



MAXinBOX 8

8 Outputs Actuator

ZN1IO-MB8



Program version: 1.0

Manual edition: a

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1. INTRODUCTION

1.1. MAXINBOX 8 ACTUATOR

MAXinBOX 8 is a KNX actuator that combines in a same device the following features:

- **8 multifunction binary outputs** (relay outputs), with 16 A each, configured as:
 - Up to 4 shutter channels (with or without slats).
 - Up to 8 individual outputs.
- Possibility to connect **different phases** in adjacent outputs.
- **10 multi operational logical functions** module, which may be enabled or disabled independently by means of a communication object.
- **Manual control** of the outputs.

The outputs and the logical functions module work independently and can interact the others as if they were two autonomous devices connected to the KNX bus.



Figure 1.1. MAXinBOX 8 Actuator

1.2. INSTALLATION

MAXinBOX 8 connects to the KNX bus through the included KNX connector.

Once the device is provided with power supply from the KNX bus, both the physical address and the associated application program can be downloaded.

This actuator does not need any additional external power supply since it is powered through the KNX bus.

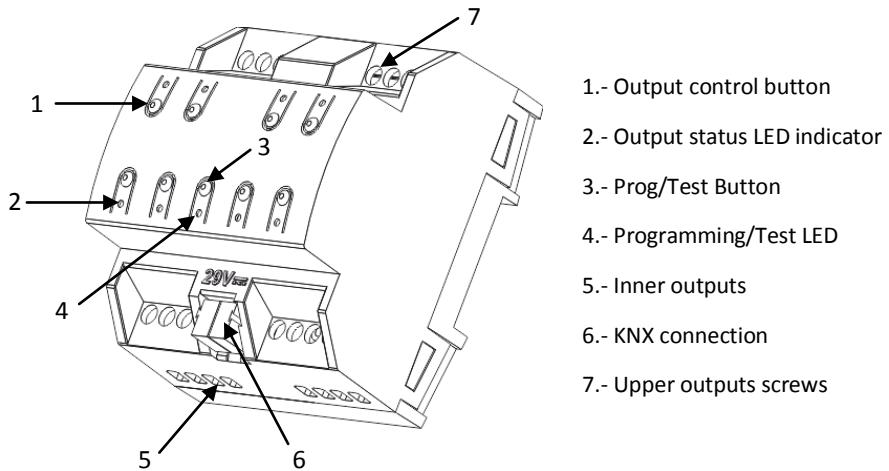


Figure 1.2. MAXinBOX 8. Elements scheme

It is described below the functionality of the main elements of the actuator:

- ➊ **Prog/Test push button (3):** a short press on this button set the actuator in programming mode, and the associated LED lights red. (**Note:** If this button is held while plugging the device into the KNX bus, MAXinBOX 8 goes into secure mode. The LED blinks red every 0.5 seconds).

A long push on this button, (at least 3 seconds, until the red light associated to Prog/Test changes its colour) enables the manual control over the actuator (this control will be explained in detail in section 2.3). When releasing the button, the LED will light green, indicating the activation of this control. To stop controlling the actuator manually, just push once the Prog/Test button (the LED will be switched off).

Whenever MAXinBOX 8 is initializing, after a download of a bus power failure, the LED blinks blue. During the time the actuator takes to initialize, any order received will be taken into account and will be executed when the initialization is completed.

- **Push button 1-8 output control (1):** to act over every output of the actuator, when the manual control has been configured. Each button has a luminous indicator that lights green when the associated output is ON.

To obtain more detailed information about the technical features of MAXinBOX 8, as well as security and installation information, please read the actuator **Datasheet**, included in the original package of the device and also available at: <http://www.zennio.com>.

2. CONFIGURATION

2.1. INDIVIDUAL OUTPUTS

MAXinBOX has **8 relay outputs** that allow the control of different charges autonomously. Each output can be enabled or disabled **independently**.

Every individual output can be configured as **normally open** (the output is ON when its relay closes) or **normally closed** (the output is ON when its relay opens).

Besides the type, MAXinBOX 8 allows the configuration of the following functionalities of the individual outputs:

- ⌚ **Timers.** This section is meant to control the outputs by means of a timer, setting times for the ON and OFF of the output.
- ⌚ **Scenes.** Allows running and/or saving a specific action over the output/s where this function is enabled. The status of the outputs will vary depending on the action set by the parameterized scene.
- ⌚ **Alarm.** Allows changing the output status where this function is enabled. It can be configured the status on which the output will be set both for the alarm activation and for the alarm deactivation.

Note: *The alarm has priority over the rest of functionalities.*

- ⌚ **Start-up configuration** Default or custom.

All these configuration options are explained in detail in the section 3. ETS Parameterization.

2.2. SHUTTER CHANNELS

MAXinBOX 8 allows installing **up to 4** different shutter drive control (or similar) on its channels.

These channels allow controlling the shutter movements in a domotic installation:

- ➊ **Basic control:** lower/raise the shutter
- ➋ **Precise control:** precise positioning of the shutter and the slats (for blinds with slats)

Each channel (associated to a letter from A to D) consists of two consecutive individual outputs; i.e., Channel A, for instance, includes the individual outputs 1 and 2; Channel C, 5 and 6, etc. The first output of the channel sends the order to **raise** the shutter, whereas the second one sends the order to **lower** the shutter. Therefore, the motor cables of the shutters, in charge of carrying out these actions, should be properly connected to each output of the channel to perform the required action.

The Table 1.1 shows the action carried out by the outputs of each channel:

Channel	Outputs	Action
A	1	Raise
	2	Lower
B	3	Raise
	4	Lower
C	5	Raise
	6	Lower
D	7	Raise
	8	Lower

Table 1.1. Shutter channels: actions of the outputs

Each channel can be configured as **Shutter (No Slats)** or as **Blind (with Slats)**.

Besides the type of shutter, MAXinBOX 8 allows the configuration of the following functionalities of the shutter channels:

- ➌ **Times.** Allows configuring the main times associated to the movement of a shutter: time up and time down, and also the definition of a security time to pause the movement when the direction changes and an additional time when the shutter gets its limit (top or bottom). For blinds with slats, it is also possible to configure the secondary time, referred to the slats length and the slats step time.

- **Status objects.** Reports on the actual position of the shutter.
- **Precise control.** Allows moving the shutter to any position (in percentage: 0-100%, defined by parameter) on its length. Moreover, for blinds with slats, it is also possible to establish a desired position for the slats (value between 0 and 100%).
- **Scenes.** Allows running and/or saving a specific action over the channel/s where this function is enabled.
- **Alarms.** Two alarms available for each shutter channel. They execute the action defined by parameter when receiving a specific external event.
- **Reversed moving.** It makes possible to control shutters the other way around from usual.
- **Direct positioning.** Function to move a shutter to a prefixed specific position via 1 bit communication object.
- **Start-up configuration.** Default or custom.

All these configuration options are explained in detail in the section 3. ETS Parameterization.

2.3. MANUAL CONTROL

MAXinBOX 8 allows controlling manually the status of its 8 outputs, by means of the buttons placed on the upper side of the actuator. There is one button associated to each of the outputs (please see figure 1.2. Elements scheme).

There are two ways to carry out this manual control, named: **Test Mode ON** and **Test Mode OFF**.

It is possible to lock the manual control, by means of 1 bit communication object, that will be explained in “ETS Parameterization” section.

The different behaviours, related to the chosen configuration to carry out the manual control, are explained below.

2.3.1. TEST MODE OFF

In this mode, each button of the actuator works as a communication object, thus, when pushing a button, MAXinBOX 8 behaves as if it had received an order from the communication

object that enables the outputs (“[OX] ON/OFF” for individual outputs and “[CX] Move”, “[CX] Stop” or “[CX] Stop/Step” for shutter channels).

Test Mode OFF is thought to be used in any moment during the lifetime of the actuator.

Depending on the configuration of each output (individual output or shutter channel), Test Mode OFF will have different tasks:

➊ **Individual output.** A short or a long press over any button will make MAXinBOX 8 work as if it had received a “0/1” value through the communication object “[OX] ON/OFF”, thus switching the last status of the associated output: if the output was OFF, when pressing the button it will receive a “1” value and will turn ON, and vice versa.

➋ **Shutter channel.** When pushing a button, MAXinBOX 8 will act as if it had received an order to move or stop the shutter through the corresponding object, depending on the pressing type (short or long press):

➤ A long press will make the shutter move (unless it has already reached its lowest or highest position), the same way as if the actuator had received the order through the communication object “[CX] Move”.

If no other actions are carried out over the channel buttons after sending a movement order, the corresponding LED will light green until the shutter reaches its lowest or highest position.

➤ A short press will stop the shutter (if it was in motion), the same way as if the actuator had received a “1” through the “[CX] Stop” object. If the shutter is stopped, a short press will not cause any action, unless the shutter has slats, in which case a short press will cause a movement of one step up or down (as if the actuator had received the order through the “[CX] Stop/Step” object).

Like with individual outputs, it is possible to act over several shutter channels at the same time.

➌ **Individual output or shutter channel disabled.** Any press over the corresponding buttons will be ignored. The status of the outputs remains unchanged.

The behaviour of the actuator when a button is pressed, with regard to lock states, timers, alarms, scenes, sending of status objects, etc., is the same as if it had received the order through the corresponding communication object.

Once enabled the Test Mode OFF through the parameter “Manual Control” (see section 3.2), MAXinBOX 8 will be always on this mode, by default.

2.3.2. TEST MODE ON

In this mode, each button acts directly over the corresponding relay and the communication objects do not take into account any of these actions. In fact, if MAXinBOX 8 has the Test Mode ON, any order received through a communication object will not have effect over the outputs (either individual or shutter channel).

Test Mode ON is thought to be used during the installation of the actuator.

Depending on the configuration of the outputs (individual output or shutter channel), Test Mode ON will have different tasks:

- ➊ **Individual output.** A short or a long press over the corresponding button will switch the relay, changing the actual status of the associated output (from ON to OFF or vice versa).
- ➋ **Shutter channel.** The actuation over the shutters in this mode is carried out as follows: the relay will close when pressing the corresponding button and will continue closed meanwhile the button is pressed, making the shutter move. The relay will open, making the shutter stop, when the button will be released.

During the time the button is pressed, neither the time parameterization for the shutters nor its position will be taken into account, so the shutter will not stop moving (the relay will not open) until the button is released, regardless of the duration of the press.

For security reasons, the simultaneous press over the two buttons associated to each shutter channel is not possible, i.e., if one of this buttons is pressed, a press over the other will make the shutter in motion stop.

- ➌ **Individual output or shutter channel disabled.** These outputs will be considered as individual outputs and, even if they are disabled by parameter, a short press over the button will enable the associated output, switching its state (from ON to OFF and vice versa).

Meanwhile the Test Mode is ON, the alarms, lock states, timers, or any other order sent from the KNX bus to the actuator will not affect its outputs.

Once enabled the Test Mode ON through the “Manual Control” parameter (see section 3.2), a long press over the Prog/Test button (3 seconds minimum, until the LED changes its colour to green) will be needed to place MAXinBOX 8 in this mode. To leave the Test Mode ON just press once the Prog/Test button.

Note: *In the factory status of the actuator, before downloading its application program, all the channels of MAXinBOX 8 are configured as shutter channels, for safety reasons.*

3. ETS PARAMETERIZATION

For starting to parameterize the MAXinBOX 8 actuator it is necessary, once the ETS program has been opened, importing the data base of the product (version 1.0 of the application program).

Next, the device is added to the project where desired. Click the right mouse button on the device and select "Edit parameters" for starting with the configuration.

In the following sections there is a detailed explanation about each of the different functionalities of MAXinBOX 8 in ETS.

3.1. DEFAULT CONFIGURATION

This section shows the default configuration from which the device parameterization starts.

When entering for the first time to the parameters edition of MAXinBOX 8, the following window will be shown:

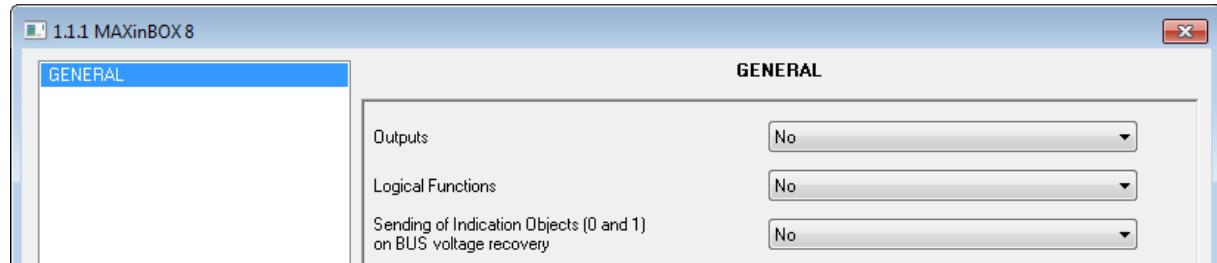


Figure 3.1. Configuration screen by default

As seen in figure 3.1, the outputs and the logical functions are disabled by default, so there will be no communication objects available until the user enables the different functionalities of the actuator.

If the parameter "Sending of Indication objects on bus voltage recovery" is enabled, two new 1-bit communication objects will appear ("Reset 0" and "Reset 1"), which allow sending to the KNX bus the values "0" and "1" after a bus power failure, in order to recover the communication with the rest of the devices in the installation. This sending may be immediate or after a configured delay (in seconds).

3.2. OUTPUTS

When selecting “Yes” in the Outputs parameter, the access to the outputs configuration will appear in the menu on the left side. It looks as follows:

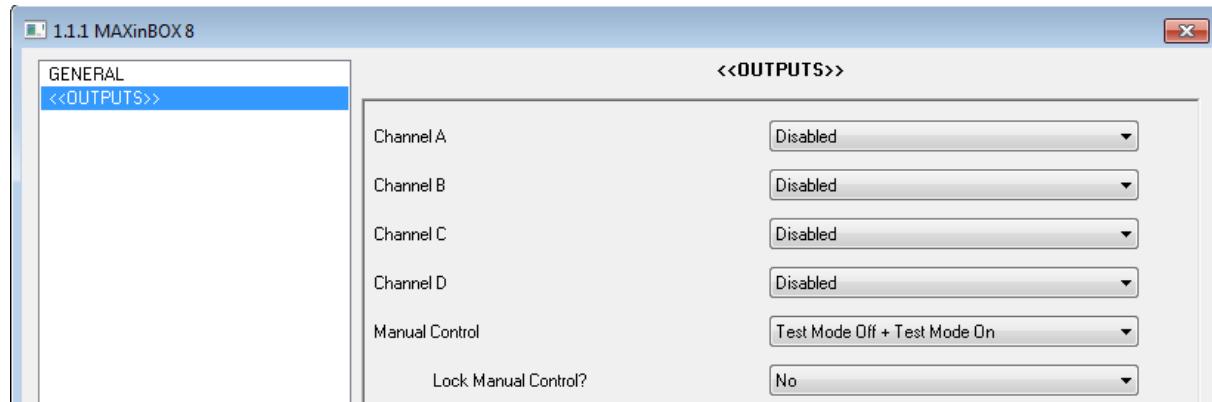


Figure 3.2. Outputs configuration

The outputs are grouped (in pairs) by channels, up to 4, named from A to D, disabled by default. When selecting one of them, it is shown a drop-down box to configure the outputs as **individual outputs** or **shutter channels**.

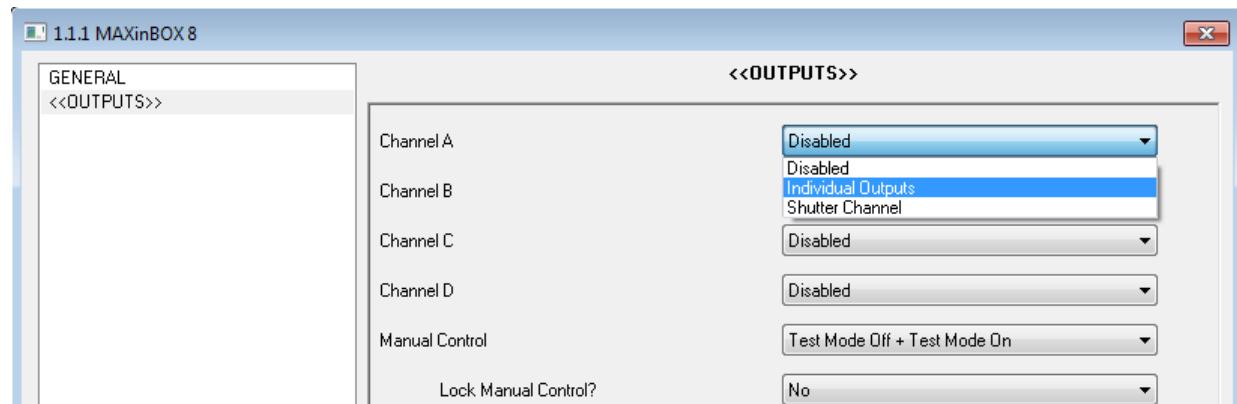


Figure 3.3. Possible configurations of the Channels

In this window, the user can also set the **control type** over the outputs (through the “Manual Control” parameter). It is possible to choose among the following options:

- ➊ **Disabled.** The manual control over the outputs is not enabled.
- ➋ **Only with Test Mode OFF.** Simple manual control. The buttons of the actuator behaves as communication objects.

- Only with Test Mode ON. Only the manual actuation over the outputs (pressing the buttons) is enabled.
- Test Mode OFF + Test Mode ON. Default value of Manual Control parameter. It allows a complete manual control, i.e., the outputs could be controlled both with Test Mode ON as with Test Mode OFF.

MAXinBOX 8 allows choosing by parameter to **lock** or not the manual control, in the box "Lock Manual Control?". If the user decides to lock this control (selecting "Yes"), the 1 bit communication object "Manual Control Locking" will be enabled and two boxes will appear to configure two additional parameters:

- Value:** indicates the value ("0" or "1") that the 1-bit communication object will use to lock/unlock the manual control. Two options can be chosen: ["0" Lock; "1" Unlock] or ["0" Unlock; "1" Lock].
- Initialization:** allows initializing the actuator after a bus power failure with its manual control locked or unlocked, or maintaining the last value (if this option is chosen, after a parameters download, the manual control will be unlocked).

While the manual mode is locked, any pulsation over the associated buttons will be ignored.

If MAXinBOX 8 receives through the corresponding object a value that locks the manual control while the Test Mode is ON, this mode will be deactivated and the manual control will be locked.

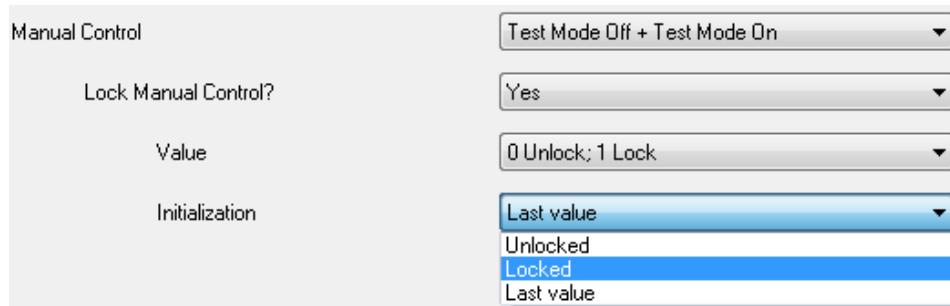


Figure 3.4. Manual control type and lock

Next it is explained in detail each of the parameters that can be configured according to the output type chosen.

3.2.1. INDIVIDUAL OUTPUTS

Figure 3.5 shows an ETS example of a channel parameterization: channel A is parameterized as “individual outputs”, output 1 and 2.

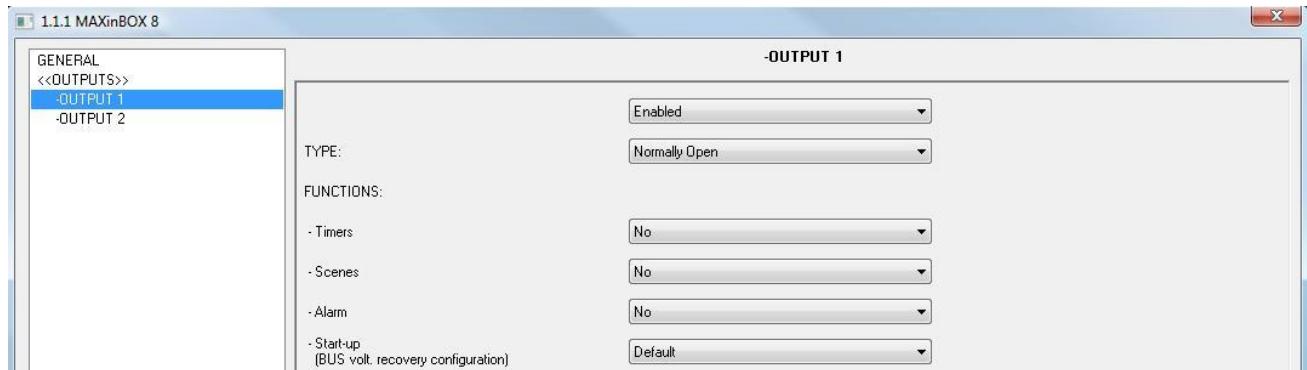


Figure 3.5. Channel A configured as individual outputs

Once the output is enabled, in the topology window of ETS will automatically appear the following communication objects (1-bit each):

- **[OX] ON/OFF:** allows activating (ON) or deactivating (OFF) the corresponding output, through sending the value "1" or "0", depending on the parameterized output type.
- **[OX] Status:** shows the current status of the output (activated or deactivated).
- **[OX] Lock:** allows locking/unlocking the output (disable/enable its control) by sending the values "1" or "0" to the object, respectively.

Note: Only the Alarm function has higher priority than the lock function; i.e., if during the lock an alarm signal arrives, the corresponding output will be placed as indicated by the alarm. When the alarm is deactivated, the output returns to the lock status.

The first thing that must be parameterized is the type of each output of the channel:

- **Normally open:** the output will be activated (ON) when its relay closes; in this moment, the LED associated to the output will light green. The output will be deactivated (OFF) when its relay opens, and the LED will be switched off.

- **Normally closed:** the output will be activated (ON) when its relay opens and the associated LED will be switched off. The output will be deactivated (OFF) when its relay closes, making the LED light green.

Below the associated functions of every output:

- **Timers:** allow timing the outputs, through a simple timer and/or a flashing.

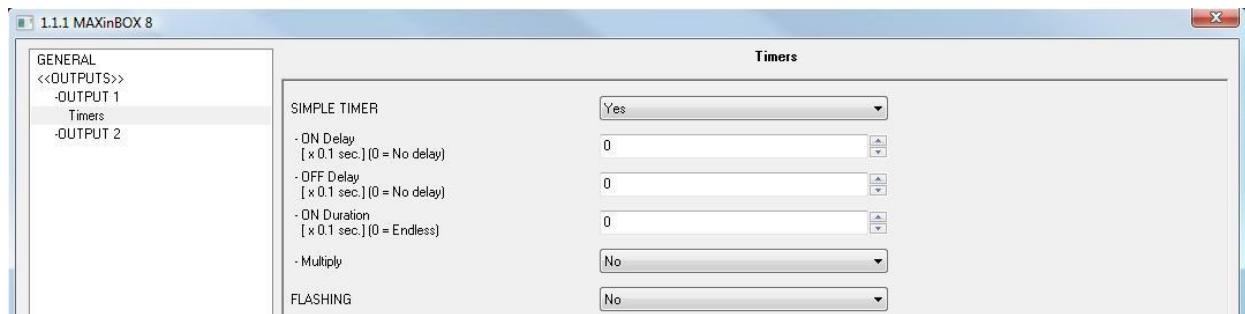


Figure 3.6. Timers screen: Simple timer

- **Simple timer** Allows controlling the ON/OFF of the outputs by means of a timer when an ON ("1") or OFF ("0") order is received through the object "[OX] Timer".
 - **On Delay:** time to pass since the ON order is sent (through the object "[OX] Timer") and the ON response in the output takes place. If no delay is needed, please set 0 in this field.
 - **OFF Delay:** time to pass since the OFF order is sent (through the object "[OX] Timer") and the OFF response in the output takes place. If no delay is needed, please set 0 in this field.
 - **On Duration:** time the output remains ON before recovering the OFF status. A 0 set in this field means the output will remain always ON, no timing is applied in the output.

These parameters are used in the timer as follows:

- When MAXinBOX 8 receives a "1" value through the communication object "[OX] Timer", an ON order is sent to the output, applying the On Delay and the On Duration (if a value different from 0 has been parameterized in these fields).

- When MAXinBOX 8 receives a "0" value through the communication object "[OX] Timer", an OFF order is sent to the output, applying the Off Delay (if a value different from 0 has been parameterized in this field).
 - **Multiply:** it allows progressively increasing (multiply), in execution time, the On Duration or the On/Off delays. I.e., when enabling this function, MAXinBOX 8 multiplies the defined times as many times as the value "1" or "0" is received through the "[OX] Timer" object. Two situations are distinguished:
 - **No multiply:** if during a temporized ON, MAXinBOX 8 receives a "1" through the object "[OX] Timer", it starts counting again the time set in the On Duration field.
 - **Multiply:** the timing applied to the output is multiplied by "n" when receiving "n" times the timed order through the corresponding object, before the parameterized time for the timer ends.

➤ **Flashing** (See figure 3.7). This function is meant for the output to run the sequence ON-OFF-ON-OFF ... when needed. It can be parameterized an ON and an OFF Duration, as well as the number of repetitions in the sequence (for an unlimited value, set 0 in this field: the sequence will repeat indefinitely, until a "0" is received through the communication object "[OX] Flashing").

It can be also defined the status of the output after the last repetition (ON or OFF).

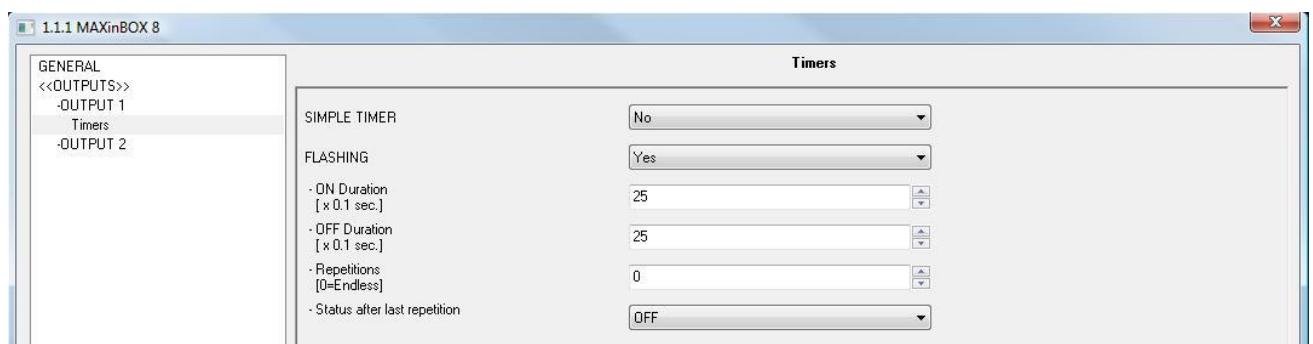


Figure 3.7. Timers screen: Flashing

It is **important** to know that MAXinBOX 8 allows parameterizing both a simple timer and a flashing for the same output.

- **Scenes:** Scenes consist of a synchronized activation of some devices in the domotic installation, so that different predefined atmospheres are generated.

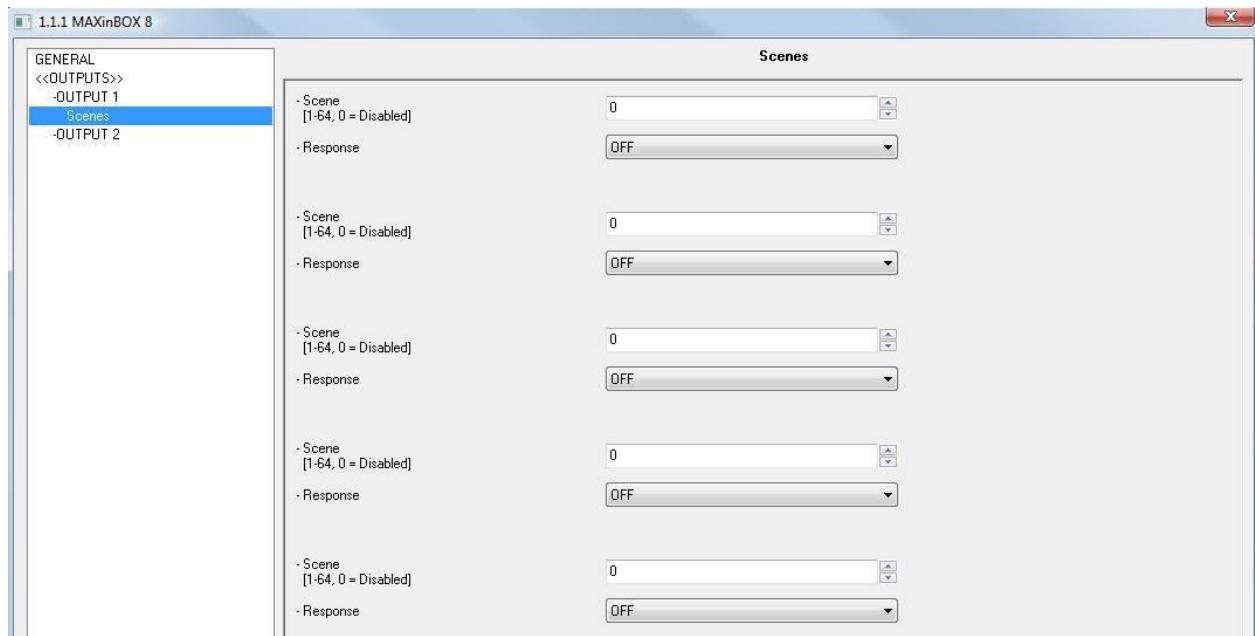


Figure 3.8. Scenes

There is a 1-byte communication object associated with Scenes for the individual outputs: “Scenes (Individual Outputs)”, which shows when the “Outputs” box in ETS is enabled, even if the outputs are disabled.

In the case of individual outputs, the scenes allow linking a numerical value (between 1 and 64, where 0 means that the scene is disabled) to an output status (OFF or ON). Thus, when the predefined numerical value for a scene is received through the Scenes object, the parameterized action for the output will be carried out: OFF or ON; so it will be possible to create different environments in the installation.

Besides running scenes, it is possible to **learn** (modify) scenes, taking into account that the associated numerical values to learn scenes are in the range 128-191.

MAXinBOX 8 allows running and/or learning **up to 5 different scenes** for each output.

- **Alarm:** it can be configured one alarm for each output. Once activated, this alarm will have priority over the rest of orders that the actuator receives, i.e., any order received while the alarm is activated will be ignored until the alarm deactivation.

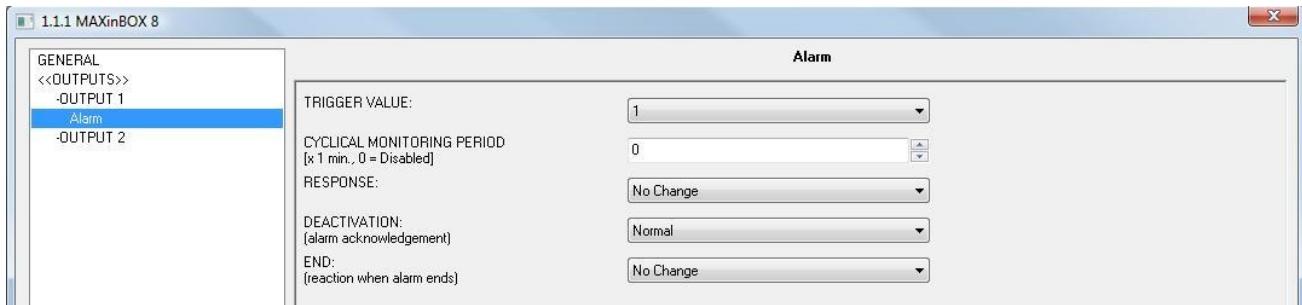


Figure 3.9. Alarm

In the alarm section for individual outputs the following parameters can be configured:

- **Trigger value:** set the value to activate the alarm status. It can be "1" or "0". An alarm status will be activated when the value set in this field is sent to the object "[OX] Alarm". It will be deactivated when the opposite value to the one set in this field is sent to the corresponding communication object.
- **Cyclical monitoring period (minutes):** parameterize the time on which the alarm will be activated again (automatically) after the last No Alarm order ("[OX] Alarm" = opposite value to trigger) received. When the cyclical monitoring period comes to its end, MAXinBOX 8 activates the alarm, which will execute the parameterized action (unless the output status has not changed). If a new alarm activation is not wanted, it will be necessary to receive the opposite value to trigger through the Alarm object before the cyclical monitoring period ends.

The cyclical monitoring can be disabled by setting a 0 in this field.

To better understand this behaviour, please read the following application example:

✓ Example:

Suppose that a cyclical monitoring time of 2 minutes is configured. The trigger value is "1" and the reaction of the actuator when the alarm is activated is to switch on the output and when the alarm is deactivated, to switch off the output. Figure that the output is switched off and the alarm is activated ("[OX] Alarm=1"), so the output is switched on. While the alarm is not deactivated, any action over the output will be ignored. After a while (t2), the alarm is deactivated ("[OX] Alarm=0"), thus switching the status of the output (from ON to OFF). Before the parameterized cyclical monitoring period (2 minutes) ends, a new alarm deactivation order arrives, so this time starts counting again. After 2 minutes without any action performed over the alarm object, the

alarm will be automatically activated, switching the output status (OFF to ON). As before, any action over the output will be ignored until the alarm is deactivated. See figure 3.10.

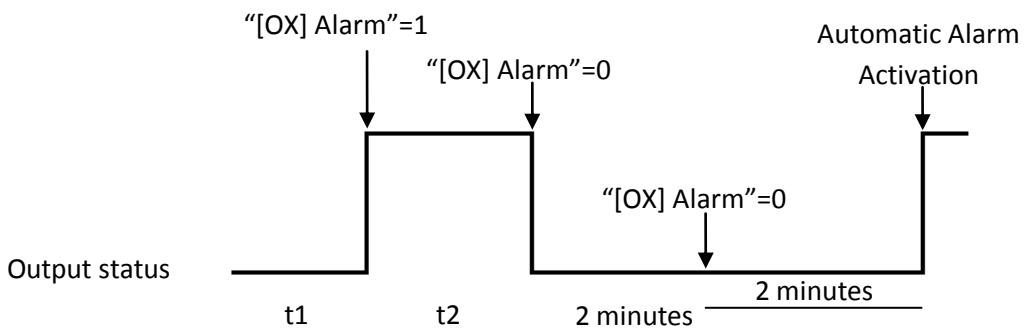


Figure 3.10. Cyclical monitoring example

➤ **Response:** set the response of the actuator channel output when the alarm is activated:

- No change
- ON
- OFF
- Flashing: 3 drop-down boxes are shown to configure the ON Duration, the OFF Duration and the number of repetitions of the flashing sequence.

➤ **Deactivation:** there are two different methods to deactivate an active alarm:

- Normal: depending on what was parameterized on “Trigger Value”, the alarm will be deactivated when the actuator receives a “0” or a “1” through the alarm object.
- Frozen: with this method, a normal deactivation will be applied, but the alarm will not be deactivated until the actuator receives, besides, a “1” through the object “[OX] Unfreeze Alarm”. This method makes the channel output remains locked even when the alarm status has finished; in this case it will be necessary that the output is manually enabled from another point in the installation.

➤ **End (reaction when alarm ends):** this parameter sets the output response in one of these statuses when the alarm finishes:

- No change
- ON
- OFF
- Last (output returns to the status before alarm)

• **Start-up configuration:** this function is meant to define the behaviour (ON/OFF) of the channel outputs after a bus power failure, or after programming the device with ETS. A default or custom configuration can be selected.

When a default configuration is chosen, after a partial or complete download from ETS, the output status will be OFF; after a bus power failure, the status of the output will be exactly the same as it had before the failure (ON or OFF).

When a custom configuration is chosen, ETS will show the following window:

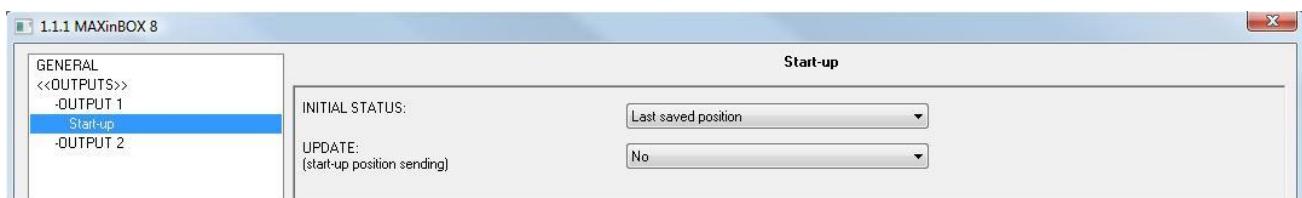


Figure 3.11. Custom Start-up configuration

Where to configure the following parameters:

- **Initial Status:** this field defines the exact initial position for the channel output after a bus power failure or after downloading the application program. The following statuses can be chosen: last saved position (status of the output before the bus power failure), ON or OFF.
- **Update:** by enabling this field ("Yes"), the output initial status signal can be sent to the bus, by means of the corresponding communication object, to feedback the rest of the devices in the installation when needed. Besides, it can be defined a sending delay. If a value 0 is set, the status is sent immediately.

Note: *The initial status is always sent through the object “[OX] Status”.*

3.2.2. SHUTTER CHANNEL

MAXinBOX 8 also allows configuring its outputs as shutter channels, being able to control **up to 4 different shutters** in an installation.

When a channel is configured in ETS as a shutter channel, it appears in the topology window a 1 bit communication object ("[CX] Lock") associated to each enabled channel, that allows locking the channel outputs (disabling the control over them, both the ON/OFF and the timed control) when a "1" is sent through the object. Moreover, if the shutter is in motion at the moment it is locked, its movement will be stopped and any control over it will be cancelled. The channel outputs will be unlocked when a "0" is sent through the locking object.

Note: *Only the Alarm function has higher priority than the lock function; i.e., if during the lock an alarm signal arrives, the corresponding shutter will be placed as indicated by the alarm. When the alarm is deactivated, the output returns to the lock status.*

The first parameter to configure is the type of shutter:

• **Shutter (No slats):** these are the typical revolving shutters, with a simple raise/lower movement. When selecting this kind of shutter, 2 communication objects will be enabled: "[CX] Move" and "[CX] Stop" to raise/lower and stop the shutter movement.

Moreover, the following Note appears: "*Slats positions will be ignored for Shutter types*". This note means that all the parameters that will appear in the enabled functions referred to the position (%) of the slats cannot be taken into account for this kind of shutters.

• **Blind (with slats):** special shutters with a secondary movements managed by the same drive. MAXinBOX 8 allows controlling both movements, slats rotation (getting more or less incident light from the outside) and the raise/lower movement. When selecting this kind of shutter, 2 communication objects will be enabled: "[CX] Move" (to send the orders of raising/lowering the blind) and "[CX] Stop/Step". This way, if the device receives a "0" or a "1" via this last object when the blind is in motion, it shall stop; while if the blind is stopped, receiving a "0" through this communication object will make slats to pull up, and a "1" will make slats to pull down. This step up/down functionality is useful to slightly correct both the slats and the blind position.

To obtain more detailed information about the blinds with slats and its ETS configuration, please read the [Annex I. Slats precise control](#).

In the next figures it can be seen the windows that appear when configuring an output channel as Shutter (no slats) and as Blind (with slats).

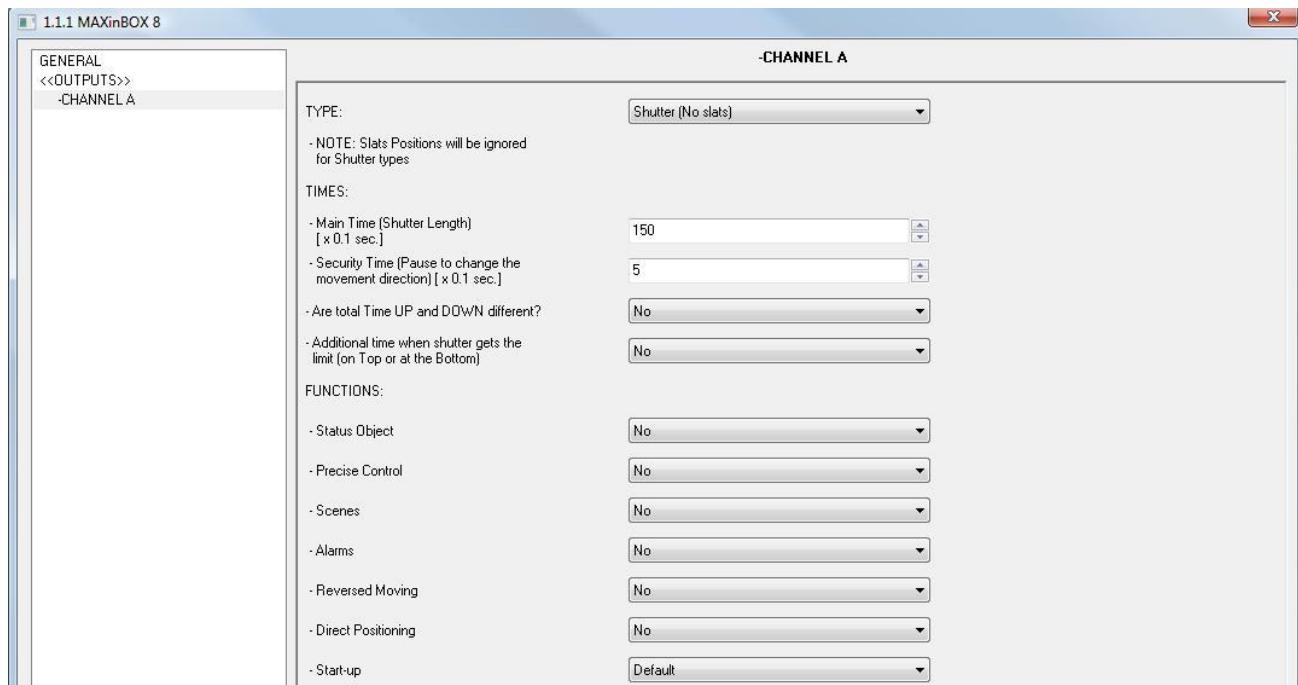


Figure 3.12. Channel A configured as Shutter (no slats)

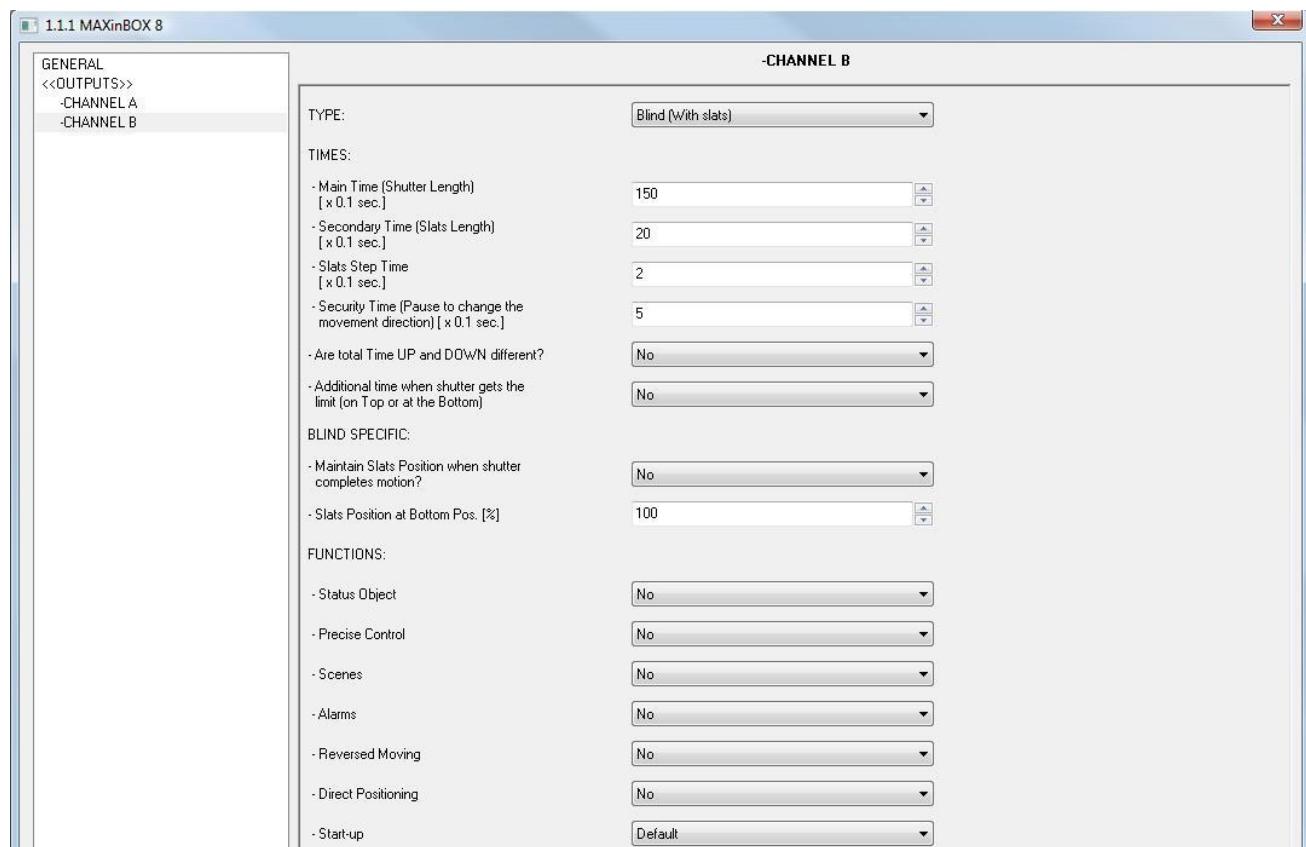


Figure 3.13. Channel B configured as Blind (with slats)

Besides the type of the shutters, the user must configure their specific functions, common to both types of shutters:

• **Times:** to define the different times (in tenths of seconds) associated to the shutter movement, such as:

➤ **Main time (Shutter length):** this is the time the shutter needs to cover its length completely. Both times (rising time or lowering time) can be used in this field, but if there was some difference between these two times, Lowering time will be considered as "master" and should be used to fill in this field. Rising time in this case will be set in the "Total Time Up" field, enabled for this purpose (when selecting "Yes" in the field "Are total Time Up and Down different?").

This variable will not need to be periodically calibrated, since the exact shutter position remains on MAXinBOX 8 (even when the power failure occurs).

➤ **Security time (pause to change the movement direction):** this time is applied by the actuator to protect the drive when the movement direction of the shutter is changed. If the device receives the order to lower the shutter while this is being raised, MAXinBOX 8 will stop it for a while (security time) to later lower it. It is recommended to keep the default value in this field: 5 tenths of second.

➤ **Are total time Up and Down different?:** whenever the shutter rising and lowering times are different (e.g. heavy shutters) this field should be dropped down to set the rising shutter time, as mentioned before. The lowering time must be set in the "Main time" field.

➤ **Additional time when the shutter gets the limit:** this parameter guarantees the shutter always gets its lowest or highest level, level by setting an extra time for the drive to keep moving once the shutter took up its rising/lowering times, preventing small maladjustments. This parameter appears disabled by default, but it is recommended to set a value on it, to ensure the proper movement of the shutter.

If the shutter is the type Blind with slats (see figure 3.13), some other times and specific parameters appear. All of them are explained in detail in the Annex I of this manual.

Note: After programming the device with ETS, MAXinBOX 8 considers the shutter is completely raised, so any raising order will be ignored.

Below an example of a possible shutter configuration.

✓ Example:

Shutter in Channel A (No slats) takes 15 seconds to be lowered and 20 seconds to be raised. An additional time of 2 seconds is added when the shutter gets its limit. The MAXinBOX 8 parameterization should remain as follows:

-CHANNEL A	
TYPE:	Shutter (No slats)
- NOTE: Slats Positions will be ignored for Shutter types	
TIMES:	
- Main Time (Shutter Length) [x 0.1 sec.]	150
- Security Time (Pause to change the movement direction) [x 0.1 sec.]	5
- Are total Time UP and DOWN different?	Yes
Total Time Up [x0.1s] (Time Down is the param. named above as Main Time)	200
- Additional time when shutter gets the limit (on Top or at the Bottom)	Yes
Time added [x0.1s]	20

The following parameters add functionality or special features to both types of shutter (with or without slats):

- ➊ **Status objects:** this function provides a 1 byte communication object "[CX] Current Shutter Position" to indicate the exact position, in percentage (%), the shutter is at all times. This object takes the value 0 when the shutter is completely up (0%) and 255 when it is completely down (100%). The rest of values represent the intermediate values.

It can be chosen by parameter whether the shutter position is sent every second or not (enabling or not the parameter "Send current shutter position every second while moving?" that appears when the "Status Object" parameter is enabled).

For Blinds with slats it also appears the 1 byte object "[CX] Current Slats Position", which will take the value 0 (0%) when the slats are completely "up" and the value 255 (100%) when the slats are completely "down".

- ➋ **Precise control:** this function makes possible to move the shutter to any position on its length, via the 1 byte communication object "[CX] Shutter Positioning", in percentage (%). Every time MAXinBOX 8 gets a new value through this object (e.g. 50%), the shutter is moved to the corresponding position (the middle in the example).

For blinds with slats it also appears the 1 byte object "[CX] Slats Positioning", through which establishing the desired position (in percentage) for the slats.

• **Scenes:** this function makes possible to use scenes for controlling the shutters. It allows choosing a precise position where to locate the shutter depending on the scene number received by MAXinBOX 8 through the 1 byte object "Scenes (Shutter Channels)".

Besides running scenes, it is possible to **learn** (modify) scenes, taking into account that the associated numerical values to learn scenes are in the range 128-191 (the values 0-63 are reserved for running scenes).

Up to 5 scenes can be run and/or learned, for each shutter channel.

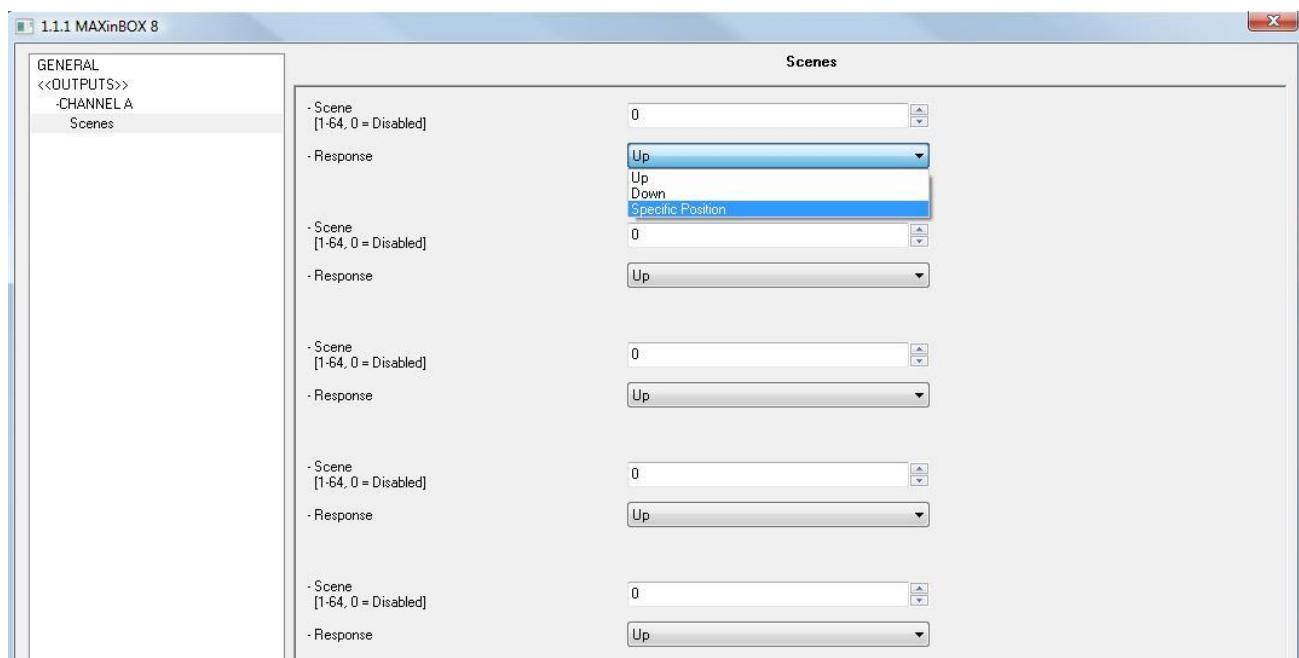


Figure 3.14. Scenes

The "Scene" parameter indicates the number of the scene at which the shutter will react. If this value is 0, the corresponding scene is disabled.

"Response" indicates the precise position where to locate the shutter when the corresponding scene number is called from the bus. The shutter can be positioned up, down, or in a specific position of its length (in percentage, from 0% to 100%). In case of choosing this last option, the parameter "Shutter specific position?" is enabled, where to set a specific position for the shutter (configured in the parameter "Select Shutter Position [%]", when selecting "Yes") or if the shutter stay in its current position.

For blinds with slats it is also possible to configure a specific position for the slats (via the parameter "Select Slats Position [%]") when receiving the configured scene number, or staying in their current position.

Please see the following example of scenes configuration.

✓ Example:

Consider a facility where 3 scenes will be used (4, 6 and 18) in MAXinBOX 8 to locate the blind with slats in a precise position:

- Scene 4 → shutter up
- Scene 6 → shutter down
- Scene 18 → shutter in the middle of its length (50%). The slats stay in their current position.

The channel parameterization will be as follows.

Scenes	
- Scene [1-64, 0 = Disabled]	4
- Response	Up
- Scene [1-64, 0 = Disabled]	6
- Response	Down
- Scene [1-64, 0 = Disabled]	18
- Response	Specific Position
Shutter Specific Position?	Yes (Move to Position)
Select Shutter Position [%]	50
Slats Specific Position?	No (Current Position will be maintained)

● **Alarms:** MAXinBOX 8 allows configuring up to 2 alarms for each shutter channel. This function is designed for cases in which the actuator must react to an alarm situation. When two alarms are configured, MAXinBOX 8 could carry out different actions to two external events.

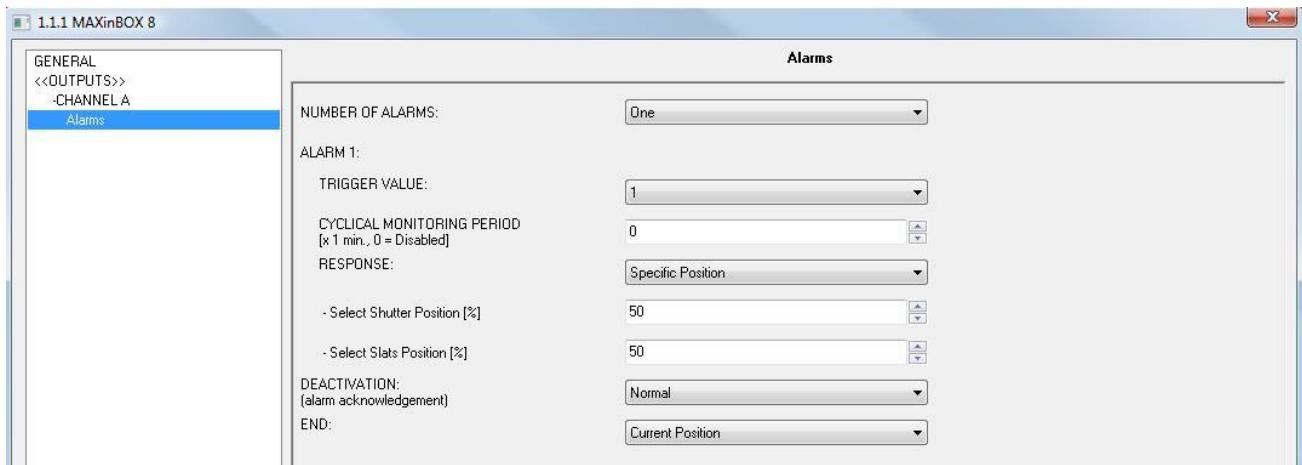


Figure 3.15. Alarms

Configure the following parameters:

- **Number of alarms:** set whether to use one or two alarms. Both of them can be independently managed through their corresponding communication objects ("[CX] Alarm" for Alarm 1 and "[CX] Alarm 2" for the second one).

Alarm 1 has **higher priority** than Alarm 2. This means that if a channel is in Alarm 2 status and Alarm 1 occurs the shutter will change to Alarm 1 status and it shall not come back to Alarm 2 until Alarm 1 goes off. Whereas if the channel is in Alarm 1 status and Alarm 2 occurs, Alarm 1 prevails.

- **Trigger value:** set the value ("1" or "0") to activate the alarm status. An alarm status will be activated when the value set in this field is sent to the object "[CX] Alarm" (or "[CX] Alarm2").

- **Cyclical monitoring period (minutes):** parameterize the time on which the alarm will be activated again (automatically) after the last No Alarm order ("[CX] Alarm" = opposite to trigger) received. When the cyclical monitoring period comes to its end, MAXinBOX 8 activates the alarm, which will execute the parameterized action (unless the output status has not changed). If a new alarm activation is not wanted, it will be necessary to receive the value opposite to trigger through the Alarm object before the cyclical monitoring period ends.

The cyclical monitoring can be disabled by setting a 0 in this field.

To better understand this behaviour, please read the following application example:

✓ Example:

Suppose that a cyclical monitoring time of 3 minutes is configured for the Alarm 1. The trigger value is “1” and the reaction of the actuator when the alarm is activated is to raise the shutter and when the alarm is deactivated, MAXinBOX 8 lowers the shutter. Figure that the shutter is down. At this moment, a “1” is received through the communication object “[CX] Alarm 1”, so the Alarm 1 will be activated, thus raising the shutter. While the alarm is not deactivated, any action over the channel outputs will be ignored. After a while (t2), the alarm is deactivated (“[CX] Alarm=0”), thus lowering the shutter. Before the cyclical monitoring period (3 minutes) ends, a new alarm deactivation order arrives from the KNX bus, so this time starts counting again. After 3 minutes without any action performed over the alarm object, it is automatically activated, raising the shutter. Like before, any action over the output will be ignored until the alarm is deactivated. See figure 3.16.

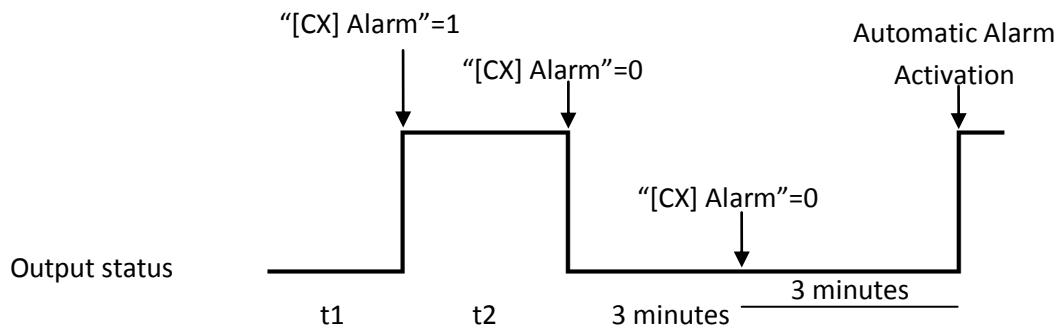


Figure 3.16. Cyclical monitoring example

➤ **Response:** set the response of the actuator channel output when the alarm is activated:

- Stop
- Up
- Down
- Specific position

When this last option is chosen, a new drop-down box is shown to set a value for this specific position, between 0% (completely up) and 100% (completely down).

For blinds with slats the option "Select Slats position [%]" is also enabled, where to set a value between 0% (totally opened or "up") and 100% (totally closed or "down").

➤ **Deactivation:** there are two different methods to deactivate an active alarm:

- Normal: depending on what was parameterized on "Trigger Value", the alarm will be deactivated when the actuator receives a "0" or a "1" through the alarm object.
- Frozen: with this method, a normal deactivation will be applied, but the alarm will not be deactivated until the actuator receives, besides, a "1" through the object "[CX] Unfreeze Alarm". This method makes the shutter channel remain locked even when the alarm status has finished; in this case it will be necessary that the output is manually enabled from another point in the installation.

➤ **End:** this parameter sets the channel response in one of these statuses when the alarm finishes:

- Current position
- Up
- Down
- Last position (before the alarm)

➊ **Reversed moving:** this function makes possible to control shutters the other way around from usual (MAXinBOX 8 raises the shutter when receiving the value "0" through the object "[CX] Move" and stops it when receiving the value "1"). Therefore, if this function is enabled, MAXinBOX 8 will raise the shutter when receiving the value "1" and will lower it when receiving the value "0" in the object "[CX] Reversed Moving".

This control is compatible with the usual control, since through the object "[CX] Move" the normal control is carried out and through "[CX] Reversed Moving", the reversed control.

This is really useful when a Central OFF is required in the installation, e.g., to turn the lights off and lower the shutters. In this case, a "0" should be sent to the light ON/OFF objects and to the shutters "Reversed moving".

➋ **Direct positioning:** this function allows moving the shutter to a prefixed position via 1-bit communication objects ("[CX] Direct Positioning" and "[CX] Direct Positioning 2"). When value

"1" is received through one of these objects, the shutter will be moved to the parameterized position. When a "0" is received, no action is performed.

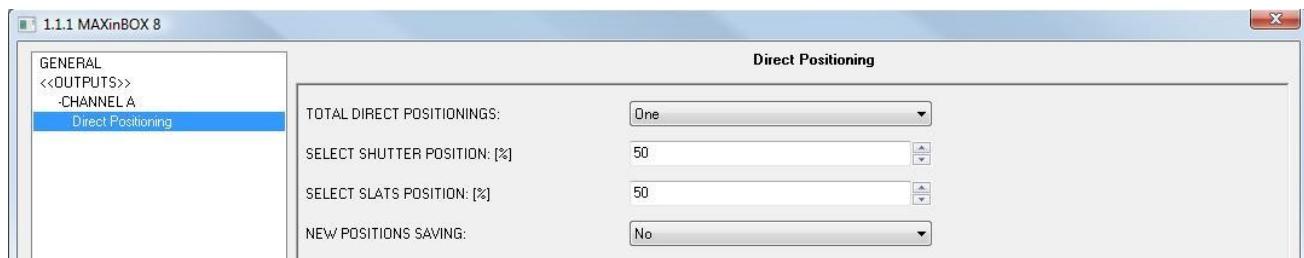


Figure 3.17. Direct positioning

It is possible to configure the following parameters:

- **Total direct positionings:** to choose one or two.
- **Select shutter position [%]:** choose the exact position to move the shutter to (Remember: 0% = Top; 100% = Bottom).

For blinds with slats, it will also appear the parameter **Select Slats position [%]**, where to establish the position to move the slats to when receiving the value "1" through the corresponding positioning object.

If two direct positionings are configured, there will be two boxes here: Select Shutter Position 1 and Select Shutter Position 2. (And the parameter "Select Slats position 1" and "Select Slats position 2" for blinds with slats).

➤ **New positions saving:** set whether to allow ("Yes") or not new positions saving. After enabling this option, one or two new communication objects appear (depending on the number of positionings): "[CX] Save Position" and "[CX] Save Position 2". To save a new position it is necessary to send a "1" to these objects when the shutter is located in the desired position.

Note: *To save a new position, the shutter must be stopped.*

- **Start-up configuration:** this function is meant to define the behaviour of the shutter channel outputs after a bus power failure or after programming the device with ETS. A default or custom configuration can be selected.

When a default configuration is chosen, after a partial or complete download from ETS, MAXinBOX 8 interprets that the shutter is completely up (0%), independently of its real status; For the blinds with slats, MAXinBOX 8 assumes that they are completely opened (0%), no matter their real status.

After a bus power failure, the position of the shutter will be the one it had before the bus failure (and so the slats).

When a custom configuration is chosen, ETS will show the following window:

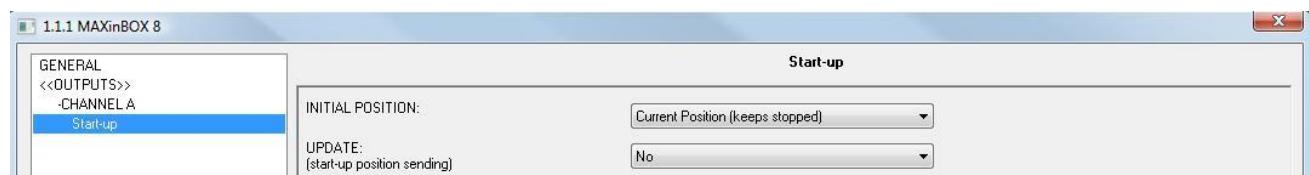


Figure 3.18. Custom Start-up configuration

Where to configure the following parameters:

- **Initial position:** this field defines the exact initial position for the shutter should be located after a bus power failure or after programming the device. The following statuses can be chosen: Current position (keeps stopped), up, down, or specific position (locate the shutter in the position established in the parameter "Select Shutter Position [%]", shown when choosing this option, and the slats in the position set in "Select Slats Position [%]").
- **Update:** by enabling this field ("Yes"), the shutter position can be sent to the bus, by means of the corresponding communication object, to feedback the rest of the devices in the installation when needed. Besides, it can be defined a sending delay. If a value 0 is set, the status is sent immediately.

Note: *The initial status is always sent through the object “[CX] Current Shutter position” (and “[CX] Current Slats position”, for blinds with slats).*

3.3. LOGICAL FUNCTIONS

This section in MAXinBOX 8 is meant to perform binary logic operations with incoming data from the KNX bus, to send the result through other communication objects specifically enabled in the actuator for this operation.

Up to 10 different logical functions can be enabled, independent of each other, which can carry out **up to 4 operations** each. To use any of them, it is necessary to enable them in the following ETS window, which appears when selecting “Yes” in the Logical Functions box of the MAXinBOX 8 General window.

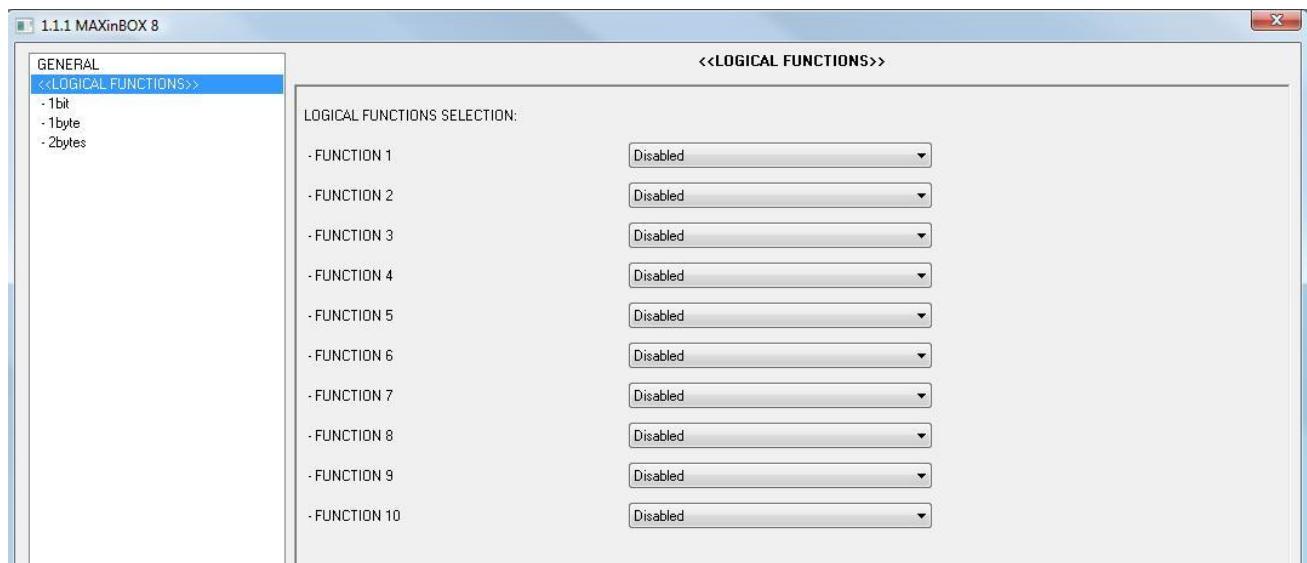


Figure 3.19. Logical functions

To obtain detailed information about the use and ETS parameterization of logical functions, please consult the specific documentation "**Logical Functions X10**", available at <http://www.zennio.com>.

ANNEX I. SLATS PRECISE CONTROL

Zennio actuators allow controlling the movement of shutter, blinds or similar which may be included in any of the following types:

- **Shutter (No slats)**
- **Blind (with slats)**

Depending on the type of shutter, the MAXinBOX 8 application program will show different options.

In this concrete section, the parameters of the Blinds with slats will be explained.

As an introduction, it is important to keep in mind the shutters positioning criteria the actuator uses:

- The shutter is in the position "up" (position **0%**, in percentage) when it is completely **open**.
- The shutter is in the position "down" (position **100%**, in percentage) when it is completely **closed**.

And the slats positioning criteria:

- The slats are in the position "up" or opened (position **0%**, in percentage) when they are in a position where they can only start moving downward.
- The slats are in the position "down" or closed (position **100%**, in percentage) when they are in a position where they can only start moving upward.

The figure 4.1 shows a scheme of the positions the slats may adopt.

It is necessary to take into account that the shutter actuators control shutter drives without feedback, where the slats are adjusted through a mechanism linked to the shutter movement. This means that **a slats movement will provoke a change in the blind position**.

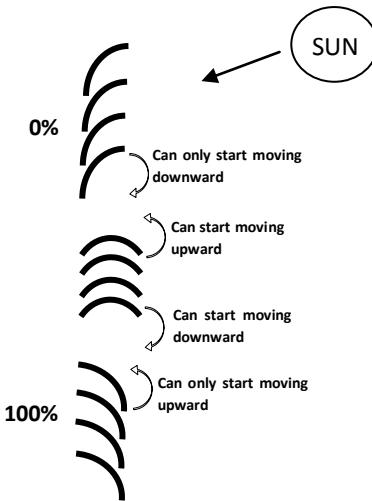


Figure 4.1. "Up" and "Down" slats positions

Next, the configuration window in ETS of Blinds with slats is shown, in order to explain in detail every available option:

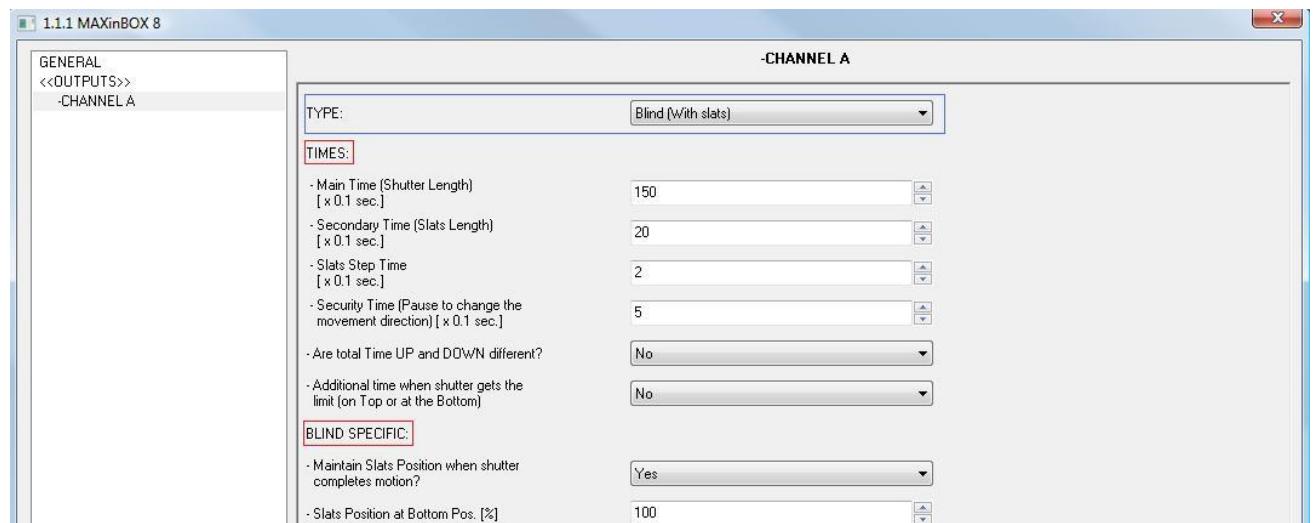


Figure 4.2. Blinds with slats configuration window (ETS)

As seen in figure 4.2, for this type of shutters several times can be parameterized. On the one hand, the times referred to the blind movement: **Main Time** (shutter length), **Security time**, **Are total time up and down different?** and **Additional time when shutter gets the limit**. All of them were already explained in section 3.2.2 of this manual.

On the other hand, the times referred to the slats movement:

- ➊ **Secondary time (slats length):** it is the time, in tenths of second, it takes the slat to complete a full movement from 0% (completely "up") to 100% (completely "down"), or vice versa. This time must be "manually" measured.
- ➋ **Slats Step Time:** this is the time, in tenths of second, it takes the slat to carry out a gradual rotation when it receives the step up/down order ("[CX] Stop/Step"=0 or 1, respectively), when the blind is stopped. These step orders allow gradually rotate the slats, modifying their position (%), which may be very useful to prevent glare when the sun changes position, for example.

Note: *The times referred to the slats movement must be shorter than the configured for the blind movement (usual configuration).*

Besides defining these times, it will be necessary to configure the following options, which are specific for blinds with slats:

- ➌ **Maintain slats position when shutter completes motion?:** this option allows choosing whether the slats may recover their position after the blind reaches the desired position, or not.

✓ Example:

Suppose the parameter "Maintain slats positioning when shutter completes motion?" has been enabled. The initial position of the slats is 50% and the initial position of the blind is 0% (up). An order to lower the blind is received, thus making the blind starts moving downwards, and so do the slats, until the blind reaches the 100% position. At this point, the blind has completed its motion. Then, MAXinBOX 8 will correct the slats position, moving them until they reach the position they had before (50%, in this example), thus making the blind move slightly, until the slats are in the 50% position.

If the parameter "Maintain slats positioning when shutter completes motion?" was disabled, when the blind reaches the 100% position (down), the slats stay at the corresponding position after the downwards movement of the blind.

- ➍ **Slats position at Bottom pos. [%]:** it allows establishing the slats position (in percentage) when the blind is completely down (i.e., its position is equal to 100%).

This means that, when the blind completes its downwards movement and reaches the 100% position, the slats will correct their position to the one established by parameter.

Besides these configuration options, it is necessary to define the parameter "**Slats specific position**" in the enabled functions of the blind channel where to parameterize concrete positions. These functions are:

- **Scenes.** Response: Specific position. The position percentages of the blind and slats can be configured independently.
- **Alarms.** Response: Specific position. Same as before.
- **Direct positioning.** Configuration of the positions 1 or 2 (depending on the parameterized number), in percentage, of the blind and slats independently.
- **Start-up configuration** Initial position: Specific position. The position percentages of the blind and slats can be configured independently.

To obtain more detailed information about configuration and options of the functions of the shutter channels, please read the section 3.2.2 of this manual.

ANNEX II. COMMUNICATION OBJECTS

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
GENERAL	0	1 byte	I/O	W	0-63 (run) 128-191 (learn)	Indifferent	Indifferent	Scenes (Individual Outputs)	Run and learn scenes
	1	1 byte	I/O	W	0-63 (run) 128-191 (learn)	Indifferent	Indifferent	Scenes (Shutter Channels)	Run and learn scenes
LOGICAL FUNCTIONS	2-33	1 bit	I	W	0/1	0	Last	[LF] (1 bit) Data Entry 1 ... [LF] (1 bit) Data Entry 32	Binary Data Entry (0/1) ... Binary Data Entry (0/1)
	34-49	1 byte	I	W	0-255	0	Last	[LF] (1 byte) Data Entry 1 ... [LF] (1 byte) Data Entry 16	1 byte data entry (0-255) ... 1 byte data entry (0-255)
	50-65	2 bytes	I	W	0-FFFF	0	Last	[LF] (2 bytes) Data Entry 1 ... [LF] (2 bytes) Data Entry 16	2 byte data entry (0-FFFF) ... 2 byte data entry (0-FFFF)
	66-75	1 bit	O	RT	0/1	0	Last	[LF] Function 1 RESULT (1 bit) ... [LF] Function 10 RESULT (1 bit)	Function 1 Result (1 bit) ... Function 10 Result
	76-85	1 byte	O	RT	0-255	0	Last	[LF] Function 1 RESULT (1 byte) ... [LF] Function 10 RESULT (1 byte)	Function 1 Result (1 byte) ... Function 10 Result (1 byte)

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
LOGICAL FUNCTIONS	86-95	2 bytes	O	RT	0xFFFF	0	Last	[LF] Function 1 RESULT (2 bytes) ... [LF] Function 10 RESULT (2 bytes)	Function 1 Result (2 bytes) ... Function 10 Result (2 bytes)
					0°C-120°C	25°C	Last	[LF] Function 1 RESULT (2 bytes) ... [LF] Function 10 RESULT (2 bytes)	Function 1 Result (2 bytes) ... Function 10 Result (2 bytes)
INDIVIDUAL OUTPUTS	96-103	1 bit	I	W	0/1	Indifferent	Indifferent	[OX] ON/OFF	N.O. (0=Open; 1=Close relay) N.C. (0=Close; 1=Open relay)
	104-111	1 bit	O	RT	0/1	Parameteriz.	Parameteriz.	[OX] Status	0=Output Off; 1=Output On
	112-119	1 bit	I	W	0/1	0	Last	[OX] Lock	1=Lock; 0=Unlock
	120-127	1 bit	I	W	0/1	Indifferent	Indifferent	[OX] Timer	0=to turn Off; 1=to turn ON
	128-135	1 bit	I	W	0/1	Indifferent	Indifferent	[OX] Flashing	1=Start flashing; 0=End flash
	136-143	1 bit	I	W	0/1	Parameteriz.	Last	[OX] Alarm	1=Alarm; 0=No alarm 0=Alarm; 1=No alarm
	152-159	1 bit	I	W	0/1	Indifferent	Indifferent	[OX] Unfreeze Alarm	Alarm=0 + Unf.=1 → End Alarm

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
SHUTTER CHANNELS	96-102 (even)	1 bit	I	W	0/1	Parameteriz.	Last	[CX] Alarm	1=Alarm; 0=No alarm 0=Alarm; 1=No alarm
	97-103 (odd)	1 bit	I	W	0/1	Parameteriz.	Last	[CX] Alarm 2	1=Alarm; 0=No alarm 0=Alarm; 1=No alarm
	112-118 (even)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Save Position	1=Save position; 0=No action
	113-119 (odd)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Save Position 2	1=Save position 2; 0=No action
	120-126 (even)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Move	0=Up; 1=Down
	121-127 (odd)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Reversed moving	0=Down; 1=Up
	128-134 (even)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Direct positioning	1=Go to position; 0=No action
	129-135 (odd)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Direct positioning 2	1=Go to position 2; 0=No action
	136-142 (even)	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Stop/Step	0=Stop/Step Up; 1=Stop/Step Down
	137-143 (odd)	1 bit	I	W	0/1	0	Last	[CX] Stop	0 or 1 = Stop shutter
	144-147	1 byte	O	RT	0-255	0	Calculate	[CX] Current slats position	0=0%=Open; 255=100%=Closed.
	148-151	1 byte	I	W	0-255	0	Last	[CX] Slats positioning	0=0%=Open; 255=100%=Closed.
	160-163	1 byte	I	W	0-255	Indifferent	Indifferent	[CX] Current shutter position	0=0%=Top; 255=100%=Bottom.
	164-167	1 byte	I	W	0-255	0	Last	[CX] Shutter positioning	0=0%=Top; 255=100%=Bottom.
	168-171	1 bit	I	W	0/1	Indifferent	Indifferent	[CX] Unfreeze Alarm	Alarm=0 + Unf.=1 → End Alarm

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
RESET	172	1 bit	O	T	0	0	0	Reset 0	Voltage recovery -> Sending of 0
	173	1 bit	O	T	1	1	1	Reset 1	Voltage recovery -> Sending of 1
LOCK MANUAL CONTROL	174	1 bit	O	RW	0/1	Parameteriz.	Parameteriz.	Manual control locking	1=Lock; 0=Unlock
									0=Lock; 1=Unlock



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