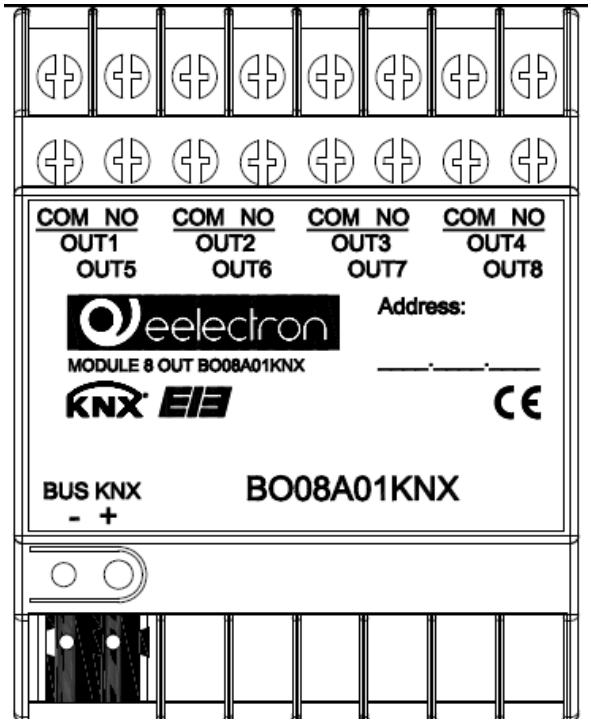
Din Rail 8 Output Module

BO08A01KNX

Product Handbook



Product
Description: **Din Rail 8 Output Module**
Order Code: **BO08A01KNX**

Document
Version**:** **1.1**
Date: **23/01/2014**

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- Any information inside this manual can be changed without advice.
- This handbook can be download freely from the website: *www.eelectron.com*
- **Exclusion of liability:**
  Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.
  Any necessary corrections will be incorporated into newer versions of this manual.

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1. General Introduction

This manual is intended to be used by installers and describes functions and parameters of the device BO08A01KNX – Din Rail 8 Output Module and how is possible to change settings and configurations using ETS software tool.

2. Product and functional overview

The BO08A01KNX module is designed to be installed on a DIN rail and to be used in Home and Building installations (i.e. offices, hospitals, hotels, private houses, etc...).

Device 8 outputs on board can be configured in different ways:

- Each output can be configured independently for load control (R1 to R8)
- Each output can be configured independently for ON / OFF or continuous switching (PWM) for Electric valves (solenoid actuators) (EV1 to Ev8)
- Outputs can be configured in pairs for the management of roller shutters and blinds; up to 4 channels (Channels A to D)
- Outputs can be configured in pairs for management of Motor Reductor or for solenoid valves with 3-point control or for ventilating grilles; up to 4 channels (Channels A to D)
- Fan Coil Actuator for 2/4 pipes systems for Heating / Cooling with 3 speed motors) (relays from 1 to 5)

  Different configurations can exist simultaneously on the same device as long as they do not use the same outputs (relays), for example you can set the following configuration:

- Relay 1 to 5 ➔ Fan Coil Actuator
- Out 6 ➔ Generic load managment
- Out 7 ÷ Out 8 ➔ Shutter management (Channel “D”)

Scheme of all possible configurations for each output:

Relay	Generic Load	Fan Coil Act.	Shutter / Blinds	Electric Valves	Motor Reduction
Out 1	R1	On / Off Heating	Channel A	EV 1	Channel A
Out 2	R2	On / Off Cooling		EV 2	
Out 3	R3	FanCoil speed 1	Channel B	EV 3	Channel B
Out 4	R4	FanCoil speed 2		EV 4	
Out 5	R5	FanCoil speed 3	Channel C	EV 5	Channel C
Out 6	R6	-		EV 6	
Out 7	R7	-	Channel D	EV 7	Channel D
Out 8	R8	-		EV 8	

The physical address, group address and parameters are assigned and programmed with ETS tool software. In order to commission the device, a PC with ETS2 version V1.3 or higher is required as well as an interface to the bus, (RS232, USB, etc...)

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2.1. Address and associations limits

- The maximum number of group addresses allowed for the device is **50** this means that it is possible to associate the communication objects to a maximum of **50** group addresses.

- The maximum number of logical associations allowed for the device is **63**; this means that the maximum number of logical connections between communication objects and group addresses is **63**.

- **Caution:** there is a limit to the number of associations that can be created, on the same device, between transmission communications objects (i.e. inputs) and receiving communication objects (i.e. outputs). If you want, on the same device, add a group address already linked to a transmission communication object (input) to a receiving communication object (output) which already has a different group address associated, please note that you can add a maximum of **13** group addresses of this kind for the whole device.

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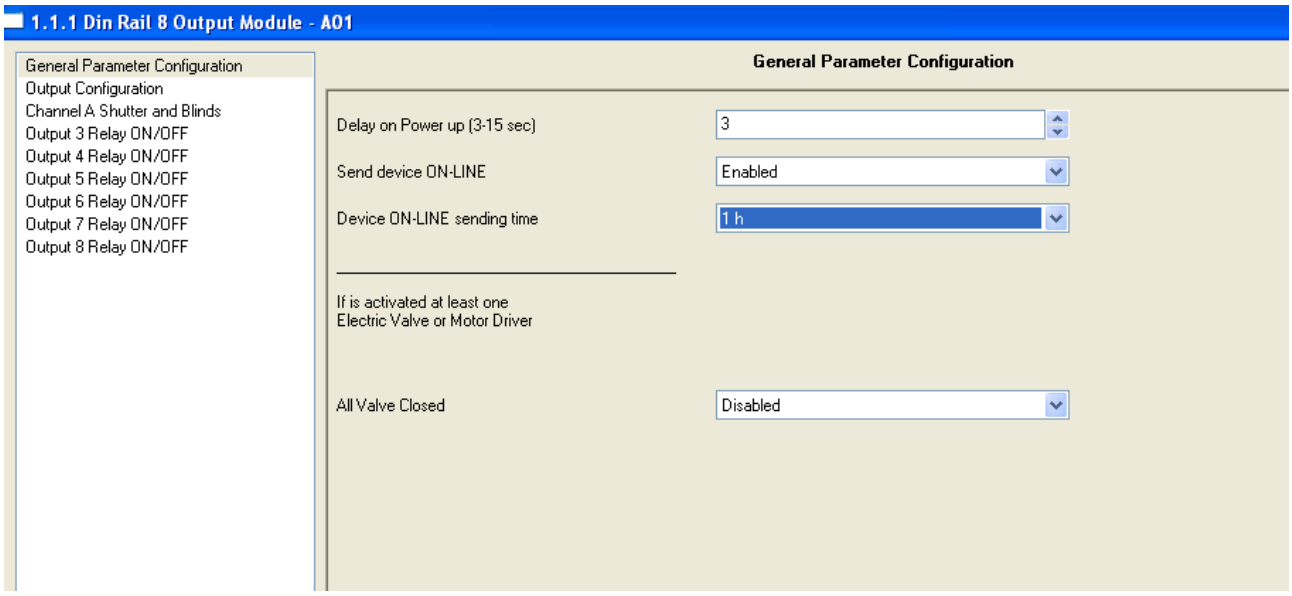
3. General Parameter Configuration

3.1. Parameters



General Parameter Configuration Page list generic parameters which affects all output channels, or their selection applies to all contacts of the input device simultaneously regardless of the function selected later for each.

KNX PARAMETER	SETTINGS
Delay on Power-up (3-15 sec)	2 ÷ 15 seconds
Through this parameter is possible to set the delay of transmission of telegrams after a power on by selecting the time by which the device is allowed to send telegrams. In large systems after a power failure or shutdown this delay avoids to generate excessive traffic on the bus, causing slow performance or a transmission block. If there are different devices that require sending telegrams on the bus after a reset, these delays must be programmed to prevent traffic congestion during the initialization phase. The input detection and the values of objects are updated accordingly at the end of the transmission delay time At the end of ETS programming the device behaves like after a power on.	

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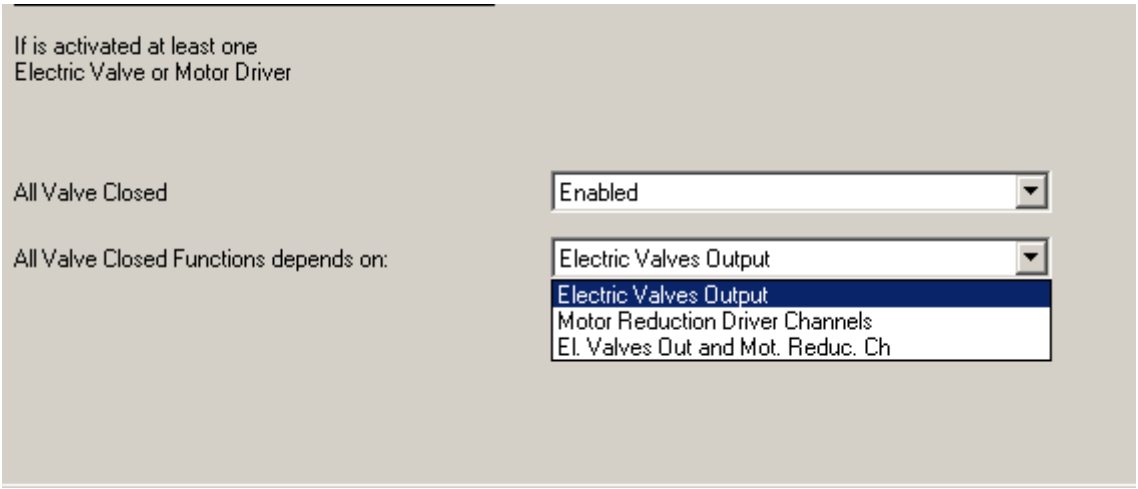
KNX PARAMETER	SETTINGS
Send Device ON-LINE	• Disabled • Enabled
Device ON-LINE sending time	• 10 min • 1 hr • 12 Hr • 24 Hr
Through this parameter it's possible to enable a cyclical sending, on the bus, of a 1 bit telegram with value "1"; this sending has a programmable time interval. This message can be used to detect errors like power failure or breakage of the device to a monitoring system or to a bus control system.	



KNX PARAMETER	SETTINGS
All Valve Closed	• Disabled • Enabled
All Valve Closed Function depends on;	• Electric valves output • Motor reduction Driver Channels • Electric valves output and Motor reduction Channels
See paragraph 9.4 Function VALVES ALL CLOSED	

3.2. Communications Objects

32	<Electric Valves / Motor Reduction Driver>	All Valve Closed	1 bit	C	R	-	T	-
49	Device On-Line		1 bit	C	R	-	T	-

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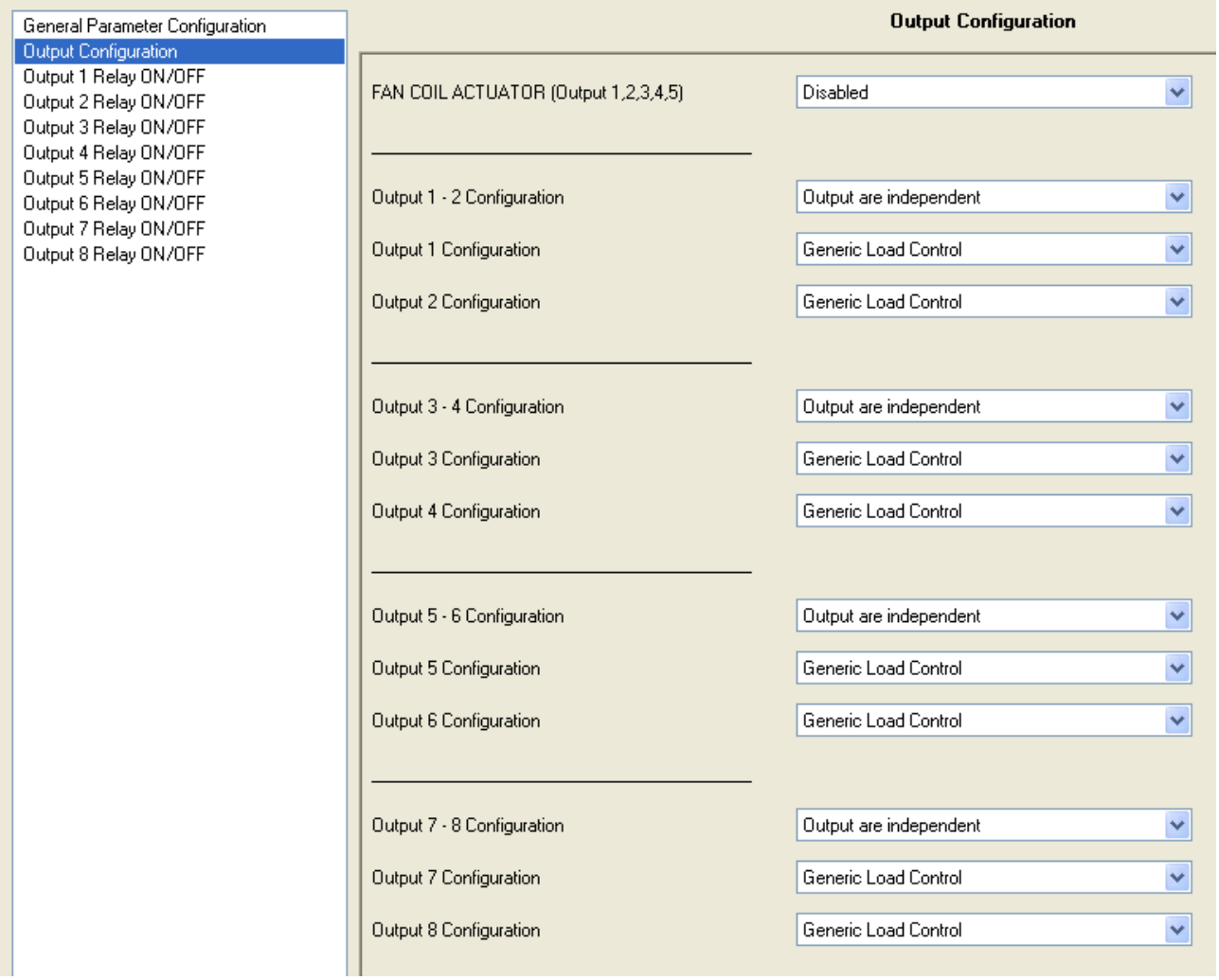
4. Output Configuration



KNX PARAMETER	SETTINGS
FAN COIL ACTUATOR (Output 1,2,3,4,5)	• Disable • Enable
This parameter defines whether the outputs from 1 to 5 are configured to manage fan coils, if the function is enabled outputs 6, 7 and 8 remain available as output for generic loads or electric valves control; outputs 7 and 8 can be still configured for control of shutters / blinds or motor reduction driver.	
Output 1 – 2 Configuration	• Output are independent • Output are coupled
Here it is possible to set if outputs are independent and therefore can be set with functions which use only one relay at a time (generic loads and electric valve); if the option selected is “Output are coupled” the relays work together to realize functions which use a double relay (shutter and motor reduction driver)	
Output 3 – 4 Configuration	Same values of “Output 1 – 2 Configuration”
Output 5 – 6 Configuration	Same values of “Output 1 – 2 Configuration”
Output 7 – 8 Configuration	Same values of “Output 1 – 2 Configuration”

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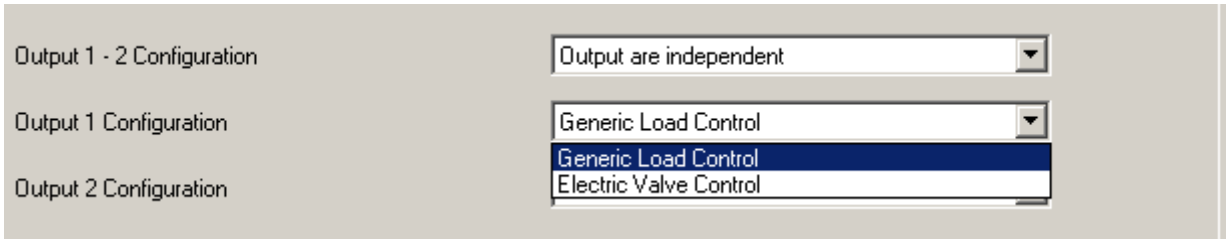

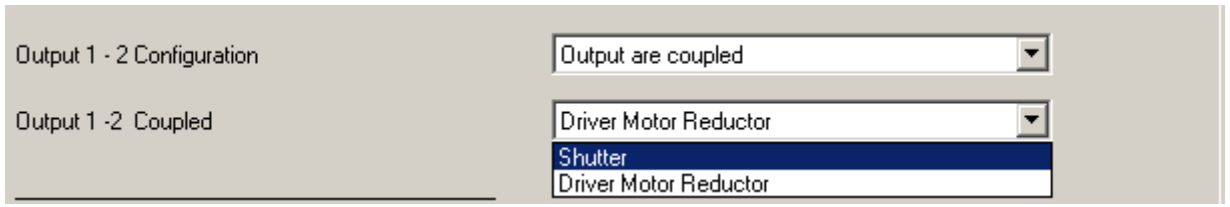

KNX PARAMETER	SETTINGS
Output 1 Configuration	• Generic Load Control • Electric Valve Control
Output 1 works in single mode; this parameter select which function is set; identical parameter for output 2, 3, 4, 5, 6, 7, 8 if configured in single mode.	
Output 1 – 2 Coupled	• Shutter • Driver Motor Reduction
Output 1 and 2 works in coupled mode; this parameter selects the function: shutter management or motor reduction management. Identical parameter for output coupled 2-3; 4-5; 7-8.	
Output 2 Configuration	Same values of “Output 1 Configuration”
Output 3 Configuration	Same values of “Output 1 Configuration”
Output 4 Configuration	Same values of “Output 1 Configuration”
Output 5 Configuration	Same values of “Output 1 Configuration”
Output 6 Configuration	Same values of “Output 1 Configuration”
Output 7 Configuration	Same values of “Output 1 Configuration”
Output 8 Configuration	Same values of “Output 1 Configuration”
Output 3 – 4 Coupled	Same values of “Output 1 - 2 Coupled”
Output 5 – 6 Coupled	Same values of “Output 1 - 2 Coupled”
Output 7 – 8 Coupled	Same values of “Output 1 - 2 Coupled”

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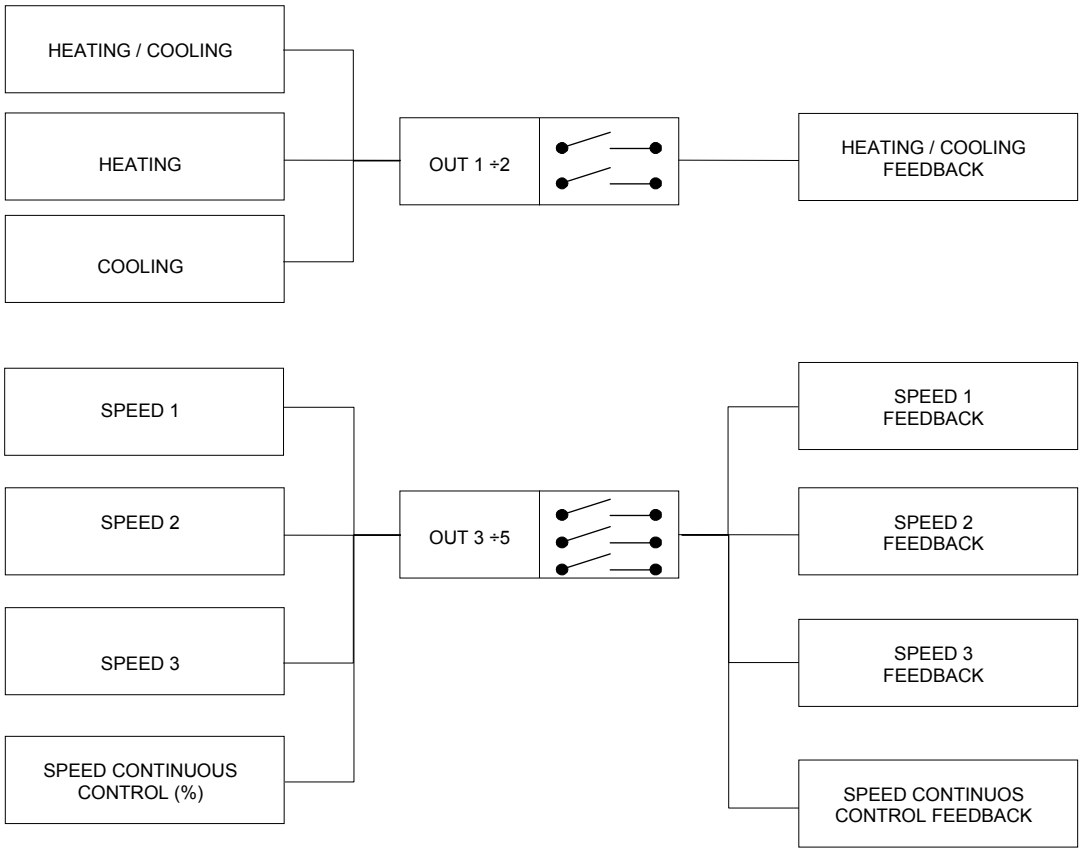
5. Output Configuration Fan Coil Actuator

This mode should be chosen first in the ETS configuration of the device as if it is enabled, commits the outputs from 1 to 5 exclusively.
Outputs 1 and 2 are interlocked and are dedicated to the operation of switching from cooling mode (air conditioning / cooling) to heating mode and vice versa.
Outputs from 3 to 5 are interlocked and dedicated to the management of the 3 speed of the Fan Coil.

Communication objects



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5.1. Electric connections

For 4 pipes systems:

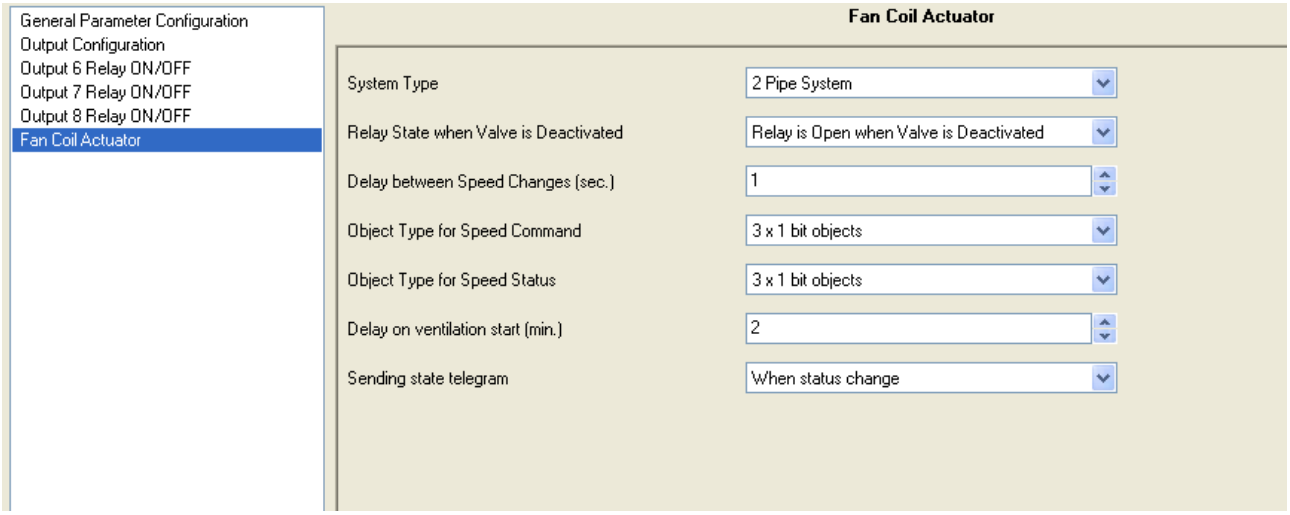
Uscita	Descrizione	Collegamento
OUT 1	VALVE HEATING	Connect to heating valve - ON/OFF contact
OUT 2	VALVE COOLING	Connect to cooling valve - ON/OFF contact
OUT 3	FAN COIL SPEED 1	Connect to fan coil speed 1 – ON/OFF contact
OUT 4	FAN COIL SPEED 2	Connect to fan coil speed 2 – ON/OFF contact
OUT 5	FAN COIL SPEED 3	Connect to fan coil speed 3 – ON/OFF contact

For 2 pipes systems:

Uscita	Descrizione	Collegamento
OUT 1	VALVE HEAT/COOL	Connect to heating / cooling valve - ON/OFF contact
OUT 2	-	See note (1)
OUT 3	FAN COIL SPEED 1	Connect to fan coil speed 1 – ON/OFF contact
OUT 4	FAN COIL SPEED 2	Connect to fan coil speed 2 – ON/OFF contact
OUT 5	FAN COIL SPEED 3	Connect to fan coil speed 3 – ON/OFF contact

(1) When fan coil actuator is configured as 2 pipes system OUT2 is not used; anyway it is configured to switch in the opposite mode of OUT1. When OUT1 goes ON OUT2 goes OFF and vice versa. This behaviour can be used to manage systems where the Heating / Cooling hydraulic system is based on a 3 way valve which switches 2 times a year when passing from Summer to Winter season and vice versa.

5.2. Control of Heating / Cooling Valve



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KNX PARAMETER	SETTINGS
System Type	• 2 pipes system • 4 pipes system
2 pipe system: the hydraulic system is unique and conveys the warm or cold fluid, depending on the season. 4-pipe system: the hydraulic system has 2 individual circuits, one for heating and one for the cooling.	
Relay state when valve is deactivated	• Relay is open when valve is deactivated • Relay is closed when valve is deactivated
Set if the relay must switch ON or OFF in order to Open / Close the valve; the deactivated state for the valve is when it is closed and the fluid does not pass through.	

5.3. Fan Coil Speed Control

The control of 3-speed fan coil can be achieved with 3 communication objects (1 bit) which accept commands on / off or with a 1-byte communication object for a proportional control.

KNX PARAMETER	SETTINGS
Delay between Speed Changes (Sec.)	1… 255
This parameter set the pause time between the switching off the relay which control one speed and the switching on of another relay to activate the next speed	
Object type for speed control	• 3 x 1 bit objects • 1 x 1 byte object
This set the data type for the speed control.	
Object type for speed status	• 3 x 1 bit objects • 1 x 1 byte object
This set the data type for the speed feedback to be sent on the bus.	
Delay on ventilation start (min)	0 … 15
This parameter has effect only in heating mode and introduces a time delay between the reception of a command which starts the fan speed and the real starting time in order to avoid to blow cold air instead of warm due to the fact the hydraulic system need a certain time to supply the hot fluid to the fan coil. The delay, however, is introduced only when the fan coil actuator activates one of his speeds starting from the state of no active speed (S1, S2, S3 are all off).	

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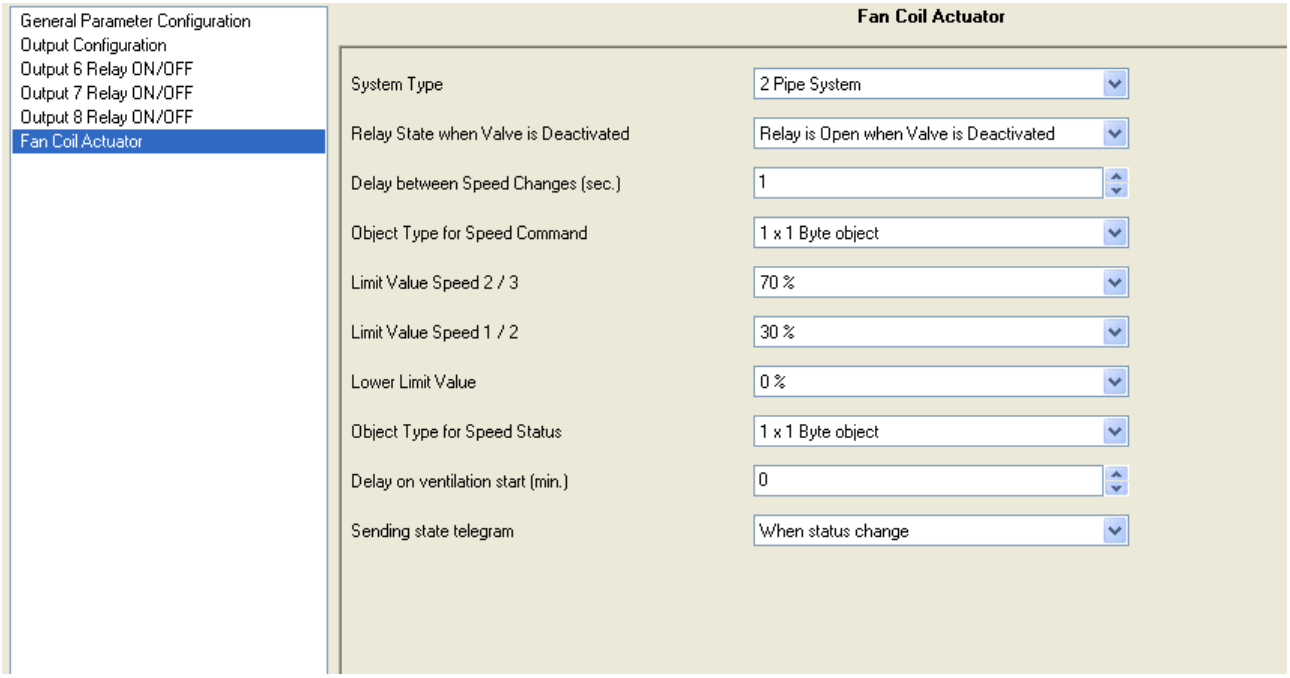
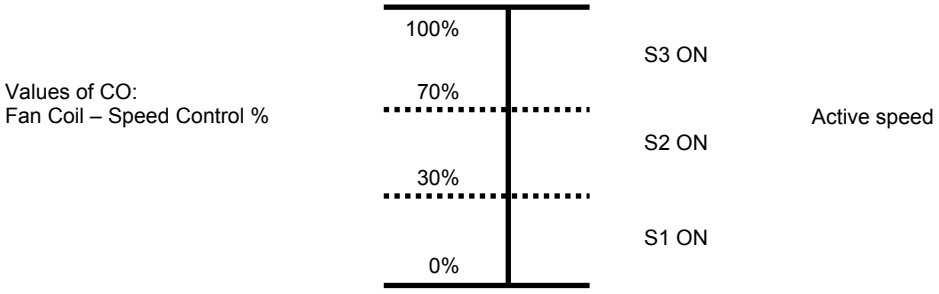


KNX PARAMETER	SETTINGS
Limit Value Speed 2 / 3	• 90% • 80% • 70% • 60%
Limit value of control to pass from Speed 2 to Speed 3	
Limit Value Speed 1 / 2	• 10% • 20% • 30% • 40%
Limit value of control to pass from Speed 1 to Speed 2	
Lower Limit Value	• 0% • 5% • 10%
Limit value of control to pass from Speed 1 to OFF	

For example if values 70%, 30% and 0% are selected:



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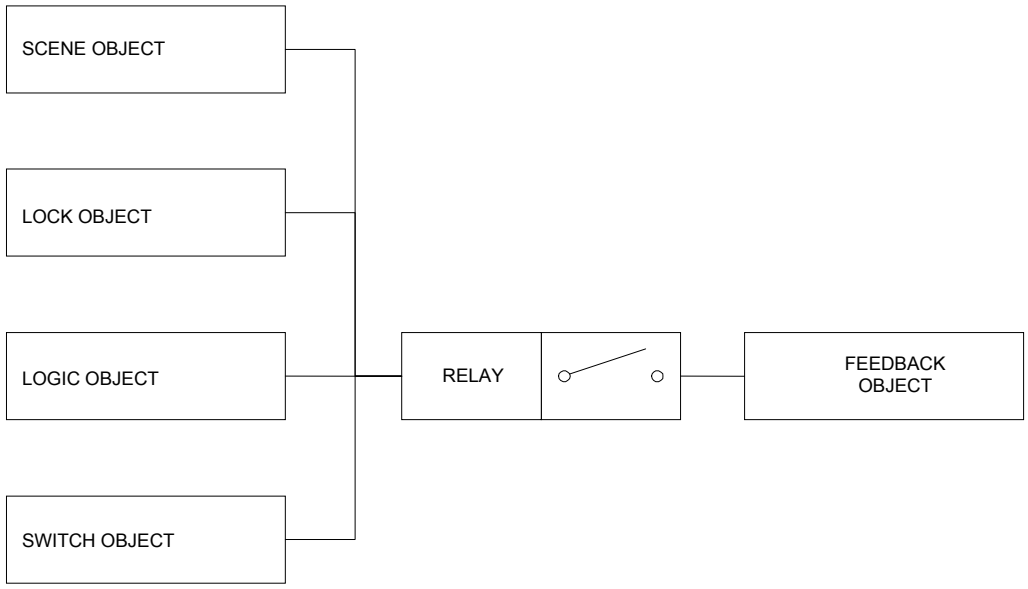
KNX PARAMETER	SETTINGS
Sending state telegram	• Disable • When status changes • On request
The parameter defines the behavior of the object as: Disabled : Not available When status changes: updated on switching and transmitted on the bus On request: updated on switching spontaneously and not transmitted on the bus but only on request	

6. Output Configuration for Generic Load Control

The functional diagram of each output configured as Generic Load Control is represented in the following scheme:



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6.2. General Parameters

KNX PARAMETER	SETTINGS
Contact type	• NO – Normally Open • NC - Normally Close
With this parameter you can set the operating mode of the relay. The relay can be used as "open contact" or "close contact"; This difference is logical because the relay has only one pole and it is not available a terminal connected to the NC contact.	

OUTPUT (Relay status)	NO – Normally Open	NC – Normally Close
ON (Activated)	NO contact is closed	NO contact is open
OFF (Deactivated)	NO contact is open	NO contact is closed

KNX PARAMETER	SETTINGS
Behaviour on power down	• ON • OFF • STOP – no movement
When bus voltage fall down under approximately 18V device enters the power down routine and it is possible to set the status of the relay status **(See note 1**).	
Behaviour on power up	• ON • OFF • Keep status on power down
On power up it is possible to set the status of each relay with this parameter **(see note 2)**	

NOTES:

[1]: *the device has to accumulate the energy it needs to switch the relays when it is on and stores it into capacitors. For this reason, when a power down is detected, the device has the energy to switch all the 8 relays only if it has been powered from at least 60 seconds and it has not done a full 8 relay switch from at least 20 seconds. It is strongly recommended not to select a full 8 relay switch on power down because the full switch cannot be done in all the situations.*

[2]: *When is selected the value "Keep status on power down" for the parameter "Behaviour on power up" it is maintained the state selected on power down unless you have selected on power down the behaviour "STOP – no movement"; in that case it is maintained the state active before power down.*

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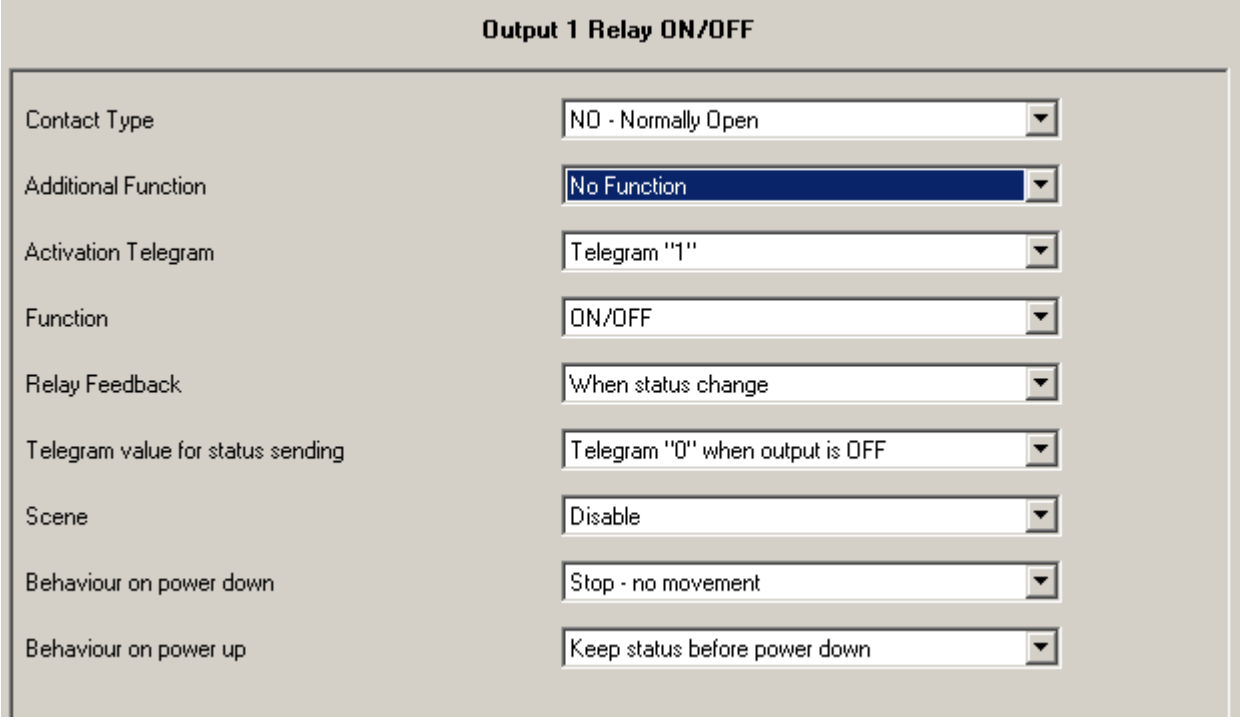
6.3. Relay Functions



KNX PARAMETER	SETTINGS
Function	• ON / OFF • ON / OFF with delay • ON with delay / timing OFF • Continuous Switching
• ON / OFF	After receiving a telegram on the switching objects, relay switch in ON or OFF position.
• ON / OFF with delay	it is possible to set a delay between the reception of a telegram and the switch of the relay ; for both telegrams: activation and deactivation
• ON with delay / timing OFF	it is possible to set a delay between the reception of a telegram of activation and the switch of the relay; the OFF switch is automatic after a configurable time (staircase timer)
• Continuous switching	with this function the relay, when a 1 bit telegram is received, starts switching ON and OFF with a configurable time; with the opposite 1 bit telegram it stops and remains in OFF position.
Activation telegram	• Telegram “0” • Telegram “1”
For every function above selected you can set a parameter to determine if the function is activated with a telegram "0" (and then off with "1") or is activated with telegram "1" (and then off with "0");	

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Relay Feedback	• Disabled • When status changes • On request
• Disabled	Status is never transmitted ad related communication object is not visible
• When status changes	Status is transmitted every time the relay switch changing his status from ON to OFF or from OFF to ON.
• On request	Status communication object is available and updated when status changes but the telegram is not transmitted. Read propriety is enabled.
Telegram value for status sending	• Telegram “0” when value is OFF • Telegram “0” when value is ON
This parameter defines which telegram value is associated to the ON or OFF status.	

6.4. Additional Functions

In BO08A01KNX 3 additional function can be enabled:

- **LOCK FUNCTION** : this function according to the command received from the bus, blocks the relay in a specific condition when a “lock on” command arrives, this state is kept until a “lock off” command is received; any command received during the period in which the block is activated is not executed.
- **LOGIC FUNCTION**: This function allows you to control the load, not only using the relay Switch Command object, but using the result of a logic operation; the logic function consists in two logic ports: the operation is performed among the logic input and the relay command object.
- **SCENE FUNCTION**: The scene function manage two possible commands to the device: **perform scene**, that is a command to create a specific condition; **learn scene**, that is a command to memorize the current status of the contact at the moment the command is received, and then reproduce it once the perform command is received.

LOCK and LOGIC function are alternative functions and only one of them can be enabled at a time.

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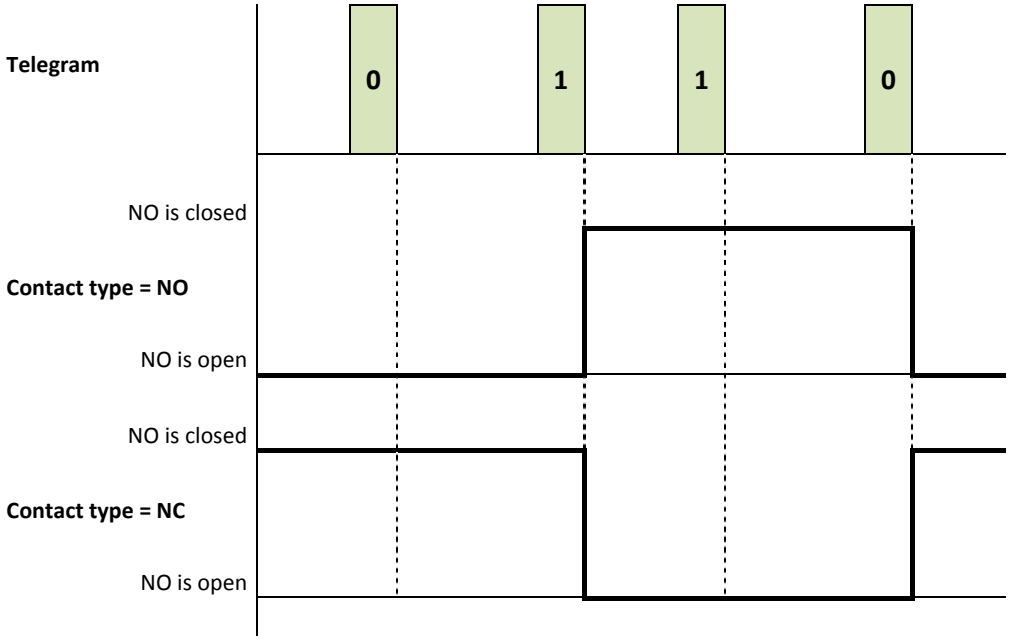
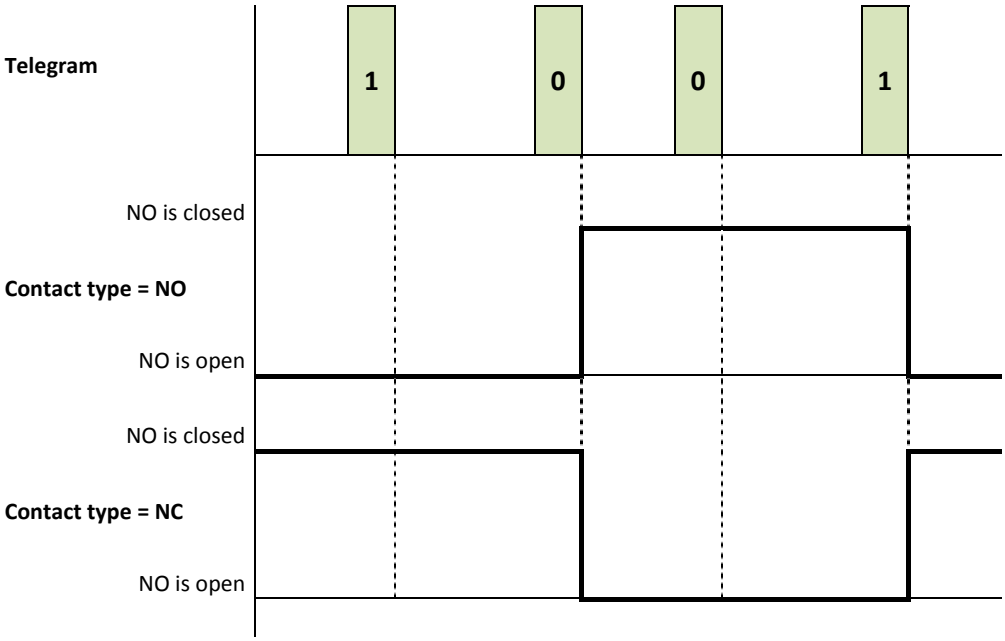
6.5. Function ON / OFF

The relay switches when a message is received on the Relay Command Object.
Behavior of the relay set to "NO" and "NC" when activation telegram is telegram "1":



Behavior of the relay set to "NO" and "NC" when activation telegram is telegram "0":



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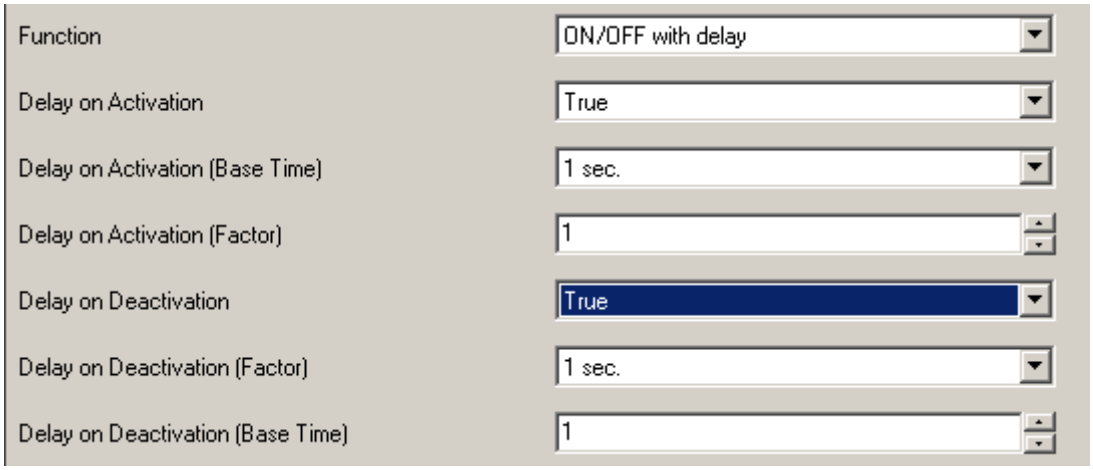
6.6. Function ON/OFF with delay

In this configuration it is possible to set a time delay on the relay activation (TON) and also a delay time for the relay deactivation (TOFF)
The opening and closing of the contact, when the parameters are different from zero, occurs later than the receipt of the telegram, activation and deactivation delays are set separately



KNX PARAMETER	SETTINGS
Delay on Activation	• True • False
Delay on Deactivation	• True • False
Delay on Activation (Base Time)	• 1 sec. • 1 minute • 1 hour
Delay on Activation (Factor)	1…255
The delay time between the receipt of a telegram and the execution of the command is given by : *Delay of Activation Time = Delay on Activation (Base Time) x Delay on Activation (Factor)*	
Delay on Deactivation (Base Time)	• 1 sec. • 1 minute • 1 hour
Delay on Deactivation (Factor)	1…255
The delay time between the receipt of a telegram and the execution of the command is given by : *Delay of Deactivation Time = Delay on Deactivation (Base Time) x Delay on Deactivation (Factor)*	

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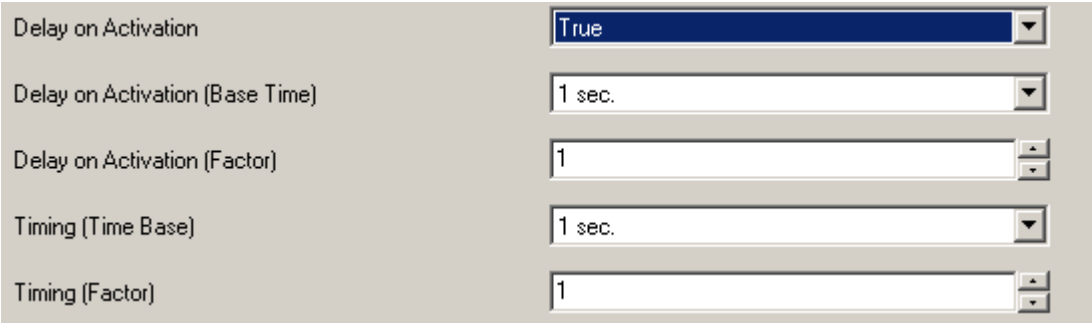
6.7. Function ON with delay / timing OFF

After receiving a telegram from the Relay Command Object, the relay is active for a time (TLS) that can be set by a parameter; when TLS expires, it turns off automatically.
It is also possible to set a delay on activation time (TON) (see “ON with delay” function).



KNX PARAMETER	SETTINGS
Delay on Activation	• True • False
Delay on Activation (Base Time)	• 1 sec. • 1 minute • 1 hour
Delay on Activation (Factor)	1…255
The delay time between the receipt of a telegram and the execution of the command is given by : *Delay of Activation Time = Delay on Activation (Base Time) x Delay on Activation (Factor)*	
Timing (Base Time)	• 1 sec. • 1 minute • 1 hour
Timing (Factor)	1…255
The TLS time set for automatic turn off is given by : *Timing duration = Timing (Base Time) x Timing (Factor)*	

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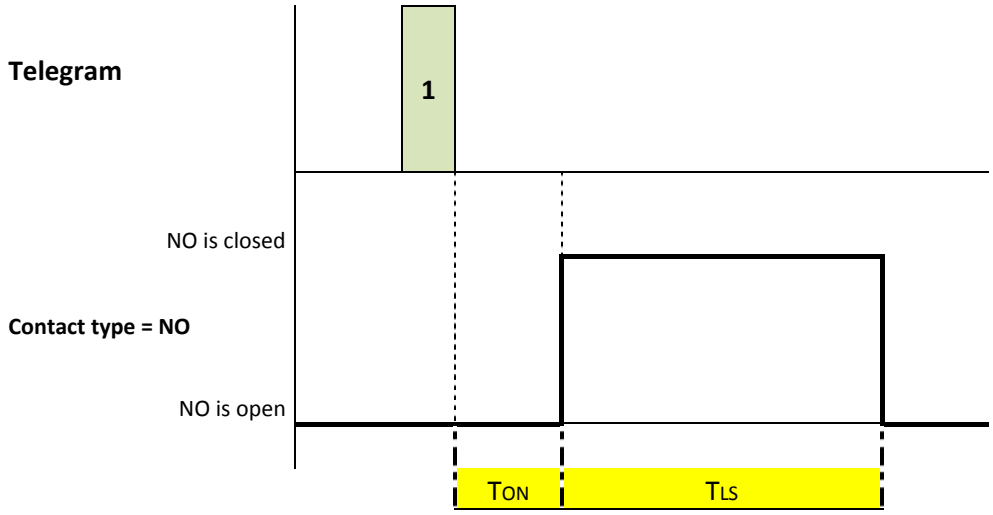
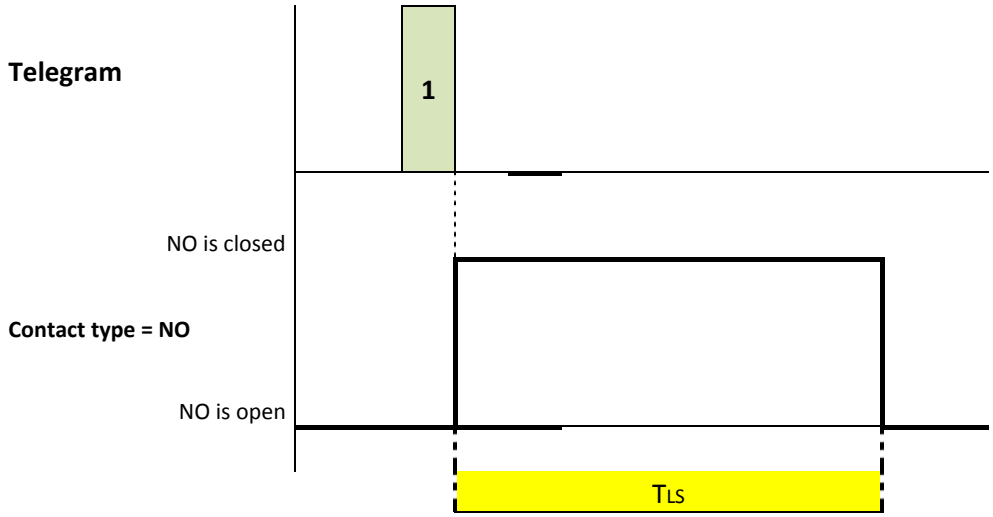
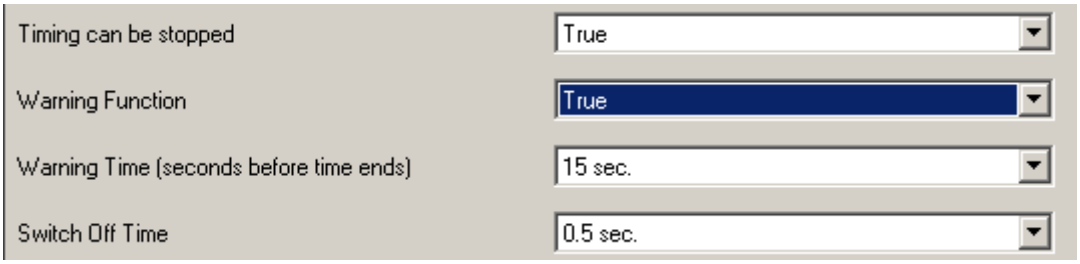
"Duration of relay activation" (TLS) and "ON delay time" (TON) are programmable by ETS.



"ON delay time" (TON) can be disable by ETS.





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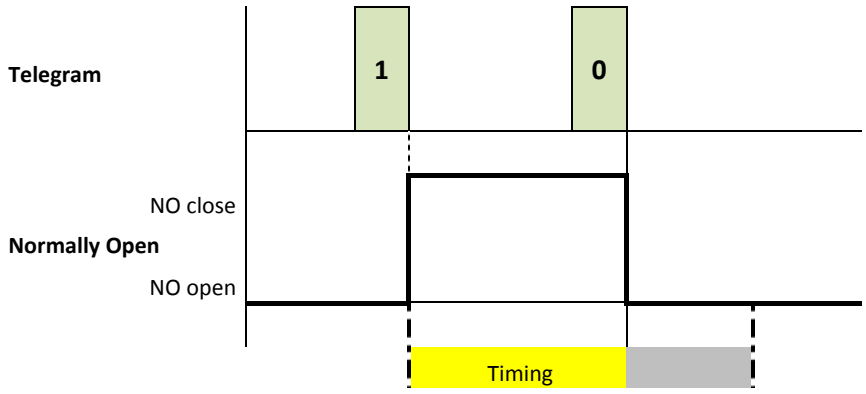
KNX PARAMETER	SETTINGS
Timing can be stopped	• True • False
This allows you to set the behaviour of the device when it receives a OFF command: • True — On receiving a OFF command, the device immediately executes the command and switch off the relay without waiting the end of the timing phase • False — On receiving a OFF command, the device ignores the command and continues the timing phase; the load is deactivated at the end of the set time and it is not possible to deactivate it using a bus command.	
Warning Function	• True • False
Warning Time (seconds before time ends)	• 15 sec. • 30 sec. • 1 minute • 2 minutes
Switch Off Time	• 1,0 sec. • 1,5 sec. • 2,0 sec.
Here you can set the warning time before the deactivation of the stairway light function, upon which the device will consequently signal the imminent termination of the stairway light function by switching off, for a brief time, the light.	

Duration of relay timing can be stopped with an OFF command.



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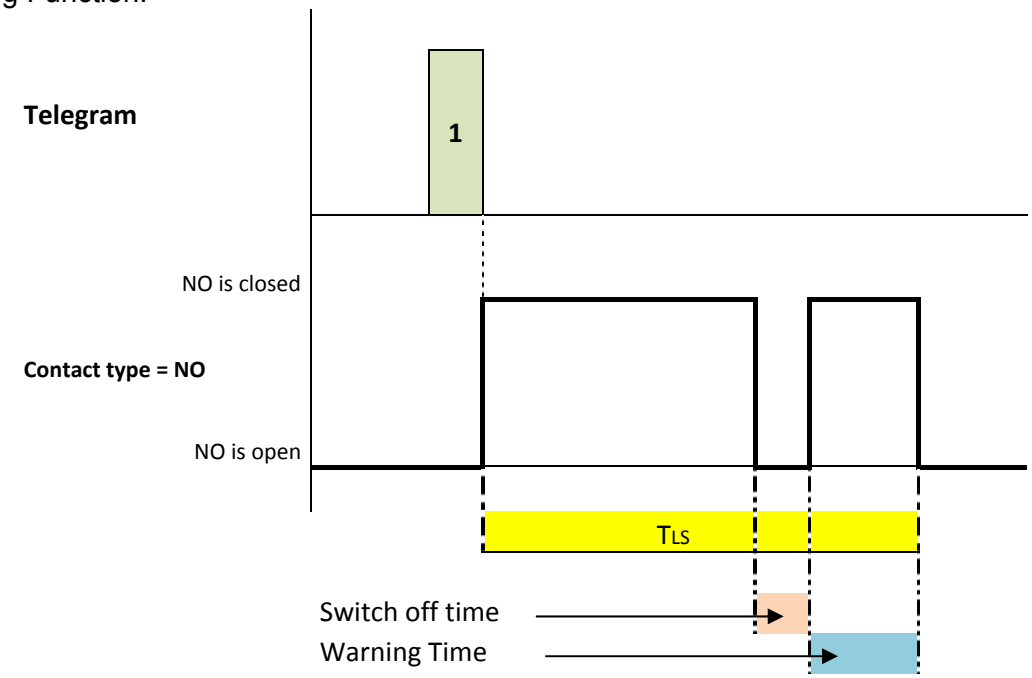
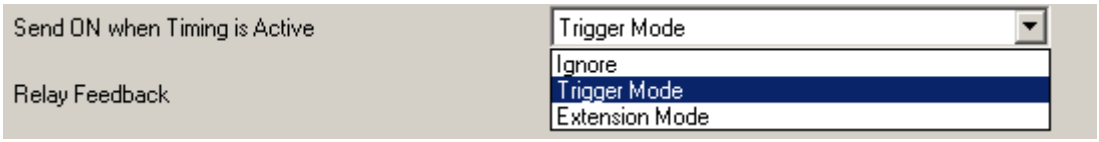
Warning Function:





KNX PARAMETER	SETTINGS
Send ON when Timing is active	• Ignore • Trigger Mode • Extension Mode

This allows you to set the behaviour of the device when it receives a ON command while the staircase timing is running:

- Ignore — On receiving a ON command, the device ignores it and goes on executing the timing.
- Trigger Mode — On receiving a ON command, the device restart the stairs light time executing the whole time again.
- Extension Mode — On receiving the command the device extends the stairs light time, increasing it by the time of the standard stairs light time. Note that the extension option does not reset the timing but it changes its duration and becomes a multiple of the set stairs light time. The maximum number of extension is allowed by the parameter “Maximum numbert of Time Extension”

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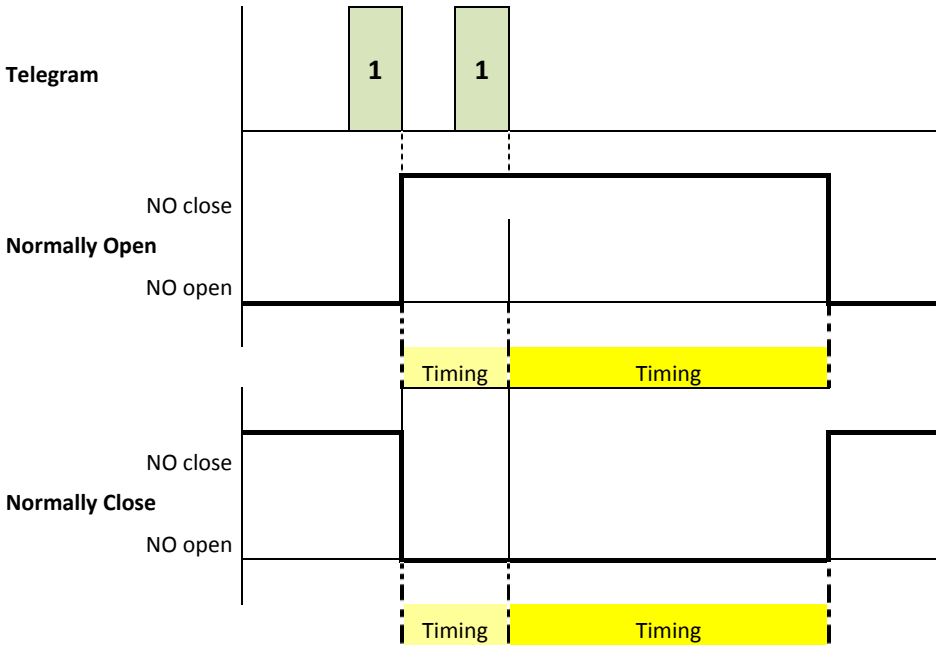
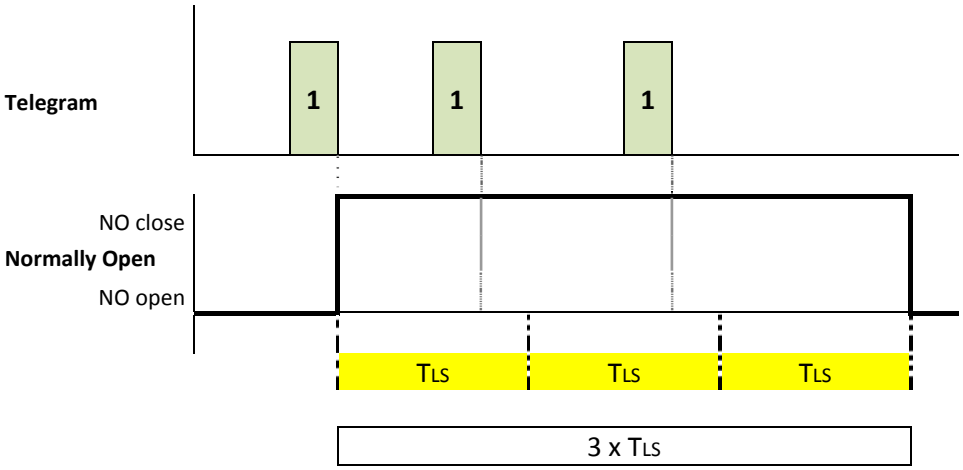
Duration of relay timing is re-trigge able:



Extension Mode:



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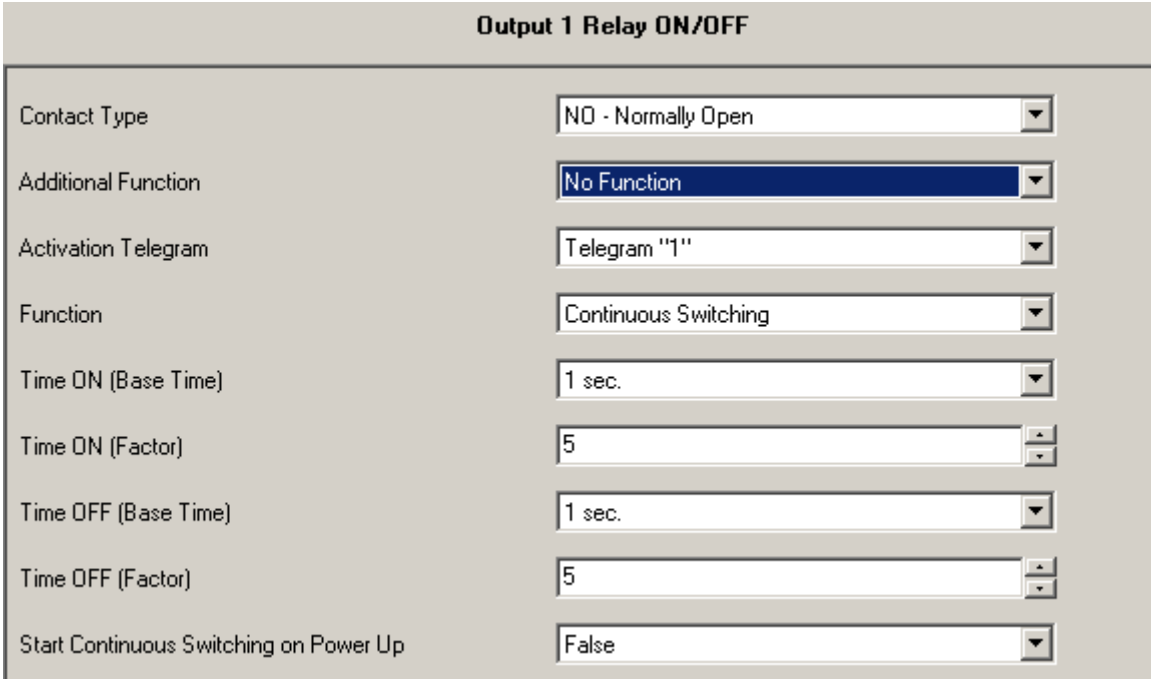
6.8. Function “Continuous Switching”

In this configuration it is possible to activate the relay to perform a continuous ON / OFF switching that can be started or ended by a specified activation telegram. TON and TOFF can be set by parameters.



KNX PARAMETER	SETTINGS
Time ON (Base Time)	• 1 sec. • 1 minute • 1 hour
Time ON (Factor)	1…255
The duration time of the ON state for the relay is: *ON Duration Time = Time ON (Base Time) x Time ON (Factor)*	
Time OFF (Base Time)	• 1 sec. • 1 minute • 1 hour
Time OFF (Factor)	1…255
The duration time of the OFF state for the relay is: *OFF Duration Time = Time OFF (Base Time) x Time OFF (Factor)*	

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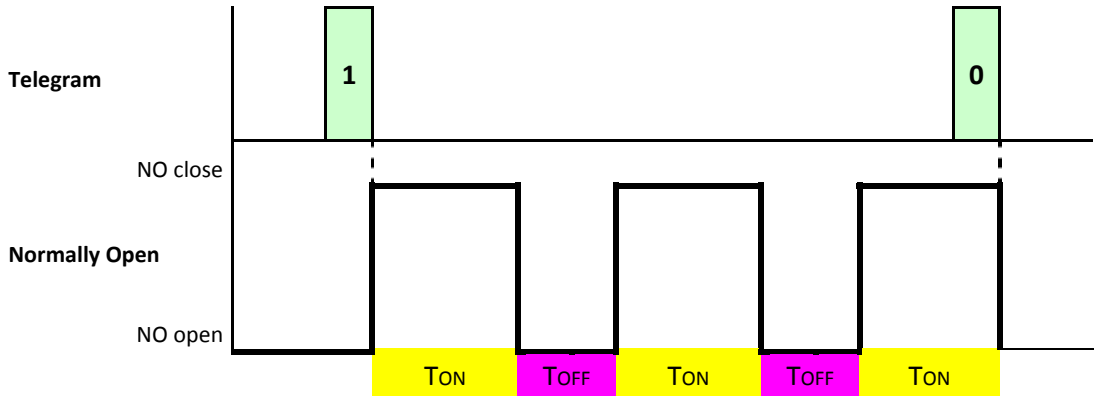
Activation Telegram = “Telegram 1”; Contact Type = “Normally Open”:



KNX PARAMETER	SETTINGS
Start Continuous Switching on Power Up	• False • True
If set to “True” this parameter enable the activation of continuous switching on power up, without waiting for the activation telegram, it starts automatically.	

*If this parameter is set to TRUE, the continuous switching starts automatically on Power ON, regardless of the setting on the parameter “**Behaviour on power up”** .*

6.9. Communication objects

Number	Name	Object Function	Length	C	R	W	T	U	Data Type	
0	<Output 1> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 1
1	<Output 1> Relay Status	On/Off	1 bit	C	R	-	T	-		
2	<Output 2> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 2
3	<Output 2> Relay Status	On/Off	1 bit	C	R	-	T	-		
4	<Output 3> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 3
5	<Output 3> Relay Status	On/Off	1 bit	C	R	-	T	-		
6	<Output 4> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 4
7	<Output 4> Relay Status	On/Off	1 bit	C	R	-	T	-		
8	<Output 5> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 5
9	<Output 5> Relay Status	On/Off	1 bit	C	R	-	T	-		
10	<Output 6> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 6
11	<Output 6> Relay Status	On/Off	1 bit	C	R	-	T	-		
12	<Output 7> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 7
13	<Output 7> Relay Status	On/Off	1 bit	C	R	-	T	-		
14	<Output 8> Relay Command	On/Off	1 bit	C	R	W	-	-		OUT 8
15	<Output 8> Relay Status	On/Off	1 bit	C	R	-	T	-		

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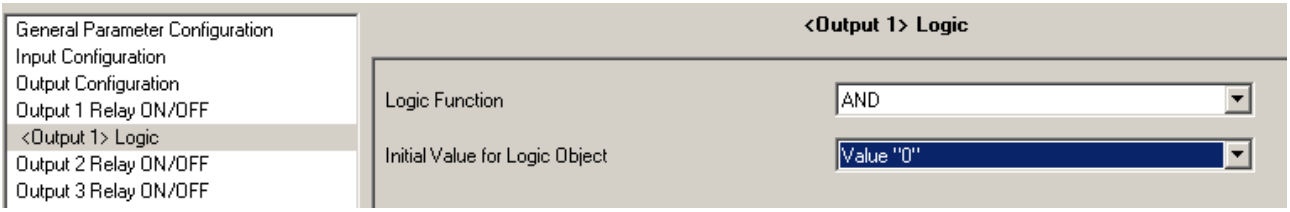
6.10. Logic Function

Enabling logical operation allow to submit the command for the output to a result of a logical operation between the communication object *<Output x> Relay Control* and another communication object called *<Output x> Logic Function*.

By ETS is possible to select the logical operation to use, every time a telegram is received on the logical object or on the control object the logical operation is calculated again and the result is taken as a command for the relay.



KNX PARAMETER	SETTINGS
Logic function	• AND • OR • XOR
This parameter selects the logical operation	
Initial Value for logic Operation	• Value “0” • Value “1”
This parameter selects the value the logical object must have on power up (**see note 1**).	

If the relay has a timing, or a delay on activation or deactivation, etc… a logical operation result that bring to command “0” or “1” determines a new behaviour of the relay that follows its own parameterization.

NOTES:

[1]: *The value assumed by the logic communication object set by the parameter “**Initial Value for logic Operation**” does not switch automatically the relay because this behaviuor is determined by the parameter “**Behaviour on power up”***

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Example of logic function:

If a relay has AND function enabled and delay on activation/deactivation enabled.

RELAY CONTROL	LOGICAL FUNCTION	RESULT	BEHAVIOUR
0	0	0	-
1	0	0	Start a delay on deactivation
1	1	1	Start a delay on activation

6.11. Lock Function

When lock function is enabled it allows, as a result of receiving a telegram on the *<Output x> Lock Function;* to switch the relay in a defined state and force it to maintain this state even if the object switching value changes.

KNX PARAMETER	SETTINGS
Initial Value for Lock Object	• Value “0” • Value “1”
This parameter selects the value of the lock object after a power on; appropriately changing this value it is possible to start the output channel related to the lock function as “locked” or “unlocked”. (**See note 1**).	
Telegram for Lock Activation	• Telegram “0” • Telegram “1”
This parameter selects the values associated to the “lock” or “unlock” condition.	
Relay Position when Lock is Active	• Relay is Deactivated • Relay is Activated
This parameter selects the state the relay must assume when the “lock function” becomes active”. (**See note 2**).	

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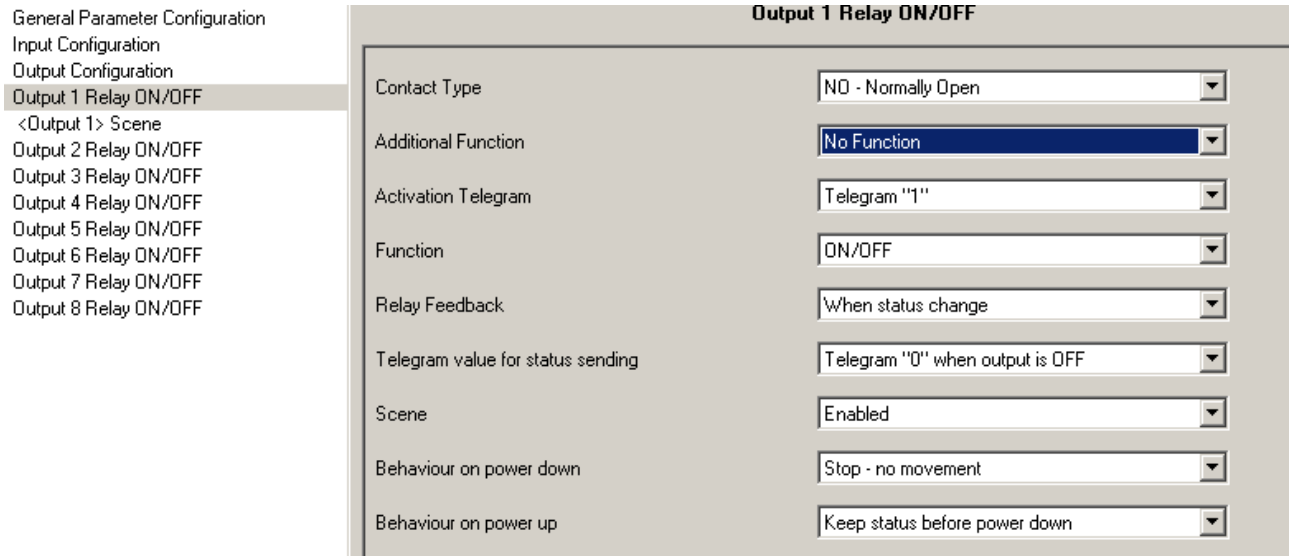
Position when Lock Ends	• Relay is Deactivated • Relay is Activated • Keep previous state and ignore telegrams • Keep previous state and don't ignore telegrams
• Relay is Deactivated • Relay is Activated • Keep previous state and ignore telegrams • Keep previous state and don't ignore telegrams	Relay is in "OFF" position (**See note 2**). Relay is in "ON" position (**See note 2**). Relay returns in the state it was before lock function became active the output channel returns to its condition prior to the activation of the block unless you have received a telegram on the switch object or scenario; in this case, the last command received is executed.

NOTES:

[1]: *If the parameter "**Initial Value for Lock Object**" has the same value of "**Telegram for Lock Activation**" happens that, on power up, the output channel starts in lock mode, waiting for a "unlock" telegram in order to become active. Note that, even if the relay starts with lock function already active it does not go automatically in the position defined by the parameter "**Relay Position when Lock is Active** "; because this behaviuor is determined only by the parameter "**Behaviour on power up"***

[2]: *The "activated" and "deactivated" conditions for each output channels correspond to ON or OFF condition upon the settings made for the "**Contact Type**" parameter.*

6.12. Scene Function



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When the scene function is enabled a communication object named *<Output x> Scene* becomes visible.

It is possible to send to the device two possible commands:

- recall scene - is a command to create a specific condition
- store scene - is a command to learn and store the current status (at the moment the command is received) of the contact, and then reproduce it once the recall command is received

For every channel it is possible to store a maximum of 4 output scene.

KNX PARAMETER	SETTINGS
Scene Number <X>	0 … 64
For the 4 possible scenes, this number is the unique identifier for the scene: valid numbers are from 0 to 63; 64 means scene is not active.	
Initial value Scene <X>	• Contact Open • Contact Close
For the 4 possible scene this number allow to initialize the status associated to previously selected scene number avoiding to execute the store scene procedure. If the store scene is done, this value is overwritten.	
Learn Scene	• Enabled • Disabled
This parameter enable / disable the output channel from storing value received from the bus; if this parameter is set to disable the value associated are set only by the parameters ***"Initial value Scene <X>"*** and cannot be modified without a ETS download.	

NOTES:

[1]: When a scene is recalled the output channel behaves in the same way as it would have received a telegram "0" or "1" on the *<Output x> Relay Command* communication objects; this means that if a output is normally open with the staircase light timer enabled – the receipt of a telegram "1" triggers a timed ON with automatic OFF when the timer expires.

[2]: After a ETS download the device assumes the value of parameter: "***Initial value Scene <X>"*** *as a value in memory for the corresponding scene and overwrites previous memorized scene positions.*

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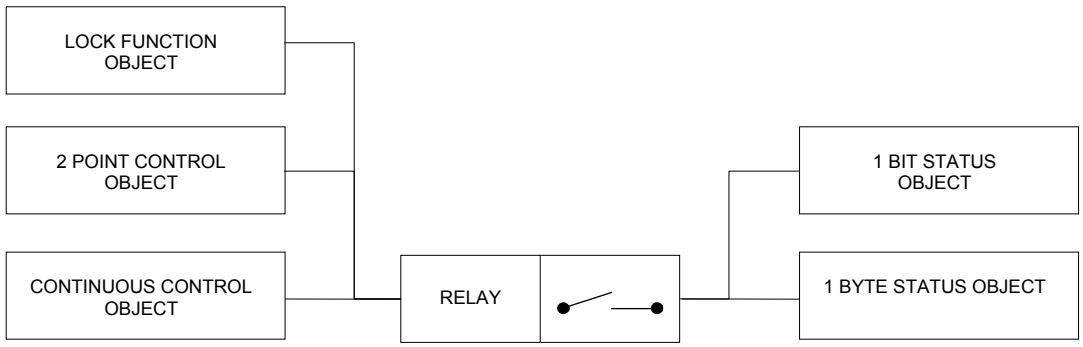
7. Output Configuration for Electric Valve Control

Each of the 8 outputs can be configured to drive an electric valve (solenoid valve) typically used in heating and cooling systems for floor panels.

- Use this output configuration when you want to drive an ON/OFF type solenoid valve, without motor reductor. In this type of valve one of two states (open or closed) is associated with the condition of valve powered, the other to valve not powered.
- If you use this configuration, the control algorithm must be resident in the control device (thermostat, etc. ..).; the relay act only to power or not the valve.

The functional diagram of each output configured as electric valve control is represented in the following scheme:



2 POINT CONTROL OBJECT :	receive 1 bit commands to open and close the valve.
CONTINUOUS CONTROL OBJECT:	receives 1 byte commands (0% -100%) to open and close the valve throught a PWM sequence.
LOCK FUNCTION OBJECT:	if enabled, according to the receipt of a 1 bit telegram, realizes a function for enabling / disabling the opening and closing of the valve
1 BIT STATUS OBJECT:	send information about the position (open / closed) of the valve using a 1 bit telegram
1 BYTE STATUS OBJECT:	send information about the proportion of active regulation using a 1 byte telegram

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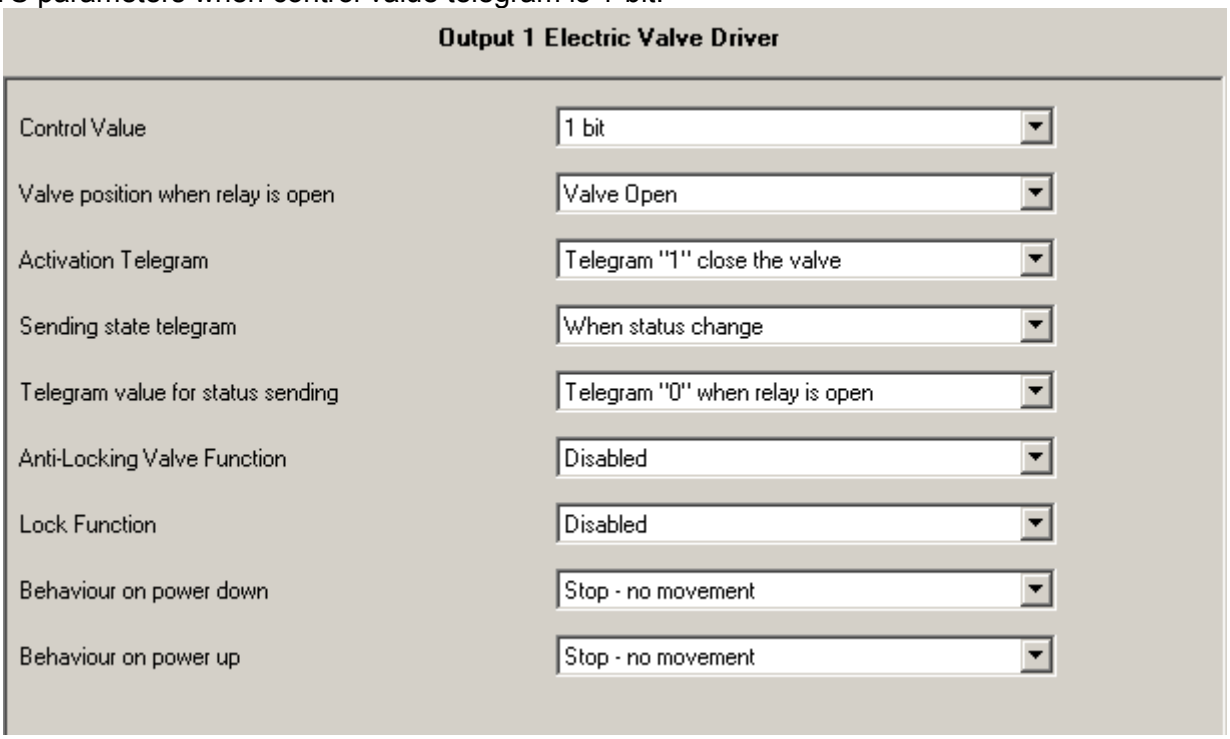
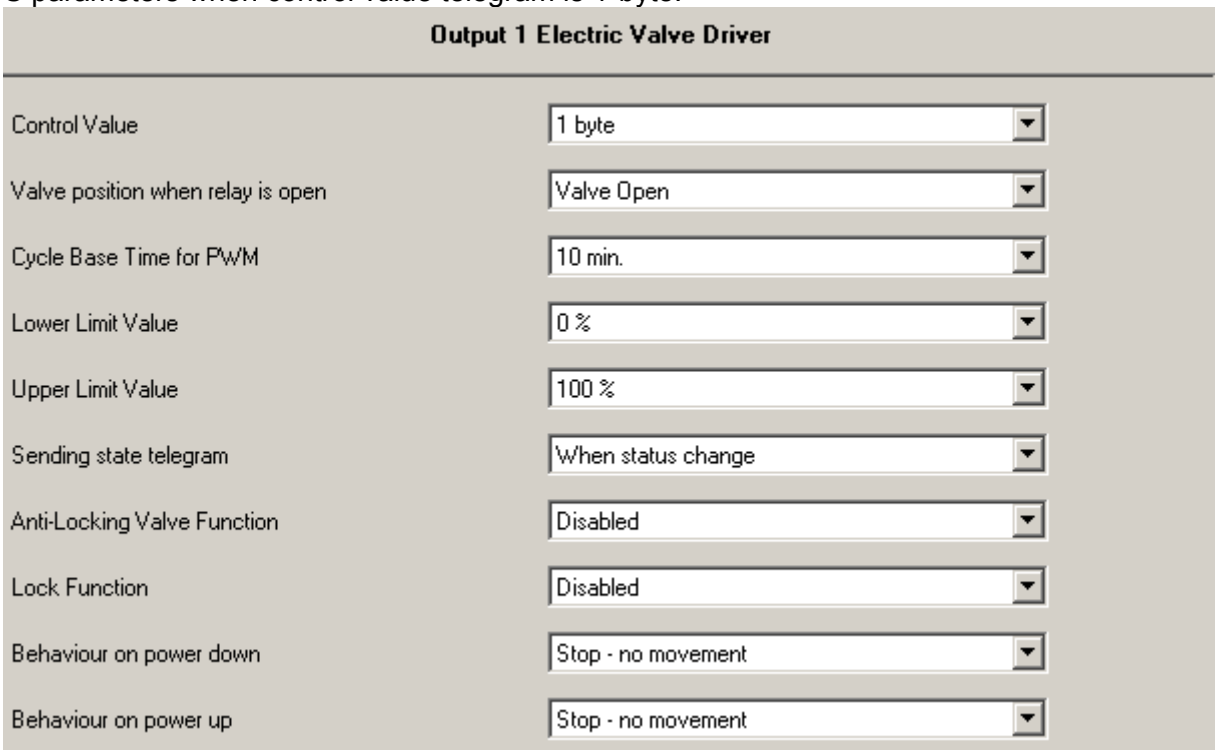
7.2. Main Parameters

ETS parameters when control value telegram is 1-bit.



ETS parameters when control value telegram is 1-byte.



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KNX PARAMETER	SETTINGS
Control Value	• 1 bit • 1 byte
This parameter defines whether the relay controls of the valve is carried out with 1-bit (ON / OFF) or 1-byte (0 to 100%) commands. When you select the 1-byte value the control is done through a PWM **(See note 1)**.	
Valve Position when relay is open	• Valve Open • Valve Close
This parameter permits to set the behavior of the relay according to the state of the valve. If you have a valve that opens when the relay is closed and you want it to be activated by an ON command of a thermostat (most common situation), you must set this parameter at the value "Valve Closed" and the parameter (see below) "Activation telegram" with value "Telegram "0" close the valve"	
Activation telegram	• Telegram "0" close the valve • Telegram "1" close the valve
It is possible to set a parameter to determine if the function is activated with a telegram "0" (and then off with "1") or is activated with telegram "1" (and then off with "0");	
Cycle Base Time For PWM	5 min to 60 min in step of 5 min.
(See note 1).	
Lower limit value	1. 0% 2. 10% 3. 20% 4. 30%
Defines the minimum value below which the valve is always closed (0% / 10% / 20% / 30%)	
Upper limit value	5. 100% 6. 90% 7. 80% 8. 70%
Defines the maximum value above which the valve is always open (70% / 80% / 90% / 100%)	
Sending State Telegram	9. Disabled 10. When status changes 11. On request
• Disabled	Status is never transmitted ad related communication object is not visible
• When status changes	Status is transmitted every time the relay switch changing his status from ON to OFF or from OFF to ON.
• On request	Status communication object is available and updated when status changes but the telegram is not transmitted. Read propriety is enabled.

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Telegram Value for status sending	• Telegram “0” when relay is open • Telegram “1” when relay is open
This set the value you want transmit when relay is open or close (and therefore the valve is open or close according to the parameter “***Valve Position when relay is open***”	
Anti-Locking Valve Function	• Disabled • Enabled
It is possible to enable an automatic switching valve function, useful when there are long periods of inactivity, for example during the summer season. If this function is activated you can select how long can be the period of inactivity (see parameter " ***Anti-Locking Valve Activation Period*** "); before that the valve performs a switching ON and after 5 minutes.a switching OFF	
Anti-Locking Valve Activation Period	• 1 day • 3 days • 10 days
Determines the maximum period of inactivity allowed.	
Lock Function	• Disabled • Enabled
When lock function is enabled it allows switching the relay in a defined state and forcing it to maintain this state even if the it receives 1-bit or 1 byte control commands.	
Behaviour on power down	• Valve Open • Valve Close • STOP – no movement
When bus voltage fall down under approximately 18V device enters the power down routine and it is possible to set the status of the relay status (**See note 2**).	
Behaviour on power up	• Valve Open • Valve Close • STOP – no movement
On power up it is possible to set the status of each valve (and therefore the relay) with this parameter **(See note 3)**	

NOTES:

[1]: *This type of control is used when you want to eliminate the hysteresis of the temperature typical of ON / OFF control. The relay drives the valve with ON / OFF commands and make a proportional control (0% ° 100%) based on the value received on the CONTINUOUS ONTROL OBJECT modulating the amplitudes of the On and OFF pulses (PWM).*
This mode is active when 1-byte control was previously selected.

It is defined a "cycle time" in which the actuator is activated at a rate of time and then off again until the end of the cycle time itself.

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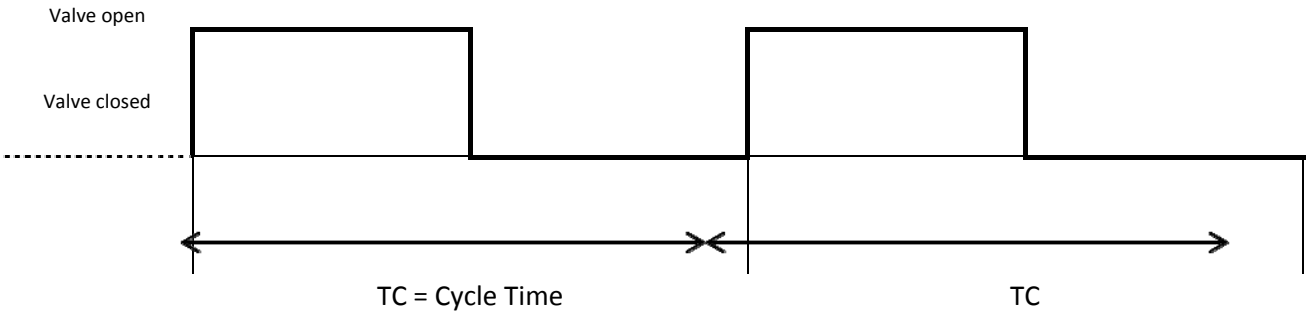
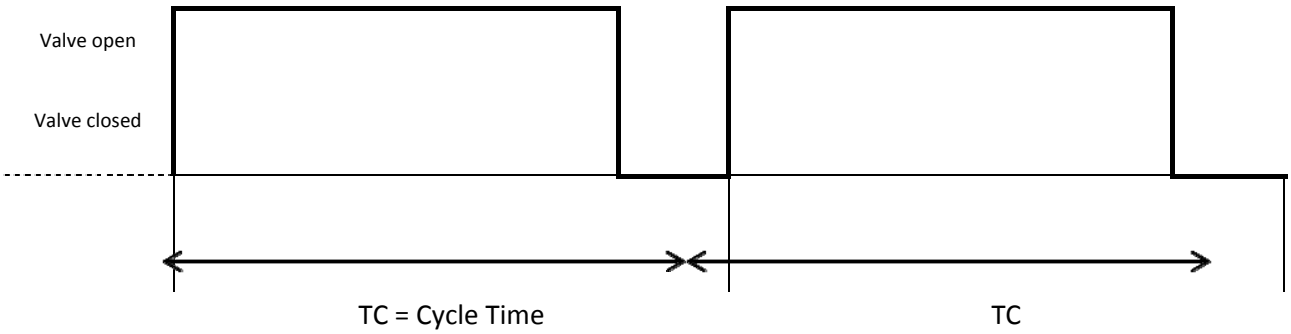
Example of control with the control value of 50%:



Example of control with the control value of 80%:



[2]: *the device has to accumulate the energy it needs to switch the relays during the power on phase and stores it into capacitors. For this reason, when a power down is detected, the device has the energy to switch all the 8 relays only if it has been powered from at least 60 seconds and it has not done a full 8 relay switch from at least 20 seconds. It is strongly recommended not to select a full 8 relay switch on power down because the full switch cannot be always be done.*

[3]: *When is selected the value "STOP – no movement" for the parameter "Behaviour on power up" it is maintained the state selected on power down unless you have selected on power down the behaviour "STOP – no movement"; in that case it is maintained the state active before power down.*

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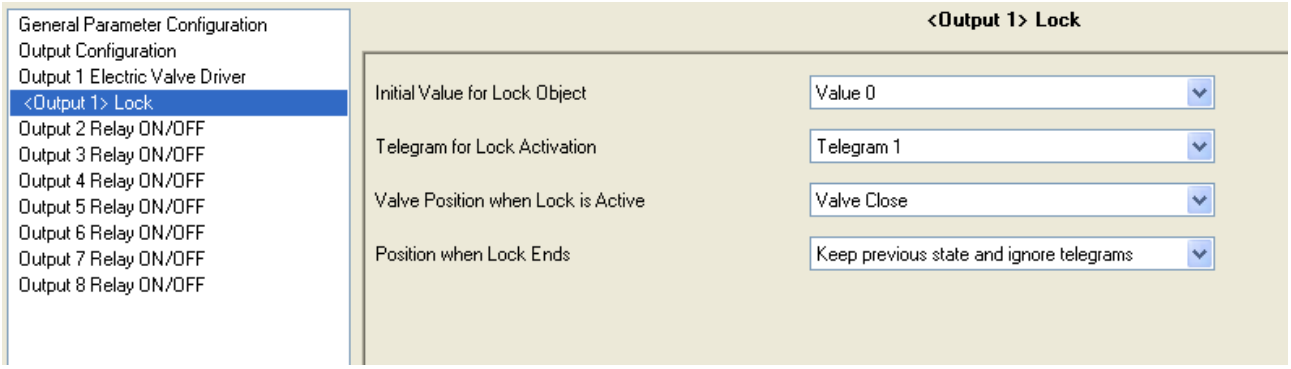
7.3. Lock Function

When lock function is enabled it allows, as a result of receiving a telegram on the *<Output x> Lock Function;* to switch the relay in a defined state and force it to maintain this state even if the object switching value changes. The behaviour of the lock function is the same described in par. *6.11* Lock *Function*.
This function can be enabled or with 1 bit commands than with 1 byte commands.



KNX PARAMETER	SETTINGS
Initial Value for Lock Object	• Value “0” • Value “1”
This parameter selects the value of the lock object after a power on; appropriately changing this value it is possible to start the output channel related to the lock function as “locked” or “unlocked”. (**See note 1**).	
Telegram for Lock Activation	• Telegram “0” • Telegram “1”
This parameter selects the values associated to the “lock” or “unlock” condition.	
Valve Position when Lock is Active	• Valve Open • Valve Close
This parameter selects the state the valve must assume when the “lock function” becomes active”. (**See note 2**).	
Position when Lock Ends	• Valve Open • Valve Close • Keep previous state and ignore telegrams • Keep previous state and don’t ignore telegrams

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• Valve Open	"valve open" position (**See note 2**).
• Valve Close	"valve closed" position (**See note 2**).
• Keep previous state and ignore telegrams	Relay returns in the state it was before lock function became active
• Keep previous state and don't ignore telegrams	the output channel returns to its condition prior to the activation of the block unless you have received a telegram on the switch object or scenario; in this case, the last command received is executed.

NOTES:

[1]: *If the parameter "**Initial Value for Lock Object**" has the same value of "**Telegram for Lock Activation**" happens that, on power up, the output channel starts in lock mode, waiting for a "unlock" telegram in order to become active. Note that, even if the relay starts with lock function already active it does not go automatically in the position defined by the parameter "**Relay Position when Lock is Active** "; because this behaviuor is determined only by the parameter "**Behaviour on power up"***

[2]: *The "valve opened" and "valve closed" conditions for each output channels correspond to ON or OFF condition of the upon the settings made for the "**Valve Position when relay is open**" parameter.*

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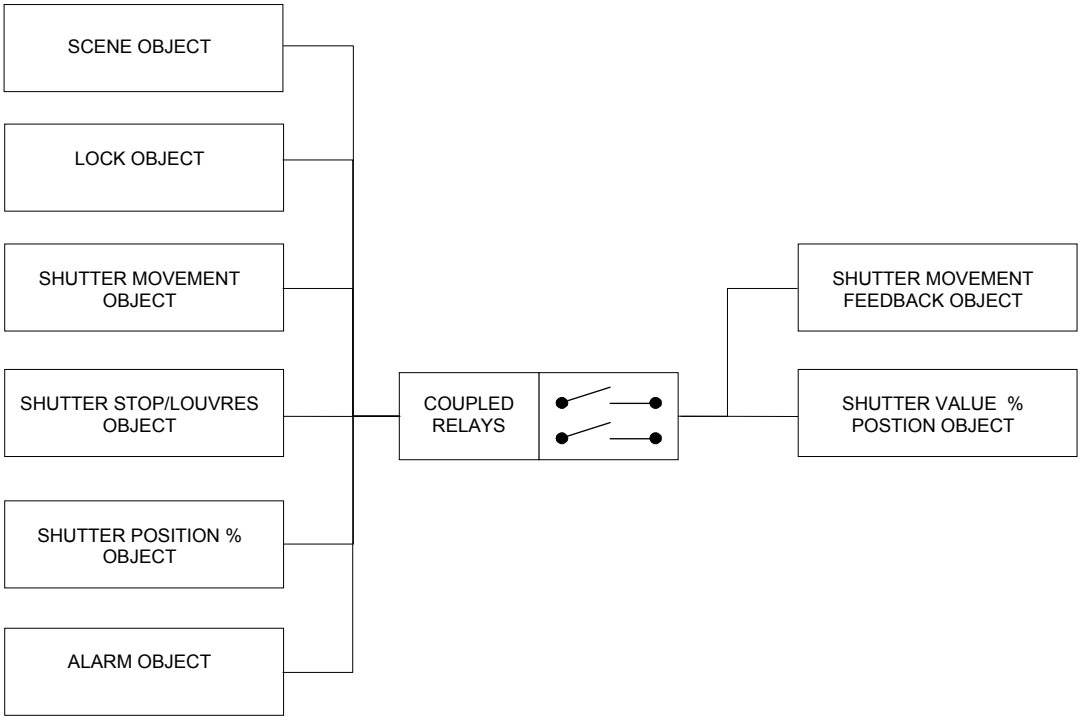
8. Output Configuration for shutter and blinds

Outputs can be configured in pairs for the management of roller shutters and blinds; up to 4 channels (Channels A to D):

Channel	Output / Function		Output / Function	
CH A	OUT 1 closed	▲ (move up)	OUT 2 closed	▼(move down)
CH B	OUT 3 closed	▲ (move up)	OUT 4 closed	▼(move down)
CH C	OUT 5 closed	▲ (move up)	OUT 6 closed	▼(move down)
CH D	OUT 7 closed	▲ (move up)	OUT 8 closed	▼(move down)



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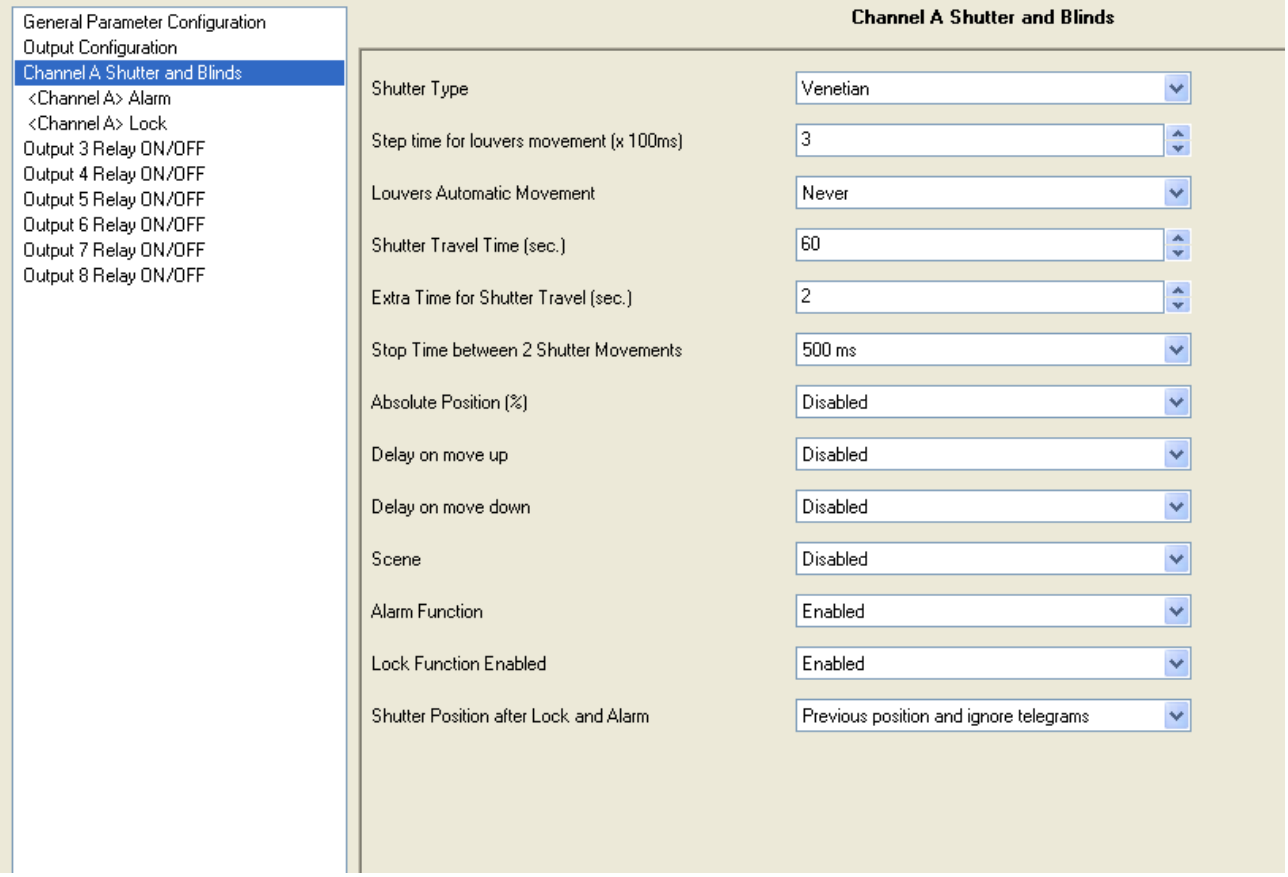
8.2. General Parameters



KNX PARAMETER	SETTINGS
Shutter Type	• Shutter • Venetian
Select "Venetian" if the shutter has louvres, select shutter if it is a roller shutter.	
Shutter travel time (sec.)	0 ÷ 3000
This parameter set the total travel time for shutter.	
Extra Time for shutter travel (sec.)	1 ÷ 255
This parameter indicates the number of seconds to add to the travel time for all the movements that bring the shutter completely up or down.	
Stop time between 2 shutter movements	• 100 ms • 800 ms . • 200 ms • 1 sec. • 300 ms • 2 sec. • 500 ms • 5 sec
Set the minimum time for the shutter to stop from passing from a movement to another.	

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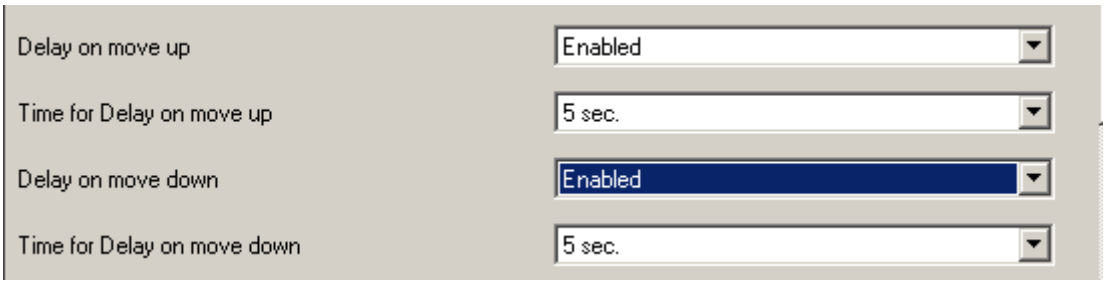
Absolute position (%)	• Disabled • Enabled
When enabled this parameter shows 2 communication object: “SHUTTER POSITION % OBJECT” and “VALUE SHUTTER POSITION % OBJECT”; SHUTTER POSITION %: a positioning control command can be sent to the device using a percentage value (the value is relative to the percentage of closure: 10%, 50%, etc. .. 0% = shutter totally up, % = shutter totally down) VALUE SHUTTER POSITION %: through 1 byte telegram the information on the current shutter position can be sent, (the value is relative to the percentage of closing).	



KNX PARAMETER	SETTINGS
Delay on move up	• Disabled • Enabled
Enable / disable a delay between the receipt of an up command and the start of the movement.	
Time for Delay on move up	• 5 sec • 10 sec • 20 sec • 30 sec
Values for the delay	
Delay on move down	• Disabled • Enabled
Enable / disable a delay between the receipt of a down command and the start of the movement.	
Time for Delay on move down	• 5 sec • 10 sec • 20 sec • 30 sec
Values for the delay	

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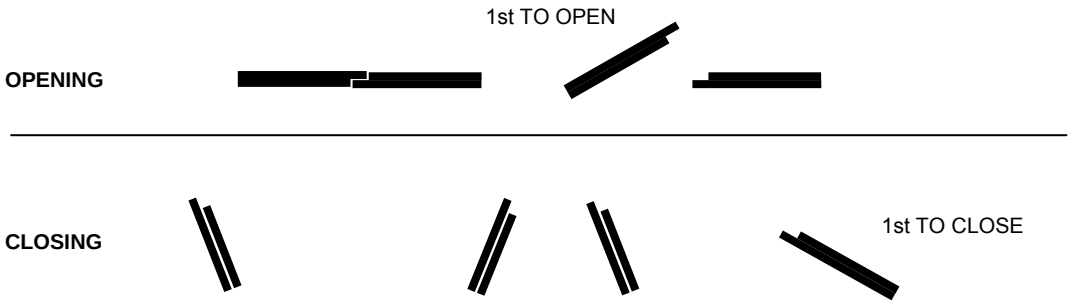
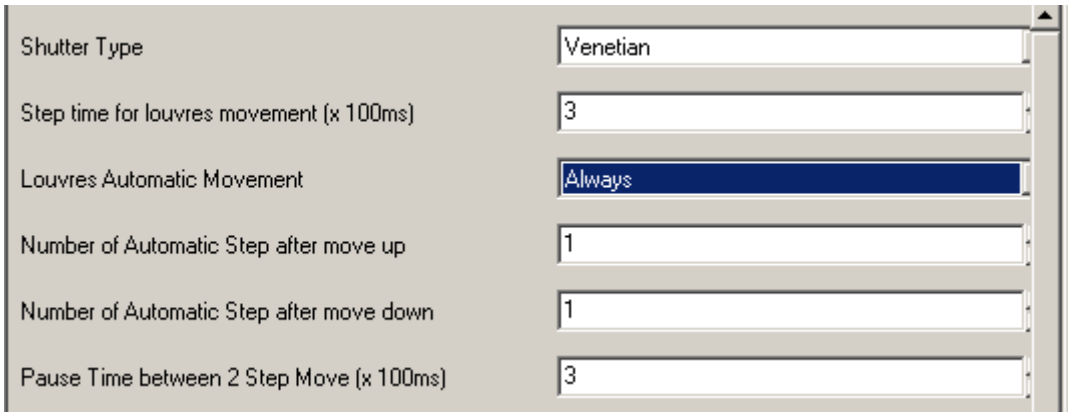
These parameters can be used if you want to drive double doors. In this case, one door must start first in opening and the other must start first in closing.





KNX PARAMETER	SETTINGS
Step time for louvres movement (x 100ms)	1 ÷ 180
This parameter selects how long the movement for every step of the louvres is (visible only if shutter type is “Venetian”; range from 100 ms to 18 sec.	

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8.3. Louvres automatic movement

If the channel is configured for Venetian control (Parameter "***Shutter Type*** = Venetian") it is possible to enable an automatic movement of the louvres which is executed at the end of movements of the shutter.; these movements are:

- Movement for scene command (if brings the shutter in a position different from totally up)
- Movement at the end of a lock or alarm state (if brings the shutter in a position different from totally up)
- Movement for a Position % command (if brings the shutter in a position different from totally up)

This automatic function moves the louvres up after a shutter down movement and down after a shutter up movement.

KNX PARAMETER	SETTINGS
Louvres automatic movement	• Never • Always • After up movements • After down movements
Set when the automatic movement must start.	
Number of automatic steps after move up	1 ÷ 15
Number of automatic steps after move down	1 ÷ 15
This parameter set the time of the movement : if this parameter is set to "2" and ***"Step time for louvres movement (x 100ms)"*** is set to "3" then the automatic movement is 300ms x 2 = 600ms	
Pause time between 2 step move (x100ms)	3 ÷ 10
Set the minimum time delay between 2 step movements.	

8.4. Additional Functions

In BO08A01KNX for channels configured for shutters 3 additional functions can be enabled:

- **SCENE FUNCTION**: The scene function manage two possible commands to the device: **perform scene**, that is a command to create a specific condition; **learn scene**, that is a command to memorize the current status (at the moment the command is received) of the shutter position, and then reproduce it once the perform command is received.
- **LOCK FUNCTION** : this function according to the command received from the bus, blocks the shutter in a specific condition when a "lock on" command arrives, this state is kept until a "lock off" command is received; any command received during the period in which the block is activated is not executed.
- **ALARM FUNCTION**: this function allows linking the shutter channel to a rain or wind sensor to protect it from damage. **[!]** This function (if enabled) requires the sensor linked to send cyclically a telegram, even if The alarm is off. If the shutter does not receive any telegram for a defined time (see parameter "**supervision time for alarm**") it goes in the alarm position as if it would have been received a alarm telegram.

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8.5. Scene Function

When the scene function is enabled a communication object named *<Channel x> Scene* becomes visible.

It is possible to send to the device two possible commands:

- recall scene - is a command to create a specific position of the shutter
- store scene - that is a command to learn and store the current position of the shutter (in the moment the command is received), and then reproduce it once the recall command is received

For every channel it is possible to store a maximum of 4 output scene.

KNX PARAMETER	SETTINGS
Scene Number <X>	0 … 64
For the 4 possible scenes this number is the unique identifier for the scene: valid numbers are from 0 to 63; 64 means scene is not active.	
Initial value Scene <X>	Values between 0% and 100% in steps of 5%
For the 4 possible scene this number allow to initialize the position associated to previously selected scene number avoiding to execute the store scene procedure. If the store scene is done, this value is overwritten.	
Learn Scene	• Enabled • Disabled
This parameter enable / disable the output channel from storing value received from the bus; if this parameter is set to disable the value associated are set only by the parameters ***"Initial value Scene <X>"*** and cannot be modified without a ETS download.	

[1]:: After a ETS download the device assumes the value of parameter: "***Initial value Scene <X>"*** *as a value in memory for the corresponding scene and overwrites previous memorized scene positions.*

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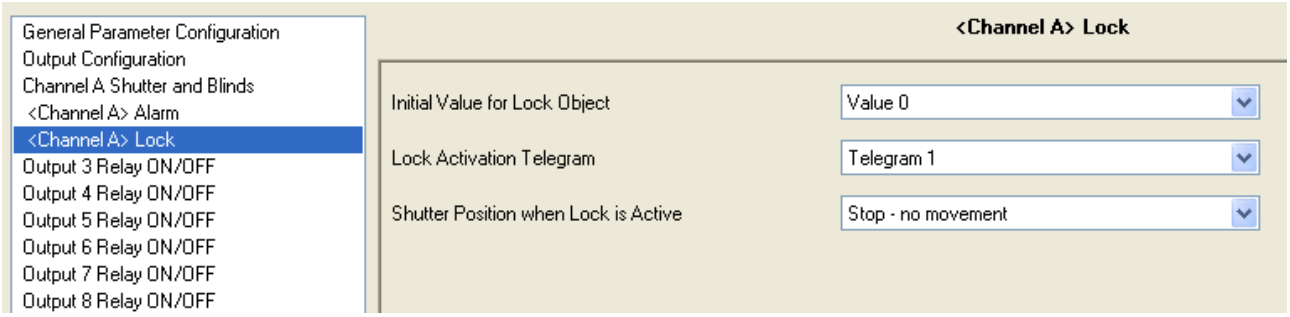
8.6. Lock Function

When lock function is enabled it allows, as a result of receiving a telegram on the *<Channel x> Lock Function;* to set the shutter in a defined position and force it to maintain this position even if the channel receives move commands.



KNX PARAMETER	SETTINGS
Initial Value for Lock Object	• Value “0” • Value “1”
This parameter selects the value of the lock object after a power on; appropriately changing this value it is possible to have the shutter channel related to the lock function as “locked” or “unlocked”. (**See note 1**).	
Lock Activation Telegram	• Telegram “0” • Telegram “1”
This parameter selects the values associated to the “lock” or “unlock” condition.	
Shutter Position when Lock is Active	• Move Up • Move Down • Stop – no movement
This parameter selects the state the relay must assume when the “lock function” becomes active”. (**See note 2**).	

NOTES:

[1]: *If the parameter “**Initial Value for Lock Object**” has the same value of “**Telegram for Lock Activation**” happens that, on power up, the shutter channel starts in lock mode, waiting for a “unlock” telegram in order to become active. Note that, even if the shutter channel starts with lock function active it does not go automatically in the position defined by the parameter “**Shutter Position when Lock is Active** “avoiding to have automatic and unexpected movements when the power returns after a black out.*

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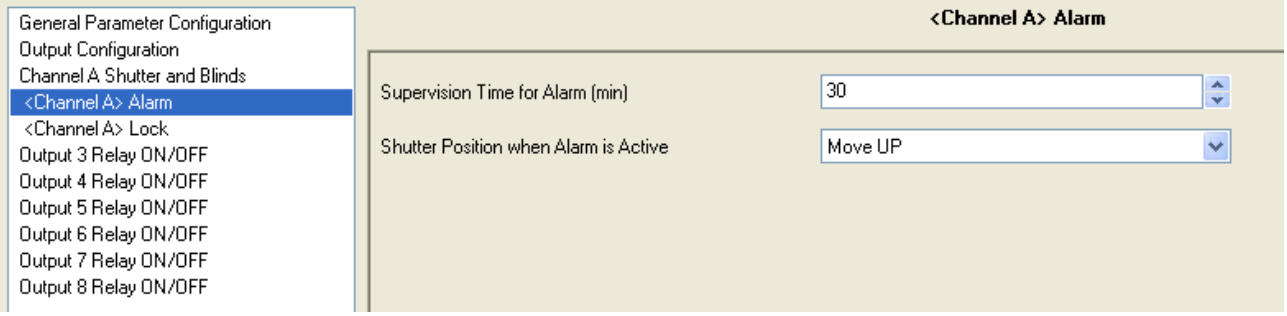
8.7. Alarm Function

Alarm function must be activated if the shutter has to be controlled by weather sensors, typically rain and wind sensors.
The sensor must send telegram “0” if no alarm is active ad telegram “1” if the alarm becomes active.
When shutter has the alarm function active goes in a defined position and cannot be moved (except with if the lock function became active) for the time the alarm is still active.



KNX PARAMETER	SETTINGS
Supervision Time for Alarm (min)	1… 120 (min)
This parameter selects how long the supervision time for the alarm function is. **[!]** If this time is set, for example, to 30 min, the shutter need to receive at least one time in 30 min. a telegram from the sensor even if the telegrams means “no alarm”. It this not happens the alarm became active (lack of supervision) and need to receive a “no alarm telegram” to reset. For this, only sensor with cyclic sending can be used and we strictly recommend set the supervision at least double the cyclic sending period.	
Shutter Position when Alarm is Active	• Move Up • Move Down • Stop – no movement
This parameter selects the values associated to the “alarm” condition.	

⚠ *If the Alarm Function is enabled it is mandatory to link a sensor with cyclic telegram sending; if the communication object is not linked or no telegram is received before the end of supervision time the alarm becomes active and the shutter goes in alarm position.*

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8.8. Shutter position after lock and alarm

This parameter set the final position of the shutter after the end of a lock or an alarm condition (of course if both functions are no “active” the value of this parameter is not considered)

KNX PARAMETER	SETTINGS
Shutter position after lock and alarm	• Move Up • Move Down • Previous position and ignore telegrams
This parameter selects the values associated to the “alarm” condition.	

8.9. Priority table for communication objects

Priority	Description
high PRIORITY Low	Lock Object
	Alarm Object
	Move Object / Absolute Position Object / Scene Object

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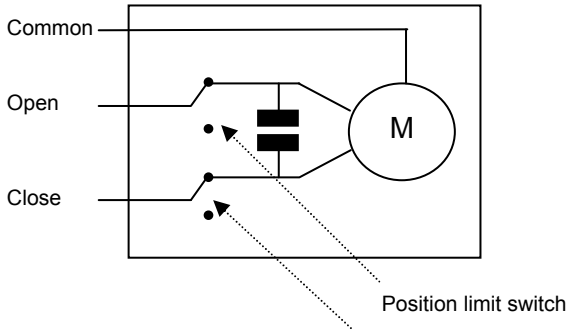
9. Output Configuration for motor reduction driver

Outputs can be configured in pairs for the management of motor reductor; up to 4 channels (Channels A to D):

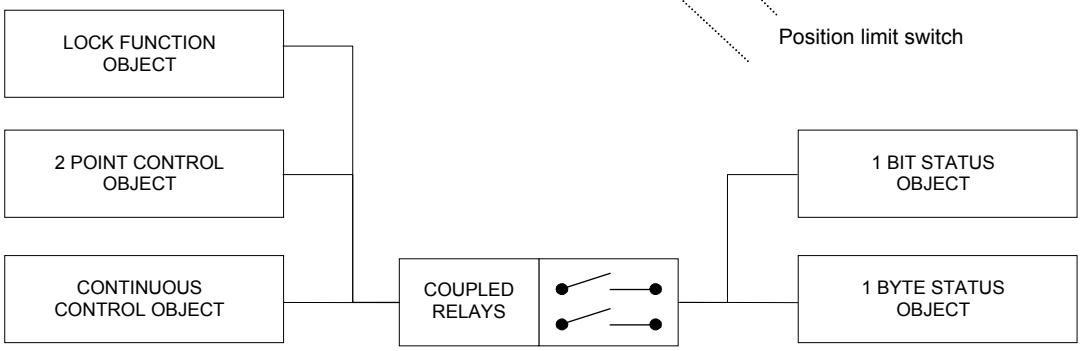
Channel	Output / Function		Output / Function	
CH A	OUT 1 closed	OPEN	OUT 2 closed	CLOSE
CH B	OUT 3 closed	OPEN	OUT 4 closed	CLOSE
CH C	OUT 5 closed	OPEN	OUT 6 closed	CLOSE
CH D	OUT 7 closed	OPEN	OUT 8 closed	CLOSE

This configuration can be used to drive a bistable device with motor reductor, typically a solenoid valve with 3 point control, or a driver for ventilation grilles in AC systems, etc...
Motor MUST have position limit switches.

Typical wiring scheme:



Communication object scheme:



2 POINT CONTROL OBJECT : 1 bit command to open/close the valve completely.
CONTINUOUS CONTROL OBJECT: 1 byte command (0% -100%) to set the valve position.
LOCK FUNCTION OBJECT: if enabled, according to the receipt of a 1 bit telegram, realizes a function for enabling / disabling the opening and closing of the valve

1 BIT STATUS OBJECT: send information about the position (open / closed) of the valve using a 1 bit telegram

1 BYTE STATUS OBJECT: send information about the proportion of active regulation using a 1 byte telegram

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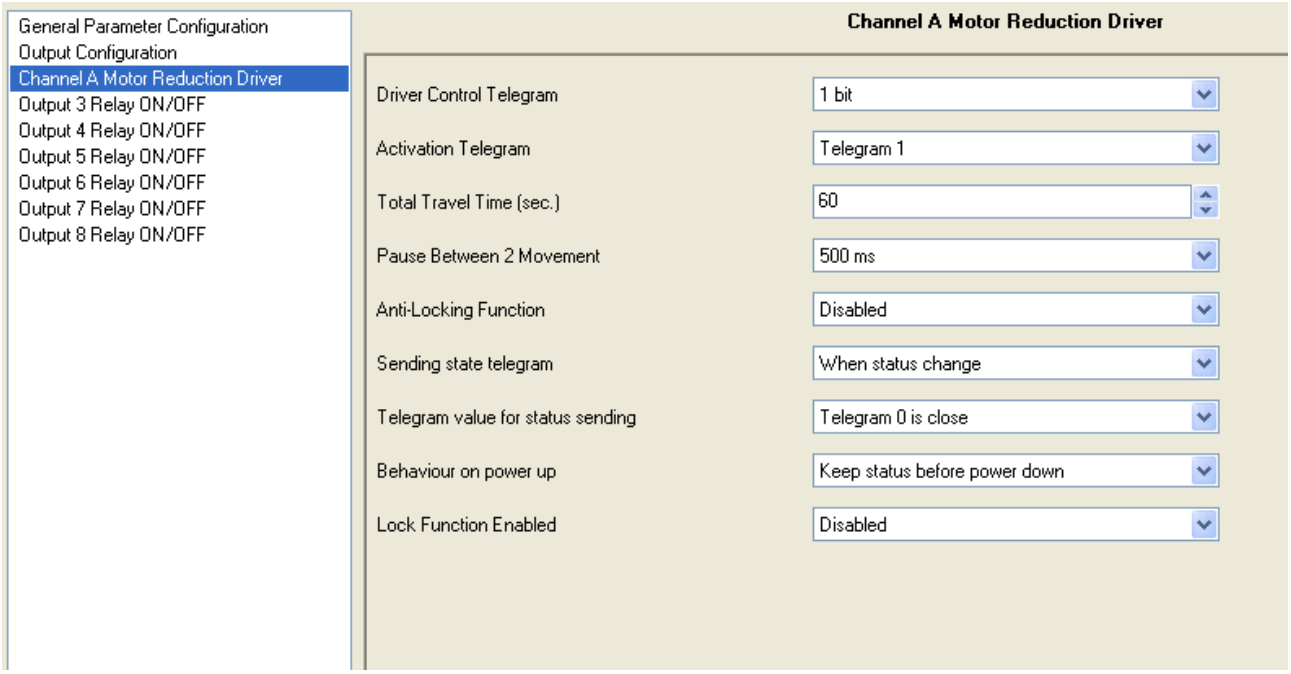
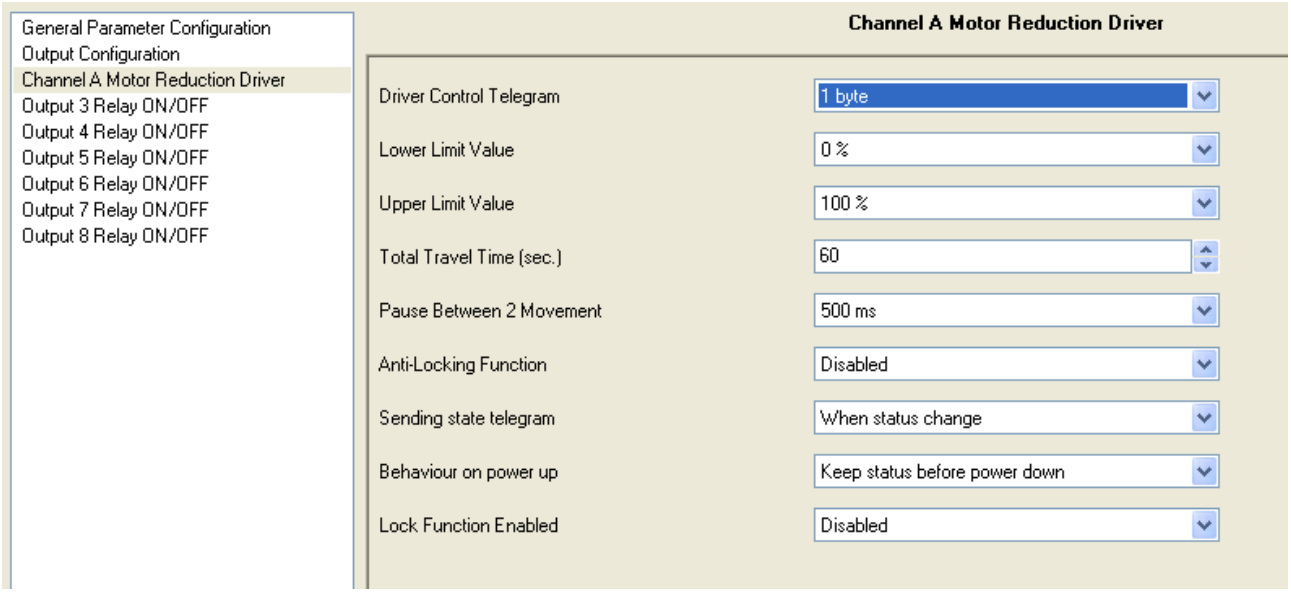
9.2. Main Parameters

ETS parameters when control value telegram is 1-bit.



ETS parameters when control value telegram is 1-byte.



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KNX PARAMETER	SETTINGS
Driver Control Telegram	• 1 bit • 1 byte
This parameter defines whether the control of the valve is carried out with 1-bit (ON / OFF only) or 1-byte commands (0 to 100% with intermediate positons).	
Total travel time	0 ÷ 3000 sec)
This represent the total travel time necessary to move the motor reductor from totally open to totally close.	
Pause between 2 movements	100 ms ÷ 5 sec.
This represent the minimum time the motor must be in stop between 2 movements.	
1 bit telegram:	
Activation telegram	• Telegram “0” • Telegram “1”
It is possible to set a parameter to determine if the Open movement is activated with a telegram "0" (and then Close with "1") or vice versa.	
Sending State Telegram	• Disabled • When status changes • On request
• Disabled	Status is never transmitted ad related communication object is not visible
• When status changes	Status is transmitted every time the relay switch changing his status from ON to OFF or from OFF to ON.
• On request	Status communication object is available and updated when status changes but the telegram is not transmitted. Read propriety is enabled.
Telegram Value for status sending	• Telegram “0” is close • Telegram “0” is open
This set the value you want transmit when the motor reductor is in open or close position.	
1 byte telegram:	
Lower limit value	• 0% • 20% • 10% • 30%
Defines the minimum value below which the valve is always closed	
Upper limit value	• 100% • 80% • 90% • 70%
Defines the maximum value above which the valve is always open	

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Anti-Locking Function	• Disabled • Enabled
It is possible to enable an automatic valve movement, useful when there are long periods of inactivity, for example during the summer season. If this function is activated you can select how long can be the period of inactivity (see parameter " ***Anti-Locking Valve movement frequency*** "); before that the valve performs a switching ON and after 5 minutes.a switching OFF	
Anti-Locking Valve movement frequency	• 1 day • 3 days • 10 days
Determines the maximum period of inactivity allowed.	
Lock Function	• Disabled • Enabled
When lock function is enabled it allows switching the relay in a defined state and forcing it to maintain this state even if the it receives 1-bit or 1 byte control commands.	
Behaviour on power up	• Valve Open • Valve Close • STOP – no movement
On power up it is possible to set the status of each valve with this parameter.	

9.3. Lock Function

When lock function is enabled it allows, as a result of receiving a telegram on the *<Output x> Lock Function;* to switch the relay in a defined state and force it to maintain this state even if the object switching value changes. The behaviour of the lock function is the same described in par. *6.11* Lock *Function*.
This function can be enabled or with 1 bit commands than with 1 byte commands.

KNX PARAMETER	SETTINGS
Initial Value for Lock Object	• Value “0” • Value “1”
This parameter selects the value of the lock object after a power on; appropriately changing this value it is possible to start the output channel related to the lock function as “locked” or “unlocked”. (**See note 1**).	
Telegram for Lock Activation	• Telegram “0” • Telegram “1”
This parameter selects the values associated to the “lock” or “unlock” condition.	
Valve Position when Lock is Active	• Valve Open • Valve Close
This parameter selects the state the valve must assume when the “lock function” becomes active”. (**See note 2**).	

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Position when Lock Ends	• Valve Open • Valve Close • Stop – no movement • Same values of command object
• Valve Open • Valve Close • Stop – no movement • Same values of command object	"valve open" position. "valve closed" position. motor remains in the state it is when the lock was active the output channel returns to its condition prior to the activation of the block unless you have received a telegram on the command object; in this case, the last command received is executed.

NOTES:

[1]: *If the parameter "**Initial Value for Lock Object**" has the same value of "**Telegram for Lock Activation**" happens that, on power up, the output channel starts in lock mode, waiting for a "unlock" telegram in order to become active. Note that, even if the channel starts with lock function already active it does not go automatically in the position defined by the parameter "**Relay Position when Lock is Active** "; because this behaviuor is determined only by the parameter "**Behaviour on power up"***

9.4. Function VALVES ALL CLOSED

When at least one output is configured on the device type "Electric Valve Driver" or "Motor Reduction Driver (Solenoid Actuator)" you can enable a communication object that sends 1 bit value: telegram "0" - when all the valves are turned off and a telegram "1" when at least one valve among those the device is controlling is active.

For outputs configured as "Motor Reduction Driver"- the valve is considered closed when the relay that controls it puts it in closed state (for ON/OFF mode – 1 bit) or when the control value is less than the minimum control value (Continuous control – parameter: "Lower limit value" - 1 byte); Vice versa it is considered open when the relay that controls it puts it in open state (for ON/OFF mode – 1 bit) or when the control value is greater than or equal to the value of the minimum control value.

When outputs are configured as Electric Driver "with 2-point control ON/OFF", valve is considered closed when the relay that controls it puts it in a close state and open when the relay puts it in the open state.

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