

Switching actuator with 2 outputs

KNX IO 510.1 *secure* (2O)

Operation and installation manual



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1 Application

The KNX IO 510.1 *secure* (2O) is a compact switching actuator with 2 bi-stable relay outputs. The outputs are connected as closing contacts.

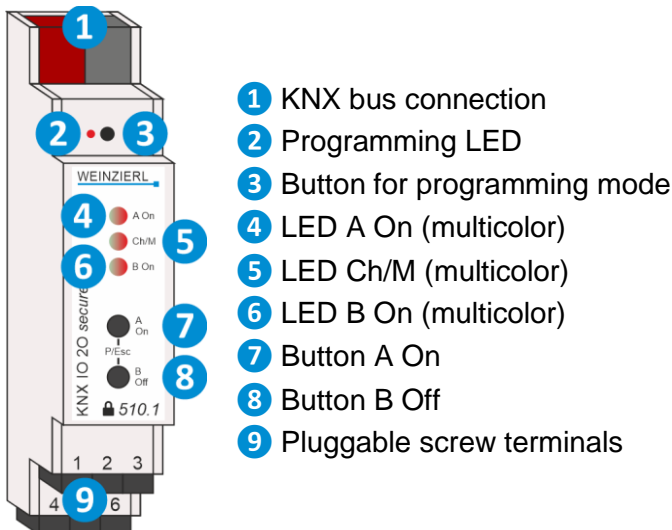
The actuator provides the function for universal outputs including scene control, timer, staircase lighting and to control heating valves (PWM for thermoelectric valve drives).

Two push buttons and three LEDs allow a local operation and a visualization of the device state.

In addition to the output channels the device includes 16 independent functions for logic or timer control. The device supports KNX Data Security.

2 Installation and connection

The KNX IO 510.1 *secure* (2O) is designed for a DIN rail (35 mm) with a width of 1 unit (18 mm). An installation-friendly design with pluggable screw terminals helps to reduce costs of commissioning. The actuator has the following controls and displays:



This device is powered by the KNX bus. An external power supply is not necessary.



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 Mode **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 successfully powered by the KNX bus.

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

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

The respective channel can be switched on with button A On **7** and switched off with button B Off **8**. The manual operation mode can be exit by pressing the buttons (P/Esc) **7** and **8** simultaneously.

The LED A On **4** is used to display the status of the first channel (A). It lights when the channel is on and is switched off when the channel is off. Analogously, the LED B On **6** is used to display the status of the second channel (B).

Summary of the states of LED Ch/M **5**:

LED Status	Meaning
LED lights green	The device operates in normal operating mode.
LED lights red	The programming mode is active.
LED flashes 1x orange	The programming mode is not active. Manual operation is active: Switching first channel (A).
LED flashes 2x orange	The programming mode is not active. Manual operation is active: Switching second channel (B).
LED flashes red	The programming mode is not active. Manual operation is not active. The device is not loaded correctly e.g. after aborting a download.
LED flashes green	The device is currently loaded by the ETS.

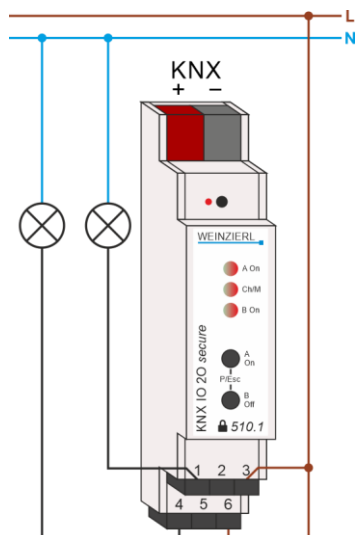
3 Reset to factory default settings

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.

4 Wiring scheme



4.1 Pluggable screw terminals

Ch A Out	Ch A Out	Ch A In
Ch B Out	Ch B Out	Ch B In

The pluggable screw terminals **9** on the left/middle terminal pins Ch A / B Out are used as closer. On the right terminal pins Ch A / B In the common pins are contacted e.g. the voltage to be switched. Channel A is located on the upper and channel B on the lower terminal.



It is allowed to connect on the upper terminal compared to the lower terminal a different phase or voltage.

4.2 Pin assignment

Connection	Icon	Description
1	Ch A Out	Connection channel A Output connected as closing contact
2	Ch A Out	Connection channel A Output connected as closing contact
3	Ch A In	Common connection for channel A e.g. the voltage to be switched
4	Ch B Out	Connection channel B Output connected as closing contact
5	Ch B Out	Connection channel B Output connected as closing contact
6	Ch B In	Common connection for channel B e.g. the voltage to be switched
KNX	+	Positive connection for KNX bus
KNX	-	Ground connection for KNX bus

5 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.

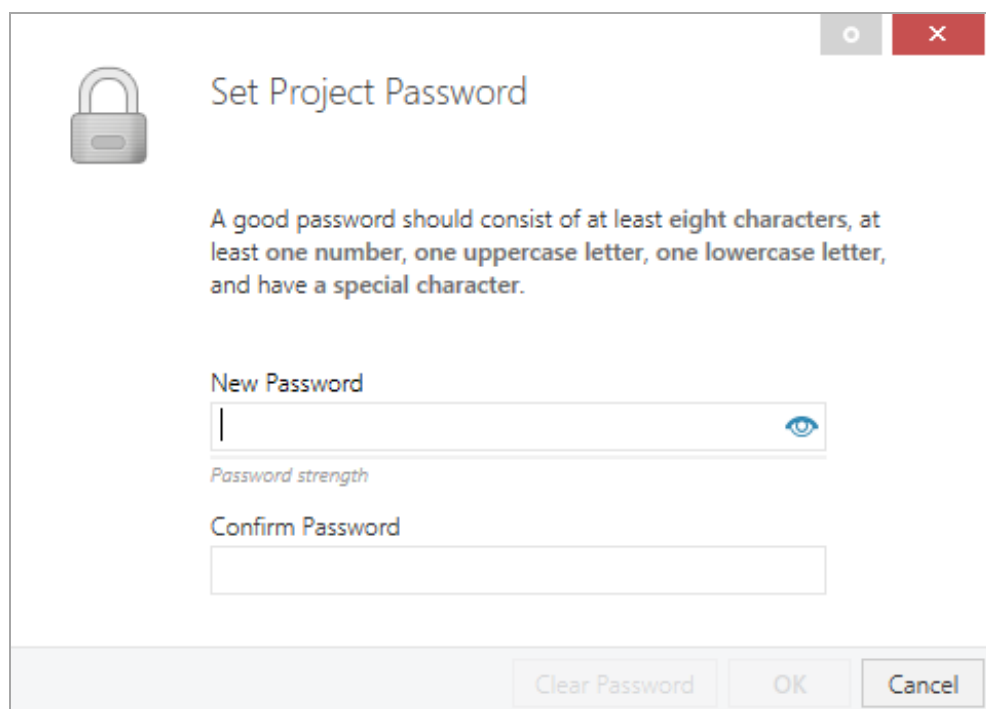
6 ETS database

The ETS5 database (for ETS 5.7 or newer) can be downloaded from the product website of the KNX IO 510.1 *secure* (2O) (www.weinzierl.de) or from the ETS online catalogue.

The KNX IO 510.1 *secure* (2O) 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.

6.1 Secure commissioning

If the first product is inserted into a project with KNX Security, the ETS prompts you to enter a project password.



Set Project Password

A good password should consist of at least **eight characters**, at least **one number**, **one uppercase letter**, **one lowercase letter**, and have a **special character**.

New Password

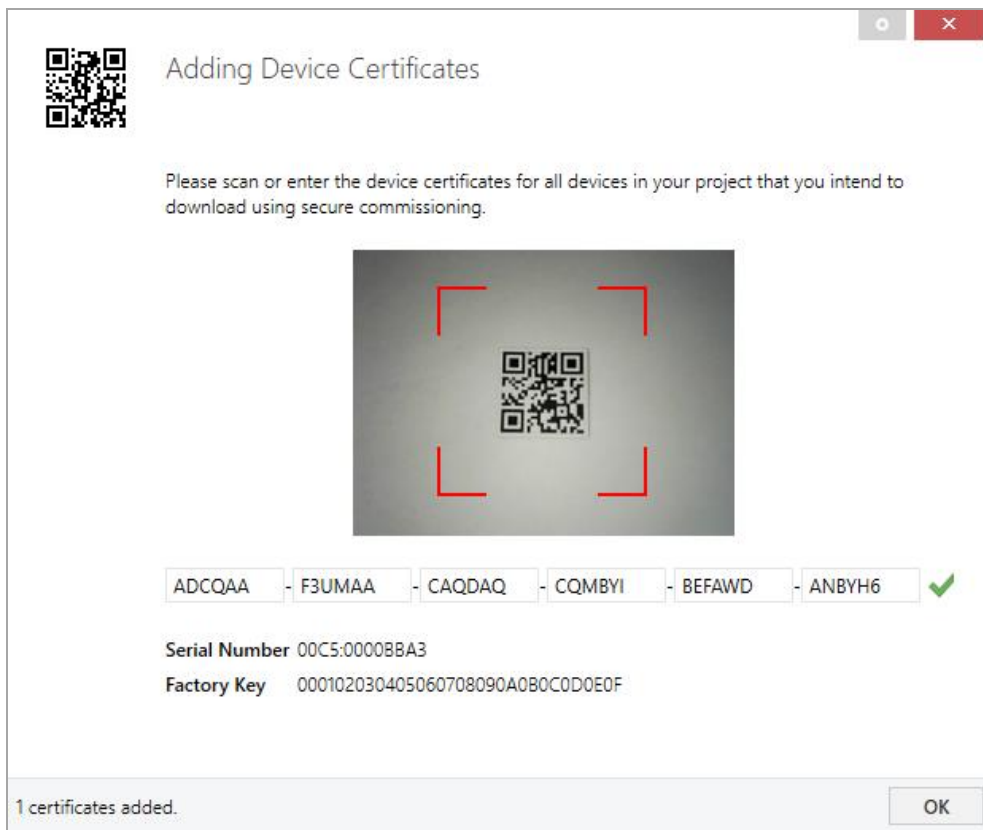
Password strength

Confirm Password

Clear Password OK Cancel

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).



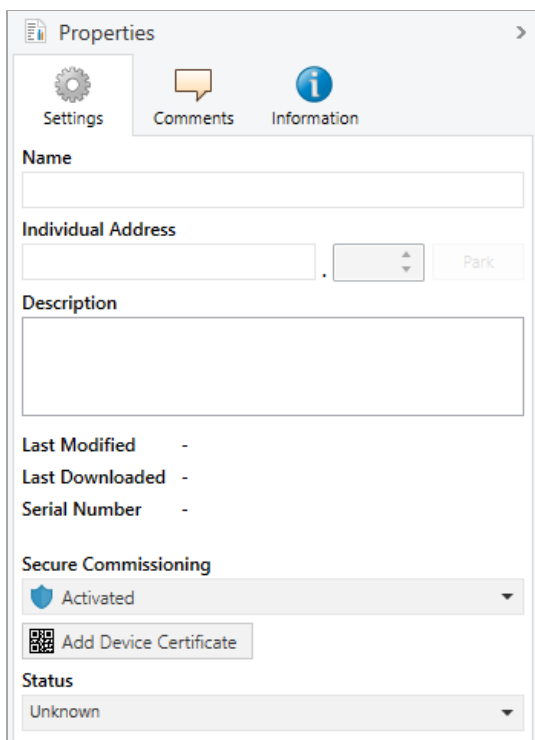
The certificate is printed as text on the device. It can also be scanned from the printed QR code via a webcam.

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.

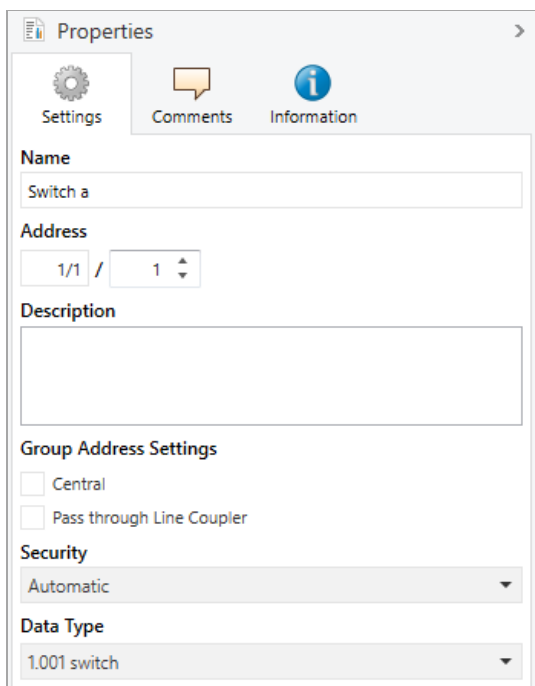
The serial number in the certificate enables the ETS to assign the correct key to a device during a download.

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









6.2 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.

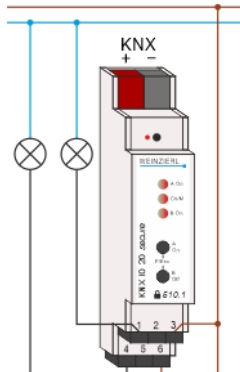
In the overview of communication objects in the ETS project, secured objects can be recognized by a shield symbol:

	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.

6.3 Description

--- KNX IO 510.1 secure (2O) > Description

Description	
General settings	KNX IO 510.1 secure (2O) Switching actuator with 2 outputs
+ Channel A: Actuator	<p>The KNX IO 510.1 secure (2O) is a compact switching actuator with 2 bi-stable relay outputs.</p> <p>The actuator provides the function for universal outputs including scene control, timer, staircase lightning and to control heating valves (PWM for thermoelectric valve drives).</p> <p>Two push buttons and three LEDs allow a local operation and a visualization of the device state.</p> <p>In addition to the output channels the device includes 16 independent functions for logic or timer control. The device supports KNX Data Security.</p> <div style="text-align: center;">  </div> <p>Wiring scheme:</p> <p>Please consult device data sheet and manual for further information.</p>
+ Channel B: Actuator	
+ Logic / Timer	

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This page shows the device description and the corresponding connection diagram.

6.4 General settings

--- KNX IO 510.1 secure (2O) > General settings

Description	
General settings	Device name: <input type="text" value="KNX IO 510.1 secure (2O)"/> Send delay after bus power return: <input type="text" value="5 s"/>
+ Channel A: Actuator	Prog. mode on device front: <input type="radio"/> Disabled <input checked="" type="radio"/> Enabled
+ Channel B: Actuator	Manual operation on device: <input type="text" value="Enabled with time limit 10 min"/>
+ Logic / Timer	Heartbeat: <input type="radio"/> Disabled <input checked="" type="radio"/> Enabled Cycle time: <input type="text" value="5 min"/>

Device name (30 characters)

An arbitrary name can be assigned for the KNX IO 510.1 secure (2O). 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 of 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 switching operations of the actuator are not affected by this parameter.

Prog. mode on device front

In addition to the normal programming button **3** 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 **7** and **8**.

This feature can be enabled and disabled via the parameter "Prog. mode on device front". The recessed programming button **3** (next to the Programming LED **2**) 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 last state of the outputs remains, until a new switching telegram is received again.

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 24 h are selectable.

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

6.5 Actuator A / B: General

--- KNX IO 510.1 secure (20) > Channel A: Actuator > Actuator A: General

Description	Name	<input type="text"/>
General settings	Function	Universal output
Channel A: Actuator	Scene function	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
Actuator A: General	Send state	Cyclic and on change
Channel B: Actuator	Time for cyclic state	6 h
Logic / Timer	Behavior on bus power failure	No reaction
	Behavior after bus power return	State like before bus power failure
	Lock function	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled

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 / B: ...”.

Function

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

- Disabled
- Universal output
- On/Off delay
- Staircase function
- Valve actuator (PWM for thermal servo)



More detailed descriptions of the functions can be found in the sections “Actuator A / B: ...”.

Scene function (only for function “Universal output”)

With this parameter the scene function can be enabled or disabled. If this functionality is enabled, the respective group object as well as the parameter page “Actuator A / B: Scene function” are displayed for further configuration of scenes 1 – 16.

Group object	Type KNX	Size	Direction
GO 12 Actuator A / B: Scene – Activ./Lrn.	18.001	1 bit	From KNX

Behavior on bus power failure (for function != "Disabled")

The behavior which is held at the output during the bus power failure can be configured here.

The following options are selectable:

- No reaction
- Switch on
- Switch off

Behavior after bus power return (for function != "Disabled")

Here the behavior of the output after bus power return can be configured. This behavior will be set after every device restart (e.g. also on restart after ETS download).

The following options are selectable:

- No reaction
- Switch on
- Switch off
- State like before bus power failure

Send state (for function != "Disabled")

This parameter defines the behavior of the state objects:

- Disabled
State objects are deactivated and not displayed
- Only on read
State objects send only on request
- On change
State objects send on value change
- Cyclic and on change
State objects send cyclically and on value change

Group object	Type KNX	Size	Direction
GO 18 Actuator A / B: Output – State	1.001	1 bit	To KNX
GO 19 Actuator A / B: Valve actuator (PWM) – State*	5.001	1 byte	To KNX

* for function = "Valve actuator (PWM for thermal servo)"

Time for cyclic state

Is selected state object "Cyclic and on change", in this parameter the cycle time can be set.

Lock function (for function “Universal output”, “On/Off delay” or “Staircase 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 “Actuator A / B: Lock function” are displayed for further configuration. If the lock has been activated via the group object “Lock”, the received switching telegrams are not executed.

In addition to the lock object, there is also a priority object, which can be switched independently of the lock. Thus, it is possible to set an output state without affecting other functions.

Group object	Type KNX	Size	Direction
GO 15 Actuator A / B: Lock – Activate	1.001	1 bit	From KNX
GO 16 Actuator A / B: Prior. output – Switch	1.001	1 bit	From KNX

Lock function (for function “Valve actuator (PWM for thermal servo)”)

With this parameter the lock function can be disabled or enabled. If this functionality is activated, the associated group objects as well as the parameter page “Actuator A / B: Lock function” are displayed for further configuration. If the lock has been activated via the group object “Lock”, the received switching telegrams are not executed.

In addition to the lock object, there is also a priority object, which can be used to set a control value independently of the lock. Thus, it is possible to set an output PWM without affecting other functions.

When the lock is ended, the last received value (not priority object) is represented as PWM at the output.

Group object	Type KNX	Size	Direction
GO 15 Actuator A / B: Lock – Activate	1.001	1 bit	From KNX
GO 17 Actuator A / B: Prior. valve actuator (PWM) – Control value	5.001	1 byte	From KNX

Example of 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 during the lecture or concert, switches that are accessible to unauthorized persons, in order to prevent unmeant switching. Nevertheless, the individual lamps can controlled by use of the priority object without canceling the lock.

6.6 Actuator A / B: Lock function

Condition:

Function is “Universal output”, “On/Off delay” or “Staircase function”.

The screenshot shows the configuration interface for Actuator A: Lock function. The breadcrumb path is: --- KNX IO 510.1 secure (20) > Channel A: Actuator > Actuator A: Lock function. The interface is divided into a left sidebar and a main content area. The sidebar contains the following items: Description, General settings, Channel A: Actuator (expanded), Actuator A: General, Actuator A: Lock function (highlighted in blue), Channel B: Actuator, and Logic / Timer. The main content area displays the following settings: Polarity of object with radio buttons for 'Lock active on 1' (selected) and 'Lock active on 0'; Behavior on start with a dropdown menu set to 'No reaction'; and Behavior at end with a dropdown menu set to 'No reaction'.

Polarity of object

This parameter defines, if the lock should be activated by receiving a 1 or by receiving a 0.

The following options are selectable:

- Lock active on 1
- Lock active on 0

Behavior on start

This parameter configures, which state the output should set, if the lock activates.

The following options are selectable:

- No reaction
- Switch on
- Switch of

This output state can still be changed by the priority object.

Behavior at end

This parameter defines, which state the output should set, if the lock deactivates.

The following options are selectable:

- No reaction
- Switch on
- Switch off

- State before lock
This restores the original state before the lock was activated. Switching telegrams received during the lock are ignored.

- State without lock
Here the state of the last received switching telegram is restored. This takes into account the received switching telegrams during the lock. Thus, when the lock is deactivated, the last received switching telegram is set.

Condition:

Function is “Valve actuator (PWM for thermal servo)”.

Polarity of object

This parameter defines, if the lock should be activated by receiving a 1 or by receiving a 0.

The following options are selectable:

- Lock active on 1
- Lock active on 0

Behavior on start

This parameter defines, which behavior the output should represent, if the lock activates.

The following options are selectable:

- No reaction
The PWM value remains as to begin of the lock function.
- Value
When the lock is activated, a defined PWM value is represented on the output.

Control value (PWM)

If a defined PWM value should be set to the output when the lock is activated, this value can be set with this parameter.

6.7 Actuator A / B: Universal output

If the universal output is selected on the parameter page “Actuator A / B: General”, the actuator can be used as a switching output. A parameter for the scene function is also displayed.

Group object	Type KNX	Size	Direction
GO 11 Actuator A / B: Output – Switch	1.001	1 bit	From KNX

6.8 Actuator A / B: Scene function

--- KNX IO 510.1 secure (20) > Channel A: Actuator > Actuator A: Scene function

Description	Scene 1	Switch on
General settings	Number	1
Channel A: Actuator	Scene 2	Switch off
Actuator A: General	Number	2
Actuator A: Scene function	Scene 3	Learnable
	Number	3
Channel B: Actuator	Scene 4	No reaction
Logic / Timer	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

Scene 1 – 16

These parameters can be used to configure the state, which is set at the output when the respective scene is executed.

The following options are selectable:

- No reaction
- Switch on
- Switch off
- Learnable

By using a scene control telegram, the current state at the output can be saved for the respective scene. This allows the user to customize the scene without ETS download.

Number

This parameter sets any scene number between 1 and 64 to the scene. There must not configured any scene numbers twice.

6.9 Actuator A / B: On/Off delay

If the on/off delay is selected on the parameter page “Actuator A / B: General”, delayed switching times can be configured. The “Actuator A / B: On/Off Delay” parameter page is displayed for this purpose.

Group object	Type KNX	Size	Direction
GO 11 Actuator A / B: Output – Switch	1.001	1 bit	From KNX

On delay time

The duration of the switch-on delay is configured in this parameter.

Input: --1-----0-----

Output: -- | -T-1-----0-----

Off delay time

The duration of the switch-off delay is configured in this parameter.

Input: --1-----0-----

Output: --1-----| -T-0--

Retriggerable

If these parameters are activated, the respective delay time is restarted upon receipt of the corresponding switching signal.

6.10 Actuator A / B: Staircase function

If the staircase function is selected on the parameter page “Actuator A / B: General”, a group object for the staircase function appears in addition to the normal switching object. Via the additional parameter page “Actuator A / B: Staircase function” this function can be configured.

Group object	Type KNX	Size	Direction
GO 11 Actuator A / B: Output – Switch	1.001	1 bit	From KNX
GO 13 Actuator A / B: Staircase function – Trigger	1.010	1 bit	From KNX

Switch off time

The time for which the output is activated after an ON telegram (object of the staircase function) has been received, can set in this parameter.

Input: --1-----0-----

Output: --1-T-0-----

Retriggerable

This parameter can be used to set whether the follow-up time is to be restarted when an ON telegram is received on the object of the staircase function.

Reaction on ‘OFF’ telegram

This parameter can be used to set whether an OFF telegram on the object of the staircase function should be processed or ignored.

Time for warning before switch off

The time between pre-warning and deactivation is configured, or the pre-warning is deactivated with this parameter. If the pre-warning time is longer than the actual follow-up time, no pre-warning is carried out.

Time of interrupt

The pre-warning is indicated by a brief interruption (switch off – switch on). The duration of this interrupt is configured in this parameter.



LED lamps often have a long follow-up time, in which the lamp still lights even though it is already switched off. With such lamps longer interrupt times must be set to generate a “visible” interruption.

6.11 Actuator A / B: Valve actuator (PWM for thermal servo)

--- KNX IO 510.1 secure (20) > Channel A: Actuator > Actuator A: Valve actuator		
Description	Cyclic time (PWM)	15 min
General settings	Maximum control value (PWM)	100 %
Channel A: Actuator	Stuck protection	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled
Actuator A: General	Execution time	5 min
Actuator A: Valve actuator	Monitoring interval	7 days
Channel B: Actuator	Protection on missing control value	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled
Logic / Timer	Protection control value (PWM)	10 %
	Monitoring interval	2 h

The function valve actuator is foreseen to control thermoelectric valve drives which are used for floor heating but also for radiators. It maps the continuous position (0 % – 100 %) to an ongoing On/Off sequence called PWM (pulse width modulation) signal.

If the valve actuator is selected on the parameter page “Actuator A / B: General”, a group object for the valve actuator appears instead of the normal switching object. This allows the current PWM at the output to be set via KNX (0 % – 100 %). An additional parameter page “Actuator A / B: Valve actuator” appears for the configuration of the valve actuator.

The received control value is saved automatically by the device, to continue faultless after a possible bus power loss.

Group object	Type KNX	Size	Direction
GO 14 Actuator A / B: Valve actuator (PWM) – Control value	5.001	1 byte	From KNX

Cyclic time (PWM)

The cyclic time of the PWM, which is used to control a servo drive, is configured with this parameter. One cycle involves a time range in which the output is switched on and one in which the output is switched off. The cyclic time corresponds to the period between two rising edges (state change at the output from OFF to ON). The longer the flow of the heating circuit (tube / pipe length), the higher the cyclic time should be set.



Typical thermal servo require several minutes for a valve change of 100 %.

Maximum control value (PWM)

This parameter can be used to limit the maximum control value. The control value is expressed in percent and defines the period during which the output is switched on in one cycle.

Example:

Cyclic time = 10 min

Maximum control value (PWM) = 80 %

Maximal output state = ON for 8 min / OFF for 2 min

Stuck protection

With the stuck protection, it is intended to prevent the valve from being damaged by corrosion or calcification, that it can no longer be moved. In case stuck protection is enabled, this is only triggered if the value is permanently 0 % or 100 %. On every other control value the servo already moves, so there is no need for a stuck protection.

Example:

Control value 0 % = Open servo for the set time

Control value 100 % = Close servo for the set time



In case the valve is not allowed to open, the stuck protection must be disabled.

Execution time (only for activated stuck protection)

If the stuck protection is activated, this parameter is used to set the duration of the state change.

Monitoring interval (only for activated stuck protection)

If the stuck protection is activated, this parameter sets the monitoring interval. If the state of the output remains unchanged for this time, the lock protection is triggered.

Protection on missing control value

This parameter enables the protection function on missing control value telegrams. This is necessary in order to prevent unwanted and uncontrolled overheating or cooling down of the room, when the control value is missing.

Protection takes effect, as soon as no telegrams are received from the controller over a longer period of time. As soon as this extended telegram pause has occurred, it can be assumed that the corresponding controller has failed or the connection between the controller and the valve actuator has been interrupted.

Protection control value (PWM) *(only for activated protection on missing control value)*

If the protection on missing control value is enabled, this parameter sets a protection control value. This configured PWM value will set the output, if the protection is active.

As soon as telegrams from the controller are received again, the protection control value (PWM) is overwritten by the received value. The protection does not react again, until the waiting time in the set monitoring interval is exceeded between individual telegrams.

Monitoring interval *(only for activated protection on missing control value)*

If the protection on missing control value is enabled, this parameter sets the monitoring interval. If no further telegram is received by the device during this time, the protection function takes effect.

6.12 Logic / Timing

--- KNX IO 510.1 secure (20) > Logic / Timer > Logic / Timer		
Description	Function 1	Timer
General settings	Function 2	Timer
+ Channel A: Actuator	Function 3	Logic
+ Channel B: Actuator	Function 4	Logic
- Logic / Timer	Function 5	Disabled
	Function 6	Disabled
	Function 7	Disabled
	Function 8	Disabled
	Function 9	Disabled
	Function 10	Disabled
	Function 11	Disabled
	Function 12	Disabled
	Function 13	Disabled
	Function 14	Disabled
	Function 15	Disabled
	Function 16	Disabled

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.



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.

6.13 Function 1 – 16: Timer

--> KNX IO 510.1 secure (20) > Logic / Timer > Function 1: Timer	
Description	Function name <input type="text"/>
General settings	Timer type Switch-on delay ▼
+ Channel A: Actuator	Delay time [s] <input type="text" value="60"/>
+ Channel B: Actuator	Output <input checked="" type="radio"/> Not inverted <input type="radio"/> Inverted
- Logic / Timer	
Logic / Timer	
Function 1: Timer	
Function 2: Timer	
Function 3: Logic	
Function 4: Logic	

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

Here the type of the timer can be set:

- 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 -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

6.14 Function 1 – 16: Logic

--- KNX IO 510.1 secure (20) > Logic / Timer > Function 3: Logic

Description	Function name	<input type="text"/>
General settings	Gate type	AND gate ▼
+ Channel A: Actuator		
+ Channel B: Actuator		
- Logic / Timer		
Logic / Timer		
Function 1: Timer		
Function 2: Timer		
Function 3: Logic		
Function 4: Logic		

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.

Gate type

This parameter defines the type of the logic gate:

- **And gate**
The output is triggered ON (1), if both inputs are switched ON (1).
- **OR gate**
The output is triggered ON (1), if one or both inputs are switched ON (1).
- **XOR gate**
The output is triggered ON (1), if the two inputs are not equal.
- **NAND gate**
The output is triggered ON (1), if one or both inputs are switched OFF (0).
- **NOR gate**
The output is triggered ON (1), if both inputs are switched OFF (0).
- **XNOR gate**
The output is triggered ON (1), if both inputs are equal.

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



The output transmits when a telegram is received on one of the inputs. A precondition 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**
Input ON (1) is converted into output OFF (0). Input OFF (0) is converted into output ON (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 on the input.



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 16 A fuse for external overcurrent protection.
- The power rating is indicated on the side of the product.



ETS5 Database

www.weinzierl.de/en/products/510.1/ets5

Data sheet

www.weinzierl.de/en/products/510.1/datasheet

CE Declaration

www.weinzierl.de/en/products/510.1/ce-declaration

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