CHORUS MART

KNX Secure 4-channel 16 AX actuator - DIN rail mounting

GW A9151

Technical Manual

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1 Introduction

The KNX Secure 4-channel 16 AX actuator – DIN rail mounting allows up to 4 different electrical loads to be activated/deactivated separately by means of 4 x 16 AX relays, each one fitted with 1 NO output contact. The relay switchover command can come from command devices or sensors of the Building Automation system via the KNX bus or generated locally via the front push-buttons.
The actuator is powered from the bus line and is equipped with 4 front green LEDs for signalling the output status. The device sends information to the bus about the relay status (ON = contact closed, OFF = contact open) when switching on, receiving a command and in the case of a command from a local push-button.
Each output channel of the actuator can be configured separately and allows the ON/OFF command of the controlled loads, execution of timed commands, scene management and execution of priority commands to force the output status. The functioning modes can be used simultaneously by means of distinct communication objects.
This means, for instance, that the device can switch a light on and off, or automatically switch it on and off after a certain pre-established time, simply on the basis of the command received.
The module is assembled on the DIN rail, inside the electric boards or junction boxes.
The device supports KNX Data Secure: this technology enhances the security of a KNX installation both during start up and during normal operation, thanks to the exchange of encrypted telegrams.

2 Application

Each actuator channel is configured with the ETS software to create the functions listed below:

Switchover

- parameterisation of output behaviour (NO/NC)
- timing of stair raiser lights, with the possibility to set the duration of the timing via bus
- timing of the stair raiser lights, with switch-off pre-warning function
- activation/deactivation delay
- blinking

Scenes

- storage and activation of 8 scenes (value 0-63) for each output
- enabling/disabling of scene storage from bus

Priority commands

- Relay status after forced positioning.
- Setting of the forcing status upon bus voltage reset.

Block command

- Parametrisation of the block activation value, behaviour when block is active, and behaviour when block is deactivated
- setting of the lockout object value upon download and upon bus voltage reset

Load control function (slave)

- Parameterisation of the relay status following the load reconnection command.
- Setting of the function status upon download and upon bus voltage reset.

Safety functions

- Regular monitoring of the input object.
- Safety behaviour parameterisation.

Logical functions

- logic operation AND/NAND/OR/NOR with command object (switching, timed switching, delayed switching, flashing) and result of the logic operation
- use of the logic operation result to enable the command object (switching, timed switching, delayed switching, flashing, scene)
- Logic operations AND/NAND/OR/NOR/XOR/XNOR up to 8 logic inputs.

Counters

- activation and count of the total output relay closing/opening time
- activation of the count of the number of operations performed by the output relay

Output status

- Parameterisable sending to the bus.

Other functions

- parameterisation of output behaviour with voltage fall/reset on bus.
- Configuration of the local command push-buttons via ETS
- Enabling/disabling of the local command push-buttons via KNX bus.

2.1 Association limits

Maximum number of group addresses:	254
Maximum number of associations:	254

This means that up to 254 group addresses can be defined, and up to 254 associations can be made between communication objects and group addresses.

3 “Main” menu

The **Main** menu contains only those parameters needed to enable and configure the operating parameters of each of the 4 output channels.
The basic structure of the menu is as follows:

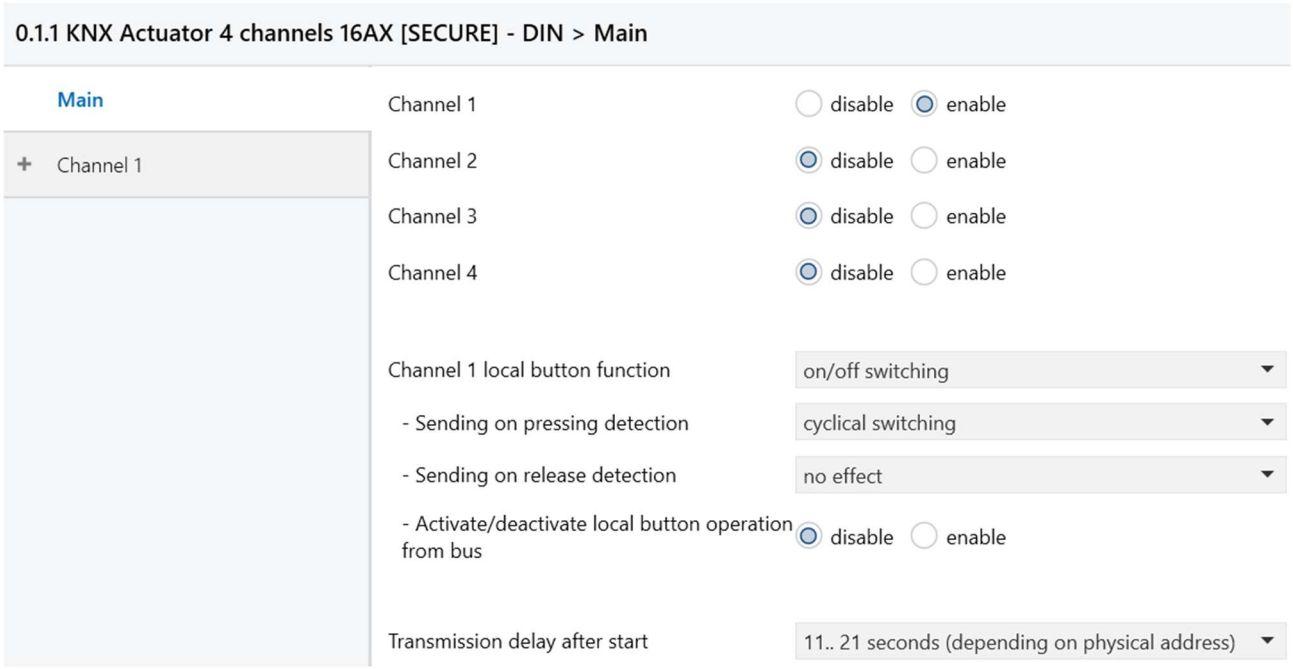


Fig. 3.1 : *“Main” menu*

3.1 Parameters

3.1.1 Channel X

The **Px “Channel 1”**, **Px “Channel 2”**, **Px “Channel 3”** and **Px “Channel 4”** parameters allow you to view and configure all the operating parameters of the relative channels grouped together in the **Channel 1 settings**, **Channel 2 settings**, **Channel 3 settings** and **Channel 4 settings** menus. The values that can be set for these parameters are:

- **disable (default value)**
- enable

3.1.2 Channel X local button function

Setting the value **enable** for parameter **Px “Channel X”** displays the corresponding configuration menus and the parameters **Px “Channel 1 local button function”**, **Px “Channel 2 local button function”**, **Px “Channel 3 local button function”** and **Px “Channel 4 local button function”**, depending on which output has been enabled.

On the front of the device there are 4 local push-buttons that can be used to directly control the load connected to the relay, without repeating the commands received via the KNX bus; the **Px “Channel 1 local button function”**, **Px “Channel 2 local button function”**, **Px “Channel 3 local button function”** and **Px “Channel 4 local button function”** parameters are used to define the behaviour of the local button key associated with the relative channel when the KNX bus voltage is present. The values that can be set for these parameters are:

- **On/Off switching (default value)**
- stairs light

- scene
- forced positioning
- block
- load control
- test on/off
- none

the difference between the values **On/Off switching, load control** and **on/off test** lies in the fact that the first behaves like a command received from the bus on the object ***Ch.x - Switching*** (and therefore has a lower priority than the overload, load control, safety, forcing and channel block functions), the second behaves like a command received from the bus on the object ***Ch.X – Slave switching for load control*** (which has a lower priority than the safety, forcing and channel block functions), and the third - switches the relay directly, ignoring any active function (whose activation status is not changed in any way).
When you select any value other than **Scene**, the **Px "Sending on pressing detection"** and **Px "Sending on release detection"** parameters are visualised, and the relative values change according to the value set for the parameter in question.
The **Px "Sending on pressing detection"** parameter is used to set the command to be sent to the on-board actuator after the pressing of the push-button associated with the channel has been detected.
The **Px "Sending on release detection"** parameter is used to set the command to be sent to the on-board actuator after the release of the push-button associated with the channel has been detected.

- If the control type is **On/Off switching** or **on/off test** the values that can be set for the two parameters listed above are:

  - off
  - on
  - **cyclical switching (press default value)**
  - **no effect (release default value)**

  Note: remember that the difference between the local button key function **On/Off switching** and **on/off test** is that the first acts like a command received from the bus on the Ch.X - Switching object (so it has a lower priority than the safety, forcing and actuator block functions, if they are active), whereas the second directly switches the relay, ignoring any active function (whose activation status is not changed in any way or notified on the bus).
  The test on/off function is designed above all to facilitate the system testing phase, when testing the connection between the relay output and the load.

- If the type of control is **stairs light**, the values that can be set for the two above parameters are:

  - timing stop
  - **timing start (pressing default value)**
  - cyclical switching
  - **no effect (release default value)**

- If the type of control is **scenes**, the two above parameters are not displayed, but the parameter **"Scene number (0.. 63)"** is shown together with the parameter **Px "Scene storing by long operation"**.
  The parameter **Px "Scene number (0.. 63)"** parameter is used to set the value of the scene to be recalled/stored; if this value does not coincide with the one associated with the relative parameters in the **Scenes** menu of the associated channel, no scene will be recalled/memorised. The possible values are:

  - from **0 (default value)** to 63, in steps of 1

  The **Px "Scene storing by long operation"** parameter enables the sending of a scene memorising command when a long operation is recognised. The values that can be set are:

  - disabled
  - **enabled (default value)**

  The device will send the scene storing command after a long operation is detected and only if the value **enabled** is selected; by selecting the value **disabled**, a long operation is not recognised and the long operation triggers the sending of the scene execution command (as for a short operation).

- If the control type is **forced positioning**, the values that can be set for the two parameters listed above are:

  - **on forcing active (default pressing value)**
  - off forcing active
  - forcing deactivation
  - on forcing/off forcing cyclical switching
  - on forcing/forcing deactivation cyclical switching
  - off forcing/forcing deactivation cyclical switching
  - **no effect (release default value)**

- If the control type is **block**, the values that can be set for the two parameters listed above are:

  - deactivation
  - **activation (pressing default value)**
  - cyclical switching
  - **no effect (release default value)**

- If the control type is **load control**, the values that can be set for the two parameters listed above are:

  - deactivation
  - coupling
  - **cyclical switching (press default value)**
  - **no effect (release default value)**

NB: The operation of the local button keys is guaranteed ONLY when the bus voltage is present.

Selecting any value other than none for the parameter **Px "Channel x local button key function"** displays the parameter **Px "Activate/deactivate operation of the local key button via bus"** in order to deactivate and reactivate the operation of the local push-button (defined by the parameter **Px "Channel x local button key function"**) by sending an enabling/disabling command via the new communication object **Ch.x - Local button key function enabling** (Data Point Type 1.003 DPT_Enable). The values that can be set are:

- **disable (default value)**
- enable

selecting **enable** displays the **communication objects Ch.x - Local button key function enabling** (Data Point Type 1.003 DPT_Enable) and **Ch.x - Local button key function enabling status** (Data Point Type 1.003 DPT_Enable) that permit respectively to receive commands for the activation/deactivation of the function of the local key button and to signal the activation status of the push-button function; the signal is sent upon request, upon change and after the bus power supply is restored.

3.1.3 Delay time between switching on and first transmission

To ensure that, with several devices in the line, the telegrams sent by the various devices do not collide when the bus voltage is reset, you can define a time limit after which the device can transmit the telegrams on the bus following a bus voltage failure/reset.
The parameter **"Transmission delay after start"** is used to set this delay; The values that can be set are:

- **11.. 21 seconds (depending on physical address)(default value)**
- 5.. 9 seconds
- 11 seconds
- 13 seconds
- 15 seconds

- 17 seconds
- 19 seconds
- 21 seconds
- no delay

setting the values **11.. 21 seconds (depending on physical address)** and **5.. 9 seconds**, the device automatically calculates the transmission delay according to an algorithm that examines the physical address of the device itself; The values indicated (11/21 or 5/9) indicate the extremes of the value range that can be calculated.
The delay following the reset of the 230V supply rather than just the bus voltage may be different even if the same value is set, because in the first case the device must actually start up while in the second it might already be active if the 230V supply hasn't failed.

SUMMARY OF THE ACTIONS ON THE CONTACTS WITH BUS AND 230V VOLTAGE FAILURE/RESET

		KNX bus voltage	
		failure	reset
230V AC voltage on at least 1 channel	absent	No action. Device NOT POWERED; the action required when the bus voltage fails has already been carried out on the failure of the 230V supply	No action. Device NOT POWERED
	present	• Status of the contacts, as defined in the **"Relay status at bus voltage failure"** parameter • Possibility to change the load status using the local push-button	• The status of the contacts when the bus voltage is reset follows the indications in the Channel X function priorities table

		230V AC voltage on at least 1 channel	
		failure (of the last channel powered)	reset
KNX bus voltage	absent	No direct voltage failure effect on the contacts; the action required when the bus voltage fails has already been carried out	• No direct voltage failure effect on the contacts; when the KNX bus is reset, the indications in the Channel X function priorities table will be followed • Possibility to change the load status using the local push-button
	present	• Status of the contacts, as defined in the **"Relay status at bus voltage failure"** parameter even if the bus is present, the device is not powered so the same behaviour as for bus voltage failure is adopted	• The status of the contacts when the bus voltage is reset follows the indications in the Channel X function priorities table; even if the bus is present, the device is re-powered so the same behaviour as for bus voltage reset is adopted

4 *"Channel x settings"* menu

For the sake of simplicity, the items that make up the menus **Channel 1 settings**, **Channel 2 settings, *Channel 3 settings*** and ***Channel 4 settings*** will be described only once in the following chapters (in reference to the general **Channel x settings** menu) as all these menus contain the same items.
The **Channel x settings** menu contains the parameters that define the behaviour of the relay of the device associated with channel x, beyond the specific functions implemented by the actuator channel.
The basic structure of the menu is as follows:

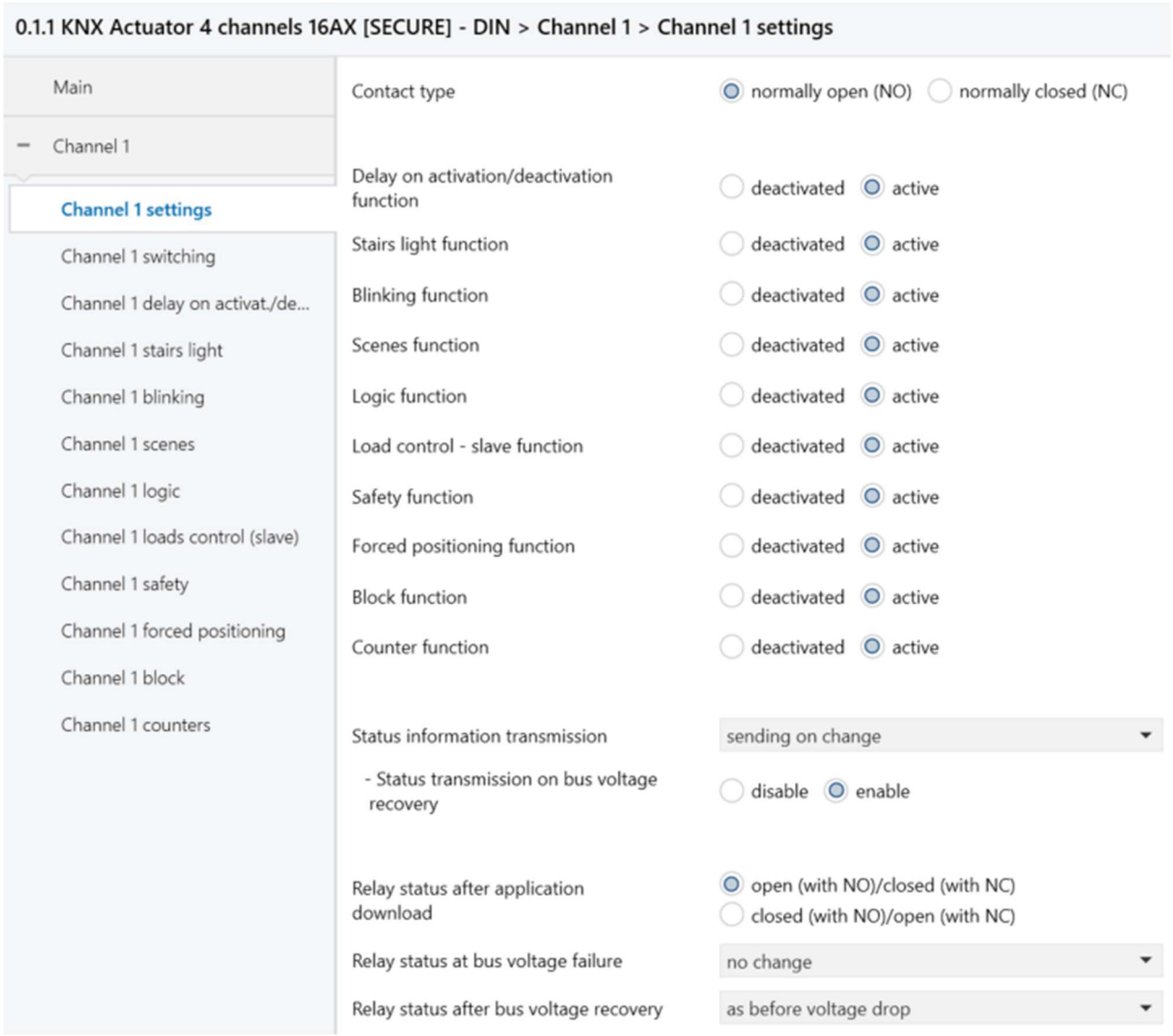


Fig. 4.1: *Setting ETS parameters – "Channel x settings" section*

4.1 Parameters

The device has various operating modes and different functions with different priorities; the parameters **"Delay on activation/deactivation function"**, **"Stairs light function"**, **"Blinking function"**, **"Scenes function"**, **"Logic function"**, **"Load control - slave function"**, **"Safety function"**, **"Forced positioning function"**, **"Block function"** and **"Counter function"** are used to activate the functions and make their operating parameters visible and configurable by making the configuration menus **Channel x delay on activation/deactivation**, **Channel x stairs light**, **Channel x blinking**, **Channel x scenes**, **Channel x logic**, **Channel x loads control (slave)**, **Channel x safety**, **Channel x forced positioning**, **Channel x block** and **Channel x counters** visible. The values that can be set for the parameters listed above are:

- **deactivated (default value)**
- active

selecting **active** displays the relative configuration menu, whose parameters are explained in the next paragraphs.

By default, on this page ETS shows not only the push-buttons for enabling the various functions but also the menus "**Channel X communication**"; the parameters "**Contact type**", "**Status information transmission**", "**Relay status after application download**", "**Relay status at bus voltage failure**" and "**Relay status after bus voltage recovery**" described below.

4.1.1 Contact type

Given that the relay that controls the load has an output with an NO (Normally Open) contact, in order to manage the loads with an NC contact the device must be aware of this type of relay functioning. The **Px "Contact type"** parameter is used to define the type of contact associated with the output that the device has to manage.
The values that can be set are:

- **normally open (NO) (default value)**
- normally closed (NC)

4.1.2 Status information transmission

The status of the relay and as a result of the connected load can be transmitted on the bus via a specific communication object. the parameter used to enable transmitting this information is **Px "Status information transmission"**, which can have the following values:

- disabled
- on demand only
- **sending on change - (default value)**

Selecting any value other than disabled displays the communication object Ch.x - Status (Data Point Type 1.001 DPT_Switch) that allows transmitting the status information, concerning the load connected to the device, on the bus.
If the status signalling takes place **on variation**, the communication object is sent spontaneously when the status switches from ON to OFF or vice versa. If the set value is **on demand only**, the status will never be sent spontaneously by the device. Only when a status reading request is received from the bus, the device sends a response telegram with the current load status.
The communication object assumes a value of 1 (ON) if the NO (normally open) contact closes or if the NC (normally closed) contact opens, depending on the setting of the"Contact type" parameter; in the same way, the communication object assumes a value of 0 (OFF) if the NO (normally open) contact opens or if the NC (normally closed) contact closes.

4.1.3 Status transmission on bus voltage recovery

When the on variation value is selected, the **Px "Status transmission on bus voltage recovery"** parameter is visualised; this enables the transmission of the load status information when the bus voltage is reset.
The parameter can have the following values:

- disable
- **enable (default value)**

4.1.4 Relay status after application download

This parameter can be used to set the status that the relay contact must assume after downloading the application parameters from the ETC software via the parameter **Px "Relay status after application download"** which can have the following values:

- **open (with NO)/closed (with NC) (default value)**
- closed (with NO)/open (with NC)

4.1.5 Relay status at bus voltage failure

The status of the relay contact following a bus voltage failure (with 230V voltage on at least one channel) can be set via the parameter **Px "Relay status at bus voltage failure"**, which can have the following values:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- **no change - (default value)**

4.1.6 Relay status after bus voltage recovery

The status of the relay contact following the recovery of bus voltage (with 230V voltage on at least one channel) can be set via the parameter **Px "Relay status after bus voltage recovery"**, which can have the following values:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- **as before voltage drop - (default value)**

5 *“Channel X switching”* menu

One of the channel operating modes is on/off switching, which involves switching the relay status according to the commands received; from the bus, this operating mode can be controlled via the ***Ch.X - Switching*** communication object (Data Point Type: 1.001 DPT_Switch) communication object. This function has the same priority of the activation/deactivation delay, stair raiser light and flashing functions; this means that when one of the functions is activated while another is already active, it is executed, ending the previously active one.
The structure of the menu is as follows:

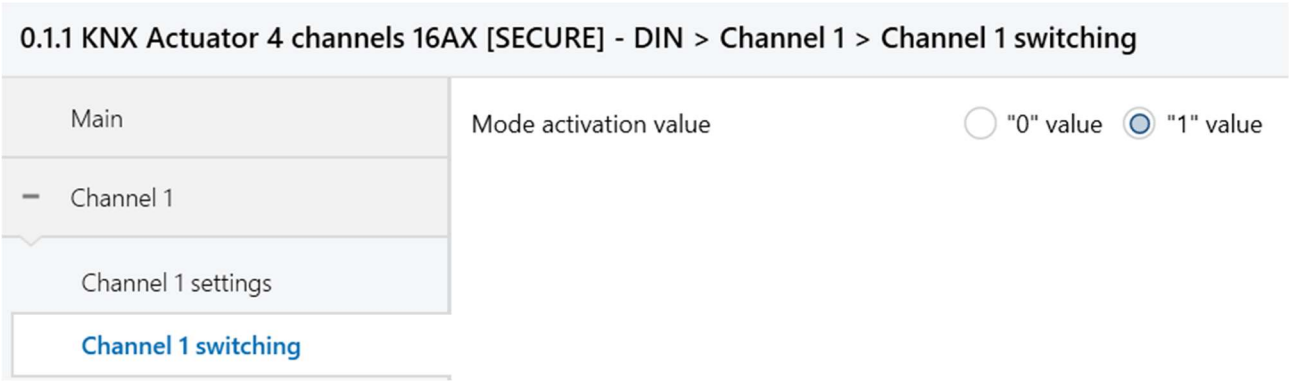


Fig. 4.2: “Channel X switching” menu

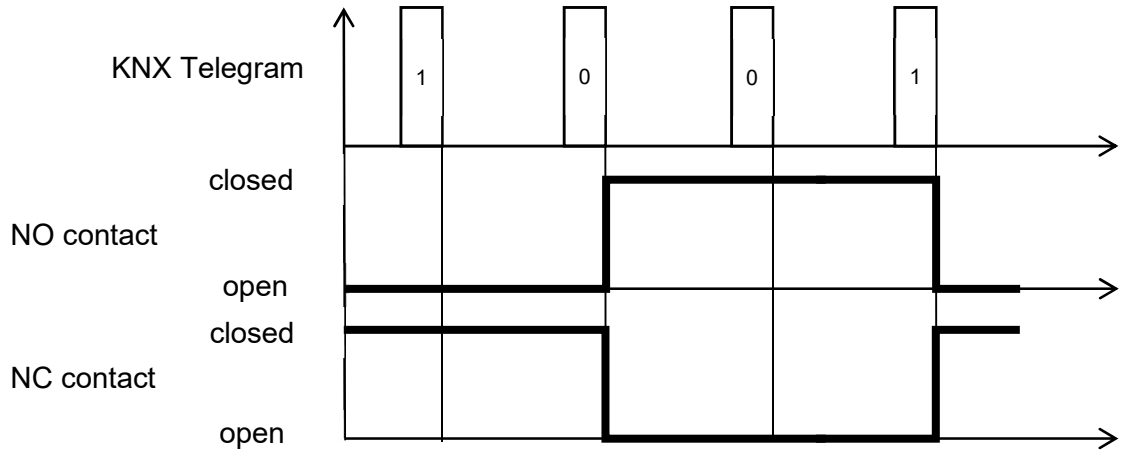
5.1 Parameters

5.1.1 Mode activation value

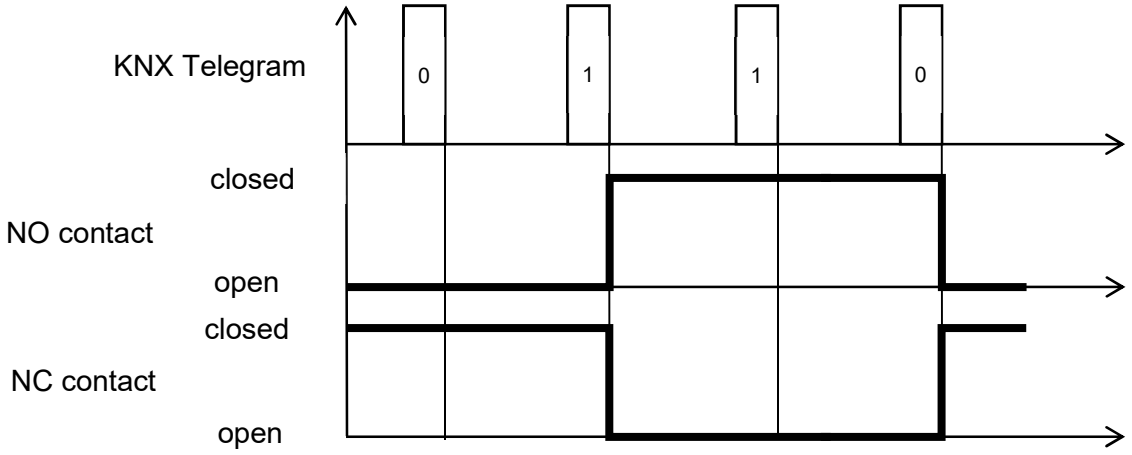
The parameter **Px “Mode activation value”** determines which logic value received on the communication object ***Ch.x - Switching*** switches the relay to the ON status (NO contact closed/NC contact open); the values that can be set are:

- “0” value
- **“1” value (default value)**

Selecting **“0” value**, when the device receives a telegram from the bus with a logic value equal to “0” it switches the relay to the status → NO contact closed/NC contact open; Vice versa, when the logic value “1” is received, the device shifts the contact to → NO contact open/NC contact closed. See figure below.



Selecting **“1” value**, when the device receives a telegram from the bus with a logic value equal to “1” it switches the relay to the status → NO contact closed/NC contact open; Vice versa, when the logic value “0” is received, the device shifts the contact to → NO contact open/NC contact closed. See figure below.



6 “Channel X delay on activation/deactivation” menu

One of the channel operating modes is on/off switching with an activation/deactivation delay, which switches the relay status on the basis of the received commands, creating a delay between the moment of receiving the command and the moment in which the relay is effectively switched over. from the bus, this operating mode can be controlled via the communication object ***Ch.x - Delayed switching*** (Data Point Type: 1.001 DPT_Switch) communication object. This function has the same priority as the on/off switching, stair raiser light and blinking functions; this means that when one of the functions is activated while another is already active, it is executed, ending the previously active one.
The menu is visible if the **Px “Delay on activation/deactivation” function** parameter of the **Channel x settings** menu is set with the value **active**.

The structure of the menu is as follows:

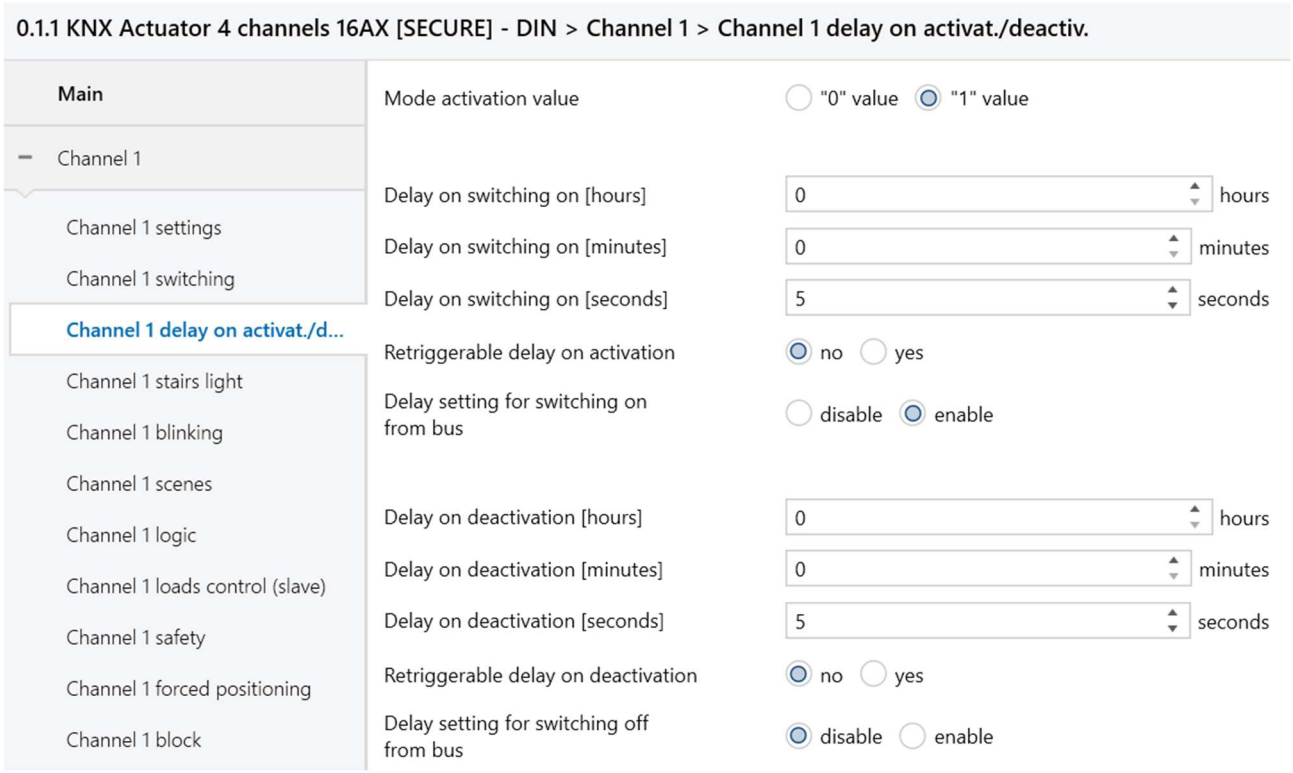


Fig. 4.4 “Channel x delay on activation/deactivation” menu

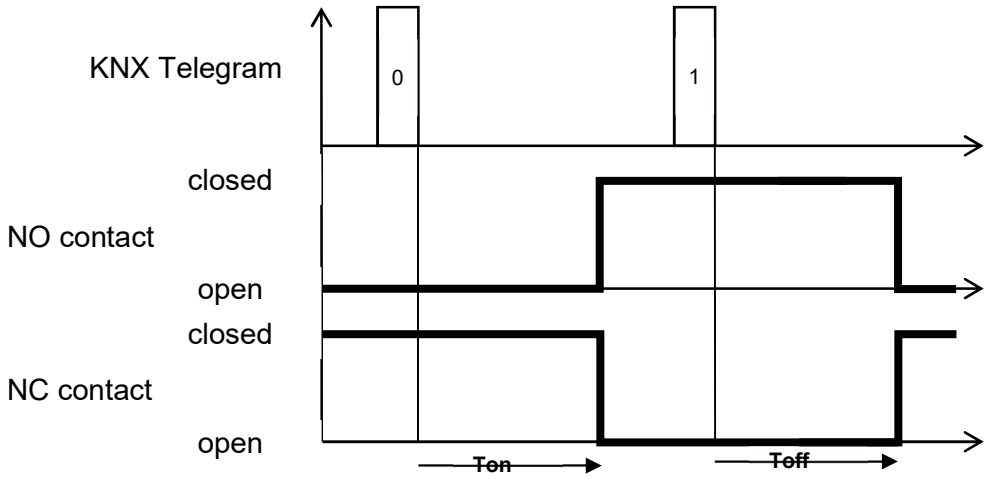
6.1 Parameters

6.1.1 Mode activation value

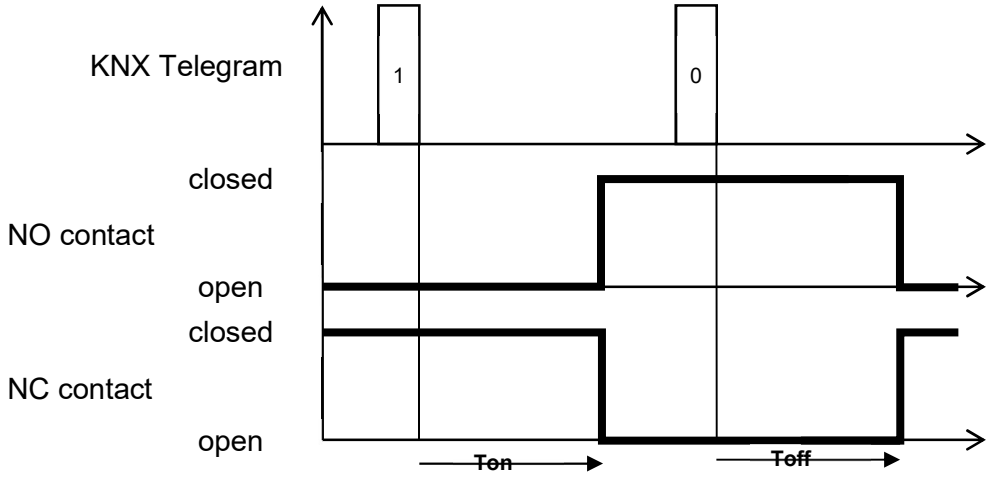
The parameter **Px “Mode activation value”** determines which logic value received on the communication object ***Ch.x - Delayed switching*** switches the relay to the ON status (NO contact closed/NC contact open); the values that can be set are:

- “0” value
- **“1” value (default value)**

Selecting **“0” value**, when the device receives a telegram from the bus with a logic value equal to “0”, after the set activation delay time (Ton) has passed, it switches the relay to the status → NO contact closed/NC contact open; Vice versa, when the logic value “1” is received, the device waits for the deactivation delay time (Toff) before switching the contact to → NO contact open/NC contact closed. See the figure below.



Selecting **"1" value**, when the device receives a telegram from the bus with a logic value equal to "1", after the set activation delay time (Ton) has passed, it switches the relay to the status → NO contact closed/NC contact open; Vice versa, when the logic value "0" is received, the device waits for the deactivation delay time (Toff) before switching the contact to → NO contact open/NC contact closed. See the figure below.



6.1.2 Delay on switching on [hours]

The parameter **Px "Delay on switching on [hours]"** is used to set the first of the three values (hours) that make up the activation delay time (hours, minutes, seconds); the values that can be set are:

- from **0 (default value)** to 24, in steps of 1

6.1.3 Delay on switching on [minutes]

The parameter **Px "Delay on switching on [minutes]"** is used to set the second of the three values (minutes) that make up the activation delay time (hours, minutes, seconds); the values that can be set are:

- from **0 (default value)** to 59, with steps of 1

6.1.4 Delay on switching on [seconds]

The parameter **Px "Delay on switching on [seconds]"** is used to set the last of the three values (seconds) that make up the activation delay time (hours, minutes, seconds); the values that can be set are:

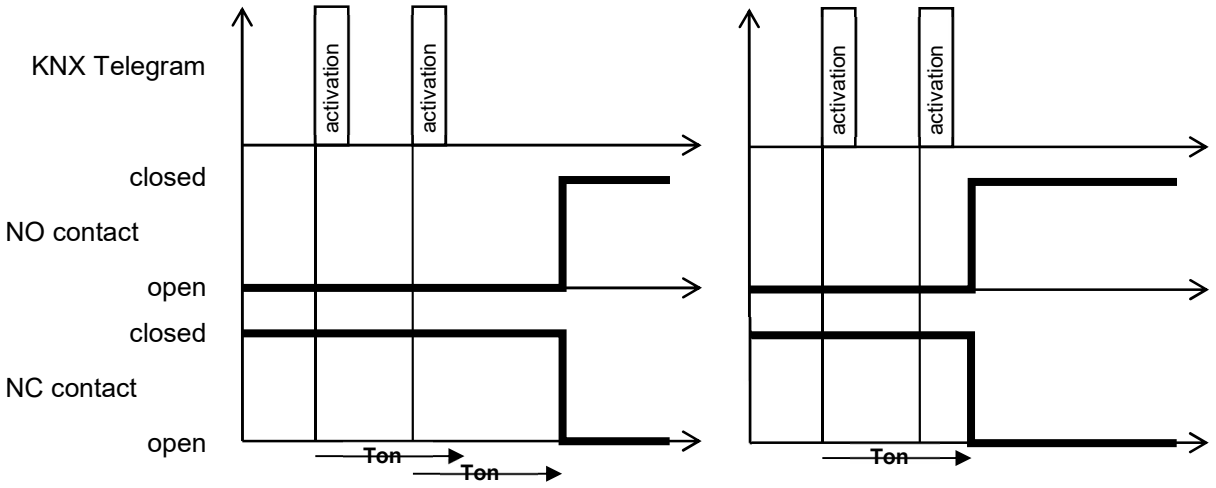
- from 0 to 59 with steps of 1, with **5 (default value)**

6.1.5 Retriggerable delay on activation

The parameter **Px "Retriggerable delay on activation"** is used to enable the reset of the activation delay time whenever a delayed activation bus telegram is received while the delay count is already active; the values that can be set are:

- **no (default value)**
- yes

by selecting **yes**, if a new delayed activation telegram is received during the activation delay count, the counter is reinitialised; otherwise, the count continues without changes. See figure below (to the left with reset enabled, to the right without reset).



6.1.6 Delay setting for switching on from bus

The parameter **"Delay setting for switching on from bus"** is used to enable the communication object via which a new activation delay value is received, which overwrites the one configured in ETS; the values that can be set are:

- **disable (default value)**
- enable

selecting **enable**, displays the communication object ***Ch.x - Delay on activation*** (Data Point Type: 7.005 DPT_TimePeriodSec) which is used to receive the value of the activation delay from the bus.
If the new value is received while an activation delay time count is already in progress, it will become operative when the subsequent activation command is received.

6.1.7 Delay on deactivation [hours]

The parameter **Px "Delay on deactivation [hours]"** is used to set the first of the three values (hours) that make up the deactivation delay time (hours, minutes, seconds); the values that can be set are:

- from **0 (default value)** to 24, in steps of 1

6.1.8 Delay on deactivation [minutes]

The parameter **Px "Delay on deactivation [minutes]"** is used to set the second of the three values (minutes) that make up the deactivation delay time (hours, minutes, seconds); the values that can be set are:

- from **0 (default value)** to 59, with steps of 1

6.1.9 Delay on deactivation [seconds]

The parameter **Px "Delay on deactivation [seconds]"** is used to set the last of the three values (seconds) that make up the deactivation delay time (hours, minutes, seconds); the values that can be set are:

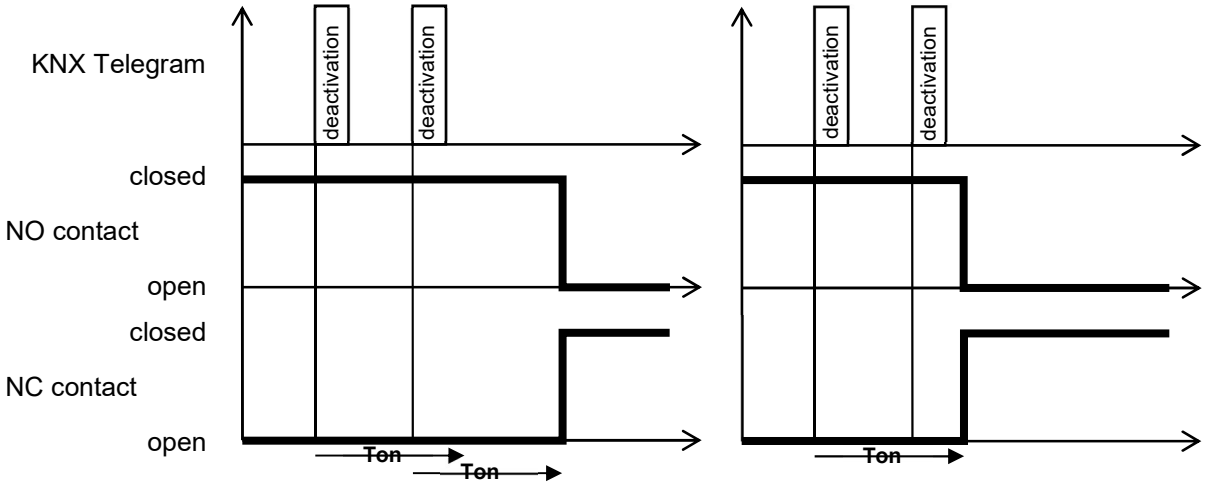
- from 0 to 59 with steps of 1, with **5 (default value)**

6.1.10 Retriggerable delay on deactivation

The parameter **Px "Retriggerable delay on deactivation"** is used to enable the reset of the deactivation delay time whenever a delayed deactivation bus telegram is received while the delay count is already active; the values that can be set are:

- **no (default value)**
- yes

By selecting **yes**, if a new delayed deactivation telegram is received during the deactivation delay count, the counter is reinitialised; otherwise, the count continues without changes. See figure below (to the left with reset enabled, to the right without reset).



6.1.11 Delay setting for switching off from bus

The parameter **Px "Delay setting for switching off from bus"** is used to enable the communication object via which a new deactivation delay value is received, which overwrites the one configured in ETS; the values that can be set are:

- **disable (default value)**
- enable

selecting **enable**, displays the communication object ***Ch.x - Delay on deactivation*** (Data Point Type: 7.005 DPT_TimePeriodSec) which is used to receive the value of the deactivation delay from the bus.
If the new value is received while a deactivation delay time count is already in progress, it will become operative when the subsequent deactivation command is received.

7 “Channel x stairs light” menu

One of the channel operating modes is timed activation, or the stair raiser light function, which involves activating the load for a certain period of time and then deactivating it automatically without receiving any command. Furthermore, it is possible to enter a certain delay between the moment the timed start command is received and the effective instant in which the relay is switched; from the bus, this operating mode can be controlled via the communication object ***Ch.x - Timed switching*** (Data Point Type: 1.010 DPT_Start).
This function has the same priority as the on/off switching, delayed activation/deactivation, and blinking functions; this means that when one of the functions is activated while another is already active, it is executed, ending the previously active one.

The menu is visible if the **Px “Stairs light function”** parameter of the **Channel x settings** menu is set with the value **active**.

The structure of the menu is as follows:

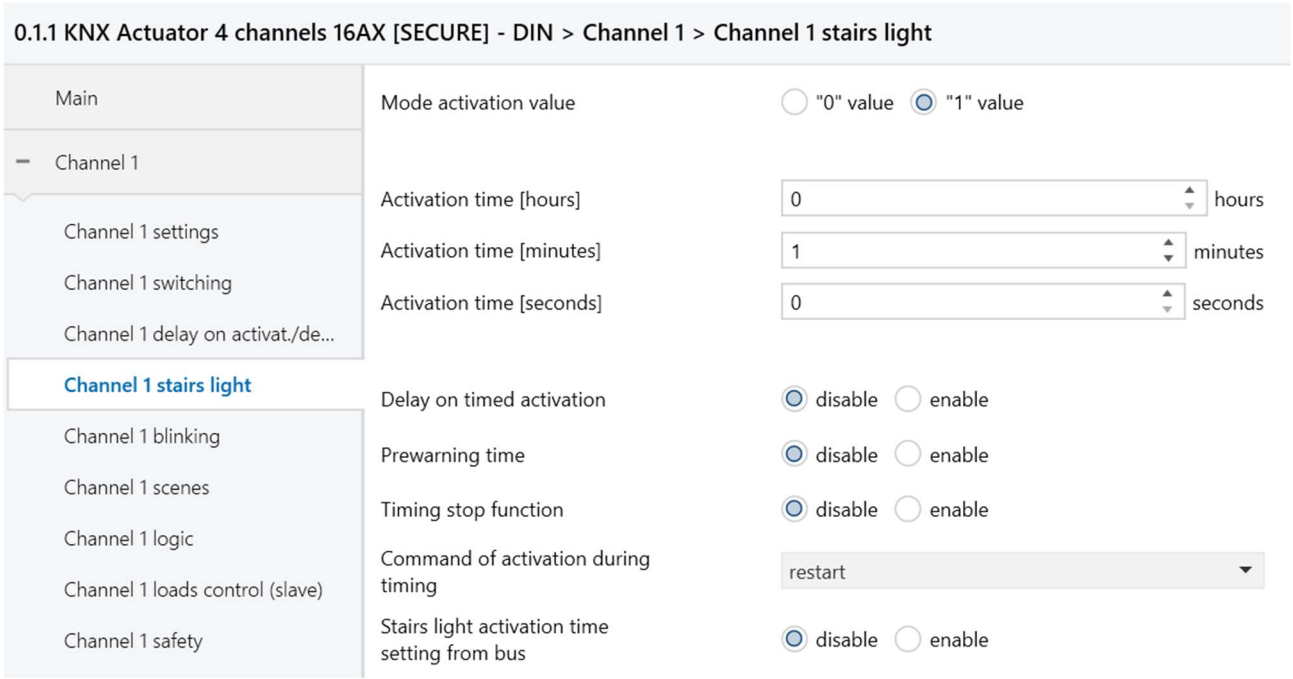


Fig. 4.5 “Channel X stairs light” menu

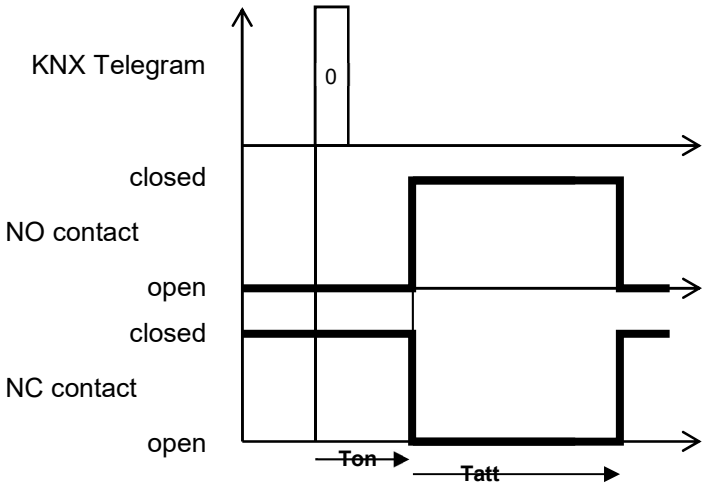
7.1 Parameters

7.1.1 Mode activation value

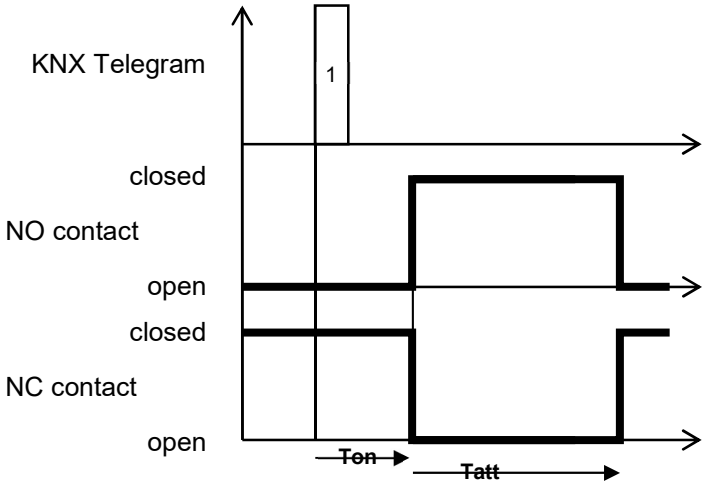
The parameter **Px “Mode activation value”** determines which logic value received on the communication object ***Ch.x - Timed switching*** switches the relay to the ON status (NO contact closed/NC contact open) and activates timing; the values that can be set are:

- “0” value
- **“1” value (default value)**

Selecting **“0” value**, when the device receives a telegram from the bus with a logic value equal to “0”, after the set activation delay time (Ton) has passed it switches the relay to the status → NO contact closed/NC contact open and begins the activation time count; when the activation time (Tatt) has elapsed, the contact returns to the open status (if NO) or closed (if NC). See figure below.



Selecting **"1" value**, when the device receives a telegram from the bus with a logic value equal to "1", after the set activation delay time (Ton) has passed, it switches the relay to the status → NO contact closed/NC contact open; when the activation time (Tatt) has elapsed, the contact returns to the open status (if NO) or closed (if NC). See figure below.



7.1.2 Activation time [hours]

The parameter **Px "Activation time [hours]"** is used to set the first of three values (hours) that make up the load activation time (Tatt); the values that can be set are:

- from **0 (default value)** to 24, in steps of 1

7.1.3 Activation time [minutes]

The parameter **Px "Activation time [minutes]"** is used to set the second of three values (minutes) that make up the load activation time (Tatt); the values that can be set are:

- from 0 to 59 with steps of 1, with **1 (default value)**

7.1.4 Activation time [seconds]

The parameter **Px "Activation time [seconds]"** is used to set the last of three values (seconds) that make up the load activation time (Tatt); the values that can be set are:

- from **0 (default value)** to 59, with steps of 1

7.1.5 Delay on timed activation

The parameter **Px "Delay on timed activation"** is used to enter a delay between the moment in which the communication object ***Ch.x - Timed switching*** is received and the moment in which the command is actually executed (closure of NO contact/opening of NC contact); the values that can be set are:

- **disabled (default value)**
- enabled

7.1.6 Duration of delay on timed activation

if the delay is **enabled**, the parameter **Px "Duration of delay on timed activation"** will be displayed. This is used to set the value of the delay in seconds. The parameter can have the following values:

- **1 s (default value)**, 2 s, 3 s, 5 s, 10 s, 15 s, 20 s, 30 s, 45 s, 1 min, 1 min 15 s, 1 min 30 s, 2 min, 2 min 30 s, 3 min, 5 min, 15 min, 20 min, 30 min, 1 h, 2 h, 3 h, 5 h, 12 h, 24 h.

The activation delay cannot be reset.

7.1.7 Prewarning time

The parameter **Px "Prewarning time"** can be used to enable a signal when the load is about to be automatically switched off. This is done by deactivating and reactivating the load for a moment (blinking); the pre-warning time is applied after the expiration of the activation time. The parameter can assume the following values:

- **disabled (default value)**
- enabled

Select **enabled** to view the **Px "Prewarning time duration"** and **Px "Load deactivation duration [x 100ms]"** parameters.

7.1.8 Prewarning time duration

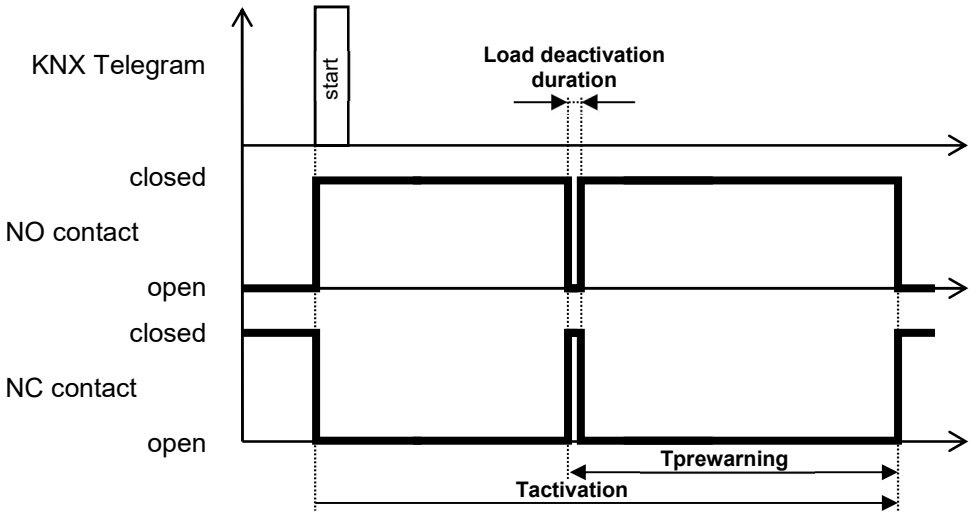
Parameter **"Prewarning time duration"** is used to set the time that passes between the signalling that the deactivation will take place soon and the deactivation itself of the load; the values that can be set are:

- **15 s (default value)**, 30 s, 1 min.

7.1.9 Load deactivation duration [x 100ms]

Parameter **Px "Load deactivation duration [x 100ms]"** is used to set the time interval during which the load is deactivated to perform the prewarning function; the values that can be set are:
- from **5 (default value)** to 15, with steps of 1

The figure below shows the operating principle of the pre-warning function.



7.1.10 Timing stop function

Via the parameter **Px "Timing stop function"** it is possible to enable the possibility of ending the timed activation by means of the bus command on the communication object ***Ch.x - Timed switching*** with the opposite value to the one set in the previously analysed **"Mode activation value"**. The values that can be set are:

- **disable (default value)**
- enable

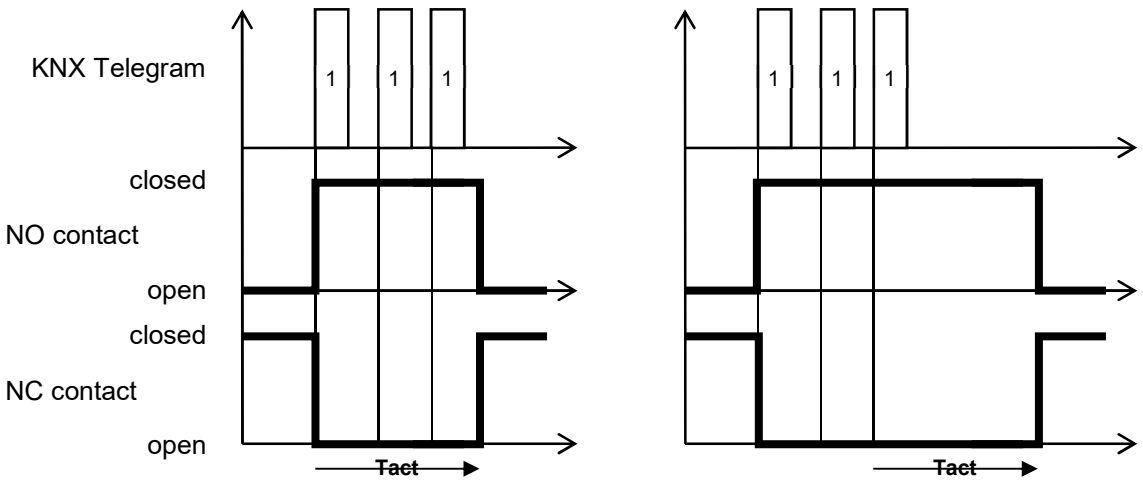
If the function is enabled, when the value opposite to the mode activation value is received, the device ends the timing and deactivates the load.

7.1.11 Command of activation during timing

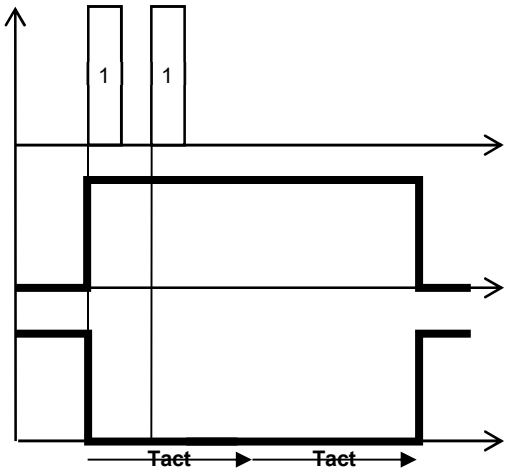
The parameter **Px "Command of activation during timing"** is used to define the behaviour of the device when a timed activation command is received while it is already in progress; the values that can be set are:

- no effect
- **Restart (default value)**
- extend (multiply by factor)

selecting **no effect**, the subsequent commands are ignored; selecting **restart**, every timed activation command received during the activation time count causes the count to reinitialise. By selecting **extension**, each received command results in an extension equal to the count activation time. The figure below shows an example of each of the three configurations.



no effect *restart*



extension

If the value **extension** is selected, it is possible to set a maximum number of consecutive extensions of the activation time via the new displayed parameter **Px "Multiplicative factor maximum value"**. The parameter can have the following values:

- from 2 to **5 (default value)** with steps of 1

7.1.12 Stairs light activation time setting from bus

The parameter **Px "Stairs light activation time setting from bus"** displays the input communication object ***Ch. x - Stairs light activation time*** (Data Point Type: 7.005 DPT_TimePeriodSec) which can be used to receive the activation time of the stair raiser light function via the bus communication object; the values that can be set are:

- **disable (default value)**
- enable

The activation time is between 0h:0min:1sec and 24h:59min:59sec so,, when the bus receives a value that lies outside this range, the value set for the deactivation delay time is the range limit value closest to the received value.

If a new activation time value is received, this becomes the new stair raiser light time, overwriting the old value (which will be deleted); if the new value is received while the timing is already active, it will become operative upon the subsequent activation of the timing.

8 “Channel x blinking” menu

One of the relay output operating modes is the blinking mode, which activates the load for a specific period of time then deactivates it and repeats the process until the deactivation command is received; from the bus, this operating mode can be controlled via the communication object ***Ch.x - Blinking*** (Data Point Type: 1.001 DPT_Switch) communication object.
This function has the same priority as the on/off switching, delayed activation/deactivation, and timed activation functions; this means that when one of the functions is activated while another is already active, it is executed, ending the previously active one.
The menu is visible if the parameter **Px “Blinking function”** of the **Channel x settings** menu is set with the value **active**.
The structure of the menu is as follows:

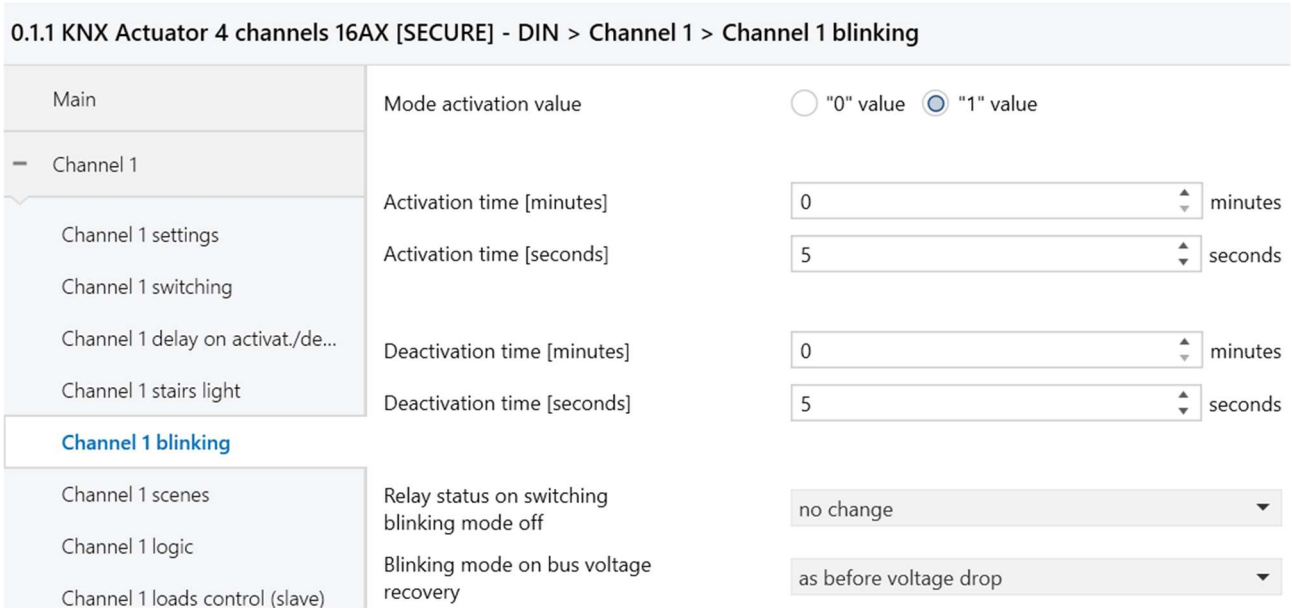


Fig. 4.6: “Channel X blinking” menu

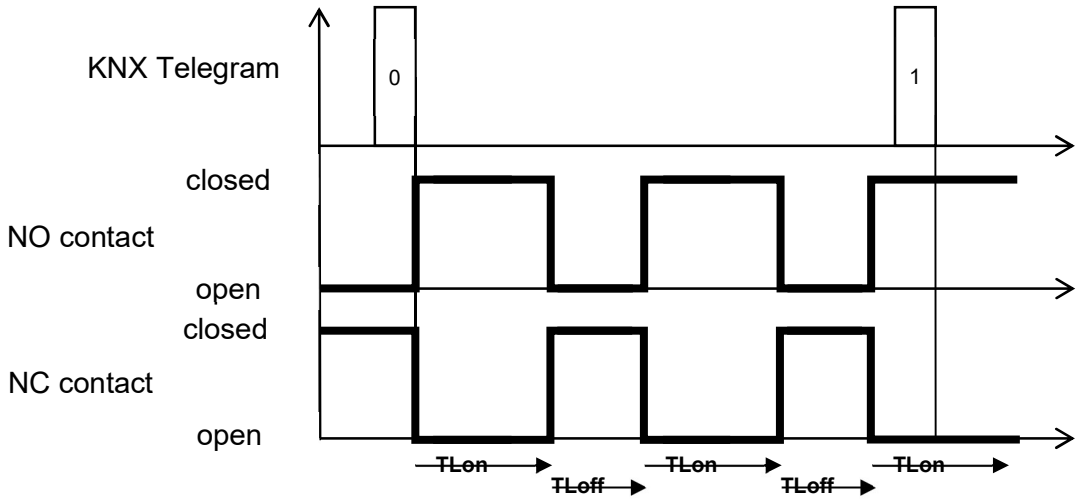
8.1 Parameters

8.1.1 Mode activation value

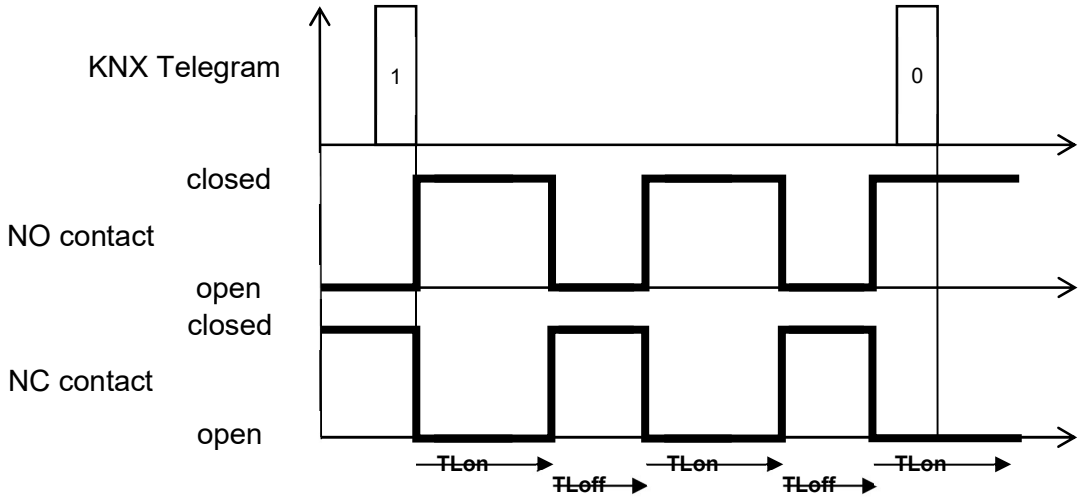
The parameter **Px “Mode activation value”** determines which logic value received on the communication object ***Ch.x - Blinking*** activates the load activation/deactivation process; the values that can be set are:

- “0” value
- **“1” value (default value)**

Selecting **“0” value**, when the device receives a telegram from the bus with a logic value equal to “0”, it switches the relay to the status → NO contact closed/NC contact open, and begins the activation time count; at the end of the activation time, the device deactivates the load (NO contact open/NC contact closed) for a period of time equal to the deactivation time, and then reactivates the load and restarts the process. See figure below.



Selecting **"1" value**, when the device receives a telegram from the bus with a logic value equal to "1", it switches the relay to the status → NO contact closed/NC contact open, and begins the activation time count; at the end of the activation time, the device deactivates the load (NO contact open/NC contact closed) for a period of time equal to the deactivation time, and then reactivates the load and restarts the process. See figure below.



8.1.2 Activation time [minutes]

The parameter **Px "Activation time [minutes]"** is used to set the first of two values (minutes) that make up the load activation time (TLon); the values that can be set are:

- from **0 (default value)** to 59, with steps of 1

8.1.3 Activation time [seconds]

The parameter **Px "Activation time [seconds]"** is used to set the last of two values (seconds) that make up the load activation time (TLon); the values that can be set are:

- from 0 to 59 with steps of 1, with **5 (default value)**

8.1.4 Deactivation time [minutes]

The parameter **Px "Deactivation time [minutes]"** is used to set the first of two values (minutes) that make up the load deactivation time (TLoff); the values that can be set are:

- from **0 (default value)** to 59, with steps of 1

8.1.5 Deactivation time [seconds]

The parameter **Px "Deactivation time [seconds]"** is used to set the last of two values (seconds) that make up the load deactivation time (TLoff); the values that can be set are:

- from 0 to 59 with steps of 1, with **5 (default value)**

8.1.6 Relay status on switching blinking mode off

It is possible to define the status of the relay contact upon receiving the blinking mode deactivation command via the parameter **Px "Relay status on switching blinking mode off"** which can have the following values:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- **no change (default value)**

selecting **no change**, the status of the contact remains the one assumed when the mode deactivation command was received.

8.1.7 Blinking mode on bus voltage recovery

The parameter **Px "Blinking mode on bus voltage recovery"** is used to define the status of the blinking mode on bus voltage recovery; the values that can be set are:

- deactivated
- active
- **as before voltage drop (default value)**

selecting **active**, if no function with a higher priority than the blinking mode is active, the device will start the blinking phase, ignoring the value set for the **"Relay status after bus voltage recovery"** item of the **Channel x settings** menu.

9 “Channel x scenes” menu

The scenes function is used to replicate a certain pre-set or previously memorised status upon receipt of the scene execution command; from the bus, this function can be controlled via the communication object ***Ch.x - Scenes*** (Data Point Type 18.001 DPT_SceneControl). The device is able to memorise and execute 8 scenes. The menu is visible if the parameter **Px “Scenes function”** of the **Channel x settings** menu is set with the value **active**.
The structure of the menu is as follows:

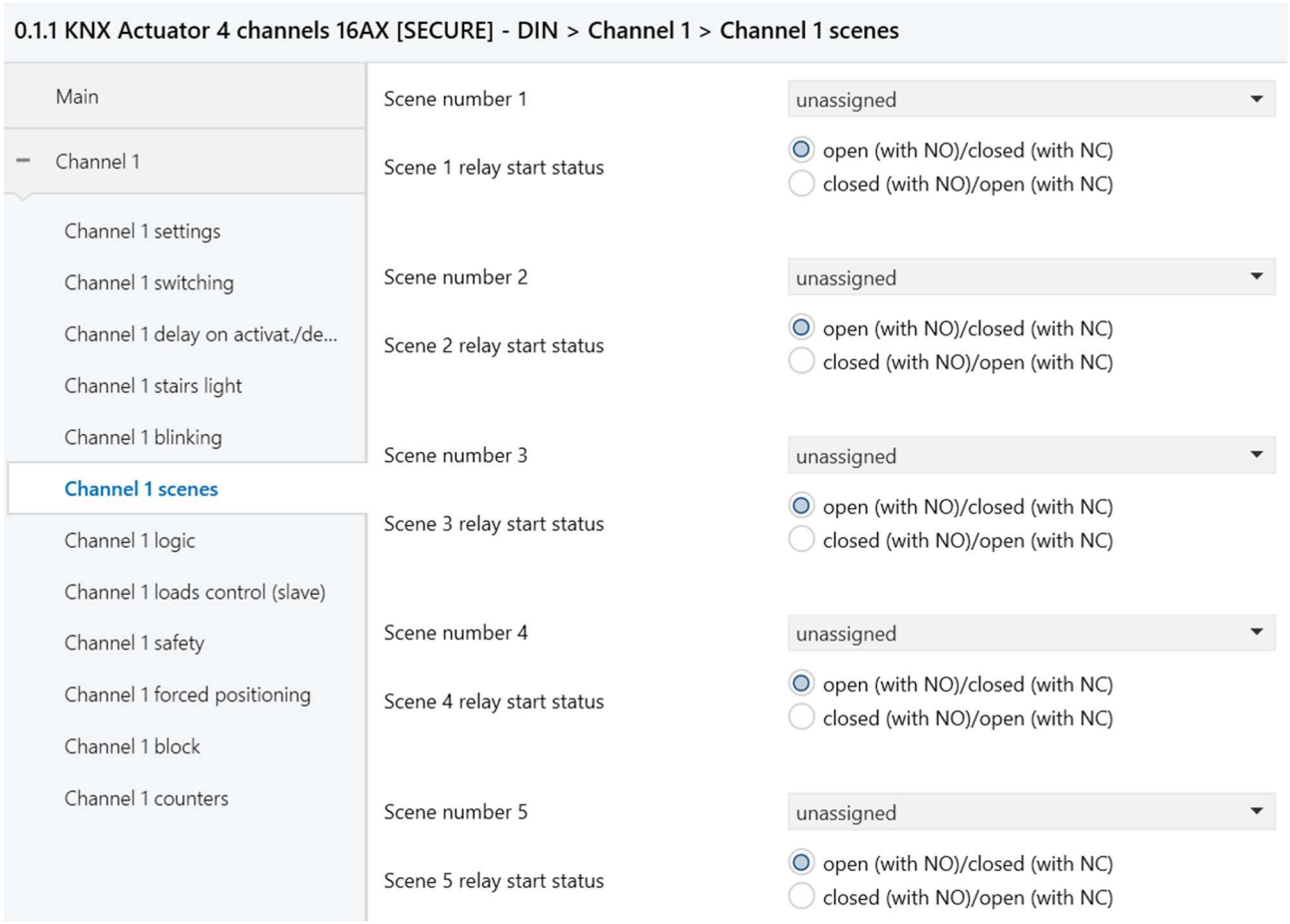


Fig. 4.7: “Channel x scenes” menu

9.1 Parameters

9.1.1 Scene number i

With the parameter **“Scene number i”** ($1 \leq i \leq 8$) it is possible to set the numerical value that is used to identify and therefore execute/memorise the i-th scene; the values that can be set are:

- **not assigned (unassigned) (default value)**
- 0, 1.. 63

9.1.2 Scene i relay start status

The parameters **“Scene i relay start status”** ($1 \leq i \leq 8$) are used to preset the status of the contact that the device must replicate after receiving a telegram for the execution of the i-th scene; the values that can be set are:

- **open (with NO)/closed (with NC) (default value)**
- closed (with NO)/open (with NC)

9.1.3 Scene storing enabling

The parameter **Px "Scene storing enabling"** makes it possible to enable/disable the possibility of scene storing via the communication object ***Ch. x - Scene***; the parameter can assume the following values:

- disable
- **enable (default value)**

selecting the value **enable** displays the communication object ***Ch. x - Scene storing enabling*** (Data Point Type: 1.003 DPT_Enable) which enables or disables (via bus) the possibility of scene learning via the ***Ch.x - Scene*** communication object.

10 “Channel x - Logic” menu

Load activation/deactivation can be subordinated on the basis of the results of logic operations whose inputs are their communication objects. The menu is visible if the **Px “Logic function”** parameter of the **Channel x settings** menu is set with the value **active**. The structure of the menu is as follows:

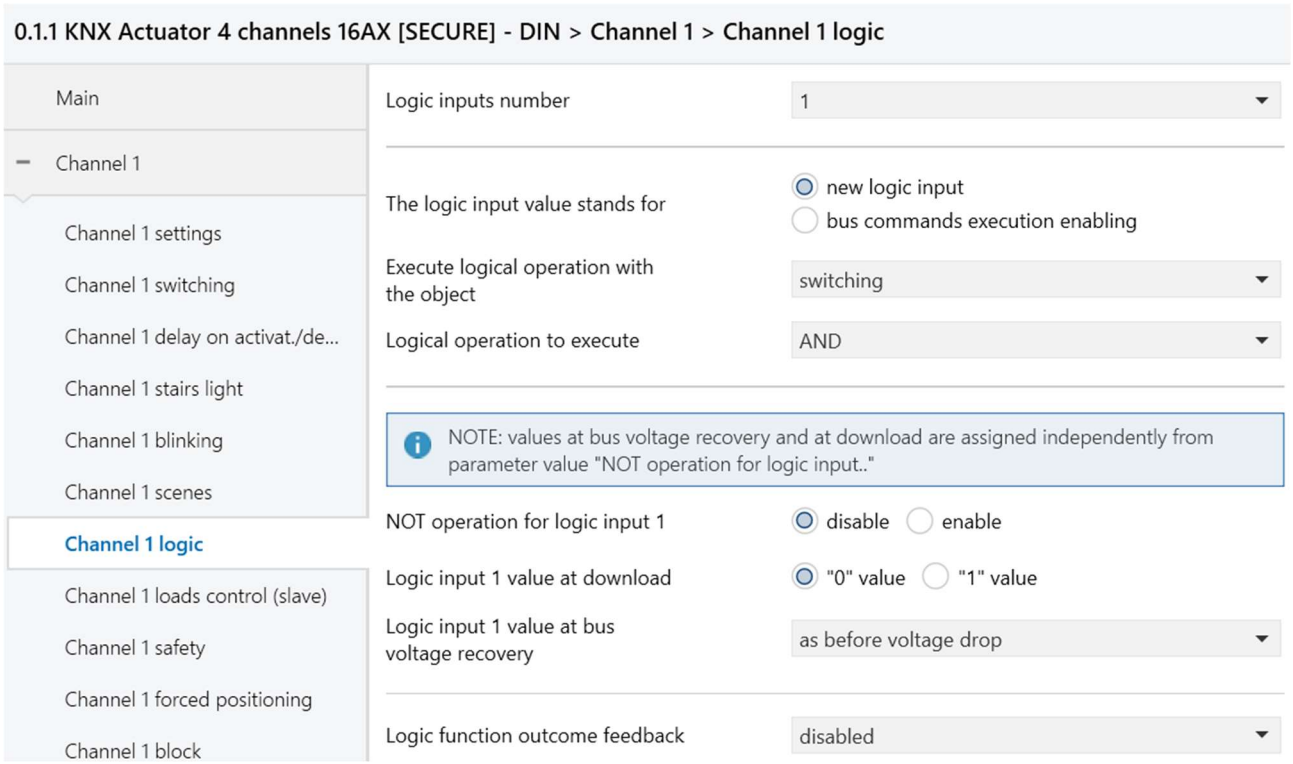


Fig. 4.8: “Channel X logic” menu

10.1 Parameters

10.1.1 Logic inputs number

It is possible to set the number of logic inputs via the parameter **Px “Logic inputs number”** which can assume the following values:

- **1** (default value), 2, 3, 4, 5, 6, 7, 8

Depending on the selected value, the following communication objects are made available ***Ch.x - Logic input 1***, ***Ch.x - Logic input 2***, ***Ch.x - Logic input 3***, ***Ch.x - Logic input 4***, ***Ch.x - Logic input 5***, ***Ch.x - Logic input 6***, ***Ch.x - Logic input 7*** and ***Ch.x Logic input 8***.

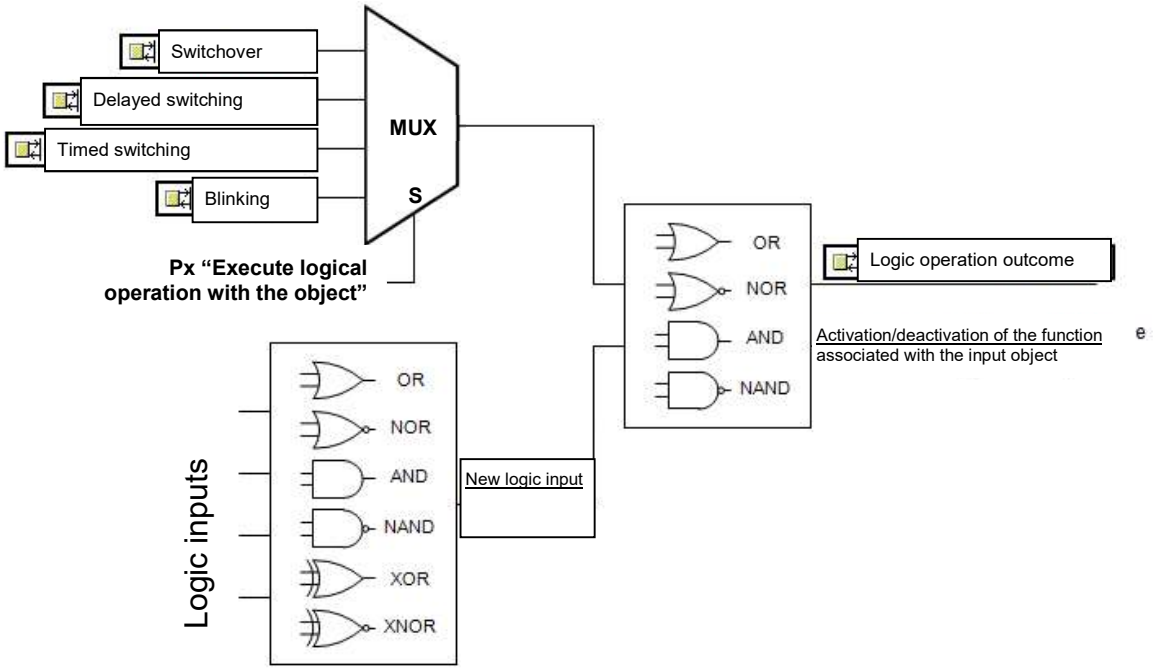
10.1.2 Operation between logic inputs

If the set value is other than **1**, it is possible to set the logic operation to be executed between the logic inputs. The operation is selected using the parameter **Px “Operation between logic inputs”**, which can assume the following values:

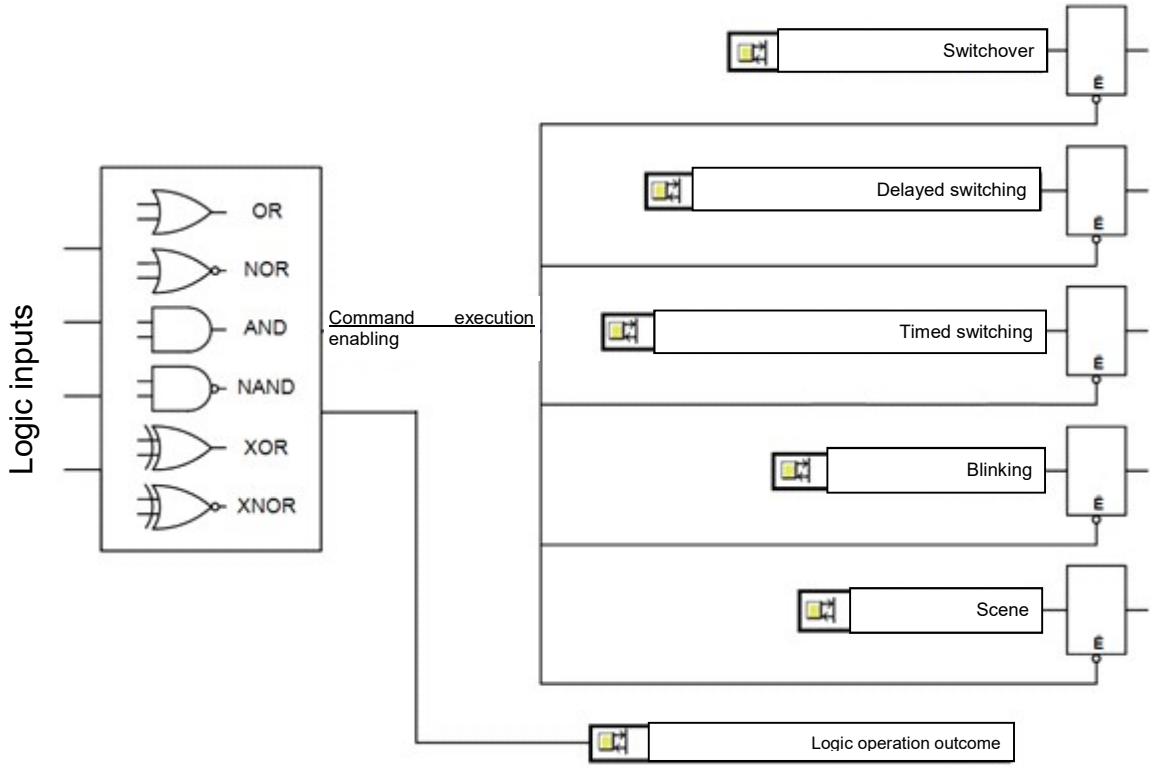
- **AND** **(default value)**
- OR
- NAND
- NOR
- XOR
- XNOR

The outcome of the operations between logic inputs (or the value of the individual logic input, if only one logic input was set) can be used as follows:

1 as the input of another logic operation, executed with one of the following objects - ***Ch.x - Switching***, ***Ch.x - Timed switching***, ***Ch.x - Delayed switching*** and ***Ch.x - Blinking***



2 it can be used to enable the execution of the commands received from the bus on the objects ***Ch.x - Switching***, ***Ch.x - Timed switching***, ***Ch.x - Delayed switching***, ***Ch.x - Blinking*** and ***Ch.x - Scenes***.



10.1.3 The outcome of the operation between logic inputs represents

The parameter used to select the function of the outcome of the operation between logic inputs is **Px "The outcome of the operation between logic inputs represents"** that, in the case of a single logic input, is replaced by the parameter **Px "The logic input value stands for"**; These parameters can assume the following values:

- **new logic input (default value)**
- bus commands execution enabling

If the value **new logic input** was selected (case 1), it is possible to define which object should be used to execute the new logic operation via the parameter **Px "Execute logical operation with the object"** and the logic operation to execute with the selected object via the parameter **Px "Logical operation to execute"**.

10.1.4 Execute logical operation with the object

The parameter **Px "Execute logical operation with the object"** may assume the following values:

- **switching (default value)**
- delayed switching
- timed switching
- blinking

The function associated with the selected object will be activated/deactivated according to the result of the logic. EXAMPLE: if the "blinking" object is selected and the function has been enabled in ETS, the blinking function will be activated when the logic is true and stopped if the logic is false.
If the function is not activated, the logic will not have any effect on the load connected to the output.

10.1.5 Logical operation to execute

The **Px "Logical operation to execute"** parameter may assume the following values:

- **AND (default value)**
- OR
- NAND
- NOR

10.1.6 Switching commands / Timed activation commands / Blinking activation/deactivation commands / Scenes commands

If the value **Bus command execution enabling** is selected (case 2, see fig. 4.9), a series of parameters appear that are used to set which commands received from the bus require enabling to be executed; these parameters are **Px "Switching (on/off) commands"**, **Px "Delayed switching commands"**, **Px "Timed activation commands"**, **"Px Blinking switching of/off commands"** and **Px "Scene commands"**, which may be assigned the following values:

- **independent from logic function (default value)**
- enabled by logic function

The commands enabled by the logic function are only executed if the outcome of the logic operation is true. If the outcome of the logic operation changes from false to true, the commands received after the status change will be executed. The commands received when the outcome of the logic function is false are ignored.

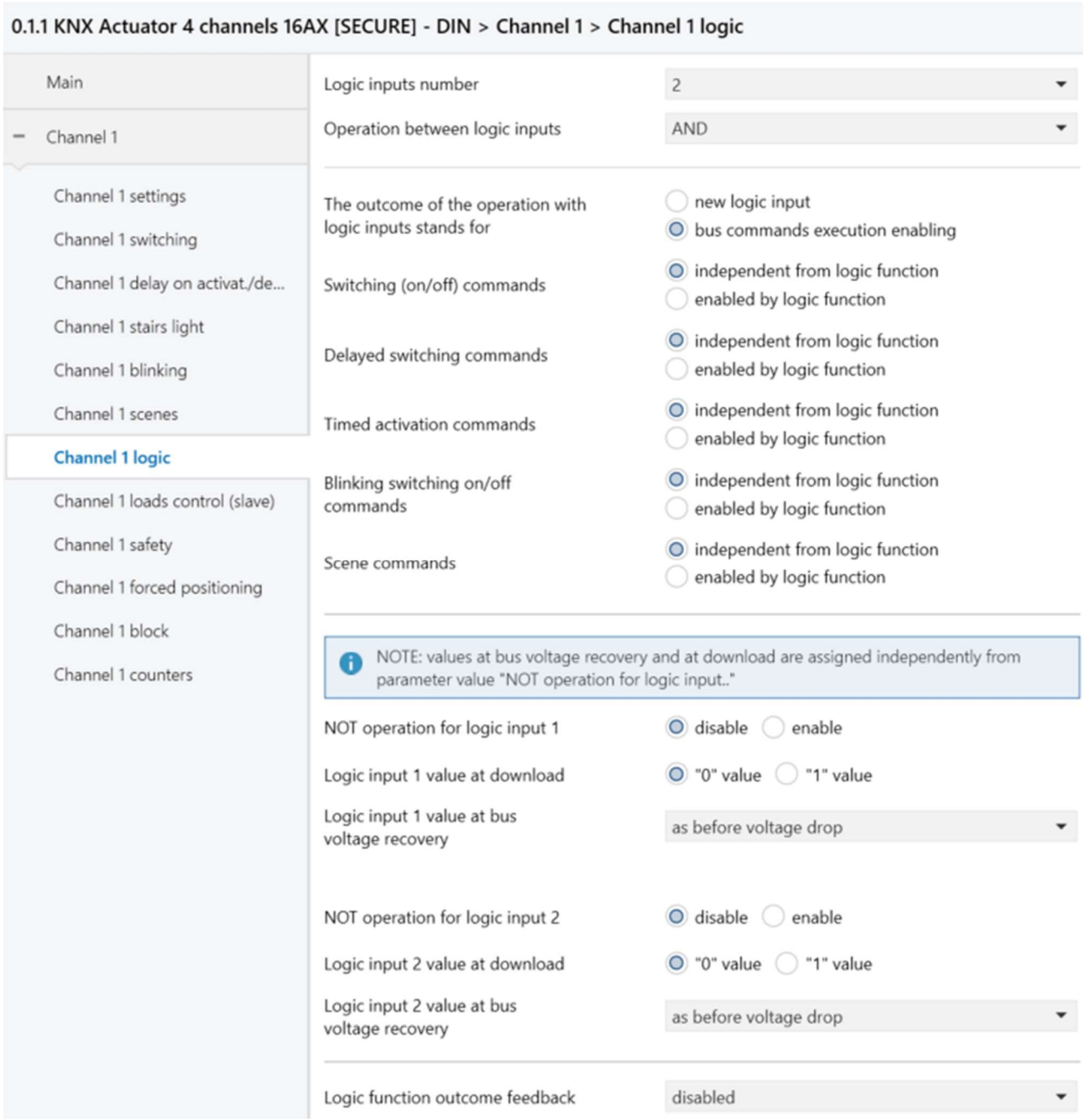


Fig. 4.9: “Channel X logic – bus command execution enabling” menu

10.1.7 NOT operation for logic input i

It is possible to refuse the value received from the bus on the communication objects associated with the logic inputs via the parameters **Px “NOT operation for logic input 1”**, **Px “NOT operation for logic input 2”**, **Px “NOT operation for logic input 3”**, **Px “NOT operation for logic input 4”**, **Px “NOT operation for logic input 5”**, **Px “NOT operation for logic input 6”**, **Px “NOT operation for logic input 7”** and **Px “NOT operation for logic input 8”** (displayed or not, depending on the number of enabled logic inputs), which can have the following values:

- **deactivated (default value)**
- active

10.1.8 Logic input i value at download

It is possible to set the value of the logic inputs at ETS download via the parameters **Px "Logic input 1 value at download"**, **Px "Logic input 2 value at download"**, **Px "Logic input 3 value at download"**, **Px "Logic input 4 value at download"**, **Px "Logic input 5 value at download"**, **Px "Logic input 6 value at download"**, **Px "Logic input 7 value at download"** and **Px "Logic input 8 value at download"** (they are displayed depending on the number of enabled logic inputs), which can have the following values:

- **"0" value (default value)**
- "1" value

10.1.9 Logic input i value at bus voltage recovery

It is possible to set the value of the logic inputs in the case of bus power supply voltage recovery via the parameters **Px "Logic input 1 value at bus voltage recovery"**, **Px "Logic input 2 value at bus voltage recovery"**, **Px "Logic input 3 value at bus voltage recovery"**,**Px "Logic input 4 value at bus voltage recovery"**, **Px "Logic input 5 value at bus voltage recovery"**, **Px "Logic input 6 value at bus voltage recovery"**, **Px "Logic input 7 value at bus voltage recovery"** and **Px "Logic input 8 value at bus voltage recovery"** (they are displayed depending on the number of enabled logic inputs), which can have the following values:

- "0" value
- "1" value
- **as before voltage drop (default value)**

selecting the value **as before voltage drop**, the device restores the values previous to the voltage drop and sends the read requests on the objects ***Ch.x - Logic input 1***, ***Ch.x - Logic input 2***, ***Ch.x - Logic input 3***, ***Ch.x - Logic input 4***, ***Ch.x - Logic input 5***, ***Ch.x - Logic input 6***, ***Ch.x - Logic input 7*** and ***Ch.x - Logic input 8*** to update with the field.
NB: The values at bus voltage recovery and downloading are assigned to logic objects independently of the value of the parameters **Px "NOT operation for logic input i"** ($1 \leq i \leq 8$).

10.1.10 Logic function outcome feedback

Finally, it is possible to enable the sending of the outcome of the logic function on the bus, and specify whether this information should always be sent when an input changes, or only if the outcome of the logic function changes via the parameter **Px "Logic function outcome feedback"**, which can have the following values:

- **disabled (default value)**
- only if the outcome changes
- even if the outcome does not change

setting a value other than **disabled** displays the ***Ch. x - Logic operation outcome*** (Data Point Type: 1.002 DPT_Bool).

The value transmitted on the bus is:
a) the outcome of the operation between the outcome of the logic input logical operation and the object selected in the parameter **Px "Execute logical operation with the object"** if the parameter **Px "The outcome of the operation between logic inputs stands for"** assumes the value **new logic input**
b) the outcome of the operation between logic inputs if the value of the parameter is **bus commands execution enabling**.

11 “Channel X load control (slave)” menu

For each channel, the slave load control function can be activated so the channel can be controlled by a master device (P-COMFORT KNX) or supervisor to create the monitoring function for active power and load control. This function has a higher priority than all the others apart from the safety, forcing and block functions.
The menu is visible if the parameter **Px “Load control - slave function”** of the **Channel x settings** menu is set with the value **active**.

The structure of the menu is as follows:

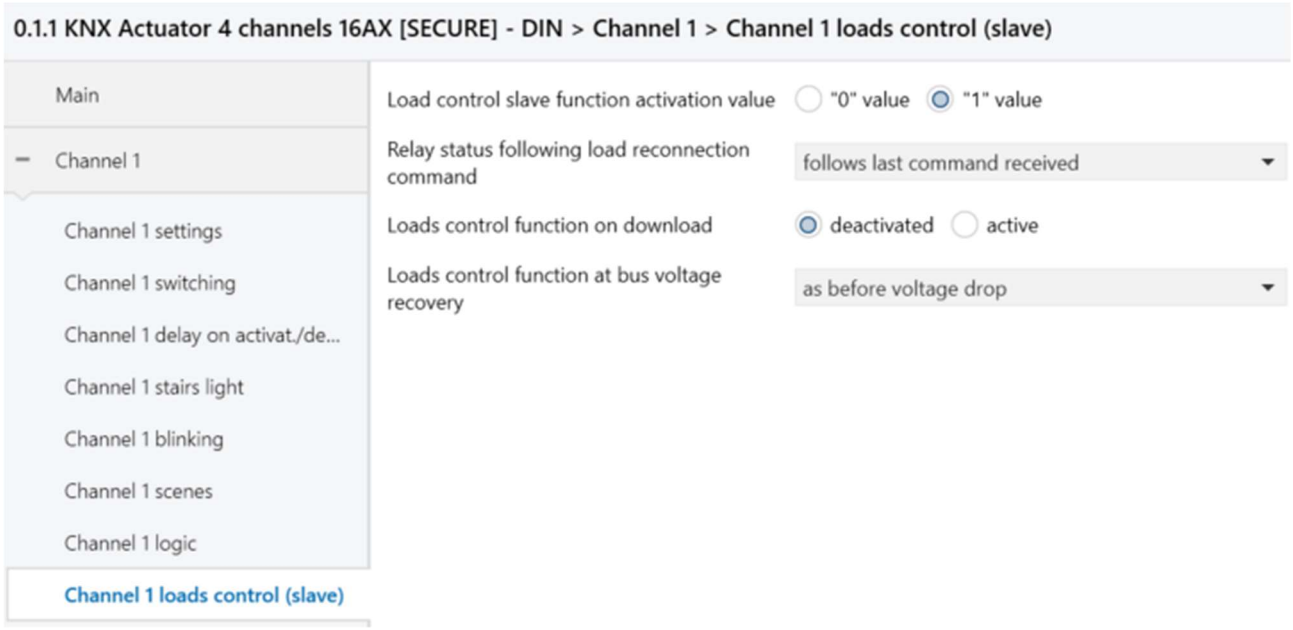


Fig. 4.10: “Channel X loads control (slave)” menu

11.1 Parameters

11.1.1 Load control slave function activation value

The parameter **Px “Load control slave function activation value”** determines which logic value activates the load control function of the actuator channel; the values that can be set are:

- “0” value
- **“1” value (default value)**

The communication objects ***Ch.x - Enable loads control slave function*** Data Point Type:1.002 DPT_Bool) e ***Ch.x - Loads control slave function enabling status*** (Data Point Type:1.003 DPT_Enable) can be used respectively to receive the load control function activation commands and send the signalling of the function activation status; the telegrams are sent via the ***Ch.X - Loads control slave function enabling*** object following a bus request, spontaneously after each change in the function enabling status, and upon bus voltage reset.

11.1.2 Relay status following load reconnection command

The parameter **Px “Relay status following load reconnection command”** is used to set the status that the contact must assume following the reconnection command received on the ***Ch.X - Slave switching for loads control object*** (Data Point Type:1.001 DPT_Switch); This object allows the load disconnection (“0” value)/reconnection (“1” value) commands to be received when the load control function (slave) is active. The parameter can assume the following values:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- **follows last command received (default value)**
- as before deactivation

If the parameter assumes the value **follows last command received**, the output follows the dynamics determined by the last command as if the execution of the command was initiated at the moment in which it was effectively received. Basically, the command is executed in the background and applied to the output at the moment the load is released. This behaviour applies, for example, to timed actuation commands or commands with delayed activation/deactivation, where the timing duration goes beyond the moment of load deactivation (release) because of the load control function.

Load deactivation/reconnection commands made while the load control function is deactivated are ignored. The deactivation/reconnection commands have a higher priority than priority 1 commands (see priority) when the load is deactivated via the load control function, the commands with a lower priority are performed but do not have any effect on the relay status.

The load status (deactivated/connected) is transmitted on the bus via the ***Ch.X - Slave status for loads control*** communication object (Data Point Type:1.001 DPT_Switch); when the load is "deactivated", the "0" value is transmitted; when the load is connected, a value of "1" is sent. The telegrams are sent via the ***Ch.X - Slave status for loads control*** object following a bus request, spontaneously after each change in the function enabling status, and upon bus voltage reset.

11.1.3 Loads control function on download

The parameter **Px "Loads control function on download"** sets the slave load control function status after downloading the application from ETS; the values that can be set are:

- **deactivated (default value)**
- active

The parameter **Px "Loads control function at bus voltage recovery"** sets the slave load control function status after a bus voltage reset; the values that can be set are:

- deactivated
- active
- **as before voltage drop (default value)**

If the value **deactivated** is selected (and the slave load control function was already active prior to the voltage failure), the function will be deactivated upon bus voltage reset and the relay will assume the value defined by the parameter **Px Relay status after bus voltage recovery"** ("Channel x settings" menu"). If the value set for this last parameter is **follows last command received**, the output will execute the last command received before the voltage drop that, as a result, must be stored to the non-volatile memory. If the last command received before the voltage failure was a timed activation or activation delay command, the command will not be executed when the voltage is reset and the relay will switch to the open (with NO)/closed (with NC) status.

12 “Channel X safety” menu

The safety function allows the output to function under normal conditions until certain set conditions occur (no periodic reception, reception of particular data from the bus), after which the device forces the status of the relay to a specific condition; to deactivate the safety function, the normal operation conditions must be reset. Any command that is received (excluding the block activation and forced positioning activation command) during a period when the safety is activated will not be executed as it has priority over any other bus command, with the exception of the block and forced positioning functions.
The communication object used to monitor the operating conditions is ***Ch.X - Safety*** (Data Point Type: 1.002 DPT_Bool).
The device signals the activation status of the safety function (1 = active, 0 = deactivated) via the ***Ch.X – Safety status*** communication object (Data Point Type: 1.003 DPT_Enable), regardless of whether or not any functions with a higher priority are active. The communication object is sent on request, when the bus voltage is recovered, and spontaneously on change of the function activation status.
The menu is visible if the parameter **Px “Safety function”** of the **Channel x settings** menu is set with the value **active**.
The structure of the menu is as follows:

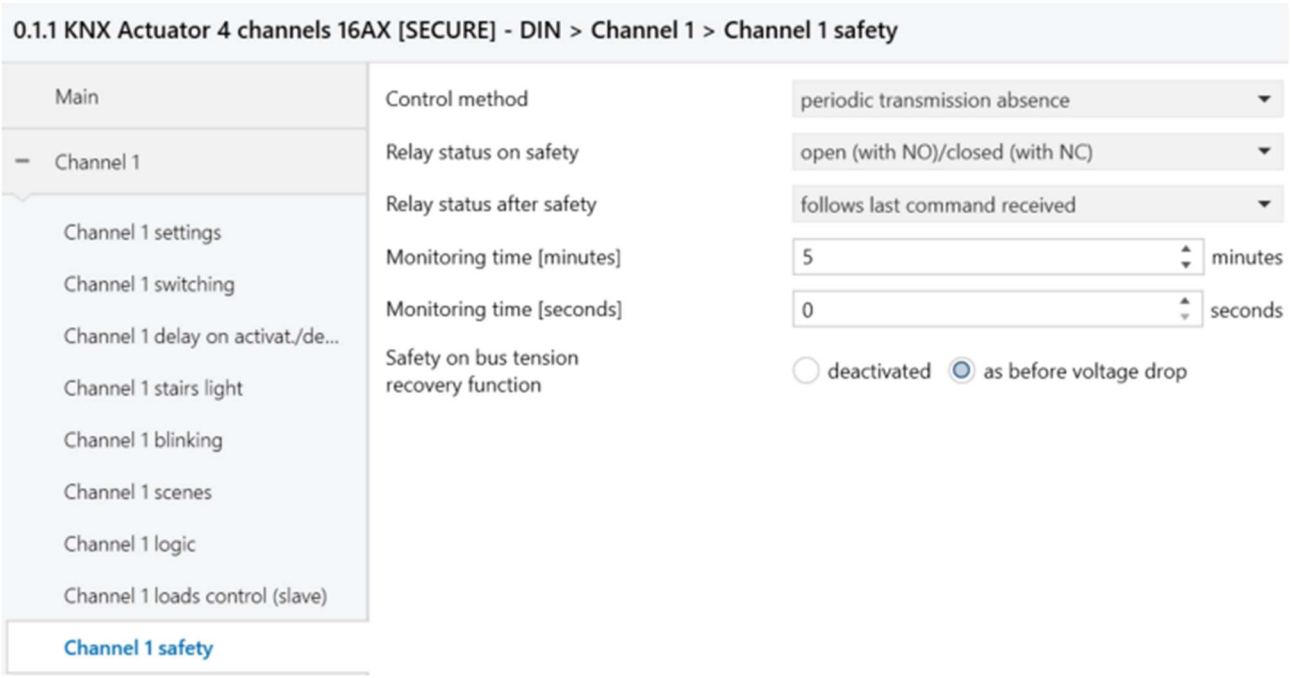


Fig. 4.12: “Channel X safety” menu

12.1 Parameters

12.1.1 Control method

The parameter **Px “Control method”** is used to define the conditions for which the device activates the safety function; unlike the process for the ***Block*** and ***Priority command*** commands, which are activated via a bus command, the safety function is enabled by the device when the conditions set in the reference parameter occur.
The values that can be set are:

- value “1” or no periodic transmission
- value “0” or no periodic transmission
- **periodic transmission absence (default value)**

By selecting **value "1" or periodic transmission absence**, the safety function is activated following two events:

- the communication object ***Ch.x - Safety*** no longer receives the telegram with logic value "0" (no periodic transmission) for a period of time equal to the time represented by the values set in parameters **Px "Monitoring time [minutes]"** and **Px "Monitoring time [seconds]"**.
- if the ***Ch.x - Safety*** communication object receives a telegram with the logic value "1" (value "1" received).

In both cases, the safety function is deactivated when the communication object ***Ch.x - Safety*** receives a telegram with logic value "0"; once safety is deactivated, the monitoring time is restarted.

By selecting **value "0" or no periodic transmission**, the safety function is activated following two events:

- the communication object ***Ch.x - Safety*** no longer receives the telegram with logic value "1" (no periodic transmission) for a period of time equal to the time represented by the values set in parameters **Px "Monitoring time [minutes]"** and **Px "Monitoring time [seconds]".**.
- if the ***Ch.x -* Safety** communication object receives a telegram with the logic value "0" (value "0" received).

In both cases, the safety function is deactivated when the communication object ***Ch.x - Safety*** receives a telegram with logic value "1"; once safety is deactivated, the monitoring time is restarted.

By selecting the value **periodic transmission absence**, the safety function is activated when the communication object ***Ch.x - Safety*** does not receive any telegram for a period of time equal to the time represented by the values set in parameters **Px "Monitoring time [minutes]"** and **Px "Monitoring time [seconds]"**, independently of the value of the telegram itself.
The safety function is deactivated when the communication object ***Ch.x - Safety*** receives a telegram with logic value "0" or "1"; once safety is deactivated, the monitoring time is restarted.

12.1.2 Relay status on safety

The parameter **Px "Relay status on safety"** is used to set the status of the contact when the security function is active; the values that can be set are:

- **open (with NO)/closed (with NC) (default value)**
- closed (with NO)/open (with NC)
- no change

12.1.3 Relay status after safety

When normal operating conditions are restored (safety deactivation), the status to which the actuator switches the relay is defined by the parameter **Px "Relay status after safety"**; the values that can be set are:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- no change
- **follows last command received (default value)**
- as prior to the safety activation

by selecting the value **follows last command received**, the output follows the dynamics determined by the last command, as if the execution of the command was initiated at the moment in which it was effectively received. Basically, the command is executed in the background and is applied to the output in the moment in which safety is ended. This behaviour applies, for example, to timed actuation commands with timing that has a duration that goes beyond the moment of safety deactivation or commands with delayed activation/deactivation.

12.1.4 Monitoring time [minutes]

The parameter **Px "Monitoring time [minutes]"** is used to set the first of two values (minutes) that make up the time that must pass after which the device will activate the safety if it does not receive the expected telegram (periodic transmission absence); the values that can be set are:

- from 0 to 59 with steps of 1, with **5 (default value)**

12.1.5 Monitoring time [seconds]

The parameter **Px "Monitoring time [seconds]"** is used to set the second of the two values (seconds) that make up the time that must pass after which the device will activate the safety if it does not receive the expected telegram (periodic transmission absence); the values that can be set are:

- from **0 (default value)** to 59 with steps of 1

NB: Setting a monitoring time equal to **0 minutes** and **0 seconds**, the ***Safety*** object is not monitored and the absence of periodic transmission on the object does not activate the function.

12.1.6 Safety on bus tension recovery function

The parameter **Px "Safety on bus tension recovery function"** is used to determine the status of the security function on bus voltage recovery. This parameter is useful if the function is active at the time of the bus failure and you don't want the output behaviour to change after the reset. The parameter can assume the following values:

- deactivated
- **as before voltage drop (default value)**

If the value **deactivated** is selected (and safety was activated before the bus voltage drop), when the voltage is recovered the safety function will be deactivated and the relay will take on the value determined by the parameter **Px "Relay status after bus voltage recovery"** ("Channel x settings" menu). If the value set for this last parameter is **follows last command received**, the output will execute the last command received before the bus voltage drop that, as a result, must be stored to the non-volatile memory. If the last command received before the voltage failure was a timed activation or activation delay command, the command will not be executed when the voltage is reset and the relay will switch to the open (with NO)/closed (with NC) status. If the value **as before voltage drop** is selected (and safety was activated before the voltage drop), when the voltage is recovered the safety function will be reactivated and the relay will be set to the conditions set in the parameter **Px "Relay status on safety"**.

13 “Channel x forced positioning" menu

It is possible to force the relay status in a certain (settable) condition after receiving the communication object ***Ch. x - Priority command*** (Data Point Type: 2.001 DPT_Switch_Control), which activates the forced positioning function; until this is deactivated, any command received on all other input communication objects will not be executed, with the exception of commands received on the ***Ch.x - Block*** object. The forced positioning function has the highest priority over all others with the exception of the Block function.
The device indicates the activated status of the forcing function via the communication object ***Ch.x - Priority command status*** (Data Point Type: 2.001 DPT_Switch_Control), regardless of whether or not any functions with a higher priority are active. The communication object is sent on request, when the bus voltage is recovered, and spontaneously. It is sent spontaneously when the status passes from "activate forced positioning ON" to "activate forced positioning OFF" or "deactivate forced positioning", and vice versa.
The menu is visible if the parameter **Px “Forcing function”** of the **Channel x settings** menu is set with the value **active**.
The structure of the menu is as follows:

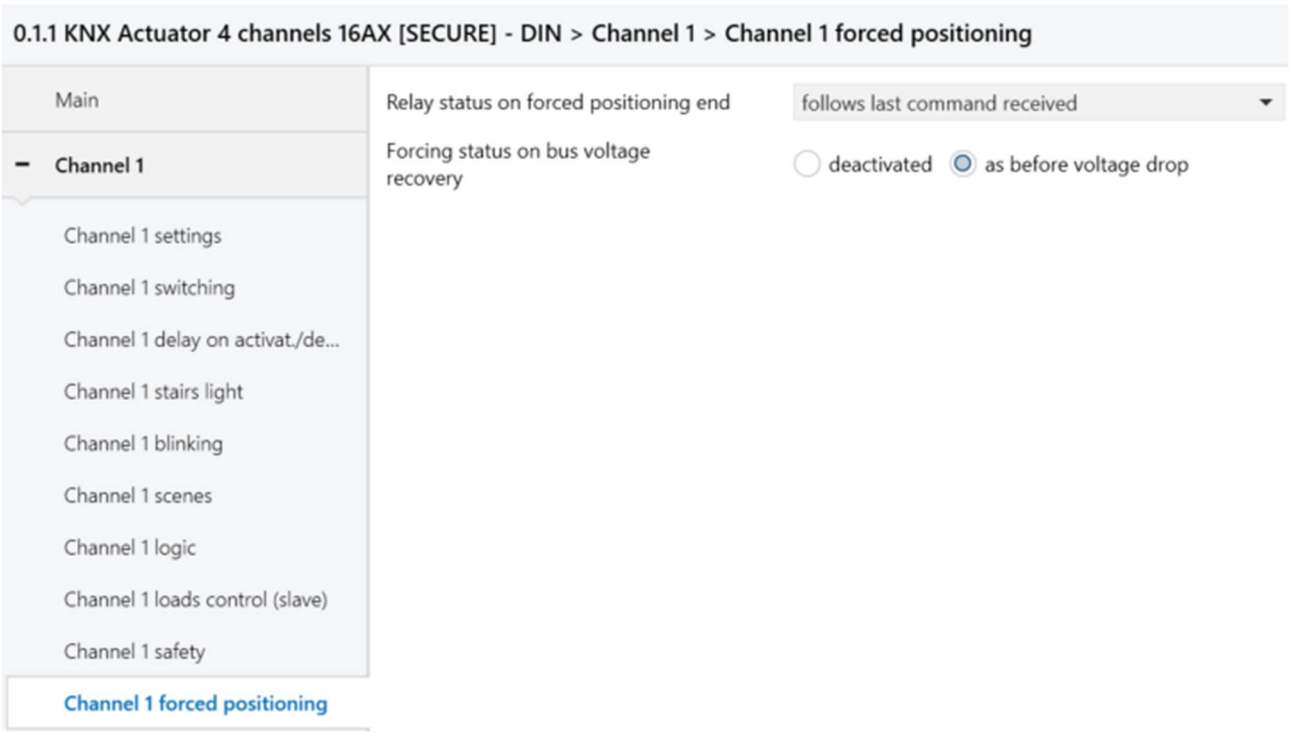


Fig. 4.13: “Channel X forced positioning” menu

The semantics of the command received from the bus follow what is shown in the table below:

bit1	bit 0	
0	0	Forcing deactivation
0	1	Forcing deactivation
1	0	Forced positioning OFF
1	1	Forced positioning ON

13.1 Parameters

13.1.1 Relay status on forced positioning end

When a priority command is received with the forced positioning activation ON value, the actuator switches the relay, closing the NO contact or opening the NC contact; vice versa, when a priority command is received with the forced positioning activation OFF value, the actuator switches the relay, opening the NO contact or closing the NC contact.
Upon receipt of the forced positioning deactivation command, the status to which the output switches the relay is defined by the parameter **Px "Relay status on forced positioning end"**; the values that can be set are:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- no change
- **follows last command received (default value)**
- as prior to the forcing activation

If the parameter assumes the value **follows last command received**, the output follows the dynamics determined by the last command as if the execution of the command was initiated at the moment in which it was effectively received. Basically, the command is executed in the background and is applied to the output in the moment in which forced positioning is ended. This behaviour applies, for example, to timed actuation commands with timing that has a duration that goes beyond the moment of forced positioning deactivation or commands with delayed activation/deactivation.

13.1.2 Forcing status on bus voltage recovery

The parameter **Px "Forcing status on bus voltage recovery"** determines the status of the forced positioning function on bus voltage recovery. This parameter is useful if the function is active at the time of the voltage failure and you don't want the output behaviour to change after the failure. The parameter can assume the following values:

- deactivated
- **as before voltage drop (default value)**

If the value **deactivated** is selected (and forced positioning was activated before the bus voltage drop), when the voltage is recovered the forced positioning function will be deactivated and the relay will take on the value determined by the parameter **Px "Relay status after bus voltage recovery"** ("Channel x settings" menu). If the value set for this last parameter is **follow last command received**, the actuator will execute the last command received before the bus voltage drop that, as a result, must be stored to the non-volatile memory. If the last command received before the voltage failure was a timed activation or activation delay command, the command will not be executed when the voltage is reset and the relay will switch to the open (with NO)/closed (with NC) status.
If the value **as before voltage drop** is selected (and forcing was activated before voltage drop), when the voltage is recovered the forcing function is reactivated and the relay switches to the status prior to the voltage drop.

If a forced positioning deactivation command is received and the parameter **Px "Relay status on forced positioning end"** assumes the value **follows last command received**, the actuator executes the last command received before the bus voltage drop (which, as a result, must be stored in the non-volatile memory). If the last command received before the voltage failure was a timed activation or activation delay command, the command will not be executed when the voltage is reset and the relay will switch to the open (with NO)/closed (with NC) status.

14 “Channel X block” menu

The device can be locked in a certain (settable) condition after receiving the ***Ch. X - Block*** communication object (Data Point Type: 1.002 DPT_Bool), which activates the block function; until it is deactivated, any command received on all other input communication objects will not be executed. The block function is the function with the highest priority.
The device signals the activation status of the block function (1 = active, 0 = deactivated) via the ***Ch.X – Block status*** communication object (Data Point Type: 1.003 DPT_Enable). The communication object is sent on request, when the bus voltage is recovered, and spontaneously on change of the function activation status.
The menu is visible if the parameter **Px “Block function”** of the **Channel x settings** menu is set with the value **active**.
The structure of the menu is as follows:

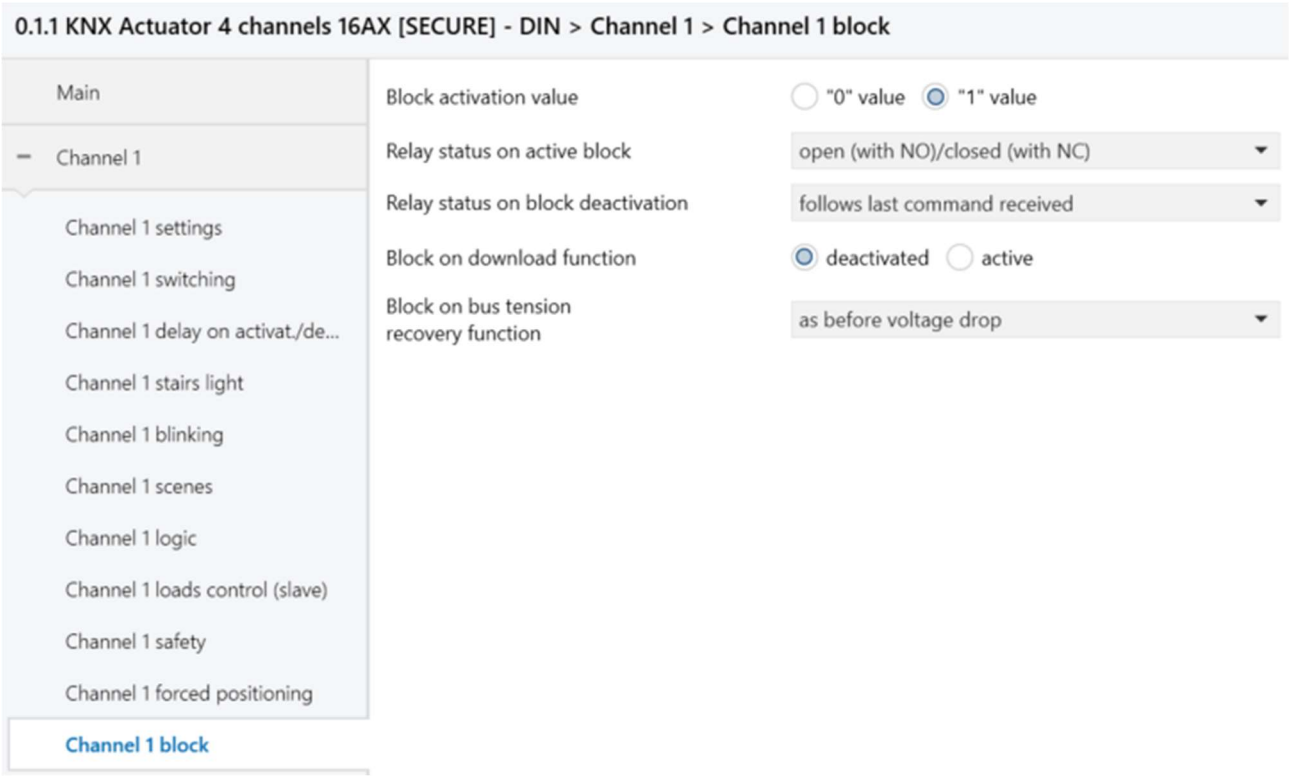


Fig. 4.14: “Channel X block” menu

14.1 Parameters

14.1.1 Block activation value

The parameter **Px “Block activation value”** determines which logic value activates the actuator block function; the values that can be set are:

- “0” value
- **“1” value (default value)**

14.1.2 Relay status on active block

The parameter **Px "Relay status on active block"** is used to set the status that the contact must assume when the block function is activated; the values that can be set are:

- **open (with NO)/closed (with NC) (default value)**
- closed (with NO)/open (with NC)
- no change

14.1.3 Relay status on block deactivation

The parameter **Px "Relay status on block deactivation"** is used to set the status that the contact must assume after the deactivation of the block function; the values that can be set are:

- open (with NO)/closed (with NC)
- closed (with NO)/open (with NC)
- no change
- **follows last command received (default value)**
- as prior to the block activation

If the parameter assumes the value **follows last command received**, the output follows the dynamics determined by the last command as if the execution of the command was initiated at the moment in which it was effectively received. Basically, the command is executed in the background and is applied to the output in the moment in which the block is deactivated. This behaviour applies, for example, to timed actuation commands with timing that has a duration that goes beyond the moment of block deactivation or commands with delayed activation/deactivation.

14.1.4 Block on download function

The parameter **Px "Block on download function"** sets the block function status after downloading the application from ETS; the values that can be set are:

- **deactivated (default value)**
- active

14.1.5 Block on bus tension recovery function

The parameter **Px "Block on bus tension recovery function"** is used to set the status of the block function after the bus power supply voltage is recovered; the values that can be set are:

- deactivated
- active
- **as before voltage drop (default value)**

If the value **deactivated** is selected (and the block function was activated before the bus voltage drop), when the voltage is recovered the block function will be deactivated and the relay will take on the value determined by the parameter **Px "Relay status after bus voltage recovery"** ("Channel x settings" menu). If the value set for this last parameter is **follows last command received**, the output will execute the last command received before the voltage drop that, as a result, must be stored to the non-volatile memory. If the last command received before the voltage failure was a timed activation or activation delay command, the command will not be executed when the voltage is reset and the relay will switch to the open (with NO)/closed (with NC) status. If the **as before voltage drop** value is selected (and the block function was activated before the voltage drop), when the voltage is reset the block function will be reactivated and the relay will assume the conditions set in the parameter **Px "Relay status on active block"**.

15 “Channel X counters” menu

This is used to enable the count of the operating time (closing or opening), and the number of operations of the relay associated with the channel, by setting the count parameters.
The menu is visible if the parameter **Px “Counters”** of the **Channel x settings** menu is set with the value **active**.

The structure of the menu is as follows:

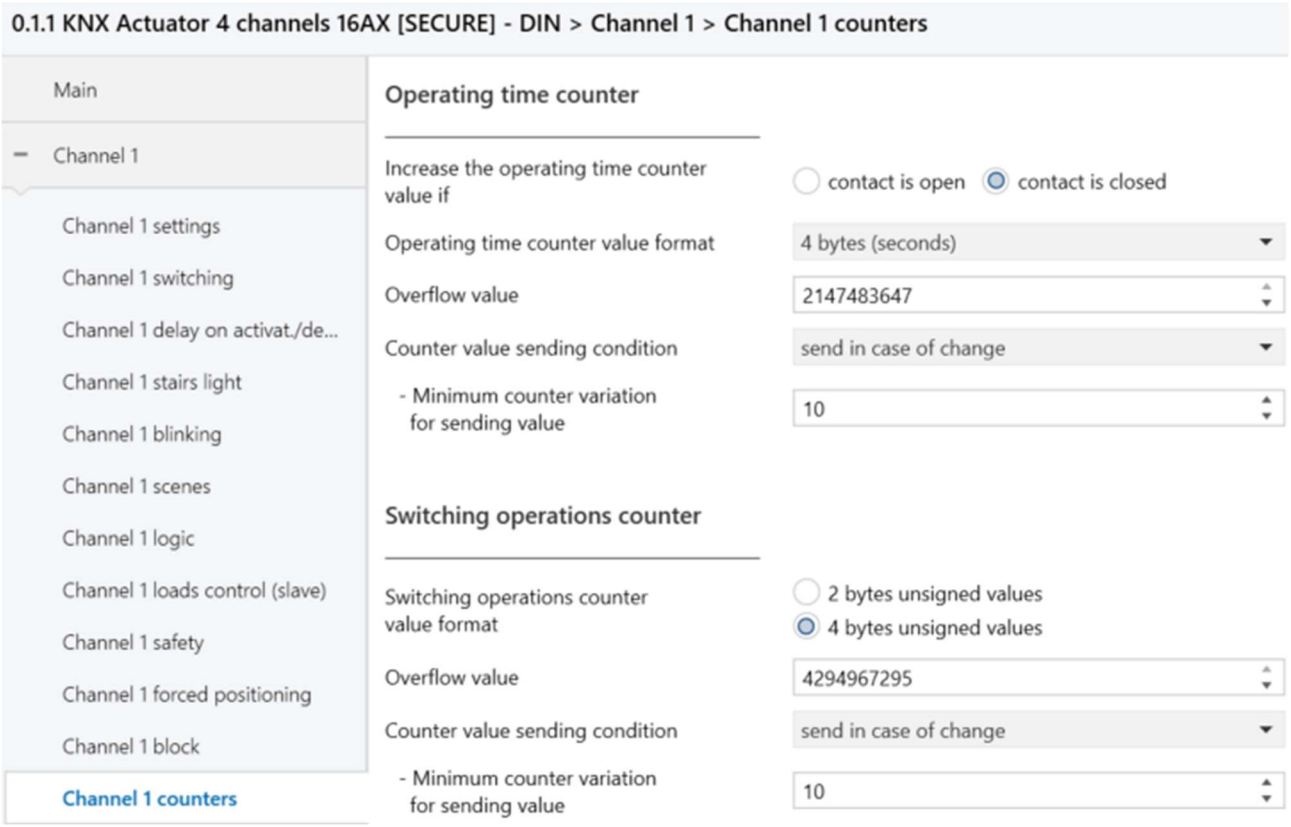


Fig. 4.15: “Channel X counters” menu

15.1 Parameters

15.1.1 Increase the operating time counter value if

The device is able to signal the count of the total operating time (closing or opening) of the relay; The count is based on the detection of the status of the relay associated with the output. There are 2 detectable statuses: contact is closed and contact is open; the parameter **Px “Increase the operating time counter value if”** is used to set the status of the contact that is considered for increasing the counter. The values that can be set are:

- open contact
- **contact is closed (default value)**

The count is only made if the supply voltage is present; otherwise, the counter is not increased. The count can still be made even if there is no bus voltage.

15.1.2 Operating time counter value format

The counter that is used for the count can have different units of measure depending on the format selected for transmitting the value on the KNX bus; the parameter **Px "Operating time counter value format"** parameter is therefore used to define the size and code of the communication object used to communicate the counter value, and hence the counter measurement unit. The values that can be set are:

- **4 byte (seconds) (default value)**
- 2 byte (minutes)
- 2 byte (hours)

The value set for this item will affect the values that can be set for the parameter **Px "Overflow value"** and the format of the ***Ch.X - Operating time counter*** communication object; The initial value is always 0, regardless of the format selected.

15.1.3 Overflow value

The parameter **Px "Overflow value"** is used to set the maximum value of the operating time counter; in fact, it is possible to set the maximum counter value - i.e. the value beyond which the counter is in an overflow condition.
Depending on the value set for the parameter **Px "Operating time counter value format"**, the values that can be set for this item will be different:

- If the counter format is **4 bytes (seconds)**, this displays the communication object ***Ch.x - Operating time counter*** (Data Point Type: 13.100 DPT_LongDeltaTimeSec) is visible and the values that can be set for the above parameter are:
  - from 0 to **2147483647 (default value, ≈ 68 years)** with steps of 1
- If the counter format is **2 bytes (minutes)**, this displays the communication object ***Ch.x - Operating time counter*** (Data Point Type: 7.006 DPT_TimePeriodMin) is visible and the values that can be set for the above parameter are:
  - from 0 to **65535 (default value, ≈ 45.5 days)** with steps of 1
- If the counter format is **2 bytes (hours)**, this displays the communication object ***Ch.x - Operating time counter*** (Data Point Type: 7.007 DPT_TimePeriodHrs) is visible and the values that can be set for the above parameter are:
  - from 0 to **65535 (default value, ≈ 7.4 years)** with steps of 1

When the maximum value is reached, the count stops until a reset command is implemented.

Via the object ***Ch.x - Operating time counter overflow*** (Data Point Type: 1.002 DPT_Bool) the device indicates the overflow of the operating time counter; when the overflow occurs, a value of "1" is sent; a value of "0" is sent when the counter is reinitialised.

Via the communication object ***Ch.x - Operating time counter reset*** (Data Point Type: 1.015 DPT_Reset) the device can receive the counter reinitialisation commands that return the count to its initial value (0); the "0" value is ignored but, if a value of "1" is received, the counter value is reset at the initial value and the ***Ch.X - Operating time counter overflow*** object is set to "0".

15.1.4 Counter value sending condition

The parameter **Px "Counter value sending condition"** defines the conditions for sending the current value of the operating time counter; the values that can be set are:

- send on demand only
- **send in case of change (default value)**
- send periodically
- send in case of change and periodically

selecting the value **send in case of change** or **send in case of change and periodically**, displays the parameter **Px "Minimum counter variation for sending value"** whereas selecting the value **send periodically** or **send in case of change and periodically** displays the parameter **Px "Counter value sending period"**.
Selecting the value **send on demand only**, no new parameter will be enabled because the operating time counter value is not sent spontaneously by the device; only in the case of a status read request will it send the user a telegram in response to the command received, giving information about the current value of the counter.
After a bus voltage reset, the value of the counter should be sent in order to update any connected devices.

15.1.5 Minimum counter variation for sending value

The parameter **Px "Minimum counter variation for sending value"**, which is visible if the operating time counter value is sent on change, is used to define the minimum counter variation (in relation to the last value sent) that causes the new value to be sent spontaneously; the values that can be set are:

- from 1 to 100 with steps of 1, with **10 (default value)**

The unit of measurement of the minimum variation is the same as that set for the counter format.

The parameter **Px "Counter value sending period [seconds]"**, which is visible if the operating time counter value is sent periodically, is used to define the frequency for spontaneously sending telegrams indicating the current counter value; the values that can be set are:

- from 1 to 255 with steps of 1, with **15 (default value)**

In the event of a voltage failure, the operating time counter value must be saved in a non-volatile memory and reset when the supply voltage is reset.

The device is able to signal the count of the number of operations performed by the relay; the count is based on the detection of the change in status of the relay associated with the output.

15.1.6 Switching operations counter value format

The counter used for the count of the number of operations can have different units of measure depending on the format selected for transmitting the value on the KNX bus; the parameter **Px "Switching operations counter value format"** is therefore used to define the size and code of the communication object used to communicate the counter value, and therefore the counter measurement unit. The values that can be set are:

- 2 bytes unsigned values
- **4 bytes unsigned values (default value)**

15.1.7 Overflow value

The value set for this item will affect the values that can be set for the parameter **Px "Overflow value"** and the format of the ***Ch.X - Switching operations counter*** communication object; The initial value is always 0, regardless of the format selected.

The parameter **Px "Overflow value"** is used to set the maximum value of the switching operations counter; in fact, it is possible to set the maximum counter value - i.e. the value beyond which the counter is in an overflow condition.
Depending on the value set for the parameter **Px "Switching operations counter value format"**, the values that can be set for this item will be different:

- If the counter format is **2 bytes unsigned values**, this displays the communication object ***Ch.x - Switching operations counter*** (Data Point Type: 7.001 DPT_Value_2_Ucount) is displayed and the values that can be set for the above parameter are:

  - from 0 to **65535 (default value)** with steps of 1

- If the counter format is **4 bytes unsigned values**, this displays the communication object ***Ch.x - Switching operations counter*** (Data Point Type: 12.001 DPT_Value_4_Ucount) is displayed and the values that can be set for the above parameter are:
  - from 0 to **4294967295 (default value)** with steps of 1

When the maximum value is reached, the count stops until a reset command is implemented.

Via the object ***Ch.x - Switching operations counter overflow*** (Data Point Type: 1.002 DPT_Bool) to indicate the overflow of the switching operations counter; when the overflow occurs, a value of "1" is sent; a value of "0" is sent when the counter is reinitialised.

Via the communication object ***Ch.x - Switching operations counter reset*** (Data Point Type: 1.015 DPT_Reset) the device can receive the counter reinitialisation commands that return the count to its initial value (0); the "0" value is ignored but, if a value of "1" is received, the counter value is reset at the initial value and the ***Ch.X - Switching operations counter overflow*** object is set to "0".

15.1.8 Counter value sending condition

The parameter **Px "Counter value sending condition"** defines the conditions for sending the current value of the switching operations counter; the values that can be set are:

- send on demand only
- **send in case of change (default value)**
- send periodically
- send in case of change and periodically

selecting the value **send in case of change** or **send in case of change and periodically**, displays the parameter **Px "Minimum counter variation for sending value"** whereas selecting the value **send periodically** or **send in case of change and periodically** displays the parameter **Px "Counter value sending period"**.
Selecting the value **send on demand only**, no new parameter will be enabled because the switching operations counter value is not sent spontaneously by the device; only in the case of a status read request will it send the user a telegram in response to the command received, giving information about the current value of the counter.
After a bus voltage reset, the value of the counter should be sent in order to update any connected devices.

15.1.9 Minimum counter variation for sending value

The parameter **Px "Minimum counter variation for sending value"**, which is visible if the switching operations counter value is sent on change, is used to define the minimum counter variation (in relation to the last value sent) that causes the new value to be sent spontaneously; the values that can be set are:

- from 1 to 100 with steps of 1, with **10 (default value)**

The unit of measurement of the minimum variation is the same as that set for the counter format.

The parameter **Px "Counter value sending period [seconds]"**, which is visible if the switching operations counter value is sent periodically, is used to define the frequency for spontaneously sending telegrams indicating the current counter value; the values that can be set are:

- from 1 to 255 with steps of 1, with **15 (default value)**

In the event of a voltage failure, the switching operations counter value must be saved in a non-volatile memory and reset when the supply voltage is reset.

16 Priority of channel X functions

The priority of the functions implemented by channel X is shown in the following table:

Function	Priorities	
On/off switching	1	low
Timed switching	1	
Delayed switching	1	
Blinking	1	
Scene	1	
Logic function (if used for enabling of commands)	2	
Relay status following a load reconnection command	3	
Relay status after safety	4	
Relay status on forced positioning end	5	
Relay status on block deactivation	6	
Relay status after bus voltage recovery	7	
Blinking mode on bus voltage recovery	8	
Slave load control	9	
Safety	10	
Forcing	11	
Lockout	12	
Local push-button (for “test on/off” function)	13	
Load control function on power supply reset	14	
Safety status on bus voltage reset	15	
Forced positioning status on bus voltage reset	16	
Block function on download/bus voltage reset (if value = active)	17	
Relay status on voltage failure (open)	18	high

To sum up, in normal operating conditions the device behaves as shown in the flow chart below:

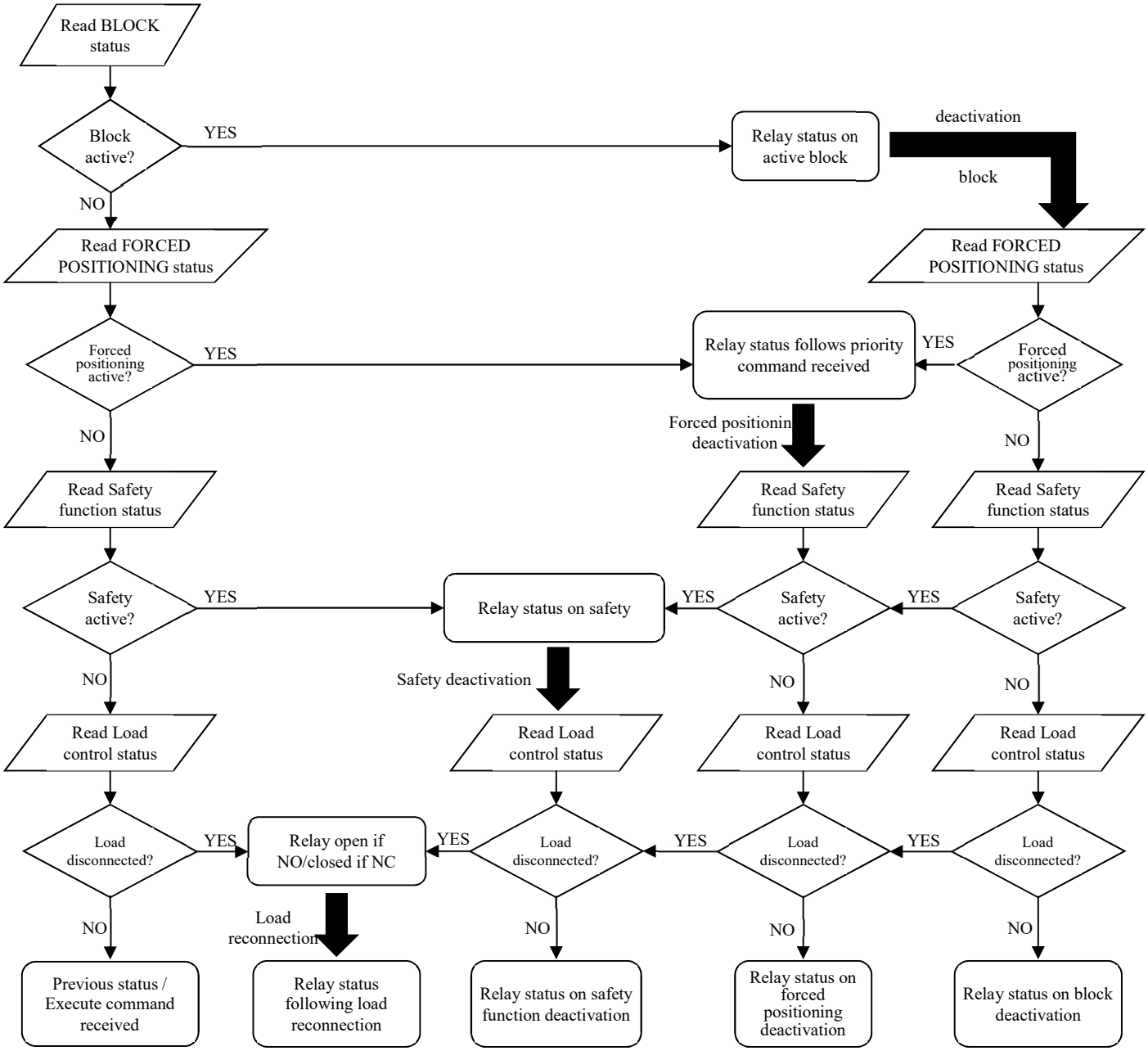


Fig. 5.1: Flow chart for normal operation

When the bus voltage is reset, the device behaves as shown in the following flow diagram:

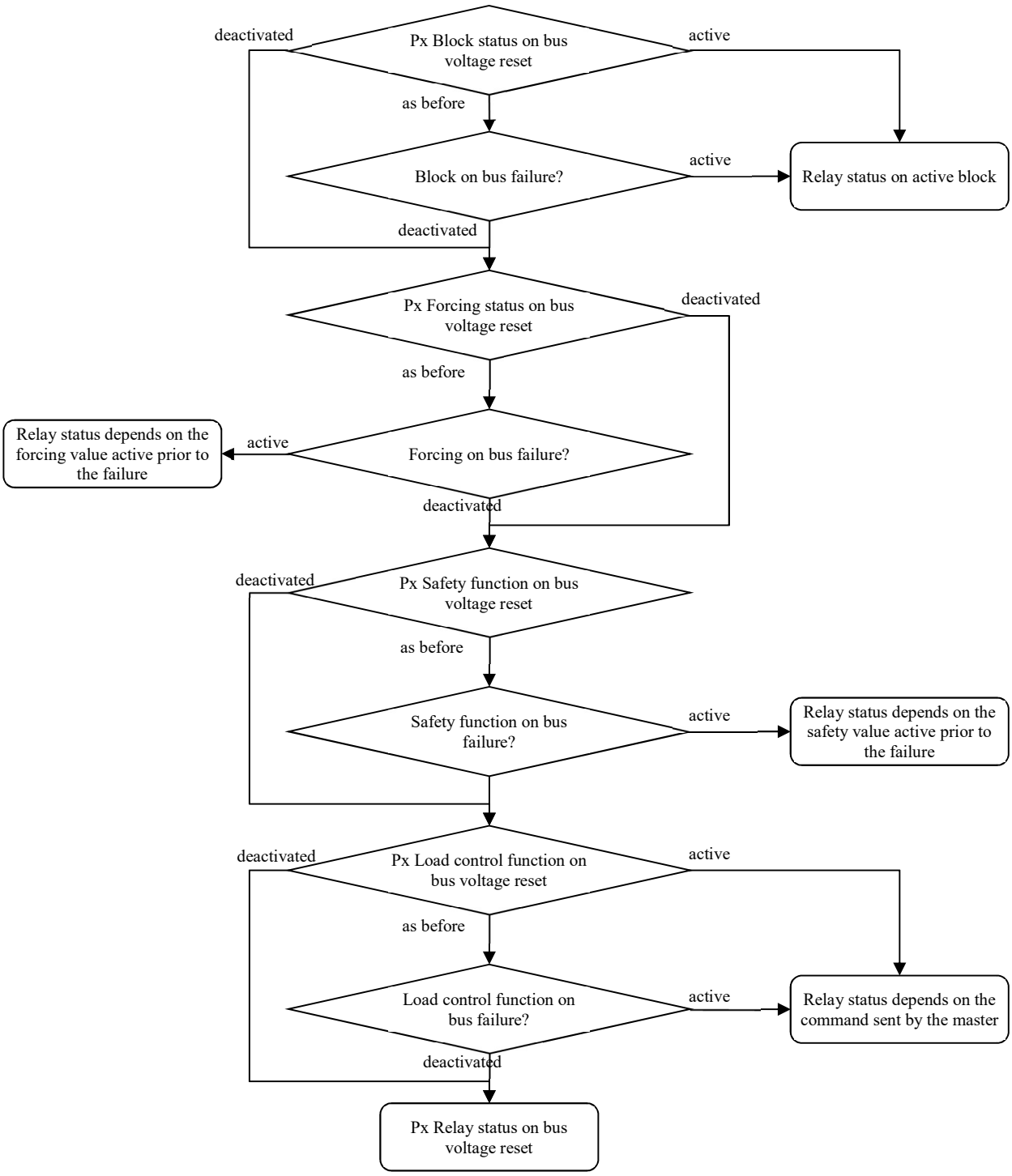


Fig. 5.2: Flow chart for bus voltage reset

17 Local command elements on the device

The device has a button key on the front, for programming the KNX physical address.

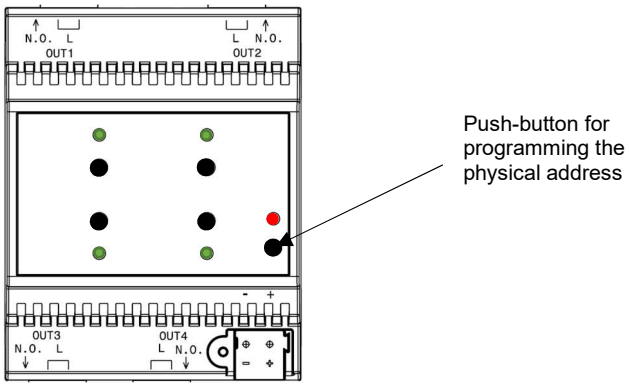


Fig. 6.1: Push-button for programming the physical address

When the push-button is pressed, the device goes into physical address programming mode. It will maintain this status until the physical address is downloaded from ETS. The device will quit physical address programming mode if the programming button key is pressed again when it is already in this mode.

The device has three front push-buttons for relay command; their operation depends on the parameter **Px "Channel x local key function**" of the "Main" menu.

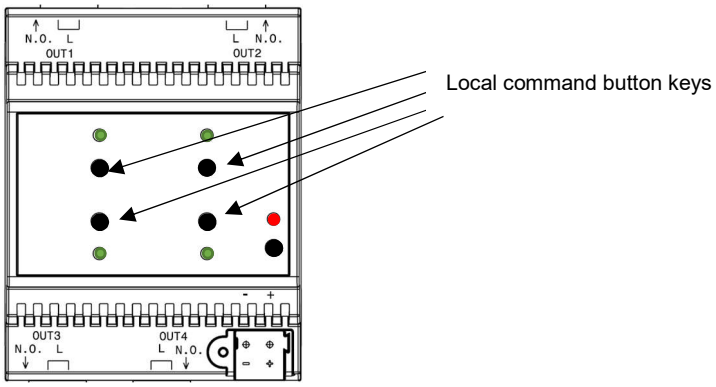


Fig. 6.2: Local command button keys

The local button keys can be used with or without the bus voltage, but in both cases with the 230V voltage on at least one of the channels.
If enabled, the local button key permits the cyclical switching of the relay status, and can be enabled and disabled via a bus command.

18 Visualisation elements

The device is equipped with:

1 red LED on the front of the device

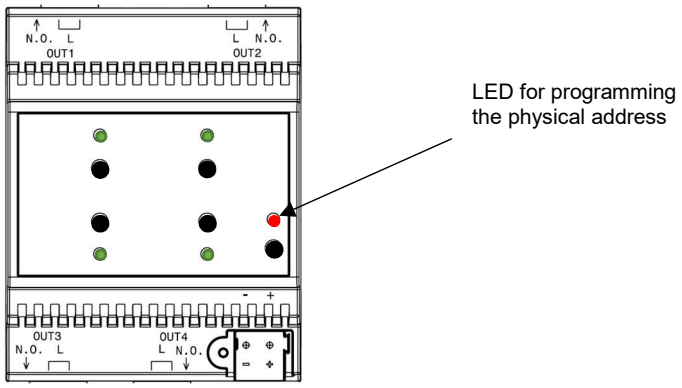


Fig. 7.1: LED for programming the physical address

The LED indicates the presence of KNX bus voltage / physical address programming mode signalling.
The LED is ON when the device is in KNX physical address programming mode and the KNX bus voltage is present. The LED switches off automatically when the physical address is downloaded via ETS, or by pressing the programming push-button with the LED illuminated.
The LED is also used to signal a download in progress by ETS and the deletion of the application by ETS (see Signalling of ETC download in progress/application deleted).

1 green front LED (for each channel)

The LEDs indicate the status of the load:
ON FIXED → load active (closed or open, depends on the **"Type of contact"** set in the "Channel x settings" menu)
OFF→ load deactivated (closed or open, depends on the **"Contact type"** set in the "Channel x settings" menu)

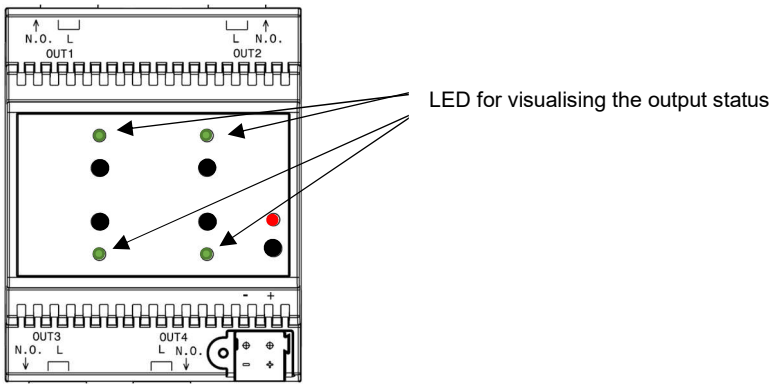


Fig. 7.2: LED for visualising the output status

19 Factory reset / signalling of ETS download in progress / application deleted

The device can be used to perform a factory reset via the following procedure:

1. Disconnect the power (KNX terminal)
2. Press the KNX address programming key
3. Reconnect the power supply (KNX terminal) with the programming key still pressed
4. After approx. 5 seconds, 5 fast flashes of the programming LED to signal that the factory reset was performed

After a factory reset, all the factory parameters are reset along with the physical factory address, and the FDSK (Factory Default Setup Key - do masterreset) is reactivated.

Attention! If an application is downloaded from ETS with KNX Secure enabled, it will not be possible to download another from a different ETS project before performing the factory reset from the local menu. The procedure for resetting the FDSK is essential and therefore it is not enough to delete the application on the device via ETS.

During the download of the ETS application, the red physical address programming LED blinks cyclically approx. every 1.5 seconds. The LED is deactivated at the end of the download.

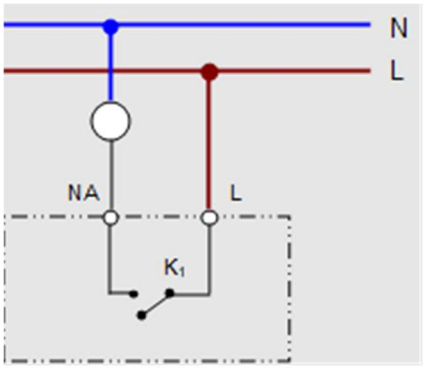
Following the “delete application” command performed via ETS, the device performs a factory reset (see above), maintaining the physical address (unless the command “delete application and physical address” is performed).

20 Communication objects

The communication objects are listed in the following table:

Outputs:

For each channel, a potential-free terminal to which a normally open contact is connected for managing 230 Vac generic loads.
Output contact nominal current: 16 AX (140µF)
Switching cycles: 100000



The device can manage the output as a normally closed contact, making this selection via the respective ETS parameter (see "Channel x settings" menu).

#				Object name	Function of object	Description	Datapoint type
Ch 1	Ch 2	Ch 3	Ch 4				
1	38	75	112	Ch.x – Status	On/Off status	Sends the status of the load connected to the output	1.001 DPT_Switch
19	56	93	130	Ch.x - Logic operation outcome	Logic	Logic function output	1.002 DPT_Bool
21	58	95	132	Ch.x - Loads control slave function enabling	Active/deactivated	Indicates the activation status of the load control slave function	1.003 DPT_Enable
23	60	97	134	Ch.x - Slave status for loads control	1=Connected/0=Deactivated	Indicates the load status set by the load control slave function	1.001 DPT_Switch
25	62	99	136	Ch.x - Safety status	Active/deactivated	Indicates the activation status of the safety function	1.003 DPT_Enable
27	64	101	138	Ch.x - Priority command status	On/off forcing status	Forces the load value to an on/off value	2.001 DPT_Switch_Control
29	66	103	140	Ch.x - Block status	Active/deactivated	Indicates the activation	1.003 DPT_Enable

						status of the block function	
30	67	104	141	Ch.x - Operating time counter	Value 0 .. 2147483647 [s]	Sends the counter value expressed in seconds	13.100 DPT_LongDeltaTimeSec
30	67	104	141	Ch.x - Operating time counter	Value 0 .. 65535 [min]	Sends the counter value expressed in minutes	7.006 DPT_TimePeriodMin
30	67	104	141	Ch.x - Operating time counter	Value 0 .. 65535 [h]	Sends the counter value expressed in hours	7.007 DPT_TimePeriodHrs
31	68	105	142	Ch.x - Operating time counter overflow	Overflow status	Sends the counter overflow signal	1.002 DPT_Bool
33	70	107	144	Ch.x - Switching operations counter	Value 0 .. 65535	Sends the counter value	7.001 DPT_Value_2_Ucount
33	70	107	144	Ch.x - Switching operations counter	Value 0 .. 4294967295	Sends the counter value	12.001 DPT_Value_4_Ucount
34	71	108	145	Ch.x - Switching operations counter overflow	Overflow status	Sends the counter overflow signal	1.002 DPT_Bool
37	74	111	148	Ch.x - Local button key function enabling status	Enabled/disabled	Sends the enabling status of the local button key function	1.003 DPT_Enable

Inputs:

#				Object name	Function of object	Description	Datapoint type
Ch 1	Ch 2	Ch 3	Ch 4				
2	39	76	113	Ch.x - Switching	On/Off	Receives the load activation/deactivation commands	1.001 DPT_Switch
3	40	77	114	Ch.x - Delayed switching	On/Off	Receives the commands for load activation/deactivation with delay	1.001 DPT_Switch
4	41	78	115	Ch.x - Delay on activation	Sets the value	Value of the delay on activation	7.005 DPT_TimePeriodSec
5	42	79	116	Ch.x - Delay on deactivation	Sets the value	Value of the delay on deactivation	7.005 DPT_TimePeriodSec

6	43	80	117	Ch.x - Timed switching	Start/Stop	Receives the timed activation start/stop commands	1.010 DPT_Start
7	44	81	118	Ch.x - Stairs light activation time	Sets the value	Stairs light timing value	7.005 DPT_TimePeriodSec
8	45	82	119	Ch.x - Blinking	Active/deactivated	Receives the activation/deactivation commands for load blinking mode	1.001 DPT_Switch
9	46	83	120	Ch.x - Scenes	Execute/Learn	Used to store/execute scenes	18.001 DPT_SceneControl
10	47	84	121	Ch.x - Scene storing enabling	Enable/disable	Enables/disables scene storing	1.003 DPT_Enable
11	48	85	122	Ch.x - Logic input 1	Logic function input	Logic function input	1.002 DPT_Bool
12	49	86	123	Ch.x - Logic input 2	Logic function input	Logic function input	1.002 DPT_Bool
13	50	87	124	Ch.x - Logic input 3	Logic function input	Logic function input	1.002 DPT_Bool
14	51	88	125	Ch.x - Logic input 4	Logic function input	Logic function input	1.002 DPT_Bool
15	52	89	126	Ch.x - Logic input 5	Logic function input	Logic function input	1.002 DPT_Bool
16	53	90	127	Ch.x - Logic input 6	Logic function input	Logic function input	1.002 DPT_Bool
17	54	91	128	Ch.x - Logic input 7	Logic function input	Logic function input	1.002 DPT_Bool
18	55	92	129	Ch.x - Logic input 8	Logic function input	Logic function input	1.002 DPT_Bool
20	57	94	131	Ch.x - Load check slave function enabling	Enable/disable	Receives the load check slave function enable/disable commands	1.002 DPT_Bool
22	59	96	133	Ch.x - Slave switching for loads control	Load 1=reconnection /0=deactivation	Receives the load deactivation/reconnection commands for the load control function	1.001 DPT_Switch
24	61	98	135	Ch.x - Safety	Monitoring	Used to monitor a sensor for the safety function	1.002 DPT_Bool
26	63	100	137	Ch.x - Priority command	On/Off forcing	Forces the load value to an on/off value	2.001 DPT_Switch_Control
28	65	102	139	Ch.x - Block	Active/deactivated	Blocks the status of the load in a parametrisable condition	1.002 DPT_Bool
32	69	106	143	Ch.x - Operating time counter reset	1=Reset/0=no action	Receives the counter value reset command	1.015 DPT_Reset
35	72	109	146	Ch.x - Switching operations counter reset	1=Reset/0=no action	Receives the counter value reset command	1.015 DPT_Reset

36	73	110	147	Ch.x - Local button key function enabling	Enable/disable	Enables/disables the local key button function	1.003 DPT_Enable

code 70205752

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