KNX shutter actuator 1-fold with binary input 2-fold

KNX IO 520.1 *secure*

Operation and installation manual

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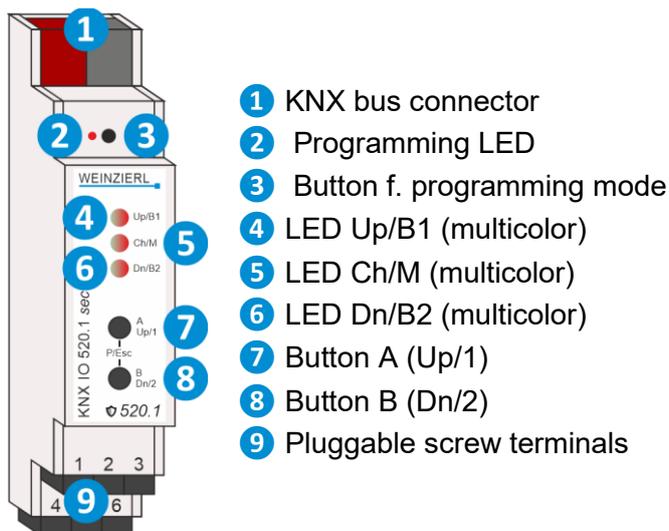Web: www.weinzierl.de

Content

1 Application

The KNX IO 520.1 *secure* is a compact blind actuator with two additional binary inputs. The actuator is used to control a blind, a shutter or a window drive. The relay contacts are electrically interlocked.

The inputs can be connected to conventional switches with an external voltage of 12 to 230 V. In the not configured state the binary inputs control the actuator channel. Via commissioning the device using ETS® software the binary inputs can be used independently.

Two push buttons and three LEDs allow a local operation and a visualization of the device state. In addition to the output and input channels the device includes 16 independent functions for logic or timer control.

2 Installation and connection

The KNX IO 520.1 *secure* is designed for installation on a DIN rail (35 mm) with a width of 1 unit (18 mm). An installation-friendly design with pluggable screw terminals helps to reduce the cost of commissioning. It features the following controls and displays:

1 KNX bus connector
2 Programming LED
3 Button f. programming mode
4 LED Up/B1 (multicolor)
5 LED Ch/M (multicolor)
6 LED Dn/B2 (multicolor)
7 Button A (Up/1)
8 Button B (Dn/2)
9 Pluggable screw terminals

If the bus voltage is missing, the device is without function.

2.1 KNX programming mode

The KNX programming mode is activated/deactivated either by pressing the recessed KNX programming button ③ or by simultaneously pressing the buttons (P/Esc) ⑦ and ⑧.

When the programming mode is active, the programming LED ② and the LED Ch/M ⑤ light up red.

The operation/visualization of the programming mode on the front can be activated/deactivated in the ETS® on page general settings.

2.2 Manual operation and status display

The LED Ch/M ⑤ lights up or flashes if the device is powered by the KNX bus.

Default Channel

The default channel is channel A, the blind actuator. Here LED Up/B1 ④ lights up green if the upward relay is active and LED Dn/B2 ⑥ lights up green for the downward relay.

By pressing button A ⑦ long, the manual operation mode will be entered for channel (A), the blind actuator. This is indicated by cyclic single flashing of LED Ch/M ⑤ in orange.

By pressing button B ⑧ long, the manual operation mode will be entered for channel (B), the binary inputs. This is indicated by cyclic double flashing of LED Ch/M ⑤ in orange.

Blind actuator (channel A)

The LED Up/B1 ④ lights up green if the upward relay is active and LED Dn/B2 ⑥ lights up green for the downward relay.

Pressing the button ⑦ shortly steps / stops the blind actuator upward, and pressing it long starts an upward movement. Button ⑧ works similar for downward movement and step / stop.

Binary input (channel B)

The LED Up/B1 ④ lights up green if the Input B1 is active and LED Dn/B2 ⑥ lights up green for the Input A2.

Pressing the button ⑦ "simulates" a signal on Input B1 and pressing button ⑧ does the same for Input A2.

The manual operation mode can be exit by pressing the buttons (Esc) ⑦ und ⑧ simultaneously.

LED Status	Meaning
LED lights green	Device is working in standard operation mode.
LED lights red	Programming mode is active.
LED flashes 1x orange	Programming mode is not active. Manual operation mode for channel A (blind actuator) is active.
LED flashes 2x orange	Programming mode is not active. Manual operation mode for channel B (binary inputs) is active.
LED blinks red	Programming mode is not active. Manual operation is not active. The device is not properly loaded e.g. after an interrupted download.
LED blinks green	The device is currently loaded by the ETS.

3 Ex-factory behavior

Ex-factory the binary inputs are directly connected to the actuator. Impulses to the binary input B1 induce upward movement, impulses to the input B2 cause downward movement.

This complies with the parameter setting Blind / Shutter DEVICE INTERNAL Up for B1 and Blind / Shutter DEVICE INTERNAL Down for B2.

4 Reset to factory default settings

It is possible to reset the device to its factory default settings.

- Disconnect the KNX bus connector ① from the device.
- Press the KNX programming button ③ and keep it pressed down.
- Reconnect the KNX bus connector ① to the device.
- Keep the KNX programming button ③ pressed for at least another 6 seconds.
- A short flashing of all LEDs (② ④ ⑤ ⑥) visualizes the successful reset of the device to factory default settings.

In the factory default settings, the device has the physical address 15.15.255 and no group addresses are connected. Also, KNX Data Security is disabled and the initial key (FDSK) must be used for secure commissioning.

5 Wiring scheme
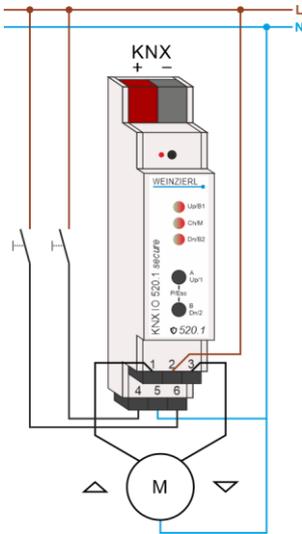
5.1 Pluggable screw terminals

Ch A Up	Ch A Cm	Ch A Dn
Ch B In 1	Ch B Cm	Ch A In 2

Top connector

The top connector links to the drive actuator. On Cm (common), the middle pin, the supply voltage for the drive has to be connected. On the left the cable for upward movement and on the right for downward movement have to be hooked up.

Bottom connector

The middle pin of the bottom connector shall be connected to the common wire (neutral for 230V AC and GND for DC). The left and right pin shall be connected to the corresponding switches / push buttons.

> *Unless explicitly stated by the manufacturer of the drive, no motors may be directly parallel connected to a shutter actuator. Those drives must be electrically separated by using relays for decoupling.*

5.2 Pin assignment

Connection	Icon	Description
1	Ch A Up	Connector Channel A Output for drive up
2	Ch A Cm	Connector Channel A Common
3	Ch A Dn	Connector Channel A Output for drive down
4	Ch B In 1	Connector Channel B Input B1
5	Ch B Cm	Connector Channel B Common
6	Ch B In 2	Connector Channel B Input A2
KNX	+	Positive connection for KNX bus
KNX	-	Ground connection for KNX bus

6 KNX Security

The KNX standard was extended by KNX Security to protect KNX installations from unauthorized access. KNX Security reliably prevents the monitoring of communication as well as the manipulation of the system.

The specification for KNX Security distinguishes between KNX IP Security and KNX Data Security. KNX IP Security protects the communication over IP while on KNX TP the communication remains unencrypted. Thus, KNX IP Security can also be used in existing KNX systems and with non-secure KNX TP devices.

KNX Data Security describes the encryption on telegram level. This means that the telegrams on the twisted pair bus or via RF (radio frequency) are also encrypted.

Encrypted telegrams are longer than the previously used unencrypted ones. For secure programming via the bus, it is therefore necessary that the interface used (e.g. USB) and any intermediate line couplers support the so called KNX Long Frames.

7 ETS database

The ETS 5 database (for ETS 5.7 or newer) can be downloaded from the product website of the KNX IO 520.1 *secure* (www.weinzierl.de) or from the ETS online catalogue.

The KNX IO 520.1 *secure* supports KNX Data Security to protect the device against unauthorized access from the KNX bus. If the device is programmed via the KNX bus, this is done with encrypted telegrams.

7.1 Secure commissioning

If the first product is inserted into a project with KNX Security, the ETS prompts you to enter a project password.
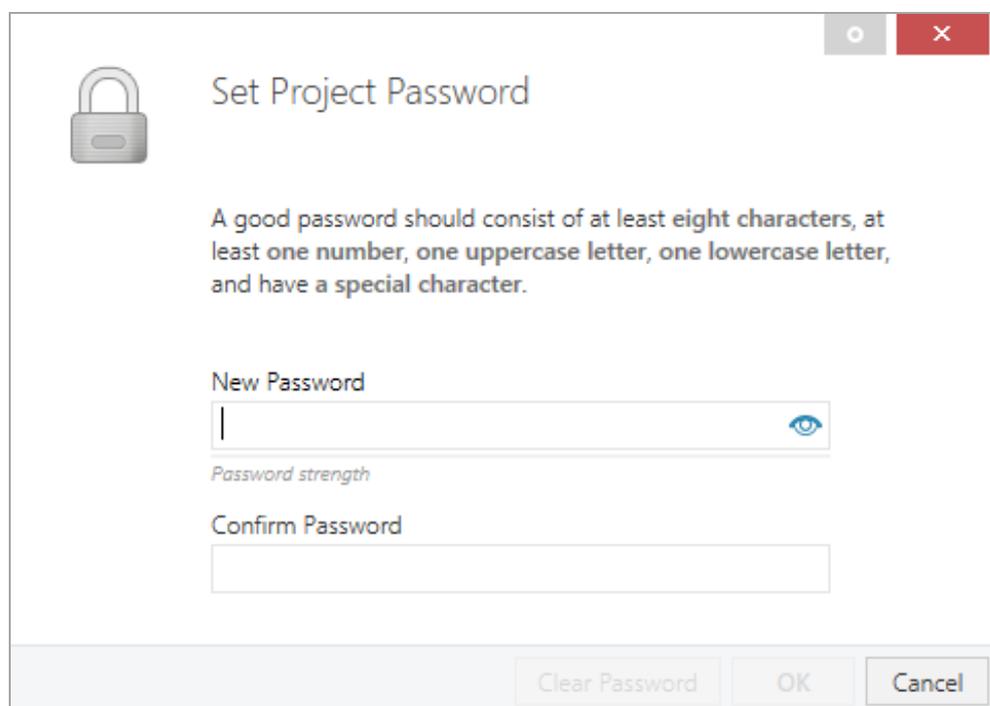
This password protects the ETS project from unauthorized access. This password is not a key that is used for KNX communication. The entry of the password can be bypassed with "Cancel", but this is not recommended for security reasons.

ETS requires a device certificate for each device with KNX Security that is created in the ETS. This certificate contains the serial number of the device as well as an initial key (FDSK = Factory Default Setup Key).

Adding Device Certificates

Please scan or enter the device certificates for all devices in your project that you intend to download using secure commissioning.

| ADCQAA | - F3UMAA | - CAQDAQ | - CQMBYI | - BEFAWD | - ANBYH6 | ✔ |

Serial Number 00C5:0000BBA3
Factory Key 000102030405060708090A0B0C0D0E0F

1 certificates added.   OK
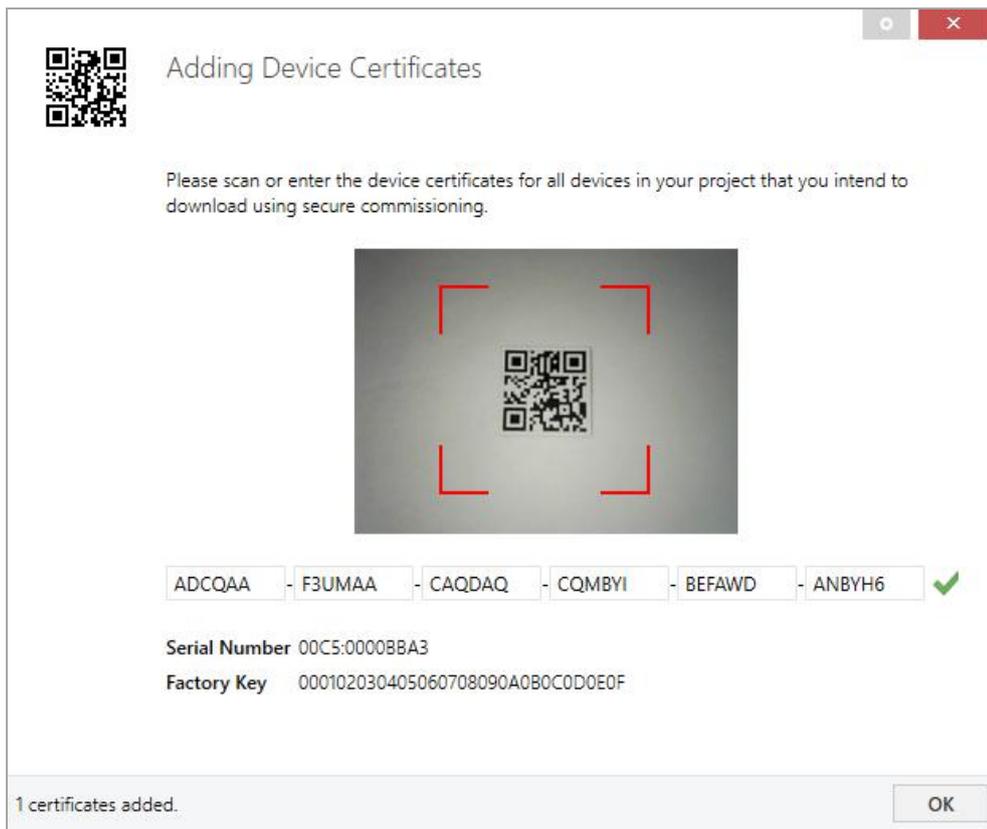
The certificate is printed as text on the device. It can also be scanned from the printed QR code via a webcam.

The list of all device certificates can be managed in the ETS panel Reports – Project Security.

This initial key is required to safely put a device into operation from the start. Even if the ETS download is recorded by a third party, the third party has no access to the secured devices afterwards. During the first secure download, the initial key is replaced by the ETS with a new key that is generated individually for each device. This prevents persons or devices who may know the initial key from accessing the device. The initial key is reactivated after a reset to factory default settings.

The serial number in the certificate enables the ETS to assign the correct key to a device during a download.

In the ETS project in the properties of the device, secure commissioning can be activated and the device certificate can be added:
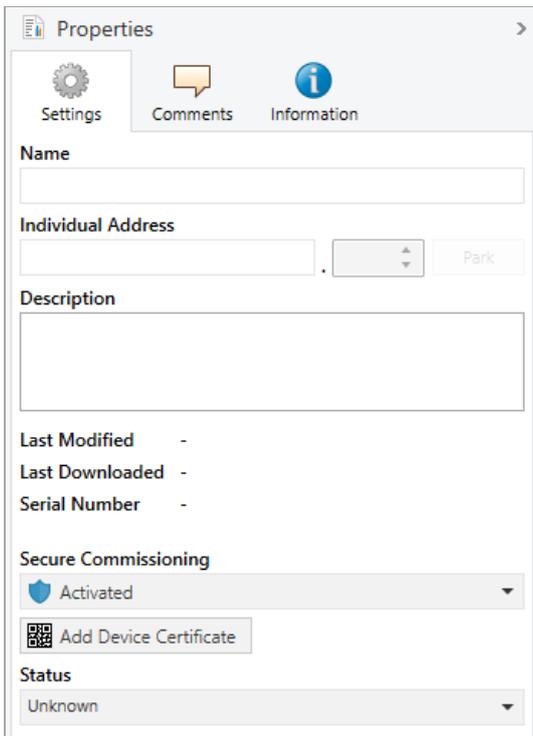
7.2 Secure group communication

Each object of the device can communicate either encrypted or unencrypted. The encryption is set under "Security" in the properties of the used group address:
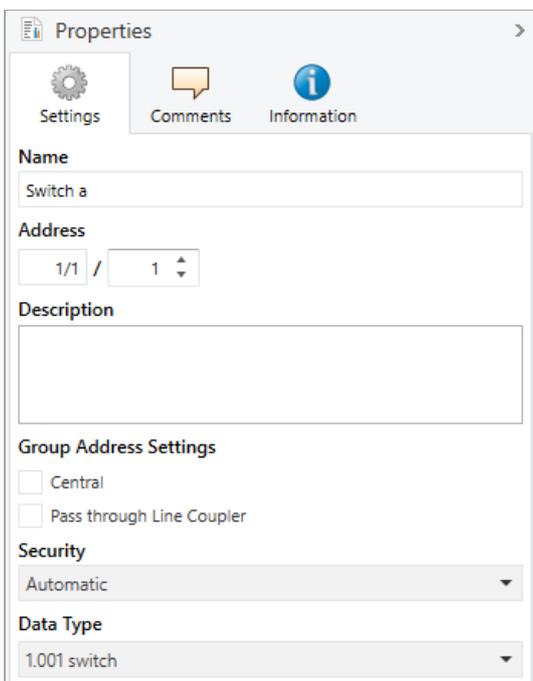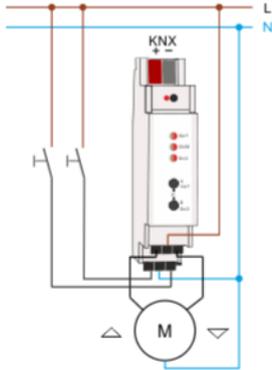
The setting "Automatic" activates encryption if both objects to be connected can communicate encrypted. Otherwise encrypted communication between the objects is not possible.

In the overview of communication objects in the ETS project, secured objects can be recognized by a shield symbol:

	Security	Number ▲	Name	Object Function	Description	Group Address
	🛡	11	Button A0: Object a	Switch	Switch a	1/1/1
		12	Button A0: Object b	Switch	Switch b	1/1/2
	🛡	21	Button A1: Object a	Switch	Switch a	1/1/1
		22	Button A1: Object b	Switch	Switch b	1/1/2

A separate key is automatically generated by the ETS for each secured group address. These keys can also be checked in the ETS panel Reports – Project Security. To enable all devices to communicate with a secure group address, the keys must be known to all. Therefore a download must be made into all devices that use this group address when a key is created or changed. A key is changed by the ETS e.g. when the encryption of a group address is switched off and on again.

7.3 Description

The first page shows general information about the device.

7.4 General settings

Device name (30 characters)

An arbitrary name can be assigned for the KNX IO 520.1 *secure*. The device name should be meaningful, e.g. "Living Room". This helps the clarity of the ETS project.

Send delay after bus power return

A send delay for telegrams after the return of the bus voltage can be set via this parameter. In this case, telegrams from the device are sent to the KNX bus in a delayed manner by the set time. This results in a reduction of the bus load at a bus power return. Other functions such as receiving telegrams of drive operations of the actuator are not affected by this parameter.

Prog. mode on device front

In addition to the normal programming button ❸ the device allows activating the programming mode on the device front without opening the switchboard cover. The programming mode can be activated and deactivated via pressing simultaneously both buttons ❼ and ❽.

This feature can be enabled and disabled via the parameter "Prog. mode on device front". The recessed programming button ❸ (next to the Programming LED ❷) is always enabled and not influenced by this parameter.

Manual operation on device

This parameter is used to configure the manual operation on the device. The manual operation mode can be disabled or activated (with or without time limitation). The time limit defines the duration until the automatic return from the manual operation mode back into the normal operating mode.

The device is in normal operating mode when the manual control is not active. In the manual operating mode, received switching telegrams are ignored. When the manual operation mode is terminated (after expiry of the time limit or manually), the drive is halted.

The following options are selectable:

- Disabled
- Enabled with time limit 1 min
- Enabled with time limit 10 min
- Enabled with time limit 30 min
- Enabled without time limit

Heartbeat

Cyclic sending of values to the KNX-Bus, to indicate that the device is operational. For the Cycle time values between 1 min and 24h are selectable.

Group object	Type KNX	Size	Direction
GO 1 Heartbeat – Trigger	1.001	1 Bit	To KNX

Binary Inputs

In this block the general parameters for all binary inputs are displayed.
The "long button press after" parameter defines the time after an external signal is considered as a long button press. This only affects the signals through the connector inputs and not the push buttons on the device.

Logic / Timer / Comparison / Calculation

The function block for logic, timer, comparison, and calculation can be activated here.

See "Logic / Timer / Comparison / Calculation"

7.5 Diagnostics

7.5.1 Activation

This parameter page allows diagnostic data to be displayed directly in the ETS without having to read out group objects. The current status of each channel is displayed. To activate diagnostics, the physical address must be programmed. The current statuses of the channels can then be displayed by clicking the "Refresh" button. This also activates control via the diagnostics page.

7.5.2 Control

		Description
		General settings
		Diagnostics

Diagnostics

ℹ️ This page provides diagnostic information.
Only the individual address has to be programmed.

	State		Switch cycles			
Actuator A	⬆	47.1 %	13	Up	Down	Stop
Input B1	⏻		6	Reset		
Input B2	⏻		13	Reset		

Refresh

Sidebar navigation:
- Description
- General settings
- **Diagnostics**
- − Channel A: Actuator
  - Actuator A: General
  - Actuator A: Blind settings
- − Channel B: Input 1
  - Input B1: General
  - Input B1: Scaled counter
- − Channel B: Input 2
  - Input B2: General
  - Input B2: Operation time coun...

For diagnostic purposes, the controller data can be read during runtime using the "Refresh" button.

Actuator A

Following functions/information is available:

- **State:** Shows the direction of the blinds actuator (Up: ⬆, Down: ⬇, Stop: ☰)
  When position calculation is activated, the position is also displayed.
- **Switch cycles:** Shows the switch cycles of the relays
- **Up/Down/Stop:** Control shutter

Input B1/B2

Following general information is available:

- **State:** Shows if the input is active (On: ⏻, Off: ⏻)
- **Switch cycles:** Shows the switch cycles
- **Reset:** Resets switch cycles

ℹ️ *Switching cycles of the inputs are only displayed for the "Operating time counter" OR "Impulse counter" functions.*

7.6 Actuator A: General

Name (30 characters)

An arbitrary name can be assigned for the channel. However, this should be clear and meaningful, this makes it easier to work with the associated group objects, because the given name is displayed there as a label. If no name is assigned, the group objects are named "Actuator A: …".

Function

The blind actuator functionality can here be disabled or enabled. Whilst disabled no drive command will be set on the outputs, but the binary inputs are still fully functional.

Drive direction

If the actuator moves up and down in reverse, the parameter can be set to "Inverted" here without having to adjust the wiring.

Position

This device is designed for three different use cases.

- Without calculation
- Calculation for blinds with slats
- Calculation for shutter

Each one of them can be selected via this parameter. The first is a general drive without any position calculation. The second and third functions differ in how the device calculates the estimated position of the hangings / slats.

Since there is no direct feedback from the drive about the actual position, any position calculation can only be an approximation.

Send state *(with Position != "Without Calculation")*

This parameter determines the sending behavior of the status objects.

The choice is yours:

- Disabled
- Only on read
  Send status objects only for read requests
- On change and at the end
  Send status objects on value change and after drive is finished
- Cyclic and on change
  Send status objects cyclically and on value change and after drive is finished

Group object	Type KNX	Size	Direction
GO 15 Actuator A: Blind position – Status	5.001	1 Byte	To KNX
GO 16 Actuator A: Slats position – Status	5.001	1 Byte	To KNX

Value change for state *(with Send state = "On change and at the end" OR "Cyclic and on change")*

This parameter determines the minimum change for sending the status objects.

The choice is yours:

- 1 – 50 %
  Send status after value changed by percentage and after drive is finished
- Only at the end
  Send only after drive is finished

Time for cyclic state *(with Send state = "Cyclic" OR "Cyclic and on change")*

If the Send value is configured with "Cyclic and on change", this parameter appears to set the cycle time**.** Values range from 10 s to 24 h.

Behavior after bus power return *(with Function = "Enabled")*

The behavior of the output after bus voltage recovery can be configured here.

The choice is yours:

- No reaction
- Up
- Down
- Operation like before bus power failure

Delay between direction changes *(with Function = "Enabled")*

To protect the drive against abrupt direction changes, which may cause damage to the drive, a minimum time between output commands in opposite directions can be set here.

Stepping *(with Function = "Enabled")*

Enable / disable stepping functionality

Stepping time *(with Stepping = "Enabled")*

Only available if stepping is active. After receiving a step command via the group object, this parameter determines the interval length for the drive in the given direction. Eg. if set to 500 ms, a step up command will cause the up relay to switch on for 500 ms.'

Send operation time

The operating time indicates how long the channel has been in operation. This parameter determines the sending behavior of the operation data.

The choice is yours:

- Only on read
  Send status objects only for read requests
- Only read
  Send status objects only for read requests
- On change
  Send status objects on value change (Delta)
- Cyclic
  Send status objects cyclically
- Cyclic and on change
  Send status objects cyclically and on value change (Delta)

Value change (Delta) *(with Send operation time = "On change" OR "Cyclic and on change")*
This parameter sets the value change. Values range from 1 minute to 7 days.

Cycle time *(with Send operation time = "Cyclic" OR "Cyclic and on change")*

If the Send value is configured with "Cyclic and on change", this parameter appears to set the cycle time**.** Values range from 1 minute to 7 days.

Group object	Type KNX	Size	Direction
GO 30 Actuator A: Operation time in s – State	13.100	4 byte	To KNX
GO 31 Actuator A: Operation time – Reset	1.015	1 bit	From KNX

Send switching cycle counter

This parameter can be used to query and output the current number of switching cycles via a group object entry.

The choice is yours:

- Disabled
  Status objects are disabled and hidden
- Only on read
  Send status objects only for read requests
- Only on change
  Send status objects on value change
- Cyclic and on change
  Status objects send cyclically and on value change

Cycle time

If the Send value is configured with "Cyclic and on change", this parameter appears to set the cycle time.

Group object	Type KNX	Size	Direction
GO 32 Actuator A: Switch cycle counter – State	13.100	4 byte	To KNX

Scene function

The scene function can be enabled or disabled here. If this function is enabled, the respective group object appears, as well as the parameter page "Actuator A: Scene function" for further configuration of scenes 1 – 16.

Alarm / Lock function

The device provides a lock down / alarm state. During this drive commands from the bus are ignored and it is possible to specify an action which should be performed on entering and / or leaving this state. For more details see the "Actuator A: Alarm / Lock function"

Automatic mode

Only available if position calculation is set to blind or shutter mode.
Provides an additional set of group objects to change the positions of the blinds / slats. Those group objects will be disabled if an new drive command is received by any of the other group objects.

Group object	Type KNX	Size	Direction
GO 26 Actuator A: Automatic mode – Activate	1.003	1 Bit	From KNX
GO 26 Actuator A: Automatic mode – State	1.003	1 Bit	From KNX
GO 28 Actuator A: Autom. blind position – Set position	5.001	1 Byte	From KNX
GO 29 Actuator A: Autom. slats position – Set position *	5.001	1 Byte	From KNX
GO 30 Actuator A: Autom. combined position – Set position *	240.800	3 Byte	From KNX

Only for blinds with slats

To enable the automatic group objects after such an event two ways are provided. Enable via a fallback time. After this time the automatic mode will be enabled automatically. Or secondly via a group object. Sending 1 enables the automatic mode, sending a 0 disables the automatic mode.

7.6.1 Actuator A: Blind settings

Only visible if position calculation is set to Calculation for blind with slats.

Total runtime of blind upwards [s]

The time the drive needs to move the hanging from the bottom to the top position. Normally this is determined by measurement.

Total runtime of blind downwards [s]

The time the drive needs to move the hanging from the top to the bottom position. Normally this is determined by measurement. May differ from upwards runtime.

Time for full turn of slats [s]

The time the slats need from one endpoint to the other. This parameter is a float value.
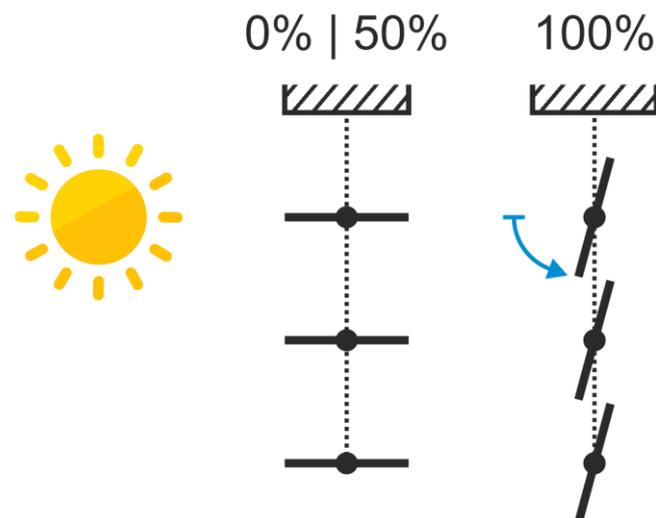
Slat position range

For blinds that allow the following positions, select "0% to 100%."
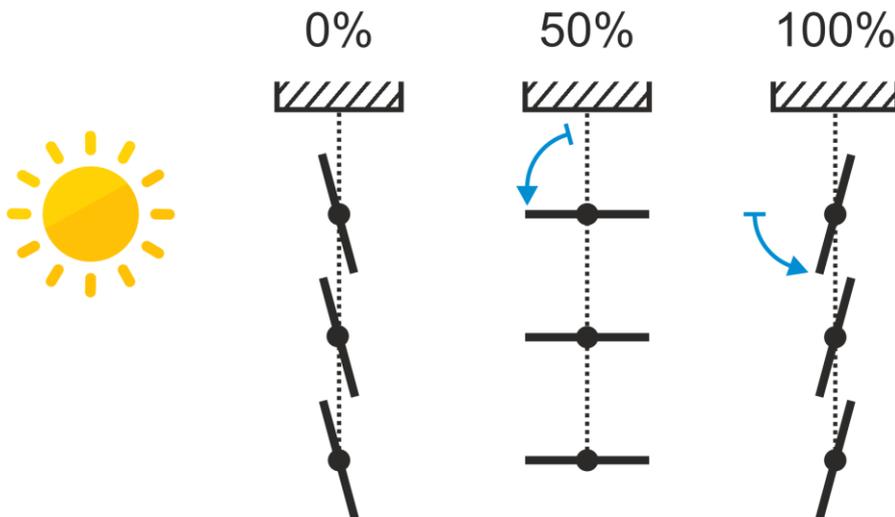
Positions of blind and slats 180°

For blinds that can only be moved from the horizontal position to the closed position at the bottom, select "50% to 100%." If you prefer the horizontal position as 0%, you can also select the "0% to 100%" option.

Positions of blind and slats 90°

Group object	Type KNX	Size	Direction
GO 10 Actuator A: Up / Dn – Drive start	1.008	1 Bit	From KNX
GO 11 Actuator A: Step / Stop – Drive stop	1.007	1 Bit	From KNX
GO 12 Actuator A: Blind position – Set position	5.001	1 Byte	From KNX
GO 13 Actuator A: Slats position – Set position	5.001	1 Byte	From KNX
GO 14 Actuator A: Combined position – Set position	240.800	3 Byte	From KNX

7.6.2 Actuator A: Shutter settings

Only visible if position calculation is set to Calculation for shutter

Total runtime of blind upwards [s]

The time the drive needs to move the hanging from the bottom to the top position. Normally this is determined by measurement.

Total runtime of blind downwards [s]

The time the drive needs to move the hanging from the top to the bottom position. Normally this is determined by measurement. May differ from upwards runtime.

Proportion of maximum to minimum velocity

To account for the fact that most shutter drives will not provide a constant speed this parameter can be used. In most cases the drive will speed up during movement from bottom to top position due to the increased diameter of the windings.

So if the speed on the bottom is twice the speed on the top the appropriate value for this parameter would be 200 %.

Group object	Type KNX	Size	Direction
GO 10 Actuator A: Up / Dn – Drive start	1.008	1 Bit	From KNX
GO 11 Actuator A: Step / Stop – Drive stop	1.007	1 Bit	From KNX
GO 12 Actuator A: Blind position – Set position	5.001	1 Byte	From KNX

7.6.3 Actuator A: Scene function

Description	**Actuator A: Scene function**
General settings	
Diagnostics	Position strategy — Direct
− Channel A: Actuator	Scene 1 — Up
	Number — 1
Actuator A: General	Scene 2 — Down
Actuator A: Blind settings	Number — 2
Actuator A: Scene function	Scene 3 — Learnable
+ Channel B: Input 1	Number — 3
+ Channel B: Input 2	Scene 4 — Fixed value
+ Logic / Timer / Comparison / C...	Number — 4
	Blind position — 10 %
	Slats position — 50 %
	Scene 5 — No reaction
	Scene 6 — No reaction
	Scene 7 — No reaction
	Scene 8 — No reaction
	Scene 9 — No reaction
	Scene 10 — No reaction
	Scene 11 — No reaction
	Scene 12 — No reaction
	Scene 13 — No reaction
	Scene 14 — No reaction
	Scene 15 — No reaction
	Scene 16 — No reaction

Position strategy

If any type of position calculation is enabled (See "Actuator A: General") this parameter will become visible.

- Direct
  Moves direct to target position
- Indirect using top endpoint
  Moves first to top endpoint and then to target position
- Indirect using bottom endpoint
  Moves first to bottom endpoint and then to target position
- Indirect using nearest endpoint
  Move first to endpoint that is closest to the target position and then to the target position afterward

Scene 1 – 16

For each scene a scene number 1 – 64 is selectable. Receiving this number on the scene group object will trigger the chosen reaction for that scene. In all position calculation modes the three basic options are available.

- No reaction
- Up
  Does not use endpoints of indirect position strategy. Only moves up
- Down
  Does not use endpoints of indirect position strategy. Only moves down

Additionally two more options appear for blind and shutter mode.

- Learnable
  The current position may be set as new target position by sending a DPT18 value with set control bit to the scene group object
- Fixed value
  The target position is directly selectable in the ETS database

Group object	Type KNX	Size	Direction
GO 17 Actuator A: Scene – Activ./Lrn.	18.001	1 Byte	From KNX

7.6.4 Actuator A: Alarm / Lock function

This page provides parameters for activating or deactivating the alarm and lock functions separately. Only one of the following functions can be active at a time, so only the function with the highest priority will be executed.

The order from highest to lowest priority is: emergency stop function, alarm function 1, alarm function 2, alarm function 3, lock function.

Emergency stop function

Enables or disables the emergency stop function. If enabled a stop telegram during reference drives or alarm / locking drives will stop the drive immediately and put the device in emergency stop state. This state can be left by sending any value to the Drive start Up / Dn group object. This allows the device to stop the drive under any circumstances in case of an emergency.

At the end of the emergency stop the last action will be continued

Alarm function 1 – 3

Meant for protecting the hanging against e.g. wind damage or ensuring a certain position in case of a fire alarm. This function moves the hanging to a given position and puts the device in an alarm state in which any other commands, except emergency stop commands, from the KNX bus will be ignored.

Example for priority:

Alarm 2: To reduce dirt on the windows, the blinds should be closed when it rains.

Alarm 1: However, in strong winds, the blinds should be opened with higher priority to prevent damage to the slats.

Polarity of object

Select whether a 1 value or 0 value sent to the alarm object will trigger the alarm.

Monitoring interval

Not receiving any value during this period of time on the alarm group object will cause the device to raise the alarm and switch into alarm state. Every time a telegram is received the interval will start again.

Behavior on start

At the beginning of the alarm the device allows for different reactions.

- No Reaction
- Up (move to topmost position)
- Down (move to bottom position)
- Stop any current movement

Behavior at end

Whilst ending the alarm these options are available

- No Reaction
- Up
- Down
- State before function
  At the beginning of the alarm the current position will be stored and restored if the alarm ends
- State without function
  The device processes all incoming telegrams during the alarm state and at the end of the function the last one will be performed. If no telegram is received during that state the last position before the state will be restored.

The last two options are only available if the position calculation in enabled.

Group object	Type KNX	Size	Direction
GO 18 Actuator A: Alarm – Activate	1.005	1 Bit	From KNX

Lock function

Similar to the alarm function this allows locking the device. Whilst locked any telegram received via the normal move command group objects and scene commands are ignored. This function has a slightly lower priority than the alarm function. Therefore during an alarm locking doesn't change anything. But during locking a newly raised alarm will result in the desired reaction for entering the alarm state.

Enabling this function adds four additional group objects with priority function. A locked device will ignore the "normal" move command objects but still reacts to prioritized commands.

Example for the priority object:
In the case of events in public buildings or in restaurants, the normal operation can be set into an inoperative state by the lock group object. Thus it is possible to lock push buttons, which are accessible to unauthorized persons, in order to prevent unmeant movement of the blind, during the lecture or concert. Nevertheless the blinds can still be operated by use of the priority object without canceling the lock.

Polarity of object

Select whether a 1 or 0 value sent to the locking group object will trigger the locking state.

Behavior on start

At the beginning of the locking the device can provide serveral reactions.

- No Reaction
- Up (move to topmost position)
- Down (move to bottom position)
- Stop any current movement

Behavior at end

Whilst ending the locking state these options are available

- No Reaction
- Up
- Down
- State before function
  At the beginning of the locking the current position will be stored and restored if the locking ends
- State without function
  The device processes all incoming telegrams during the locking state and after the last one will be performed. If no telegram is received during that state the last position before will be restored.

The last two options are only available if the position calculation in enabled.

Group object	Type KNX	Size	Direction
GO 19 Actuator A: Lock – Activate	1.001	1Bit	From KNX
GO 20 Actuator A: Prior. drive start –Up / Dn	1.008	1 Bit	From KNX
GO 21 Actuator A: Prior. drive stop – Step / Stop	1.007	1 Bit	From KNX
GO 22 Actuator A: Prior. blind position – Set position	5.001	1 Byte	From KNX
GO 23 Actuator A: Prior. slats position – Set position*	5.001	1 Byte	From KNX
GO 24 Actuator A: Prior. combined position – Set position*	240.800	3 Byte	From KNX

Only for blind drives

7.7   Input B1: General
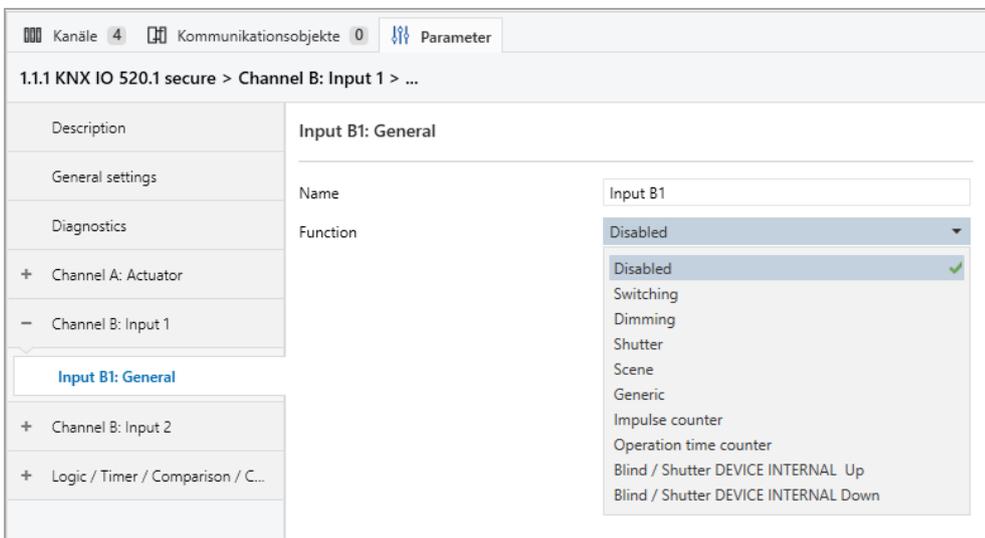
Name (30 Characters)

An arbitrary name can be assigned for the channel. However, this should be clear and meaningful, this makes it easier to work with the associated group objects, because the given name is displayed there as a label. If no name is assigned, the group objects are named "Input …" with the channel number, which is also used in this manual. The 1st channel will be described below, the functioning of the other 3 channels is according to the 1st.

Function

This parameter defines the functionality of the connected contact. The following options are selectable:

- Disabled
- Switching
- Dimming
- Shutter
- Send value
- Scene

- Impulse counter
- Operation time counter
- Blind / Shutter DEVICE INTERNAL Up *
- Blind / Shutter DEVICE INTERNAL Down *

A more detailed description of the functions can be found in the individual function descriptions.

An internal connection from the binary input to the actuator. In this case there will be no telegram on the bus, instead the actuator will be directly controlled by the binary inputs. A short impulse on the binary input will trigger either stepping or stops the actuator if the blind is currently moving. A longer impulse starts an upward or downward movement.

7.7.1 Function "Switching, Dimming, Shutter, Send value, Color, Scene or Generic"

If an input function of a channel is selected, the following parameters are displayed:

Type

The mode of operation of the contact connected to the input channel can be configured here:

- Normally open contact
- Normally closed contact

Lock function

With this parameter the lock function can be enabled. If this functionality is activated, the associated group objects as well as the parameter page "Input B1: Lock function" are displayed for further configuration. If the lock has been activated via the group object, no telegrams are triggered by state changes of the connected contact.

Group object	Type KNX	Size	Direction
GO 38 Input B1: Lock – Activate	1.001	1 Bit	From KNX

7.7.2 Function „Impulse counter"

If the impulse counter function is selected, further parameters are displayed in the general settings of the input channel. Here, the general settings of the impulse counter are made, a scaled counter and/or counter of the rate of change must also be selected.

Count on

This parameter can be used to determine whether the value of the counter is increased at the rising or falling edge at the input

Scaled counter (e.g. [kWh])

Here, the scaled counter can be activated, the parameter page "Scaled counter" is displayed when activated.

Rate of change (e.g. [kW], [m/s], [km/h])

The counter for a rate of change can be activated here. If activated, the "Rate of change" parameter page is displayed.

7.7.3　Input B1: Switching

If the switching function is selected, up to 2 binary switching telegrams can be sent via the following objects:

Group object	Type KNX	Size	Direction
GO 33 Input B1: Output a – Switch	1.001	1 Bit	To KNX
GO 34 Input B1: Output b – Switch	1.001	1 Bit	To KNX

Output b is only visible when activated by parameter.

The time for detection of a long button press can be set in the general parameters and is valid for all inputs/buttons.

User control

The parameter "User control" determines whether telegrams are sent when the input is changed (e.g. key switches) or when the button is operated short/long (e.g. button for switching/dimming).

Function of object a/b on press
Function of object a/b on short press
Function of object a/b on release
Function of object a/b on long press

It is selectable for each object a and b, which telegram is sent on press and release or on short/long button press.

The following options are available:

- No reaction
- Switch on
- Switch off
- Toggle
  On toggle the last value received from the bus is evaluated if the write flag is activated on the object.

Output b

Here you can show/hide the parameters and the object for output b.

7.7.3.1   Input B1: Switching – State query

The Status query function is used, for example, to monitor window contacts.

The status query mode is automatically recognized by the firmware if the following parameter settings are present:

User control: Press / Release
Function (…) on press: Switch on
Function (…) on release: Switch off

or inverted:

User control: Press / Release
Function (…) on press: Switch off
Function (…) on release: Switch on

With configured status query, the value on the object is kept up to date. The value corresponds to the current state that is read. If the lock is active, the object value corresponds to the last status before the lock or the configured value when the lock is activated.

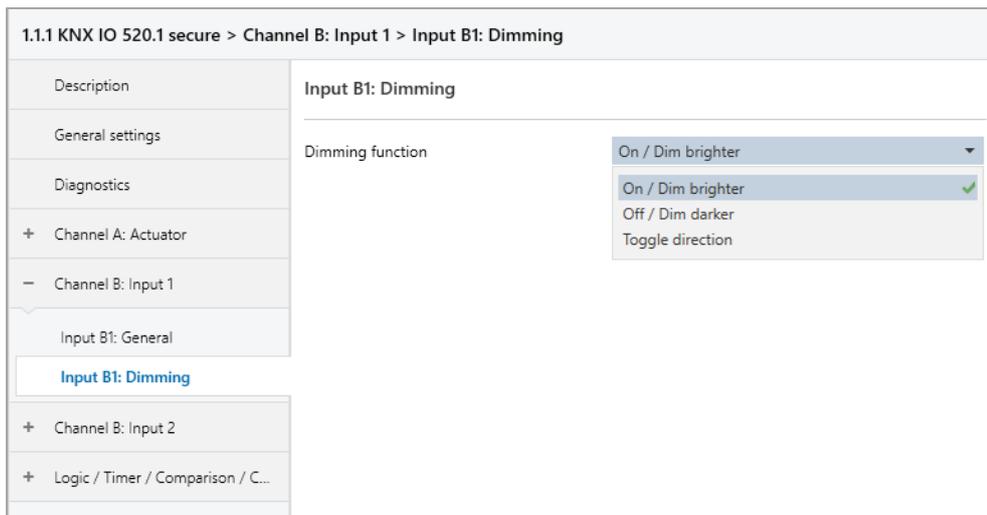**Cyclic sending of object a/b** *(only for state query)*

When the status query is active, cyclic sending can be configured independently for object a and b. The following options are available:

- 1 min
- 2 min
- 5 min
- 10 min
- 20 min
- 30 min
- 1 h
- 6 h
- 12 h
- 24 h

When the lock is active, cyclic sending is disabled.

7.7.4 Input B1: Dimming

On selection of function Dimming following objects are visible:

Group object	Type KNX	Size	Direction
GO 33 Input B1: Dimming on/off – Switch	1.001	1 Bit	To KNX
GO 34 Input B1: Dimming relative – Brighter/Darker	3.007	4 Bit	To KNX

> ℹ️ *The time for detection of a long button press can be set in the general parameters and is valid for all inputs/buttons.*

Dimming function

The dimming function parameter determines whether only one switching / dimming direction or 1-button control is to be used:

- On / Dim brighter
- Off / Dim darker
- Toggle direction
  On toggle direction, the last value received from the bus is evaluated if the write flag is activated on the object. This applies to object 11 and object 12.
  In addition, object 13 is visible. If one of the limit values is received here as the status (e.g. 0 % or 100 %), the dimming direction is adjusted accordingly.

Group object	Type KNX	Size	Direction
GO 35 Input B1: Dimming absolute – State	5.001	1 Byte	From KNX

If the input detects a short button press, a switching telegram is sent via object 11. On long button press, a relative dimming is sent over the entire dimming range to object 12. When releasing after long button press, a dimming-stop telegram is sent via object 12.

The time for detection of a long button press can be set in the general parameters and is valid for all channels.

Dimming direction after switch on *(only for toggle direction)*

This parameter is only visible on toggle direction and determines the dimming direction of the next dimming command following an ON telegram.

This is useful in the bathroom, for example, when the light is switched on at low brightness at night and then should be dimmed brighter.

7.7.5 Input B1: Shutter

1.1.1 KNX IO 520.1 secure > Channel B: Input 1 > Input B1: Shutter	
Description	**Input B1: Shutter**
General settings	
Diagnostics	Shutter direction — Up / Step-Stop
+ Channel A: Actuator	User control — KNX standard: Long / Short
− Channel B: Input 1	Additional function on very long button press
Input B1: General	Additional function — Call scene
Input B1: Shutter	Scene — 1
+ Channel B: Input 2	Very long button press after [s] — 5
+ Logic / Timer / Comparison / C...	

On selection of Shutter function following objects are visible:

Group object	Type KNX	Size	Direction
GO 33 Input B1: Drive start – Up/Down	1.008	1 Bit	To KNX
GO 34 Input B1: Drive stop – Step/Stop	1.007	1 Bit	To KNX

> ℹ️ *The time for detection of a long button press can be set in the general parameters and is valid for all inputs/buttons.*

Shutter direction

The parameter "Shutter direction" determines whether only one shutter direction or 1-button control is to be used.

- Up
- Down
- Toggle
  If the write flags are set, the shutter objects evaluate the last value received from the bus. This keeps the direction and state of the shutter in the button up to date. This applies to object 11 and object 12. In addition, object 13 is visible. If one of the limit values is received here as the status (e.g. 0 % or 100 %), the driving direction is adjusted accordingly.

Group object	Type KNX	Size	Direction
GO 35 Input B1: Blind position – State	5.001	1 Byte	From KNX

User control

The parameter "User control" determines the sending of telegrams on short and long button press:

- KNX standard: Long / Short
  This is the standard configuration for controlling a shutter.
  Long actuation: Drive command via object 11
  Short actuation: Stop/Step command via object 12
  Very long actuation: Additional function

- KNX standard with turning time
  This is the standard configuration for controlling a shutter with the extension that a stop is triggered when the shutter is released within the turning time. Thus, you can turn the slats with dead man.
  Long actuation: Drive command via object 11
  Release after long actuation within turning time: Stop/Step command via object 12
  Release after long actuation after turning time: No reaction
  Short actuation: Stop/Step command via object 12
  Very long actuation: Additional function

- KNX Inverted: Short / Long
  This is the inverted standard configuration for controlling a shutter. This should be used when the main usage is on move commands.
  Short actuation: Drive command via object 11
  Long actuation: Stop/Step command via object 12
  Actuation during drive: Stop/Step command via object 12
  Very long actuation: Additional function

- Short / Short
  This is an optimized variant for controlling a shutter, which uses only short button presses. The step command in the actuator should be disabled.
  Short actuation: Drive command via object 11
  Actuation during drive: Stop/Step command via object 12
  Long actuation: Additional function

- Short / Short plus Long with turning time
  This is an optimized variant for controlling a shutter, which mainly uses short button presses. A long button press can additionally be used to turn the slats.
  The step command in the actuator should be disabled.
  Short actuation: Drive command via object 11
  Long actuation: Drive command via object 11
  Release after long actuation within turning time: Stop/Step command via object 12
  Release after long actuation after turning time: No reaction
  Actuation during drive: Stop/Step command via object 12
  Very long actuation: Additional function

- Hold (Deadman switch)
  The dead man operation mode can be used for applications with short moving time, for example for skylights. The step command in the actuator should be disabled.
  On actuation: Drive command via object 11
  On release: Stop/Step command via object 12

- Hold with turning time
  This operating mode is suitable for applications with mainly short moving times, with the addition that long moving times, by holding beyond the turning time, can also be easily realized. The step command in the actuator should be disabled.
  On actuation: Drive command via object 11
  On release within turning time: Stop/Step command via object 12
  On release after turning time: No reaction

- Hold, delayed with turning time
  This is analog to the operating mode "Hold with turning time", with the difference that the movement is on the long button press. The step command in the actuator should be disabled.
  Long actuation: Drive command via object 11
  Release after long actuation within turning time: Stop/Step command via object 12
  Release after long actuation after turning time: No reaction
  Short actuation: Additional function
  Actuation during drive: Stop/Step command via object 12

Drive time (Time window for stop) [s]

Only displayed for the user controls with "Actuation during drive: Stop/Step command". The time window for the actuation at which a stop/step command is sent is set here.

Turning time [s]

Only displayed for the user controls with turning time. In general, by releasing within the turning time, the shutter can be stopped while continuing to move after the turning time.

If the button tone is activated on the "General settings" page, the end of the turning time is indicated by a signal tone.

Additional function on short/long/very long button press

The following functions can be triggered by short/long/very long keystrokes:

- Switch on
- Switch off
- Toggle
  On toggle, the last value received from the bus is evaluated if the write flag is activated on the object.

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Switch	1.001	1 Bit	To KNX

- Dim brighter
- Dim darker

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Dimming relative	3.007	4 Bit	To KNX

- Drive up
- Drive down

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Up/Down	1.008	1 Bit	To KNX

- Step up / Stop
- Step down / Stop

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Step/Stop	1.007	1 Bit	To KNX

- Send value
  With this function, a byte value can be sent. A parameter for selecting the value is displayed

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Send value	5.001	1 Byte	To KNX

- Call scene
  With this function, a scene can be sent. A parameter for selecting the scene is displayed.

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Call scene	18.001	1 Byte	To KNX

- Save scene
  With this function, a scene can be saved. A parameter for selecting the scene is displayed.

Group object	Type KNX	Size	Direction
GO 36 Input B1: Additional function – Save scene	18.001	1 Byte	To KNX

Very long button press after [s]

This parameter is visible only when using the very long actuation, it sets the time to detect a very long button press.

7.7.6 Input B1: Scene

On selection of Scene function the following object is visible:

Group object	Type KNX	Size	Direction
GO 33 Input B1: Send percent value (1 byte) – Set value	5.001	1 Byte	To KNX

> *The time for detection of a long button press can be set in the general parameters and is valid for all inputs/buttons.*

Scene position 1 – 8

For each position, scene 1 – 64 can be activated.

If only one scene position is activated, it is sent on short button press.

If several scene positions are used, the activated positions are switched through with each short button press.

The behavior for selecting and sending the scene positions can be determined by the following parameter.

Reset scene position

The following options are available:

- **Never**
  Starting with the first scene position, the next position of the list is sent with each short button press, after the last scene position has been sent, the list starts again from the beginning.

- **After execution**
  This selection enables the parameter **Time until execution**.
  Beginning with the first scene position, each short button press switches the position by one position within the execution delay, at the end of the execution delay, the current scene position is sent.

- **5 s – 10 min**
  On each button press the configured delay time is started.
  Starting with the first scene position, the next position of the list is sent with each short button press, after the last scene position has been sent, the list starts again from the beginning.
  After the delay time has expired, the list starts again at the first scene position on the next short button press.

When the button lock is used, the scene position is always reset when unlocking.

Condition on long button press
Condition on very long button press

It is also possible to select how a long and very long button press should be handled:

- No reaction
- Reset position
  This function is used to override the behavior as set in the parameter **Reset scene position**.
- Call scene
  The scene configured in the appearing parameter is sent.
- Save last scene
  A telegram for "save scene" with the last sent scene is triggered.
- Additional function

Additional function

The following functions can be triggered by a long or very long button press:

- Switch on
- Switch off
- Toggle
  On toggle, the last value received from the bus is evaluated if the write flag is activated on the object.

Group object	Type KNX	Size	Direction
GO 34 Input B1: Additional function – Switch	1.001	1 Bit	To KNX

- Dim brighter
- Dim darker

Group object	Type KNX	Size	Direction
GO 34 Input B1: Additional function – Dimming relative	3.007	4 Bit	To KNX

- Drive up
- Drive down

Group object	Type KNX	Size	Direction
GO 34 Input B1: Additional function – Up/Down	1.008	1 Bit	To KNX

- Step up / Stop
- Step down /Stop

Group object	Type KNX	Size	Direction
GO 34 Input B1: Additional function – Step/Stop	1.007	1 Bit	To KNX

- Send value
  With this function, a byte value can be sent. A parameter for selecting the value is displayed.

Group object	Type KNX	Size	Direction
GO 34 Input B1: Additional function – Send value	5.001	1 Byte	To KNX

Very long button press after [s]

This parameter is visible only when using the very long actuation, he sets the time to detect a very long button press.

7.7.7 Input B1: Generic

With this button function, a separate object is available for each event at the input/pushbutton in order to set the function of the input/pushbutton individually.

These events at the input/button and their associated objects are:

- **Button – Pressed**

Group object	Type KNX	Size	Direction
GO 33 Input B1: Pressed – …	Depending on function		To KNX

- **Button – Released**

Group object	Type KNX	Size	Direction
GO 34 Input B1: Released – …	Depending on function		To KNX

- **Button – Pressed short**

Group object	Type KNX	Size	Direction
GO 35 Input B1: Pressed short – …	Depending on function		To KNX

- **Button – Pressed long**

Group object	Type KNX	Size	Direction
GO 36 Input B1: Pressed long – …	Depending on function		To KNX

- Button – Pressed very long

Group object	Type KNX	Size	Direction
GO 37 Input B1: Pressed very long – …	Depending on function		To KNX

Each event can be assigned the following functions:

- Switch on
- Switch off
- Toggle
  On toggle the last value received from the bus is evaluated if the write flag is activated on the object.

Group object	Type KNX	Size	Direction
GO … Input B1: … – Switch	1.001	1 Bit	To KNX

- Dim brighter (no Stop)
- Dim darker (no Stop)
- Dim Stop

Group object	Type KNX	Size	Direction
GO … Input B1: … – Dimming relative	3.007	4 Bit	To KNX

- Drive up
- Drive down

Group object	Type KNX	Size	Direction
GO … Input B1: … – Up/Down	1.008	1 Bit	To KNX

- Step up / Stop
- Step down / Stop

Group object	Type KNX	Size	Direction
GO … Input B1: … – Step/Stop	1.007	1 Bit	To KNX

- Send value
  With this function, a byte value can be sent. A parameter for selecting the value is displayed.

Group object	Type KNX	Size	Direction
GO … Input B1: … – Send value	5.001	1 Byte	To KNX

- Call Scene
  With this function a scene can be sent, a parameter for selecting the scene is displayed.

Group object	Type KNX	Size	Direction
GO … Input B1: … – Call scene	18.001	1 Byte	To KNX

- Save Scene
  With this function a scene can be saved, a parameter for selecting the scene is displayed.

Group object	Type KNX	Size	Direction
GO … Input B1: … – Save scene	18.001	1 Byte	To KNX

The time for detection of a long button press can be set in the general parameters and is valid for all inputs/buttons.

Very long button press after [s]

This parameter is visible only when using the very long actuation, he sets the time to detect a very long button press.

Long triggering (with very long keystroke)

This parameter is only visible when the long and very long actuation is used simultaneously.

If this parameter is activated, both events are always triggered after a very long actuation; if it is deactivated, the duration of the activation is evaluated: if it lies between the time of long and very long actuation, only the function for long actuation is triggered. If the time for very long actuation is exceeded, only the function for very long actuation is triggered.

7.7.8   Input B1: Scaled counter

This counter can be used to count values on input impulses, where an integer value or a floating-point value can be selected as a counter variable. With this function, e.g. Electrical energy can be counted directly and sent to the bus via an object.

Scaling factor (Value per pulse)

Here, a floating-point value is to be entered. It determines the value by which the counter value is increased per pulse.

Datapoint type

The datapoint type of output object of the counter variable can be selected here:

- Integer (32 Bit) – DPT 13

Group object	Type KNX	Size	Direction
GO 33 Input B1: Counter – Value	13.013	4 Byte	To KNX

- Float (16 Bit) – DPT 9

Group object	Type KNX	Size	Direction
GO 33 Input B1: Counter – Value	9.024	2 Byte	To KNX

- Float (32 Bit) – DPT 14

Group object	Type KNX	Size	Direction
GO 33 Input B1: Counter – Value	14.056	4 Byte	To KNX

Send condition

This parameter can be used to determine how the current counter value is to be sent:

- On read
  No independent sending of the counter value by the device. To read the counter value, the read-flag of the group object has to be set.
- On change
  An additional parameter is displayed to select the minimal delta from the last sent value for sending a new counter value.
- Cyclically
  An additional parameter is displayed to configure the sending frequency of the counter variable.
- On change and cyclically
  Both sending conditions are active.

If the counter is locked by the object, also cyclic sending is stopped.

Monitoring limit value

When limit monitoring is activated, the following object is displayed:

Group object	Type KNX	Size	Direction
GO 34 Input B1: Counter threshold – State	1.002	1 Bit	To KNX

When limit monitoring is activated, the following parameters are displayed:

Limit value

Here you can edit the checked limit value. The datapoint type is the same as the counter value.

Behavior on reaching limit value (object)

Here it is possible to determine whether a 0 or a 1 is sent via the object "Counter threshold – State" when the limit value is reached.

Behavior on reaching limit value (counter)

In addition to the limit value itself, it is possible to determine the behavior of the counter when the limit value is reached:

- Counter continue
  Counter value continues increasing on ever pulse
- Counter reset and continue
  Counter value is reset to 0 and continues increasing on ever pulse
- Counter stop
  Counter value stays on limit value and must be reset by object

Send on device restart

It can be determined with this parameter whether the counter value should be sent when the device is restarted.

Reset via object

If this function is activated, the following object appears:

Group object	Type KNX	Size	Direction
GO 35 Input B1: Reset – Trigger	1.017	1 Bit	From KNX

When a telegram is received via this object, the current count values are reset to 0.

Reset after ETS download

If this parameter is activated, the counter values are reset to 0 after device reset (e.g. after ETS download), otherwise they are retained.

Lock function

The lock function can be activated or deactivated here. If this functionality is activated, the following group object appears, as well as the parameter page "Input B1: Lock function" for detailed configuration.

Group object	Type KNX	Size	Direction
GO 38 Input B1: Lock – Activate	1.001	1 Bit	From KNX

If the lock has been activated via the group object, state changes at the input do not cause an increase of the counter variable.

7.7.9 Input B1: Rate of change

This counter is used to connect devices to the bus where the rate of change is critical within a time interval, e.g. an anemometer.

Scaling factor (Value per delta in base time span)

A floating-point value is to be entered here. It determines the value by which the counter value is increased on every pulse

Time base

Here the time base of the rate of change can be specified:

- Pulses per second (e.g. [m/s], [km/h])
  Value from parameter Scaling factor is multiplied by 1
- Pulses per hour (e.g. [kW])
  Value from parameter Scaling factor is multiplied by 3600

Measurement time span

The measurement time span determines how quickly the counter can react to changes. Therefore, a short sample rate should be selected for fast processes (e.g. anemometer).

The rate of change is calculated using the 3 parameters mentioned above:

The device saves several meter readings per measurement interval, scales it with the scaling factor * time base and divides it by the measuring interval.

Datapoint type

The datapoint type of output object of the counter variable can be selected here:

- Floating point (16 Bit) – DPT 9

Group object	Type KNX	Size	Direction
GO 36 Input B1: Rate of change – Value	9.024	2 Byte	To KNX

- Floating point (32 Bit) – DPT 14

Group object	Type KNX	Size	Direction
GO 36 Input B1: Rate of change – Value	14.056	4 Byte	To KNX

Send condition

This parameter can be used to determine how the current counter value is to be sent:

- On read
  No independent sending of the counter value by the device. To read the counter value, the read-flag of the group object has to be set.
- On change
  An additional parameter is displayed to select the minimal delta from the last sent value for sending a new counter value.
- Cyclically
  An additional parameter is displayed to configure the sending frequency of the counter variable.
- On change and cyclically
  Both sending conditions are active.

Monitoring limit value

When limit monitoring is activated, the following object is displayed:

Group object	Type KNX	Size	Direction
GO 37 Input B1: Rate threshold – State	1.002	1 Bit	To KNX

When limit monitoring is activated, the following parameters are displayed:

Limit value

Here you can edit the checked limit value. The datapoint type is the same as rate of change value.

Behavior on exceeding limit value

In addition to the limit value itself, it is possible to determine whether the counter should transmit 0 or 1 via the object if the limit value is exceeded.

Behavior on going below limit value

Here it is possible to determine whether the counter should transmit 0 or 1 via the object if the counter variable goes under limit value.

Example: Electricity meter with S0 interface

From the data sheet of the electricity meter it can be seen that the device delivers 500 pulses per kWh. A device with constant power of 1kW is connected to this current meter for one hour.

The scaled counter measures the energy consumed:

```
Scaling factor: 1 / 500 = 0.002 -> Output in kWh
```

```
The counter for the rate of change measures the current power:
```

```
Scaling factor:
```

```
- Output in kW: 1/500 = 0.002
```

```
- Output in W: 1/500 * 1000 = 2
```

```
Time base: Pulses per hour
```

```
Measurement time span: 300 s
```

Example: Anemometer

From the data sheet of the electricity meter it can be seen that the device delivers 4 pulses/s at a wind speed of 1 m/s.

The counter for the rate of change measures the wind speed:

```
Scaling factor:
```

```
- Output in m/s: 1/4 = 0.25
```

```
- Output in km/h: 1/4 * 3.6 = 0.9
```

```
Time base: Pulses per second
```

```
Measurement time span: 10 s
```

7.7.10 Input B1: Operation time counter

The operation time counter can be used to output how long the channel has been switched on.

Input state send condition

This parameter is used to determine how the current input status is to be sent:

- Disabled
- On read
  No independent sending of the counter value by the device. To read the counter value, the read-flag of the group object has to be set.
- On change
  Sends on changed value
- Cyclically
  An additional parameter is displayed to configure the sending frequency of the counter variable.
- On change and cyclically
  Both sending conditions are active.

Group object	Type KNX	Size	Direction
GO 33 Input B1: Input – State	1.001	1 Bit	To KNX

Switch counter send condition

This parameter is used to determine how the current switching counter is to be sent:

- Disabled
- On read
  No independent sending of the counter value by the device. To read the counter value, the read-flag of the group object has to be set.
- On change
  Sends on changed value
- Cyclically
  An additional parameter is displayed to configure the sending frequency of the counter variable.
- On change and cyclically
  Both sending conditions are active.

Group object	Type KNX	Size	Direction
GO 34 Input B1: Switch counter – State	13.001	4 Bytes	To KNX
GO 35 Input B1: Reset switch counter – Trigger	1.017	1 Bit	From KNX

Operation time send condition [s]

This parameter is used to determine how the current operating time is to be sent:

- Disabled
- On read
  No independent sending of the counter value by the device. To read the counter value, the read-flag of the group object has to be set.
- On change
  An additional parameter is displayed to select the minimal delta from the last sent value for sending a new value.
- Cyclically
  An additional parameter is displayed to configure the sending frequency of the operation time.
- On change and cyclically
  Both sending conditions are active.

Group object	Type KNX	Size	Direction
GO 36 Input B1: Operation time – State	13.100	4 Bytes	To KNX
GO 37 Input B1: Reset operation time – Trigger	1.017	1 Bit	From KNX

7.7.11 Input B1: Lock function

7.7.11.1 Lock function "Switching"

Polarity of object

This parameter defines, if the lock should be activated by receiving a 1 or by receiving a 0. The respective opposite telegram deactivates the lock again.

Behavior of object a/b on start

The telegram can be configured here, which is sent on the according object when the lock is activated.

Behavior of object a/b at end

The telegram can be configured here, which is sent on the according object when the lock is deactivated.

7.7.11.2 Lock function "Dimming, Shutter, Scene"

Polarity of object

This parameter defines, if the lock should be activated by receiving a 1 or by receiving a 0. The respective opposite telegram deactivates the lock again.

Behavior on start

The telegram can be configured here, which is sent on the according object when the lock is activated.

Behavior at end

The telegram can be configured here, which is sent on the according object when the lock is deactivated.

7.7.11.3 Lock function "Generic"

Polarity of object

This parameter defines, if the lock should be activated by receiving a 1 or by receiving a 0. The respective opposite telegram deactivates the lock again.

7.7.11.4 Lock function "Scaled counter"

Only with the lock function activated and with the "impulse counter" function.

Polarity of object

This parameter can be used to determine how the lock is to be activated, either by receiving a 1 or a 0. The corresponding telegram disables the lock again.

Behavior on start of lock

With this parameter the behavior of the counter can be configured when the lock is activated:

- Counter stop
- Counter stop and reset

Behavior on end of lock

With this parameter the behavior of the counter can be configured when the lock is deactivated:

- Counter continue
- Counter reset and continue

7.8 Logic / Timer / Comparison / Calculation

Function 1 – 16

These parameters contain the functions timer and logic, whereby all 16 functions are identical.

The following options are available:

- Disabled
  No parameters and group objects for timer and logic.
- Timer
  Parameters and group objects for timer are available.
- Logic
  Parameters and group objects for logic are available.
- Compare
- Parameters and group objects for compare are available.
- Calculation
  Parameters and group objects for calculation are available.

> *The functions for timer and logic can be linked to one another by means of the associated group objects. This also allows to create complex structures. For this purpose, the output of a function is set to the same group address as the input of the next function.*

7.8.1 Function 1 – 16: Timer
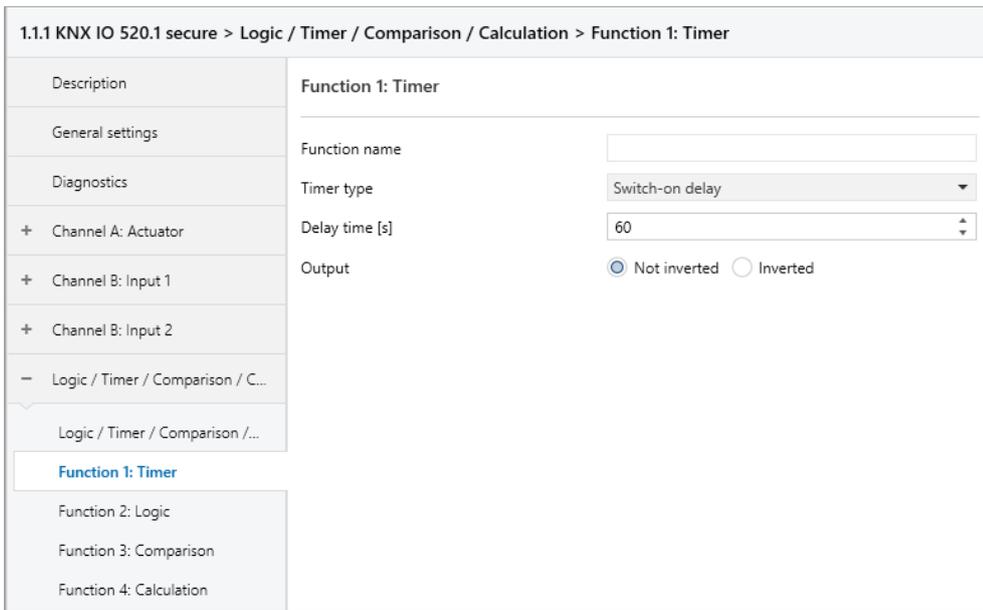
Function name *(10 characters)*

The function name can be chosen freely.

The name is visible in the group object entry in the ETS software. This makes it easier to work with the associated group objects, because the given name is displayed there as a label.

Timer type

The type of time switch can be selected here:

- Switch-on delay
  The ON telegram (1) received on the input is delayed on the output.
  Input: `--1---------0------`
  Output: `--|-T-1-----0------`

Group object	Type KNX	Size	Direction
Timer – Switch-on delayed – Input	1.002	1 Bit	From KNX
Timer – Switch-on delayed – Output	1.002	1 Bit	To KNX

- Switch-off delay
  The OFF telegram (0) received on the input is delayed on the output.
  Input: `--1---------0------`
  Output: `--1---------|-T-0-`

Group object	Type KNX	Size	Direction
Timer – Switch-off delayed – Input	1.002	1 Bit	From KNX
Timer – Switch-off delayed – Output	1.002	1 Bit	To KNX

- Switch-on and switch-off delay
  The ON/OFF telegram (1/0) received on the input is delayed on the output.
  Input: `--1---------0------`
  Output: `--|-T-1-----|-T-0-`

Group object	Type KNX	Size	Direction
Timer – Switch-on/off delayed – Input	1.002	1 Bit	From KNX
Timer – Switch-on/off delayed – Output	1.002	1 Bit	To KNX

- Impulse (staircase)
  The ON telegram (1) received on the input is sent on the output. After a delay the output sends the OFF telegram (0).
  Input: `--1---------0------`
  Output: `--1-T-0-----------`

Group object	Type KNX	Size	Direction
Timer – Impulse (staircase) – Input	1.002	1 Bit	From KNX
Timer – Impulse (staircase) – Output	1.002	1 Bit	To KNX

Each timer can be stopped by sending the opposite value to its input group object. For example: An already started switch-on timer can be stopped by sending OFF (0) to its input group object.

Delay [s]

This parameter defines the delay when sending at the output.

Output

Via this parameter the sent value on the output can be inverted:

- Not inverted
- Inverted

7.8.2 Function 1 – 16: Logic

Function name *(10 characters)*

The function name can be freely selected.

It is visible in the group object entry in the ETS software. This makes it easier to work with the associated group objects later, as the assigned name is displayed there as a designation.

Gate type

This parameter defines the type of logic gate:

- And gate
  The output is triggered ON (1), if all inputs are switched ON (1).
- OR gate
  The output is triggered ON (1), if at least one input is switched ON (1).
- XOR gate
  The output is triggered ON (1), if an odd number of inputs is switched ON (1).
- NAND gate
  The output is triggered ON (1), if at least one inputs is switched OFF (0).
- NOR gate
  The output is triggered ON (1), if all inputs are switched OFF (0).
- XNOR gate
  The output is triggered ON (1), if an even number of inputs is switched ON (1).

Group object	Type KNX	Size	Direction
Logic – Gate input A – Input	1.002	1 Bit	From KNX
Logic – Gate input B – Input	1.002	1 Bit	From KNX
Logic – Gate output – Output	1.002	1 Bit	To KNX
Logic – Gate input C – Input	1.002	1 Bit	From KNX
Logic – Gate input D – Input	1.002	1 Bit	From KNX

The output sends when a telegram is received at an input. The condition for this is that both inputs are valid (have received at least one telegram). The output sends a 1 if the respective condition is fulfilled, otherwise a 0.

- INVERTER
  The input is inverted at the output, ON (1) becomes OFF (0) and OFF (0) becomes EIN (1).

Group object	Type KNX	Size	Direction
Logic – Gate input – Input	1.002	1 Bit	From KNX
Logic – Gate output – Output	1.002	1 Bit	To KNX

The output transmits when a telegram is received at the input.

Number of inputs

This parameter defines the number of inputs for the logic gate.

Input (A, B, C, D)

This parameter specifies whether the input is to be filled via an external (from the bus) or internal value (from the device).

Value (A, B, C, D) *(with Input (A, B, C, D) = "Internal")*

This parameter defines the internal value that is used as an input.

The status of a channel can only be used as a value for the input if the function is set for this channel. (Only for Function != "Impulse counter")

Send cyclically

This parameter specifies whether the result is sent cyclically and at what interval.

7.8.3   Function 1 – 16: Compare

Function name *(10 Characters)*

The function name can be freely selected.

It is visible in the group object entry in the ETS software. This makes it easier to work with the associated group objects later, as the assigned name is displayed there as a description.

Operation

This parameter defines the type of comparison operation used to compare the values of input A and B:

- A < B
  Input A is less than input B
- A = B
  Input A is equal to input B
- A > B
  Input A is higher than input B

Input type *(with Input A != "Internal" OR for Input B != "Internal")*

This parameter defines the type of inputs:

- DPT 05 – Percent – 1 byte
  Value range: 0% (≜ 0) – 100% (≜ 255)
- DPT 05 – Unsigned – 1 byte
  Wertebereich: 0 – 255
- DPT 07 – Unsigned – 2 bytes
  Value range: 0 – 65535
- DPT 12 – Unsigned – 4 bytes
  Value range: 0 – 4294967295
- DPT 09 – Float – 2 bytes
  Value range: -671088.64 – +670433.28
- DPT 14 – Float – 4 bytes
  Value range: -3.4E+38 – +3.4E+38

Input A

This parameter specifies whether the input is to be filled via internal value or via an external value (from the bus).

Value A *(Input A = "Internal")*

This parameter defines whether blind or slats postion of Actuator A is used as input.

Input B

This parameter specifies whether the input is to be filled via internal value, via an external value (from the bus) or static value (from the ETS).

Value B *(Input B = "Internal")*

This parameter defines whether blind or slats postion of Actuator A is used as input.

Value B *(Input B = "Static")*

This parameter defines the static value that is used as an input.

Send cyclically

This parameter specifies whether the result is sent cyclically and at what interval.

Group object	Type KNX	Size	Direction
Logic – Comparison – ... Byte input A	5.001, 5.010, 7.001, 12.001, 9.001, 14.001**	1 Byte, 2 Byte, 4 Byte	From KNX
Logic – Comparison – ... Byte input B*	5.001, 5.010, 7.001, 12.001, 9.001, 14.001**	1 Byte, 2 Byte, 4 Byte	From KNX
Logic – Comparison – Output	1.002	1 Bit	To KNX

* Only for "Input B" parameter = External
** Type KNX determined by "Input type" parameter

> *The output sends when a telegram is received at an input. The condition for this is that both inputs are valid (have received at least one telegram). The output sends a 1 if the respective condition is fulfilled, otherwise a 0.*

7.8.4   Function 1 – 16: Calculation

Function name *(10 Characters)*

The function name can be freely selected.

It is visible in the group object entry in the ETS software. This makes it easier to work with the associated group objects later, as the assigned name is displayed there as a description.

Operation

This parameter defines the type of comparison operation:

- Average value of input A and B
  (input A + input B) / 2
- Convert value
  Convert input A to another type
- Limit value
  Limit input A

Input type *(with Input A != "Internal" OR for Input B != "Internal")*

This parameter defines the type of input:

- DPT 05 – Percent – 1 byte
  Value range: 0% (≙ 0) – 100% (≙ 255)
- DPT 05 – Unsigned – 1 byte
  Wertebereich: 0 – 255
- DPT 07 – Unsigned – 2 bytes
  Value range: 0 – 65535
- DPT 12 – Unsigned – 4 bytes
  Value range: 0 – 4294967295
- DPT 09 – Float – 2 bytes
  Value range: -671088.64 – +670433.28
- DPT 14 – Float – 4 bytes
  Value range: -3.4E+38 – +3.4E+38

Input A

This parameter specifies whether the input is to be filled via internal value or via an external value (from the bus).

Value A *(Input A = "Internal")*

This parameter defines whether blind or slats postion of Actuator A is used as input.

Input B *(with Operation = "Average value of input A and B")*

This parameter specifies whether the input is to be filled via internal value, via an external value (from the bus) or static value (from the ETS).

Value B *(Input B = "Static")*

This parameter defines the static value that is used as an input.

Value B *(Input B = "Internal")*

This parameter defines whether blind or slats postion of Actuator A is used as input.

Correction *(with Operation = "Convert value")*

This parameter specifies whether the value is to be added with an offset or multiplied by a factor.

Offset *(with Correction = "Offset" AND for output type != "DPT 01 – Binary – 1 bit")*

This parameter defines the offset that is added to the input.

Factor *(with Correction = "Factor" AND for output type != "DPT 01 – Binary – 1 bit")*

This parameter defines the factor by which the input is multiplied.

Send 1 on *(with Operation = "Convert value" AND for output type = "DPT 01 – Binary – 1 bit")*

This parameter specifies whether 1 is sent at input A lower or higher than the threshold value.

Threshold value
(with Operation = "Convert value" AND for output type = "DPT 01 – Binary – 1 bit")

This parameter defines the threshold value to which the input is compared.

Limit (min.) *(with Operation = "Limit value")*

This parameter defines the lower limit with which the output is limited.

Limit (Max.) *(with Operation = "Limit value")*

This parameter defines the upper limit with which the output is limited.

Output type *(with Operation = "Convert value")*

This parameter defines the type of input:

- DPT 01 – Binary – 1 bit
  Value range: 0 – 1
- DPT 05 – Percent – 1 byte
  Value range: 0% (≜ 0) – 100% (≜ 255)
- DPT 05 – Unsigned – 1 byte
  Wertebereich: 0 – 255
- DPT 07 – Unsigned – 2 bytes
  Value range: 0 – 65535
- DPT 12 – Unsigned – 4 bytes
  Value range: 0 – 4294967295
- DPT 09 – Float – 2 bytes
  Value range: -671088.64 – +670433.28
- DPT 14 – Float – 4 bytes
  Value range: -3.4E+38 – +3.4E+38

Send cyclically

This parameter specifies whether the result is sent cyclically and at what interval.

Group object	Type KNX	Size	Direction
Logic – Calculation – … Byte Input A	5.001, 5.010, 7.001, 12.001, 9.001, 14.001**	1 Byte, 2 Byte, 4 Byte	Von KNX
Logic – Calculation – … Byte Input B*	5.001, 5.010, 7.001, 12.001, 9.001, 14.001**	1 Byte, 2 Byte, 4 Byte	Von KNX
Logic – Calculation – … Output	1.002, 5.001, 5.010, 7.001, 12.001, 9.001, 14.001***	1 Bit, 1 Byte, 2 Byte, 4 Byte	Nach KNX

Only for "Input B" parameter = External
*** Type KNX determined by "Input type" parameter*
*** *Type KNX is determined by the types of the inputs. With the Operation "Convert value", the output type can be freely chosen.*

The output sends when a telegram is received at an input. The condition for this is that both inputs are valid (have received at least one telegram). The output sends a 1 if the respective condition is fulfilled, otherwise a 0.

⚠ WARNING

- The device must be mounted and commissioned by an authorized electrician.
- The prevailing safety rules must be heeded.
- The device must not be opened.
- For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered.
- The device is a permanently connected equipment: A readily accessible disconnect device shall be incorporated external to the equipment.
- The installation requires a 10 A fuse for external overcurrent protection.
- The power rating is indicated on the side of the product.

Product database for ETS 5/6
www.weinzierl.de/en/products/520-1/ets6

Data sheet
www.weinzierl.de/en/products/520-1/datasheet

CE Declaration
www.weinzierl.de/en/products/520-1/ce-declaration

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