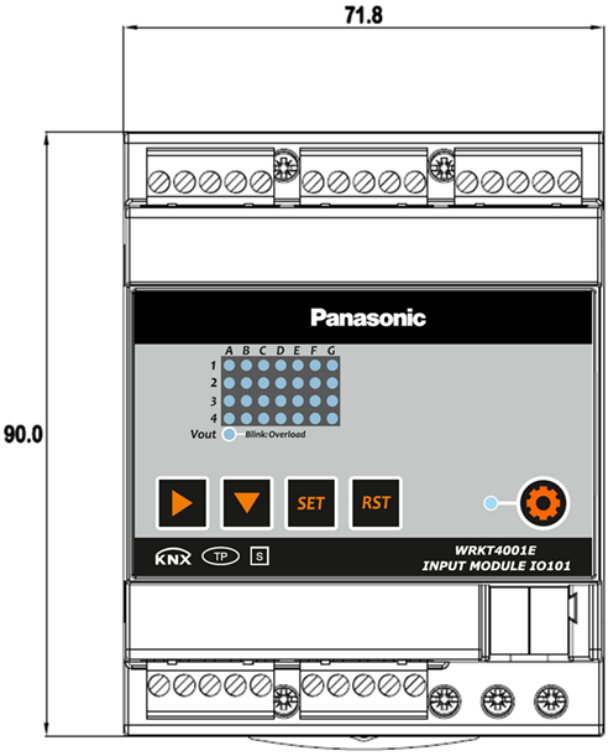


Figure 1 Top view of the KNX Input Module

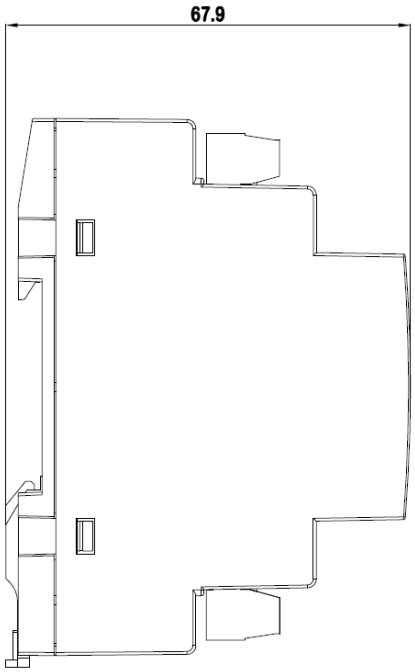


Figure 2 Side view of the KNX Input Module

2.6 Connection

2.6.1 Dry-contacts Connection

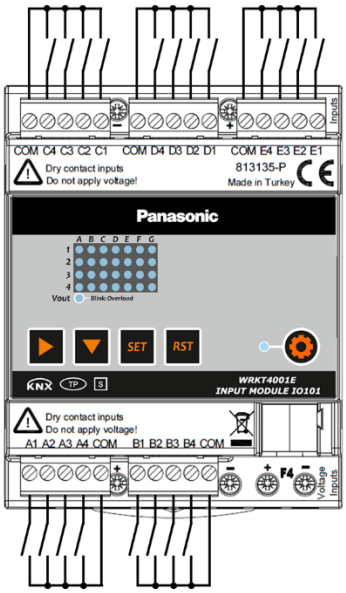


Figure 3 Dry-contacts connection

⚠ Don’t apply an external voltage to dry contact inputs. Applying an external voltage damages the device.

⚠ COM terminals are internally interconnected to each other.

2.6.2 10-230V AC Connection

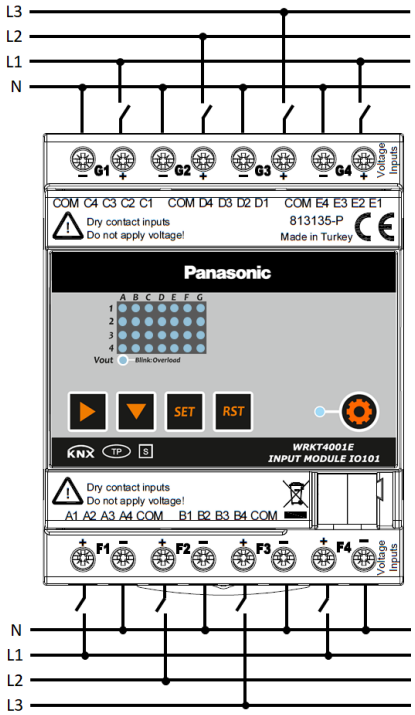


Figure 4 10-230V AC connection

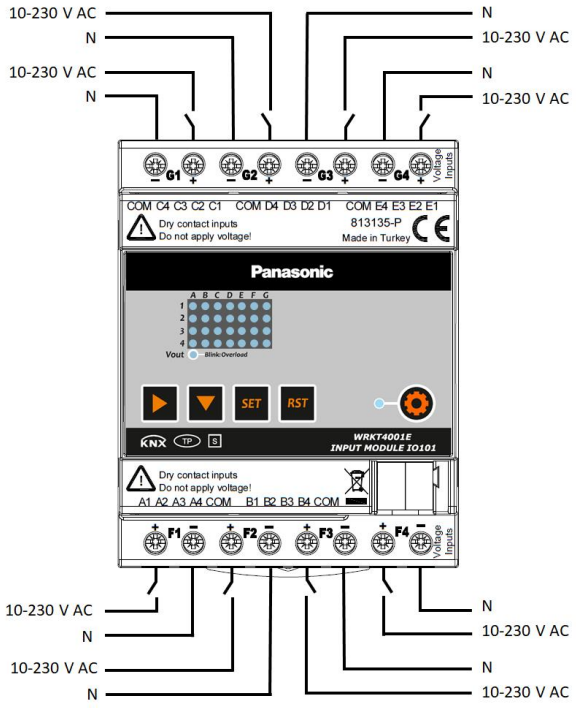


Figure 5 10-230V AC connection

2.6.3 10-230V DC Connection

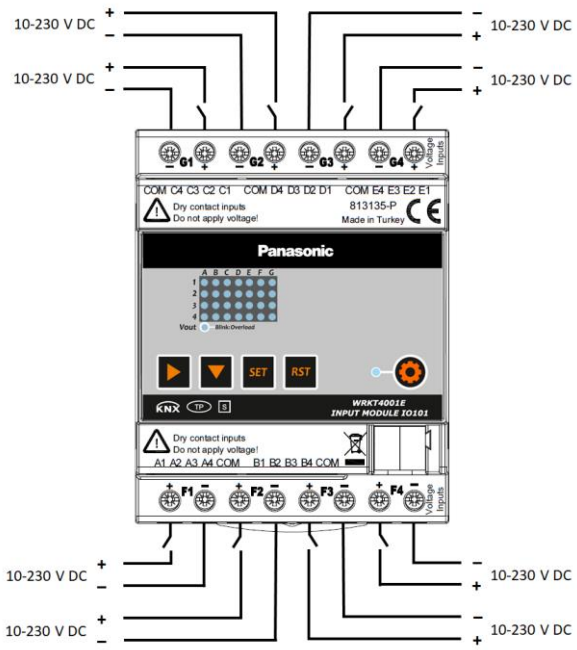


Figure 6 10-230V DC connection

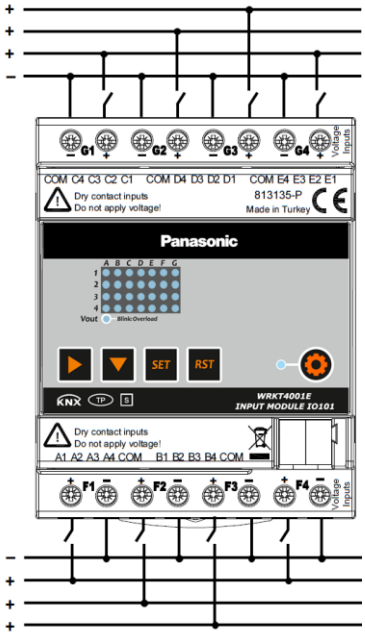


Figure 7 10-230V DC connection

⚠ Correct polarity must be observed when a DC voltage is applied on the 10-230V AC/DC inputs. The input status cannot be read if a wrong connection is made.

2.6.4 Vout Connection

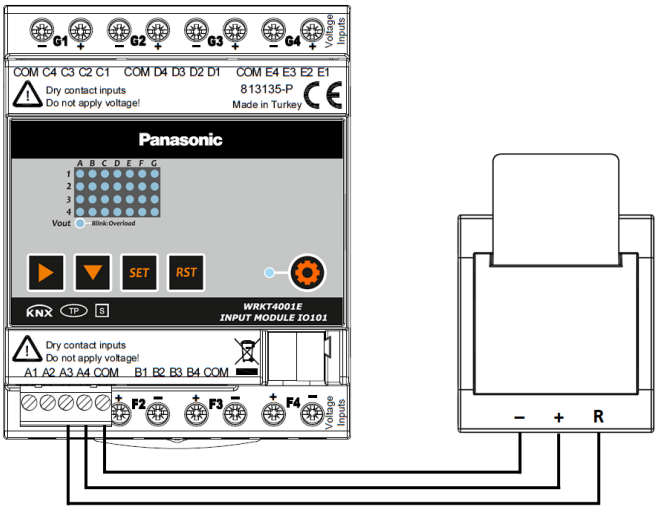


Figure 8 Vout connection

⚠ Only supported devices are permitted to be connected to Vout port. In case of connecting a not supported device, the KNX Input Module may be damaged.
Supported devices:

- Panasonic Energy Saver Card Reader 13.56 MHz MP (Wxxx0580)
- Panasonic Energy Saver Card Reader SW (Wxxx0582)
- For the complete list please contact the sales team

3 Product ETS Database

Manufacturer	Panasonic
Product family	Interfaces
Product type	Input Module
Product name	Input Module 20 Gang Dry-Contact IO100 Input Module 20/8 Gang Dry-Contact/230V IO101

4 General Settings

4.1 General Settings Parameters

Name	Values	Description
Startup delay	0…**1**…250 s	This parameter defines the delay time for startup in seconds. After bus voltage recovery, the device always waits the delay time to expire before sending telegrams to the bus and start operation.
Send device in operation telegram	**No** Yes	Selecting Yes enables “Device In Operation” object.
Device in operation telegram value	**Off** On	This parameter specifies the value of the telegram that will be sent from “Device In Operation” object.
Telegram cycle time unit	Second **Minute** Hour Day	This parameter sets the unit of the time interval at which the “Device In Operation” group object sends a telegram cyclically.
Telegram cycle time value	**1**…255	This parameter sets the value of the time interval at which the “Device In Operation” group object sends a telegram cyclically.
Enable telegram limitation	**No** Yes	This parameter is used to enable telegram limitation. Telegram limitation is used to limit the telegrams that are sent by the device to the bus in order to decrease the load on KNX bus.
Telegram limit time	1 second 5 seconds 10 seconds 30 seconds **1 minute** 5 minutes 10 minutes 30 minutes 60 minutes	This parameter determines the period of the telegram limitation. Only a specified number of telegrams will be sent in this period. Other telegrams will be postponed to the next period.
Telegram limit number	1…**10**…255	This parameter determines the maximum number of telegrams that can be sent by the device in telegram limit period.
Enable request status values	**No** Yes	This parameter enables “Request Status Values” object that is used to send “Manual Control Status” and “Input – Status” objects values to the bus.
Send request status values when request object value is	Off **On** Off or on	This parameter determines the value of “Request Status Values” object that will trigger sending status objects values.
Power saving mode for LEDs	**Not active** After 1 minute After 5 minutes After 10 minutes After 30 minutes After 60 minutes	This parameter is used to activate power saving mode for LEDs. After the specified time, the device enters power saving mode where it turns off all input status LEDs. The device exits power saving mode and displays inputs status with LEDs when a manual operation button is pressed.

4.2 General Group Objects

No	Object Name	Function	Size	Datapoint Type	Flags				
					C	R	W	T	U
1	*Device In Operation*	*Trigger*	1 Bit	1.001 Switch	C			T	

This object is available if “Send device in operation telegram” parameter is set to “Yes”. It is used to monitor the presence of the device on KNX bus. After startup delay time the device sends telegrams cyclically to this object according to “Device in operation telegram value”, “Telegram cycle time unit” and “Telegram cycle time value” parameters values.

No	Object Name	Function	Size	Datapoint Type	Flags				
					C	R	W	T	U
2	*Request status values*	*Send values*	1 Bit	1.001 Switch	C		W		

This object is available if “Enable request status values object” parameter is set to “Yes”.
When this object receives a proper telegram according to “Send status values when request status object value is” parameter, all enabled input status objects and manual control status object values are sent to the bus.

5 Manual Control

The status of the inputs can be simulated and overridden in manual control mode with manual operation buttons. In manual control mode, the input which its status is overridden will preserve the new status until the device exits manual control mode. The new status is displayed with the status LED too.

Manual control is available only after enabling it in ETS. To enter the manual control mode, press [SET] button for 5 seconds. An input's LED will start to blink indicating that the manual control is operated on that input. Press [►] button to change the group of the controlled input and [▼] button to change the controlled input number in the same group. Press [SET] or [RST] buttons to simulate setting or resetting an input signal. Press [SET] and [RST] buttons sequentially to simulate pressing and releasing a push button. Press [RST] button for 5 seconds to exit the manual control mode.

Notes:

- The disabled inputs and the inputs that have its "Enroll in manual control" parameter is set to "No" cannot be controlled in manual control mode.
- That manual control mode is disabled when the application is unloaded.
- When manual control mode starts, all locked inputs that enroll in manual control are unlocked. When manual control mode stops, the inputs return to their lock status.

5.1 Manual Control Parameters

Name	Values	Description
Manual control	**Enabled** Disabled Enable/Disable via communication object	This parameter enables or disables the manual control on the device. If "Enabled" is selected, the user can enter manual control mode via manual operation buttons. If "Disabled" is selected, the user cannot enter manual control mode via manual operation buttons. If "Enable/Disable via communication object" is selected, the operator can use "Manual Control – Enable/Disable" object to allow or prevent entering manual control mode.
Manual control after bus return	Disabled **Enabled** Read from bus As before bus failure.	This parameter determines the status of the manual control after bus voltage return. If "Read from bus" is selected, the device will send a read request for "Manual Control – Enable/Disable" object, if no response is received the manual control will be disabled.
Enable "Manual Control Status – Started / Stopped" object	**No** Yes	This parameter enables "Manual Control Status" object that is used to indicate when the manual control mode is started or stopped.
Send manual control status	Do not send, update only **On change**	"Don't send, update only": "Manual Control Status" object value is updated when the manual control mode is started or stopped but not sent to the bus. The user can read the object value or send a telegram to "Request Status Values" object to get manual control status.

		On change: Manual control status is sent to the bus when the manual operation is started or stopped.
Stop manual control automatically	Not active After 1 minute After 5 minutes **After 10 minutes** After 30 minutes After 60 minutes	This parameter is used to stop the manual control mode automatically after a specific time from the last pressing of manual operation buttons.

5.2 Manual Control Group Objects

No	Object Name	Function	Size	Datapoint Type	Flags				
					C	R	W	T	U
3	*Manual Control*	*Enable / Disable*	1 Bit	1.003 Enable	C		W		

This object is available if “Manual Control” parameter is set to “Enable/Disable via communication object”.
If this object receives “Enable” telegram, the user will be able to start manual control mode via manual operation buttons.
If this object receives “Disable” telegram, the user will not be able to start manual control mode via manual operation buttons.

No	Object Name	Function	Size	Datapoint Type	Flags				
					C	R	W	T	U
4	*Manual Control Status*	*Started / Stopped*	1 Bit	1.010 Start/Stop	C	R		T	

This object is available if “Enable “Manual Control Status – Started / Stopped” object” parameter is set to “Yes”.
This object indicates the status of the manual control mode.

6 Inputs

6.1 Input Types

In KNX Input Modules there are three types of inputs:

- Dry-contact inputs
  A dry-contact input detects whether or not an input switch is open or closed. KNX input modules have 20 x dry-contact inputs grouped in 5 groups A-B-C-D-E.

- 10-230V AC/DC inputs
  These inputs are suitable to read 10-230V AC/DC signals. Only KNX Input Module IO101 has 8 x 10-230V AC/DC inputs grouped in 2 groups F-G.

- Virtual inputs
  These inputs are used to grant the rich features of the device's main inputs to another KNX device/sensor. Any KNX device that sends on/off telegrams can gain the rich features of the main physical inputs (like signal delay – signal monitoring - short/long press distinction etc.) by linking the switch on/off object to the simulate input signal object of a virtual input. KNX Input Modules have 4 virtual inputs grouped in 1 group V.

To be able to use an input, the user should enable it in ETS by checking the related checkbox in "Enable Inputs" page.

6.2 Block Diagrams

6.2.1 Block Diagram of Physical Input Signal

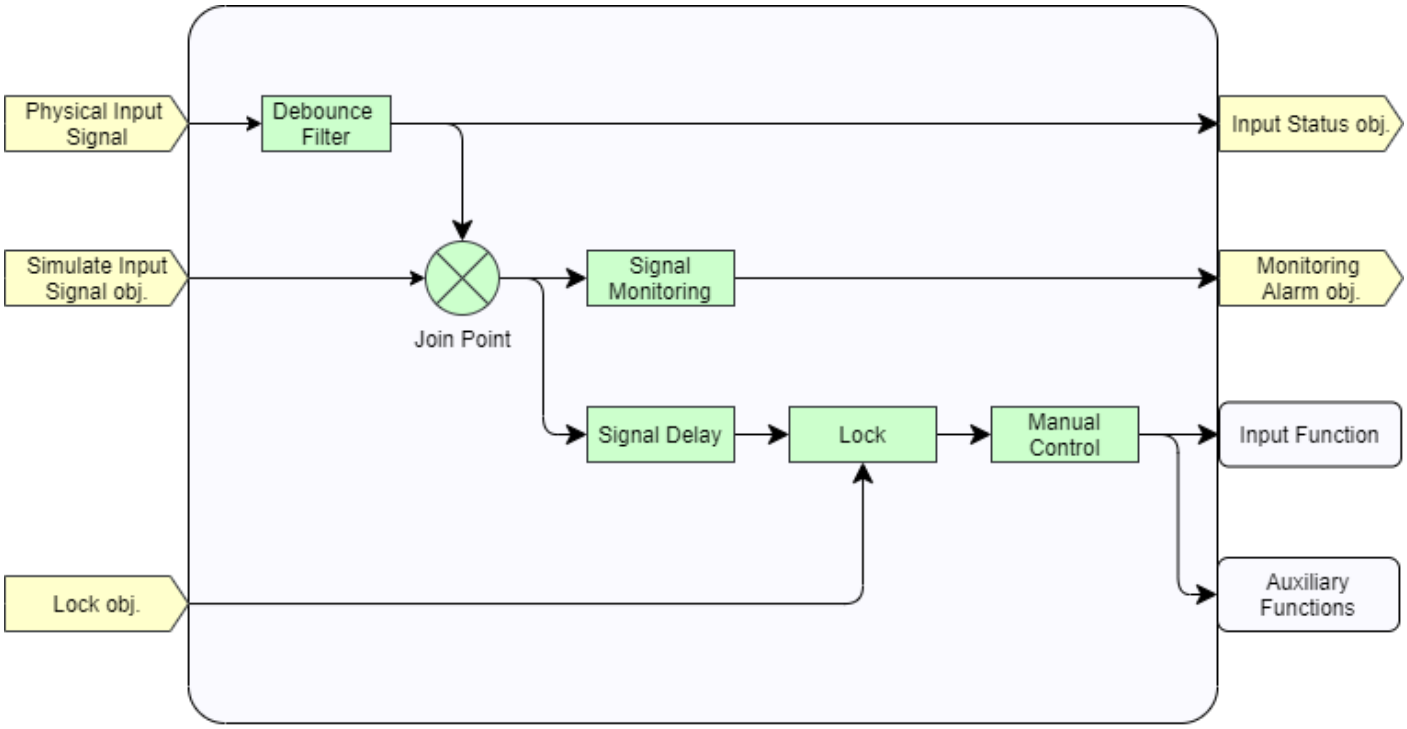


Figure 9 Block diagram of physical input signal

In the join point the last changed signal is dominant. For example, if a telegram is received from simulate input object its value is presented on the join point. Thereafter, if the physical input status is changed its signal is presented on the join point.

If a block (function) in the diagram is not enabled, the signal passes through it.

The manual control has a higher priority over the other functions. In manual control mode the input status is transmitted to input function and auxiliary functions without any delay even if the lock is enabled.

6.2.2 Block Diagram of Virtual Input Signal

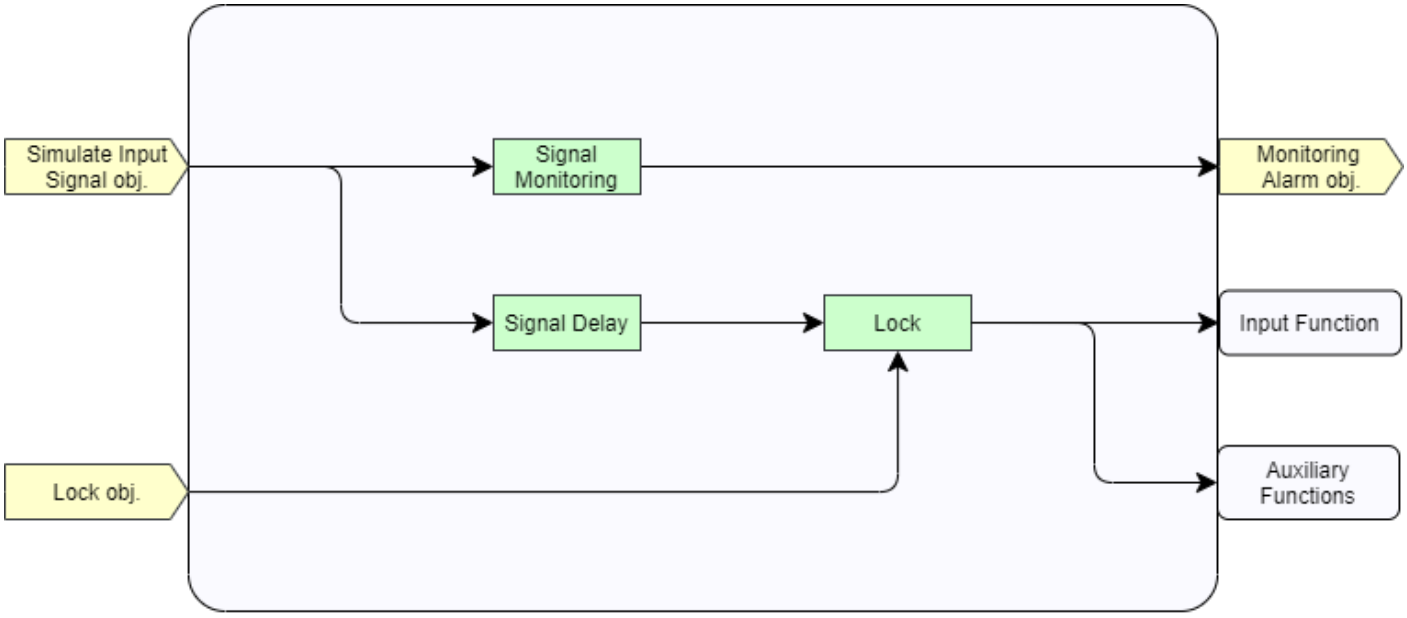


Figure 10 Block diagram of virtual input signal

6.3 Status LEDs Behavior

By default, signal status LED turns on when the contact is closed for dry-contact inputs, and when a 10-230V signal is applied on the input terminals for 10-230V AC/DC inputs. However, this behavior can be changed with parameters.

In ETS, the user can disable an input's LED or invert its behavior. Furthermore, with "Power saving mode for LEDs" parameter the status LEDs can be turned off automatically to save power. The user can exit power saving mode and see the status of the inputs by pressing any manual operation button.

In manual control mode, the disabled LEDs will be enabled but the inverted LEDs will stay inverted. So when the user press [SET] button to simulate the presence of a signal on an input which its LED is inverted, the LED will be turned off.

If the application program is unloaded, the status LEDs are enabled and run as described in the default behavior.

The input status signals that are used in controlling status LEDs are obtained from the output of the debounce filter (See Figure 9). Status LEDs are not affected with lock or signal delay functions.

6.4 Input General Parameters and Objects

6.4.1 Input General Parameters

Name	Values	Description
Input name		The user can give an input an optional name that describes its functionality or the connected device. For example, Window contact sensor, Presence sensor, Blinds upper push button. This parameter value has no effect on the channel work.
Connected device type	**Switch / Sensor** Push button Card holder	This parameter is used to determine the connected device to the input terminal in order to show the appropriate parameters in "Function" page.
Push button operating mode	**Button pressed = closed contact, button released = open contact.** Button pressed = open contact, button released = closed contact. **Button pressed = rising edge, button released = falling edge.** Button pressed = falling edge, button released = rising edge.	This parameter is shown only for dry-contact and 10-230V AC/DC inputs if "Connected device type" parameter is set to "Push button". With this parameter, the operating mode of the connected push button can be selected.
Card holder operating mode	**Card inserted = closed contact, card removed = open contact.** Card inserted = open contact, card removed = closed contact. **Card inserted = rising edge, card removed = falling edge.** Card inserted = falling edge, card removed = rising edge.	This parameter is shown only for dry-contact and 10-230V AC/DC inputs if "Connected device type" parameter is set to "Card holder". With this parameter, the operating mode of the connected card holder can be selected.
Debounce time	20 ms 30 ms 40 ms **50 ms** 75 ms 100 ms 150 ms 250 ms 500 ms 750 ms 1000 ms	This parameter is shown only for dry-contact and 10-230V AC/DC inputs. When a mechanical switch is switched it bounces between in-contact and not in-contact states for several milliseconds. Without a debounce filter the device will recognize this behavior as multiple switching events not a single one. With this parameter, the user can define the debounce time of the debounce filter that is used to prevent the bouncing effect. An input signal will be taken into account only if it persists on the terminal for more than the debounce time without interruption.
LED	Disabled **Enabled** Inverted	This parameter is shown only for dry-contact and 10-230V AC/DC inputs. If "Enabled" / "Disabled" is selected, the device will show / not show the input status with its status LED. If "Inverted" is selected the device will show the input status inverted on its status LED.

Enroll in manual control	No **Yes**	This parameter is shown only for dry-contact and 10-230V AC/DC inputs. If "No" is selected, the user will not be able to control or override the input state in manual control mode. If "Yes" is selected, the user will be able to control or override the input state in manual control mode.
Enable "Simulate Input Signal" object	No Yes	This parameter is shown only for dry-contact and 10-230V AC/DC inputs. It is used to enable / disable *"Simulate Input Signal" object.*
Enable "Input Status" object	**No** Yes	This parameter is shown only for dry-contact and 10-230V AC/DC inputs. It is used to enable / disable *"Input Status" object.*
Send input status	Do not sent, update only **On change**	"Don't send, update only": "*Input Status*" object value is updated when the input status is changed but not sent to the bus. The user can read the object value or send a telegram to "Request Status Values" object to get the input status. On change: The new input status is sent to the bus when the input status is changed.
Enable signal delay	**No** Yes	If "Yes" is selected, the specified signal in "Delay at" parameter will be sent to the input function after a delay time. If an input reverts back to its previous state before the delay expires, nothing will be sent to the input function. For example, this function can be used with presence sensors to send off telegrams only when they have not detected motion in the room for a certain period of time. If a sensor detects a motion before the period expires, off telegram will not be sent. Also, this function can be used with card holders to send off telegrams not after removing the card immediately but after a specific time. If the card is inserted again before the period expires, off telegram will not be sent.
Delay at	**Open contact signal** Closed contact signal Both signals **Falling edge signal** Rising edge signal Both signals **Off signal** On signal Both signals **Button released signal** Button pressed signal Both signals **Card removed signal** Card inserted signal Both signals	This parameter determines which signals will be delayed. Different options will be available according to the input type and the selected "Connected device type".
Open contact signal delay unit *Falling edge signal delay unit*	**Second** Minute	This parameter determines the unit of the delay time for the specified signal.

Off signal delay unit *Button released signal delay unit* *Card removed signal delay unit*	Hour Day	
Open contact signal delay value *Falling edge signal delay value* *Off signal delay value* *Button released signal delay value* *Card removed signal delay value*	1…**30**…255	This parameter determines the value of the delay time for the specified signal.
Closed contact signal delay unit *Rising edge signal delay unit* *On signal delay unit* *Button pressed signal delay unit* *Card inserted signal delay unit*	**Second** Minute Hour Day	This parameter determines the unit of the delay time for the specified signal.
Closed contact signal delay value *Rising edge signal delay value* *On signal delay value* *Button pressed signal delay value* *Card inserted signal delay value*	1…**5**…255	This parameter determines the value of the delay time for the specified signal.
Enable signal monitoring	**No** Yes	This parameter enables the monitoring function and shows "Monitoring Alarm" object of the input. Monitoring function monitors the input signal and sends alarm telegram when it does not detect a new signal similar to the one specified in "Reset monitoring timer at" parameter within the monitoring time. When monitoring function detects a new signal similar to the one specified in "Reset monitoring timer at" parameter, it resets the monitoring timer and sends no alarm telegram if an alarm telegram was sent before. In case of bus voltage return, the function continues monitoring the signal with the elapsed time and alarm state of the function before the bus failure.
Reset monitoring time at	**Open contact signal** Closed contact signal Both signals **Falling edge signal** Rising edge signal Both signals **Off signal** On signal Both signals **Button released signal** Button pressed signal Both signals **Card removed signal** Card inserted signal Both signals	This parameter determines the signal that will reset the monitoring timer when it's newly detected by the monitoring function. Different options will be available according to the input type and the selected "Connected device type".
Monitoring time unit	Second Minute Hour **Day**	This parameter determines the unit of the timer of the monitoring function.

Monitoring time value	**1**…255	This parameter determines the value of the timer of the monitoring function.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the input signal.
Lock status after bus return	**Disabled** Enabled Read from bus As before bus failure	This parameter determines the status of the input’s lock function after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the input, if no response is received the input signal will be unlocked.

6.4.2 Input General Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
Input Number (Type)	*Simulate Input Signal*	1 Bit	1.001 Switch	C		W		

This object is available if “Enable Simulate Input Signal object” parameter is set to “Yes” or if the input is a virtual input.

It is used to simulate the same signals that can be caused with the physical connected input devices such as contact open/closed signals, falling/rising edge signals etc.

According to the input type and the connected device type, the received on/off telegrams are translated to signals as below:

Input type	Connected device type	Off telegram is translated to	On telegram is translated to
Dry-contact	Switch / Sensor	Open contact signal	Closed contact signal
10-230V AC/DC	Switch / Sensor	Falling edge signal	Rising edge signal
Virtual	Switch / Sensor	Off signal	On signal
X	Push button	Button released signal	Button pressed signal
X	Card holder	Card removed signal	Card inserted signal

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
Input Number (Type)	*Status*	1 Bit	1.001 Switch	C	R		T	

This object is available for dry-contact and 10-230V AC/DC inputs only if “Enable input status object” parameter is set to “Yes”.

This object indicates the status of the input signals. The input signals are translated to on/off telegrams as below:

Input type	Connected device type	Off telegrams indicate	On telegrams indicate
Dry-contact	Switch / Sensor	Open contact signals	Closed contact signals
10-230V AC/DC	Switch / Sensor	Falling edge signals	Rising edge signals
X	Push button	Button released signals	Button pressed signals
X	Card holder	Card removed signals	Card inserted signals

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
Input Number (Type)	*Monitoring Alarm*	1 Bit	1.005 Alarm	C	R		T	

This object is available if “Enable signal monitoring” parameter is set to “Yes”. It’s used to send the status of the monitoring function’s alarm.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
Input Number (Type)	*Lock*	1 Bit	1.001 Switch	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”.

If “Enable” telegram is received the input signal will be locked to the current signal and no new signals will be transmitted to the input function and the auxiliary functions.

6.5 Input Function Parameters and Objects

6.5.1 Function Parameters of Switches Sensors and Card Holders

The input function has 3 objects. The DPT of each object can be selected from 17 types. Also, each object can be configured to send or not send telegrams when a new signal is detected.

Name	Values	Description
Block input function at start-up for specific time	**No** Yes	If “Yes” is selected, the input function will start evaluating the input signals after specific time from the start-up. If “No” is selected, the input function will evaluate the input signal immediately after the start-up.

Blocking time unit	**Second** Minute Hour Day	This parameter the unit of the blocking time.
Blocking time value	1…**3**…255	This parameter the value of the blocking time.
Scan input after unlock or bus return	**No** Yes	If "Yes" is selected, the input signal will be scanned when the lock is disabled or when the bus voltage returns. Then according to the scanned signal and the value of the other parameters, the function objects will send proper telegrams. If "No" is selected, the function objects will not send telegrams when the lock is disabled or when the bus voltage returns.
Enable sending telegrams cyclically	**No** Yes	If "Yes" is selected, the user will be able to set some telegrams to be sent cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated KNX telegrams
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated KNX telegrams
Object x		
Object type	Not used 1-bit switch 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter determines the DPT of object x.
When Y event occurs *Send telegram*	No Yes	This parameter determines whether a telegram will be sent when the mentioned event is occurred. If "Yes" is selected, one or two parameters will be displayed to enter the telegram value that will be sent. Notes: When "Toggle", "Up – Down" or "Decrease – Increase / Step up – Step down" is selected as telegram value, the object value will be inverted and sent to the bus. For example, an off telegram will be sent if the object value is on when Y event occurs. When "Decrease – Increase" is selected as the dimming direction of a 4-bit dimming control object, the dimming direction of the object will be inverted and sent to the bus.

Send cyclically	**No** Yes	This parameter is available if “Enable sending telegrams cyclically” parameter is set to “Yes”. It determines if the telegram will be sent cyclically to the bus with cycle time periods when Y event occurs.

6.5.2 Function Parameters of Push Buttons

Name	Values	Description
Block input function at start-up for specific time	**No** Yes	If “Yes” is selected, the input function will start evaluating the input signals after specific time from the start-up. If “No” is selected, the input function will evaluate the input signal immediately after the start-up.
Blocking time unit	**Second** Minute Hour Day	This parameter the unit of the blocking time.
Blocking time value	1…**3**…255	This parameter the value of the blocking time.
Push button function	**Switching control** Dimming control Blind up/down control Scene Send value	This parameter determines the task of the button. For example, if the button is intended to be used to switch lights on/off , “Switching control” should be selected.
Configuration type	**Simple** Advanced	If “Simple” is selected, simple parameters will be shown to configure the push button function. If “Advanced” is selected, the user will be able to select push button events, use up to 3 objects and determine telegram values at each event.
Switching Control Simple Parameters		
When button is pressed	Do not send telegram Send off Send on **Toggle**	This parameter determines what the function should send to “Object 1 – Switch” when the connected button is pressed. If “Toggle” is selected the object value is inverted and sent.
When button is released	**Do not send telegram** Send off Send on Toggle	This parameter determines what the function should send to “Object 1 – Switch” when the connected button is released. If “Toggle” is selected the object value is inverted and sent.
Dimming Control Simple Parameters		
Reaction to short / long keystroke	On / Brighter Toggle / Brighter Off / Darker Toggle / Darker **Toggle / Brighter - Darker**	This parameter determines the telegram values for “Object 1 – Switch” that will be sent when the button is short pressed, and the telegram values for “Object 2 – Dimming Control” that will be sent when the long press starts. When the long press ends, a break telegram will be sent to stop the dimming operation for all options.

		"Toggle / Brighter – Darker" should be selected when the dimmer will be controlled with single push button. With each long press, the push button will dim the lights brighter and darker alternatively. The other options can be selected if the dimmer will be controlled with two push buttons (two inputs). One button will dim the lights brighter and another one will dim them darker.
Long press time	300 ms 400 ms 500 ms **600 ms** 700 ms 800 ms 900 ms 1 s 2 s 3 s 4 s 5 s 6 s 7 s 8 s 9 s 10 s	A button will be considered long pressed if it is pressed for more than the specified time. If it is pressed less than the specified period, it will be considered short pressed.
Blind Up / Down Control Simple parameters		
Movement direction	Up Down **Up - Down**	This parameter determines the telegram values for "Object 1 – Up/Down" that will be sent when the button is long pressed, and the telegram values for "Object 2 – Step/Stop" that will be sent when the button is short pressed. "Up - Down" should be selected when the blinds will be controlled with single push button. With each long press, the push button will change the movement direction up and down alternatively. If the button is short pressed, a step with a direction opposite to the last sent up down telegram will be sent. The other options can be selected if the blinds will be controlled with two push buttons (two inputs). One button will move the blinds up and another one will move them down. With each long press, the specified direction will be sent to "Object 1 – Up/Down". With each short press, a step with the specified direction will be sent to "Object 2 – Step/Stop".
Stop movement with	**Release the button** Short keystroke	"Release the button": The blinds will stop moving when the button is released after a long press. "Short keystroke": The blinds will not stop moving when the button is released after a long press, but it will stop with a following short press.
Long press time	300 ms 400 ms 500 ms **600 ms** 700 ms 800 ms 900 ms 1 s	A button will be considered long pressed if it is pressed for more than the specified time. If it is pressed less than the specified period, it will be considered short pressed.

	2 s 3 s 4 s 5 s 6 s 7 s 8 s 9 s 10 s	
Scene Simple Parameters		
Scene number	**1**…64	This parameter determines which scene number will be sent to "Object 1 – Scene" when the button is pressed.
Save scene after long press	**No** Yes	If "Yes" is selected, A learn scene telegram will be sent to the bus when the button is long pressed.
Long press time	300 ms 400 ms 500 ms 600 ms 700 ms 800 ms 900 ms 1 s 2 s 3 s 4 s **5 s** 6 s 7 s 8 s 9 s 10 s	A button will be considered long pressed if it is pressed for more than the specified time. If it is pressed less than the specified period, it will be considered short pressed.
Send Value Simple Parameters		
Send value with	**Button pressed, button released** Short press, long press	This parameter determines which push button events will be used to send telegram values to "Object 1". The DPT of "Object 1" can be selected with "Object type" parameter. For each event, the user can select whether a telegram will be sent or not and determine its value. If "Button pressed, button released" is selected, the user can send telegrams at the next events: "When button is pressed" and "When button is released". If "Short press, Long press" is selected, the user can send telegrams at the next events: "When button is short pressed", "When long press is started" and "When button is released after long press". In both cases, the used can send specific telegram value when the lock is enabled if "Enable lock" parameter is set to "Yes".
Long press time	300 ms 400 ms 500 ms **600 ms** 700 ms 800 ms 900 ms 1 s	This parameter is visible if "Send value with" parameter is set to "Short press, long press". A button will be considered long pressed if it is pressed for more than the specified time. If it is pressed less than the specified period, it will be considered short pressed.

	2 s 3 s 4 s 5 s 6 s 7 s 8 s 9 s 10 s	
Push Button Advanced Configuration In advanced configurations, the user is able to select push button events, use up to 3 objects and determine telegram values at each event. Furthermore, the user can send some telegrams cyclically. Also, in advanced configuration, the DPT of some objects are pre-configured according to the selected push button function as below: • Switching control: Object 1 type = 1-bit switch. • Dimming control: Object 1 type = 1-bit switch, Object 2 type = 4-bit dimming control. • Blind up/down control: Object 1 type = 1-bit up/down, Object 2 type = 1-bit step. • Scene: Object 1 type = Scene number. • Send value: No object DPT is pre-configured.		
Push button events	**Button pressed – released** Short – long press Single – double press Single – double – triple press Single – double –triple – quadruple press	This parameter determines which push button events will be used to send telegram values to “Object 1”, “Object 2” and “Object 3”. If “Button pressed - button released” is selected, the user can send telegrams at the next events: “When button is pressed” and “When button is released”. If “Short - long press” is selected, the user can send telegrams at the next events: “When button is short pressed”, “When long press is started” and “When button is released after long press”. If “Single – double press” is selected, the user can send telegrams at the next events: “When button is single pressed”, “When double press is started” and “When button is released after double press”. If “Single – double – triple press” is selected, the user can send telegrams at the next events: “When button is single pressed”, “When button is double pressed”, “When triple press is started” and “When button is released after triple press”. If “Single – double – triple – quadruple press” is selected, the user can send telegrams at the next events: “When button is single pressed”, “When button is double pressed”, “When button is triple pressed” and “When button is quadruple pressed” In all cases, the used can send specific telegram value when the lock is enabled if “Enable lock” parameter is set to “Yes”.
Long press time	300 ms 400 ms 500 ms **600 ms** 700 ms 800 ms 900 ms 1 s 2 s 3 s 4 s 5 s	This parameter is available if “Push button events” parameter is set to “Short – long press”. A button will be considered long pressed if it is pressed for more than the specified time. If it is pressed less than the specified period, it will be considered short pressed.

	6 s 7 s 8 s 9 s 10 s	
Maximum time between two press	300 ms 400 ms **500 ms** 600 ms 700 ms 800 ms 900 ms 1 s 2 s 3 s 4 s 5 s 6 s 7 s 8 s 9 s 10 s	This parameter is available if “Push button events” parameter is set to “Single – double press”, “Single – double – triple press” or “Single – double – triple – quadruple press”. It determines the time between sequential presses to consider the button is multiple pressed. For example, if this parameter is set to “500 ms” and the elapsed time between two presses is equal or less than 500 ms they are considered a double press, else they are considered as two single presses.
Enable sending telegrams cyclically	**No** Yes	If “Yes” is selected, the user will be able to set some telegrams to be sent cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated KNX telegrams
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated KNX telegrams
Object x		
Object type	Not used 1-bit switch 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter determines the DPT of object x.
When Y event occurs *Send telegram*	No Yes	This parameter determines whether a telegram will be sent when the mentioned event is occurred. If “Yes” is selected, one or two parameters will be displayed to enter the telegram value that will be sent.

		Notes: When “Toggle”, “Up – Down” or “Decrease – Increase / Step up – Step down” is selected as telegram value, the object value will be inverted and sent to the bus. For example, an off telegram will be sent if the object value is on when Y event occurs. When “Decrease – Increase” is selected as the dimming direction of a 4-bit dimming control object, the dimming direction of the object will be inverted and sent to the bus.
Send cyclically	**No** Yes	This parameter is available if “Enable sending telegrams cyclically” parameter is set to “Yes”. This parameter determines if the telegram will be sent cyclically to the bus with cycle time periods when Y event occurs.

6.5.3 Function Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
Input Number (Type)	*Object x – Switch*	1 Bit	1.001 Switch	C	R	W	T	
	Object x – Up/Down	1 Bit	1.008 Up / Down	C	R	W	T	
	Object x – Step/Stop	1 Bit	1.007 Step	C	R	W	T	
	Object x – Trigger	1 Bit	1.017 Trigger	C	R	W	T	
	Object x – Priority	2 Bits	2.001 Switch Control	C	R		T	
	Object x – Dimming Control	4 Bits	3.007 Dimming Control	C	R	W	T	
	Object x – Scene	1 Byte	18.001 Scene Control	C	R		T	
	Object x – Percentage	1 Byte	5.001 Percentage	C	R		T	
	Object x – 1-Byte Unsigned Value	1 Byte	5.010 Counter pulses	C	R		T	
	Object x – 1-Byte Signed Value	1 Byte	6.010 Counter pulses	C	R		T	
	Object x – HVAC Mode	1 Byte	20.102 HVAC mode	C	R		T	
	Object x – 2-Byte Unsigned Value	2 Bytes	7.001 Pulses	C	R		T	
	Object x – 2-Byte Signed Value	2 Bytes	8.001 Pulses Difference	C	R		T	
	Object x – 2-Byte Float Value	2 Bytes	9.001 Temperature	C	R		T	
	Object x – 4-Byte Unsigned Value	4 Bytes	12.001 Counter Pulses (Unsigned)	C	R		T	
	Object x – 4-Byte Signed Value	4 Bytes	13.001 Counter Pulses (Signed)	C	R		T	
	Object x – 4-Byte Float Value	4 Bytes	14.000 Acceleration	C	R		T	

Input function can have up to 3 objects. The DPT of these objects is determined with “Object type” parameters or “Push button function” parameter.

In advanced configuration of push button parameters, the DPT of some objects are pre-configured according to the selected push button function as below:

- Switching control: Object 1 type = 1-bit switch.
- Dimming control: Object 1 type = 1-bit switch, Object 2 type = 4-bit dimming control.
- Blind up/down control: Object 1 type = 1-bit up/down, Object 2 type = 1-bit step.
- Scene: Object 1 type = Scene number.
- Send value: No object DPT is pre-configured.

7 Auxiliary Functions

KNX Input Modules have 32 independent auxiliary functions. The user can choose their types from “Auxiliary Functions (v2.0)” page. The inputs of some of these functions can be assigned to be internal inputs or external objects. Many complex configurations and creative scenarios can be done with these functions

There are 14 types of auxiliary functions:

1. Converter
2. Filter
3. General counter
4. Logic gate
5. Max/Min/Average value calculator
6. Monitor
7. Presence detector controller
8. Scene actuator
9. Send after delay
10. Send after reset
11. Send cyclically
12. Sequencer
13. Staircase controller
14. Working time counter

Each type has its own objects and parameters and all types have lock feature.

7.1 Converter

The converter function is used to convert data point types and/or telegram values.
There are 11 converter types:
User customized: The user specifies the input and the output object types, the comparison statement (greater than, equal to, between, etc…) for the input value, and the output values for the comparison result.
8 x 1-bit => 1 x 1-byte: Combines 8 1-bit objects into one 1-byte object
1 x 1-byte => 8 x 1-bit: separates a 1-byte object to 8 1-bit objects
2 x 1-byte => 1 x 2-byte: Combines 2 1-byte objects into one 2-byte object
1 x 2-byte => 2 x 1-byte: separates a 2-byte object to 2 1-byte objects
4 x 1-byte => 1 x 4-byte: Combines 4 1-byte objects into one 4-byte object
1 x 4-byte => 4 x 1-byte: separates a 4-byte object to 4 1-byte objects
2 x2-byte => 1 x 4-byte: Combines 2 2-byte objects into one 4-byte object
1 x 4-byte => 2 x 2-byte: separates a 4-byte object to 2 2-byte objects
1 x 2-byte float => 1 x 4-byte float: Converts DPT9 float values to IEEE 754 float values.
1 x 4-byte float => 1 x 2-byte float: Converts IEEE 754 float values to DPT9 float values.

For all converter types, the converter can be bidirectional (converts the telegrams in two directions).

Warning: because of the 2-byte float values encoding method, converting 4-byte float values to 2-byte float values becomes less accurate with large values (larger than 100.0).

7.1.1 Converter Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Converter type	**User customized** 8 x 1-bit => 1 x1-byte 1 x 1-byte => 8 x 1-bit 2 x 1-byte => 1 x 2-byte 1 x 2-byte => 2 x 1-byte 4 x 1-byte => 1 x 4-byte 1 x 4-byte => 4 x 1-byte 2 x2-byte => 1 x 4-byte 1 x 4-byte => 2 x 2-byte 1 x 2-byte float => 1 x 4-byte float 1 x 4-byte float => 1 x 2-byte float	This parameter defines the type of the converter. In user customized converters, the DPT of the input and the output objects, the converting conditions and the output values can be specified by the user. This type is used to convert KNX telegrams to another types and values. The other converter types are used to convert telegrams to another types only. Its values are not changed.
Bidirectional	**No** Yes	The bidirectional converter converts the telegrams in two directions. From X terminal object\s to Y terminal object\s and from Y terminal object\s to X terminal object\s. If “Yes” is selected, “Send output value after delay” and “Send output value cyclically” parameters cannot be used.
User customized converter parameters		

X/Y terminal object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter defines the DPT of the terminal object. If the converter is not bidirectional, X terminal is the input and Y terminal is the output, else both terminals can be operated as input and output.
If received X/Y terminal object value is	**Equal to** Unequal to Lower than Equal or lower than Greater than Equal or greater than Between Not between Above or below threshold	This parameter defines the condition of the converter. one or two additional parameters will be visible to enter the test values of the condition. If the terminal object type is “1-bit”,”2-bit” “4-bit” “Scene number” or “HVAC mode”, only two conditions can be chosen, “Equal to” and “Unequal to”.
Then send to Y/X terminal		This parameter defines the telegram value to be sent when the condition is met.
Else	**Don’t send telegram** Send telegram	This parameter defines the behavior of the converter when the condition is not met. If “Send telegram” is selected, a parameter will be visible to define the telegram value to be sent when the condition is not met.
Send telegram when	**New telegram is received** Terminal object value changes	If “New telegram is received” is selected, the converter sends telegrams to a terminal every time it receives new telegrams from the other terminal. If “Terminal object value changes” is selected, the converter sends telegrams to a terminal only when its object value is changed.
Send output value after delay	**No** Yes	This parameter enables a delay before sending the output value.
Delay time unit	Second **Minute** Hour Day	This parameter defines the unit of the delay time before the output value is sent.
Delay time value	**1**…255	This parameter defines the value of the delay time before the output value is sent.
Send output cyclically	**No** Yes	This parameter enables sending the output value cyclically to the bus.
Cycle time unit	Second **Minute**	This parameter defines the unit of the time period between the repeated output telegrams.

	Hour Day	
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated output telegrams.
Converter behavior after bus return	**Wait for new telegrams** Read X terminal objects Read Y terminal objects	This parameter defines the converter behavior after bus voltage return. If "Wait for new telegrams" is selected, no action will be taken. If "Read X/Y terminal objects" is selected, the converter will send read request for the terminal objects to the bus after bus return. Note: To be able to read terminal objects from the bus, the terminal should be an input terminal.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.1.2 Converter Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - X Terminal - Input* *Converter - X Terminal – Input / Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C C	R	W W	T T	U U

This object is available if the converter type is "User customized".
If the converter is bidirectional X terminal is used as an input and an output for the converter, else it is used as an input only.
This object DPT is determined by "X terminal object type" parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - X Terminal – 1-Byte (LSB) - Input*	1 Byte	5.010 Counter pulses	C		W	T	U
	Converter - X Terminal – 1-Byte (LSB) - Output			C	R	W	T	
	Converter - X Terminal – 1-Byte (LSB) – Input / Output			C	R	W	T	U
	Converter - X Terminal – 1-Byte (MSB) – Input			C		W	T	U
	Converter - X Terminal – 1-Byte (MSB) - Output			C	R	W	T	
	Converter - X Terminal – 1-Byte (MSB) – Input / Output			C	R	W	T	U
	Converter - X Terminal – 1-Byte (Byte i) – Input			C		W	T	U
	Converter - X Terminal – 1-Byte (Byte i) - Output			C	R	W	T	
	Converter - X Terminal – 1-Byte (Byte i) – Input / Output			C	R	W	T	U

These objects are available if the converter type is “2 x 1-byte => 1 x 2-byte”, “1 x 2-byte => 2 x 1-byte”, “4 x 1-byte => 1 x 4-byte” or “1 x 4-byte => 4 x 1-byte”.
LSB objects represents the least significant byte of the terminal. MSB objects represents the most significant byte of the terminal.
If the converter type is 2 x 1-byte => 1 x 2-byte” or “4 x 1-byte => 1 x 4-byte”, X terminal is used as an input terminal.
If the converter type is “1 x 2-byte => 2 x 1-byte” or “1 x 4-byte => 4 x 1-byte”, X terminal is used as an output terminal.
If the converter is bidirectional, X terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - X Terminal – 2-Byte (LSB) - Input*	2 Byte	7.001 Pulses	C		W	T	U
	Converter - X Terminal – 2-Byte (LSB) - Output			C	R	W	T	
	Converter - X Terminal – 2-Byte (LSB) – Input / Output			C	R	W	T	U
	Converter - X Terminal – 2-Byte (MSB) – Input			C		W	T	U
	Converter - X Terminal – 2-Byte (MSB) - Output			C	R	W	T	
	Converter - X Terminal – 2-Byte (MSB) – Input / Output			C	R	W	T	U

These objects are available if the converter type is “2 x 2-byte => 1 x 4-byte” or “1 x 4-byte => 2 x 2-byte”.
LSB objects represents the least significant bytes of the terminal. MSB objects represents the most significant bytes of the terminal.
If the converter type is “2 x 2-byte => 1 x4-byte”, X terminal is used as an input terminal.
If the converter type is “1 x 4-byte => 2 x 2-byte”, X terminal is used as an output terminal.
If the converter is bidirectional, X terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - X Terminal – 2-Byte (Float) - Input*	2 Byte	9.001 Temperature	C		W	T	U
	Converter - X Terminal – 2-Byte (Float) - Output			C	R	W	T	
	Converter - X Terminal – 2-Byte (Float) – Input / Output			C	R	W	T	U

These objects are available if the converter type is “1 x 2-byte float=> 1 x 4-byte float” or “1 x 4-byte float=> 1 x 2-byte float”.
If the converter type is “2 x 2-byte float=> 1 x 4-byte float”, X terminal is used as an input terminal.
If the converter type is “1 x 4-byte float=> 1 x 2-byte float”, X terminal is used as an output terminal.

If the converter is bidirectional, X terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - X Terminal – Bit i – Input* *Converter - X Terminal – Bit I – Output* *Converter - X Terminal – Bit i – Input / Output*	1 Bit	1.001 Switch	C C C	 R R	W W W	T T T	U U

These objects are available if the converter type is “8 x 1-bit => 1 x1-byte” or “1 x 1-byte => 8 x 1-bit”.
Each object represents the i-th bit of the terminal.
If the converter type is “8 x 1-bit => 1 x1-byte”, X terminal is used as an input terminal.
If the converter type is “1 x 1-byte => 8 x 1-bit”, X terminal is used as an output terminal.
If the converter is bidirectional, X terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Y Terminal - Output* *Converter - Y Terminal – Input / Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C C	 R	W W	T T	U U

This object is available if the converter type is “User customized”.
If the converter is bidirectional Y terminal is used as an input and an output for the converter, else it is used as an output only.
This object DPT is determined by “Y terminal object type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Y Terminal – 1-Byte - Input* *Converter - Y Terminal – 1-Byte - Output* *Converter - Y Terminal – 1-Byte – Input / Output*	1 Byte	5.010 Counter pulses	C C C	 R R	W W W	T T T	U U

This object is available if the converter type is “8 x 1-bit => 1 x1-byte” or “1 x 1-byte => 8 x 1-bit”.
It represents the byte object of the converter.
If the converter type is “8 x 1-bit => 1 x 1-byte”, Y terminal is used as an output terminal.
If the converter type is “1 x 1-byte => 8 x 1-bit”, Y terminal is used as an input terminal.

If the converter is bidirectional, Y terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Y Terminal – 2-Byte - Input* *Converter - Y Terminal – 2-Byte - Output* *Converter - Y Terminal – 2-Byte – Input / Output*	2 Bytes	7.001 Pulses	C C C	 R R	W W W	T T T	U U

This object is available if the converter type is “2 x 1-byte => 1 x 2-byte” or “1 x 2-byte => 2 x 1-byte”.
It represents the 2-byte object of the converter.
If the converter type is “2 x 1-byte => 1 x 2-byte”, Y terminal is used as an output terminal.
If the converter type is “1 x 2-byte => 2 x 1-byte”, Y terminal is used as an input terminal.
If the converter is bidirectional, Y terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Y Terminal – 4-Byte - Input* *Converter - Y Terminal – 4-Byte - Output* *Converter - Y Terminal – 4-Byte – Input / Output*	4 Bytes	12.001 Counter Pulses (Unsigned)	C C C	 R R	W W W	T T T	U U

This object is available if the converter type is “4 x 1-byte => 1 x 4-byte”, “1 x 4-byte => 4 x 1-byte”, “2 x 2-byte => 1 x 4-byte” or “1 x 4-byte => 2 x 2-byte”.
It represents the 4-byte object of the converter.
If the converter type is “4 x 1-byte => 1 x 4-byte” or “2 x 2-byte => 1 x 4-byte”, Y terminal is used as an output terminal.
If the converter type is “1 x 4-byte => 4 x 1-byte” or “1 x 4-byte => 2 x 2-byte”, Y terminal is used as an input terminal.
If the converter is bidirectional, Y terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Y Terminal – 4-Byte Float- Input* *Converter - Y Terminal – 4-Byte Float - Output* *Converter - Y Terminal – 4-Byte Float – Input / Output*	4 Bytes	14.000 Acceleration	C C C	 R R	W W W	T T T	U U

This object is available if the converter type is “1 x 2-byte float=> 1 x 4-byte float” or “1 x 4-byte float=> 1 x 2-byte float”.
It represents the 4-byte object of the terminal.
If the converter type is ““2 x 2-byte float=> 1 x 4-byte float”, Y terminal is used as an output terminal.
If the converter type is “1 x 4-byte float=> 1 x 2-byte float”, Y terminal is used as an input terminal.
If the converter is bidirectional, Y terminal is used as an input and output terminal.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Converter - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.2 Filter

Filter function controls which telegrams will be transmitted to the output when the input receives one according to the telegram value and a pre-set condition or according to the filter status (Enabled / Disabled).

7.2.1 Filter Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Filter objects type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter defines the DPT of the filter's terminals objects. If the converter is not bidirectional, X terminal is the input and Y terminal is the output, else both terminals can be operated as input and output.
Is filter bidirectional	**No** Yes	The bidirectional filter filters the telegrams in two directions. From X terminal object to Y terminal object and from Y terminal object to X terminal object. If "Yes" is selected, "Send passed values after delay" and "Send passed values cyclically" parameters cannot be used.
Enable "Filter – Enable / Disable" object	**No** Yes	"No": the filter is enabled always and passes telegrams from its input to its output according to a condition. "Yes": the filter can be enabled or disabled with an object and its behavior in both cases can be determined with parameters.
Filter status after bus return	Disabled **Enabled** Read from bus As before bus failure	This parameter determines the status of the filter after bus voltage return. If "Read from bus" is selected, the device will send a read request for *"Filter – Enable / Disable" object* of the function, if no response is received the filter will be enabled.
Behavior when filter is disabled	Block all telegrams **Pass all telegrams**	This parameter is available if "*Enable "Filter – Enable / Disable" object" parameter is set to "Yes".* This parameter determines the behavior of the filter when its disabled with *"Filter – Enable / Disable" object.*

Behavior when filter is enabled	**Block all telegrams** Pass all telegrams Pass according to condition	This parameter is available if "*Enable "Filter – Enable / Disable" object" parameter is set to "Yes".* This parameter determines the behavior of the filter when its enabled with *"Filter – Enable / Disable" object.*
Pass telegram if its value is	**Equal to** Unequal to Lower than Equal or lower than Greater than Equal or greater than Between Not between	This parameter is available if "*Enable "Filter – Enable / Disable" object" is set to "No" or if "Behavior when filter is enabled" is set to "Pass according to condition".* This parameter defines the condition of the filter. One or two additional parameters will be visible to enter the test values of the condition. If the filter receives a telegram that meet the condition, it will pass it to the output. If the terminal object type is "1-bit","2-bit" "4-bit" "Scene number" or "HVAC mode", only two conditions can be chosen, "Equal to" and "Unequal to".
Send passed telegrams after delay	**No** Yes	This parameter enables a delay before sending the passed *telegrams*.
Delay time unit	Second **Minute** Hour Day	This parameter defines the unit of the delay time before the passed *telegrams* is sent.
Delay time value	**1**…255	This parameter defines the value of the delay time before the *telegrams* value is sent.
Send passed telegrams cyclically	**No** Yes	This parameter enables sending the passed *telegrams* cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated telegrams.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.2.2 Filter Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Filter - X Terminal - Input* *Filter - X Terminal – Input / Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C C	R	W W	T	

If the filter is bidirectional X terminal is used as an input and an output for the filter, else it is used as an input only.
This object DPT is determined by “Filter objects type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Filter - Y Terminal - Output* *Filter - Y Terminal – Input / Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C C	R R	W	T T	

If the filter is bidirectional Y terminal is used as an input and an output for the converter, else it is used as an output only.
This object DPT is determined by “Filter objects type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Filter - Enable / Disable*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if the “Enable “Filter – Enable / Disable” object “is set to “Yes”.
It is used to enable or disable the filter. When the filter is enabled or disabled it will work as it set in “Behavior when filter is enabled” and “Behavior when filter is disabled” parameters.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Filter - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.3 General Counter

The counter function increases/decreases the output value when it receives a valid telegram from its input object if its input type is object, or when the specified event occurs on the internal input if its input type is internal input.

The input and output objects types can be selected from many different types. Counter start, limit and step values are configurable.

7.3.1 General Counter Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Counting type	Cyclic Up-Down Two directions **One direction – up** One direction – down One direction – direction changeable via object	This parameter defines the function behavior. Cyclic: The counter goes up (adds the step value to current counter value) at the beginning and when it reaches its limit it returns to the start value. Counting direction can be changed with "Counting Direction" object. For example, in a counter with start value 0, limit value 3 and step value 1, the counter value goes as below: 0-1-2-3-0-1-2… Up-Down: The counter goes up (adds the step value to current counter value) at the beginning and then it changes the direction every time it reaches its limit or start values. Counting direction can be changed with "Counting Direction" object too. For example, in a counter with start value 0, limit value 3 and step value 1, the counter value goes as below: 0-1-2-3-2-1-0-1-2- … Two directions: the user selects when the function will go up (add the step value to current counter value), and when the function will go down (subtract the step value from the current counter value). For example, on telegrams for up, off telegrams for down. One direction – up: The counter goes up (adds the step value to current counter value) always and when it reaches its limit it stops counting. For example, in a counter with start value 0, limit value 3 and step value 1, the counter value goes as below: 0-1-2-3-3-3… One direction – down: The counter goes down (subtract the step value from current counter value) always and when it reaches its limit it stops counting. For example, in a counter with start value 3, limit value 0 and step value 1, the counter value goes as below: 3-2-1-0-0-0...

		One direction – direction changeable via object: The counter goes up or down according to "Counting Direction" object. It stops counting when it reaches its start or limit values.
Use counting direction object	**No** Yes	This parameter is available if "Counting type" parameter is set to "Cyclic" or "Up – Down". It enables "Counting Direction" object
Input type	**Object** Internal input	This parameter determines the input type of this function. If "Object" is selected, many parameters will be visible to let the user specify the DPT of the input object and the triggering telegram values. If "internal input" is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Input functionality	**Button pressed-released / closed – open contact** Short – long press Single – double press Single – double – triple press Single – double – triple – quadruple press	This parameter is available if "Input type" parameter is set to "Internal input". This parameter determines which events will be detected on the internal input. The user should select "Button pressed – released / closed – open contact" if "Connected device type" parameter in "Input – General Settings" page is no set to "Push button". Please note that the below events are considered equal: • "Closed contact" for connected switches / sensors on dry-contact inputs • "Rising edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is on" for connected switches / sensors on virtual inputs • "Card inserted" for connected card holders on any input type. and the below events are considered equal: • "Open contact" for connected switches / sensors on dry-contact inputs • "Falling edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is off" for connected switches / sensors on virtual inputs • "Card removed" for connected card holders on any input type. According to the selected option, a parameter will be available to select which event will trigger the counter to count.
Counter value object type	1-byte percentage 1-byte unsigned value 1-byte signed value 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value	This parameter defines the DPT of the counter's output object.
Counter value object is overwritable	**No** Yes	If "Yes" is selected, sending a value to "Counter Value" object will overwrite the current counter value.
Start value	**0%**...100%	This parameter defines the counter start value.

	0…255 -128…**0**…127 **0**…65535 -32768…**0**…32767 -670760…**18**…670760 **0**…2147483647 -2147483648…**0**…2147483647	
Limit value	0%...**100%** 0…**255** -128…**127** 0…**65535** -32768…**32767** -670760…**30**…670760 0…**2147483647** -2147483648…**2147483647**	This parameter defines the counter limit value.
Step value	0%...**1%**...100% 0…**1**…255 -128…**1**…127 0…**1**…65535 -32768…1…**32767** -670760…**1**…670760 0…**1**…2147483647 -2147483648…**1**…2147483647	This parameter defines the counter step amount.
Number of input pulses for one counter step	**1**…100000	This parameter determines how many trigger is needed to count a step. For example, if this parameter value is 10 and the input type is object, the counter will move a step each time it receives 10 proper telegram value from its input object.
Send counter value	Do not send, update only **When counter value is changed** At specific interval Cyclically only When counter value is changed and cyclically At specific interval and cyclically	This parameter defines when the function will send the counter value to the bus. If “Do not send, update only” is selected, the user can send read request to “Counter Value” object to get the current counter value. If the counter value is set to be sent at specific interval, an additional parameter will be shown to enter the interval value. The counter value will be sent to the bus if its new value is divisible by the interval value. If the counter value is set to be sent cyclically, additional parameters will be shown to enter the cycle time.
Send counter value after bus return	**No** Yes	This parameter is available if “Send counter value” parameter is not set to “Do not send, update only”. If “Yes” is selected, the function will send the loaded counter value at the start-up to the bus.
Enable “Reset Counter” object	**No** Yes	This parameter is used to enable “Reset counter” object that is used to reload the counter with its start value.
Reset when received telegram is	**Off** On Off or on	This parameter defines which value will reset the counter when it is received on “Reset Counter” object.
Enable “Alarm” object	**No** Yes	This parameter is used to enable “Alarm” object that is used to send alarm when counter value reaches a specific value.

Alarm is on when	**Limit value is reached** Specific value is reached	This parameter defines which value will trigger the alarm when the counter reaches it. If “Specific value is reached” is selected, an additional parameter will be shown to enter the alarm value.
After bus return	**Load start value** Load the reached value before bus failure	This parameter defines the behavior of the function after bus voltage return.
Overwrite counter value after download	No **Yes**	This parameter is available if “After bus return” parameter is set to “Load the reached value before bus failure”. If “No” is selected, the reached counter value before the application download operation will be loaded after the download operation. If “Yes” is selected, the counter start value will be loaded after the download operation.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function’s lock after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.3.2 General Counter Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Next Step Input* *General Counter - Previous Step Input*	1 Bit 1 Byte 1 Byte	1.001 Switch 17.001 Scene Number 5.010 Counter Pulses	C		W		

These objects are available if “Input type” parameter is set to “Object”. Previous Step Input object is available only if “Counting type” parameter is set to “Two directions”.
The DPT of these objects can be specified with “Object type” parameters.
These objects are used to trigger the counter to count when it receives a proper telegram according to “Next step at” and “Previous step at” parameters.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Counting Direction*	1 Bit	1.008 Up / Down	C		W		

This object is available if “Counting type” parameter is set to “One direction – changeable via object” or when it is set to “Cyclic” or “Up – down” and “Use “Counting Direction” object” is set to “Yes”.

It's used to change the counting direction.
When the direction is up, the counter adds the step value to the current counter value when it's triggered.
When the direction is down, the counter subtracts the step value from the current counter value when it's triggered.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Counter value*	1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes	5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed)	C	R	W	T	

The value of this object represents the reached counter value. Its DPT is specified by "Counter value object type" parameter.
If "Counter value object is overwritable" parameter is set to "Yes", writing a value to this object will overwrite the current counter value. If the written value isn't between the start and the limit values, the counter will use the start or the limit value.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Reset Counter*	1 Bit	1.001 Switch	C		W		

This object is available if "Enable "Reset Counter" object" parameter is set to "Yes".
It's used to reload the counter with its start value when it receives a telegram as specified in "Reset when received telegram is" parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Alarm*	1 Bit	1.005 Switch	C	R		T	

This object is available if "Enable "Alarm" object" parameter is set to "Yes".
It's used to send alarm when counter value reaches a specific value.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*General Counter - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if "Enable lock" parameter is set to "Yes". It is used to lock/unlock the auxiliary function.

7.4 Logic Gate

This function acts as a logic gate with maximum 8 x 1-bit input objects or internal inputs, and one output object.

The output object type can be selected from 14 types.

7.4.1 Logic Gate Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Logic gate type	**AND** OR XOR NAND NOR XNOR One hot NOT	AND: gives a true output only if all its inputs are 1. OR: gives a true output if one or more of its inputs are 1. XOR: gives a true output when the number of 1 inputs is odd. NAND: Its output is true if any of the inputs are 0. NOR: produces an output which is false only if all its inputs are 1. XNOR: gives a true output when the number of 1 inputs is even. One hot: gives a true output if there is only one input is 1. For example: The gate gives true with these input values: 0-1-0-0-0-0 or 0-0-0-0-0-1 or 1-0-0-0-0-0 The gate gives false with these input values: 0-0-0-0-0-0 or 0-1-1-0-0-0 or 1-1-1-1-1-1 NOT: produces an inverted version of the input at its output. It is also known as an inverter.
Number of used inputs	**2** … 8	This parameter is shown if the logic gate type is not “NOT” gate. It defines how many inputs the logic gate will have.
Number of used NOT gates	**1** … 4	This parameter is shown if the logic gate type is “NOT” gate. It defines how many NOT gate the auxiliary function will have.
Input x type	**1-bit object** Internal input	This parameter determines the input type of this function. If “internal input” is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Input X polarity	**Normal** Inverted	This parameter is shown if the logic gate type is not “NOT” gate. It is used to invert the input object value or the internal input signal.
Input X value after mains voltage recovery	**0** 1 As before bus failure Read from bus	This parameter is shown if the logic gate type is not “NOT” gate and “Input x type” parameter is set to “1-bit object”. If “Read from bus” is selected, the function will send read request for the input object. If no response is received, the input value will be 0.

	Block output until new telegram is received	If “Block output until new telegram is received” is selected, the output value will not be sent to the bus until the logic gate receives a telegram from this input.
Output object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter is shown if the logic gate type is not “NOT” gate. This parameter defines the DPT of the output object of the logic gate, and according to its value two parameters will be shown to specify the output values for true and false.
Send output telegram when	**Input is updated** Output changes	If “Input is updated” is selected, the gate will send an output telegram every time a telegram is sent to an input object or the internal input state changes even if the output state didn’t change. If “Output changes” is selected, the gate will send an output telegram only when its output state changes from true to false or from false to true.
Send output value after delay	**No** Yes	This parameter is shown if the logic gate type is not “NOT” gate. It enables a delay before sending the output value.
Delay time unit	Second **Minute** Hour Day	This parameter defines the unit of the delay time before the output value is sent.
Delay time value	**1**…255	This parameter defines the value of the delay time before the output value is sent.
Send output cyclically	**No** Yes	This parameter is shown if the logic gate type is not “NOT” gate. It enables sending the output value cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated output telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated output telegrams.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function’s lock after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.4.2 Logic Gate Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n *AF n*	*Logic Gate - Input x* *NOT Gate x - Input*	1 Bit	1.002 Boolean	C		W	T	U

The input objects of the logic gate. They are available if “Input x type” parameter is set to “1-bit object”.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Logic Gate - Output*	1 Bit	1.001 Switch	C	R		T	
AF n	*Logic Gate - Output*	1 Bit	1.008 Up / Down					
AF n	*Logic Gate - Output*	1 Bit	1.007 Step					
AF n	*Logic Gate - Output*	1 Bit	1.017 Trigger					
AF n	*Logic Gate - Output*	2 Bits	2.001 Switch Control					
AF n	*Logic Gate - Output*	4 Bits	3.007 Dimming Control					
AF n	*Logic Gate - Output*	1 Byte	18.001 Scene Control					
AF n	*Logic Gate - Output*	1 Byte	5.001 Percentage					
AF n	*Logic Gate - Output*	1 Byte	5.010 Counter pulses					
AF n	*Logic Gate - Output*	1 Byte	6.010 Counter pulses					
AF n	*Logic Gate - Output*	1 Byte	20.102 HVAC mode					
AF n	*Logic Gate - Output*	2 Bytes	7.001 Pulses					
AF n	*Logic Gate - Output*	2 Bytes	8.001 Pulses Difference					
AF n	*Logic Gate - Output*	2 Bytes	9.001 Temperature					
AF n	*Logic Gate - Output*	4 Bytes	12.001 Counter Pulses (Unsigned)					
AF n	*Logic Gate - Output*	4 Bytes	13.001 Counter Pulses (Signed)					
AF n	*Logic Gate - Output*	4 Bytes	14.000 Acceleration					
AF n	*NOT Gate x- Output*	1 Bit	1.002 Boolean					

The output object of the logic gate. Its DPT is specified by “Output object type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Logic Gate - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.5 Min/Max/Average Value Calculator

The value calculator calculates the minimum, the maximum or the average value of many input object values.

7.5.1 Min/Max/Average Value Calculator Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Objects type	1-byte percentage 1-byte unsigned value 1-byte signed value 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter determines the DPT of the input objects and the output object of the calculator.
Inputs number	**2** … 8	This parameter defines how many inputs the function will have.
Output value is	**The largest value of the inputs** The smallest value of the inputs The average value of the inputs	This parameter determines the type of the calculator. Note: When “the average value of the inputs” is selected, the sum of the input values must be less than 2147483648 and bigger than -2147483648. If the sum of the input values exceeds 2147483648 the calculator may give wrong output values.
Send output when	**Input is updated** Output value is changed	If “Input is updated” is selected, the calculator will send an output telegram every time a telegram is sent to an input object even if the output value didn’t change. If “Output changes” is selected, the calculator will send an output telegram only when output value changes.
Function behavior after bus return	**Use only received inputs values** Block output until all inputs are updated Send read request for all input objects	This parameter defines the behavior of the calculator after bus return. If “Block output until all inputs are updated” is selected, the calculator will send output values only if all input objects had received one telegram at least. If “Send read request for all input object” is selected, the calculator will send read request for all input objects, then it will use the received values only.
Send output value after delay	**No** Yes	This parameter enables a delay before sending the output value.
Delay time unit	Second **Minute**	This parameter defines the unit of the delay time before the output value is sent.

	Hour Day	
Delay time value	**1**…255	This parameter defines the value of the delay time before the output value is sent.
Send output cyclically	**No** Yes	This enables sending the output value cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated output telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated output telegrams.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function’s lock after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.5.2 Min/Max/Average Value Calculator Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Value Calculator - Input x*	1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C	R	W	T	U

The input objects of the calculator. The number of input objects is determined with “Inputs number” parameter. Its DPT is specified with “Objects type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Value Calculator - Output*	1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes	5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature	C	R		T	

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
		4 Bytes 4 Bytes 4 Bytes	12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration					

The output object of the calculator. Its DPT is specified with “Objects type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Value Calculator - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.6 Monitor

The monitor observes the status of an internal input or received telegrams of an object. It sends an alarm telegram if the input state or input object is not updated with the event or value specified in the parameters within a certain period of time.

7.6.1 Monitor Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Monitor time unit	Second Minute **Hour** Day	This parameter defines the unit of the monitoring time.
Monitor time value	**1**…255	This parameter defines the value of the monitoring time.
Input type	**Object** Internal input	This parameter determines the input type of this function. If “Object” is selected, a parameter will be visible to let the user specify the DPT of the input object. If “internal input” is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Reset monitor timer at	**Any telegram value** Specific telegram value	This parameter is visible if “Input type” is set to “Object”. It determines that telegram value that will reset the monitoring timer when it’s received. If “Specific telegram value” is selected, a parameter will be available to enter the telegram value that will reset the monitor.
Reset monitor timer when	**Button is released / Contact is open** Button is pressed / Contact is closed Button state is changed / Contact state is changed	This parameter is visible if “Input type” is set to “Internal input”. It determines the signal that will reset the monitoring timer when it’s newly detected. Please note that the below events are considered equal: • “Closed contact” for connected switches / sensors on dry-contact inputs • “Rising edge” for connected switches / sensors on 10-230V AC/DC inputs • “Simulate input signal object is on” for connected switches / sensors on virtual inputs • “Button pressed” for connected push buttons on any input type. • “Card inserted” for connected card holders on any input type. and the below events are considered equal:

		• "Open contact" for connected switches / sensors on dry-contact inputs • "Falling edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is off" for connected switches / sensors on virtual inputs • "Button released" for connected push buttons on any input type. • "Card removed" for connected card holders on any input type.
Send monitor alarm telegram	Do not sent, update only **On change**	"Don't send, update only": "*Monitor Alarm*" object value is updated when the alarm status is changed but not sent to the bus. The user can read the object value manually. "On change": The alarm status is sent to the bus when it is changed.
Send monitor alarm cyclically	**No** Only when alarm is off Only when alarm is on Always	This parameter determines when to send the alarm status cyclically.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated alarm status telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated alarm status telegrams.
Enable "Additional Alarm" object	**No** Yes	An additional alarm object with configurable DPT can be used to send specific telegrams when the alarm status is changed. If "Yes" is selected, many parameters will be available to let the user specify the DPT of "Additional Alarm" object and the telegram values to send when the alarm becomes on or off.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.6.2 Monitor Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Monitor - Input*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control	C		W		

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
		4 Bits	3.007 Dimming Control					
		1 Byte	18.001 Scene Control					
		1 Byte	5.001 Percentage					
		1 Byte	5.010 Counter pulses					
		1 Byte	6.010 Counter pulses					
		1 Byte	20.102 HVAC mode					
		2 Bytes	7.001 Pulses					
		2 Bytes	8.001 Pulses Difference					
		2 Bytes	9.001 Temperature					
		4 Bytes	12.001 Counter Pulses (Unsigned)					
		4 Bytes	13.001 Counter Pulses (Signed)					
		4 Bytes	14.000 Acceleration					

The input object is available if “Input type” parameter is set to “Object”. Its DPT is specified with “Input object type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Monitor - Alarm*	1 Bit	1.005 Switch	C	R		T	

This object value represents the alarm status of the function.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Monitor - Additional Alarm*	1 Bit	1.001 Switch	C	R		T	
		1 Bit	1.008 Up / Down					
		1 Bit	1.007 Step					
		1 Bit	1.017 Trigger					
		2 Bits	2.001 Switch Control					
		4 Bits	3.007 Dimming Control					
		1 Byte	18.001 Scene Control					
		1 Byte	5.001 Percentage					
		1 Byte	5.010 Counter pulses					
		1 Byte	6.010 Counter pulses					
		1 Byte	20.102 HVAC mode					
		2 Bytes	7.001 Pulses					
		2 Bytes	8.001 Pulses Difference					
		2 Bytes	9.001 Temperature					
		4 Bytes	12.001 Counter Pulses (Unsigned)					
		4 Bytes	13.001 Counter Pulses (Signed)					
		4 Bytes	14.000 Acceleration					

This object is available if “Enable “Additional Alarm” object” parameter is set to “Yes”. It is used to send specific telegrams when the alarm status is changed.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Monitor - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.7 Presence Detector Controller

Presence detector controller function is used to control the lights according to presence information that is supplied from a presence detector. When the detector detects a motion the lights are switched on immediately, when it stops detecting motion for a specific time the lights are switched off. The delay between the last motion detection and switching the lights off is configurable with a parameter and an object.

7.7.1 Presence Detector Controller Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Input type	**1-bit object** Internal input	This parameter determines the input type of this function. If "1-bit object" is selected, "Input" object will be available. The received on telegrams from this object indicate a motion is started, and the received off telegrams indicate the motion is stopped. If "internal input" is selected, a parameter will be visible to let the user specify the number of the internal input that will be used. "Contact closed", "Rising edge" and "simulate input object is on" signals from this input indicate a motion is started, and "Contact open", "Falling edge" and "simulate input object is off" signals indicate the motion is stopped.
Output object type	**1-bit switch** 1-byte percentage	This parameter determines the DPT of the output object. If "1-bit switch" is selected, on telegrams will be sent to switch the lights on and off telegrams to switch them off. If "1-byte percentage" is selected, the user can specify the telegram values for switching the lights on and off with additional two parameters.
Delay before switching off	00:00:00…**00:01:00**…09:06:07	When the detection of a presence is finished, the controller sets a delay timer, and when its time is elapsed the controller switches the lights off. If a motion is detected while the timer is running, then the timer is restarted.
Enable "Set Delay Time" object	**No** Yes	This function is used to enable "Set Delay Time" object that is used to change the switching off delay time from an object.
Overwrite delay time value with download	No **Yes**	"No": the delay time that is used before the application download operation will be used after the download operation. "Yes": the delay time in "Delay before switching off" parameter will be used after the download operation.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.

Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.7.2 Presence Detector Controller Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Presence Detector Controller - Input*	1 Bit	1.001 Switch	C		W		

The input object is available if "Input type" parameter is set to "1-bit object". The received on telegrams from this object indicate a motion is started, and the received off telegrams indicate the motion is stopped.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Presence Detector Controller – Output*	1 Bit 1 Byte	1.001 Switch 5.001 Percentage	C	R		T	

This object DPT is specified with "Output object type" parameter. It is used to switch the lights on and off.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Presence Detector Controller – Set Delay Time*	2 Bytes	7.005 time (s)	C		W		

This object is available if "Enable "Set Delay Time" object" parameter is set to "Yes". It is used to change the switching off delay time. Maximum acceptable value is 32,767 seconds (equals to 09:06:07). The received values are saved to use them after bus voltage failures too.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Presence Detector Controller - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if "Enable lock" parameter is set to "Yes". It is used to lock/unlock the auxiliary function.

7.8 Scene Actuator

Scene actuator function has one scene/internal input and 8 outputs. It sends the configured output values when it receives the set scene number from its input object or the set signal from its internal input. The output values can be from different types.
Scene actuator values can be overridden with save feature.
A delay time can be set before sending the telegram of the first output, and another delay time between the outputs' telegrams.

7.8.1 Scene Actuator Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Input type	**Scene number object** Internal input	This parameter determines the input type of this function. If "internal input" is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Scene number for actuating	**1**…64	This parameter is available if "Input type" parameter is set to "Scene number object". It defines the scene number that will trigger the function to send its output telegrams.
Save output values with learn telegrams	**No** Yes	This parameter is available if "Input type" parameter is set to "Scene number object". If "Yes" is selected, the output values can be overwritten with the last sent values to the output objects when a learn scene telegram is received. Note: Output values "Toggle", "Up – Down", "Decrease – Increase / Step up - Step down" for 1-bit objects and "Decrease – Increase" for 4-bit dimming control objects cannot be overwritten.
Stop sending telegrams if a scene with different number is called	**No** Yes	This parameter is available if "Input type" parameter is set to "Scene number object". Due to the configurable time delays parameters of the scene actuator function, actuating a scene may take a long time and may not be executed immediately. If "Yes" is selected, the scene actuator will stop sending its output telegrams when it receives a different scene number than its scene number. For example: "Yes" should be selected when "Good bye" scene number is wanted to cancel "Welcome" scene number because they have opposite operations.
Internal input functionality	**Button pressed-released / closed – open contact**	This parameter is available if "Input type" parameter is set to "Internal input".

	Short – long press Single – double press Single – double – triple press Single – double – triple – quadruple press	This parameter determines which events will be detected on the internal input. The user should select "Button pressed – released / closed – open contact" if "Connected device type" parameter in "Input – General Settings" page is no set to "Push button". Please note that the below events are considered equal: • "Closed contact" for connected switches / sensors on dry-contact inputs • "Rising edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is on" for connected switches / sensors on virtual inputs • "Card inserted" for connected card holders on any input type. and the below events are considered equal: • "Open contact" for connected switches / sensors on dry-contact inputs • "Falling edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is off" for connected switches / sensors on virtual inputs • "Card removed" for connected card holders on any input type. According to the selected option, a parameter will be available to select which event will trigger the function to send its output telegrams.
Save output values	**No** Yes	This parameter is available if "Input type" parameter is set to "Internal input". If "Yes" is selected, a parameter will be available to select which event will trigger the function to overwrite the output objects values with the last sent values. Note: Output values "Toggle", "Up – Down", "Decrease – Increase / Step up - Step down" for 1-bit objects and "Decrease – Increase" for 4-bit dimming control objects cannot be overwritten.
Overwrite output values at download	No **Yes**	If "No" is selected, the previously downloaded or learned output values will persist after the ETS download operation, and the new downloaded output values will be ignored. If "Yes" is selected, the downloaded output values will overwrite the previously downloaded or learned ones. Note: If "No" will be selected, the output types shouldn't be changed else the output values are undefined.
Enable actuating startup delay	**No** Yes	This parameter enables a delay before sending the first output value to the bus. If "Yes" is selected, two parameters will be shown to enter the unit and the value of the delay time.
Enable delay between output telegrams	**No** Yes	This parameter enables a delay between the output telegrams. If "Yes" is selected, two parameters will be shown to enter the unit and the value of the delay time.

Output x type	**Not used** 1-bit switch 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter defines the DPT of the x-th output object and according to its value additional parameter/s will be shown to specify the output values. If "Not used" is selected no telegram is sent for this output.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.8.2 Scene Actuator Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Scene Actuator - Scene Number Input*	1 Byte	18.001 Scene Control	C			T	

This object is available if "Input type" parameter is set to "Scene number object". Sending a scene number that matches the value of "Scene number for actuating" parameter to this object, triggers the scene actuator to start sending its output values.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Scene Actuator - Output x*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses	C		W	T	

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
		2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration					

This object is available if the “Output x type” parameter is not set to “Not used”.
Its DPT is specified with “Output x type” parameter.
It sends the x-th output value when the scene actuator is triggered.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Scene actuator - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It’s used to lock/unlock the auxiliary function.

7.9 Send After Delay

Send after delay function has one input and one output objects. It sends the received telegrams from its input object to its output object after a specific delay time. If a telegram is received before the delay time of a previous received telegram elapses, the previous telegram is ignored and the new telegram is sent to the output after the delay time.

7.9.1 Send After Delay Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter determines the DPT of the input and the output objects.
Delay time	00:00:00…**00:01:00**…09:06:07	This parameter determines the delay time before resending the received telegram from the input to the output.
Delay time is applied for	**All values** Specific value All values except specific value	This parameter determines which telegram values will be delayed. If “specific value” or “All values except specific value” is selected, an additional parameter will be available to enter the specific value. When the delay time is not applied for a telegram, it is redirected immediately to the output when it is received.
Enable “Set Delay Time” object	**No** Yes	This function is used to enable “Set Delay Time” object that is used to change the delay time from an object.
Overwrite delay time value with download	No **Yes**	“No”: the delay time that is used before the application download operation will be used after the download operation. “Yes”: the delay time in “Delay time” parameter will be used after the download operation.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.

Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.9.2 Presence Detector Controller Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Delay - Input*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C		W		

The input object of the function. Its DPT is specified with "Object type" parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Delay – Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C			T	

The output object of the function. Its DPT is specified with "Object type" parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Delay– Set Delay Time*	2 Bytes	7.005 time (s)	C		W		

This object is available if “Enable “Set Delay Time” object” parameter is set to “Yes”. It is used to change the delay time. Maximum acceptable value is 32,767 seconds (equals to 09:06:07). The received values are saved to use them after bus voltage failures too.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Delay - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.10 Send After Reset

Send after reset function can be used to:

1- Send a telegram with specific value or a read request when the device starts up.
2- Save the last sent value before an electric cut off and resend it when the bus voltage returns.
3- Send a read request or a telegram cyclically to the bus.

7.10.1 Send After Reset Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
After reset send	**Value telegram** Read request	This parameter defines what to send after reset.
Output object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter defines the DPT of the output object of this function.
Output value	Parameter values are shown according to the selected object type.	This parameter is available if “After reset send” parameter is set to “Value telegram”. It defines the telegram value that will be sent after reset.
Overwrite output value when a telegram is received	**No** Yes	This parameter is available if “After reset send” parameter is set to “Value telegram”. If “Yes” is selected, receiving a telegram from the output object overwrites the output value. This feature can be used to save the last sent value before an electric cut off and resend it when the bus voltage returns.
Send output after delay	**No** Yes	This parameter enables a delay before sending the output value at startup.
Delay time unit	Second **Minute**	This parameter defines the unit of the delay time before the output value is sent.

	Hour Day	
Delay time value	**1**…255	This parameter defines the value of the delay time before the output value is sent.
Send output cyclically	**No** Yes	This parameter enables sending the output value cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated output telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated output telegrams.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function’s lock after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.10.2 Send After Reset Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Reset - Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C	R	W	T	U

This object DPT is specified with “Output object type” parameter.
It sends the output value or read request after the device starts up according to the set parameters.
If “Overwrite output value when a telegram is received” parameter is set to “Yes”, receiving a telegram from this object overwrites the output value.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send After Reset - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.11 Send Cyclically

Send cyclically function has one input and one output objects. It sends the received telegrams from its input object to its output object immediately then cyclically. If a telegram is received before the cycle time of a previous received telegram elapses, the previous telegram is ignored and the new telegram is sent to the output immediately then cyclically.

7.11.1 Send Cyclically Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter determines the DPT of the input and the output objects.
Cycle time	00:00:00…**00:01:00**…09:06:07	This parameter determines the cycle time between the repeated sent telegrams.
Cycle time is applied for	**All values** Specific value All values except specific value	This parameter determines the telegram values that will be sent cyclically. If “specific value” or “All values except specific value” is selected, an additional parameter will be available to enter the specific value. When the cycle time is not applied for a telegram, it is redirected immediately to the output when it is received and not sent cyclically.
Enable “Set Cycle Time” object	**No** Yes	This function is used to enable “Set Cycle Time” object that is used to change the cycle time from an object.
Overwrite cycle time value with download	No **Yes**	“No”: the cycle time that is used before the application download operation will be used after the download operation. “Yes”: the cycle time in “Cycle time” parameter will be used after the download operation.

Limit cyclically sending count	**No** Yes	"No": the received telegrams from the input will be sent to the output cyclically forever. "Yes": the received telegrams from the input will be sent to the output cyclically a certain number of times.
Cycling count	1…**10**…65535	This parameter determines how many times a telegram will be sent cyclically.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.11.2 **Send Cyclically Group Objects**

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send Cyclically - Input*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C		W		

The input object of the function. Its DPT is specified with "Object type" parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send Cyclically – Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage	C			T	

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
		1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration					

The output object of the function. Its DPT is specified with “Object type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send Cyclically – Set Cycle Time*	2 Bytes	7.005 time (s)	C		W		

This object is available if “Enable “Set Cycle Time” object” parameter is set to “Yes”. It is used to change the cycle time. Maximum acceptable value is 32,767 seconds (equals to 09:06:07). The received values are saved to use them after bus voltage failures too.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Send Cyclically - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.12 Sequencer

The sequencer function sends the next/previous step value when it receives a valid telegram from its input object if its input type is object, or when the specified event occurs on the internal input if its input type is an internal input.

The number of steps is configurable. An additional 1-bit telegram can be sent with specific value for each step along side with output telegram. The output object type can be different for each step, or the same for all steps.

7.12.1 Sequencer Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Sequencing type	**Cyclic** Up-Down Two directions	This parameter defines the function behavior. Cyclic: The function goes up always and when it reaches its last step it returns to the first step. For example, in a sequencer with 3 steps the sequence goes as below: Step 1 – Step 2 –Step 3 – Step1 – Step 2… Up-Down: The function goes up at the beginning and then it changes the direction every time it reaches its limits. For example, in a sequencer with 3 steps the sequence goes as below: Step 1 – Step 2 –Step 3 – Step2 – Step 1 – Step 2 – Step 3 … Two directions: the user selects when the sequencer will go up, and when it will go down. For example, on telegrams for up and off telegrams for down.
Input type	**Object** Internal input	This parameter determines the input type of this function. If “Object” is selected, a parameter will be visible to let the user specify the DPT of the input object and the triggering telegram values. If “internal input” is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Input functionality	**Button pressed-released / closed – open contact** Short – long press Single – double press Single – double – triple press Single – double – triple – quadruple press	This parameter is available if “Input type” parameter is set to “Internal input”. This parameter determines which events will be detected on the internal input. The user should select “Button pressed – released / closed – open contact” if “Connected device type” parameter in “Input – General Settings” page is no set to “Push button”. Please note that the below events are considered equal: • “Closed contact” for connected switches / sensors on dry-contact inputs

		• "Rising edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is on" for connected switches / sensors on virtual inputs • "Card inserted" for connected card holders on any input type. and the below events are considered equal: • "Open contact" for connected switches / sensors on dry-contact inputs • "Falling edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is off" for connected switches / sensors on virtual inputs • "Card removed" for connected card holders on any input type. According to the selected option, a parameter will be available to select which event will trigger the sequencer to step.
Number of steps	**2**…5	This parameter defines how many step will be used in the sequencer function.
Number of output objects	**One output object for all steps** One output object for each step	This parameter defines how many object will be used for the steps. If "One output object for each step" is selected, each step can have an independent object with a different DPT.
Use additional 1-bit output object	**No** Yes	This parameter enables an additional 1-bit object that can be used to send a 1-bit telegram with a specific value for each step along side with the step output telegram. If it is enabled, further parameters will be shown to enable the user to enter the additional 1-bit object value for each step.
Output object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value 1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	This parameter is available if "Number of output objects" parameter is set to "One output object for all steps". It defines the DPT of the sequencer's output object.
Step x output object type	**1-bit switch** 1-bit up/down 1-bit step 1-bit trigger 2-bit priority 4-bit dimming control Scene number 1-byte percentage 1-byte unsigned value	This parameter is available if "Number of output objects" parameter is set to "One output object for each step". It defines the DPT of a step output object.

	1-byte signed value HVAC mode 2-byte unsigned value 2-byte signed value 2-byte float 4-byte unsigned value 4-byte signed value 4-byte float	
Step x output value	Parameter values are shown according to the selected object type.	This parameter defines the telegram value that will be sent through the step/s object when the step is reached.
Step x additional 1-bit object value	**Off** On	This parameter is available if "Use additional 1-bit output object" parameter is set to "Yes". This parameter defines the telegram value that will be sent through the additional 1-bit object when the step is reached.
After bus return start from	**Step 1** Last sent step before bus failure	This parameter defines the behavior of the function after bus voltage return.
Send output value after delay	**No** Yes	This parameter enables a delay before sending the output value.
Delay time unit	Second **Minute** Hour Day	This parameter defines the unit of the delay time before the output value is sent.
Delay time value	**1**…255	This parameter defines the value of the delay time before the output value is sent.
Send output cyclically	**No** Yes	This parameter enables sending the output value cyclically to the bus.
Cycle time unit	Second **Minute** Hour Day	This parameter defines the unit of the time period between the repeated output telegrams.
Cycle time value	**1**…255	This parameter defines the value of the time period between the repeated output telegrams.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.12.2 Sequencer Group Objects

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Sequencer - Next Step Input* *Sequencer - Previous Step Input*	1 Bit 1 Byte 1 Byte	1.001 Switch 17.001 Scene Number 5.010 Counter Pulses	C		W		

These objects are available if “Input type” parameter is set to “Object”. Previous Step Input object is available only if “Counting type” parameter is set to “Two directions”.
The DPT of these objects can be specified with “Object type” parameters.
These objects are used to trigger the sequencer to step when it receives a proper telegram according to “Next step at” and “Previous step at” parameters.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Sequencer - Output*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C	R		T	

This object is available if “Number of output objects” parameter is set to “One output object for all steps”. Its DPT is specified by “Output object type” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Sequencer - Output x*	1 Bit 1 Bit 1 Bit 1 Bit 2 Bits 4 Bits 1 Byte 1 Byte 1 Byte 1 Byte 1 Byte 2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	1.001 Switch 1.008 Up / Down 1.007 Step 1.017 Trigger 2.001 Switch Control 3.007 Dimming Control 18.001 Scene Control 5.001 Percentage 5.010 Counter pulses 6.010 Counter pulses 20.102 HVAC mode 7.001 Pulses 8.001 Pulses Difference 9.001 Temperature 12.001 Counter Pulses (Unsigned) 13.001 Counter Pulses (Signed) 14.000 Acceleration	C	R		T	

This object is available if “Number of output objects” parameter is set to “One output object for each step”. Its DPT is specified by “Step x output object type” parameter.
It represents the output object of one step in the sequencer function.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Sequencer - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.13 Staircase Controller

Staircase controller function is used to switch the lights on when it is triggered, then switch them off automatically after a specific period. The function can give the user a warning before switching the lights off.

7.13.1 Staircase Controller Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Input type	**1-bit object** Internal input	This parameter determines the input type of this function. If "1-bit object" is selected, "Input" object will be available. The received on telegrams from this object triggers the function to switch the lights on. If "internal input" is selected, a parameter will be visible to let the user specify the number of the internal input that will be used. "Contact closed", "Rising edge", "simulate input object is on", "Button pressed" and "Card inserted" signals from this input triggers the function to switch the lights on. "Contact open", "Falling edge", "simulate input object is off", "Button released" and "Card removed" signals have no effect.
Manual switch off with received off telegrams	**No** Yes	This parameter is available if "Input type" parameter is set to "1-bit object". If "Yes" is selected, receiving off telegram from the input forces the function to switch off the lights immediately. If "No" is selected, off telegrams are ignored.
Output object type	**1-bit switch** 1-byte percentage	This parameter determines the DPT of the output object. If "1-bit switch" is selected, on telegrams will be sent to switch the lights on and off telegrams to switch them off. If "1-byte percentage" is selected, the user can specify the telegram values for switching the lights on and off with additional two parameters.
Light-on time	00:00:00…**00:02:00**…09:06:07	This parameter determines the time the lights will remain on after triggering the function.
Enable "Set Light-on" object	**No** Yes	This function is used to enable "Set Light-on Time" object that is used to change the light-on time from an object.
Staircase timer is retriggerable	**No** Yes	If "Yes" is selected, retriggering the function during the light-on time resets the timer. If "No" is selected, retriggering the function during the light-on time has no effect.

Overwrite delay time value with download	No **Yes**	"No": the light-on time that is used before the application download operation will be used after the download operation. "Yes": the light-on time in "Light-on time" parameter will be used after the download operation.
Switch off prewarning	**Disabled** Enabled	This parameter is used to warn the user that the lights will be switched off soon. Its behavior differs according to output object type. For 1-bit switch output object: Two additional times will be entered by the user "Prewarning off time" and "Prewarning on time". When light-on time is elapsed, the lights are switched off for "Prewarning off time" then switched on for "Prewarning on time" then switched off permanently. If the function is triggered during "Prewarning off time" or "Prewarning on time" the lights are switched on and the timer is reset. For 1-byte percentage output object: One additional time "Prewarning time" and one dimming value "Prewarning value" will be entered by the user. When the light-on time is elapsed, the lights are dimmed to "Prewarning value" level for "Prewarning time" then they are dimmed to "switch off value". If the function is triggered during "Prewarning time" the lights are dimmed to "switch on value" and the timer is reset.
Enable lock	**No** Yes	This function enables "Lock" object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function's lock after bus voltage return. If "Read from bus" is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.13.2 **Staircase Controller Group Objects**

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Staircase Controller - Input*	1 Bit	1.001 Switch	C		W		

The input object is available if "Input type" parameter is set to "1-bit object". Receiving on telegrams from this object triggers the function, and the receiving off telegrams may or may not switch the lights off according to "Manual switch off with received off telegrams".

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Staircase Controller – Output*	1 Bit 1 Byte	1.001 Switch 5.001 Percentage	C	R		T	

This object DPT is specified with “Output object type” parameter. It is used to switch the lights on and off.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Staircase Controller – Set Light-on Time*	2 Bytes	7.005 time (s)	C		W		

This object is available if “Enable “Set Light-on Time” object” parameter is set to “Yes”. It is used to change the light-on time. Maximum acceptable value is 32,767 seconds (equals to 09:06:07). The received values are saved to use them after bus voltage failures too.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Staircase Controller - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

7.14 Working Time Counter

The working time counter allows to count the time that a KNX device remains on or an internal input remains active. Also, it can give an alarm when the working time reaches a specific value.

7.14.1 Working Time Counter Parameters

Name	Values	Description
Auxiliary function name		The user can give the auxiliary function a name for documentation purposes. This parameter value has no effect on the function work.
Input type	**1-bit object** Internal input	This parameter determines the input type of this function. If "internal input" is selected, a parameter will be visible to let the user specify the number of the internal input that will be used.
Input object value after bus return	**Off** On Read from bus As before bus failure	This parameter is shown if "Input type" parameter is set to "1-bit object". If "Read from bus" is selected, the function will send read request for the input object. If no response is received, the input value will be off.
Input polarity	**Normal** Inverted	This parameter is used to invert the input object value or the internal input signal. "Normal": If input type is 1-bit object, the counter will count the time the input object value remains on. If input type is internal input, the counter will count the time the input signal remains: • "Closed contact" for connected switches / sensors on dry-contact inputs • "Rising edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is on" for connected switches / sensors on virtual inputs • "Button pressed" for connected push buttons on any input type • "Card inserted" for connected card holders on any input type. "Inverted": If input type is 1-bit object, the counter will count the time the input object value remains off. If input type is internal input, the counter will count the time the input signal remains: • "Open contact" for connected switches / sensors on dry-contact inputs • "Falling edge" for connected switches / sensors on 10-230V AC/DC inputs • "Simulate input signal object is off" for connected switches / sensors on virtual inputs • "Button released" for connected push buttons on any input type • "Card removed" for connected card holders on any input type.

Counting direction	**Decrement** Increment	"Decrement": the counter will be loaded with "Counter start value" at the beginning and it will count down to 0. "Increment": the counter will be loaded with 0 at the beginning and it will count up to "Counter limit value".
Counter time unit	Second Minute **Hour**	This parameter determines the time unit of the counter.
Counter start value	1…**10000**…65535	This parameter is available if "Counting direction" parameter is set to "Decrement". It determines the value that the timer will load it at the beginning.
Counter limit value	1…**1000**…65535	This parameter is available if "Counting direction" parameter is set to "Increment". It determines the value that the timer will count up to it.
Counter value object type	2-byte unsigned value 4-byte unsigned value	This parameter defines the DPT of "Counter Value" object.
Counter value object is overwritable	**No** Yes	If "Yes" is selected, sending a value to "Counter Value" object will overwrite the current counter value.
Send counter value	Do not send, update only **When counter value is changed** At specific interval Cyclically only When counter value is changed and cyclically At specific interval and cyclically	This parameter defines when the function will send the counter value to the bus. If "Do not send, update only" is selected, the user can send read request to "Counter Value" object to get the current counter value. If the counter value is set to be sent at specific interval, an additional parameter will be shown to enter the interval value. The counter value will be sent to the bus if its new value is divisible by the interval value. If the counter value is set to be sent cyclically, additional parameters will be shown to enter the cycle time.
Send counter value after bus return	**No** Yes	This parameter is available if "Send counter value" parameter is not set to "Do not send, update only". If "Yes" is selected, the function will send the loaded counter value at the start-up to the bus.
Enable "Reset Counter" object	**No** Yes	This parameter is used to enable "Reset counter" object that is used to reload the counter with its start value when "Counting direction" is "Decrement" or with 0 value when "Counting direction" is "Increment".
Reset when received telegram is	**Off** On Off or on	This parameter defines the value that will reset the counter when it is received on "Reset Counter" object.
Enable "Alarm" object	**No** Yes	This parameter is used to enable "Alarm" object that is used to send alarm when counter value reaches a specific value.
Alarm is on when	**Counter time is elapsed** Specific value is reached	This parameter defines the value that will trigger the alarm when the counter reaches it.

		If “Specific value is reached” is selected, an additional parameter will be shown to enter the alarm value.
After bus return	**Reset** Load the reached value before bus failure	This parameter defines the behavior of the function after bus voltage return.
Overwrite counter value after download	No **Yes**	This parameter is available if “After bus return” parameter is set to “Load the reached value before bus failure”. If “No” is selected, the reached counter value before the application download operation will be loaded after the download operation. If “Yes” is selected, after the download operation the counter will be loaded with its start value when “Counting direction” is “Decrement” or with 0 value when “Counting direction” is “Increment.
Enable lock	**No** Yes	This function enables “Lock” object that is used to lock the auxiliary function.
Lock status after bus return	**Unlocked** Locked Read from bus As before bus failure	This parameter determines the status of the function’s lock after bus voltage return. If “Read from bus” is selected, the device will send a read request for the lock object of the function, if no response is received the function will be unlocked.

7.14.2 **Working Time Counter Group Objects**

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Working Time Counter - Input*	1 Bit	1.001 Switch	C		W		

This object is available if “Input type” parameter is set to “1-bit object”.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Working Time Counter - Counter value*	2 Bytes 2 Bytes 2 Bytes 4 Bytes 4 Bytes 4 Bytes	7.005 Time(s) 7.006 Time(m) 7.007 Time(h) 12.100 Counter Time (s) 12.101 Counter Time (min) 12.102 Counter Time (h)	C	R	W	T	

The value of this object represents the reached counter value. Its DPT is specified by “Counter time unit” and “Counter value object type” parameters.
If “Counter value object is overwritable” parameter is set to “Yes”, writing a value to this object will overwrite the current counter value. If the written value is larger than the start or the limit value, the counter will use the start or the limit value.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Working Time Counter - Reset Counter*	1 Bit	1.001 Switch	C		W		

This object is available if “Enable “Reset Counter” object” parameter is set to “Yes”.
It’s used to reload the counter with its start value if “Counting direction” is “Decrement” or with 0 value if “Counting direction” is “Increment” when it receives a telegram as specified in “Reset when received telegram is” parameter.

Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Working Time Counter - Alarm*	1 Bit	1.005 Switch	C	R		T	

This object is available if “Enable “Alarm” object” parameter is set to “Yes”.
It’s used to send alarm when counter value reaches a specific value.

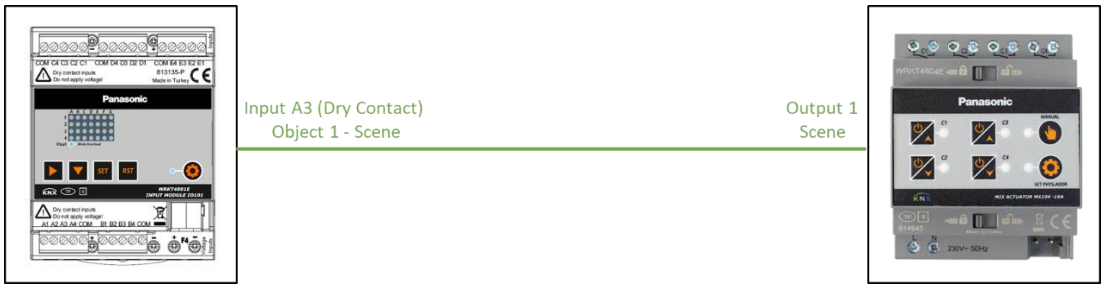
Object Name	Function	Size	Datapoint Type	Flags				
				C	R	W	T	U
AF n	*Working Time Counter - Lock*	1 Bit	1.003 Enable	C	R	W	T	U

This object is available if “Enable lock” parameter is set to “Yes”. It is used to lock/unlock the auxiliary function.

8 Some Examples of Typical Applications

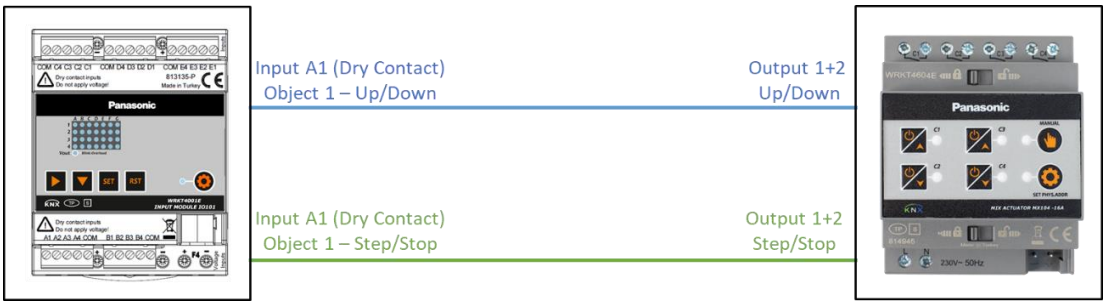
8.1 Controlling Lights with Panasonic Card Holder

KNX Input Modules have voltage output port can be used to supply one of the supported devices/sensors. In this example, Panasonic Card Holder is connected to KNX Input Module and its power is supplied from Vout as described in “2.6.4 Vout connection” section.
KNX Input Module is programmed to call a scene to turn on the lights when a card is inserted into the card holder. The lights are turned off after 1 minute from removing the card from the card holder.
More KNX devices can be linked to the address of the scene object and be programmed to do some actions when the card is inserted or removed.

Used devices	KNX Input Module (WRKT400XE5NC) with Panasonic Card Holder connected to Vout and A3 KNX Mix Actuator 4 Channels MX104 (WRKT4604E)
Objects linking	
KNX Input Module parameters	• Enable Inputs – Enable Vout: Yes • Enable Inputs – Physical Inputs – A3: ✓ • Input A3 – General – Connected device type: Card holder • Input A3 – General – Card holder operating mode: Card inserted = open contact, card removed = closed contact • Input A3 – General – Enable signal delay: Yes • Input A3 – General – Delay at: Card removed signal • Input A3 – General – Card removed signal delay unit: Second • Input A3 – General – Card removed signal delay value: 60 • Input A3 – Function – Object 1 – Object type: Scene number • Input A3 – Function – Object 1 – When card is inserted – Send telegram: Yes, Call scene 1 • Input A3 – Function – Object 1 – When card is removed – Send telegram: Yes, Call scene 2
KNX Mix Actuator parameters	• Group 1 – Output 1 Selection: Switching (Lighting) • Output 1 Lighting Settings – Scene: Enabled • Output 1 Lighting Settings – Scene – Scene1: Enabled, scene number 1, On • Output 1 Lighting Settings – Scene – Scene2: Enabled, scene number 2, Off
	The unmentioned parameters can be the default or user defined parameters

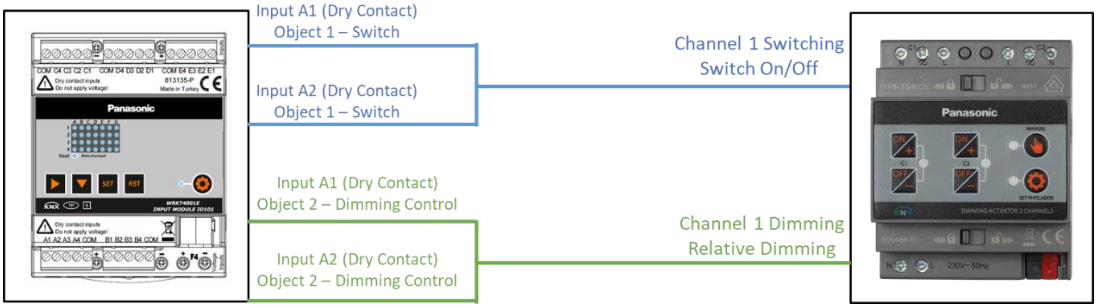
8.2 Controlling Blinds with Single Push Button

In this example, one push button is used to move the blinds up and down. With each long press, the blinds will change the movement direction up and down alternatively. With short presses, the blinds will step with a direction opposite to the last long movement direction.

Used devices	KNX Input Module IO101 (WRKT400XE5NC) with a push button connected to A1 KNX Mix Actuator 4 Channels MX104 (WRKT4604E)
Objects linking	
KNX Input Module parameters	• Enable Inputs – Physical Inputs – A1: ✓ • Input A1 – General – Connected device type: Push button • Input A1 – Function – Push button function: Blind up/down control • Input A1 – Function – Configuration type: Simple • Input A1 – Function – Movement direction: Up - Down
KNX Mix Actuator parameters	• Group 1 – Output 1 Selection: Shutter\Blind
	The unmentioned parameters can be the default or user defined parameters

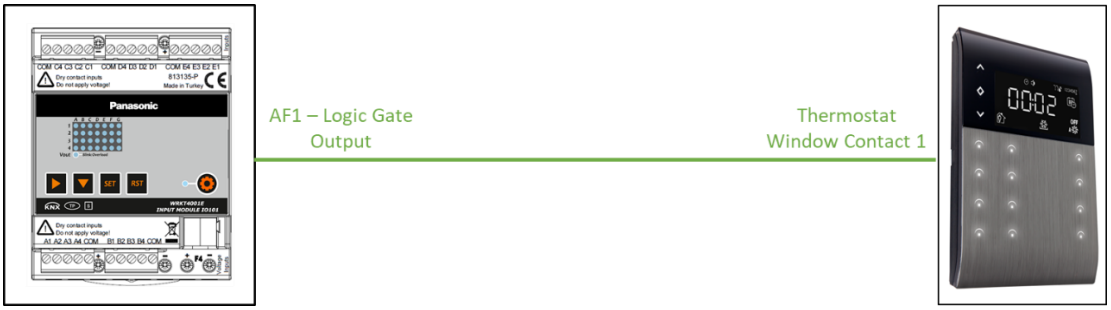
8.3 Dimming Lights with Two Push Buttons

In this example, two push buttons are used to dim and switch a light. Long pressing the first button will dim the light up and long pressing the second button will dim the light down. Short pressing any button will toggle the light.

Used devices	KNX Input Module IO101 (WRKT400XE5NC) with two push buttons connected to A1 and A2 KNX 2 Gang Dimming Actuator 300W DM102 (WRKT5512E)
Objects linking	
KNX Input Module parameters	• Enable Inputs – Physical Inputs – A1: ✓ • Enable Inputs – Physical Inputs – A2: ✓ • Input A1 – General – Connected device type: Push button • Input A1 – Function – Push button function: Dimming control • Input A1 – Function – Configuration type: Simple • Input A1 – Function – Reaction to short/long keystroke: Toggle / Brighter • Input A2 – General – Connected device type: Push button • Input A2 – Function – Push button function: Dimming control • Input A2 – Function – Configuration type: Simple • Input A2 – Function – Reaction to short/long keystroke: Toggle / Darker
	The unmentioned parameters can be the default or user defined parameters

8.4 Controlling Energy Saver Function of a Multi-Functional Switch with 4 Window Contacts

In this example, 4 window sensors are connected to KNX Input Module. These sensors are used to indicate when a window is opened to stop the heating/cooling system. A window sensor closes its contacts when the window is closed and opens them when the window is open. KNX Input Module is programmed to send “a window is open = on” telegram to the thermostat of the multi-functional switch if any window is opened. It sends “all windows are closed = off” telegram after closing all windows.

Used devices	KNX Input Module IO101 (WRKT400XE5NC) with 4 window sensors connected to A1, A2, A3 and A4 KNX Multi-Functional Switch MS104 (WRKT62145FA)
Objects linking	
KNX Input Module parameters	• Enable Inputs – Physical Inputs – A1: ✓ • Enable Inputs – Physical Inputs – A2: ✓ • Enable Inputs – Physical Inputs – A3: ✓ • Enable Inputs – Physical Inputs – A4: ✓ • Auxiliary Functions (v2.0) – Auxiliary function 1: Logic gate • AF1 – Logic Gate – Logic gate type: NAND • AF1 – Logic Gate – Number of used inputs: 4 • AF1 – Logic Gate – Input 1 type: Internal input • AF1 – Logic Gate – Internal input number for gate input 1: A1 (Dry Contact) • AF1 – Logic Gate – Input 1 polarity: Normal • AF1 – Logic Gate – Input 2 type: Internal input • AF1 – Logic Gate – Internal input number for gate input 2: A2 (Dry Contact) • AF1 – Logic Gate – Input 2 polarity: Normal • AF1 – Logic Gate – Input 3 type: Internal input • AF1 – Logic Gate – Internal input number for gate input 3: A3 (Dry Contact) • AF1 – Logic Gate – Input 3 polarity: Normal • AF1 – Logic Gate – Input 4 type: Internal input • AF1 – Logic Gate – Internal input number for gate input 4: A4 (Dry Contact) • AF1 – Logic Gate – Input 4 polarity: Normal • AF1 – Logic Gate – Output object type: 1-bit switch • AF1 – Logic Gate – Output value for true: On • AF1 – Logic Gate – Output value for false: Off

KNX Multi-Functional Switch parameters	• Thermostat – Energy Saver Functions – Window Contact – Window contact inputs: Enable • Thermostat – Energy Saver Functions – Window Contact – Invert input objects: None
	The unmentioned parameters can be the default or user defined parameters